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The International Federation of Fertility Societies (IFFS) is a federation of national membership societies that have an interest in the clinical and research aspects of reproduction and fertility. IFFS is a non-governmental organization (NGO) in official relations with the World Health Organization (WHO).

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FOREWORD

An estimated one in four couples worldwide are affected by infertility and the levels of primary and secondary infertility have changed little over the previous two decades. While infertility is rarely considered a national health priority by governments, its impact on the lives of individuals, couples and their families who experience problems having children are enormous. The development of Assisted Reproductive Technologies (ART) is gradually transforming the range of options available to couples and individuals, bringing hope to millions. As these technologies become more effective and affordable they become more accessible, thereby enabling more and more of those affected with fertility problems to have a genuine choice in achieving their fertility goals.

The World Health Organization's (WHO) Department of Reproductive Health and Research, including the Special Programme of Research on Human Reproduction, wholeheartedly congratulates IFFS for producing *Surveillance 2016*. The information collected through its innovative rapid survey methodology provides extremely useful insights into the provision of ART globally, as well as nationally through the IFFS national members and respondents. Thoughtful selection of a wide range of topics on which data were collected affords a detailed understanding of the opportunities and challenges facing expansion of ART services. Of particular concern is the limited access to these services by those living in LMICs due to cost and other barriers. While some recent policy restrictions are noted, the overall situation is one of increasing access in most countries, and a better understanding of the complexity of the issues surrounding ART provision. WHO is delighted to have partnered with IFFS in preparing this document.

WHO is in the process of broadening its activities that address infertility and fertility care. We look forward to continuing and expanding our engagement with IFFS and other partners that are dedicated to improving the lives of those affected by infertility. The information in *Surveillance 2016* provides a strong basis for guiding WHO's work on ART and we thank IFFS for its leadership and partnership in producing this valuable resource.

Ian Askew
Director, Reproductive Health and Research
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DEDICATION: HOWARD W. JONES, JR, MD, 1910 – 2015

Surveillance 2016 is dedicated to Dr. Howard W. Jones, Jr., in vitro fertilization (IVF) pioneer, surgeon, educator, visionary, and past editor of Surveillance. He was among the first to recognize the need to create a forum to record and compare ART practices around the world. He remained interested and engaged in this project until shortly before his death.

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PREFACE

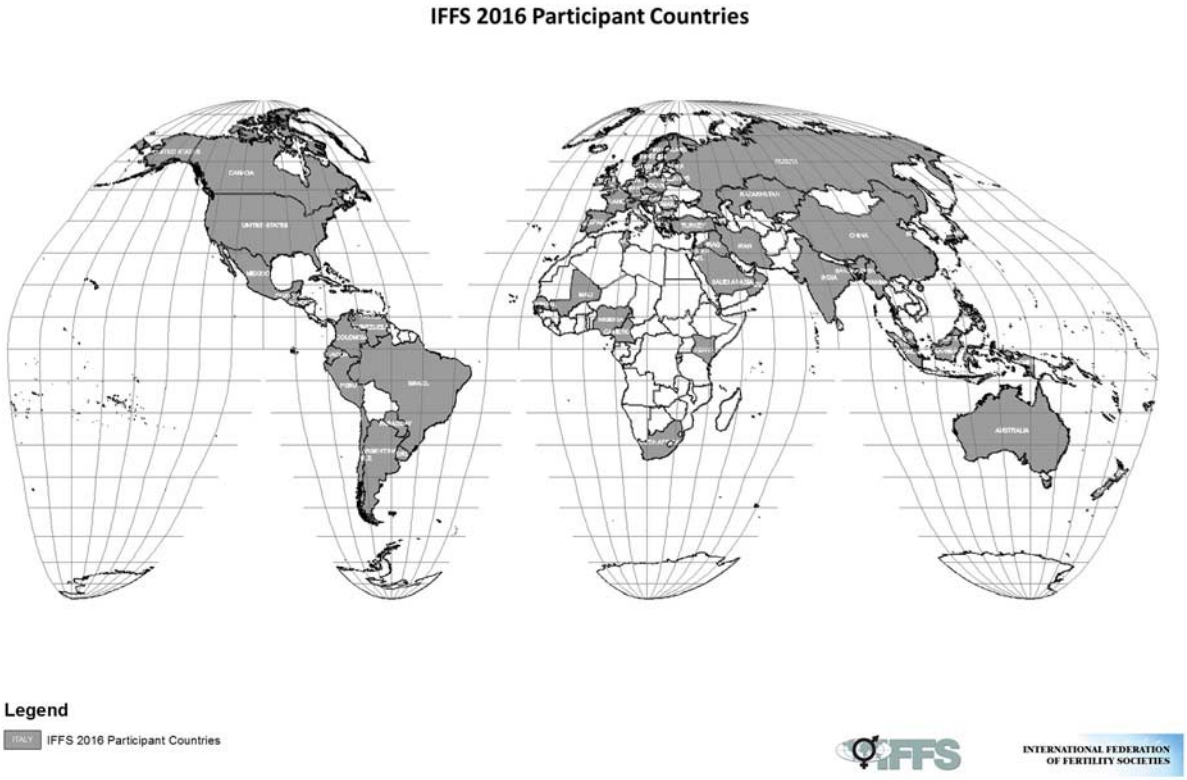
International Federation of Fertility Societies (IFFS) Surveillance 2016 represents several milestones. Surveillance 2016 serves as the first edition of the new online IFFS journal, *Global Reproductive Health*. Surveillance 2016 represents a broader joint effort of the IFFS and World Health Organization (WHO) in association with the IFFS status as a non-governmental organization (NGO) in official relations with WHO. WHO representatives participated in the reorganization and reformatting of the 2012 questionnaire and expansion of the database of contacts among global public health officials and experts in order to supplement the pre-existing Surveillance contact list. We anticipate, that as we fulfill our responsibilities in our relations with WHO, that our joint activities in subsequent editions will likely continue to expand.

An entirely new survey was developed and used for Surveillance 2016. The contract for conducting the online questionnaire, follow-up, data analysis an ultimate product development was awarded to Medtech For Solutions. The previous Excel spreadsheet was abandoned in favor of a streamlined, more focused web-based questionnaire that eliminated redundancies and sought more focused information in evolving areas of interest. A few sections were added addressing reporting mechanisms, policies regarding access for same sex and single parenting individuals, as well as policies governing cross-border reproductive care.

The questionnaire (2015 survey or questionnaire) consisted of 97 questions in English, and took the average respondent 2.5 hours to complete (cumulative onsite time). The online survey was launched on October 1, 2015 and requests to participate were submitted to over 600 individuals in 215 countries for preparation of the publication of Surveillance 2016. The survey officially ended on December 31, 2015, however responses were received as late as March 1, 2016 and were included in the report. Ultimately, responses were received from respondents in 75 countries with 70 providing data sufficient to be included in the overall analysis. Not all countries provided complete responses to all queries and the number of countries responding varied as noted within the chapter discussion and tabulation of topic responses.

Surveillance 2016 represents the culmination of the efforts of many. I am profoundly grateful to the respondents listed below who committed a great deal of time and effort to accurately compile and convey the information that was sought. A very talented editorial board was assembled and Drs. Sonia Allan, Basak Balaban, Manish Banker, Peter Brinsden, John Buster, Edgar Mocanu, Hrishikesh Pai, and Paul Le Roux all contributed substantially to the revision of the questionnaire, the selection of new content, the analysis of the data, and the individual organization and production of each section. Dr. Marcos Horton deserves special mention for doggedly and successfully pursuing countries that had not responded to the initial invitation to participate and assuming extra editorial duties. Kathleen Miller, from *Medtech For Solutions,* was a superb managing editor and was indispensable to the final product. She had essential roles throughout the process including oversight of the development of the new questionnaire, execution of the online survey, compilation and distribution of the data, facilitation of the online development of the manuscript, and production of the figures and tables. Dr. Sheryl van der Poel also made unique contributions. During her tenure at WHO, she served as a liaison between WHO and IFFS and made numerous suggestions pertaining to content, organization and language for both the development of the questionnaire and this final report. She played a key role in the revision of the 2009 International Committee Monitoring Assisted Reproductive Technologies (ICMART)-WHO Glossary on Assisted Reproductive Terminology and was invaluable in ensuring that our terminology was consistent with the new draft 2016 glossary on terminology for fertility care and infertility. I would also like to acknowledge the IFFS officers, Board of Directors, and administrative staff for their unflagging support and contributions.

Surveillance 2016 serves as a record and an overview of the practice, policies and activities associated with assisted reproductive technology (ART) as it existed globally, at the end of 2015. It also, provides an evaluation of specific national and



global trends over time that concern specific, and sometimes controversial, topics and issues. However, there are significant limitations to this report. All aspects of ART are dynamic and continuing to change. The respondents for the 2016 edition represent the majority of countries with the most active ART services worldwide; however, the experiences of over 100 countries are not depicted in this report despite intensive efforts to find representative respondents to include them. The responses to the questionnaire were provided by one or two well-informed individuals in each country but these responses were not validated and may contain inherent accuracies. Caution should be taken when interpreting or re-presenting these data. There are limitations in the completeness and quality of the surveillance data reported, including the variability in respondents from countries who provided feedback to surveys in 2013 versus in 2016. Nevertheless, this report remains the only source of information that provides a global overview of ART practices. Potential partnerships with other global organizations and an increase in awareness of this IFFS data collection should improve the quality in years to come. Nevertheless, Surveillance 2016 attests to a robust and expanding scope of ART practices, policies, and activities among nations around the world while highlighting significant and important differences with a review of trends that have occurred the triennium.

Steven J Ory
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Surveillance 2016
July 2016

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CHAPTER 1: NUMBER OF CENTRES

Compiling an accurate tabulation of the number of centres providing assisted reproductive technology (ART) services remains a formidable challenge. The number of countries where centres are licensed, registered, or where oversight is otherwise provided, continues to increase and reliable estimates may be made in these countries from that point forward. Significant global progress has been made in establishing ART registries and oversight over the intervening three years. The 2016 data for these countries may represent a more accurate and complete estimate than previous estimates with an ability to utilize the registries to determine ART centre numbers. However, many countries still lack national ART registries, clinic-specific information is collected sporadically (if at all), and there are no reliable estimates on clinic numbers. The 2016 data set offers a more comprehensive attempt to determine the total number of ART centres worldwide but over 100 countries contacted did not complete the 2015 questionnaire. While this poses a significant limitation to the study, many of the non-responding countries are known to not have ART programmes or are believed to have a small number of centres.

Overall, 74 countries had respondents who provided data about number and type of centres (Table 1). Of the estimated total number of centres reported, there is an increase from approximately 3800 in 2012 to 5353 in 2015. However, Surveillance 2016 includes 14 additional countries, which did not report in 2012. Most of the respondents that provided information for both years have reported a modest increase in the total number of clinics or no significant change. Comparing the 2013 to the 2016 publications, 49 countries reported by their respective respondents in both surveys, 25 were new to the 2016 edition and 10 that reported in 2013 did not report for 2016. Of countries whose representatives have provided reliable estimates for both years, Argentina, Bulgaria, Finland, India, Ireland, Kazakhstan, Peru, Saudi Arabia, Turkey and Venezuela appear to have had significant increases and only Brazil and the United States reported a decrease of 5 or more centres. Of the 10 countries that only had responses in 2013, only Egypt (58) and Vietnam (13) previously reported having greater than 10 centres. The apparent large increase in the total number of centres reported this year appears to reflect more complete capture of data from a greater number of country representatives and perhaps a modest overall increase in the number of centres in a few countries.

This year, respondents were queried regarding the types of centres included in their countries, including designations for

Chapter 1. Table 1

Number of Centres

	Year			2016 Type of Centre				
Country	2010 (N)	2013 (N)	2016 (N)	Private Physician Clinic	Private Hospital-Based Clinic	Private or Public University-Based Clinic	Public Hospital-Based Clinic	Sole Practitioner Clinic
Argentina	23-25	30-44	60	22	1	2	1	34
Australia	63	Did not report	76	59	12	0	5	0
Austria	25	25	27	20	1	3	3	0
Bangladesh	Did not report	Did not report	13	6	1	0	0	6
Barbados	Did not report	Did not report	1	1	0	0	0	0
Belarus	4	4	8	1	4	0	3	0
Belgium	16-30	31	34	0	0	0	0	0
Brazil	150	200	180	126	27	18	9	0
Bulgaria	16	23	31	0	30	0	1	0
Cameroon	2	2	2	0	2	0	0	2
Canada	Did not report	Did not report	31	28	0	0	3	0
Chile	8-9	7	9	0	7	2	0	0
China	102-300	> 200	358	0	0	0	0	0
Colombia	19-21	27	25					
Croatia	7-11	13	12	5	0	7	0	0
Czech Republic	30	38	42	36	0	5	0	0
Democratic Republic of Congo	1	1	Did not report					
Denmark	18-22	18-21	21	0	0	12	9	0
Dominican Republic	4	5	Did not report					
Ecuador	6-8	11	10	10	0	0	0	0
Egypt	52-55	58	Did not report					
El Salvador	Did not report	Did not report	1	1		0	0	0
Estonia	Did not report	Did not report	5	1	1	1	2	0
Finland	19-20	18	24	0	14	5	5	0
France	90-106	100	104	0	58	40	46	0
Germany	Did not report	Did not report	134	92	5	32	5	0
Greece	50-60	~60	66	46	10	9	1	0
Guatemala	Did not report	Did not report	3	3	0	0	0	0
Honduras	Did not report	Did not report	2	0	0	0	0	0
Hong Kong (China*)	7	9-12	11	8	2	2	3	0
Hungary	12	14	13	9	0	3	1	0
Iceland	1	1	Did not report					
India	500	500-600	1000	995	0	0	5	0
Indonesia	Did not report	Did not report	26	0	0	0	0	0
Iran	Did not report	Did not report	62	0	37	0	24	0
Iraq	Did not report	Did not report	13					
Ireland	7	7-8	28	0	0	0	0	0
Israel	24-30	29	34	7	7	3	17	0
Italy	360	350	350	200	25	100	25	0
Ivory Coast	3	2	Did not report					
Japan	606-618	591	587	388	63	72	64	0
Jordan	Did not report	Did not report	20	10	6	4	2	
Kazakhstan	Did not report	12	19	15	0	2	2	0
Kenya	Did not report	Did not report	5	4	0	1	0	0
Latvia	4-5	4	Did not report					
Libya	9-10	8-10	Did not report					
Malaysia	Did not report	Did not report	36	17	10	3	4	2

Chapter 1. Table 1

(*Continued*)

Country	Year			2016 Type of Centre				
	2010 (N)	2013 (N)	2016 (N)	Private Physician Clinic	Private Hospital-Based Clinic	Private or Public University-Based Clinic	Public Hospital-Based Clinic	Sole Practitioner Clinic
Mali	Did not report	Did not report	1	0	1	0	0	0
Mexico	Uncertain	~30	48	35	2	0	3	5
Myanmar	Did not report	Did not report	1	1	0	0	0	1
Netherlands	Did not report	Did not report	13	1	0	0	12	0
New Zealand	7	7	9	0	1	5	3	0
Nigeria	Did not report	Did not report	50	35	5	3	1	6
Norway	11	10	12	6	0	4	2	0
Oman	Did not report	Did not report	14					
Panama	7	9	12	4	7	0	1	0
Paraguay	Did not report	Did not report	2	2	0	0	0	0
Peru	5-7	6	12	0	9	0	1	2
Philippines	4	5	6	4	1	0	0	0
Poland	Did not report	Did not report	50	0	0	0	0	0
Portugal	24	28	24	14	1	0	9	0
Romania	Did not report	Did not report	21	17	3	2	0	0
Russian Federation	80	110-130	170	115	0	0	55	0
Saudi Arabia	24-30	30	50	10	34	6	5	0
Senegal	2	2	2	2	0	0	0	0
Singapore	9	11	11	4	4	0	3	0
Slovak Republic	Did not report	Did not report	9	8	0	0	1	0
Slovenia	3	3	3	0	1	2	0	0
South Africa	12-15	15	20	18	0	2	0	0
South Korea	142	150	148	54	60	34	0	0
Spain	177-203	> 100	371	281	0	0	90	0
Sri Lanka	Did not report	Did not report	6	0	0	0	0	0
Sweden	15-16	16	17	11	1	0	6	0
Switzerland	26	26	25	0	0	0	7	0
Taiwan (China*)	72-78	76	79	34	35	0	10	0
Togo	1	1	Did not report					
Trinidad and Tobago	Did not report	Did not report	1	0	2	0	0	0
Tunisia	8	12	9	6	0	0	2	0
Turkey	112-116	131	153	31	80	33	9	0
Uganda	1	2	Did not report					
UK	66	71-117	78	0	0	78	0	0
Uruguay	4	4	3	0	3	0	0	0
USA	450-480	430	410	320	15	60	0	15
Venezuela	17-18	10	30	22	8	0	0	0
Vietnam	11-12	13	Did not report					
Totals	3524-3870	3701-3890	5353	3145	596	555	460	73

*Reporting separately for this report.

public, private, hospital, university based and private practitioner models. The private physician clinic model appears to be the most prevalent type and the sole practitioner, the least.

CHAPTER 2: LEGISLATION AND GUIDELINES

The practice of assisted reproductive technology (ART) is usually regulated by legislation promulgated in each country. Guidelines of professional societies, licensing bodies, and agency oversight also influence current ART practice. Of the 75 countries that responded to the questionnaire submitted in 2015, 70 provided sufficient information to be included in this analysis on legislation and guidelines.

In the previous 2013 International Federation of Fertility Societies (IFFS) Surveillance report, more than 90% of the country representatives reporting had legislation and/or guidelines regulating ART treatment. Legislation and guidelines are

continually evolving and, for the most part, have established restrictions on various applications of the practice of ART. While some of these developments are intended to enhance the safety, access, and transparency of ART, other developments have limited or curtailed practices and techniques that are widely accepted and practiced in other countries. While the overall trend appears to be one of increasing uniformity and access, the local practices of ART vary significantly among regions and cultures and are ultimately determined by the local stakeholders. These stakeholders include patient advocacy groups, local healthcare providers, professional organizations, local and national government agencies, insurance and other organizations responsible for payment, legislative bodies, and religious organizations. As the practice of ART has become more pervasive within private and public health care services and a greater number of patients have been impacted, subsequent public awareness, scrutiny, and interest have been magnified.

Advances in the genetic assessment of embryos, trends in cross border reproductive care, ethical debates regarding the appropriateness of preserving anonymity for gamete donation, and proscriptions on gestational carriers are examples of topics that have received extensive attention over the past three years. Thus, many of these issues and related aspects of ART have been recently addressed in legislation and guidelines.

Surveillance 2016 offers a more detailed look at recently implemented legislation and guidelines compared to past efforts. The 2016 survey also highlights specific topics that received unique legislative attention. This more detailed questionnaire attempted to engage international respondents uniquely suited to provide the most reliable information. Specific queries to address the process for institution and monitoring of licenses for ART centres, affiliated labs, clinicians, lab directors, and staff were included in the 2016 questionnaire and provide a unique comparison of systems of governance among different countries (Table 1).

Analysis of the Survey

Data was received from 93 respondents in 75 countries in this 2016 IFFS Surveillance Report survey. In this chapter, data deemed adequate for analysis was received from 70 countries. Of the 70 counties whose reports were deemed adequate for analysis, 40 (57.1%) had legislation promulgated in their country to regulate ART. Of these 40 countries, 41% had additional ART society guidelines in their country and 15.7% had legislation alone to regulate practice.

Out of all 70 countries, 24.3% of respondents had only national society guidelines without any formal legislation. In 18.6% of these countries, there were no regulatory structures in the form of legislation or guidelines (Table 1).

When queried regarding updates in legislation since the 2012 survey, 35% of the countries had new legislation and 48.5% had no updates. The remainder of respondents were unsure whether updates had occurred. Table 2 and Chart 1 list and illustrate the various aspects of ART addressed by legislation in the past three years in rank order, illustrating the most prevalent topics in new legislation.

In the countries in which updated legislation had occurred, the respondents noted that access to ART had not been restricted nor applications limited in 60% of countries. In 28% of countries, new legislation was perceived as having negatively affected access, and 12% replied that there had been a variable effect.

The relationship of media attention to allegations of violations of ART regulations was also assessed. In 23% of countries, respondents were aware of reports of violations, 57% responded that there had been no publicity related to ART violations, and in the remainder of countries it was unknown.

The ART Centre Itself

The licensing criteria, monitoring of governance, and identification of the credentialing bodies pertaining to ART centres was assessed separately:

The Survey noted that 70% of countries had licensing criteria for ART centres as a whole unit. Of these, 73% relied on an examination or certification procedure, 57% utilized on-site inspection, and 63% used a period report. Some countries employed combined strategies.

Monitoring of ART centres was performed in 64% of countries. The principal mechanisms employed in the countries that had systems in place for monitoring included: on-site inspection (87%); a national registry, (73%); and a periodic report (64%). Twenty-two percent of the countries with monitoring also submitted their data to an international registry.

Government employees were responsible for monitoring ART centres in 58% of countries; independent agencies and medical officers were equally responsible for monitoring in 40% of countries. Two percent of countries utilized monitoring with unofficial agencies.

Reproductive Medicine Physicians

In 50% of countries, licensing or credentialing criteria exist for reproductive medicine specialist physicians or endocrinologists who have undergone special training in ART medicine. This was accomplished in over 90% of countries by certification examination.

Thirty-seven percent of countries perform ongoing monitoring of reproductive medicine physicians.

OB/GYN Practicing ART

In 41% of countries, there were licensing criteria for obstetrician gynecologist physicians practicing ART, accomplished by examination or certification in 91% of cases. It was not clear how many of these countries had separate sub-specialization fellowship programmes for reproductive medicine specialists, and overlap likely exists between the categories of obstetrician gynecologist with and without further fellowship qualifications.

The ART Laboratory

In 59% of countries, there were licensing requirements specific to the ART laboratory rather than the whole centre. The majority of countries relied on a certification system in 89% of cases. An onsite inspection system was performed in 61% of countries, and a periodic report was performed in 44% of countries' laboratories.

Fifty-one percent of countries had ongoing monitoring criteria for the ART labs, and the majority (61%) used onsite inspection for this process. Government employees performed the monitoring in 43% of countries, medical officials in 18%, independent agencies in 14%, and unofficial agencies in 2% of countries.

Chapter 2. Table 1

How is ART Regulated In Your Country?

Country	No Regulations	Federal/National Laws/ Statutes/Ordinances/Policies	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Licensing Body	Professional Organization Standards/Guidelines
Argentina	NO	YES	YES	NO	NO	YES	YES
Australia	NO	YES	YES	NO	YES	YES	YES
Austria	NO	YES	NO	YES	NO	YES	YES
Bangladesh	NO	NO	NO	NO	NO	NO	NO
Barbados	YES	NO	NO	NO	NO	NO	YES
Belarus	NO	YES	NO	NO	NO	YES	YES
Belgium	NO	YES	NO	NO	NO	NO	NO
Brazil	NO	YES	NO	NO	YES	NO	YES
Bulgaria	NO	YES	NO	YES	YES	YES	YES
Cameroon	YES	NO	NO	NO	NO	NO	YES
Canada	NO	YES	YES	NO	NO	NO	YES
Chile	YES	NO	NO	NO	NO	NO	YES
China	NO	YES	NO	NO	YES	YES	YES
Colombia	YES	NO	NO	NO	NO	NO	YES
Czech Republic	NO	YES	NO	NO	NO	YES	YES
Denmark	NO	YES	NO	NO	YES	YES	YES
Ecuador	YES	NO	NO	NO	NO	NO	YES
El Salvador	YES	NO	NO	NO	NO	NO	NO
Estonia	NO	YES	NO	NO	YES	YES	NO
Finland	NO	YES	NO	NO	YES	YES	YES
France	NO	YES	NO	NO	YES	YES	NO
Germany	NO	YES	YES	NO	YES	YES	YES
Greece	NO	YES	NO	NO	YES	YES	NO
Guatemala	NO	NO	NO	NO	YES	YES	YES
Honduras	YES	NO	NO	NO	NO	NO	NO
Hong Kong (China*)	NO	NO	NO	NO	NO	YES	YES
Hungary	NO	YES	NO	NO	NO	NO	YES
India	YES	NO	NO	NO	NO	NO	YES
Indonesia	NO	YES	YES	YES	YES	YES	YES
Iran	NO	YES	NO	NO	YES	Unknown	Unknown
Iraq	NO	YES	NO	NO	NO	YES	YES
Ireland	YES	NO	NO	NO	NO	NO	YES
Israel	NO	YES	NO	NO	NO	YES	YES
Italy	NO	YES	YES	NO	NO	NO	YES
Japan	YES	NO	NO	NO	NO	NO	YES
Jordan	NO	NO	NO	NO	NO	YES	YES
Kazakhstan	NO	YES	NO	NO	NO	YES	YES
Kenya	YES	NO	NO	NO	NO	NO	NO
Malaysia	NO	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO
Mexico	YES	NO	NO	NO	NO	NO	NO
Myanmar	YES	NO	NO	NO	NO	NO	NO
Netherlands	NO	YES	NO	NO	NO	YES	YES
Nigeria	YES	NO	NO	NO	NO	NO	YES
Norway	NO	YES	NO	NO	NO	YES	NO
Panama	NO	YES	NO	NO	NO	NO	NO
Paraguay	YES	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO	NO
Philippines	YES	NO	NO	NO	NO	Unknown	YES
Portugal	NO	YES	NO	NO	YES	YES	NO
Romania	NO	YES	NO	NO	YES	YES	YES
Russian Federation	NO	YES	YES	NO	NO	YES	NO
Saudi Arabia	NO	NO	NO	NO	NO	YES	YES
Senegal	YES	NO	NO	NO	NO	NO	YES
Singapore	NO	NO	NO	NO	NO	YES	NO
Slovak Republic	NO	YES	NO	NO	NO	NO	YES
South Africa	NO	YES	NO	NO	NO	NO	YES
South Korea	NO	YES	NO	NO	NO	NO	YES
Spain	NO	YES	NO	NO	NO	NO	YES
Sri Lanka	YES	NO	NO	NO	NO	NO	YES
Sweden	NO	YES	YES	YES	NO	YES	YES
Switzerland	NO	YES	YES	NO	NO	YES	YES
Taiwan (China*)	NO	YES	NO	NO	NO	YES	YES
Trinidad and Tobago	YES	NO	NO	NO	NO	NO	NO
Tunisia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Turkey	NO	YES	NO	NO	NO	NO	NO
UK	NO	YES	NO	NO	NO	YES	YES
Uruguay	NO	YES	NO	NO	NO	NO	NO
USA	NO	YES	YES	NO	YES	NO	YES
Venezuela	YES	NO	NO	NO	NO	NO	YES

*Reporting separately for this report.

Lab Director and Lab Staff

In 51% of countries, there were licensing criteria for the lab director and 36% had licensing criteria for the lab staff. In more than 80% of cases this was accomplished by examination and certification.

Ongoing monitoring was performed in 30% of countries for the lab director and 19% for lab staff, using similar mechanisms to the original licensing criteria.

Monitoring of ART Outcomes

The respondents were queried regarding mechanisms for monitoring ART outcomes. In 34% of countries a national registry was used. Fourteen percent reported that they presented data to an international registry and 31% had periodic reports submitted from ART units on their ART outcomes. Verification was accomplished by on-site inspections in 16% of countries. This was performed in 34% of countries by government employees,

Chapter 2. Table 2

Main Modification to Legislation in Last 3 Years

Main Modification *(In Rank Order)*	% Of Countries that Reported Legislation Change Out of 70 Countries *(More than One Topic May have been Modified Per Country)*
General changes to legislation and guidelines	27%
Insurance coverage	13%
Number of embryos to transfer	10%
Marital status	10%
Cross border reproduction	7%
Gamete donation	7%
Sex selection	6%
Preimplantation genetic diagnosis	6%
Same sex parenting policies	6%
Reporting mechanisms	6%
Surrogacy	4%
Anonymity	3%
Status of the embryo	3%
Cryopreservation	3%
Posthumous reproduction	1%
Micromanipulation	1%
Welfare of the child	1%
Experimentation on the embryo	1%
Cloning	1%
Fertility Preservation	1%
Oocyte maturation	0%
Fetal Reduction	0%

18% by medical officials, 12% by independent agencies, and 3% by unofficial agencies.

Penalties for Violation of Governance, Licensure or Credentialing

In 57% of 70 countries responding, penalties were in place for violations of governance, licensure, or credentialing. In 27% of countries responding there were no penalties in place, and it was unknown whether penalties existed in 16%.

A variety of penalties existed across the different countries. In 19%, a fine could be imposed, in 33% the IVF unit could lose its registration or be closed, criminal prosecution or imprisonment was possible in 23% of countries, and one country reported that publication of the details of an IVF unit's infraction was a potential penalty.

Discussion

In more than 80% of countries, ART was regulated by legislation, guidelines, or a combination of both. Over the last 3 years, legislation was updated in 35% of countries and the changes were perceived as positive in the majority of cases.

The perception of acceptable and best practice in reproductive medicine is continuing to evolve. New initiatives are underway in licensing and legislation, and professional societies' guidelines often reflect these changes. The respondents viewed the changes implemented as a positive development, in that they did not restrict access or limit the application of ART in 60% of cases.

This survey accurately surveyed 70 countries, which was an improvement compared with the 2013 survey published where only 60 countries had complete data for analysis. In addition, there was more meaningful data obtained about the topics updated in recently introduced legislation. There was also an in-depth analysis of how the different facets of an ART centre are licensed and monitored over time.

The issues that received the most attention in legislation were insurance coverage for ART, limits on the numbers of embryos for transfer, role of marital status in determining access, cross-border reproduction, gamete donation, sex selection, pre-implantation genetic testing (PGT), and same sex parenting policies.

Summary

The chapter on Legislation and Guidelines in this Surveillance 2016 included complete data from 70 countries, which was more extensive than previous IFFS reports. The 2015 questionnaire was intended to elicit more specific data for each topic, and provide more detailed information about international ART practices. More than 80% of countries used legislation, guidelines, or a combination of both to regulate ART practice. New legislation had been introduced in 35% of countries since 2012, and 60% of these updates were perceived to be positive by the respondents. The focus of new legislation over the past three years included insurance coverage, access to ART services based on marital and relationship status, cross-border reproduction, performance of gamete donation, and limits on the number of

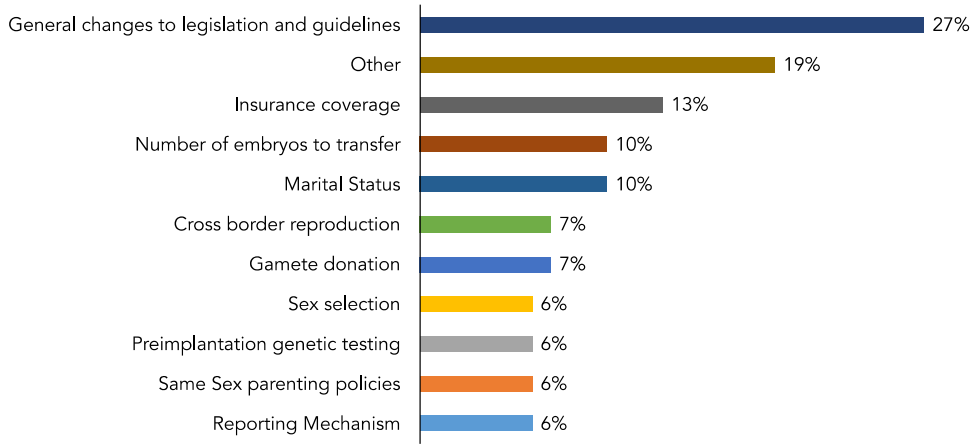


Chart 1. % Of countries that reported legislation change out of 70 countries (More than one topic may have been modified per country).

embryos for transfer. More countries are adopting measures to promote safety, efficacy, and standardization, but a variety of mechanisms has been employed to accomplish this.

CHAPTER 3: INSURANCE COVERAGE

Introduction

The provision of assisted reproductive technology (ART) therapy has seen a constant growth in recent years due to a better understanding of the causes of infertility and an increased opportunity to avail of in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) treatments in a larger number of countries worldwide. In a recent publication, the International Committee Monitoring Assisted Reproductive Technologies (ICMART) world report detailed results from years 2008, 2009, and 2010 and showed an annual increase to each preceding year of 9.0%, 6.4%, and 13.1%, respectively [1]. The reported ART utilization rates (number of initiated cycles per million population) varied widely from 4775 in Israel, 2337 in Australia/New

Chapter 3. Table 1

Are There Regulations that Address Reimbursement of ART Procedures in Your Country?

Country	No Regulations	Federal/National Laws/ Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional/Organization Standards/Guidelines	Cultural Practice	Religious Decree
Argentina	NO	NO	NO	NO	NO	NO	NO	NO
Australia	NO	YES	YES	NO	NO	NO	NO	NO
Austria	NO	YES	NO	NO	NO	YES	NO	NO
Bangladesh	NO	NO	NO	NO	NO	NO	YES	YES
Barbados	YES							
Belarus	NO	NO	NO	NO	NO	NO	NO	NO
Belgium		YES						
Brazil	NO							
Bulgaria		YES	NO	YES	YES	NO	NO	NO
Cameroon	NO	NO	NO	NO	NO	NO	NO	NO
Canada	NO	NO	YES	NO	NO	NO	NO	NO
Chile		YES						
China	YES	NO	NO	NO	NO	NO	NO	NO
Colombia	NO	NO	NO	NO	NO	NO	NO	NO
Czech Republic	NO	YES	NO	NO	NO	YES	NO	NO
Denmark	NO	YES	NO	NO	NO	NO	NO	NO
Ecuador	YES							
El Salvador	YES	NO	NO	NO	NO	NO	NO	NO
Estonia	NO	YES	NO	NO	NO	NO	NO	NO
Finland	NO	YES	NO	NO	YES	NO	NO	NO
France	NO	YES	NO	NO	NO	Unknown	NO	NO
Germany	NO	YES	YES	NO	NO	YES	NO	NO
Greece	YES							
Guatemala	Unknown	NO	NO	NO	NO	NO	NO	NO
Honduras	NO	NO	NO	NO	NO	NO	NO	
Hong Kong (China*)					YES			
Hungary	NO	YES	NO	NO	NO	NO	NO	NO
India	YES							
Iran	NO	Unknown	NO	NO	NO	NO	NO	NO
Ireland	YES	NO	NO	NO	NO	NO	NO	NO
Israel	YES	YES	NO	YES	YES	NO	NO	NO
Italy	NO	NO	YES	NO	NO	NO	NO	NO
Japan	NO	YES	YES	YES	NO	NO		
Jordan	NO							
Kazakhstan	YES	YES	NO	NO	NO	NO	NO	NO
Kenya	YES							
Malaysia	NO	NO	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO	NO
Mexico	YES	NO	NO	NO	NO	NO	NO	NO
Myanmar	YES	NO	NO	NO	NO	NO	YES	Unknown
Netherlands	NO	YES	NO	NO	NO	NO	NO	NO
Nigeria	NO	NO	NO	NO	NO	NO	NO	NO
Norway	NO	YES						
Panama	YES	NO	NO	NO	NO	NO	NO	NO
Paraguay	YES	NO	NO	NO	NO	NO	NO	NO
Philippines	NO	NO	NO	NO	NO	NO	NO	NO
Portugal		YES	NO	NO	NO	NO	NO	NO
Romania	YES	YES	NO	NO	NO	NO	NO	NO
Russian Federation		YES						
Saudi Arabia	YES	NO	NO	NO	YES	YES	YES	YES
Senegal	NO	NO	NO	NO	NO	NO	NO	NO
Singapore	NO	YES	NO	NO	NO	NO	NO	NO
Slovak Republic		YES						
South Africa	NO	NO	NO	NO	NO	NO	NO	NO
South Korea		YES						
Spain	NO	NO	NO	NO	NO	NO	NO	NO
Sri Lanka	YES							
Sweden	NO	YES	YES		NO			
Switzerland	NO							
Taiwan (China*)	NO	NO	NO	NO	NO	NO	NO	NO
Trinidad and Tobago	YES	NO	NO	NO	NO	NO	NO	NO
Tunisia		YES						
Turkey	YES	YES	NO	NO	NO	NO	NO	NO
UK	NO	NO	YES	NO	NO	NO	NO	NO
Uruguay	NO	NO	NO	NO	NO	YES	YES	NO
USA	NO	NO	YES	NO	NO	YES	YES	NO
Venezuela	NO	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

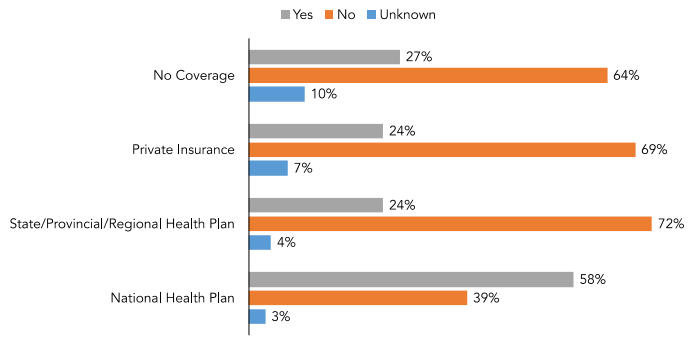


Chart 1. What Type of Coverage or Reimbursement.

Chapter 3. Table 2

Is Insurance Coverage or Government Funding Based on Fertility Status?

Country	Primary Infertility	Secondary Infertility	Family Building
Argentina	NO	NO	NO
Australia	YES	YES	
Austria	NO	NO	NO
Bangladesh	NO	NO	NO
Belarus	YES	Unknown	YES
Belgium	NO	NO	NO
Brazil	YES	YES	
Bulgaria	YES	YES	NO
Cameroon	NO	NO	YES
Canada			YES
Chile			YES
China	NO	NO	NO
Czech Republic	NO	NO	NO
Denmark	YES		
Ecuador	YES	YES	
El Salvador	NO	NO	NO
Estonia	NO	NO	NO
Finland	NO	NO	NO
France	YES	YES	YES
Germany	NO	NO	NO
Greece	NO	NO	NO
Guatemala	NO	NO	NO
Honduras	YES	YES	YES
Hong Kong (China*)	YES		
Hungary	YES	YES	YES
India	NO	NO	NO
Iran	Unknown	Unknown	Unknown
Ireland	NO	NO	NO
Israel	YES	YES	YES
Italy	YES	YES	NO
Japan	YES	YES	Unknown
Jordan	Unknown	Unknown	Unknown
Kazakhstan	YES	YES	YES
Malaysia	YES	YES	
Mali	Unknown	Unknown	Unknown
Myanmar	NO	NO	NO
Netherlands	YES	YES	YES
Nigeria	NO	NO	NO
Norway	NO	NO	NO
Panama	NO	NO	NO
Paraguay	NO	NO	NO
Peru	NO	NO	NO
Portugal	YES	YES	NO
Romania	YES	YES	NO
Russian Federation	NO	NO	NO
Saudi Arabia	YES	YES	YES
Senegal	NO	NO	NO
Singapore	YES	YES	NO
Slovak Republic	YES	YES	
South Africa	NO	NO	NO
South Korea	YES	YES	
Spain	YES	YES	NO
Sri Lanka	NO	NO	NO
Sweden	YES	NO	
Switzerland	NO	NO	NO
Taiwan (China*)	NO	NO	YES
Tunisia	YES		
Turkey	YES	NO	NO
UK	NO	NO	NO
Uruguay	NO	NO	NO
USA	NO	NO	YES
Venezuela	NO	NO	NO

*Reporting separately for this report.

Zealand, to the lowest rates in Latin America (152) and sub-Saharan Africa (87). Such variations are likely due to treatment availability and the possibility that access to care may be limited by lack of financial support for couples in need. The previous (2013) IFFS Surveillance report analyzed data from 60 countries and showed the number of countries providing cover for ART to be decreasing (60% in 2010 and 52% in 2013), possibly due to respondent profile variability [2]. The importance of this chapter lies in detailing the global ART insurance coverage and in particular, revealing the gap between service need and financial support from states and private insurers.

Analysis of the Survey

The present survey is comprised of data from 70 countries with respondents providing data on this topic (a 17% increase compared to 2013). We acknowledge limitations in the completeness and quality of data associated with the issue of insurance coverage, as in previous reports. For example, only one question was answered by all respondents from 70 countries, and one had as few as 35 country respondents, making data difficult to compare with previous years in order to observe trends.

Only 37 countries (53%) reported providing coverage for infertility treatments. Among the 35 out of 67 countries (52%) where reimbursement was regulated (Table 1), 26 reported regulations on the national level. Furthermore, a large proportion of government funding was reported to be provided on the national level in 32/47 (68%) of responding countries with the remaining at local or regional level. However, the extent of number of cycles, and the limitations on public health support and access to ART care can vary greatly from country to country and in some cases, within regions or states of a country. The extent of insurance coverage for ART was measured as either complete or partial. Of the 52 respondents, 15 countries provide national complete coverage (29%) though a national health plan, whereas nine countries offer state/ provincial/ regional complete coverage (17.3%). Six countries (11.6%) reported full coverage by private insurance. A partial national health plan coverage is offered in 22 countries (42%); partial state/ provincial/ regional in seven countries (13%), and partial private insurance in eight countries (15%).

Twenty-four countries (36%) of 66 respondents provide no ART insurance coverage compared to 40% reported in a different cohort of countries represented in the 2013 report. Large countries from the Western Pacific and Southeast Asian regions (India,

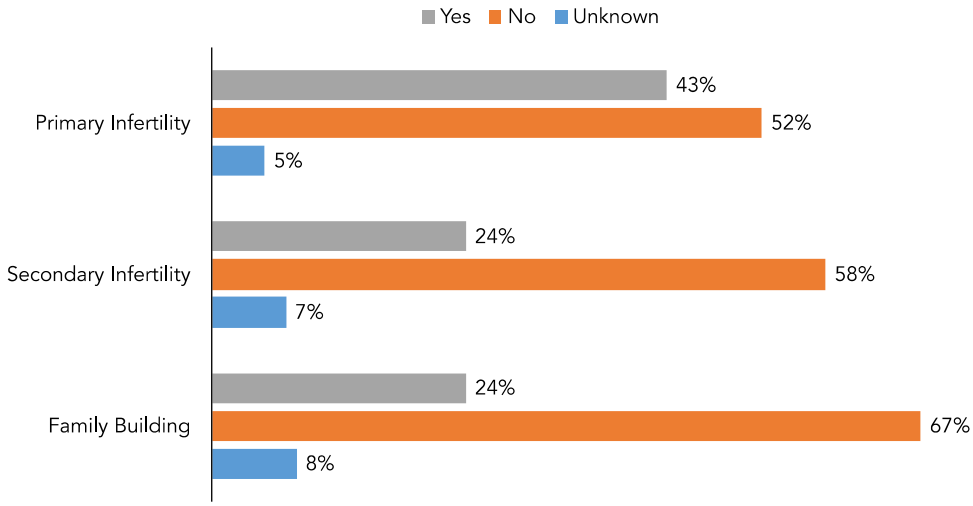


Chart 2. What Is Coverage or Reimbursement Based On?

China, the Philippines, Hong Kong [China {Reporting separately for this report.}]) and some from Central and Latin American region (Mexico, Columbia, Venezuela) are not financially supporting any ART activity (Chart 1). Of the 46 countries that reported providing some level of government funding, 34 have a national plan (74%), nine (19%) have regional plans, and 4 (7%) have local plans. With regard to changes from the previous 2013 report, of those 56 countries with respondents, 32 (57%) reported no insurance modifications, five recorded a reduction in access to coverage or reimbursement, and 16 an increase in coverage. Specifically, for example, Slovakia reported initiation of cross-border reproductive care coverage for ART, and Japan reported the introduction of an age limit for insurance coverage of less than 43 years for women.

Specific limitations in funding of ART were reported for 62 countries. Half of these countries (31/62) reported offering funding based on fertility status (Table 2 and Chart 2), however in 20 (32%) countries, both primary and secondary infertility were reported to be covered by insurance. Similarly, 18% reported to have ART reimbursement tied to a policy of elective single embryo transfer (eSET), while only five of 37 countries reported basing their funding upon duration of infertility (Table 3 and Chart 3) (Turkey, Finland, UK, USA: three years; Romania: two years). The age profile of patients covered by ART health plans varies widely, with 31 out of 39 countries imposing an age limit (range of 39 to 50 y old for the woman). For example, Italy and Greece reported 50 as the upper limit, while 24 countries reported limits between 40-45 years of age for the woman.

Interestingly, only three countries (Chile, Japan, and Switzerland) out of 35 reported that their ART reimbursement is tied to income. Of the 37 countries that had respondents who answered this question, 29 have a limit on the number of cycles covered by insurance. For example, respondents from Australia, Russia, Israel, Estonia, Greece, Panama, and Switzerland reported that their countries do not limit the number of cycles reimbursed. Romania, Canada and Chile reimburse one cycle only, while Belgium, Japan, Singapore, and the USA (USA is individual state specific) reported that they offer up to six reimbursed treatments.

Details of fertility treatments that are covered by insurance (as reported by country respondents) are present in Tables 4–6 and Charts 4–7. Interestingly, coverage for pre-implantation genetic testing (PGT) for diseases (previously defined as PGD) is exclusively present in Israel and European countries, while in four

Chapter 3. Table 3

What is Coverage Based On?

Country	Duration of Infertility	Income Levels	Age	eSET
Argentina	No	No	No	No
Australia	Unknown	No	Yes	Unknown
Austria	No	No	Yes	No
Belgium	No	No	Yes	Yes
Brazil	No	No	Yes	No
Bulgaria	No	Unknown	Yes	No
Canada	No	Yes	Yes	Yes
Chile	No	NO	No	No
Colombia	NO	No	NO	NO
Czech Republic	No	No	Yes	Yes
Denmark	No	No	Yes	No
Estonia	No	No	Yes	No
Finland	Yes	No	Yes	No
France	No	No	Yes	No
Germany	No	No	Yes	No
Greece	No	No	Yes	No
Hungary	No	No	Yes	No
Ireland	No	No	No	No
Israel	No	No	Yes	Yes
Italy	No	Yes	Yes	No
Japan	No	No	Yes	No
Malaysia	No	No	Yes	No
Netherlands	No	No	Yes	Yes
Norway	No	No	No	No
Portugal	Yes	No	Yes	No
Romania	No	No	Yes	No
Russian Federation	No	No	No	No
Saudi Arabia	No	No	Yes	No
Singapore	No	No	Yes	No
Slovak Republic	No	No	Yes	No
South Korea	No	Yes	Yes	No
Spain	No	No	Yes	No
Sweden	No	No	Yes	No
Switzerland	Yes	No	Yes	No
Turkey	Yes	No	Yes	Yes
UK	No		Yes	No
Uruguay	Yes		Yes	No
USA			Unknown	Yes

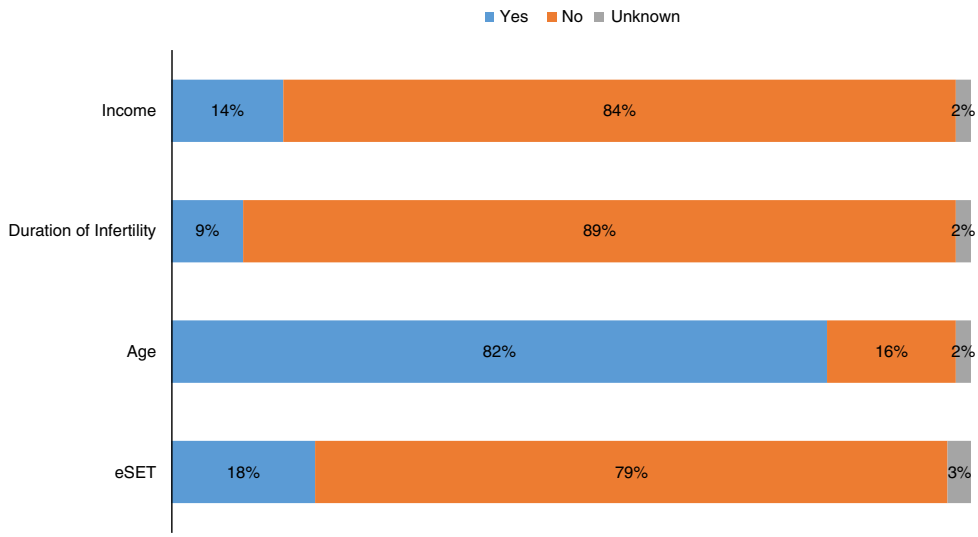


Chart 3. What Is Coverage Based On?

Chapter 3. Table 4

Does Insurance Coverage or Government Funding Typically Cover the Following ART Services?

Country	Diagnostic Evaluation	Fertility Medications	Intrauterine Insemination	IVF	ICSI	Assisted Hatching	PGT-M	PGT-A
Argentina	YES	YES	YES	YES	YES	NO	NO	NO
Australia	YES	YES	YES	YES	YES	Unknown	NO	NO
Austria	NO	YES	NO	YES	YES	NO	NO	NO
Bangladesh	NO	NO	NO	NO	NO	NO	NO	NO
Barbados	NO	NO	NO	NO	NO	NO	NO	NO
Belarus	YES	NO	NO	NO	NO	NO	NO	NO
Belgium	YES	YES	YES	YES	YES	NO	NO	NO
Brazil	YES	NO	YES	YES	YES		NO	NO
Bulgaria	NO	YES	NO	YES	YES	NO	NO	NO
Cameroon	YES	NO	NO	NO	NO	NO	NO	NO
Canada	YES	NO	YES	YES	YES	YES	NO	NO
Chile	YES	YES	YES	YES	YES	YES	NO	NO
China	NO	NO	NO	NO	NO	NO	NO	NO
Colombia	YES	NO	NO	NO	NO	NO	NO	NO
Czech Republic	YES	YES	YES	YES	NO	NO	YES	YES
Denmark	YES	YES	YES	YES	YES	Unknown	YES	NO
Ecuador	YES	NO	NO	NO	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO	NO	NO
Estonia	YES	YES	NO	YES	YES	NO	NO	NO
Finland	YES	YES	YES	YES	YES	YES	YES	YES
France	YES	YES	YES	YES	YES	YES	YES	NO
Germany	YES	YES	YES	YES	YES	NO	NO	NO
Greece	YES	YES	NO	NO	NO	NO	NO	NO
Guatemala	YES	NO	NO	NO	NO	NO	NO	NO
Honduras	NO	NO	NO	NO	NO	NO	NO	NO
Hong Kong (China*)			YES	YES	YES			
Hungary	YES	YES	YES	YES	YES	YES	NO	NO
India	NO	NO	NO	NO	NO	NO	NO	NO
Iran	YES	YES	NO	NO	NO	NO	NO	NO
Ireland	NO	NO	NO	YES	YES	NO	NO	NO
Israel	YES	YES	YES	YES	YES	YES	YES	NO
Italy	YES	YES	YES	YES	YES	NO	NO	NO
Japan	NO	NO	NO	YES	YES	YES	NO	NO
Jordan	NO	NO	NO	NO	NO	NO	NO	NO
Kazakhstan	NO	NO	NO	YES	YES	YES	NO	NO
Kenya	NO	NO	NO	NO	NO	NO	NO	NO
Malaysia	YES	YES	YES	YES	YES	YES	NO	NO
Mali	YES	NO	NO	NO	NO	NO	NO	NO
Mexico	NO	NO	YES	NO	NO	NO	NO	NO
Myanmar	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Netherlands	YES	YES	YES	YES	YES	NO	YES	NO
Nigeria	NO	NO	NO	NO	NO	NO	NO	NO
Norway	YES	YES	YES	YES	YES	NO	YES	NO
Panama	YES	YES	YES					
Paraguay	NO	NO	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO	NO	NO
Philippines	NO	NO	NO	NO	NO	NO	NO	NO
Portugal	YES	YES	YES	YES	YES	YES	YES	YES
Romania	YES			YES	NO	YES		
Russian Federation	YES	YES	NO	YES	YES	NO	NO	NO
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO	NO
Senegal	NO	NO	NO	NO	NO	NO	NO	NO
Singapore	NO	YES	YES	YES	YES	YES	NO	NO
Slovak Republic	YES	YES	NO	YES	NO	NO	NO	NO
South Africa	YES	NO		NO	NO	NO	NO	NO

Chapter 3. Table 4

(Continued)

Country	Diagnostic Evaluation	Fertility Medications	Intrauterine Insemination	IVF	ICSI	Assisted Hatching	PGT-M	PGT-A
South Korea	YES	YES	YES	YES	YES	YES	NO	NO
Spain	YES	YES	YES	YES	YES	Unknown	YES	YES
Sri Lanka	NO	NO	NO	NO	NO	NO	NO	NO
Sweden	YES	YES	YES	YES	YES	NO	YES	NO
Switzerland	YES	YES	YES	NO	NO	NO	NO	NO
Taiwan (China*)	NO	NO	NO	YES	NO	NO	NO	NO
Trinidad and Tobago	NO	NO	NO	NO	NO	NO	NO	NO
Tunisia		YES	YES	YES	YES		NO	NO
Turkey	YES	YES	YES	YES	YES	YES	YES	NO
UK	YES	YES	YES	YES	YES	Unknown	Unknown	NO
Uruguay	YES	YES	YES	YES	YES	NO	NO	NO
USA	YES	NO	NO	NO	NO	NO	NO	NO
Venezuela	NO	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

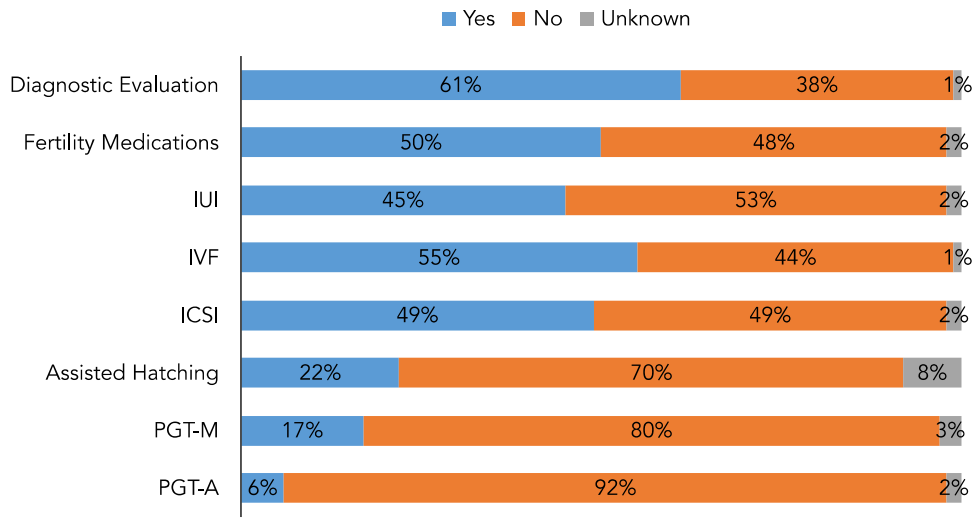


Chart 4. What Does Insurance Coverage or Government Funding Cover-ART?

Chapter 3. Table 5

Does Insurance Coverage or Government Funding Typically Cover the Following ART Third Party Reproduction Services?

	Donor			Gestational Carrier			
Country	Sperm	Egg	Embryos	"Traditional" (Surrogate Mother's Ova with a Prospective Parent's Sperm)	"Gestational" (Donated Ova and Commissioning Male's Sperm)	"Gestational" (Commissioning Couple's Ova and Sperm)	"Gestational" (Donated Ova and Donated Sperm)
Argentina	YES	YES	NO	NO	NO	NO	NO
Australia	YES	YES	YES	NO	NO	NO	NO
Austria	NO	NO	NO	NO	NO	NO	NO
Bangladesh		NO	NO	NO	NO	NO	NO
Barbados	NO	NO	NO	NO	NO	NO	NO
Belarus	NO	NO	NO	NO	NO	NO	NO
Belgium	NO	NO	NO	NO	NO	NO	NO
Brazil	NO	NO	NO	Unknown	NO	NO	NO
Bulgaria	NO	NO	NO	NO	NO	NO	NO
Cameroon	NO	NO	NO	NO	NO	NO	NO
Canada	NO	NO	NO	Unknown	Unknown	Unknown	Unknown
Chile	NO	NO	NO	NO	NO	NO	NO
China	NO	NO	NO	NO	NO	NO	NO
Colombia	NO	NO	NO	NO	NO	NO	NO
Czech Republic	NO	NO	NO	NO	NO	NO	NO
Denmark	YES	YES	NO	NO	NO	NO	NO
Ecuador	NO	NO	NO	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO	NO
Estonia	NO	NO	NO	NO	NO	NO	NO
Finland	YES	YES	YES	NO	NO	NO	NO
France	YES	YES	YES	NO	NO	NO	NO
Germany	NO	NO	NO	NO	NO	NO	NO
Greece	NO	NO	NO	NO	NO	NO	NO
Guatemala	NO	NO	NO	NO	NO	NO	NO
Honduras	NO	NO	NO	NO	NO	NO	NO
Hungary	YES	YES	YES	NO	NO	NO	NO
India	NO	NO	NO	NO	NO	NO	NO
Iran	NO	NO	NO	NO	NO	NO	NO

Chapter 3. Table 5

(Continued)

	Donor			Gestational Carrier			
Country	**Sperm**	**Egg**	**Embryos**	**"Traditional" (Surrogate Mother's Ova with a Prospective Parent's Sperm)**	**"Gestational" (Donated Ova and Commissioning Male's Sperm)**	**"Gestational" (Commissioning Couple's Ova and Sperm)**	**"Gestational" (Donated Ova and Donated Sperm)**
Ireland	NO	NO	NO	NO	NO	NO	NO
Israel	NO	NO	NO	NO	NO	NO	NO
Italy	NO	NO	NO	NO	NO	NO	NO
Japan	NO	NO	NO	NO	NO	NO	NO
Jordan	NO	NO	NO	NO	NO	NO	NO
Kazakhstan	NO	NO	NO	NO	NO	NO	NO
Kenya	NO	NO	NO	NO	NO	NO	NO
Malaysia	NO	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO
Mexico	NO	NO	NO	NO	NO	NO	NO
Myanmar	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Netherlands	YES	YES	YES	Unknown	YES	Unknown	Unknown
Nigeria	NO	NO	NO	NO	NO	NO	NO
Norway	YES	NO	NO	NO	NO	NO	
Paraguay	NO	NO	NO	NO	NO	NO	NO
Peru	NO			NO	NO	NO	NO
Philippines	NO	NO	NO	NO	NO	NO	NO
Portugal	YES	YES	YES	NO	NO	NO	NO
Romania	YES		YES				
Russian Federation	NO	NO	NO	NO	NO	NO	NO
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO
Senegal	NO	NO	NO	NO	NO	NO	NO
Singapore	NO	NO	NO	NO	NO	NO	NO
Slovak Republic	NO	NO	NO	NO	NO	NO	NO
South Africa	NO	NO	NO	NO	NO	NO	NO
South Korea	NO	NO	NO	NO	NO	NO	NO
Spain	YES	YES	NO	NO	NO	NO	NO
Sri Lanka	NO	NO	NO	NO	NO	NO	NO
Sweden	YES	YES	NO	NO	NO	NO	NO
Switzerland	YES	NO	NO	NO	NO	NO	NO
Taiwan (China*)	NO	NO	NO	NO	NO	NO	NO
Trinidad and Tobago	NO	NO	NO	NO	Unknown	NO	NO
Tunisia	NO	NO	NO	NO	NO	NO	NO
Turkey	NO	NO	NO	NO	NO	NO	NO
UK	YES	YES	YES	Unknown	Unknown	Unknown	Unknown
Uruguay	YES	YES	YES	NO	YES	NO	YES
USA	NO	NO	NO	NO	NO	NO	NO
Venezuela	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

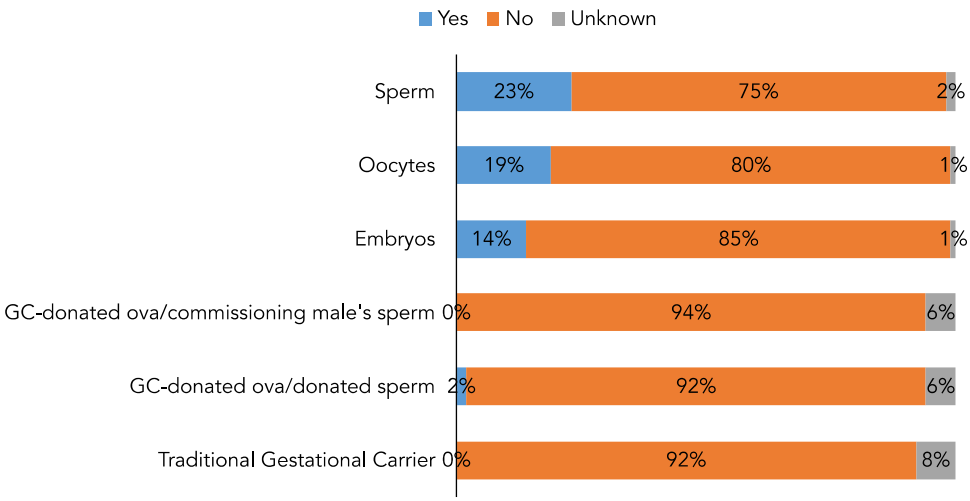


Chart 5. What Does Insurance Coverage or Government Funding Cover-Third Party?

European countries (Spain, Portugal, Finland, and Czech Republic) PGT for screening (previously defined as PGS) is also covered. It is noteworthy that no country representative reported reimbursements for either oocyte or ovarian tissue cryopreservation for non-medical reasons.

Discussion

The percentage of countries whose respondents reported providing ART coverage has modestly increased since the last report and now stands at 64% of reporting countries. In 29% of countries, the reimbursement coverage has increased from the

Chapter 3. Table 6

Does Insurance Coverage or Government Funding Typically Cover the Following ART Cryopreservation Services?

	Cryopreservation from an IVF Cycle		Cryopreservation for Fertility Preservation for Medical Indications					Cryopreservation for Fertility Preservation for Non-medical Indications				
Country	Supernumerary Oocytes	Supernumerary Embryos	Oocytes	Sperm	Embryos	Testicular Tissue	Ovarian Tissue	Oocytes	Sperm	Embryos	Testicular Tissue	Ovarian Tissue
Argentina	NO	YES	NO	NO	NO	Unknown	Unknown	NO	NO	NO	Unknown	Unknown
Australia			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Austria	YES	YES	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO
Bangladesh	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Barbados	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Belarus	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Belgium	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Brazil	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO		NO
Bulgaria	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Cameroon	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Canada	NO	NO	YES	YES	YES	YES	Unknown	NO	NO	NO	NO	Unknown
Chile	YES	NO	NO	NO	NO	Unknown	Unknown	NO	NO	NO	Unknown	Unknown
China	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Colombia	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Czech Republic	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Denmark	YES	YES	YES	YES	YES	Unknown	YES	NO	NO	NO	NO	NO
Ecuador	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Estonia	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Finland	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
France	YES	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO
Germany	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Greece	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Guatemala	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Unknown
Honduras	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Hungary	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
India	NO	NO	NO	NO	NO		NO	NO	NO	NO	NO	NO
Iran	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Ireland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Israel	YES	YES	YES	YES	YES	NO	YES		NO	NO	NO	NO
Italy	YES	YES	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
Japan	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Jordan	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Kazakhstan	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Kenya	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Malaysia	NO	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Mexico	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Myanmar	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Netherlands	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Nigeria	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Norway	YES	YES	YES	YES	YES	YES	YES		NO	NO	NO	NO
Paraguay	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Philippines	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Portugal	Unknown	YES	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO
Romania	YES	YES			YES							
Russian Federation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Senegal	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Singapore	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Slovak Republic	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
South Africa	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
South Korea	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Spain	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Sri Lanka	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Sweden	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Switzerland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Taiwan (China*)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Trinidad and Tobago	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Tunisia	YES	YES	YES	YES	YES	YES	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Turkey	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
UK	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
Uruguay	NO	YES	NO	NO	YES	YES	NO	NO	NO	YES	YES	NO
USA	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Venezuela	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

previous report, offering reassurance that policy makers realize the societal importance of supporting fertility therapy. Respondents from some countries with large populations (e.g., India, China) report not providing funding for ART treatments. Considering the significant shift toward eSET worldwide, it is noteworthy that only 18% of countries tie their ART reimbursement programmes to an eSET policy. eSET in ART has the potential for significant cost-effectiveness when considering the care for multiple newborns born through ART who often present with medical complications and prematurity. The cost savings for an eSET policy linked to national ART reimbursement policies perhaps requires greater research and assessment at the country level. Similarly, PGT for disease detection, a procedure with clear medical indications, is covered only in Israel and a few European countries. Cross-border reproductive care is a world phenomenon and the Slovakian initiative to reimburse cross-border ART therapy is unique; however, no details on the eligibility criteria were provided.

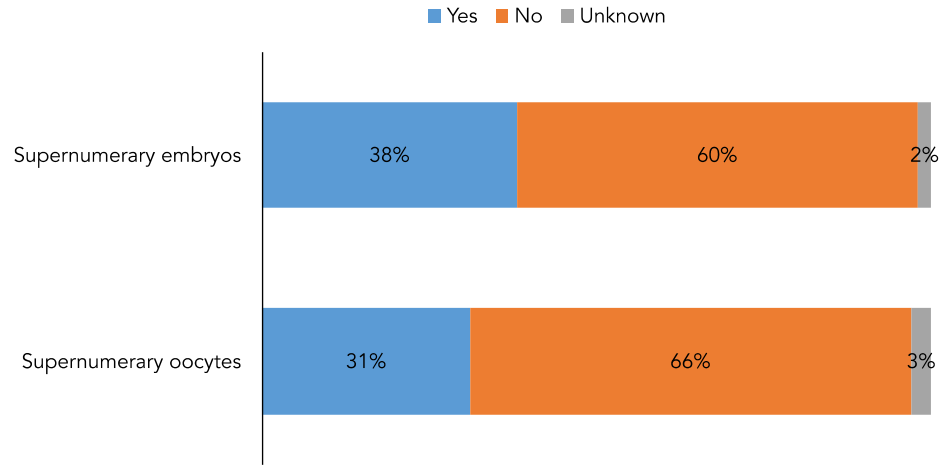


Chart 6. What Does Insurance Coverage or Government Funding Cover -Cryopreservation from An IVF Cycle?

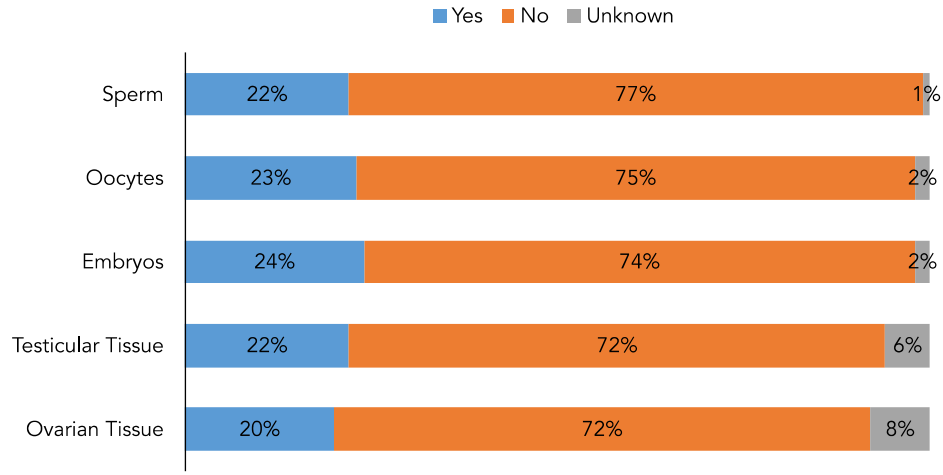


Chart 7. What Does Insurance Coverage or Government Funding Cover-Cryopreservation for fertility preservation for medical indications?

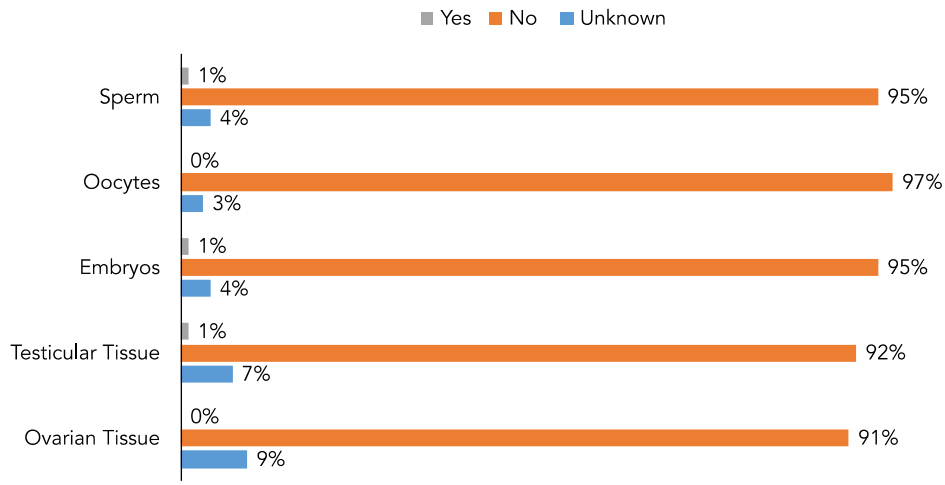


Chart 8. What Does Insurance Coverage or Government Funding Cover-Cryopreservation for Fertility Preservation For Non-medical Indications?

Summary

Insurance coverage for ART remains an area of great disparity as reported among the world's countries. This report notes a modest increase in coverage, with 74% of countries providing a reported coverage at various levels through a national, regional/provincial, or state plan. Eligibility criteria for funding and expanded equity of access are areas that require greater exploration.

References

[1] Dyer S, Chambers GM, De Mouzon J, et al. International Committee for Monitoring Assisted Reproductive Technologies world report: Assisted Reproductive Technology 2008, 2009 and 2010. Hum Reprod 2016;31 (7):1588-1609.

[2] Ory SJ (Ed.). IFFS Surveillance 2013. Available at: https://c.ymcdn.com/sites/iffs.site-ym.com/resource/resmgr/iffs_surveillance_09-19-13.pdf. Accessed August 9, 2016.

CHAPTER 4: MARITAL STATUS

Introduction

A stable, legal heterosexual relationship (marriage) is reported to be a requirement for assisted reproductive technology (ART) services in most countries offering treatment. The concept of marriage has been expanded to include couples or individuals in a stable same sex relationship. This current survey also addresses provisions for care for single individuals and patients in same sex relationships, including their acceptance as legal parents, and the type of treatments offered to them.

In Surveillance 2013, only marital status and relevant laws pertaining to access to ART were addressed. In this survey, access to ART based on relationship status was explored in the following categories:

- Which countries require a stable relationship as a basis for ART treatment;
- Whether laws or guidelines exist to regulate this;
- What type of treatment may be offered to patients who are not a part of this category; and,
- If a same sex partner has legal rights to parenthood.

Analysis of the Survey

Of 68 countries that had respondents who provided responses to this topic, 31 countries reported that a patient is required to be in a recognized or stable heterosexual relationship to avail of ART treatment (Table 1 and Chart 1). Of these, 17 countries reported federal laws or statutes governing these regulatory processes. Ten countries, including several Southeast Asian countries, have professional organizations or guidelines that address access to care based on relationship status. In six countries, primarily in Islamic nations, the requirement for a stable relationship was reported by the respondents to be chiefly based upon the religious and cultural preferences of that country, although no official laws may exist.

In the 2015 survey, this topic was further explored in three additional categories. Those countries that did not cite existence of a stable relationship as a requirement were surveyed to find out whether access to treatment was available to the following groups: single women, single men, males in same sex

Chapter 4. Table 1

To Access IVF or ART Services, are a Couple or an Individual Required to be in a Recognized or Stable Heterosexual Relationship?

				Are these Requirements Governed by?					
Country	Yes	No Requirement	Unknown	Federal/National Laws/ Statutes/Ordinances	Professional Organization Standards/Guidelines	State/Provincial/Regional Laws/Statutes/Ordinances	Cultural Practice	Religious Decree	Agency Regulations/ Oversight
Argentina		+							
Australia		+							
Austria	+				+				
Bangladesh	+					+		+	+		
Barbados		+							
Belarus		+							
Belgium		+							
Brazil		+							
Bulgaria		+							
Cameroon	+					+			
Canada		+							
Chile		+							
China	+						+		
Colombia		+							
Czech Republic	+				+				
Denmark		+							
Ecuador		+							
El Salvador		+							
Estonia		+							
Finland		+							
France	+			+					
Germany		+							
Greece		+							
Guatemala		+							
Honduras		+							
Hong Kong (China*)	+								+
Hungary	+				+				
Indonesia	+							+	
Iran	+				+				
Iraq	+							+	
Ireland		+							
Israel		+							
Italy	+				+				

Chapter 4. Table 1

(Continued)

				Are these Requirements Governed by?					
Country	**Yes**	**No Requirement**	**Unknown**	**Federal/National Laws/ Statutes/Ordinances**	**Professional Organization Standards/Guidelines**	**State/Provincial/Regional Laws/Statutes/Ordinances**	**Cultural Practice**	**Religious Decree**	**Agency Regulations/ Oversight**
Japan	+				+				
Jordan	+			+			+	+	
Kazakhstan	+			+					
Kenya			+						
Malaysia	+				+				
Mali	+				+		+		
Mexico		+							
Myanmar			+						
Netherlands		+							
Nigeria		+							
Norway	+			+					
Panama		+							
Paraguay		+							
Peru		+							
Philippines	+								
Portugal	+			+					
Romania		+							
Russian Federation		+							
Saudi Arabia	+				+		+	+	
Senegal	+				+		+		
Singapore	+			+					
Slovak Republic	+			+	+		+		
South Africa		+							
South Korea	+				+				
Spain		+							
Sri Lanka			+						
Sweden	+			+					
Switzerland	+			+					
Taiwan (China*)	+			+					
Trinidad and Tobago		+							
Tunisia	+			+					
Turkey	+			+					
UK		+							
Uruguay		+							
USA		+							
Venezuela		+							

relationships, females in same sex relationships, transgender individuals, and intersex individuals (Table 2).

Of the 36 countries included in this category, all respondents (with the exception of Columbia) reported that their countries offer treatment to single women. Sixteen of these countries reportedly offered ART services to single males. Twenty-eight countries offered treatment to same sex female couples, whereas only 13 allowed treatment for same sex male couples. In addition, 14 of these countries had respondents who reported that their country allows treatment of transgender and intersex individuals. Based upon respondent responses, those countries with the greatest access for all infertile populations (e.g., those that allow treatment to all patients, regardless of their relationship status) included Australia, Belgium, Brazil, Canada, Mexico, Paraguay, Peru, South Africa, UK, and USA (individual state specific).

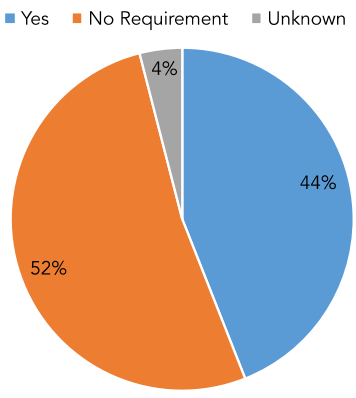


Chart 1. To access IVF or ART services, are a couple or an individual required to be in a recognized or stable heterosexual relationship required?

The next query determined whether a country has laws that recognize the same-sex partner of a person who has used ART as a legal parent of the resulting child (Table 3 and Chart 2). A total of 70 countries had respondents who answered this question. Eighteen of these countries were reported to regard the same sex partner of a woman as a legal parent, and 11 of these countries were reported to also regard a man with a male partner as a legal parent.

A slight discrepancy in the responses from surveyed countries showed that Argentina and Denmark recognized a man with a male partner as a legal parent. However, respondents from these two countries did not report that same sex male couples were allowed to undergo ART treatment. Similarly, Israel is reported to recognize a woman's same sex partner as a legal parent, but also was reported to not allow treatment for same sex female couples.

This year's survey also included a new section, which listed the types of treatments available to unmarried couples. Respondents from 60 countries answered this section, and reported that basic infertility evaluations were available for single women. Of these 60 countries, 13 were reported to permit the use of traditional gestational carriers and 15 countries were reported to allow embryo donation with gestational carriers for single women

Chapter 4. Table 2

If there is No Requirement for an Official or Stable Heterosexual Union, is IVF or ART Services Accessible to?

	Single Women		Single Men			Same Sex Female Couples			Same Sex Male Couples			Transgender			Intersex Individuals		
Country	**Yes**	**No**	**Yes**	**No**	**Unknown**	**Yes**	**No**	**Unknown**	**Yes**	**No**	**Unknown**	**Yes**	**No**	**Unknown**	**Yes**	**No**	**Unknown**
Argentina	+			+		+				+			+			+	
Australia	+		+			+			+			+			+		
Barbados	+			+		+				+			+			+	
Belarus	+			+				+			+			+			
Belgium	+		+			+			+			+			+		
Brazil	+		+			+			+			+			+		
Bulgaria	+			+		+				+				+			+
Canada	+		+			+			+			+			+		
Chile	+		+			+				+			+				+
Colombia		+		+			+			+			+			+	
Denmark	+			+		+				+		+			+		
Ecuador	+			+		+				+			+			+	
El Salvador	+		+			+				+				+			+
Estonia	+			+		+				+				+			+
Finland	+		+			+			+				+			+	
Germany	+			+		+				+				+			+
Greece	+			+			+			+			+			+	
Guatemala	+			+		+				+			+			+	
Honduras	+		+					+			+			+			+
Ireland	+			+		+			+			+			+		
Israel	+						+			+			+			+	
Mexico	+		+			+			+			+			+		
Netherlands	+				+	+					+			+			+
Nigeria	+			+			+			+			+			+	
Panama	+			+		+				+			+			+	
Paraguay	+		+			+			+			+			+		
Peru	+		+			+			+			+			+		
Romania	+			+			+			+			+			+	
Russian Federation	+			+				+		+				+			+
South Africa	+		+			+			+			+			+		
Spain	+					+				+		+			+		
Trinidad and Tobago	+			+		+				+		+			+		
UK	+		+			+			+			+			+		
Uruguay	+			+		+				+			+			+	
USA	+		+			+			+			+			+		
Venezuela	+		+			+			+					+			+

Chapter 4. Table 3

Does Your Country have Laws that Recognize the Same-sex Partner of a Person who has used Assisted Reproduction as a Legal Parent of the Resulting Child?

	Same Sex Partner of a Woman			Same Sex Partner of a Man		
Country	**Yes**	**No**	**Unknown**	**Yes**	**No**	**Unknown**
Argentina	+			+		
Australia	+					
Austria	+				+	
Bangladesh		+			+	
Barbados		+			+	
Belarus		+			+	
Belgium	+			+		
Brazil	+			+		
Bulgaria		+			+	
Cameroon		+			+	
Canada			+			+
Chile		+			+	
China		+			+	
Colombia		+			+	
Czech Republic		+			+	
Denmark	+			+		
Ecuador		+			+	
El Salvador		+			+	
Estonia		+			+	
Finland	+			+		
France		+			+	
Germany			+			+
Greece		+			+	
Guatemala		+			+	
Honduras		+			+	
Hong Kong (China*)		+			+	
Hungary		+			+	
India		+			+	
Indonesia		+			+	
Iran		+			+	
Iraq		+			+	
Ireland	+			+		
Israel	+				+	
Italy		+			+	
Japan		+			+	
Jordan		+			+	
Kazakhstan		+			+	
Kenya		+			+	
Mali		+			+	
Malaysia		+			+	

Chapter 4. Table 3

(Continued)

Country	Same Sex Partner of a Woman			Same Sex Partner of a Man		
	Yes	No	Unknown	Yes	No	Unknown
Mali		+			+	
Mexico	+				+	
Myanmar			+			+
Kenya		+			+	
Malaysia		+			+	
Mali		+			+	
Mexico	+				+	
Myanmar			+			+
Netherlands	+			+		
Nigeria		+			+	
Norway	+				+	
Panama		+			+	
Paraguay		+			+	
Peru		+			+	
Philippines		+			+	
Portugal		+			+	
Romania		+			+	
Russian Federation		+			+	
Saudi Arabia		+			+	
Senegal		+			+	
Singapore		+			+	
Slovak Republic		+			+	
South Africa	+			+		
South Korea		+			+	
Spain	+				+	
Sri Lanka		+			+	
Sweden	+			+		
Switzerland		+			+	
Taiwan (China*)		+			+	
Trinidad and Tobago		+			+	
Tunisia		+			+	
Turkey		+			+	
UK	+			+		
Uruguay	+				+	
USA	+			+		
Venezuela		+			+	

*Reporting separately for this report.

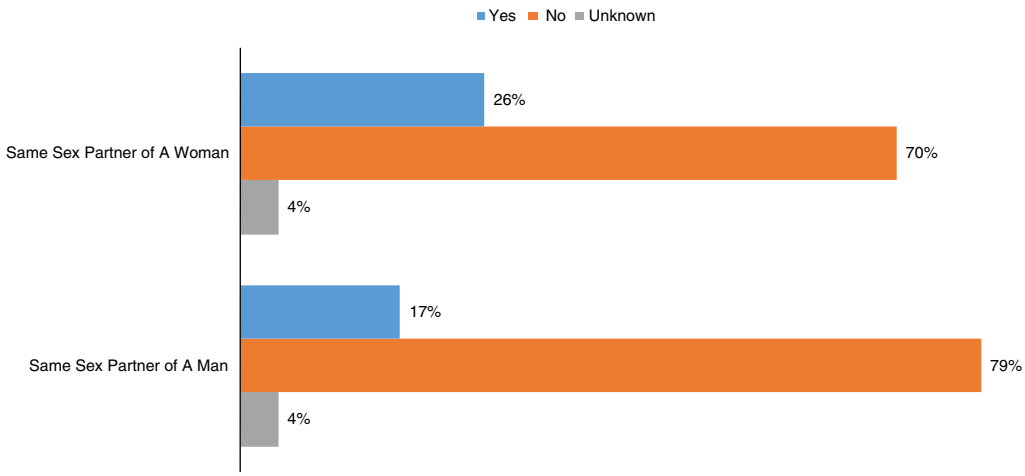


Chart 2. Does your country have laws that recognize the same-sex partner of person who has used assisted reproduction as a legal parent of the resulting child?

desiring pregnancies. Forty of the 54 responding country respondents reported that diagnostic evaluation of single men was permitted but only 14 of these countries were reported to permit advanced treatments, including in vitro fertilization (IVF). Respondents from 30 countries reported to offer treatment to male same sex partners, female same sex partners, and transgender couples.

Summary

Most countries reportedly offered infertility treatment to women regardless of their relationship status. Laws and guidelines in some countries often limit access to services to specific population groups or to specific treatments such as IVF, pre-implantation genetic testing (PGT) for disease, and the use of gestational carriers.

CHAPTER 5: NUMBER OF EMBRYOS FOR TRANSFER IN ART

Introduction

The World's first in vitro fertilization (IVF) baby, born in 1978, resulted from the recovery of a single oocyte from a "natural cycle" followed by fertilization with sperm in a culture dish, and transfer of the resulting single embryo to the uterus of the woman. However, shortly thereafter, it became apparent that IVF production and subsequent transfer of multiple embryos was associated with a greater success rate, and that controlled ovarian hyperstimulation or multiple follicular stimulation was performed in order to produce more oocytes and respectively more embryos. It became common practice to transfer three, four, or more embryos to achieve a better chance of a pregnancy. However, it soon became apparent that large numbers of twins and higher order multiple (HOMs; triplets and greater) births resulted in an unacceptably high fetal and maternal complication rate. Multiple pregnancies remain the single greatest risk of assisted reproductive technology (ART) despite great concern and efforts to reduce this risk over the past two decades.

The incidence of twin and HOM births quadrupled after 1980 – the beginning of the ART era – and peaked in many countries in the 1990s. Many countries addressed this alarming public health problem with a variety of initiatives intended to reduce the number of embryos transferred [2]. A dramatic reduction in multiple pregnancies, particularly HOMs, followed in most countries but considerable variation continues to exist in the strategies employed and their efficacy in reducing multiple rates. Limitations on the number of embryos permitted for transfer has had a profound effect on multiple rates; however, the continued practice of controlled ovarian hyperstimulation (COH) that results in high numbers of oocyte maturation (with or without intra-uterine insemination [IUI; procedure within which the number of embryos generated cannot be controlled]) remains an important contributor to multiple pregnancies, especially HOMs.

The risk of fetal, neonatal, and infant death is considerably increased for twins, triplets, and quadruplets. For example, the perinatal mortality and infant mortality rates for singleton versus multiple births in England and Wales for the year 2013 [1] were as follows: - Neonatal deaths: 2.4 versus 13.8 per 1000 live births; Infant deaths: 3.6 versus 17.7 per 1000 live births, and post-neonatal deaths: 1.1 versus 3.9 per 1000 live births. For quadruplets, the mortality rate was 40 to 50% higher than for triplets. This increase in perinatal mortality is primarily due to premature delivery, but also to utero-placental compromise and an increased rate of congenital anomalies amongst these infants. Maternal complications of triplet and HOM births include pregnancy-induced hypertension, ante-partum and post-partum haemorrhage, and severe anemia.

An intensive effort to inform patients of the extensive and severe risks of multiple pregnancies has served to inform the debate and promote broader patient acceptance of more restrictive embryo transfer policies. However, some patients are still insistent on the transfer of an inappropriate number of embryos for a variety of reasons and some clinicians advocate and practice transfer of an excessive number of embryos. The methods by which this problem is addressed (or not addressed) vary enormously among countries and remains one of the most contentious issues in ART.

During the past 10 years in Europe, especially within the last five years, a variety of measures have been employed to greatly limit the number of embryos that can be transferred. Most recently, studies from Sweden, Denmark, the Netherlands, and Belgium have shown that single embryo transfer (SET), especially when combined with frozen/thawed embryo transfer (FET) in a subsequent cycle, achieves pregnancy and live birth rates equivalent to the transfer of two and even three or more embryos, without the complications of twin and HOM pregnancies and births. Several countries now have firm guidelines or regulations allowing only SET for certain categories of patients. The United Kingdom regulatory body has put in place measures to ensure that national and clinic specific multiple pregnancy rates must be maintained at below 10% of all IVF births. Thus, increasingly, practitioners are advocating the transfer of a single embryo.

Some Recommended Indications for SET

The American Society of Reproductive Medicine (ASRM) in their recent Practice Committee Report on SET [3,4] recommended the following as guidelines for considering SET:

- Female age < 35
- More than one "top quality embryo" available for transfer
- First or second treatment cycle
- Previous successful IVF cycle
- Recipient of embryos created from donor oocytes.

Some European countries are recommending a tighter criterion for SET, setting the age for SET at < 37 or 38. The British Fertility Society (BFS) in 2015 recommended that at least 50% of embryo transfers should be SET and never more than two embryos [5]. The effect of this policy would be to bring the multiple pregnancy rate down to $< 10\%$. They recommend that practitioners consider the following factors:

- Female partner's age
- Previous pregnancies
- Cause of infertility
- Number of previous IVF failures
- Response to follicular stimulation
- Number of oocytes
- Number of good quality embryos
- Number cultured to blastocyst.

Analysis of the Survey

Three separate questions were included in the 2015 survey to assess current practices regarding this issue.

In response to the question: "Are the number of embryos transferred regulated in your country; if so, by what means", 41 (59%) confirmed the existence of guidelines or laws governing the number of embryos permitted for transfer, while 24 did not, and five gave no or non-valid replies (Table 1 and Chart 1). Of the 41 countries having regulations/guidelines, 14 were reported to be enforced by federal or national laws, and 27 by guidelines or professional organizations.

To the query: "If the number of embryos transferred is under governance in your country, is there a penalty for violation? (Table 2). If "yes", what is the violation and is it variable"; 17 countries (24%) had responses that affirmed that there was indeed a penalty, 36 (51%) noted that no penalty exists, and 17 (24%) of the country respondents did not answer the question. Nine of the 17 that reported penalties responded with details of

Chapter 5. Table 1

Are the Number of Embryos Transferred Regulated in Your Country by?

Country	Agency Regulations/ Oversight	Professional Organization Standards/ Guidelines	Federal/National Laws/Statutes/ Ordinances	Cultural Practice	Not Regulated	Religious Decree
Argentina					X	
Australia	X	X				
Austria		X				
Bangladesh					X	
Barbados					X	
Belarus						
Belgium			X			
Brazil	X	X				
Bulgaria			X			
Cameroon		X				
Canada					X	
Chile					X	
China			X			
Colombia		X				
Czech Republic			X			
Denmark		X	X			
Ecuador		X			X	
El Salvador					X	
Estonia			X			
Finland					X	
France				X		
Germany	X	X	X			
Greece	X		X			
Guatemala					X	
Honduras						
Hong Kong (China*)	X					
Hungary		X	X			
India	X					
Indonesia						
Iran	X				X	
Iraq						
Ireland		X				
Israel		X	X			X
Italy					X	
Japan		X				
Jordan					X	
Kazakhstan		X				
Kenya					X	
Malaysia					X	
Mali					X	
Mexico					X	
Myanmar					X	
Netherlands			X			
Nigeria		X				
Norway					X	
Panama					X	
Paraguay					X	
Peru					X	
Philippines		X				
Portugal	X					
Romania					X	
Russian Federation			X			
Saudi Arabia	X	X			X	
Senegal					X	
Singapore			X			
Slovak Republic		X				
South Africa			X			
South Korea		X				
Spain			X			
Sri Lanka					X	
Sweden			X			
Switzerland		X	X			
Taiwan (China*)	X	X				
Trinidad and Tobago					X	
Tunisia					X	
Turkey			X			
UK	X	X	X	X		
Uruguay			X			
USA		X		X		
Venezuela		X				

*Reporting separately for this report.

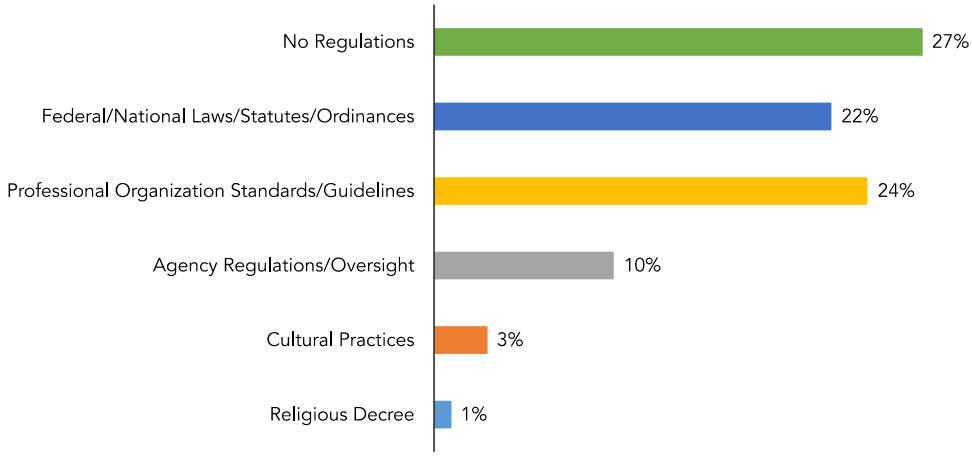


Chart 1. Are the number of embryos transferred in your country regulated by? (More than one category may have been chosen per country).

Chapter 5. Table 2

If the Number of Embryos Transferred is Under Governance in Your Country, is there a Penalty for Violation?

Country	Yes	No	Unknown	If yes, what is the Violation and is it Variable, and if so, why?
Argentina		X		
Australia		X		
Austria		X		
Bangladesh			X	
Barbados				
Belarus			X	
Belgium		X		
Brazil	X			
Bulgaria	X			no response
Cameroon		X		
Canada		X		
Chile				
China	X			Fine or disqualify the ART License
Colombia		X		
Czech Republic		X		
Denmark		X		
Ecuador				
El Salvador		X		
Estonia	X			Fines and /or revocation of license
Finland		X		
France				
Germany	X			up to â‚¬50,000 or up to 6 mo in jail, depending on the court
Greece	X			Violation: To surplus the permitted number of transferred embryos. Variables: Temporary revoke of license min. 6 mo. Fine: 2000 -4000 â‚¬. If it is violated again a new permanently revoke of license.
Guatemala		X		
Honduras				
Hong Kong (China*)	X			Warning letter to attending physician.
Hungary	X			In serious cases, withdraw of licenses (never happened).
India			X	
Indonesia				
Iran		X		
Iraq				
Ireland		X		
Israel		X		
Italy		X		
Japan			X	
Jordan			X	
Kazakhstan		X		
Kenya				
Malaysia		X		
Mali		X		
Mexico				
Myanmar			X	
Netherlands		X		
Nigeria		X		
Norway		X		
Panama		X		
Paraguay		X		
Peru		X		
Philippines		X		
Portugal		X		
Romania		X		
Russian Federation		X		
Saudi Arabia		X		

Chapter 5. Table 2

(Continued)

Country	Yes	No	Unknown	If yes, what is the Violation and is it Variable, and if so, why?
Senegal		X		
Singapore	X			Depends on Ministry of Health
Slovak Republic		X		
South Africa	X			10 y in jail
South Korea		X		
Spain	X			Law 14/2006 establishes penalties of 1001-10.000 Euros if >3 embryos are transferred
Sri Lanka		X		
Sweden	X			
Switzerland	X			
Taiwan (China*)	X			
Trinidad and Tobago				
Tunisia				
Turkey	X			Centre pays all of the expenses of pregnancy and delivery.
UK	X			There are national targets to reach by each clinic
Uruguay	X			Transfer more than 2 embryos, they could close your Clinic
USA		X		
Venezuela		X		

*Reporting separately for this report.

the penalty for violation. These penalties included (1) revocation of the ART license in four countries; (2) up to six months in jail or a 50,000 Euro fine; (3) a warning letter to the physician in charge; (4) 10 years in jail for the director; (5) a fine of 1000-10,000 Euros if >3 embryos are transferred; and (6) a requirement that the centre to pay all the expenses of the pregnancy, delivery, and neonatal care of multiple pregnancies.

In response to the question: "What is the maximum number of embryos allowed to be transferred" (Table 3), the 23 countries that had respondents who provided complete answers noted:

- Oocyte age <35: 1 country = 1 embryo only, 8 countries = 2 embryos, 8 countries = 3 embryos, 2 countries = 4 embryos, and 4 countries with no response.
- Oocyte age 35-39: No countries limited to 1 embryo, 7 countries = 2 embryos, 9 countries = 3 embryos, 2 countries = 4 embryos, and 5 countries with no response.
- Oocytes age ≥40: No countries limited to 1 embryo, 3 countries = 2 embryos, 11 countries = 3 embryos, 4 countries = 4 embryos, and 5 countries with no response.

Of note is that only one country (USA, individual state specific) established new guidelines to reduce the recommended number of embryos for transfer from 2 to 1 for women <35 years of age, based on blastocyst stage.

In response to the question about criteria for the number of embryos to be transferred (Table 4), 26 countries had respondents who provided responses regarding the age of the donor oocyte recipient: 11 countries answered "yes", 5 answered "no", and 10 answered "not addressed". When considering the age of the donor: 7 countries answered "yes". 8 "no". and 11 answered "not addressed". Regarding the quality of the embryos as a determinant: 11 countries answered "yes", 8 "no", and 7 answered "not addressed". Regarding the stage of the embryo (cleavage or blastocyst stage): 7 countries answered "yes", 10 "no", and 9 "not addressed". The tables below list the individual policies of the countries' respondent responses regarding the number of embryos allowed for transfer, which also in some cases included qualifying or detailed comments provided by some respondents.

Chapter 5. Table 3

Maximum Number of Embryos Allowed to be Transferred?

	Oocyte Age <35			Oocyte Age 35-39			Oocyte Age =>40		
Country	Day 2	Day 3	Day 5	Day 2	Day 3	Day 5	Day 2	Day 3	Day 5
Bangladesh	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not Addressed
Belarus	2	2	2	2	3	3	3	3	3
Brazil	2	2	2	3	3	3	4	4	4
Bulgaria	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
China	3	3	3	3	3	3	3	3	3
Estonia	3	3	3	3	3	3	3	3	3
Germany	3	3	3	3	3	3	3	3	3
Greece	2	2	2	3	3	3	4	4	4
Hong Kong (China*)	3	3	3	3	3	3	3	3	3
Hungary	4	4	4	4	4	4	4	4	4
India	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not Addressed
Japan	2	2	2	2	2	2	2	2	2
Jordan	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Singapore	2	2	2	2	2	2	3	3	3
South Africa	3	3	3	3	3	3	3	3	3
Spain	3	3	3						
Sweden	2	2	2	2	2	2	2	2	2
Switzerland	3	3	3	3	3	3	3	3	3
Taiwan (China*)	4			4			4		
Turkey	1	1	1	2	2	2	2	2	2
UK	2	2	2	2	2	2	3	3	3
Uruguay	3	3	2	3	3	2	3	3	2
USA	2	2	1	2	2	2	3	3	3

*Reporting separately for this report.

Chapter 5. Table 4

Is the Number of Embryos to be Transferred Based on?

Country	Age of the Donor Oocyte Recipient	Age of the Oocyte Donor	Quality of the Embryos	Stage of the Embryo
Bangladesh	Not addressed	Not addressed	YES	NO
Belarus	YES	YES	YES	Not addressed
Brazil	YES	YES	YES	YES
Bulgaria	YES	NO	NO	NO
China	Not addressed	Not addressed	Not addressed	Not addressed
Colombia	YES	YES	YES	YES
Czech Republic	YES	YES	NO	NO
Estonia	NO	NO	NO	NO
Germany	Not addressed	Not addressed	NO	NO
Greece	YES	UNKNOWN	YES	YES
Hong Kong (China*)	Not addressed	Not addressed	Not addressed	Not addressed
Hungary	YES	YES	YES	YES
India	Not addressed	Not addressed	Not addressed	Not addressed
Japan			Not addressed	Not addressed
Jordan	Not addressed	Not addressed	Not addressed	Not addressed
Myanmar	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Singapore	YES	NO	NO	NO
South Africa	NO	NO	NO	NO
Spain	NO	NO	NO	NO
Sweden	YES	NO	YES	YES
Switzerland	Not addressed	Not addressed	YES	YES
Taiwan (China*)	Not addressed	Not addressed	Not addressed	Not addressed
Turkey	YES	NO	NO	NO
UK	YES	YES	YES	UNKNOWN
Uruguay	NO	NO	YES	NO
USA	NO	YES	YES	YES

*Reporting separately for this report.

Discussion

There is clear evidence that a major effort has been made in most countries to reduce the number of embryos transferred in an IVF cycle, but there is still room for considerable improvement. There are clinics in a few countries that reportedly continue to condone the transfer of an excessive number of embryos. However, the data presented in Surveillance 2016 do show an overall reduction in the number of embryos transferred and a significant trend to increasing the proportion of single embryo transfers.

Summary

The evidence from this 2016 International Federation of Fertility Societies (IFFS) Survey supports the notion that there has been an increase in the proportion of countries with legislation or clinical guidelines restricting the number of embryos permissible for transfer to women undergoing IVF/ART cycles (59% vs. 38% in 2013). Respondents reported a variety of sanctions that have been imposed by the 17 countries that noted that penalties exist for non-compliance, ranging from revocation of a clinic's license to practice ART, to substantial fines, to prison terms for responsible individuals.

Progress in the actual reduction of the number of embryos transferred has been more gradual but improvements in culture systems, embryo selection methods, and cryopreservation technology have led to improved embryo implantation rates and live birth rates. As these advances become evidence-based and are more consistently applied, further reductions in multiple embryo transfers and multiple pregnancy rates should become evident.

References

[1] Office for National Statistics. Statistical bulletin: Childhood, Infant and Perinatal Mortality in England and Wales: 2013; March 2015.

[2] Maheshwari A, Griffiths S, Bhattacharya S Global variations in the uptake of single embryo transfer. Hum Reprod Update 2011;17(1):107–120.

[3] Practice Committee of the Society for Assisted Reproductive Technology, Practice Committee of the American Society for Reproductive Medicine. Elective single-embryo transfer. Fertil Steril 2012;97:835–842.

[4] Practice Committee of the American Society for Reproductive Medicine, Practice Committee of the Society for Assisted Reproductive Technology. Criteria for number of embryos to transfer: A Committee Opinion. Fertil Steril 2013;99:44-46.

[5] Harbottle S, Hughes C, Cutting R, et al; Association Of Clinical Embryologists (ACE) & The British Fertility Society (BFS). Elective single embryo transfer: an update to UK Best Practice Guidelines. Hum Fertil 2015;18(3):165-183.

CHAPTER 6: CRYOPRESERVATION

There has been considerable interest in the field of cryopreservation of human tissue for over 200 years. Recent advances in freezing reproductive tissues have potentiated several new clinical applications. Initial development of slow freezing techniques and subsequent vitrification technology coupled with newer cryoprotectants in various combinations have advanced the field considerably. Sperm, oocytes, and embryos can now be frozen at various stages of development, allowing for safer and more efficacious assisted reproductive technology (ART) treatments as well as allowing for the cryopreservation of gametes and embryos for fertility preservation [1].

Human ART today, routinely in a majority of in vitro fertilization (IVF) laboratories, utilizes both sperm and embryo cryopreservation. Sperm banking is indicated for cancer patients facing gonadotoxic therapy. Preservation of testicular tissue obtained from prepubertal boys undergoing gonadotoxic treatment and those with cryptorchidism has been performed but is still experimental. Techniques to induce in vitro spermatogenesis are being developed with the aim of preserving fertility in patients affected by diseases such as Klinefelter Syndrome and Sertoli cell only syndrome [2]. Embryo cryopreservation offers the opportunity to avoid repeated ovarian stimulation, optimizes achieving embryo-endometrial synchrony, and facilitates performing single embryo transfer (SET). The improved results of embryo cryopreservation have been an essential component for preimplantation genetic testing, especially when trophectoderm biopsy is performed [3] Oocyte cryopreservation for fertility preservation is now being widely used in the majority of clinical ART centres. It is indicated for fertility preservation in patients of reproductive age facing treatment of malignancies or chronic illnesses in which the underlying disease or its treatment would likely result in loss of fertility potential. It is also commonly performed for donor oocyte banking and elective postponement of childbirth. Cited advantages are that it eliminates certain ethical, moral, and in some jurisdictions, legal obstacles to embryo freezing. The limited available studies suggest that the technique of vitrification of oocytes has higher pregnancy rates as compared to slow-freezing [4]. The advent of donor egg cryobanks with cryopreserved oocytes allows larger supplies of potential donor oocytes to be produced and avoids the need for cycle synchronization with the recipient [5]. Oocyte cryopreservation also allows for the quarantining of human immunodeficiency virus (HIV) affected oocytes [6,7]. A more controversial but increasingly prevalent application involves offering oocyte vitrification to

healthy women with good reproductive potential with the intent of extending their reproductive lifespan [8].

Potential concerns regarding the effects of cryopreservation on the embryo genome have been addressed in various studies. The limited numbers of long-term follow-up human studies provide reassurance but they are mostly derived from retrospective studies with some methodological weaknesses [9].

Ovarian tissue cryopreservation is still considered an experimental procedure. It is indicated for patients who require immediate gonadotoxic treatment without the opportunity for oocyte or embryo freezing and is the only option available for prepubertal girls. Vitrification of ovarian tissue was found to be similar to slow freezing, and both preserved the morphologic integrity of the ovarian tissue [10]. Orthotopic transplantation of the cortical strips from the tissue has been successful, and live births have been reported. However, it could not be ascertained whether ovulation from a remaining, untreated ovary produced the pregnancy [11].*In vitro* activated ovarian tissue cryopreservation and transplantation is a new method requiring more clinical research. This procedure involves stimulation of dormant follicles within the cryopreserved tissue graft prior to transplantation, in order to generate mature oocytes shortly after transplantation [12].

Analysis of Survey (Tables 1 and 2)

Of the 68 respondents that provided information on this topic, the results show that 27 countries are regulated by cryopreservation laws or statutes; 15 have only guidelines and nine have both statutes and guidelines to follow. However, 17 of these countries were reported to have no regulations or guidelines, follow individual practice policies, or are guided by cultural or religious decrees.

Cryopreservation of fertilized oocytes and embryos was permitted at all stages through blastocyst development in all the participating countries except Italy, which permits oocyte cryopreservation but not embryo freezing. Prior to 2008, the law in Italy banned embryo freezing and permitted that a maximum of three oocytes per cycle be inseminated. Transfer of all embryos produced was required, prohibiting surplus embryo production and freezing. In May 2009, the Constitutional Court declared this law to be unconstitutional, removing most of its limitations. The changes allowed embryo selection and cryopreservation in specific cases [13]. Venezuela now permits embryo cryopreservation, which was not allowed at the time of publication of Surveillance 2013; cryopreservation of oocytes, ovarian, testicular tissue has been and remains acceptable. In the Netherlands, though permitted, fertilized egg freezing is not practiced, yet oocyte cryopreservation is commonly used. In Ireland, the issue of personhood with regard to the embryo has raised ethical questions and led to the passage of legislation restricting the creation of excess embryos with the intent of avoiding cryopreservation and the need to discard unused embryos. However, after the Supreme Court of Ireland judgment of 2009 stated that embryos in storage are not guaranteed a right to life, the Irish Medical Council altered its guidelines to no longer specifically require that embryos "must be used for normal implantation and must not be deliberately destroyed" [14].

The permissible duration for embryo cryopreservation varies between countries. There is no limit reported for the duration of storage in most of the countries. There is however a reported limit of five years in Belgium, China, Denmark, Norway, Romania, South Korea, Sweden, Switzerland, Turkey, Australia, Greece, Barbados, Mali, and Chile. An extension of five years is permitted in Belgium and in South Korea as well. The limit on embryo cryopreservation is seven years in Estonia and 10 years in Austria, Hungary, Singapore, South Africa, Taiwan [China (Reporting separately for this report.)], UK, Ecuador and Hong Kong [China (Reporting separately for this report.)]. In the UK, the cryopreserved embryos should be transferred before the age 50 of the female partner, and until such time embryo storage can be extended beyond 10 years. The issue of time limit for cryopreservation of gametes and embryos has not been specifically addressed in the Czech Republic, Uruguay, Cameroon, India, Jordan, Germany, Mexico, Paraguay, or Sri Lanka. Survey participants from Ireland, the Philippines, Portugal, and Kenya did not provide an answer to the question, and the answer is unknown to those from France, Slovak Republic, Netherlands, and Malaysia. In Japan, embryos can remain cryopreserved for as long as the couple is married and the female partner is within reproductive age. Spain permits embryo storage until the age of 59 years for the female partner. The American Society for Reproductive Medicine (ASRM) guidelines in the USA recommend storage for an unlimited time, but unclaimed embryos should be discarded after five years of unsuccessful attempts to contact the individual or couple and if there are no written instructions from the couple concerning disposal [15].

All countries with respondents, except Uruguay, permit oocyte cryopreservation. Senegal and Bangladesh have no developed programmes and oocyte cryopreservation has never been performed. Oocyte preservation is reported to be permitted for medical indications such as cases of ovarian hyperstimulation syndrome, failure to obtain a sperm sample, and for fertility preservation for cancer patients only, and specifically not for non-medical (social) indications in Austria, Denmark, France, Hungary, Norway, Singapore, Turkey, Cameroon, Jordan, and Saudi Arabia.

Ovarian and testicular tissue preservation is reported to not be permitted in Bulgaria, Taiwan [China (Reporting separately for this report.)], Nigeria, El Salvador, and Bangladesh. In the countries where it is reported to be permitted, fertility preservation in anticipation of cancer treatment is the main indication for its practice. A few countries including Uruguay, Cameroon, Ecuador, and Barbados report acceptance of testicular tissue cryopreservation, but not for ovarian tissue.

Summary

Cryopreservation of human gametes and embryos has found broad application in the practice of assisted reproduction and has contributed to its overall safety and efficacy. A successful cryopreservation programme for both gametes and embryos is an important component for any ART programme. It can promote optimal success rates, reduce the risk of multiple pregnancy, and effectively address unique patient needs, such as those that require genetic testing or screening, cancer treatment, and special measures to reduce risk of the IVF process (e.g., those at risk for ovarian hyperstimulation). The responses in the current questionnaire indicate broader acceptance of cryopreservation technologies but considerable variation around the world in their regulation and implementation reflecting individual cultural concerns. In addition, various service providers have self-imposed ethnic, societal, or religion based policies guiding these practices. The long-term follow-up of the children born following an IVF cycle from frozen embryos has been reassuring

Chapter 6. Table 1

How is Cryopreservation Governed?

By Statutes	Cryopreservation of Fertilized Eggs		Cryopreservation of Oocytes		Cryopreservation of Ovarian/Testicular Tissue	
	Allowed	Practiced	Allowed	Practiced	Allowed	Specific conditions
Austria	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Belarus	Not for non-medical conditions	+	+	Infrequently	+	Only for medical conditions
Belgium	+	+	+	+	+	
Bulgaria	+	+	+	Infrequently	No	
China	Not for non-medical conditions	Infrequently	+	Infrequently	+	Only for medical conditions
Czech Republic	+	+	+	+	+	
Denmark	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Estonia	+	Infrequently	+	Infrequently	+	
France	Not for non-medical conditions	+	Not for non-medical conditions	+	+	Only for medical conditions
Hungary	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Israel	Not for non-medical conditions	+	+	Infrequently	+	Ovarian tissue -only for medical conditions
Kazakhstan	+	+	+	+	+	
Norway	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Romania	+	+	+	Infrequently	+	
Russian federation	+	+	+	+	+	
Singapore	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Slovak Republic	+	+	+	+	+	
South Africa	+	Infrequently	+	+	+	
South Korea	+	+	+	Infrequently	+	Unknown for non-medical conditions
Spain	Not for non-medical conditions	+	+	+	+	Unknown for non-medical conditions
Sweden	+	+	+	Infrequently	+	
Switzerland	Not for non-medical conditions	+	+	+	+	
Taiwan (China*)	+	+	+	+	No	
Tunisia	+	+	+	Infrequently	+	Not mentioned for non-medical conditions
Turkey	Not for non-medical conditions	Infrequently	Not for non-medical conditions	Infrequently	+	Only for medical conditions
UK	+	+	+	Infrequently	+	
Uruguay	Not for non-medical conditions	+	No		Only Testicular tissue allowed	Ovarian tissue not allowed

By Guidelines	Cryopreservation of Fertilized Eggs		Cryopreservation of Oocytes		Cryopreservation of Ovarian/Testicular Tissue	
	Allowed	Practiced	Allowed	Practiced	Allowed	Specific Conditions
Argentina	+	+	+	+	+	
Cameroon	Not for non-medical conditions	+	Not for non-medical conditions	+	Only Testicular tissue allowed	Only for medical conditions
Colombia	+	+	+	+	+	
Ecuador	+	+	+	+	Only Testicular tissue allowed	Ovarian tissue not allowed
India	+	+	+	+	For medical conditions	Unknown for non-medical reasons
Ireland	+	Infrequently	+	commonly used	+	
Italy	No	Infrequently	+	commonly used		
Japan	+	+	+	Infrequently	+	
Jordan	Not for non-medical conditions	Infrequently	Not for non-medical conditions	Infrequently	+	Only for medical conditions
Netherlands	+	Never performed	+	+	+	Unknown for non-medical reasons
Nigeria	+	+	+	+	No	
Philippines	+	Infrequently	+	+	+	Only for medical conditions
Senegal	+	+	unknown	Never performed	unknown	
USA	+	Infrequently	+	+	+	
Venezuela	+	+	+	+	+	

Both Statute and Guidelines	Cryopreservation of Fertilized Eggs		Cryopreservation of Oocytes		Cryopreservation of Ovarian/Testicular Tissue	
	Allowed	Practiced	Allowed	Practiced	Allowed	Specific Conditions
Australia	+	+	+	+	+	
Brazil	+	+	+	+	+	
Finland	+	+	+	+	+	
Germany	Not for non-medical conditions	+	+	Infrequently	+	
Greece	+	+	+	+	+	
Hong Kong (China*)	+	+	+	Infrequently	+	Only for medical conditions
Iran	+	Infrequently	+	Infrequently	+	Only for medical conditions
Portugal	Not for non-medical conditions		+	Infrequently	+	
Saudi Arabia	Not for non-medical conditions	+	Not for non-medical conditions	Infrequently	+	

None	Cryopreservation of Fertilized Eggs		Cryopreservation of Oocytes		Cryopreservation of Ovarian/Testicular Tissue	
	Allowed	Practiced	Allowed	Practiced	Allowed	Specific Conditions
Chile	+	+	+	+	+	
Barbados	Not for non-medical conditions	+	+	+	Testicular tissue allowed	Ovarian tissue not allowed
Canada						
Chile	+	+	+	Infrequently	+	
El Salvador	Not for non-medical conditions	Infrequently	+	Infrequently	No	
Guatemala	+	+	+	+	+	
Honduras	+	+	+	+	+	
Kenya	+	+	+	Infrequently		
Malaysia	+	Infrequently	+	Infrequently	+	
Mali	+	Infrequently	+	Infrequently	+	
Mexico	+	+	+	+	+	
Panama	+	Infrequently	+	Infrequently	+	
Paraguay	+	+	+	+	+	
Peru	+	+	+		+	
Sri Lanka	+	Infrequently	+	Infrequently	+	Unknown for non-medical conditions
Trinidad and Tobago	+	Infrequently	+	Infrequently	+	

Religious	Cryopreservation of Fertilized Eggs		Cryopreservation of Oocytes		Cryopreservation of Ovarian/Testicular Tissue	
	Allowed	Practiced	Allowed	Practiced	Allowed	Specific Conditions
Bangladesh	Not for non-medical conditions	Infrequently	unknown	Never performed	No	Bangladesh

*Reporting separately for this report.

*Non-Medical conditions include the deliberate deferral of child-bearing for personal reasons. Medical conditions include cryopreservation for a future cycle of fertility treatment due to an existing condition or disease, requiring an immediate toxic pharmaceutical or any other intervention that would be contrary to immediately attempting a pregnancy.

Chapter 6. Table 2

The Duration of Storage of Cryopreserved Fertilized Eggs, and Country Specific Comments

	Country	Consensus on Duration of Storage of Cryopreserved Fertilized Eggs	Comment on Regulation of Cryopreservation
By statutes	Austria	10 y + extension allowed	
	Belgium	5 y + extension allowed	Frozen embryos have to be used before creating new embryos. 10 y storage permitted for gametes
	Bulgaria	No limit	Only those of good quality
	China	5 y	
	Czech Republic	Not addressed	Freezing is allowed for all stages of embryo development
	Denmark	5 y	
	Estonia	7 y	
	France	Unknown	Consent from both partners
	Hungary	10 y	
	Israel	No limit	
	Kazakhstan	No limit	MH Instruction letter
	Norway	5 y	
	Romania	5 y	
	Russian federation	No limit	
	Singapore	10 y	
	Slovak Republic	Unknown	
	South Africa	10 y	Need consent to freeze them. if unclaimed for 10 y they can be destroyed.
	South Korea	5 y	
	Spain	Until female age 50 y	
	Sweden	5 y	For medical and social reasons
	Switzerland	5 y	Only zygotes
	Taiwan (China*)	10 y	
	Tunisia	No limit	
	Turkey	5 y	
	UK	10 y	Couple consent
	Uruguay	Not addressed	
By Guidelines	Argentina	No limit	Informed consent of both partners, with annual renewals
	Cameroon	Not addressed	
	Colombia	No limit	Clinical history of gamete donors, Genetic test, psychological assessment, infectious diseases tests and previous quarantine.
	Ecuador	4–9 y	
	India	Not addressed	
	Ireland		
	Italy	No limit	
	Japan	Not addressed	Frozen embryos should be used during the marriage of the couples by the end of reproductive age of female.
	Jordan	Not addressed	
	Netherlands	Unknown	
	Nigeria	No limit	
	Philippines		married couples, at least Grade 2 + cleavage stage embryos.
	Senegal	No limit	
	USA	No limit	Used commonly in almost all programmes.
	Venezuela	No limit	
Both statutes and Guidelines	Australia	5 y	10 y for gametes (sperm, oocytes)
	Brazil	No limit	Signed informed consent
	Germany	Not addressed	
	Greece	5 y	
	Hong Kong (China*)	10 y	Married couples
	Iran	No limit	
	Portugal		
	Saudi Arabia	No limit	consent of husband and wife
None	Barbados	5 y	10 y for sperm, no limit for oocytes
	Canada	No limit	
	Chile	5 y	
	El Salvador	No limit	No limit for gametes
	Guatemala	No limit	
	Honduras	No limit	
	Ireland	No limit	
	Kenya		
	Malaysia	Unknown	
	Mali	5 y	
	Mexico	Not addressed	
	Panama	No limit	
	Paraguay	Not addressed	
	Peru	No limit	
	Sri Lanka	Not addressed	
	Trinidad and Tobago	No limit	
Religion	Bangladesh	No limit	

*Reporting separately for this report.

thus far, but there is limited long-term data regarding children who are born following a cycle from frozen oocytes. It is recommended that circumstances governing the duration of storage and disposal of frozen gametes and embryos be addressed in writing prior to the start of a treatment cycle of such use.

References

[1] Griveau JF, Lopes M, Jouve G, et al. Vitrification: principles and results. J Gynecol Obstet Biol Reprod (Paris) 2015;44 (6):485-495. French.

[2] Goossens E, Tournaye H. Male fertility preservation, where are we in 2014? Ann Endocrinol (Paris) 2014;75(2):115-117.

[3] Konc J, Kanyo K, Kriston R, et al. Cryopreservation of embryos and oocytes in human assisted reproduction. Biomed Res Int 2014:307268.
[4] Glujovsky D, Riestra B, Sueldo C, et al. Vitrification versus slow freezing for women undergoing oocyte cryopreservation. Cochrane Database Syst Rev 2014;9:CD010047.
[5] Cobo A, Remohi J, Chang CC, et al. Oocyte cryopreservation for donor egg banking. Reprod Biomed Online 2011;23 (3):341-346.
[6] Vajta G, Rienzi L, Ubaldi FM Open versus closed systems for vitrification of human oocytes and embryos. Reprod Biomed Online 2015;30(4):325-333.
[7] Bielanski A A review of the risk of contamination of semen and embryos during cryopreservation and measures to limit cross-contamination during banking to prevent disease transmission in ET practices. Theriogenology 2012;77 (3):467-482.
[8] Cobo A, Garcia-Velasco JA. Why all women should freeze their eggs. Curr Opin Obstet Gynecol 2016;28(3):206-210.
[9] Kopeika J, Thornhill A, Khalaf Y The effect of cryopreservation on the genome of gametes and embryos: principles of cryobiology and critical appraisal of the evidence. Hum Reprod Update 2015;21(2):209-227.
[10] Sanfilippo S, Canis M, Smitz J, et al. Vitrification of human ovarian tissue: a practical and relevant alternative to slow freezing. Reprod Biol Endocrinol 2015;13:67.
[11] Practice Committee of American Society for Reproductive Medicine. Ovarian tissue cryopreservation: a committee opinion. Fertil Steril 2014;101(5):1237-1243.
[12] Meirow D, Roness H, Kristensen SG, et al. Optimizing outcomes from ovarian tissue cryopreservation and transplantation; activation versus preservation. Hum Reprod 2015;30(11):2453-2456.
[13] Levi Setti PE, Albani E, Cesana A, et al. Italian Constitutional Court modifications of a restrictive assisted reproduction technology law significantly improve pregnancy rate. Hum Reprod 2011;26(2):376-381.
[14] Sills ES, Murphy SE. Determining the status of non-transferred embryos in Ireland: a conceptus of case law and implications for clinical IVF practice. Philos Ethics Humanit Med 2009;4:8.
[15] Ethics Committee of the American Society for Reproductive Medicine. Disposition of abandoned embryos: a committee opinion. Fertil Steril 2013;99(7):1848-1849.

CHAPTER 7: POSTHUMOUS REPRODUCTION

The assessment of applications of posthumous reproduction was expanded in the 2015 questionnaire to support the Surveillance 2016 report. The 2013 report noted that 25% of countries allowed posthumous insemination, but did not specify the circumstances, including the permissibility of immediate postmortem extraction of gametes and specific limitations pertaining to recovery of sperm, ova, and embryos.

Posthumous reproduction can occur at two different stages. Firstly, it may include the immediate extraction of sperm, ova, or excision of reproductive tissue from a comatose person who is usually brain dead. Immediate testicular sperm extraction has also been performed on males following complete cessation of cardiac activity. Immediate extraction is often not addressed by existing legislation and is usually performed following an urgent court order. Recent updates in legislation are now targeting this controversial topic in many countries.

Posthumous reproduction can also occur through the utilization of products (gametes, reproductive tissue, or embryos) that had been cryopreserved before the individual died. New cryopreservation techniques (slow freezing or vitrification) allow stored sperm, ova, and embryos to be used many years after freezing, and thus with the potential to be used long after the demise of the person whose reproductive products had been stored. Increasingly, patients are freezing gametes or embryos for fertility preservation after they have been diagnosed with cancer and before they receive gonadotoxic therapy in the hope that they may preserve their reproductive potential to be used at a later date. This reproductive option usually arises at an inopportune time, when the patients are forced to confront several difficult issues simultaneously relating to their cancer treatment, including decisions regarding the disposition of their gametes, reproductive tissue, or embryos in the event of their death. Other complicated cases include occasions in which a person may die unexpectedly and their partner may wish to proceed with fertility treatment using their cryopreserved biological material with or without previously obtained express written permission. These cases may be further complicated when the decreased individual may have verbally expressed their wish to have children together, but not formally made an agreement or given written consent.

Actual utilization of cryopreserved gametes, reproductive tissue, or embryos after the death of a person depend on existing legislation, prior written legal agreements or consent documentation, and family input about the wishes of the decreased person. The onus often falls on the courts to determine whether the person may have truly wished to procreate after their death. Although the courts have generally tended to err on the side of caution and deny most of these requests, recent international media attention in some of these cases has led some governments to update legislation in this area.

Analysis of Survey (Tables 1–4)

There were respondents from 63 countries who had responded to the questionnaire that addressed questions about whether posthumous reproduction procedures were allowed in their countries. Frozen sperm insemination was reported to be permitted in 27% of countries, insemination of frozen ova from a decreased woman was reported to be allowed in 24% of countries, and in 30% of countries transfer of frozen embryos from a deceased person was reported to be allowed. Immediate posthumous procedures in brain dead or just deceased patients were reported to be allowed in 14% of countries.

Legislation to allow immediate posthumous reproduction was reported to be present in 34% of these countries, whereas 42% of countries reportedly allowed posthumous sperm insemination. Thirty-four percent of countries allowed insemination of frozen ova, 45% countries had legislation allowing posthumous transfer of frozen embryos.

Although legislation may exist in some countries allowing the procedures, the data from the respondents addressing actual application of these procedures indicate that they are performed infrequently. Respondents from 65 countries reported in response to whether posthumous reproduction procedures were

actually performed in their countries. Frozen sperm insemination was done in 25% of countries, insemination of frozen ova from a decreased woman was done in 15% of countries, and in 25% of countries, transfer of frozen embryos from a deceased person was performed. Immediate posthumous procedures in brain dead or recently deceased patients was infrequently performed (11% of countries).

The use of *immediate* posthumous extraction of gametes was reported to be infrequent (11% of countries), and the usage of frozen ova was reported to be practiced in 15% of these countries. The *non-immediate* posthumous use of sperm for insemination was reportedly used more often in 25% of countries, and the transfer of frozen embryos was reported to be performed in 25% of these countries.

Where legislation existed about posthumous reproduction, the procedures were reported to be mostly covered by federal law (immediate posthumous 57%, insemination with frozen sperm 67%, insemination of frozen ova 67%, implantation of frozen embryos 70%). In less than 10% of countries, the legislation was addressed via state laws or agency oversight. In approximately 10% of countries the topic was covered by professional society guidelines, and in 10% of countries, respondents reported that religious decree affected practice.

Tables 1–4 show whether respondents stated that legislation exists, if procedures are allowed, or if procedures are actually done in their country, for the following categories: immediate posthumous reproduction, posthumous insemination with sperm, insemination of frozen ova, and posthumous embryo transfer respect. The most recent questionnaire provided respondents the opportunity to provide additional details regarding the practice of posthumous reproduction with specific information about unique applications, oversight, and actual prevalence of practices.

In more than a third of countries with respondents providing feedback, there was legislation in place to govern posthumous reproduction. These data show that there is a definite trend internationally to include this topic in national legislation, and most countries were reported to do so through federal legislation.

Fertility clinics and courts are often confronted with difficult decisions regarding disposition of cryopreserved gametes, reproductive tissue, and embryos following the death or demise of a donor when his or her clear preferences and instructions are not available. It is beneficial to have legislation in place to assist medical practitioners and legal practitioners with such decisions.

Chapter 7. Table 1

Immediate Posthumous Collection of Sperm or Oocytes

	% of Countries
Posthumous collection allowed	14%
Legislation is present governing procedure	34%
Posthumous immediate extraction is used	11%

Chapter 7. Table 2

Posthumous Sperm Insemination

	% of Countries
Posthumous sperm insemination allowed	27%
Legislation is present governing procedure	42%
Posthumous sperm insemination is used	25%

Chapter 7. Table 3

Posthumous Insemination of Frozen Ova

	% of Countries
Posthumous insemination of frozen ova allowed	24%
Legislation is present governing procedure	34%
Posthumous sperm insemination is used	15%

Chapter 7. Table 4

Posthumous Transfer of Frozen Embryos

	% of Countries
Posthumous transfer of frozen embryos allowed	30%
Legislation is present governing procedure	45%
Posthumous transfer of frozen embryos is used	25%

Summary

Based upon this Surveillance report, posthumous reproduction is increasing on a global scale and being addressed by national-level legislation (usually by federal statute). Controversies in this area, as highlighted by the respondents, include the circumstances in which posthumous gametes, or reproductive tissue may be obtained and conditions in which gametes, reproductive tissue, and embryos may be utilized after death.

CHAPTER 8: DONATION

Gamete and embryo donation are well-established assisted reproduction procedures that are increasingly used around the world. Egg donation is performed either with fresh oocytes, or, since the advent and clinical application of vitrification [1], with vitrified-warmed oocytes. The widespread use of egg vitrification has significantly altered the practice of assisted reproduction and more clinics are banking oocytes for future donation, as the clinical pregnancy results in egg donation cycles have been found to be similar between fresh and frozen eggs [2]. However, additional clinical evidence is needed to address the comparison of obstetric, neonatal, and long term child outcomes. Recently, both the American Society for Reproductive Medicine and European Society of Human Reproduction and Embryology (ESHRE) have described oocyte vitrification as a safe and efficient procedure [3,4], rendering it no longer an experimental procedure.

There are significant differences in the use and regulations applied to gamete donation between different countries, even in the same continent or in countries with similar cultural and religious background. This situation is clearly reflected in Europe, where periodic reporting to the European IVF (in vitro fertilization) Monitoring Consortium (EIM)/ ESHRE registry has shown the imbalance of IVF/ intracytoplasmic sperm injection (ICSI) to egg donation cycles in some countries [5]. Also, countries regulate differently the allowance of male and female gamete donation; consequently, there has been a surge of cross-border reproductive care for patients to access care to obtain specific sex gamete donation procedures in order to avoid restrictions in their home countries. This is raising new, challenging ethical questions [6].

Analysis of Survey

Countries whose representatives have responded to the questions on donation for both the previous 2013 report and this current report, do report changes since the last publication. For example,

Chapter 8. Table 1

Is Third Party Reproduction Allowed/Permitted in Your Country?

Country	Sperm Donation	Oocyte Donation	Embryo Donation from a Previous IVF Cycle	De Novo Generation of Embryos for Donation Purposes	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Tissue Donation
Argentina	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Australia	YES	YES	YES	YES	UNKNOWN	YES	YES
Austria	YES	YES	YES	YES	NO	NO	NO
Bangladesh	NO	NO	NO	NO	NO	NO	
Barbados	YES	YES	YES	YES	NO	NO	NO
Belarus	YES	YES	NO	YES	NO	NO	NO
Belgium	YES	YES	YES	UNKNOWN	UNKNOWN	YES	YES
Brazil	YES	YES	YES	NO	NO	NO	NO
Bulgaria	YES	YES	NO	NO	NO	NO	NO
Cameroon	YES	YES	NO	NO	NO	NO	NO
Canada	YES	YES	YES	YES	YES	YES	YES
Chile	YES	YES	YES	NO	YES	YES	YES
China	YES	NO	NO	NO	NO	NO	NO
Colombia	YES	YES	YES		NO	NO	NO
Czech Republic	YES	YES	YES	YES	NO	NO	NO
Denmark	YES	YES	NO	NO	NO	NO	NO
Ecuador	YES	YES	YES	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO	NO
Estonia	YES	YES	YES	NO	NO	UNKNOWN	UNKNOWN
Finland	YES	YES	YES	NO	NO	YES	YES
France	YES	YES	YES	YES	NO	UNKNOWN	UNKNOWN
Germany	YES	NO	YES	NO	NO	NO	
Greece	YES	YES	YES	NO	UNKNOWN	UNKNOWN	UNKNOWN
Guatemala	YES	YES	YES	YES	YES	YES	YES
Honduras	YES	YES	UNKNOWN				
Hong Kong (China*)	YES	YES	YES				
Hungary	YES	YES	YES	YES	NO	NO	NO
India	YES	YES	YES	YES	YES	YES	YES
Iran	YES	YES	YES	NO	UNKNOWN	UNKNOWN	UNKNOWN
Israel	NO	YES	NO	NO	NO	NO	NO
Italy	YES	YES	NO	YES	NO	NO	NO
Japan	YES	NO	NO	NO	UNKNOWN	UNKNOWN	UNKNOWN
Jordan	NO	NO	NO	NO	NO	NO	NO
Kazakhstan	YES	YES	YES	YES	YES	YES	YES
Malaysia	YES	YES	NO	NO	NO	NO	NO
Mali	UNKNOWN	UNKNOWN	UNKNOWN	NO	NO	NO	NO
Mexico	YES	YES	UNKNOWN	YES	YES	YES	YES
Netherlands	YES	YES	YES	NO	NO	NO	NO
Nigeria	YES	YES	YES	NO	NO	NO	NO
Norway	YES		NO	NO	NO	NO	NO
Panama	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN
Paraguay	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN
Peru	YES	YES		UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Philippines	NO	NO	NO	NO	NO	NO	NO
Portugal	YES	YES	YES	NO	UNKNOWN	UNKNOWN	UNKNOWN
Romania	YES	YES	YES	NO	NO	NO	NO
Russian Federation	YES	YES	YES	YES	YES	YES	YES
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO
Senegal	NO	NO	NO	NO	NO	NO	NO
Singapore	YES	YES	YES	NO	NO	NO	NO
Slovak Republic	YES	YES	YES	YES	YES	YES	YES
South Africa	YES	YES	YES	YES	NO	NO	NO
South Korea	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Spain	YES	YES	YES	NO	NO	NO	NO
Sri Lanka	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	YES	YES	NO	NO	NO	NO	NO
Switzerland	YES	NO	NO	NO	NO	UNKNOWN	UNKNOWN
Taiwan (China*)	YES	YES	NO	NO	NO	NO	NO
Trinidad and Tobago	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN
Tunisia	NO	NO	NO	NO	NO	NO	NO
Turkey	NO	NO	NO	NO	NO	NO	NO
UK	YES	YES	YES	YES	NO	YES	UNKNOWN
Uruguay	YES	YES	YES	NO	YES	NO	NO
USA	YES	YES	YES	YES	NO	YES	YES
Venezuela	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN

*Reporting separately for this report.

in Italy, sperm donation for assisted reproductive technology (ART), previously banned, is currently allowed following a 2014 court ruling. Out of these countries, 13% completely ban all gamete and embryo donation, as reported to include the following: Bangladesh, El Salvador, Jordan, the Philippines, Saudi Arabia, Senegal, Tunisia, and Turkey. (Table 1) When gamete donation is reported to be allowed, most of those surveyed stated that the country allows both male and female gamete donations (Table 1 and Chart 1).

However, in some countries, gamete donation is differentially regulated depending on sex (Tables 2 and 3, Charts 2 and 3). Germany, Japan, Norway, and Switzerland are reported to only allow sperm donation, but do not permit egg donation. Interestingly, only Israel reflects the opposite position, i.e. Israel is reported to allow egg donation but has some restrictions regarding sperm donation. None of these countries are reported to allow embryo donation from a previous IVF cycle with the exception of Germany that allows this type of embryo donation. A number of the countries' respondents reported that they permit both sperm and egg donation, but do not allow embryo donation, including Belarus, Bulgaria, Cameroon, Denmark, Israel, Italy, Malaysia, Sweden, and Taiwan [China (Reporting separately for this report.)].

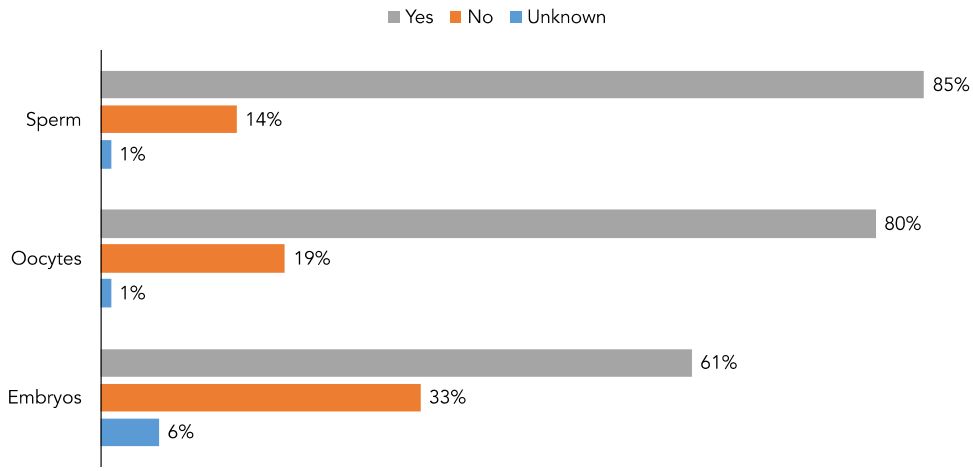


Chart 1. Is Donation Allowed/Permitted In Your Country?

Chapter 8. Table 2

Are There Regulations That Govern Third Party Reproduction in Your Country?

Country	Sperm Donation	Oocyte Donation	Embryo Donation from a Previous IVF Cycle	De Novo Generation of Embryos for Donation Purposes	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Tissue Donation	Agencies which Recruit and Match Egg Donors and Recipients as Well as Surrogates and Gestational Carriers
Argentina	NO	NO	NO	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Australia	YES	YES	YES	YES	YES	YES	YES	YES
Austria	YES	YES	YES	YES	UNKNOWN	YES	UNKNOWN	YES
Bangladesh	NO	NO	NO	NO	NO	NO	NO	NO
Barbados	NO	NO	NO	NO	NO	NO	NO	NO
Belarus	YES	YES		YES				
Belgium	YES	YES	YES	UNKNOWN	UNKNOWN	YES	YES	NO
Brazil	YES	YES	YES	NO	NO	NO	NO	NO
Bulgaria	YES	YES	YES	YES	NO	YES	YES	NO
Cameroon	YES	YES	NO	NO	NO	NO	NO	NO
Canada	YES	YES	YES	YES	YES	YES	YES	YES
Chile	NO	NO	NO	NO	NO	NO	NO	UNKNOWN
China	YES	YES	YES	YES	NO	NO	NO	NO
Colombia	YES		NO	NO	NO	NO	NO	NO
Czech Republic	YES	YES	YES	YES	NO	NO	NO	NO
Denmark	YES	YES						
Ecuador	NO	NO	NO	NO	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO	NO	NO
Estonia	YES	YES	YES	YES	NO	UNKNOWN	UNKNOWN	NO
Finland	YES	YES	YES	YES	YES	YES	YES	YES
France	YES	YES	YES	YES		YES	UNKNOWN	YES
Germany	YES	YES	YES	YES	UNKNOWN	YES	YES	YES
Greece	YES	YES	YES	YES	NO	NO	NO	NO
Guatemala	NO	NO	NO	NO	NO	NO	NO	NO
Honduras	NO	NO	NO	NO	NO	NO	NO	NO
Hong Kong (China*)	YES	YES	YES					
Hungary	YES	YES	YES	YES	NO	NO	NO	NO
India	YES	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	YES
Iran	NO	NO	YES	NO	NO	NO	NO	NO
Ireland	NO	NO	NO	NO	NO	NO	NO	NO
Israel	YES	YES	YES	NO	YES	YES	YES	NO
Italy	YES	YES	YES	YES	NO	NO	NO	NO
Japan	YES	NO	NO	YES	NO	NO	NO	NO
Kazakhstan	YES	YES	YES	YES	YES	YES	YES	YES
Malaysia	NO	NO	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO	NO
Mexico	YES	YES	YES	YES	YES	YES	YES	NO
Netherlands	YES	YES	YES	YES	YES	NO	NO	YES
Nigeria	YES	YES	YES	NO	NO	NO	NO	NO
Norway	YES	YES	YES	YES	YES	YES		YES
Panama	NO	NO	NO	NO	NO	NO	NO	NO
Paraguay	NO	NO	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO	NO	NO
Portugal	YES	YES	YES	YES	NO	NO	NO	NO
Romania	YES	YES	YES	YES	NO	NO	NO	NO
Russian Federation	YES	YES	YES	YES	NO	NO	NO	NO
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO	NO
Senegal	NO	NO	NO	NO	NO	NO	NO	NO
Singapore	YES	YES	YES	YES	YES	YES	YES	YES
Slovak Republic	YES	YES	YES	YES	YES	YES	YES	YES
South Africa	YES	YES	YES	NO	NO	NO	NO	YES
South Korea	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Spain	YES	YES	YES	YES	NO	NO	NO	NO
Sri Lanka	NO	NO	NO	NO	NO	NO	NO	NO

Chapter 8. Table 2

(Continued)

Country	Sperm Donation	Oocyte Donation	Embryo Donation from a Previous IVF Cycle	De Novo Generation of Embryos for Donation Purposes	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Tissue Donation	Agencies which Recruit and Match Egg Donors and Recipients as Well as Surrogates and Gestational Carriers
Sweden	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Switzerland	YES	YES	YES	YES	NO	NO	NO	NO
Taiwan (China*)	YES	YES		UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Trinidad and Tobago	NO	NO	NO	NO	NO	NO	NO	NO
Tunisia	NO	NO	NO	NO	NO	NO	NO	NO
Turkey		YES	YES	YES		YES		YES
UK	YES		YES	YES	NO	YES	NO	YES
Uruguay	YES	YES	YES	NO	YES	NO	NO	NO
USA	YES	YES	YES	YES	YES	YES	YES	YES
Venezuela	NO	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

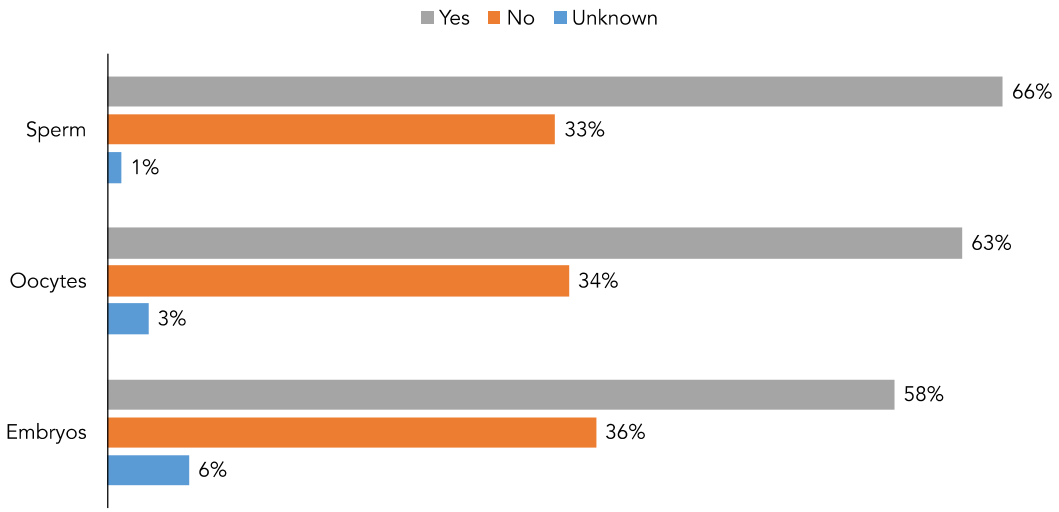


Chart 2. Are There Regulations That Govern Third Party Reproduction In Your Country?

Almost 57% (37/65 respondents) described sperm and oocyte donation as "commonly used" in their countries, in contrast with embryo donation, with 23% eliciting "commonly used" responses (Table 4). Some country respondents reported that both sperm and egg donation were "infrequently used", for example in Cameroon, China, France, Iran, Italy, Japan, Kazakhstan, Malaysia, Romania, Singapore, South Korea, and Sri Lanka. The respondents reported that local regulations and restrictions on donors account for some of these differences, because the social, political, and cultural backgrounds of these countries vary.

The majority of countries who had respondents who were surveyed (almost 55%) reported that their countries do not allow the de-novo generation of embryos with donor gametes for purposes of donation, encompassing the countries that ban embryo donation noted above with the exception of Belarus. An additional group of countries including Brazil, Chile, Ecuador, Estonia, Finland, Greece, Iran, Netherlands, Nigeria, Portugal, Romania, Singapore, Spain, and Uruguay were reported by respondents to specifically forbid this form of embryo donation. Twenty-three (37%) countries were reported to permit this form of embryo donation, and two of which (Italy and Belarus) were reported to not allow conventional embryo donation from previous IVF cycles. Seven (8%) countries had respondents leave this question unanswered, or had answered that the situation was unclear or unknown. Finally, the following countries reportedly permit both forms of embryo donation: Australia, Austria, Barbados, Canada, Czech Republic, France, Guatemala, Hungary, India, Kazakhstan, Panama, Paraguay, Russia, Slovak Republic, South Africa, Sri Lanka, Trinidad & Tobago, UK, USA, and Venezuela.

A new technique called cytoplasmic transfer (see Chapter 10, Micromanipulation).has been developed with the principal intention of avoiding mitochondrial disorders. This requires an oocyte or fertilized embryo cytoplasmic donation from a non-affected female donor in order to replace the cytoplasm of an affected female recipient. This process of cytoplasmic transfer is reported to be allowed in Canada, Chile, Guatemala, India, Kazakhstan, Mexico, Russia, Slovak Republic, and Uruguay. However, 14 respondents (around 23%) acknowledge that the status of potential legislation or regulation of cytoplasmic donation is unknown or unclear, and that it is possible that cytoplasmic donation could be used in an experimental environment. Thirty-nine countries (63%) were reported to not allow

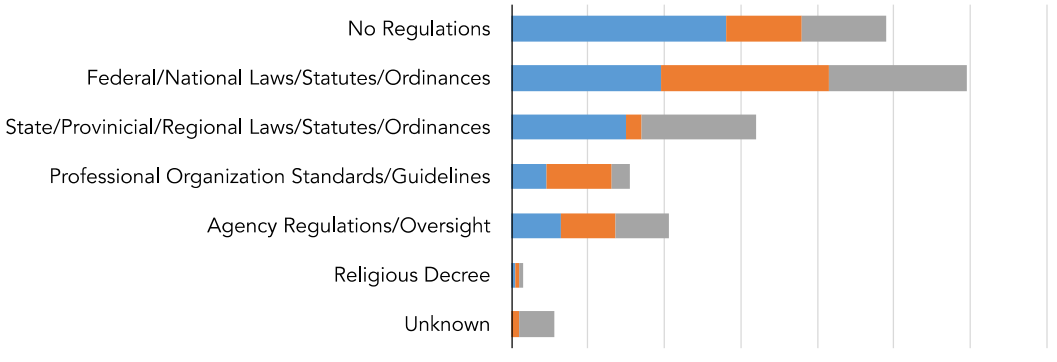
Chapter 8. Table 3

If Donation is Regulated in Your Country, How is it Done?

Country	Sperm Donation	Oocyte Donation	Embryo Donation	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Donation
Argentina	No Regulation	No Regulation	No Regulation	Unknown	Unknown	Unknown
Australia	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines	State/Provincial/Regional Laws/Statutes/ Ordinances, Agency Regulations/Oversight, Professional Organization Standards/ Guidelines
Austria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Bangladesh	No regulations, Religious decree	Religious decree	Religious decree	No regulations	No regulations	No regulations
Barbados	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Belarus	Federal/National Laws/Statutes/Ordinances, Professional Organization Standards/ Guidelines	Federal/National Laws/Statutes/Ordinances, Professional Organization Standards/ Guidelines	Federal/National Laws/Statutes/Ordinances, Professional Organization Standards/ Guidelines			
Belgium	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Brazil	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight			
Bulgaria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Cameroon	No regulations, Professional Organization Standards/Guidelines					
Canada	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances			
Chile	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
China	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances			
Colombia	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	No regulations	No regulations	No regulations
Czech Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	No regulations
Denmark	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances				
Ecuador	No regulations, Professional Organization Standards/Guidelines	No regulations, Professional Organization Standards/Guidelines	No regulations, Professional Organization Standards/Guidelines			
El Salvador	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Estonia	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	No regulations
Finland	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances, No regulations, Professional Organization Standards/Guidelines	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	No regulations	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances
Greece	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Agency Regulations/Oversight, Federal/ National Laws/Statutes/Ordinances	Unknown	Unknown	Unknown
Guatemala	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Hong Kong (China*)	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight			
Hungary	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
India	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines
Iran	Agency Regulations/Oversight	Federal/National Laws/Statutes/Ordinances, Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Ireland	Agency Regulations/Oversight, No regulations	Agency Regulations/Oversight, No regulations	Agency Regulations/Oversight, No regulations	Agency Regulations/Oversight, No regulations	Agency Regulations/Oversight, No regulations	Agency Regulations/Oversight, No regulations
Israel	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances				
Italy	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/ Ordinances, State/Provincial/Regional Laws/Statutes/Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/ Ordinances, State/Provincial/Regional Laws/Statutes/Ordinances				
Japan	Professional Organization Standards/ Guidelines	No regulations	Professional Organization Standards/ Guidelines	No regulations	No regulations	No regulations

Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Malaysia	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Mali	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Mexico	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Netherlands	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	No regulations	No regulations	No regulations	No regulations
Nigeria	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Professional Organization Standards/ Guidelines	Unknown	Unknown	Unknown
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Paraguay	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Portugal	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances			
Romania	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Russian Federation	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	No regulations
Singapore	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances			
Slovak Republic	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances
South Africa	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	No regulations
South Korea	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances				
Spain	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Federal/National Laws/Statutes/ Ordinances	No regulations	No regulations	No regulations
Sri Lanka	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Sweden	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Unknown	Unknown	Unknown
Switzerland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Taiwan (China*)	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Unknown	Unknown	Unknown	Unknown
Trinidad and Tobago	No regulations	No regulations	No regulations	No regulations	No regulations	No regulations
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Unknown	Federal/National Laws/Statutes/Ordinances	Unknown
Uruguay	Federal/National Laws/Statutes/Ordinances					
USA	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/ Guidelines, Agency Regulations/Oversight, Federal/National Laws/Statutes/Ordinances, State/Provincial/Regional Laws/Statutes/ Ordinances
Venezuela	Professional Organization Standards/ Guidelines, No regulations	Professional Organization Standards/ Guidelines, No regulations	Professional Organization Standards/ Guidelines, No regulations	Professional Organization Standards/ Guidelines, No regulations	Professional Organization Standards/ Guidelines, No regulations	Professional Organization Standards/ Guidelines, No regulations

*Reporting separately for this report.



	Unknown	Religious Decree	Agency Regulations/Oversight	Professional Organization Standards/Guidelines	State/Provinicial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No Regulations
Sperm	0%	1%	13%	9%	30%	39%	56%
Oocytes	2%	1%	14%	17%	4%	44%	20%
Embryos	9%	1%	14%	5%	30%	36%	22%

Chart 3. Are There Regulations That Govern Third Party Reproduction In Your Country?

Chapter 8. Table 4

How Often is Third Party Reproduction Performed in Programmes Within Your Country?

Country	Sperm Donation	Oocyte Donation	Embryo Donation from a Previous IVF Cycle	De Novo Generation of Embryos for Donation Purposes	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Tissue Donation
Argentina	Commonly Used	Commonly Used		Infrequently Used	Unknown	Unknown	Unknown
Australia	Commonly Used	Commonly Used		Infrequently Used	Unknown	Unknown	Unknown
Austria	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown
Bangladesh	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	
Barbados	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Never Performed	Never Performed
Belarus	Commonly Used	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Never Performed	Never Performed
Belgium	Commonly Used	Commonly Used	Commonly Used	Unknown	Unknown	Unknown	Unknown
Brazil	Commonly Used	Commonly Used	Infrequently Used	Unknown	Never Performed	Never Performed	Never Performed
Bulgaria	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Cameroon	Infrequently Used	Infrequently Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used
Canada	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Unknown	Unknown	Unknown
Chile	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Unknown	Unknown
China	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Colombia	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Czech Republic	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Never Performed	Never Performed
Denmark	Commonly Used	Infrequently Used					
Ecuador	Commonly Used	Commonly Used	Commonly Used				
El Salvador	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Estonia	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Finland	Commonly Used	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed
France	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Germany	Commonly Used	Never Performed	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Greece	Commonly Used	Commonly Used	Commonly Used	Never Performed	Unknown	Unknown	Unknown
Guatemala	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Honduras	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Hong Kong (China*)	Commonly Used	Commonly Used	Infrequently Used				
Hungary	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed
India	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used
Iran	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Ireland	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Israel		Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Italy	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Japan	Infrequently Used	Infrequently Used	Unknown	Never Performed	Never Performed	Never Performed	Never Performed
Kazakhstan	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Malaysia	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown	Unknown	Unknown
Mali	Unknown	Unknown	Unknown	Never Performed	Never Performed	Never Performed	Never Performed
Mexico	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Unknown	Unknown
Netherlands	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Nigeria	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Norway	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Panama	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown
Paraguay	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown
Peru	Commonly Used	Commonly Used	Infrequently Used	Unknown	Unknown	Unknown	Unknown
Portugal	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Romania	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Russian Federation	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Never Performed	Never Performed
Saudi Arabia	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Senegal	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Singapore	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Slovak Republic	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used
South Africa	Commonly Used	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed
South Korea	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown	Unknown	Unknown
Spain	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Sri Lanka	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown

Chapter 8. Table 4

(Continued)

Country	Sperm Donation	Oocyte Donation	Embryo Donation from a Previous IVF Cycle	De Novo Generation of Embryos for Donation Purposes	Cytoplasmic Donation	Ovarian Tissue Donation	Testicular Tissue Donation
Sweden	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Switzerland	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Taiwan (China*)	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Trinidad and Tobago	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Turkey	Never Performed	Never Performed	Never Performed	Never Performed		Never Performed	Never Performed
UK	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Never Performed	Infrequently Used	Never Performed
Uruguay	Commonly Used	Commonly Used	Commonly Used		Commonly Used	Commonly Used	Commonly Used
USA	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Never Performed	Infrequently Used	Infrequently Used
Venezuela	Commonly Used	Commonly Used	Infrequently Used	Unknown	Never Performed	Never Performed	Never Performed

*Reporting separately for this report.

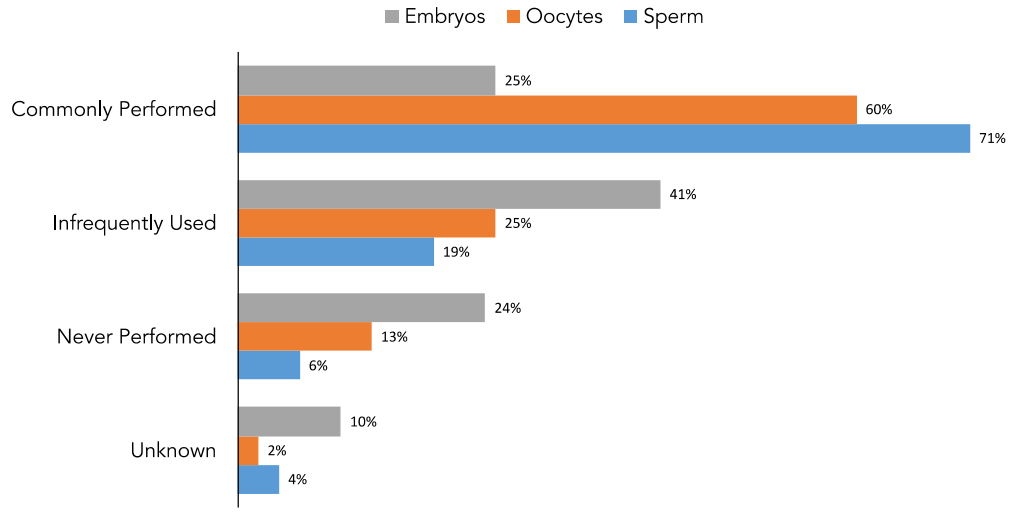


Chart 4. How Often Is Third Party Reproduction Performed In Your Country?

the procedure. This is an active research and clinical field, with several recent, significant advances reported by UK researchers. It is not surprising that the UK representative responded negatively to these questions, although the UK Human Fertilisation and Embryology Authority (HFEA) recently (October 2015, during the official completion dates of this survey) approved cytoplasmic transfer as a procedure for mothers at risk to pass on serious mitochondrial diseases to their children, but not for other fertility treatments [7].

Respondents reported that ovarian tissue donation is allowed in countries including Australia, Belgium, Canada, Chile, Finland, Guatemala, India, Kazakhstan, Mexico, Russia, Slovak Republic, UK, and the USA, representing 21% of those surveyed. A majority of the respondents (35 countries; 55%) reported that this procedure was not permissible and 15 respondents (24%) answered that the status was "unknown."

Similarly, testicular tissue donation followed the same pattern of response as ovarian tissue donation, with the exception of the UK, where the respondent stated that it is unknown if this procedure is allowed, although the respondent noted that the HFEA does provide a flow diagram for testicular tissue donation, under strict guidelines that requires prior authorization [8].

Regulation of third party reproduction was reported to affect 63% (39 of the 62 countries). Most of the European countries were reported to be highly regulated for sperm and egg donation by federal/national laws or statutes, except for Ireland and Belgium that have no regulation on this issue. Canada, Australia, and the USA have either national or state/provincial laws governing third party reproduction. (Table 3) On the contrary, in most of Latin America, respondents reported no regulation regarding third party reproduction, and the same situation was reported for several Caribbean countries including Barbados and Trinidad & Tobago. This was also the case in several southeast Asian countries (Sri Lanka, Malaysia, Mali, and Bangladesh). Some countries in Latin America were, however, reported to be regulated by third party reproduction (namely government agencies), including Brazil and Mexico. In the case of Colombia and Uruguay, there is regulation by law that was reported, but only concerning sperm donation.

Compensation for donors is reported to be permitted in most countries, although the amount of compensation varies widely. As noted in Table 5, donors are reported to often be reimbursed for their time and expenses, but in some countries, for example in the USA, Spain, Portugal, Russia, Belarus, India, Iran, Cameroon,

Chapter 8. Table 5

If Third Party Reproduction is Allowed/Permitted in Your Country, are Donors Compensated?

Country	Sperm Donors	Oocyte Donors	Embryo Donors	Cytoplasmic Donation	Ovarian Tissue	Testicular Tissue
Argentina	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Unknown	Unknown	Unknown
Australia	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No
Austria	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown			
Bangladesh	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Barbados	No	Reimbursement for time and expenses	No	No	No	No
Belarus	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement				
Belgium	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Reimbursement for time and expenses	Reimbursement for time and expenses
Brazil	Reimbursement for time and expenses	Compensated Beyond Reimbursement	No			
Bulgaria	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No	No
Cameroon	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Unknown	No	No	No
Canada	No	No	No	No	No	No
Chile	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No	Unknown	Unknown	Unknown
China	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No	No
Colombia	Reimbursement for time and expenses	Reimbursement for time and expenses	NO	UNKNOWN	UNKNOWN	UNKNOWN
Czech Republic	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No
Denmark	Reimbursement for time and expenses	Reimbursement for time and expenses				
Ecuador	Reimbursement for time and expenses	Reimbursement for time and expenses	No			
El Salvador	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Unknown	Unknown	Unknown
Estonia	Reimbursement for time and expenses	Compensated Beyond Reimbursement	Reimbursement for time and expenses		Unknown	Unknown
Finland	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Reimbursement for time and expenses	Reimbursement for time and expenses
France	No	No	No	No	No	No
Germany	Reimbursement for time and expenses	No	No	No	No	No
Greece	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Unknown	Unknown	Unknown
Guatemala	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Unknown	Unknown	Unknown
Honduras	Unknown	Unknown				
Hong Kong (China*)	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown			
Hungary	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No	No
India	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Unknown	Unknown	Unknown
Iran	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Unknown	Unknown	Unknown
Ireland	Reimbursement for time and expenses	No	No			
Israel	Reimbursement for time and expenses	Reimbursement for time and expenses				
Italy	No	No				
Japan	No					
Kazakhstan	No	No	No	No	No	No
Malaysia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Mali	Unknown	Unknown	Unknown	No	No	No
Mexico	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Reimbursement for time and expenses	Unknown	Unknown
Netherlands	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Unknown	Unknown
Nigeria	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No	Unknown	Unknown	
Norway	Reimbursement for time and expenses					
Panama	Unknown	Reimbursement for time and expenses	Unknown	Unknown	Unknown	Unknown
Paraguay	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Unknown	Unknown
Peru	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Unknown	Unknown	Unknown
Portugal	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No			
Romania	No	No	No	No	No	No
Russian Federation	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No	Unknown	Unknown	Unknown
Saudi Arabia	No	No	No	No	No	No
Senegal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Singapore	Reimbursement for time and expenses	Reimbursement for time and expenses				
Slovak Republic	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses
South Africa	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No	No
South Korea	Reimbursement for time and expenses	Reimbursement for time and expenses				
Spain	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No	No	No	No
Sri Lanka	Reimbursement for time and expenses	Reimbursement for time and expenses	Reimbursement for time and expenses	Unknown	Unknown	Unknown
Sweden	Reimbursement for time and expenses	Reimbursement for time and expenses				
Switzerland	Reimbursement for time and expenses					
Taiwan (China*)	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	No	No
Trinidad and Tobago	Reimbursement for time and expenses	Reimbursement for time and expenses	No	No	Unknown	Unknown
UK	Reimbursement for time and expenses	Reimbursement for time and expenses	No	Unknown	Unknown	Unknown
Uruguay	Reimbursement for time and expenses	Reimbursement for time and expenses				
USA	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	No	No	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement
Venezuela	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement	Unknown	No	Unknown	Unknown

*Reporting separately for this report.

Chapter 8. Table 6

What is Donor Compensation?

Country	Sperm Donors	Min Amount	Max Amount	Oocyte Donors	Min Amount	Max Amount	Embryo Donors	Cytoplasmic Donation	Ovarian Tissue	Testicular Tissue
Argentina	No min or max			No min or max			Unknown	Unknown	Unknown	Unknown
Bangladesh	Unknown			Unknown			Unknown	Unknown	Unknown	Unknown
Belarus	Unknown			Unknown						
Belgium	No min or max			No min or max			No min or max	No min or max	No min or max	No min or max
Brazil	No min or max			No min or max			Not addressed	Not addressed	Not addressed	Not addressed
Bulgaria	Unknown			Unknown			Unknown	Unknown	Unknown	Unknown
Cameroon	No min or max			No min or max				Unknown	Unknown	Unknown
Chile	Unknown			Enter values	500,000	700,000	Not addressed	Not addressed	Not addressed	Not addressed
Colombia	Enter values	200	300	Enter values	350	500	No	NO		
Denmark	Enter values		400	Enter values		2400				
Ecuador	No min or max			No min or max			Not addressed			
El Salvador	No min or max									
Estonia	No min or max			No min or max			No min or max	Not addressed	Not addressed	Not addressed
Greece	Enter values	300	300	Enter values	1200	1200	Not addressed	Unknown	Unknown	Unknown
Guatemala	Enter values	2500	4000	Enter values	6500	8000	Not addressed	Not addressed	Not addressed	Not addressed
Hungary	Not addressed			Not addressed			Not addressed	Not addressed	Not addressed	Not addressed
India	No min or max			No min or max			No min or max	Unknown	Unknown	Unknown
Israel	No min or max			No min or max						
Mali	Unknown			Unknown			Unknown	Not addressed	Not addressed	Not addressed
Netherlands	Not addressed			Not addressed			Not addressed	Not addressed	Not addressed	Not addressed
Nigeria	Enter values		10	Enter values		5	Not addressed	Unknown	Unknown	Unknown
Panama	Unknown			Enter values	500	2000	Unknown	Unknown	Unknown	Unknown
Paraguay	Not addressed			Not addressed			Not addressed	Not addressed	Not addressed	Not addressed
Peru	Unknown			Unknown			Unknown			
Portugal	Enter values		120	Enter values		680				
Romania	Not addressed			Not addressed			Not addressed	Not addressed	Not addressed	Not addressed
Russian Federation	No min or max			No min or max				No min or max	No min or max	No min or max
Slovak Republic	No min or max			No min or max			No min or max	No min or max	No min or max	No min or max
South Africa	Enter values	200	500	Enter values	7000	7000	Not addressed	Not addressed	Not addressed	Not addressed
Spain	Not addressed			Not addressed						
Sri Lanka	No min or max			No min or max			No min or max			
Trinidad and Tobago	Enter values	2000	3000	Enter values	0	8000	Enter values			
UK	Enter values	0	35	Enter values	0	750	Not addressed	Not addressed	Not addressed	Not addressed
Uruguay	Unknown			No min or max						
USA	No min or max			No min or max			Unknown	Unknown	Unknown	Unknown
Venezuela	Unknown			Unknown			Not addressed	Not addressed	Not addressed	Not addressed

Chapter 8. Table 7

If Third Party Reproduction is Allowed/Permitted in Your Country, are the Qualifications to be a Donor Based Upon Medical, Mental Health and/or any Lifestyle (Age and Occupational) Criteria?

Country	Sperm Donors (Men/Boys)	Oocyte Donors (Women/Girls)	Embryo Donors (Women/Girls)
Argentina	YES	YES	YES
Australia	YES	YES	YES
Austria	YES	YES	Not addressed
Bangladesh	Unknown	Unknown	Unknown
Barbados		YES	YES
Belarus	YES	YES	
Belgium	YES	YES	YES
Brazil	YES	YES	YES
Bulgaria	YES	YES	Unknown
Cameroon	YES	YES	YES
Canada	YES	YES	NO
Chile	YES	YES	Not addressed
China	YES	YES	NO
Colombia	YES	YES	YES
Czech Republic	YES	YES	YES
Denmark	YES	YES	
Ecuador	YES	YES	YES
El Salvador	YES		
Estonia	YES	YES	YES
Finland	YES	YES	YES
France	YES	YES	YES
Germany	YES	Not addressed	Not addressed
Greece	YES	YES	YES
Guatemala	YES	YES	YES
Honduras	YES	YES	Not addressed
Hong Kong (China*)	YES	YES	YES
Hungary	YES	YES	YES
India	YES	YES	YES
Iran	YES	YES	YES
Ireland	NO	NO	NO
Israel	YES	YES	
Italy	YES	YES	
Japan	Not addressed		
Kazakhstan	YES	YES	YES
Malaysia	YES	YES	Not addressed
Mali	Unknown	Unknown	Unknown
Mexico	Not addressed	Not addressed	Not addressed
Netherlands	YES	YES	YES
Nigeria	YES	YES	YES
Norway	YES		
Panama	YES	YES	Unknown

Chapter 8. Table 7

(*Continued*)

Country	Sperm Donors (Men/Boys)	Oocyte Donors (Women/Girls)	Embryo Donors (Women/Girls)
Paraguay	YES	YES	YES
Peru	YES	YES	YES
Portugal	YES	YES	YES
Romania	YES	YES	YES
Russian Federation	YES	YES	NO
Senegal	Not addressed	Not addressed	Not addressed
Singapore	YES	YES	
Slovak Republic	YES	YES	YES
South Africa	YES	YES	Unknown
South Korea	NO	NO	
Spain	YES		YES
Sri Lanka	YES	YES	YES
Sweden	YES	YES	Not addressed
Switzerland	YES		
Taiwan (China*)	YES		NO
Trinidad and Tobago	YES	YES	
UK	YES	YES	YES
Uruguay	YES	YES	YES
USA	YES	YES	YES
Venezuela	YES	YES	Not addressed

*Reporting separately for this report.

Nigeria, Venezuela, and Chile, compensation goes beyond simple reimbursement (in the USA this varies per state law). In Canada, France, Italy, and Japan, the respondents reported that compensation to donors is illegal; and in other countries, it was reported that minimum and maximum fees could be payed to donors. (Table 6)

Most countries (53/62, 85.5%) had respondents who reported that qualifications had been established for individuals to become a sperm or egg donor, although this issue was less clear for embryo donors, where 19 countries had respondents who reported that this issue was either "not addressed" or "unknown (Table 7)."

Summary

According to this report, the practice of gamete and embryo donation continues to be increasing worldwide; despite this, social acceptance and use is reported to be restricted in some countries. Respondents often perceived this to be due to ethical, legal, or religious constraints. Restrictive policies can pose additional emotional stress, financial burdens, and may result in forms of discrimination for access to care for couples and individuals obliged to travel abroad to receive desired treatments. Most of the European countries that had respondents who were surveyed are highly regulated by laws, statutes, or government regulatory authorities. Although a minority of countries are reported to completely ban any form of donation, some countries are reported to have regulations restricting some types of donation (for example, embryo donation from either a previous IVF cycle or the de-novo generation of IVF embryos for donation). Other countries are reported to have discordant views toward sperm versus egg donation. In North, Central, and South America, it is reported that gamete and embryo donation is more homogeneously utilized. Cytoplasmic donation is reported to be used primarily within experimental environments, and most of the countries surveyed reported to infrequently use either ovarian or testicular tissue donation.

References

[1] Kuwayama M, Vajta G, Kato O, et al. Highly effective vitrification method for cryopreservation of human oocytes. Reprod Biomed Online 2005;11(3):300-308.

[2] Cobo A, Meseguer M, Remohí J, et al. Use of cryo-banked oocytes in an ovum donation programme: a prospective, randomized, controlled, clinical trial. Hum Reprod 2010;25:2239–2246.

[3] Dondorp W, de Wert G, Pennings G, et al; ESHRE Task Force on Ethics and Law. Oocyte cryopreservation for age-related fertility loss. Hum Reprod 2012;27(5):1231-1237.

[4] Practice Committees of American Society for Reproductive Medicine; Society for Assisted Reproductive Technology. Mature oocyte cryopreservation: a guideline. Fertil Steril 2013;99(1):37-43.

[5] Kupka MS, D'Hooghe T, Ferraretti AP, et al; European IVF-Monitoring Consortium (EIM); Europeann Society of Human Reproduction and Embryology (ESHERE). Assisted reproductive technology in Europe, 2011: results generated from European registers by ESHRE. Hum Rep 2016;31(2):233-248.

[6] Pennings G, de Wert G, Shenfield F, et al. ESHRE task force on ethics and law 15: cross-border reproductive care. Hum Rep 2008;23(10):2182-2184.

[7] Human Fertilisation & Embryology Authority. Mitochondrial donation. Available at: http://www.hfea.gov.uk/9933.html. Accessed August 9, 2016.

[8] Human Fertilization & Embryology Authority; Human Tissue Authority. Regulation of ovarian and testicular tissue. Available at: http://www.hfea.gov.uk/docs/Regulation_of_ovarian_and_testicular_tissue_-_flow_diagram.pdf. Accessed August 9, 2016.

CHAPTER 9: ANONYMITY

Anonymous gamete donation is still reported to be the most prevalent practice for sperm and oocyte donation around the

world. However, there has been a gradual trend in some countries toward a more open approach in obtaining information from donors, with the intent of sharing with prospective parents and for potential disclosure to future offspring [1]. In some cases, donors may also obtain some limited information from the offspring but this practice remains more controversial and has had a much more limited application. There are inevitable conflicts of interests involving ethical and legal considerations, and these include the rights of autonomy and privacy of the prospective parents, the right of privacy of the donor, and the right of the child to know his/her genetic origins [2].

The ability for a donor to remain anonymous can no longer be ensured. Recently, current technologies include affordable massive gene sequencing, commercial direct-to-consumer genetic testing, and the creation of human DNA databases have made assurances of anonymity increasingly problematic and difficult, if not impossible to ensure. This lack of an ability to ensure donor anonymity profoundly impacts the practice of anonymous gamete and embryo donation, and currently results in additional debates and considerations that address ethical, legal, and medical implications of this practice [3].

In the vast majority of countries, the respondents surveyed (45/56, 80%), reported no modifications in regulations that address anonymity since 2012 (the time of the previous International Federation of Fertility Societies [IFFS] questionnaire), and 12.5% reported the issue as unknown (Table 1).

A few countries had respondents who reported modifications in their regulations within the triennium. One example is Australia, where more information is currently required from the donor and offspring. This information includes identifying and non-identifying data from the donor to be provided to the offspring and non-identifying data from the offspring to be provided to the donor. These modifications have been reported to be implemented within both state/provincial laws and by professional organization guidelines.

In Argentina, it was reported that an extensive reform of the Civil Code to include assisted reproductive technology (ART) filiation took place in 2013, and has led to a registry of newborns from ART procedures, leaving open the possibility that offspring from a donor ART cycle can request non-identifying data from the donor (when they reach the age of 18, and only after obtaining a court order). The respondent from Hong Kong [China (Reporting separately for this report.)] also reports new policies from regulatory agencies allowing the ability to request information from the donor to be provided to the offspring. In Uruguay, the respondent reported that modifications to national laws have implied that information can be provided to offspring under certain circumstances.

In total, 13 countries had respondents who reported having no regulations regarding information addressing anonymity, including Barbados, Bangladesh, Canada, Chile, Ecuador, Guatemala, Honduras, Kenya, Malaysia, Mexico, Nigeria, Panama, Paraguay, Peru, Sri Lanka, Trinidad & Tobago, and Tunisia (Table 2).

Every European country which had a respondent who was surveyed, with the exception of Ireland, have national laws requiring potential disclosure of information regarding donors or offspring, although the situation is not homogeneous among all European countries with regard to the type of information disclosed and how it is implemented. Table 3 shows the type of disclosure in some countries with laws in place, reflecting the wide variety of practices in each country assessed. Nonetheless, Australia, Belgium, and the UK are the countries that are reported to currently be more open to full disclosure of donor and offspring information to both parties (identifying and non-identifying data). When asked if it is customary to disclose this information, regardless of the existence of laws or regulations, most of the respondents in these countries reported having laws that require disclosure as customary (Table 4).

Chapter 9. Table 1

If You Responded to the Surveillance Survey 2012, have there Been any Modifications to Legislation or Guidelines on Anonymity of Donors?

Country	What were the Main Modifications?
Argentina	Increase information given to offspring
Australia	Increase information given to donor. Increase information given to offspring.
Austria	No modifications
Bangladesh	No modifications
Belarus	No modifications
Belgium	No modifications
Brazil	No modifications
Bulgaria	Unknown
Cameroon	No modifications
Canada	No modifications
Chile	No modifications
Colombia	No modifications
Czech Republic	No modifications
Ecuador	Unknown
Estonia	No modifications
Finland	No modifications
France	No modifications
Germany	Unknown
Greece	No modifications
Guatemala	Unknown
Hong Kong (China*)	Increase information given to offspring
Hungary	No modifications
India	No modifications
Iran	No modifications
Italy	No modifications
Japan	No modifications
Jordan	No modifications
Kazakhstan	No modifications
Malaysia	Unknown
Mali	Unknown
Mexico	No modifications
Netherlands	No modifications
Nigeria	No modifications
Norway	No modifications
Panama	No modifications
Paraguay	No modifications
Philippines	No modifications
Portugal	No modifications
Romania	No modifications
Russian Federation	No modifications
Senegal	Unknown
Singapore	No modifications
Slovak Republic	No modifications
South Africa	No modifications
South Korea	No modifications
Spain	No modifications
Sweden	No modifications
Switzerland	No modifications
Taiwan (China*)	No modifications
Trinidad and Tobago	No modifications
Tunisia	No modifications
Turkey	No modifications
UK	No modifications
Uruguay	Restrict information given to offspring
USA	No modifications
Venezuela	No modifications

*Reporting separately for this report.

Chapter 9. Table 2

Are there Practices or Regulations that Address Anonymity in Your Country?

Country	No Practices or Regulations	Federal/National Laws/Statutes/ Ordinances	State/Provincial/ Regional Laws/Statutes/ Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Argentina	NO	YES	NO	NO	NO	YES	NO	NO
Australia			YES			YES		
Austria		YES						
Bangladesh	YES	NO	NO		NO	NO	YES	YES
Barbados	NO							
Belarus	UNKNOWN	YES				YES		
Belgium		YES						
Brazil					YES	YES		
Bulgaria		YES						
Cameroon	NO	NO				YES	YES	YES
Canada	YES							
Chile	NO							
China		YES						
Colombia						YES		
Czech Republic		YES						
Denmark		YES						
Ecuador	YES							
Estonia		YES						
Finland		YES			YES			
France		YES						
Germany		YES						
Greece		YES						
Guatemala	YES	NO	NO	NO	NO	NO	NO	NO
Honduras	YES							
Hong Kong (China*)					YES			
Hungary		YES						
India						YES		
Iran	NO	YES	NO	NO	YES	NO	NO	NO
Ireland	NO	NO	NO	NO	NO	YES	NO	NO
Israel		YES						YES
Italy			YES					
Japan						YES		
Jordan								YES
Kazakhstan		YES						
Kenya	YES							
Malaysia	NO							
Mali						YES		
Mexico	YES							
Netherlands		YES				YES		
Nigeria	YES	NO	NO	NO	NO	YES	YES	NO
Norway		YES						
Panama	YES	NO	NO	NO	NO	NO	NO	NO
Paraguay	YES	NO	NO	NO	NO	NO	NO	NO
Peru	YES							
Portugal		YES						
Romania		YES			YES			
Russian Federation		YES						
Saudi Arabia	NO	NO	NO	NO	NO	NO	NO	NO
Senegal	UNKNOWN					YES		
Singapore		YES						
Slovak Republic		YES				YES		
South Africa		YES						
South Korea		YES				YES		
Spain		YES						
Sri Lanka	NO	NO	NO	NO	NO	NO	UNKNOWN	NO
Sweden		YES	YES					
Switzerland		YES						
Taiwan (China*)		YES						
Trinidad and Tobago	YES							
Tunisia	YES							
Turkey		YES						
UK		YES						
Uruguay		YES						
USA	NO	NO	NO	NO	YES	YES	YES	NO
Venezuela	NO					YES	YES	

*Reporting separately for this report.

Cameroon, Bangladesh, Jordan, and Nigeria respondents report that this issue is addressed through cultural practice and religious decree. In the case of Ireland, this issue is reported to be addressed by standards and guidelines from professional organizations, and the same situation was reported to apply to the USA, Canada, Colombia, Japan, and Mali, where no federal laws exist regarding this issue. In Iran, it was reported that government agencies and national laws regulate anonymity, and identifying data from donors can be provided to offspring in certain circumstances. A similar situation exists was reported to exist in Brazil, where identifying data from donors to offspring, and from offspring to donors, can be disclosed under certain conditions, and is overseen by a government agency. Table 3 allo shows the multiple approaches that are reported to be used by different countries to address the issue of donor anonymity.

Summary

In brief, based upon this report, donor and offspring anonymity remains the most commonly practiced form of donor gamete treatment in the majority of countries with respondents who were

Chapter 9. Table 3

What Type of Information can be Provided?

Country	Non-identifying about the Donor to the Offspring	Identifying about the Donor to the Offspring	Non-identifying about the Offspring to the Donor	Identifying about the offspring to the Donor
Argentina	Allowed with conditions	Not Allowed	Not mentioned	Not mentioned
Australia	Allowed	Allowed	Allowed	Allowed with conditions
Austria	Not Allowed		Not mentioned	Not mentioned
Bangladesh	Unknown	Unknown	Unknown	Unknown
Barbados	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Belarus	Unknown	Unknown	Unknown	Unknown
Belgium	Allowed	Allowed	Allowed	Allowed
Brazil		Allowed with conditions		Allowed with conditions
Cameroon	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Canada	Allowed	Allowed		
Denmark	Allowed	Allowed	Not Allowed	Not Allowed
Finland	Not mentioned	Allowed	Allowed with conditions	Allowed with conditions
Germany	Not Allowed	Allowed	Not mentioned	Not mentioned
Guatemala	Unknown	Unknown	Unknown	Unknown
Honduras	Unknown	Unknown	Unknown	Unknown
Hong Kong (China*)	Allowed		Allowed	
Hungary	Allowed	Not Allowed	Allowed	Not Allowed
India		Allowed		
Iran	Allowed with conditions	Unknown	Unknown	Unknown
Ireland	Allowed with conditions	Allowed with conditions	Not Allowed	Not Allowed
Kazakhstan	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Malaysia	Unknown	Unknown	Unknown	Unknown
Mali	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Netherlands	Unknown	Allowed with conditions	Allowed	Not Allowed
Nigeria	Allowed	Not Allowed	Not Allowed	Not Allowed
Norway	Allowed			
Panama	Unknown	Unknown	Unknown	Unknown
Paraguay	Unknown	Unknown	Unknown	Unknown
Peru	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Romania	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Russian Federation	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Slovak Republic	Not Allowed	Not Allowed	Not Allowed	Not Allowed
South Africa	Allowed	Allowed with conditions	Not Allowed	Not Allowed
Sri Lanka	Unknown	Unknown	Unknown	Unknown
Sweden	Allowed	Allowed	Not mentioned	Not Allowed
Switzerland	Allowed	Allowed with conditions	Not Allowed	Not Allowed
Trinidad and Tobago	Unknown	Unknown	Unknown	Unknown
UK	Allowed	Allowed with conditions	Allowed with conditions	Allowed with conditions
USA	Allowed	Allowed with conditions	Allowed	Allowed with conditions
Venezuela	Unknown	Unknown	Unknown	Unknown

*Reporting separately for this report.

Chapter 9. Table 4

What Information is Customary to Provide?

Country	Non-identifying about the Donor to the Offspring	Identifying about the Donor to the Offspring	Non-identifying about the Offspring to the Donor	Identifying about the Offspring to the Donor
Argentina	Customary	Not customary	Unknown	Unknown
Australia	Customary	Customary	Customary	Varies
Austria		Customary		
Bangladesh	Unknown	Unknown	Unknown	Unknown
Barbados	Varies	Varies	Varies	Varies
Belarus	Unknown	Unknown	Unknown	Unknown
Belgium	Not customary	Customary	Varies	Customary
Cameroon	Customary	Not customary	Not customary	Not customary
Canada	Customary	Varies	Varies	Varies
Chile	Varies	Not customary	Varies	Not customary
Denmark	Varies	Varies	Not customary	Not customary
Finland	Unknown	Unknown	Unknown	Unknown
Germany		Varies		
Guatemala	Unknown	Unknown	Unknown	Unknown
Honduras	Unknown	Unknown	Unknown	Unknown
Hong Kong (China*)	Customary		Customary	
Hungary	Customary	Unknown	Not customary	
India	Customary		Customary	
Ireland	Not customary	Not customary	Not customary	Not customary
Kazakhstan	Not customary	Not customary	Not customary	Not customary
Malaysia	Unknown	Unknown	Unknown	Unknown
Mali	Unknown	Unknown	Unknown	Unknown
Netherlands	Not customary	Customary	Unknown	Unknown
Nigeria	Customary	Not customary	Unknown	Not customary
Norway	Customary			
Panama	Unknown	Unknown	Unknown	Unknown
Paraguay	Unknown	Unknown	Unknown	Unknown
Romania	Varies	Varies	Varies	Varies
Russian Federation	Varies	Varies	Varies	Varies
Slovak Republic	Not customary	Not customary	Not customary	Not customary
South Africa	Customary	Customary	Not customary	Not customary
Sri Lanka	Customary	Not customary	Customary	Not customary
Switzerland	Varies	Varies	Not customary	Not customary
Trinidad and Tobago	Unknown	Unknown	Unknown	Unknown
UK	Varies	Varies	Varies	Varies
USA	Customary	Customary	Customary	Customary
Venezuela	Unknown	Unknown	Unknown	Unknown

*Reporting separately for this report.

surveyed. Recently, regulatory agencies and professional organizations have promoted changes that have gradually established a trend toward disclosing more information from donors to prospective parents and future offspring, or from offspring to donors. This data is provided freely and openly in some countries (e.g., UK, Australia, and Belgium), or released only under certain circumstances or court orders in other countries. Anonymity and issues revolving around disclosure in gamete donation remains a matter of scientific and ethical debate worldwide.

References

[1] van den Akker O. A review of family donor constructs: current research and future directions. Hum Reprod Update 2006;12(2):91-101.

[2] ESHRE Task Force on Ethics and Law. III. Gamete and embryo donation. Hum Reprod 2002;17(5):1407-1408.

[3] Harper JC, Kennett D, Reisel D. The end of donor anonymity: how genetic testing is likely to drive anonymous gamete donation out of business. Hum Reprod 2016;31(6):1135-1140.

CHAPTER 10: MICROMANIPULATION

Introduction

Micromanipulation techniques in the context of this Surveillance report are interventions performed on the oocyte or embryo with the specific intention of improving assisted reproductive treatment outcomes. These micromanipulation assisted reproductive technology (ART) procedures include intracytoplasmic sperm injection (ICSI), assisted hatching (AH), and various types of embryo biopsy. All of these particular procedures have been employed for some time but their value and specific indications are still debated.

Microinsemination or Intracytoplasmic Sperm Injection (ICSI)

Since its introduction to clinical practice in 1992, ICSI has been used effectively for couples with significant male factor infertility. In patients undergoing ART with surgically retrieved spermatozoa for obstructive or non-obstructive azoospermia and in those

Chapter 10. Table 1

How Is Micromanipulation Governed?

		ICSI Allowed		Assisted Hatching Allowed			Assisted Hatching Practiced		Other Micro-manipulation Allowed*		
How ART is Governed?	**Country**	**Yes**	**No**	**Yes**	**No**	**Not mentioned**	**Yes**	**Not used**	**Yes**	**No**	**Other**
By statutes	Austria	+		+			+		+	BBCT, MT	
	Belgium	+		+			Infrequent		+		CT, MT unknown
	Bulgaria	+		+			+		+		CT, MT unknown
	China	+		+			+		+		CT, MT unknown
	Czech Republic	+		+			+		+		CT, MT unknown
	Hungary	+		+			+		+	CT	MT unknown
	Israel	+		+			+		+	CT, MT	
	Kazakhstan	+		+			+		+		
	Norway	+		+			Infrequent		+		
	Romania	+		+			Infrequent		+	CT, MT	
	Russian Federation	+		+			+		+		
	Singapore	+		+			+		+	CT, MT	
	South Africa	+		+			Infrequent		+	CT, MT	
	Spain	+		+			Infrequent		+	MT	CT unknown
	Sweden	+		+			Infrequent		+	+	CT, MT unknown
	Switzerland	+		+			Infrequent		+	CT	MT unknown
	Turkey	+		+			+		+	CT, MT	
	UK	+		+			Infrequent		+		
Both Statute and Guidelines	Cameroon	+		+			Infrequent			All not allowed	
	Finland	+		+			Infrequent		+	CT, MT	
	Germany	+		+			Infrequent		+	BB, CT, MT	
	Greece	+		+			Infrequent		+		CT, MT unknown
	Portugal	+		+			Infrequent		+		CT, MT unknown
	Slovak Republic	+		+			+		+		

		ICSI Allowed		Assisted Hatching Allowed			Assisted Hatching Practiced		Other Micro-manipulation Allowed*		
How ART is Governed	**Country**	**Yes**	**No**	**Yes**	**No**	**Not mentioned**	**Yes**	**Not used**	**Yes**	**No**	**Other**
Guidelines	Argentina	+		+			+		+		CT, MT unknown
	Australia	+		+			+			MT	All others unknown
	Belarus	+		+			+		+	CT, MT	
	Ecuador	+		+			+		+	PBB CT, MT	
	Hong Kong (China*)	+		+			+		+		CT, MT not mentioned
	India	+		+			Infrequent		TB		All others unknown
	Italy	+		+			Infrequent		+		CT, MT unknown
	Japan	+		+			+		+		CT, MT unknown
	Jordan	+		+			Infrequent		BB		All others unknown
	Netherlands	+		+			Infrequent		+	CT	MT unknown
	Nigeria	+		+			+		+		CT, MT unknown
	Philippines	+		+			+			All not allowed	
	Saudi Arabia	+		+			+		BB		All others unknown
	Senegal	+				+	Not mentioned				All others not mentioned
	Taiwan (China*)	+		+			+			+	BB, TB unknown
	Venezuela	+		+			Infrequent		+		MT unknown
None	Cameroon	+		+			Infrequent			All not allowed	
	Finland	+		+			Infrequent		+	CT, MT	
	Germany	+		+			Infrequent		+	BB, CT, MT	
	Greece	+		+			Infrequent		+		CT, MT unknown
	Portugal	+		+			Infrequent		+		CT, MT unknown
	Slovak Republic	+		+			+		+		
	Bangladesh	+		+			+	Never performed		All not allowed	
	Canada	+		+			+		+		CT, MT unknown
	Chile	+		+			Infrequent		+		CT, MT unknown
	Denmark	+		+			Infrequent		+		CT, MT unknown
	Colombia	+		+			Infrequent		+		
	El Salvador	+				+	Not mentioned				All others not mentioned
	Estonia	+		+			Infrequent		+		CT, MT unknown
	France	+		+			Infrequent		+	CT, MT	
	Guatemala	+		+			+		+		
	Iran	+		+			+		+		CT, MT unknown
	Ireland	+		+			+		+	CT, MT	
	Malaysia	+		+			Infrequent		+	CT, MT	
	Kenya	+		+			Infrequent		+		
	Mali	+				Unknown	+				All others unknown
	Mexico	+		+			Infrequent		+		
	Panama	+		+			Infrequent		+		
	Paraguay	+		+			Infrequent		+		MT unknown
	Peru	+		+			+		+		MT unknown
	Sri Lanka	+		+			Infrequent				All others unknown
	Tunisia	+		+			Unknown				All others unknown
	Uruguay	+		+			Not mentioned		+		
	Trinidad and Tobago	+		+			Infrequent		+		MT unknown
	USA	+		+			+		+	CT, MT	

*Reporting separately for this report.

*Other Micromanipulation includes Polar body biopsy (PBB), Blastomere biopsy (BB) and Trophectoderm biopsy (TB), Cytoplasmic transfer (CT), and Mitochondrial transfer (MT).

patients with significant quantitative and qualitative sperm abnormalities, ICSI is usually obligatory to achieve an effective oocyte fertilization rate. Although commonly employed for other milder, male factor parameters, benefit is less clearly established. ICSI is recommended in the setting of mild male factor (as defined by a minimum of one semen parameter abnormality per World Health Organization [WHO]). In addition, it has been empirically used for cases of previous fertilization failure, poor-quality

oocytes, cryopreserved oocytes, in vitro maturation oocytes and diminished ovarian reserve [1]. The American Society for Reproductive Medicine (ASRM) Practice Committee opines that the routine use of ICSI in non-male factor infertility is not supported by adequate data [2].

With the widespread application of in vitro fertilization (IVF) and ICSI in infertility management, the health of offspring produced has been an ongoing concern. The interventions involved, parental age, and factors underlying infertility have all been suggested to be associated with adverse epigenetic effects on the offspring. Cases of severely impaired spermatogenesis are associated with specific chromosomal anomalies, especially a high frequency of Y-chromosomal micro deletions. ICSI is a more invasive intervention than conventional fertilization and confers heightened potential concerns regarding risk of congenital anomalies in children conceived with ICSI [3]. A systematic literature review from 1985 to May 2014 suggested that there was a slightly higher risk of genitourinary congenital malformation such as hypospadias and cryptorchidism in children conceived with ICSI compared to IVF offspring. However, a subsequent analysis of selective, higher quality studies did not find an increased risk [4]. Frequency of imprinting disorders, metabolic syndromes, and various malignancies have also been assessed among IVF and IVF/ICSI children. A direct link between IVF/ICSI and the studied disorders has not been established [5].

Assisted Hatching (AH)

AH is a technique used to improve ART success rates by facilitating the emergence of the embryo from the zona pellucida. It involves the artificial thinning or breaching of the zona pellucida, using either acidified Tyrode's solution, a glass microneedle, laser photo ablation, or a piezo micromanipulator. It has been utilized for "poor prognosis" embryos based on factors including zona thickness, blastomere number, fragmentation rates, and maternal age. The ASRM Practice Committee in 2014 recommended against the routine use of AH for all patients undergoing IVF. Although there is good evidence that the clinical pregnancy rates are slightly improved in poor prognosis patients, the evidence that it improves live birth rates remains insufficient [6].

Assisted hatching has been associated with a higher risk of monozygotic twin pregnancy in patients with a maternal age less than 35 years. However, a Cochrane database review in 2012 did not find an association between monozygotic twinning and assisted hatching in either fresh or frozen transfer cycles [7].

Embryo Biopsy

The procurement of embryonic DNA for pre-implantation genetic testing (PGT) may utilize PGT for aneuploidies (PGT-A), PGT for monogenic/single gene defects (PGT-M), and PGT for chromosomal structural rearrangements (PGT-SR). Overall assessment of the safety of the biopsy on the embryo, and determination of the optimal stage of development for biopsy for safety and efficacy are ongoing.

Recent studies have concluded that trophectoderm biopsy of a blastocyst rather than cleavage stage biopsy may be preferable. The cleavage stage embryos are believed to be more vulnerable to injury with resultant slower development and a higher chance of embryonic death. Also, the higher level of mosaicism at this stage increases the embryonic misdiagnosis rate even when cellular diagnosis is correct. Some experts believe that the removal of a euploid cell from a mosaic cleavage stage embryo may result in a higher aneuploid cellular load, which could have further deleterious effects. Moreover, pregnancy rates are higher when trophectoderm biopsy for preimplantation genetic screening is performed at the blastocyst stage, although recent reports of a high frequency of mosaicism in trophectoderm biopsies have now cast doubt on the specificity of the use of PGT for identifying euploidy, i.e., normal embryos that are diploid [8].

Cytoplasmic and Mitochondrial Transfer

Cytoplasmic transfer was a technique initially attempted to prevent serious mitochondrial disease. It involves the transfer of a small amount of ooplasm from a healthy donor oocyte to a recipient oocyte, creating a heteroplasmic oocyte. The presumed mutated mitochondrial DNA (mtDNA) of the recipient oocyte is not removed, but healthy donor mitochondrial DNA is added to it. However, there are three modifications of the cytoplasmic approach that are currently being actively researched and applied in experimental clinical trials. In the pronuclear transfer technique, the pronuclei from the zygote of the affected woman are inserted into the enucleated donor zygote containing nonpathogenic mtDNA. The second is the spindle transfer technique, in which the metaphase II spindle of chromosomes from the unfertilized oocyte of an affected woman is transferred to an enucleated donor oocyte. The most recent is the polar body transfer technique. In these methods, the nuclear chromosomes are from the two parent gametes, but the mtDNA is primarily inherited from the donor oocyte. The risk of epigenetic abnormalities is unknown and further clinical research and long term child outcome data are needed before direct clinical application [9].

In the USA, the Food and Drug Administration (FDA) has oversight of technology pertaining to techniques for mtDNA transfer. These procedures may be undertaken as clinical trials, after appropriate approvals are awarded. The Human Fertilisation and Embryology Authority (HFEA) in the UK has permitted mitochondrial replacement techniques as a clinical procedure since the end of 2015, proposing that these techniques be restricted to clinics licensed specifically to perform them and monitor outcomes [10].

Analysis of Survey (Table 1)

Of the 63 respondents that addressed this topic, ART legislation or guidelines were reported to be applicable to micromanipulation procedures in 40 countries. Eighteen countries were reported to be governed by statute. Activities were reported to be conducted within published guidelines within a further 16 countries, and activities were also reported to be covered under both statutes and guidelines in six countries. There are neither laws nor guidelines for the main micromanipulation techniques of ICSI and AH reported by respondents from 23 countries.

ICSI was reported to be allowed by statute or guidelines, and commonly practiced in all countries that are represented in this report. ICSI with surgically retrieved sperm is reported to be infrequently used in Belarus, Denmark, Germany, Jordan, Kenya, Malaysia, Mali, Senegal, and Sri Lanka.

Assisted hatching is also a generally accepted procedure in all countries represented in this report except for Bangladesh and Mali, where it is reportedly never performed. In Tunisia, the frequency of its use was unknown to the respondent.

Embryo or oocyte biopsy is reported to never be performed in Bangladesh, Mali, Norway, and the Philippines. Blastomere biopsy on cleavage stage embryos was reportedly not allowed to be performed in Austria and Germany but polar body and trophectoderm biopsy were reported to be allowed. Countries whose respondents stated that embryo biopsy could be performed but not polar body biopsy include Colombia, Denmark, Ecuador, Guatemala, Hong Kong [China (Reporting separately for this report.)], Iran, Mexico, the Netherlands, Paraguay, and Sweden. Trinidad and Tobago infrequently do blastomere biopsy, but do not perform polar body or trophectoderm biopsy.

Cytoplasmic transfer is reported to be used infrequently throughout the world. As noted and presented in greater detail in Chapter 8, cytoplasmic transfer is reported to be "commonly used" in only four countries: Kazakhstan, Cameroon, Slovak Republic, and Uruguay. It is reported to be used infrequently in India, Israel, and Mexico. Mitochondrial transfer is reported to be used infrequently in the UK, Cameroon, Israel, Slovak Republic, and Mexico. The other countries that had respondents fill out the questionnaire stated that their countries do not perform cytoplasmic or mitochondrial transfer.

Summary

ICSI remains the primary method of achieving fertilization for severe or mild male factor infertility and is utilized by all countries with respondents reporting for this Surveillance 2016. It is also commonly used for other instances of non-male factor infertility but these other applications are not currently recommended by large regional and some national professional societies. AH is reported to be utilized in all but two countries sampled. Embryo biopsy for PGT is reported to be performed in a large majority of countries and is reported to be usually preferentially performed on trophectoderm from blastocysts.

Cytoplasmic and mitochondrial transfer, which may ultimately be used to prevent serious mitochondrial disease, remain experimental with very limited clinical application worldwide with few respondents reporting their country to be utilizing these techniques. Pronuclear and spindle transfer are the newer research refinements but have even more limited use reported by the countries represented in this 2016 Surveillance report.

References

[1] Babayev SN, Park CW, Bukulmez O. Intracytoplasmic sperm injection indications: how rigorous? Semin Reprod Med 2014;32(4):283-290.

[2] Practice Committees of the American Society for Reproductive Medicine and Society for Assisted Reproductive Technology. Intracytoplasmic sperm injection (ICSI) for non-male factor infertility: a committee opinion. Fertil Steril 2012;98(6):1395-1399.

[3] Pinborg A, Henningsen AK, Malchau SS, et al. Congenital anomalies after assisted reproductive technology. Fertil Steril 2013;99(2):327-332.

[4] Massaro PA, MacLellan DL, Anderson PA, et al. Does intracytoplasmic sperm injection pose an increased risk of genitourinary congenital malformations in offspring compared to in vitro fertilization? A systematic review and meta-analysis. J Urol 2015;193(Suppl 5):1837-1842.

[5] Fauser BC, Devroey P, Diedrich K, et al. Health outcomes of children born after IVF/ICSI: a review of current expert opinion and literature. Reprod Biomed Online 2014;28 (2):162-182.

[6] Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology. Role of assisted hatching in in vitro fertilization: a guideline. Fertil Steril 2014;102(2):348-351.

[7] Carney SK, Das S, Blake D, et al. Assisted hatching on assisted conception (in vitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI). Cochrane Database Syst Rev 2012;12: CD001894.

[8] Brezina PR, Kutteh WH. Clinical applications of preimplantation genetic testing. BMJ 2015;350:g7611.

[9] Amato P, Tachibana M, Sparman M, et al. Three-parent in vitro fertilization: gene replacement for the prevention of inherited mitochondrial diseases. Fertil Steril 2014;101 (1):31-35.

[10] Board on Health Sciences Policy, Institute of Medicine. Ethical and social policy considerations of novel techniques for prevention of maternal transmission of mitochondrial DNA diseases. In: Claiborne A, English R, Kahn J, eds. Mitochondrial Replacement Techniques: Ethical, Social, and Policy Considerations. Washington (DC): National Academies Press (USA); 2016.

CHAPTER 11: OOCYTE MATURATION

Introduction

In-vitro maturation (IVM) following the recovery of immature oocytes was first suggested in the early 1990s as an option for improving potential fertilization rates of women undergoing in vitro fertilization (IVF). Currently, the major difference between this technique as it is typically performed, and conventional IVF treatment, is that oocyte retrieval is performed without prior controlled ovarian hyperstimulation (COH), and the immature oocytes recovered are subsequently cultured in vitro in enhanced culture environments until they complete maturation at the metaphase II (MII) stage. Several potential advantages of IVM have been cited, including improved safety by eliminating risk of ovarian hyperstimulation syndrome (OHSS), particularly for patients with polycystic ovarian syndrome (PCOS) and reduced cost and greater convenience with less stress to the patient by eliminating COH. However, clinical adaptation has been slow because of concerns pertaining to a lower overall clinical success, need for development of competency to perform the laboratory technique, limited follow-up data regarding the health of the resulting offspring, and the possible inducement of permanent changes in the expression of imprinted genes when compared to conventional IVF treatment [1].

Analysis of the Survey (Tables 1 and 2, Charts 1 and 2)

Oocyte Maturation

This survey topic included analyzable data from feedback from respondents from 64 countries. The procedure is reported to be permitted in 57 of these countries, whereas in two countries (Bangladesh and Belarus) it is reported to not be allowed. The situation was not reported by respondents in five countries (Australia, Mali, Paraguay, Sri Lanka, and Tunisia). In the majority of the countries, oocyte maturation is reported not to be overseen by an authority whereas in 14 countries application is

Chapter 11. Table 1

Parameters for Oocyte Maturation

Country	Is Oocyte Maturation Permitted in Your Country?	Are there Regulations that Govern? Oocyte Maturation in Your Country?	Is Oocyte Maturation Performed in Your Country?
Argentina	YES	NO	Infrequently Used
Australia	UNKNOWN	UNKNOWN	Unknown
Austria	YES	NO	Infrequently Used
Bangladesh	NO	NO	Never Performed
Barbados	YES	NO	Infrequently Used
Belarus	NO	NO	Infrequently Used
Belgium	YES	NO	Infrequently Used
Brazil	YES	NO	Infrequently Used
Bulgaria	YES	YES	Infrequently Used
Cameroon	YES	NO	Commonly Used
Canada	YES	NO	Infrequently Used
Chile	YES		Infrequently Used
China	YES	NO	Infrequently Used
Colombia	YES	NO	Infrequently Used
Czech Republic	YES	UNKNOWN	Infrequently Used
Denmark	YES	UNKNOWN	Infrequently Used
Ecuador	YES	NO	Infrequently Used
El Salvador	Yes	NO	Infrequently Used
Estonia	YES	NO	Infrequently Used
Finland	YES	YES	Infrequently Used
France	YES	YES	Infrequently Used
Germany	YES	NO	Infrequently Used
Greece	YES	YES	Infrequently Used
Guatemala	YES	NO	Never Performed
Hong Kong (China*)	YES	YES	Infrequently Used
Hungary	YES	NO	Infrequently Used
India	YES	YES	Infrequently Used
Iran	YES	UNKNOWN	Commonly Used
Ireland	YES	NO	Infrequently Used
Israel	YES	NO	Commonly Used
Italy	YES	YES	Infrequently Used
Japan	YES	NO	Infrequently Used
Jordan	YES	NO	Infrequently Used
Kazakhstan	YES	NO	Commonly Used
Kenya		NO	Unknown
Malaysia	YES	NO	Never Performed
Mali	UNKNOWN	NO	Never Performed
Mexico	YES	NO	Infrequently Used
Netherlands	YES	UNKNOWN	Never Performed
Nigeria	YES	YES	Commonly Used
Norway	YES	YES	Infrequently Used
Panama	YES	NO	Infrequently Used
Paraguay	UNKNOWN	NO	Never Performed
Peru	YES	NO	Infrequently Used
Philippines	YES		Commonly Used
Portugal	YES	NO	Infrequently Used
Romania	YES	YES	Infrequently Used
Russian Federation	YES	NO	Infrequently Used
Saudi Arabia	YES	YES	Commonly Used
Senegal		NO	
Singapore	YES		Infrequently Used
Slovak Republic	YES	YES	Commonly Used
South Africa	YES	NO	Infrequently Used
South Korea	YES	NO	
Spain	YES	NO	Infrequently Used
Sri Lanka	UNKNOWN	NO	Infrequently Used
Sweden	YES	UNKNOWN	Infrequently Used
Switzerland	YES	NO	Infrequently Used
Taiwan (China*)	YES	UNKNOWN	Infrequently Used
Trinidad and Tobago	YES	NO	Infrequently Used
Tunisia	UNKNOWN	NO	Unknown
Turkey	YES	YES	Infrequently Used
UK	YES	YES	Infrequently Used
Uruguay	YES	NO	Commonly Used
USA	YES	NO	Infrequently Used
Venezuela	YES	NO	Infrequently Used

*Reporting separately for this report.

reported to be primarily regulated by federal/ national rules or voluntarily by professional organization standards and guidelines. Oocyte maturation was reported to be commonly used in only in nine countries.

Discussion

Despite evidence of a modest increase in the utilization of IVM as noted from the IFFS Surveillance 2010 until 2013, the current survey results in 2016 provide very similar information when compared with 2013. Since current data have not shown the clinical efficiency of the technique to offer superior results to conventional IVF treatment, new clinical evidence will be needed to promote wider application of IVM.

Summary

IVM offers significant hypothetical advantages over conventional IVF but the extant reported clinical experience does not yet support broader application, which has limited its adoption. This situation has not significantly changed over the past three years.

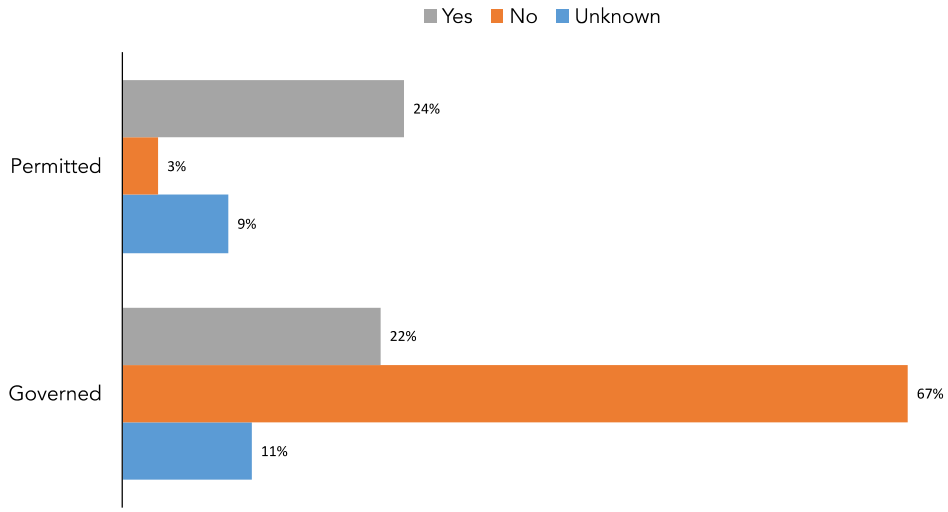


Chart 1. Is Oocyte Maturation Permitted or Governed In Your Country?

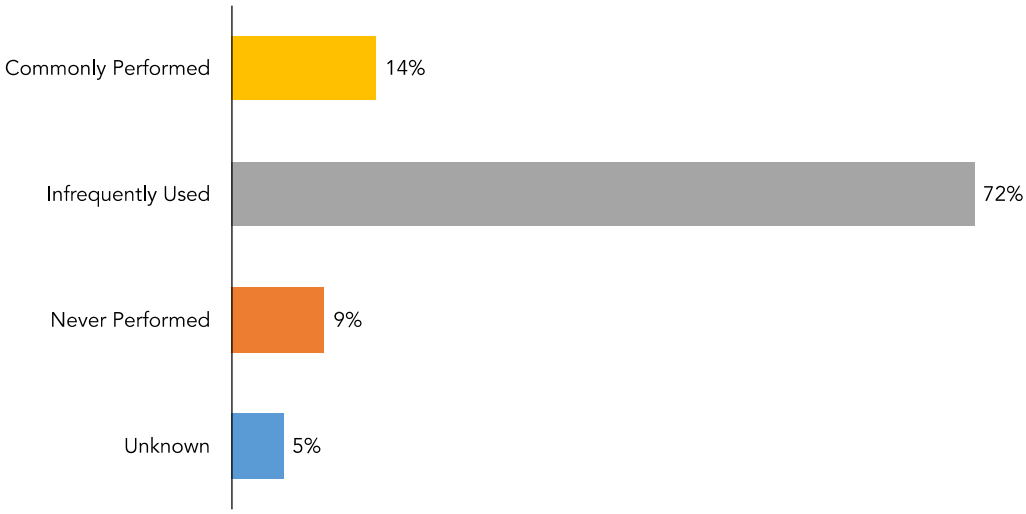


Chart 2. How Often Is Oocyte Maturation Performed In Your Country?

Chapter 11. Table 2

If Oocyte Maturation is Regulated in Your Country, how is it Done?

Country	No Regulations	Federal/National Laws/Statutes/ Ordinances	State/Provincial/ Regional Laws/ Statutes/Ordinances	Municipal Laws/ Statutes/ Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/ Guidelines	Cultural Practice	Religious Decree	Unknown
Argentina	YES								
Australia									
Austria									
Bangladesh	YES								
Belarus						YES			
Belgium									
Bulgaria		YES							
Cameroon									
Canada	YES								
Chile	YES								
China	YES								
Czech Republic									
Denmark									
Ecuador	YES					YES			
El Salvador	YES								
Estonia	YES								
Finland		YES			YES				
France			YES						
Germany	YES								
Greece									
Guatemala	YES								

Chapter 11. Table 2

(*Continued*)

Country	No Regulations	Federal/National Laws/Statutes/ Ordinances	State/Provincial/ Regional Laws/ Statutes/Ordinances	Municipal Laws/ Statutes/ Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/ Guidelines	Cultural Practice	Religious Decree	Unknown
Hong Kong (China*)					YES				
Hungary	YES								
India						YES			
Iran	YES								
Ireland	YES								
Israel		YES							
Italy						YES			
Japan	YES								
Jordan						YES			
Kazakhstan									
Malaysia	YES								
Mali	YES								
Mexico									
Netherlands									YES
Nigeria						YES			
Norway		YES							
Panama	YES								
Paraguay	YES								
Peru	YES								
Philippines									
Portugal									
Romania		YES							
Russian Federation	YES								
Saudi Arabia					YES				
Senegal									
Singapore		YES							
Slovak Republic		YES				YES			
South Africa	YES								
Spain	YES								
Sri Lanka	YES								
Sweden									
Switzerland	YES								
Taiwan (China*)									YES
Tunisia	YES								
Turkey		YES							
UK		YES							
Uruguay									
USA	YES								
Venezuela	YES					YES			

*Reporting separately for this report.

References

[1] Paulson RJ, Fauser BC, Vuong LT, et al. Can we modify assisted reproductive technology practice to broaden reproductive care access? Fertil Steril 2016;105(5):1138-1143.

CHAPTER 12: WELFARE OF THE CHILD

The ultimate goal of all infertility treatments is the birth of a single healthy baby. Initial early observational studies of neonates provided reassurance that assisted reproductive technology (ART) interventions were not associated with adverse outcomes. More recently, larger population-based studies with longer and more thorough follow-up have raised concerns regarding an increased frequency of abnormalities. Early reports published after intracytoplasmic sperm injection (ICSI) was established as a new method of fertilization reported an expected incidence of birth defects, comparable to the general population. However, de-novo sex chromosome anomalies and structural autonomic anomalies were increased in newborns after ICSI but not after in vitro fertilization (IVF), presumed to be inherited through the paternal pathway and thus not due to the ICSI treatment itself [1]. Other studies described a higher incidence of birth defects [2,3] in

Chapter 12. Table 1

Are There Practices or Regulations that Address the Welfare of the Child in Your Country?

Country	No Practices or Regulations	Federal/National Laws/Statutes/ Ordinances	State/Provincial/ Regional Laws/Statutes/ Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Argentina	YES	NO	NO	NO	NO	YES	NO	
Australia		YES	YES		YES	YES		
Austria	NO							
Bangladesh	NO	NO	NO	NO	NO	NO	NO	NO
Barbados		YES						
Belarus						YES		
Belgium			YES					
Brazil		YES			YES	YES		
Bulgaria		YES						
Cameroon	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	
Canada	NO	YES						
Chile	NO							
China	NO	YES						
Colombia		YES						
Czech Republic		YES						
Denmark		UNKNOWN						

Chapter 12. Table 1

(*Continued*)

Country	No Practices or Regulations	Federal/National Laws/Statutes/ Ordinances	State/Provincial/ Regional Laws/Statutes/ Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Ecuador	YES							
El Salvador	YES					YES		
Estonia		YES						
Finland		YES				YES		
France		YES						
Germany	NO	YES	NO	NO	YES	YES	UNKNOWN	UNKNOWN
Greece		YES						
Guatemala	YES							
Hong Kong (China*)					YES			
Hungary	YES							
India	UNKNOWN					YES	YES	YES
Iran		YES			YES	NO	NO	NO
Ireland	YES					YES		
Israel		YES						
Italy						NO		
Japan						YES		
Jordan	YES	YES				UNKNOWN	YES	YES
Kazakhstan	YES							
Kenya	YES							
Malaysia	YES							
Mali	YES					YES		
Mexico	NO							
Netherlands	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Nigeria						YES	UNKNOWN	UNKNOWN
Norway		YES						
Panama		YES						
Paraguay	YES							
Peru	YES							
Philippines		YES	YES	YES	YES	YES	YES	
Portugal	YES							
Romania		YES						
Russian Federation	NO	YES	YES	YES		YES	YES	
Saudi Arabia	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Senegal						YES		
Singapore		YES						
Slovak Republic		YES				YES	YES	
South Africa	NO							
South Korea		YES						
Spain		YES						
Sri Lanka	YES	NO	NO	NO	NO	NO	UNKNOWN	NO
Sweden	NO	YES		YES		YES		
Switzerland		YES						
Taiwan (China*)	YES							
Trinidad and Tobago	YES							
Tunisia		YES						
Turkey		YES						
UK		YES	NO	NO	NO	NO	NO	NO
Uruguay		YES						
USA	YES	NO	NO	NO	NO	YES	YES	NO
Venezuela	NO					NO		

*Reporting separately for this report.

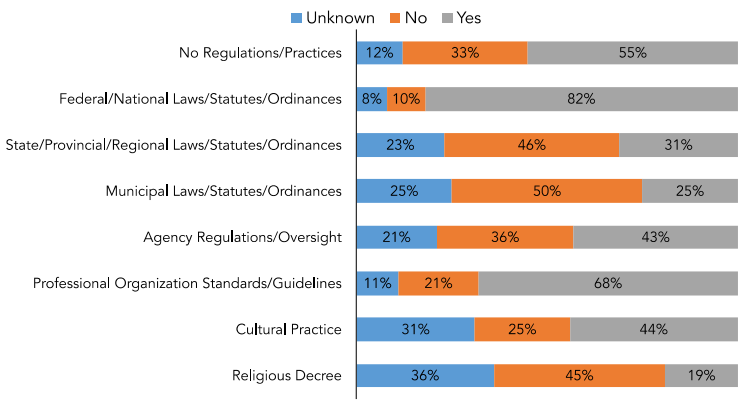


Chart 1. Are there practices or regulations that address the welfare of the child in your country? (More than one topic could be selected per country).

newborns after ICSI compared to IVF. It is not clear whether this effect, if significant, is a result of the intervention or if it instead represents an increase in the baseline anomaly rate in an infertile population (as reported in a systematic review in 2014) [4]. There is evidence to support both hypotheses. Considering the widespread use of ART in general, and ICSI in particular (which is increasingly being used for non-male factor indications), follow-up of children born following ART is essential.

Analysis of the Survey

Of the 68 countries that had respondents providing answers for the current survey concerning this topic, 31 (45.6%) report having legislation addressing the welfare of the child (Table 1 and Chart 1). Most of these countries were in Europe and included Belgium, Bulgaria, the Czech Republic, Estonia, Finland, France, Germany, Greece, Norway, Romania, Russia, Slovak Republic, Spain, Sweden, Switzerland, and the UK. Other countries reported to have pertinent legislation were Australia, Barbados, Canada, China, Iran, Israel, Jordan, Philippines, Singapore, South Korea, Tunisia, Turkey. Latin American countries included Brazil, Colombia, Panama, and Uruguay. Some countries have addressed this with multiple mechanisms, such as national, state, and municipal laws, and include Australia, the Philippines, Russia and Sweden. This topic was reported to not be addressed by 26 countries (38.2%), all of which have no reported legislation. Five countries were reported to have an unknown status on these issues (Cameroon, Denmark, India, the Netherlands, and Saudi Arabia). Six countries had respondents who gave no response (Table 1). Hong Kong [China (Reporting separately for this report.)] has reported to have oversight by a government

Chapter 12. Table 2

Assessment or Concerns Regarding the Welfare of the Child

Country	Is a Formal Assessment of the Welfare of the Child an Obligatory Part of the Fertility Clinic Evaluation of Prospective Parents?	Can Fertility Care be Declined if There Are Concerns Regarding the Welfare of Any Potential Future Child?
Argentina	No	Unknown
Australia	Yes	Yes
Austria	No	Unknown
Bangladesh	No	Yes
Barbados	No	Yes
Belarus	Unknown	Unknown
Belgium	No	Yes
Brazil	No	Yes
Bulgaria	No	Unknown
Cameroon	No	Yes
Canada	No	Yes
Chile	No	Yes
China	No	Unknown
Colombia	NO	Yes
Czech Republic	No	Yes
Denmark	No	Yes
Ecuador	Yes	YES
El Salvador	no	Yes
Estonia	No	Yes
Finland	Yes	Yes
France	No	Yes
Germany	No	Yes
Greece	No	Yes
Guatemala	Yes	Yes
Hong Kong (China*)	Yes	Yes
Hungary	No	Unknown
India	Yes	Yes
Iran	No	Unknown
Ireland	Yes	Yes
Israel	Yes	Yes
Italy	No	Unknown
Japan	No	Unknown
Jordan	Unknown	Yes
Kazakhstan	No	Unknown
Malaysia	No	Unknown
Mali	Unknown	Yes
Mexico	No	Yes
Netherlands	No	Yes
Nigeria	Unknown	Yes
Norway	Yes	Yes
Panama	No	No
Paraguay	Yes	Unknown
Peru	No	
Philippines	Yes	Yes
Portugal	No	Yes
Romania	Yes	Yes
Russian Federation	No	Yes
Saudi Arabia	No	No
Senegal	Yes	Unknown
Singapore	No	Unknown
Slovak Republic	Yes	Yes
South Africa	No	Yes
South Korea	No	Unknown
Spain	No	
Sri Lanka	Unknown	Yes
Sweden	Yes	Yes

Chapter 12. Table 2

(Continued)

Country	Is a Formal Assessment of the Welfare of the Child an Obligatory Part of the Fertility Clinic Evaluation of Prospective Parents?	Can Fertility Care be Declined if There Are Concerns Regarding the Welfare of Any Potential Future Child?
Switzerland	No	Yes
Taiwan (China*)	Unknown	Unknown
Trinidad and Tobago	Yes	Yes
Tunisia	No	Unknown
Turkey	Yes	Yes
UK	Yes	Yes
Uruguay	No	Yes
USA	No	Yes
Venezuela	Unknown	Yes

*Reporting separately for this report.

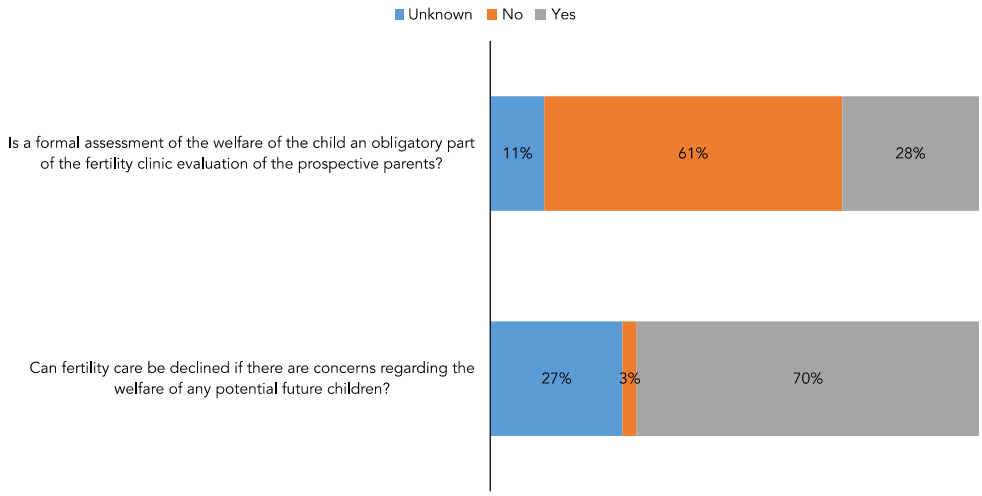


Chart 2. Formal assessment of the welfare of a child.

agency, and Australia, Brazil, Germany, Iran, and the Philippines have been reported to have an agency oversight as well as legislation. Jordan and India have been reported to address the welfare of the child by religious decree and cultural practice. The latter was also reported by respondents from Cameroon, the Philippines, Russia, Slovak Republic, and the USA. Nineteen countries were reported to have professional organizations that address the welfare of the child, including Argentina, Australia, Belarus, Brazil, Cameroon, El Salvador, Finland, Germany, India, Ireland, Japan, Mali, Nigeria, the Philippines, Russia, Senegal, Slovak Republic, Sweden, and the USA.

However, when the questionnaire asked the respondents if formal assessment of welfare of the child was an obligatory part of the initial evaluation of prospective parents in fertility clinics, 40 respondents (61%) answered negatively (Tables 2 and 3, Chart 2). The following countries were reported to include the welfare of the child as part of a routine infertility evaluation: Australia, Ecuador, Finland, Guatemala, Hong Kong [China (Reporting separately for this report.)], India, Ireland, Israel, Norway, Paraguay, the Philippines, Romania, Senegal, Slovak Republic, Sweden, Trinidad & Tobago, Turkey, and the UK (18/65 or 28%).

As part of the future welfare of the child evaluation and its familial and social environment, additional questions were posed to the respondents to determine whether prospective parents are asked about their background, including any previous clinical, psychiatric, or criminal history. Results are depicted in Tables 2 and 3. Twenty-seven countries (41%) had respondents report that topics such as history of family violence, harming a child, or prior history of contacting social services regarding care of other children were not being addressed prior to initiation of fertility treatment. Eleven countries (18%), had respondents note that a history of alcohol or drug abuse was not sought prior to fertility treatment, including Austria, Barbados, France, India, Japan, Jordan, Mexico, Panama, South Africa, South Korea, Tunisia, and the USA. Forty-four countries (70%) were reported to inquire about serious mental or physical illness that could potentially impact child care, and 43 (66.1%) reported that counseling about the risk of the child for a serious medical condition was included prior to initiation of fertility treatment. Furthermore, Austria, India, Japan, Mexico, Panama, South Korea, Tunisia, and the USA had respondents report that prospective parents are not routinely evaluated for any of these issues. Forty-four countries (44/65 respondents, 67.7%) were reported to have the ability to deny fertility services when a potential significant risk of affecting the future welfare of a child was determined to exist. (Tables 2 and 3).

Chapter 12. Table 3

Are Prospective Parents Asked About the Following Information?

Country	Previous Convictions Related to Harming a Child	Contact with Social Services Regarding Care of other Children	A History of Violence or Serious Discord within the Family	Drug or Alcohol Abuse	The Existence of Serious Mental or Physical Conditions that Might Impair their Ability to Care for a Child	Risk to the Child of a Serious Medical Condition
Argentina	NO	NO	NO	YES	YES	YES
Australia	YES	YES	YES	YES	YES	
Austria	NO	NO	NO	NO	NO	NO
Bangladesh	NO	NO	NO	YES	YES	YES
Barbados	NO	NO	NO	NO	YES	YES
Belarus	NO	NO	NO	YES	YES	UNKNOWN
Belgium	YES	YES	YES	YES	YES	YES
Brazil	NO	NO	NO	YES	YES	YES
Bulgaria	NO	NO	NO	YES	YES	YES
Cameroon	NO	UNKNOWN	YES	YES	YES	YES
Canada	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Chile	NO	NO	YES	YES	NO	NO
China	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	UNKNOWN
Colombia	NO	NO	YES	YES	YES	YES
Czech Republic	NO	NO	NO	YES	YES	YES
Denmark	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	YES
Ecuador	NO	NO	NO	YES	YES	YES
El Salvador				YES	YES	YES
Estonia	NO	NO	NO	YES	NO	YES
Finland	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	YES
France	YES	NO	YES	NO	NO	NO
Germany	NO	NO	NO	YES	YES	YES
Greece	NO	NO	NO	YES	YES	YES
Guatemala	YES	YES	YES	YES	YES	YES
Hong Kong (China*)			YES		YES	YES
Hungary	NO	NO	NO	YES	YES	YES
India	NO	NO	NO	NO	NO	NO
Iran	YES	YES	YES	YES	YES	YES
Ireland	YES	YES	YES	YES	YES	YES
Israel	YES	YES	YES	YES	YES	YES
Italy	NO	NO	NO	YES	YES	YES
Japan	NO	NO	NO	NO	NO	NO
Jordan	NO	NO	NO	NO	NO	YES
Kazakhstan	NO	NO	YES	YES	YES	YES
Kenya	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Malaysia	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Mali	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	YES
Mexico	NO	NO	NO	NO	NO	NO
Netherlands	NO	NO	NO	YES	YES	YES
Nigeria	YES	YES	YES	YES	YES	YES
Norway	YES	YES	YES	YES		YES
Panama	NO	NO	NO	NO	NO	NO
Paraguay	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Peru	YES	YES	YES	YES	YES	YES
Philippines	NO	YES	YES	YES	YES	YES
Portugal	NO	NO	NO	YES	YES	YES
Romania	YES	YES	YES	YES	YES	YES
Russian Federation	NO	NO	NO	YES	YES	YES
Saudi Arabia	NO	NO	NO	YES	YES	YES
Senegal	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Singapore	NO	NO	NO	YES	YES	YES
Slovak Republic	UNKNOWN	NO	YES	YES	UNKNOWN	YES
South Africa	NO	NO	NO	NO	YES	YES
South Korea	NO	NO	NO	NO	NO	
Spain	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES	YES
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	NO	NO	NO	YES	YES	NO
Switzerland	NO	NO	NO	YES	YES	YES
Taiwan (China*)	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Trinidad and Tobago	YES	YES	YES	YES	YES	YES
Tunisia		NO	NO	NO	NO	NO
Turkey	YES	YES	YES	YES	YES	YES
UK	YES	YES	YES	YES	YES	YES
Uruguay				YES	YES	YES
USA	NO	NO	NO	NO		NO
Venezuela	NO	NO	UNKNOWN	YES	YES	YES

*Reporting separately for this report.

Discussion

The results of the survey reflect a heterogeneous approach to the assessment of the welfare of the child. The current survey does show a clear trend towards more extensive and consistent assessment prior to initiating treatment. For example, the UK's Human Fertilisation and Embryology Authority (HEFA)'s code of practice refers to guidance notes about the assessment process, mechanisms for obtaining further information, and circumstances for refusing treatment [5]. The survey also reveals insufficient information and resources for the assessment and management of these issues. This is reflected by a significant percentage of respondents responding to several questions with "unknown" or "no response" (data not fully shown in tables).

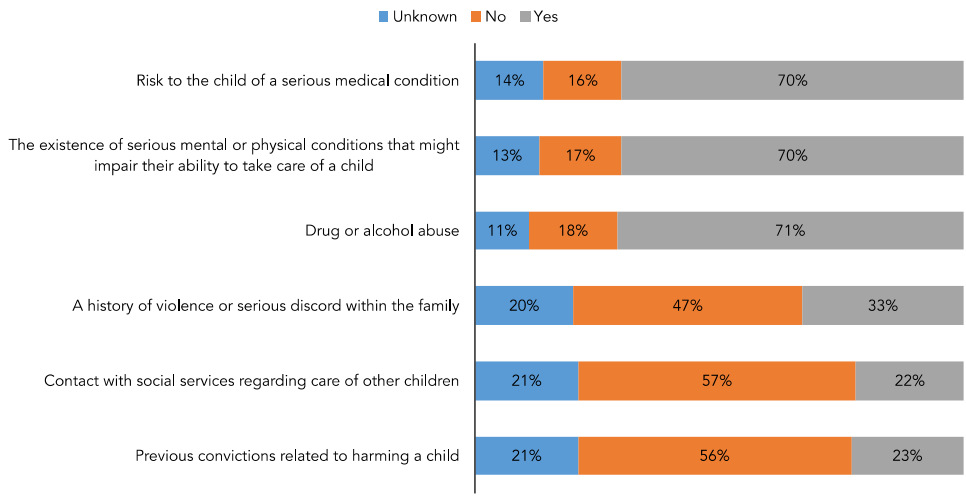


Chart 3. Are prospective parents asked about the following information?

Summary

The assessment of the welfare of the child is assuming increasing importance among countries that perform ART and is being addressed with many different models. This 2016 Surveillance report does show a clear trend in comparison to the 2013 report toward more extensive and consistent assessment prior to initiating therapy. Welfare of the child is reported to be primarily addressed by federal or local laws/statutes, and, in countries reported to be without legislation, professional organizations usually provide guidelines and standards to properly assess prospective parents.

References

[1] Bonduelle M, Liebaers I, Deketelaere V, et al. Neonatal data on a cohort of 2889 infants born after ICSI (1991-1999) and of 2995 infants born after IVF (1983- 1999). Hum Reprod 2002;17:671-694.
[2] Hansen M, Kurinczuk JJ, Bower C, et al. The risk of major birth defects after intracytoplasmic sperm injection and in vitro fertilization. N Engl J Med 2002;346:725-730.
[3] Wen J, Jiang J, Ding C, et al. Birth defects in children conceived by in vitro fertilization and intracytoplasmic sperm injection: a meta-analysis. Fertil Steril 2012;97(6):1331-1337.
[4] Simpson JL Birth defects and assisted reproductive technologies. Semin Fetal Neonatal Med 2014;19(3):177-182.
[5] Human Fertilisation & Embryology Authority. HFEA Code of Practice 8. Welfare of the Child Available at: http://www.hfea.gov.uk/5473.html. Accessed August 10, 2016.

CHAPTER 13: FETAL REDUCTION

Introduction

Multiple pregnancy remains the primary risk of all infertility treatment involving ovulation induction agents and has been the focus of intense public health scrutiny for two decades. Multiple pregnancy and high order multiple pregnancy (HOM), in particular, confer substantial fetal, neonatal, and maternal risk (see Chapter 5). In essence, two approaches have been adopted to reduce this risk. Many countries have adopted strict measures to limit the number of embryos transferred and have confirmed the efficacy of this approach with subsequent substantial reductions in multiple rates, particularly HOMs. Countries that have not developed legislation or guidelines to reduce the number of embryos transferred continue to see high HOM rates. In addition, countries in which significant numbers of ovulation induction cycles with gonadotropins (controlled ovarian hyperstimulation or super-ovulation with or without intra-uterine insemination) are performed experience significant numbers of multiple pregnancies, especially HOMs. Fetal or selective reduction (FR) has most often been employed in these circumstances to mitigate this risk. While highly controversial and unacceptable to many, fetal reduction has been shown to significantly reduce risk to the mother and surviving progeny [1].

Analysis of the Survey

Respondents from 66 countries provided analyzable data for this topic. The respondents could select one of four answers regarding the status of FR: allowed (21 countries); allowed with permission (21 countries); not allowed (13 countries); and not addressed or status unknown (11 countries) (Table 1 and Chart 1).

FR is reported to be frequently used in four countries: Belarus, Bulgaria, Czech Republic, and Greece. It is reported to be infrequently used in 39 countries, and not practiced at all in 14 countries (Table 2 and Chart 2).

The survey results show that the practice of FR was reported to be mandated: by federal law in 21 countries; by state laws or statutes in four countries; by agency regulations in four countries; by professional organizational standards or guidelines in nine countries; and by cultural practices or religious decrees in two countries (Table 3).

A new category was added to this year's questionnaire, which queried respondents on their country's regulation or monitoring of FR practices. Nineteen countries were reported to monitor regularly, 11 countries were reported to partially or inconsistently monitor, and 19 countries were reported to have no provisions (Table 4 and Chart 3).

As noted in Surveillance 2013, most South American countries are reported to not allow the FR procedure. Many European

Chapter 13. Table 1

Is Selective Reduction Allowed?

Country	Allowed	Allowed with Conditions	Not Addressed	Not Allowed	Unknown
Argentina				+	
Australia	+				
Austria		+			
Bangladesh			+		
Barbados			+		
Belarus	+				
Belgium	+				
Brazil		+			
Bulgaria	+				
Cameroon	+				
Canada	+				
Chile				+	
China	+				
Colombia		+			
Czech Republic	+				
Denmark		+			
Ecuador		+			
El Salvador					+
Estonia			+		
Finland		+			
France	+				
Germany		+			
Greece		+			
Guatemala				+	
Hong Kong (China*)	+				
Hungary		+			
India	+				
Iran		+			
Ireland		+			
Israel		+			
Italy				+	
Japan			+		
Jordan		+			
Kazakhstan	+				
Kenya			+		
Malaysia	+				
Mali					+
Mexico		+			
Netherlands	+				
Nigeria	+				
Norway		+			
Panama				+	
Paraguay				+	
Peru				+	
Philippines				+	
Portugal			+		
Romania		+			
Russian Federation	+				
Saudi Arabia		+			
Senegal			+		
Singapore		+			
Slovak Republic		+			
South Africa	+				
South Korea			+		
Spain			+		
Sri Lanka				+	
Sweden		+			
Switzerland	+				
Taiwan (China*)				+	
Trinidad and Tobago				+	
Tunisia	+				
Turkey		+			
UK	+				
Uruguay				+	
USA	+				
Venezuela				+	

*Reporting separately for this report.

countries were reported to have in existence some legislation regulating reduction but the respondents noted that they are inconsistently monitored. Venezuela is the only country in which fetal reduction is reported to be infrequently performed although it is not legally permissible.

In 2013, respondents from Brazil and Latvia reported the practice of FR even though it was not allowed by statute or approved by guidelines. In 2016, the respondent from Brazil noted that FR is allowed with certain conditions, although it was reported to be infrequently performed. The respondent from Latvia did not submit a response to this issue for the 2016 survey.

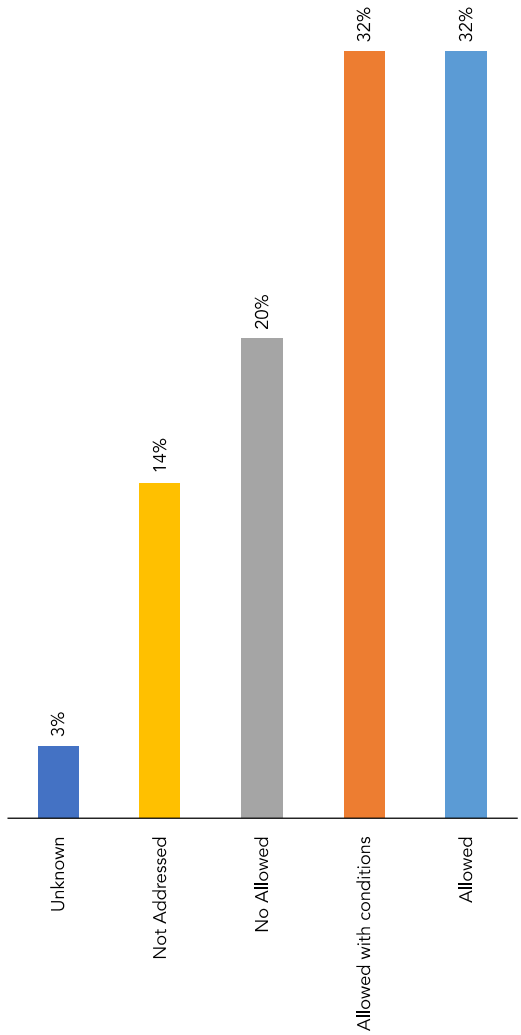


Chart 1. Is Selective Reduction Allowed?

Chapter 13. Table 2

Is Fetal Selective Reduction Performed in Your Country?

Country	Yes	No	Unknown	If Yes, Frequency
Argentina			+	
Australia	+			Infrequently used
Austria	+			Infrequently used
Bangladesh	+			Infrequently used
Barbados		+		
Belarus	+			Infrequently used
Belgium	+			Frequently used
Brazil	+			Infrequently used
Bulgaria	+			Frequently used
Cameroon	+			Infrequently used
Canada	+			Infrequently used
Chile		+		
China	+			Infrequently used
Colombia	+			Infrequently used
Czech Republic	+			Frequently used
Denmark	+			Infrequently used
Ecuador		+		
El Salvador		+		
Estonia			+	
Finland	+			Infrequently used
France	+			Infrequently used
Germany	+			Infrequently used
Greece	+			Frequently used
Guatemala			+	
Hong Kong (China*)	+			Infrequently used
Hungary	+			Infrequently used
India	+			Infrequently used
Iran	+			Infrequently used
Ireland	+			Infrequently used
Israel	+			Infrequently used
Italy		+		
Japan	+			Infrequently used
Jordan	+			Infrequently used
Kazakhstan	+			Infrequently used
Kenya			+	
Malaysia	+			Infrequently used
Mali		+		
Mexico	+			Infrequently used
Netherlands	+			Infrequently used
Nigeria	+			Infrequently used
Norway		+		
Panama		+		
Paraguay			+	
Peru		+		
Philippines		+		
Portugal	+			Infrequently used
Romania	+			Infrequently used
Russian Federation	+			Infrequently used
Saudi Arabia	+			Infrequently used
Senegal		+		
Singapore	+			Infrequently used
Slovak Republic			+	
South Africa	+			Infrequently used
South Korea	+			
Spain	+			Infrequently used
Sri Lanka			+	
Sweden	+			Infrequently used
Switzerland	+			Infrequently used
Taiwan (China*)		+		
Trinidad and Tobago		+		
Tunisia	+			Infrequently used
Turkey	+			Infrequently used
UK	+			
Uruguay		+		
USA	+			Infrequently used
Venezuela	+			Infrequently used

*Reporting separately for this report.

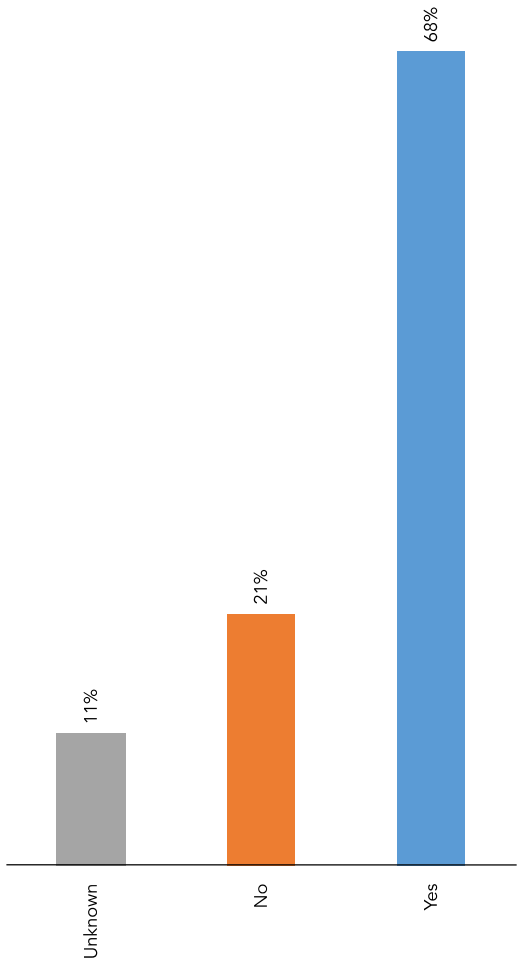


Chart 2. Is Selective Reduction Performed?

Summary

Most of the countries represented in this 2016 Surveillance were reported to permit FR but the respondents noted that it is infrequently performed. Most respondents report some form of ongoing regular monitoring but 19 countries were reported to not have strict regulations for monitoring. As noted in 2013, the majority of the respondents who report outright prohibition of FR in their country are in South America, and according to the respondents, this appears to reflect their country's religious and cultural preferences.

Chapter 13. Table 3

If Allowed/Permitted in Your Country, are There Regulations that Address Selective Fetal Reduction?

Country	No Regulations	Federal/National Laws/ Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Australia			YES					
Austria						YES		
Belarus		YES				YES		
Belgium		YES						
Brazil						YES		
Bulgaria		YES						
Cameroon	YES					YES		
Canada	YES	NO	NO	NO	NO	Unknown	NO	NO
China		YES						
Colombia		YES						
Czech Republic		YES						
Denmark		Unknown						
Ecuador	YES					YES		
Finland	NO	YES	NO	NO	YES	NO	NO	NO
France		YES						
Germany		YES						
Greece		YES						
Hong Kong (China*)			YES		YES			
Hungary		YES						
India			YES			Unknown		
Iran					YES			
Ireland		YES						
Israel		YES						
Jordan	Unknown							
Kazakhstan	YES							
Malaysia	YES							
Mexico		NO	YES	NO	NO	NO	NO	YES
Netherlands	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Mexico		NO	YES	NO	NO	NO	NO	YES
Netherlands	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Nigeria	YES							
Norway		YES						
Romania		YES						
Russian Federation		YES						
Saudi Arabia	NO				YES	YES	YES	YES
Singapore		YES						
Slovak Republic		YES				YES		
South Africa	NO							
Switzerland		Unknown				YES		
Tunisia		YES						
Turkey		YES						
UK		YES						
USA	YES	NO	NO	NO	NO	YES	YES	NO

*Reporting separately for this report.

Chapter 13. Table 4

Are Outcomes of Selective Reduction Monitored And/or Documented?

Country	Yes	No	Partially (Inconsistently)	Unknown
Argentina		+		
Australia		+		
Austria		+		
Bangladesh			+	
Barbados				+
Belarus	+			
Belgium	+			
Brazil		+		
Bulgaria	+			
Cameroon		+		
Canada				+
China	+			
Colombia		+		
Czech Republic	+			
Denmark				+
Ecuador			+	
Finland	+			
France		+		
Germany			+	
Greece		+		
Guatemala				+
Hong Kong (China*)	+			
Hungary			+	
India	+			
Iran	+			
Ireland		+		
Israel	+			
Japan		+		
Jordan			+	
Kazakhstan	+			
Malaysia		+		
Mali		+		
Mexico		+		

Chapter 13. Table 4

(Continued)

Country	Yes	No	Partially (Inconsistently)	Unknown
Netherlands		+		
Nigeria	+			
Norway	+			
Panama		+		
Paraguay				+
Peru		+		
Portugal	+			
Romania			+	
Russian Federation	+			
Saudi Arabia	+			
Senegal				+
Singapore	+			
Slovak Republic			+	
South Africa		+		
South Korea		+		
Spain			+	
Sweden			+	
Switzerland				+
Trinidad and Tobago				+
Tunisia			+	
Turkey	+			
UK		+		
Uruguay				+
USA	+			
Venezuela			+	

*Reporting separately for this report.

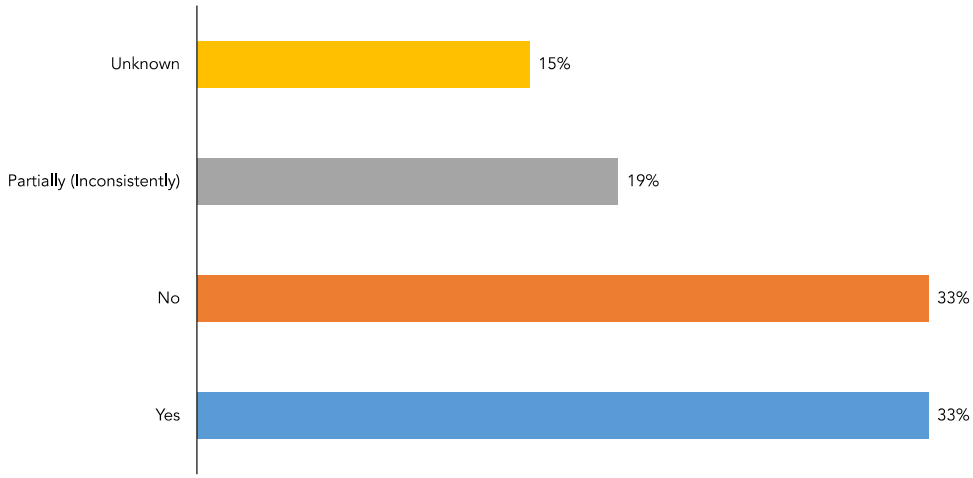


Chart 3. Are Outcomes of Selective Reduction Monitored and Documented?

Reference

[1] Evans MI, Andriole S, Britt DW Fetal reduction: 25 years' experience. *Fetal Diagn Ther* 2014;35:69-82.

CHAPTER 14: PREIMPLANTATION GENETIC DIAGNOSIS (PGD) AND PREIMPLANTATION GENETIC SCREENING (PGS)

Introduction

Preimplantation genetic testing (PGT) is a test performed to analyze the DNA from oocytes (polar bodies) or embryos (cleavage stage or blastocyst) for human leukocyte antigen (HLA)-typing or for determining genetic abnormalities. These include: PGT for aneuploidy (PGT-A), PGT for monogenic/single gene defects (PGT-M), and PGT for chromosomal structural rearrangements (PGT-SR). This terminology now supplants the terminology preimplantation genetic diagnosis (PGD) and screening (PGS). Since the field and the 2015 questionnaire used the terminology PGD and PGS, the tables of responses reflect the older terms. However, this chapter will adopt the new terminology.

PGT-M for monogenic/single gene defects (PGT-M) has been used for detection of molecular defects linked with specific inherited diseases in embryos prior to uterine transfer. Non-affected embryos are selected and transferred to the patient with the expectation of producing a child free of that disease. Additional PGT-M applications include generation of embryos followed by selection by HLA haplotype to produce a "savior sibling" for a family member afflicted with a potentially lethal

Chapter 14. Table 1

Is Pre-implantation Genetics Allowed/Permitted in Your Country?

Country	Pre-implantation Genetic Testing (Monogenic & Single Gene Defect)	Pre-implantation Genetic Testing (Aneuploidy)	Pre-implantation Genetic Testing (Sex Selection)
Argentina	YES	YES	YES
Australia	YES	UNKNOWN	UNKNOWN
Austria	YES	YES	NO
Bangladesh	NO	NO	NO
Barbados	YES	YES	NO
Belarus	YES	YES	YES
Belgium	YES	YES	NO
Brazil	YES	YES	NO
Bulgaria	YES	YES	NO
Cameroon	NO	NO	NO
Canada	YES	YES	NO
Chile	YES	YES	YES
China	YES	YES	NO
Colombia	YES	YES	YES
Czech Republic	YES	YES	NO
Denmark	YES	NO	NO
Ecuador	YES	YES	YES
Estonia	YES	YES	NO
Finland	YES	YES	NO
France	YES	NO	NO
Germany	YES	YES	UNKNOWN
Greece	YES	YES	YES
Guatemala	YES	YES	YES
Hong Kong (China*)	YES	YES	
Hungary	YES	NO	NO
India	YES	YES	NO
Iran	YES	NO	YES
Ireland	YES	YES	NO
Israel	YES	NO	NO
Italy	YES	YES	NO
Japan	YES	NO	NO
Jordan	YES	YES	YES
Kazakhstan	YES	YES	NO
Malaysia	YES	YES	YES
Mali	NO	NO	NO
Mexico	YES	YES	YES
Netherlands	YES	YES	UNKNOWN
Nigeria	YES	YES	YES
Norway		NO	NO
Panama	YES	YES	YES
Paraguay	YES	YES	YES
Peru	YES	YES	YES
Philippines	NO	NO	NO
Portugal	YES	YES	NO
Romania	YES	YES	NO
Russian Federation	YES	YES	NO
Saudi Arabia	YES	YES	YES
Senegal	NO	NO	NO
Singapore	YES	NO	NO
Slovak Republic	YES	YES	NO
South Africa	YES	YES	NO
South Korea	NO	NO	NO
Spain	YES	YES	NO
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	YES	NO	NO
Switzerland	YES	NO	NO
Taiwan (China*)	YES	YES	NO
Trinidad and Tobago	YES	YES	YES
Tunisia	YES	NO	NO
Turkey	YES	YES	NO
UK	YES	YES	NO
Uruguay	NO	YES	NO
USA	YES	YES	YES
Venezuela	YES	YES	YES

*Reporting separately for this report.

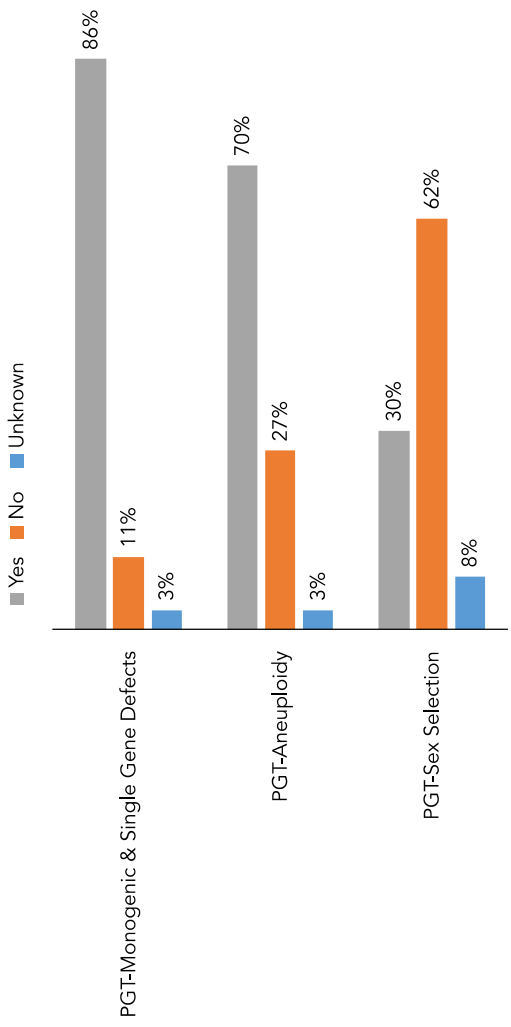


Chart 1. Is Pre-Implantation Genetic Testing Allowed/Permitted In Your Country?

disease that may be treated with hematopoietic stem cell transplantation or other cell or organ transplantation.

PGT-M was initially performed on cleavage stage (8-cell) and involved removal of 1 or 2 blastomeres [1]. Currently PGT-M is most often performed with trophectoderm biopsy at the blastocyst stage and involves removal of a greater number of cells than typically performed with cleavage stage embryos. Biopsied blastocysts are usually cryopreserved for subsequent transfer following completion of the molecular analysis. Molecular diagnosis may be done using fluorescent in situ hybridization (FISH), polymerase chain reaction (PCR) whole genome

Chapter 14. Table 2

If Allowed/Permitted, are there Regulations that Govern these Techniques in Your Country?

Country	Pre-implantation Genetic Diagnosis (Single Gene)	Pre-implantation Genetic Screening (Aneuploidy)	Pre-implantation Genetic Screening (Sex Selection)
Argentina	NO	NO	NO
Australia	YES	YES	YES
Austria	YES	YES	YES
Bangladesh	NO	NO	NO
Barbados	NO	NO	NO
Belarus	NO	NO	NO
Belgium	YES	YES	NO
Brazil	YES	YES	NO
Bulgaria	YES	YES	YES
Cameroon	NO	NO	NO
Canada	NO	NO	
Chile	NO	NO	NO
China	YES	YES	YES
Colombia	NO	NO	NO
Czech Republic	YES	YES	NO
Denmark	YES		
Ecuador	NO	NO	NO
Estonia	NO	NO	YES
Finland	YES	YES	YES
France	YES	YES	YES
Germany	YES	YES	YES
Greece	YES	YES	YES
Guatemala	NO	NO	NO
Hong Kong (China*)	YES	YES	
Hungary	YES	UNKNOWN	NO
India	NO	NO	NO
Iran	NO	NO	NO
Ireland	NO	NO	NO
Israel	YES		
Italy	YES	YES	NO
Japan	YES	YES	YES
Jordan	NO	NO	NO
Kazakhstan	YES	YES	YES
Malaysia	NO	NO	NO
Mali	NO	NO	NO
Mexico	NO	NO	NO
Netherlands	YES	YES	UNKNOWN
Nigeria	YES	YES	YES
Norway	YES	YES	YES
Panama	NO	NO	NO
Paraguay	NO	NO	NO
Peru	NO	NO	NO
Portugal	YES	YES	
Romania	YES	YES	YES
Russian Federation	NO	NO	YES
Saudi Arabia	NO	NO	NO
Singapore	YES		
Slovak Republic	YES	YES	NO
South Africa	NO	NO	YES
Spain	YES	YES	YES
Sri Lanka	NO	NO	NO
Sweden	YES		
Switzerland	YES	YES	YES
Taiwan (China*)	UNKNOWN	UNKNOWN	
Trinidad and Tobago	NO	NO	NO
Tunisia	NO		
Turkey	YES	YES	NO
UK	YES	YES	NO
Uruguay	NO	YES	NO
USA	NO	NO	NO
Venezuela	NO	NO	NO

*Reporting separately for this report.

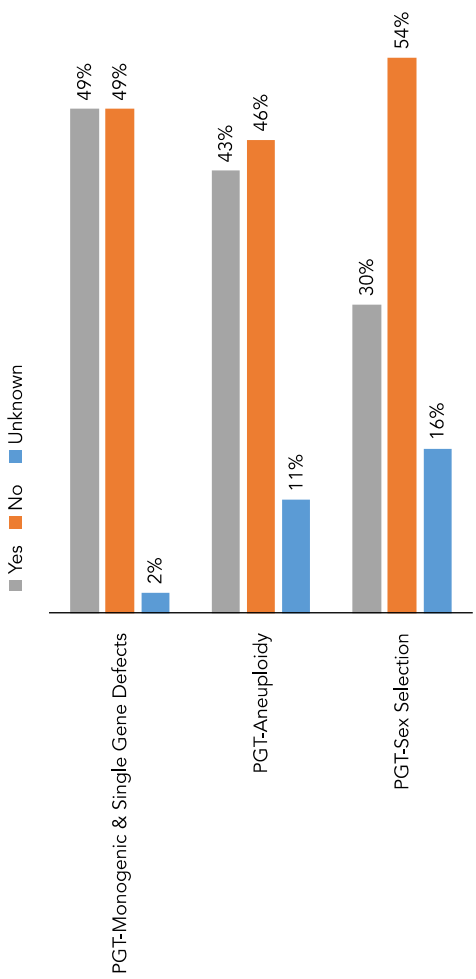


Chart 2. If Allowed, Are There Regulations That Govern These Techniques In Your Country?

amplification (WGA), microarrays, or next generation sequencing (NGS) technology [2-10]. Unaffected blastocysts are transferred back after thaw. Since embryos with genetic abnormalities are discarded, the decision to utilize PGT-M implies that patients are making a moral distinction between termination of an implanted pregnancy and discarding an affected embryo [1-11].

There are nine general categories for which PGT is currently used:

1. Autosomal single gene disorders [5-7]
2. Some chromosomal rearrangements [5-7]
3. X-linked diseases [5-7]
4. HLA typing [5-7]

Chapter 14. Table 3

If these Techniques are Regulated in Your Country, How is it Done?

Country	PGD-Single Gene	PGS-Aneuploidy	PGS-Sex Selection
Argentina	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Australia	State/Provincial/Regional Law/Statute/ Ordinance	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances
Austria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Bangladesh	No regulations	No regulations	No regulations2
Barbados	No regulations	No regulations	No regulations
Belarus	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Belgium	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Brazil	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	
Bulgaria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Cameroon	No regulations Professional Organization Standards/Guidelines		
Canada			
China	No regulations	No regulations	Federal/National Laws/Statutes/Ordinances
Colombia	No regulations	No regulations	No regulations
Czech Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	
Denmark		Federal/National Laws/Statutes/Ordinances	
Ecuador	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Estonia	No regulations	No regulations Federal/National Laws/Statutes/Ordinances	
Finland	Federal/National Laws/Statutes/Ordinances Agency Regulations/ Oversight	Federal/National Laws/Statutes/Ordinances Agency Regulations/ Oversight	Federal/National Laws/Statutes/Ordinances Agency Regulations/Oversight
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Greece	Federal/National Laws/Statutes/Ordinances Agency Regulations/ Oversight	Federal/National Laws/Statutes/Ordinances Agency Regulations/ Oversight	Federal/National Laws/Statutes/Ordinances Agency Regulations/Oversight
Guatemala	No regulations	No regulations	No regulations
Hong Kong (China*)	Agency Regulations/Oversight	Agency Regulations/Oversight	
Hungary	Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Ireland	No regulations	No regulations	No regulations
Italy	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Japan	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Kenya	No regulations	No regulations	No regulations
Malaysia	No regulations	No regulations	No regulations
Mali	No regulations	No regulations	No regulations
Mexico	No regulations	No regulations	No regulations
Netherlands	Federal/National Laws/Statutes/Ordinances	Unknown	Unknown
Nigeria	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	No regulations	No regulations	No regulations
Paraguay	No regulations	No regulations	No regulations
Peru	No regulations	No regulations	No regulations
Portugal	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	
Romania	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Russian Federation	No regulations	No regulations	Federal/National Laws/Statutes/Ordinances
Saudi Arabia	No regulations	No regulations	No regulations
Singapore	Federal/National Laws/Statutes/Ordinances		
Slovak Republic	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	
South Africa	No regulations	No regulations	Federal/National Laws/Statutes/Ordinances
Spain	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Sri Lanka	No regulations	No regulations	No regulations
Sweden	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines		
Switzerland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Taiwan (China*)	Unknown	Unknown	
Trinidad & Tobago	No regulations	No regulations	No regulations
Tunisia	No regulations	No regulations	
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	
Uruguay	Federal/National Laws/Statutes/Ordinances		
USA	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Venezuela	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines

*Reporting separately for this report.

5. Cancer predisposition genes [8]
6. Mitochondrial DNA disorders [9]
7. PGT-A for embryonic aneuploidy [5-7,12-16]
8. Adult onset disorders [10]
9. Non-medical sex selection [5,6]

PGT-A and PGT-SR were previously defined as preimplantation genetic screening (PGS). PGT-SR and PGT-A are used increasingly to identify structural or numerical chromosomal abnormalities, respectively, as an adjunct to IVF [12-16]. PGT identifies euploid blastocysts for transfer to increase implantation and live birth rates. When optimally performed, PGT-A and PGT-SR augments strategies to perform successful elective single embryo transfer (eSET) and avoid multiple pregnancies. Current diagnostics focus on analysis of 24 chromosome numbers for evaluation and transfer of only euploid embryos. Different molecular techniques used for this propose include FISH, comparative genome hybridization (CGH), array CGH (aCGH), digital polymerase chain reaction (dPCR), single-nucleotide polymorphism (SNP) array, real-time quantitative PCR (qPCR), and NGS [12-16]. Earlier versions of PGS utilized FISH, which was only able to evaluate smaller subsets of chromosomes (usually only 5-10), instead of the 24 chromosomes performed with newer

Chapter 14. Table 4

Are these Techniques Performed in Your Country?

Country	PGD (Single Gene)	PGS (Aneuploidy)	PGD (Single Gene) performed in tandem with PGS (Aneuploidy)	PGD (Single Gene) Performed in Tandem with PGS (Sex Selection)
Argentina	Commonly Performed	Commonly Performed	Commonly Performed	Infrequently Performed
Australia	Commonly Performed	Unknown	Unknown	Unknown
Austria	Commonly Performed	Commonly Performed	Infrequently Performed	Never Performed
Bangladesh	Never Performed	Never Performed	Never Performed	Never Performed
Barbados	Infrequently Performed	Infrequently Performed	Infrequently Performed	Never Performed
Belarus	Infrequently Performed	Commonly Performed	Infrequently Performed	Infrequently Performed
Belgium	Commonly Performed	Infrequently Performed	Infrequently Performed	Unknown
Brazil	Commonly Performed	Commonly Performed	Commonly Performed	Unknown
Bulgaria	Infrequently Performed	Infrequently Performed	Infrequently Performed	Unknown
Cameroon	Never Performed	Never Performed	Never Performed	Never Performed
Canada	Commonly Performed	Commonly Performed	Unknown	Never Performed
Chile	Infrequently Performed	Commonly Performed	Commonly Performed	Infrequently Performed
China	Infrequently Performed	Infrequently Performed	Infrequently Performed	Never Performed
Colombia	Infrequently Performed	Commonly Performed	Commonly Performed	Infrequently Performed
Czech Republic	Commonly Performed	Commonly Performed	Commonly Performed	Never Performed
Denmark	Infrequently Performed	Not Answered	Not Answered	Not Answered
Ecuador	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
El Salvador	Never Performed	Never Performed	Never Performed	Never Performed
Estonia	Unknown	Unknown	Unknown	Unknown
Finland	Commonly Performed	Commonly Performed	Never Performed	Never Performed
France	Infrequently Performed	Never Performed	Infrequently Performed	Infrequently Performed
Germany	Infrequently Performed	Infrequently Performed	Unknown	Unknown
Greece	Commonly Performed	Commonly Performed	Commonly Performed	Commonly Performed
Guatemala	Never Performed	Commonly Performed	Never Performed	Never Performed
Hong Kong (China*)	Infrequently Performed	Infrequently Performed	Infrequently Performed	Not Answered
Hungary	Infrequently Performed	Infrequently Performed	Infrequently Performed	Unknown
India	Infrequently Performed	Infrequently Performed	Infrequently Performed	Not Answered
Iran	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Ireland	Commonly Performed	Commonly Performed	Commonly Performed	Infrequently Performed
Israel	Commonly Performed	Commonly Performed	Commonly Performed	Commonly Performed
Italy	Infrequently Performed	Infrequently Performed	Unknown	Never Performed
Japan	Infrequently Performed	Unknown	Unknown	Unknown
Jordan	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Kazakhstan	Infrequently Performed	Commonly Performed	Commonly Performed	Never Performed
Kenya	Unknown	Unknown	Unknown	Unknown
Malaysia	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Mali	Never Performed	Never Performed	Never Performed	Never Performed
Mexico	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Netherlands	Commonly Performed	Never Performed	Never Performed	Never Performed
Nigeria	Commonly Performed	Commonly Performed	Commonly Performed	Commonly Performed
Norway	Never Performed	Never Performed	Never Performed	Never Performed
Panama	Infrequently Performed	Commonly Performed	Infrequently Performed	Commonly Performed
Paraguay	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Peru	Infrequently Performed	Commonly Performed	Infrequently Performed	Infrequently Performed
Portugal	Infrequently Performed	Infrequently Performed	Not Answered	Not Answered
Romania	Infrequently Performed	Infrequently Performed	Never Performed	Not Answered
Russian Federation	Infrequently Performed	Commonly Performed	Infrequently Performed	Infrequently Performed
Saudi Arabia	Commonly Performed	Commonly Performed	Commonly Performed	Commonly Performed
Senegal	Never Performed	Never Performed	Never Performed	Never Performed
Singapore	Commonly Performed	Never Performed	Never Performed	Never Performed
Slovak Republic	Commonly Performed	Commonly Performed	Commonly Performed	Never Performed
South Africa	Commonly Performed	Commonly Performed	Commonly Performed	Never Performed
South Korea	Commonly Performed	Infrequently Performed	Infrequently Performed	Never Performed
Spain	Commonly Performed	Commonly Performed	Commonly Performed	Never Performed
Sri Lanka	Infrequently Performed	Infrequently Performed	Unknown	Unknown
Sweden	Commonly Performed	Never Performed	Never Performed	Never Performed
Switzerland	Never Performed	Never Performed	Never Performed	Never Performed
Taiwan (China*)	Commonly Performed	Infrequently Performed	Infrequently Performed	Never Performed
Trinidad and Tobago	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed
Tunisia	Never Performed	Never Performed	Never Performed	Never Performed
Turkey	Commonly Performed	Commonly Performed	Infrequently Performed	Never Performed
UK	Infrequently Performed	Infrequently Performed	Infrequently Performed	Never Performed
Uruguay	Not Answered	Commonly Performed	Not Answered	Not Answered
USA	Commonly Performed	Commonly Performed	Commonly Performed	Commonly Performed
Venezuela	Infrequently Performed	Infrequently Performed	Infrequently Performed	Infrequently Performed

*Reporting separately for this report.

molecular technology [12-16]. Randomized controlled trials (RCT) assessing PGS performed with FISH showed no significant improvement in pregnancy and live birth rates [12]. Evidence with the newer technologies offer more encouraging results. Since 24 chromosome technology has emerged, there have been three level one RCTs using either qPCR based comprehensive chromosomal screening (CCS) or rapid aCGH showing significant improvements in ongoing pregnancy rates, birth rates, and single pregnancy rates from SET with PGT [13-15]. The two most commonly used molecular techniques, qPCR and aCGH, appear to produce similar results [16]. SNP microarray and NGS are increasingly reported in recent studies. Despite this progress, recent reports of a high frequency of mosaicism in trophectoderm biopsies have now cast doubt on the specificity of PGT for identifying euploid embryos [17].

Analysis of the Survey (Tables 1-7 and Charts 1-4)

Respondents from 66 countries addressed this topic of PGT-M for single gene disorder. It was reported that PGT-M is permitted

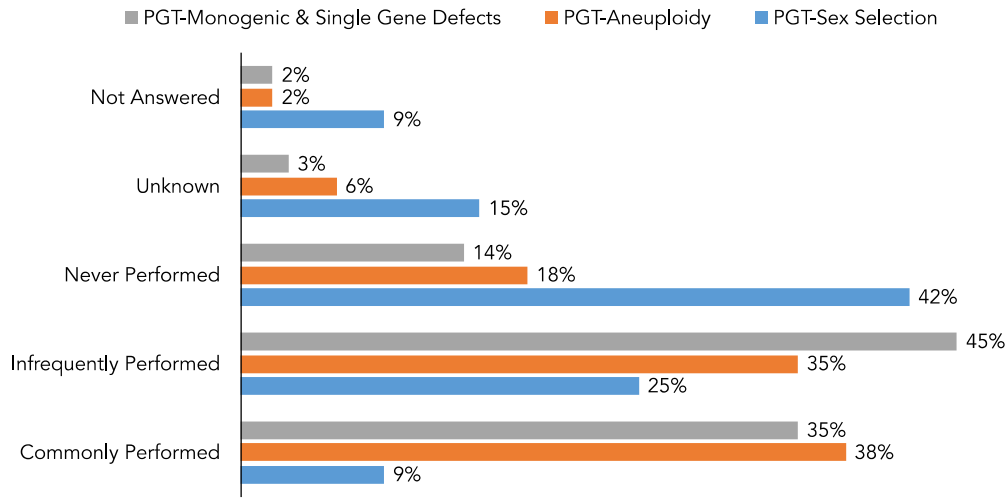


Chart 3. Are These Techniques Performed In Your Country?

in 57 countries by statutes, laws, or guidelines (Table 1). It is reported to not be addressed in one country and not allowed in eight countries. PGT-M is regulated by guidelines that govern its use in 26 of the 63 countries in which it is reported to be condoned. It is not regulated in 36 countries, and its status is unknown by the respondent of one country (Table 2). PGT-M for single gene disorders is reported to be commonly performed as a clinical service in 23 of 67 countries, infrequently performed in 33 countries, never performed in nine countries, and not reported by the respondents for two countries (Table 4). PGT-M for single gene disorders is reported by the respondents as being acceptable to prevent or allow disease in the child to be born from the embryo in 58 out of 64 of these countries (Table 5). Respondents also reported that it was acceptable for producing an offspring to serve as a cell donor (savior sibling) for a diseased family member in 31 of 64 countries; PGT-M is permissible for the assistance of creating a child for an immunologically matched donor in 19 of 64 countries. It is acceptable for generating an embryo with a selected disease (e.g., genetic congenital deafness) to be used for procreation in 19 of 64 countries, and for generating a diseased embryo for research or experimentation in 3 of 64 countries.

PGT-A for aneuploidy was reported by the respondents to be permitted in 57 of 66 countries by statutes, laws, and guidelines, not addressed by eight countries, and not allowed in seven countries (Table 1). When allowed for screening for aneuploidy, it was reported to be regulated by guidelines that govern its use in 27 of 63 countries, not regulated in 30, and respondents did not report for six countries (Table 2). PGT-A for genetic sex selection was reported to be allowed in 21 of the 66 countries, not addressed by five countries, and reported by respondents to not be allowed in 41 countries. When reported to be allowed for sex selection, PGT-A is regulated by guidelines that govern its use in 16 of 63 countries, not regulated in 39, and respondents did not report for eight countries. PGT-A for aneuploidy was reported by the respondents to be commonly performed as a clinical service in 28 of 67 countries, infrequently performed in 24 countries, never performed in 13 countries, and not reported by two countries (Table 4). PGT-A for aneuploidy performed in tandem with PGT-M for single gene disorders was reported by the respondents to be commonly performed as a clinical service in 17 of 67 countries, infrequently performed in 28 countries, never performed in 12 countries, and respondents for 10 countries did not report.

Regulatory bodies reported by respondents to be governing PGT in their countries range from none to various combinations of federal, provincial, municipal, various agencies, and professional organizations (Table 3). Thus 27 of 61 countries with respondents providing feedback have reported no regulations governing PGT. Respondents representing 29 countries reported governances by federal authorities, one by provinces, five by regulatory agencies, and 13 by professional organizations. Centres providing PGT services include sole practitioners in private clinics in 12 of 56 countries, large multiple practitioner clinics in 26 countries, hospital based clinics in 20 countries, university clinics in 23 countries, and public hospitals in 15 countries (more than one response was permitted) (Table 6).

PGT-M for single gene disorders is reported to be considered an established (not experimental) medical practice in 55 of 62 countries. PGT-A and PGT-SR are considered established (not experimental) techniques in 32 of 62 countries. PGT-M for single gene disorders performed in tandem with PGT-A for aneuploidy is now considered an established medical practice in 29 of 62 countries (Table 7).

Discussion

Compared to Survey 2013, PGT-M now comprises an increasing percentage of assisted reproductive technology (ART) services throughout the world. Its application, however, is often reported as being restricted by statute or local clinical tradition. It is reported by the respondents to be prohibited in only eight countries. PGT-M for single gene disorders is reported to be commonly performed as a clinical service in 23 of 67 countries, infrequently performed in 33 of 67 countries, never performed in nine of 67 countries, and respondents did not respond on this issue for two of 67 countries. Now a well-established and reliable procedure, PGT-M has a low error rate when performed in experienced centres. A number of drawbacks remain. These include the high cost and inefficiency of IVF as a platform, requirements for development to blastocyst stage, and

Chapter 14. Table 5

Is Pre-implantation Genetic Diagnosis (Single Gene) Accepted for Use to Prevent or Allow Disease?

Country	In the Child to be Born from the Embryo	For Assisting in Generating a Child on Behalf of a Diseased Sibling	For Assisting in Generating a Child for Any Immunologically Donor Matched Diseased Child	For Assisting in Generating an Embryo on Behalf of a Diseased Sibling	For Assisting in Generating an Embryo for any Immunologically Donor Matched Diseased Child	To be Manifested in the Child to be Born from the Embryo	For Assisting in Generating a Diseased Embryo for Research/Experimentation
Argentina	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Australia	YES	YES	YES	YES	YES	YES	YES
Austria	YES	NO	NO	NO	NO	NO	NO
Bangladesh	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Barbados	YES	YES	YES	YES	YES	YES	NO
Belarus	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Belgium	YES	YES	YES	YES	YES	YES	YES
Brazil	YES	YES	YES	YES	YES	YES	NO
Bulgaria	YES	YES	NO	YES	NO	NO	NO
Cameroon	NO	NO	NO	NO	NO	NO	NO
Canada	YES	NO	NO	NO	NO	NO	NO
Chile	NO	NO	NO	NO	NO	NO	NO
China	YES	YES	NO	YES	NO	NO	NO
Colombia	YES	NO	NO	NO	NO	YES	NO
Czech Republic	YES	YES	YES	YES	UNKNOWN	NO	NO
Denmark	YES	YES	NO	UNKNOWN	NO	YES	NO
Ecuador	YES	YES	YES	YES	NO		
Estonia	YES	NO	NO	NO	NO	YES	NO
Finland	YES	NO	NO	NO	NO	NO	NO
France	YES	YES	NO	YES	YES	NO	NO
Germany	YES	NO	NO	NO	NO	YES	NO
Greece	YES	YES	UNKNOWN	YES	UNKNOWN	YES	NO
Guatemala	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Hong Kong (China*)	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Hungary	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
India	YES	YES	YES	YES	YES	YES	YES
Iran	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	NO
Ireland	YES	YES	YES	NO	NO	NO	NO
Israel	YES	YES	YES	YES	YES	UNKNOWN	NO
Italy	YES	NO	NO	NO	NO	YES	NO
Japan	YES	NO	NO	NO	NO	UNKNOWN	UNKNOWN
Jordan	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Kazakhstan	YES	YES	YES	YES	YES	YES	NO
Malaysia	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	
Mali	NO	NO	NO	NO	NO	NO	NO
Mexico	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Netherlands	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	NO
Nigeria	YES	YES	NO	NO	NO	NO	NO
Norway	YES	YES	YES	YES	NO		NO
Panama	YES	YES	YES	YES	YES	YES	UNKNOWN
Paraguay	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Portugal	YES	YES	NO	YES	NO	NO	NO
Romania	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	YES	UNKNOWN
Russian Federation	YES	YES	YES	YES	YES	UNKNOWN	UNKNOWN
Saudi Arabia	YES	YES	NO	YES	NO	YES	NO
Senegal	NO	NO	NO	NO	NO	NO	NO
Singapore	YES	NO	NO	NO	NO	NO	NO
Slovak Republic	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
South Africa	YES	YES	YES	YES	YES	YES	NO
South Korea	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Spain	YES	NO	YES	NO	NO	NO	NO
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	YES	YES	YES	UNKNOWN	UNKNOWN	YES	NO
Switzerland	YES	NO	NO	NO	NO	YES	NO
Taiwan (China*)	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Trinidad and Tobago	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Tunisia	YES	NO	NO	NO	NO	NO	NO
Turkey	YES	YES	YES	YES	YES	YES	NO
UK	YES	YES	YES	NO	NO	NO	NO
Uruguay	YES	YES	NO	YES	YES	YES	NO
USA	YES	YES	NO	YES	NO	YES	NO
Venezuela	YES	YES	YES	YES	YES	UNKNOWN	NO

*Reporting separately for this report.

compromised birth rates (even in fertile women), because PGT-A eliminates some embryos for transfer. (Table 1)

Although not considered to be experimental, PGT-M was reported to be frequently denied insurance reimbursement in the USA and is usually not covered except for some single gene disorders and selected chromosomal defects. However, with the advent of new genetic screening tests, utilization of PGT-M by fertile couples in the USA, European Union, and the Middle Eastern region is reported by respondents to be expanding with the detection of carriers who are at risk for transmission of genetic disorders to their progeny and who are otherwise reluctant to have children. In addition, identification of common but devastating genetic mutations, such as BRCA, are now possible by PGT-M. The availability of new molecular genetic tests, public initiatives surrounding specific genetic diseases, and increasing Internet marketing of tests and identification of carriers should increase demand for PGT-M worldwide [2-5,7]. (Table 1)

Compared to Survey 2013, PGT-A and PGT-SG are reported to constitute an increasing proportion of ART service effort throughout the world (Table 2). These two types of PGT are reported by the survey respondents to be allowed in 57 of the 66 countries by statutes, laws, and guidelines, however the respondents did not report

Chapter 14. Table 6

Are there Specific Centres or Institutions where these Techniques are Only Allowed/Permitted to be Performed?

Country	PGD-Single Gene	PGS-Aneuploidy	PGS-Sex Selection
Argentina	Unknown	Unknown	Unknown
Austria	Unknown	Unknown	Unknown
Barbados	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
Belarus	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Belgium	Public Hospital-based	Public Hospital-based	
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
Brazil	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Unknown
Bulgaria	Hospital-based clinic	Hospital-based clinic	
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
Cameroon		Unknown	Unknown
Chile	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Unknown
China	Public Hospital-based	Public Hospital-based	
Colombia	Sole Practitioner clinic	Hospital-based clinic	Hospital-based clinic
		Sole Practitioner clinic	Sole Practitioner clinic
Denmark	Public Hospital-based		
Ecuador	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
France	University-based clinic		
Germany	University-based clinic	Unknown	Unknown
	Large, Private physician clinic 5 or > physicians		
Greece	Public Hospital-based	Public Hospital-based	Public Hospital-based
	University-based clinic	University-based clinic	University-based clinic
	Hospital-based clinic	Hospital-based clinic	Hospital-based clinic
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Guatemala	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Unknown
Hong Kong (China*)	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
Hungary	Public Hospital-based	Unknown	Unknown
	University-based clinic		
India	Public Hospital-based	Public Hospital-based	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
Iran	Unknown	Unknown	Unknown
Ireland	Public Hospital-based	Public Hospital-based	
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
Israel	Public Hospital-based		
	University-based clinic		
Japan	Unknown		
Jordan	Public Hospital-based	Public Hospital-based	Public Hospital-based
	University-based clinic	University-based clinic	University-based clinic
	Hospital-based clinic	Hospital-based clinic	Hospital-based clinic
Kazakhstan	Sole Practitioner clinic	Sole Practitioner clinic	Sole Practitioner clinic
Malaysia	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic Large, Private physician clinic	
	Large, Private physician clinic 5 or > physicians	5 or > physicians	
Mali	Unknown	Unknown	Unknown
Mexico	Public Hospital-based	Public Hospital-based	Public Hospital-based
	University-based clinic	University-based clinic	University-based clinic
	Hospital-based clinic	Hospital-based clinic	Hospital-based clinic
	Sole Practitioner clinic	Sole Practitioner clinic	Sole Practitioner clinic
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Netherlands	University-based clinic	Unknown	Unknown
Nigeria	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Panama	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician
Paraguay	Unknown	Unknown	Unknown
Peru	Sole Practitioner clinic	Sole Practitioner clinic	Sole Practitioner clinic
Portugal	Large, Private physician clinic 5 or > physicians	University-based clinic	
		Large, Private physician clinic 5 or > physicians	
Romania		Large, Private physician clinic 5 or > physicians	
Russian Federation	Public Hospital-based	Public Hospital-based	Small Private physician clinic < 5 physician
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
	Sole Practitioner clinic	Sole Practitioner clinic	
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
Saudi Arabia	University-based clinic	University-based clinic	University-based clinic
	Hospital-based clinic	Hospital-based clinic	Hospital-based clinic
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Senegal	Unknown	Unknown	Unknown
Singapore	Hospital-based clinic		
Slovak Republic	University-based clinic	University-based clinic	Small Private physician clinic < 5 physician
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
South Africa	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
South Korea	University-based clinic	Hospital-based clinic	
	Hospital-based clinic	Large, Private physician clinic 5 or > physicians	
	Large, Private physician clinic 5 or > physicians		
Spain	Public Hospital-based	Public Hospital-based	
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
		Small Private physician clinic < 5 physician	
Sri Lanka	Unknown	Unknown	Unknown
Sweden	Public Hospital-based		
	University-based clinic		

Chapter 14. Table 7

(Continued)

Country	PGD-Single Gene	PGS-Aneuploidy	PGS-Sex Selection
	Hospital-based clinic		
	Sole Practitioner clinic		
Switzerland	Unknown	Unknown	
Trinidad & Tobago	Unknown	Unknown	Unknown
Turkey	Public Hospital-based	Public Hospital-based	
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
UK	Public Hospital-based	Public Hospital-based	
	University-based clinic	University-based clinic	
	Hospital-based clinic	Hospital-based clinic	
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	
Uruguay	Unknown		
USA	Public Hospital-based	Public Hospital-based	Public Hospital-based
	University-based clinic	University-based clinic	University-based clinic
	Hospital-based clinic	Hospital-based clinic	Hospital-based clinic
	Sole Practitioner clinic	Sole Practitioner clinic	Sole Practitioner clinic
	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician
	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Venezuela	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician

*Reporting separately for this report.

Chapter 14. Table 7

Are these Techniques Considered Experimental or Part of Established Medical Practice?

Country	Pre-implantation Genetic Diagnosis (Single Gene)	Pre-implantation Genetic Screening (Aneuploidy)	Pre-implantation Genetic Diagnosis (Single Gene) Performed in Tandem with Pre-implantation Genetic Screening for Aneuploidy
Argentina	Established medical practice	Established medical practice	Established medical practice
Australia	Established medical practice	Unknown	Unknown
Austria	Established medical practice	Established medical practice	Established medical practice
Bangladesh	Experimental	Not addressed	Not addressed
Barbados	Established medical practice	Established medical practice	Established medical practice
Belarus	Experimental	Experimental	Experimental
Belgium	Established medical practice	Established medical practice	Established medical practice
Brazil	Established medical practice	Established medical practice	Established medical practice
Bulgaria	Established medical practice	Established medical practice	Not addressed
Cameroon	Not addressed	Not addressed	Not addressed
Canada	Established medical practice	Established medical practice	Unknown
Chile	Not addressed	Not addressed	Not addressed
China	Not addressed	Not addressed	Not addressed
Colombia	Not addressed	Not addressed	Not addressed
Czech Republic	Established medical practice	Established medical practice	Established medical practice
Denmark	Established medical practice		
Ecuador	Established medical practice	Established medical practice	Established medical practice
Estonia	Experimental	Experimental	Experimental
Finland	Established medical practice	Established medical practice	Not addressed
France	Established medical practice	Not addressed	Established medical practice
Germany	Established medical practice	Established medical practice	Unknown
Greece	Established medical practice	Established medical practice	Established medical practice
Guatemala	Not addressed	Established medical practice	Not addressed
Hong Kong (China*)	Established medical practice	Established medical practice	Established medical practice
Hungary	Established medical practice	Experimental	Experimental
India	Established medical practice	Established medical practice	Established medical practice
Iran	Established medical practice	Not addressed	Established medical practice
Ireland	Established medical practice	Experimental	Experimental
Israel	Established medical practice	Experimental	Established medical practice
Italy	Established medical practice	Established medical practice	Established medical practice
Japan	Experimental	Unknown	Unknown
Jordan	Established medical practice	Established medical practice	Established medical practice
Kazakhstan	Established medical practice	Established medical practice	Established medical practice
Malaysia	Not addressed	Not addressed	Not addressed
Mali	Experimental	Experimental	Not addressed
Mexico	Not addressed	Not addressed	Not addressed
Netherlands	Established medical practice	Experimental	Not addressed
Nigeria	Established medical practice	Established medical practice	Established medical practice
Norway	Established medical practice	Experimental	Experimental
Panama	Established medical practice	Established medical practice	Established medical practice
Paraguay	Not addressed	Not addressed	Not addressed
Peru	Not addressed	Not addressed	Not addressed
Portugal	Established medical practice	Established medical practice	
Romania	Established medical practice	Established medical practice	Established medical practice
Russian Federation	Established medical practice	Established medical practice	Established medical practice
Saudi Arabia	Established medical practice	Established medical practice	Established medical practice
Senegal	Unknown	Unknown	Unknown
Singapore	Established medical practice		
Slovak Republic	Established medical practice	Established medical practice	Not addressed
South Africa	Established medical practice	Established medical practice	Established medical practice
South Korea	Established medical practice	Experimental	Established medical practice
Spain	Established medical practice	Established medical practice	Established medical practice
Sri Lanka	Established medical practice	Established medical practice	Established medical practice

Chapter 14. Table 7

(Continued)

Country	Pre-implantation Genetic Diagnosis (Single Gene)	Pre-implantation Genetic Screening (Aneuploidy)	Pre-implantation Genetic Diagnosis (Single Gene) Performed in Tandem with Pre-implantation Genetic Screening for Aneuploidy
Sweden	Established medical practice		
Switzerland	Established medical practice	Not addressed	Not addressed
Trinidad and Tobago	Not addressed	Not addressed	Not addressed
Turkey	Not addressed	Not addressed	Not addressed
UK	Established medical practice	Experimental	Experimental
USA	Established medical practice	Established medical practice	Established medical practice
Venezuela	Established medical practice	Established medical practice	Established medical practice

*Reporting separately for this report.

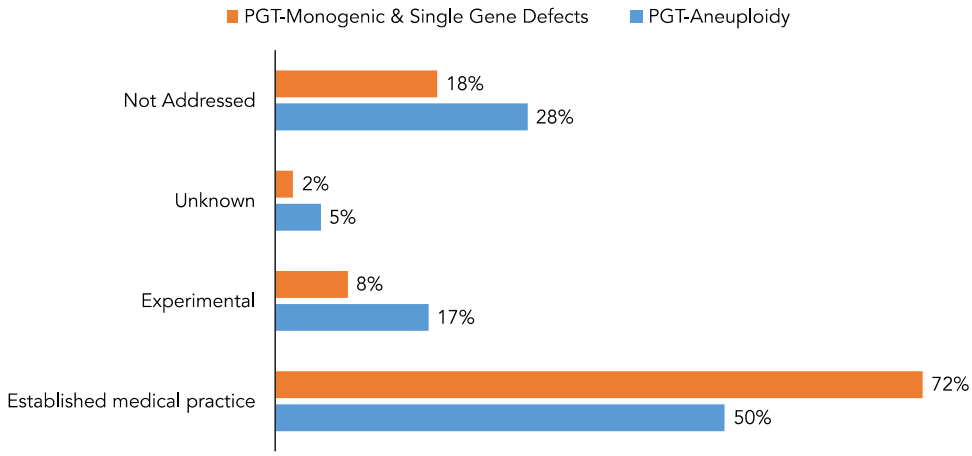


Chart 4. Are These Techniques Considered Experimental or Part of Established Medical Practice In Your Country?

on this technology in eight of the 63 countries. However, they did report that they were not allowed in seven of the 46 countries. When reported to be allowed for aneuploidy, they are reported to be regulated by guidelines that govern their use in 27 of the 63 countries and not regulated in 30 countries. Six respondents of the 63 respondent countries did not answer the query.

Summary

PGT is reported to be increasingly available and more commonly performed worldwide when compared to results from Surveillance 2013. PGT offers benefits, is generally considered safe, and has an acceptably low frequency of errors. PGT-M clearly prevents women from delivering offspring with serious genetic disorders, avoids terminations, and brings peace of mind to many couples that are fearful of, or would not otherwise attempt to have children. The newer technologies for performing PGT-A for aneuploidy are superior to FISH and may play a major role in the reduction of multiple pregnancies by virtue of improved embryo selection for eSET. PGT-A and PGT-SR are reported to be more commonly performed but recent concerns about their reliability may limit universal application.

References

[1] Simpson JL Preimplantation genetic diagnosis at 20 years. Prenat Diagn 2010;30(7):682-695.
[2] Simpson JL, Rechitsky S, Kuliev A Next generation sequencing for preimplantation genetic diagnosis. Fertil Steril 2013;99(5):1203-1204.
[3] Treff NR, Fedick A, Tao X, et al. Evaluation of targeted next-generation sequencing-based preimplantation genetic diagnosis of monogenic disease. Fertil Steril 2013;99(5):1377-1384.
[4] Martín J, Cervero A, Mir P, et al. The impact of next-generation sequencing technology on preimplantation genetic diagnosis and screening. Fertil Steril 2013;99(4):1054-1061.
[5] Collins SC Preimplantation genetic diagnosis: technical advances and expanding applications. Curr Opin Obstet Gynecol 2013;25(3):201-206.
[6] SenGupta SB, Delhanty JD Preimplantation genetic diagnosis: recent triumphs and remaining challenges. Expert Rev Mol Diagn 2012;12(6):585-592.
[7] Tur-Kaspa I Clinical management of in vitro fertilization with preimplantation genetic diagnosis. Semin Reprod Med 2012;30(4):309-322.
[8] SenGupta SB, Vadaparampil ST, Menon U Preimplantation genetic diagnosis for hereditary cancers. Adv Exp Med Biol 2012;732:103-113.
[9] Treff NR, Campos J, Tao X, et al. Blastocyst preimplantation genetic diagnosis (PGD) of a mitochondrial DNA disorder. Fertil Steril 2012;98(5):1236-1240.
[10] Roos RA Huntington's disease: a clinical review. Orphanet J Rare Dis 2010;5(1):40.

[11] Harper JC, Wilton L, Traeger-Synodinos J, et al. The ESHRE PGD Consortium: 10 years of data collection. Hum Reprod Update 2012;18(3):234-247.
[12] Mastenbroek S, Twisk M, van der Veen F, et al. Preimplantation genetic screening: a systematic review and meta-analysis of RCTs. Hum Reprod Update 2011;17:454-466.
[13] Forman EJ, Hong KH, Ferry KM, et al. In vitro fertilization with single euploid blastocyst transfer: a randomized controlled trial. Fertil Steril 2013;100:100-107.
[14] Scott RT, Upham KM, Forman EJ, et al. Blastocyst biopsy with comprehensive chromosome screening and fresh embryo transfer significantly increases in vitro fertilization implantation and delivery rates: a randomized controlled trial. Fertil Steril 2013;100:697-703.
[15] Yang Z, Liu J, Collins GS, et al. Selection of single blastocysts for fresh transfer via standard morphology assessment alone and with array CGH for good prognosis IVF patients: results from a randomized pilot study. Mol Cytogenet 2012;5:24-31.
[16] Capalbo A, Treff N, Cimadomo D, et al. Comparison of array comparative genomic hybridization and quantitative real-time PCR-based aneuploidy screening of blastocyst biopsies. Eur J Hum Genet 2015;23(7):901-906.
[17] Greco E, Minasi MG, Fiorentino F Healthy babies after intrauterine transfer of mosaic aneuploid blastocysts. N Engl J Med 2015;373:2089-2090.

CHAPTER 15: IVF GESTATIONAL CARRIERS

Introduction

Considerable confusion persists regarding definitions of the different forms of gestational carriers. The terms "surrogate host", "surrogate mother" or "surrogate" were commonly applied when referring to a woman that carries and delivers a baby for another couple, however the term "gestational carrier" is currently the preferred term. "Need for a gestational carrier in assisted reproduction" refers to treatments where the gametes of a genetic couple, the "intended parent or parents" in a gestational carrier arrangement or relationship are used to produce embryos, which are subsequently transferred to a woman who agrees to carry the pregnancy and deliver a child (or children) for the intended parent or parents. The gestational carrier is therefore genetically unrelated to the offspring that may be born as a result of this arrangement or relationship. Surveillance 2016 primarily addresses this form of gestational carrier relationship. "Genetic parent or parents" is the term used in this survey for the couple or individual who initiate the arrangement and whose gametes are used; the woman who subsequently carries the child is the "gestational carrier".

"Traditional surrogacy (TS)", "natural surrogacy", or "partial surrogacy" were terms that were commonly used refer to circumstances in which the intended gestational carrier is inseminated with the semen of the partner of the "intended couple", and does not involve IVF. It is not a treatment associated with assisted reproductive technology (ART), but is considered to be medically assisted reproduction (MAR). This particular process is currently defined as a "traditional gestational carrier" arrangement. This process results in progeny who are genetically related to the gestational carrier since her oocytes have been utilized.

The laws that govern IVF/ART gestational carrier relationships are complex and vary greatly among jurisdictions. Determining the local legal status of the child or children born is usually a first step. Full and informed legal advice from an adviser experienced in the laws of the country in which the treatment is to be performed, and, if different, in the country of domicile of the couple or individual, is mandatory. Careful medical assessment and complete counseling of all parties involved in any IVF/ART gestational carrier relationship are essential.

The principal indications for treatment through an "IVF/ART gestational carrier relationship" are:

(1) Women without a uterus, but with one or both ovaries functioning:
   (a) Women with congenital absence of the uterus
   (b) Women who have had a hysterectomy for carcinoma or other reasons.
(2) Women who suffer repeated miscarriages and for whom the prospect of carrying a baby to term is very remote. In this group, women who have repeatedly failed to become pregnant following IVF treatment may also be considered.
(3) Women with certain medical conditions that may make pregnancy life-threatening, but for whom the long-term prospects for health are good.
(4) Requests for non-medical or social reasons are currently not considered to be reasonable indications.

Analysis of the Survey

For the 2016 survey, complete responses pertaining to the issue of gestational carrier arrangements and relationships were received from respondents representing 65 countries, compared to 62 countries in 2013. In some countries, multiple mechanisms for regulation and oversight exist and multiple responses were received from respondents from these 65 countries and are included in this 2016 report.

Respondents from 65 countries responded to the question, "is gestational carrier arrangements permitted in your country? (Table 1 and Chart 2)" Those representing 24 (38%) countries noted that gestational carrier arrangements are allowed by statute or guidelines, compared with 19 (31%) in 2013. Respondents from 36 (56%) countries reported that it was not allowed, compared with 24 (39%) in 2013. Respondents from seven countries were not able to answer the question. Eight countries that allow gestational carrier arrangements noted that traditional gestational carrier arrangements were not allowed.

Responding to the query, "are there regulations that govern IVF gestational carrier arrangements in your country (Table 2 and Chart 2)", respondents from 26 of the 65 countries (40%) reported that gestational carrier arrangements are practiced (compared to 37% in 2013). Respondents from six countries were unable to answer the question. With regard to traditional gestational carrier arrangements, respondents from 29 countries reported that there are regulations, however respondents from 29 countries reported to have no regulations and respondents representing seven countries did not respond to the question. Of interest, respondents from three countries reported to have regulations pertaining to gestational carrier arrangements (Czech Republic, Greece, Japan) but not for traditional carriers.

In response to the question, "if gestational carrier arrangements are regulated in your country (Table 3), how is it done",

Chapter 15. Table 1

Are Gestational Carriers Allowed/Permitted in Your Country?

Country	Gestational Carriers	Traditional Gestational Carriers
Argentina	NO	NO
Australia	YES	YES
Austria	NO	NO
Bangladesh	NO	NO
Barbados	NO	NO
Belarus	YES	NO
Belgium	YES	YES
Brazil	YES	YES
Bulgaria	NO	NO
Cameroon	NO	NO
Canada	YES	YES
Chile	YES	YES
China	NO	NO
Colombia	YES	YES
Czech Republic	YES	NO
Denmark	NO	NO
Ecuador	YES	NO
El Salvador	NO	NO
Estonia	NO	NO
Finland	NO	NO
France	NO	NO
Germany	NO	NO
Greece	YES	NO
Guatemala	YES	YES
Honduras	UNKNOWN	YES
Hungary	NO	NO
India	YES	NO
Iran	YES	YES
Israel	NO	YES
Italy	NO	NO
Japan	NO	NO
Jordan	NO	NO
Kazakhstan	NO	NO
Malaysia	NO	NO
Mali	UNKNOWN	UNKNOWN
Mexico	YES	YES
Netherlands	NO	NO
Nigeria	YES	NO
Norway	NO	NO
Panama	NO	NO
Paraguay	UNKNOWN	UNKNOWN
Peru	YES	YES
Philippines	NO	NO
Portugal	NO	NO
Romania	YES	YES
Russian Federation	YES	NO
Saudi Arabia	NO	NO
Senegal	NO	NO
Singapore	NO	NO
Slovak Republic	NO	NO
South Africa	YES	NO
South Korea	UNKNOWN	UNKNOWN
Spain	NO	NO
Sri Lanka	YES	UNKNOWN
Sweden	NO	NO
Switzerland	NO	NO
Taiwan (China*)	NO	NO
Trinidad and Tobago	NO	NO
Tunisia	NO	NO
Turkey	NO	NO
UK	YES	YES
Uruguay	YES	NO
USA	YES	YES
Venezuela	YES	UNKNOWN

*Reporting separately for this report.

respondents from 17 countries reported to have no regulations regarding any form of gestational carrier arrangements, those from three countries report to have regulations addressing gestational carrier arrangements only and one on traditional carriers only. As far as the nature of regulation, federal or national laws or statutes governing all both types of gestational carrier arrangements are reported by respondents to exist in 17 countries. Respondents from seven countries reported gestational carrier arrangements only and one country reported traditional carriers only. State, provincial, or regional laws regulate both types of arrangements as reported by respondents from two countries (Australia and Austria) and respondents from one country (USA) reported that they have state laws pertaining to gestational carrier arrangements only. Respondents from only

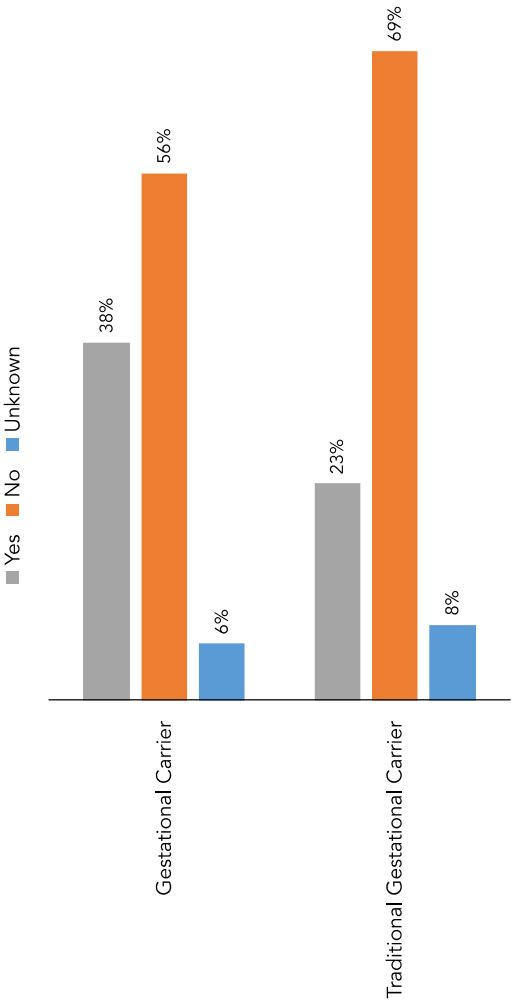


Chart 1. Are Gestational Carrier Arrangements Allowed/Permitted In Your Country?

Chapter 15. Table 2

Are there Regulations that Govern Gestational Carriers in Your Country?

Country	Gestational Carriers	Traditional Gestational Carriers
Argentina	NO	NO
Australia	YES	YES
Austria	YES	YES
Bangladesh	NO	NO
Barbados	NO	NO
Belarus	YES	
Belgium		
Brazil	YES	YES
Bulgaria	YES	YES
Cameroon	NO	NO
Canada	YES	YES
Chile	NO	NO
China	YES	YES
Colombia	NO	NO
Czech Republic	YES	NO
Denmark		
Ecuador	NO	NO
El Salvador	NO	NO
Estonia	YES	YES
Finland	YES	YES
France	YES	YES
Germany	YES	YES
Greece	YES	NO
Guatemala	NO	NO
Honduras	NO	NO
Hungary	NO	NO
India	YES	UNKNOWN
Iran	NO	NO
Ireland	NO	NO
Israel	YES	YES
Italy	YES	YES
Japan	YES	NO
Kazakhstan	NO	NO
Malaysia	NO	NO
Mali	NO	NO
Mexico	YES	YES
Netherlands	YES	YES
Nigeria	YES	YES
Norway	YES	YES
Panama	YES	YES
Paraguay	NO	NO
Peru	NO	NO
Portugal	YES	YES
Romania	YES	YES
Russian Federation	YES	YES
Saudi Arabia	NO	NO
Senegal	NO	NO
Singapore	YES	YES
Slovak Republic	YES	YES
South Africa	YES	YES
South Korea	UNKNOWN	UNKNOWN
Spain	NO	NO
Sri Lanka	NO	NO
Sweden	YES	YES
Switzerland	YES	YES
Taiwan (China*)	UNKNOWN	YES
Trinidad and Tobago	NO	NO
Tunisia	NO	NO
Turkey	YES	YES
UK	YES	YES
Uruguay	NO	NO
USA	YES	YES
Venezuela	NO	NO

*Reporting separately for this report.

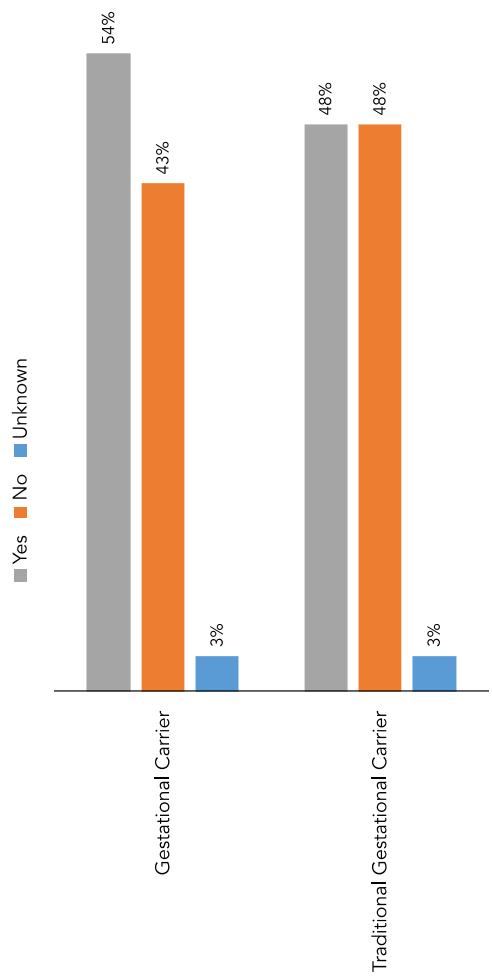


Chart 2. Are Gestational Carrier Arrangements Governed In Your Country?

one country (Mexico) reported that gestational carrier arrangements are regulated by municipal laws.

Regulation or oversight of gestational carrier arrangements by agencies were reported by respondents to exist in three countries (Greece, Hong Kong [China (Reporting separately for this report.)] and USA) and that both types of arrangements exist in one country (Brazil). Professional organization standards or guidelines prescribe practice for gestational carrier arrangements in five countries and for both types of arrangements in seven countries.

Respondents from one country (Bangladesh) cited religious reasons for a prohibition of both forms of gestational arrangements. This was the only respondent from a country offering a

Chapter 15. Table 3

If Gestational Carriers are Regulated in Your Country, How is it Done?

Country	Gestational Carriers	Traditional Gestational Carriers
Argentina	No regulations	No regulations
Australia	Professional Organization Standards/Guidelines State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances
Austria	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances
Bangladesh	No regulations Religious decree	Religious decree
Barbados	No regulations	No regulations
Belarus	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	
Brazil	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight
Bulgaria	No regulations	No regulations
Cameroon	No regulations	
Canada	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Chile	No regulations	No regulations
China	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Colombia	No regulations	No regulations
Czech Republic	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines
Ecuador	No regulations Professional Organization Standards/Guidelines	
El Salvador	No regulations	No regulations
Estonia	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Finland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Greece	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Guatemala	No regulations	No regulations
Honduras	No regulations	No regulations
Hungary	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	No regulations	No regulations
Ireland	No regulations	No regulations
Israel	Federal/National Laws/Statutes/Ordinances	
Japan	Professional Organization Standards/Guidelines	No regulations
Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Mali	No regulations	No regulations
Mexico	Municipal Laws/Statutes/Ordinances	Municipal Laws/Statutes/Ordinances
Netherlands	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Nigeria	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	No regulations	No regulations
Paraguay	No regulations	No regulations
Portugal	Federal/National Laws/Statutes/Ordinances	
Romania	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Russian Federation	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Singapore	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Slovak Republic	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances
South Africa	Federal/National Laws/Statutes/Ordinances	
South Korea	No regulations	No regulations
Sri Lanka	No regulations	No regulations
Sweden	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Switzerland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Taiwan (China*)	Unknown	Federal/National Laws/Statutes/Ordinances
Trinidad and Tobago	No regulations	No regulations
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Uruguay	Federal/National Laws/Statutes/Ordinances	
USA	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/Ordinances	
Venezuela	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines

*Reporting separately for this report.

potential basis for the ban, but it is likely that other countries also do not perform these arrangements for religious reasons.

In response to the query, "how often is third party reproduction performed in programmes in your country", respondents from 62 countries reported (Table 4 and Chart 3). Of these 62, respondents from 26 countries noted that gestational carrier arrangements are "never practiced", 21 responded "infrequently", nine replied "commonly", and respondents from six countries responded that this was "not known". Regarding traditional gestational arrangements, the respondents reported "never" from 34 countries, "infrequently" from 15, "commonly" from one, and reported "not known" from 13 countries.

In response to the question, "if gestational carrier arrangements are allowed in your country, are these women compensated", responses from respondents representing 61 countries were received (Table 5). The responses indicated that 16 countries are reported to not allow any compensation, seven permit payment for time and expenses only, and eight allow payment in addition to reimbursement for expenses. However, respondents from 30 countries did not report or used the "unknown" response. With regard to the respondents representing the 61 countries, 21 countries were reported not to permit any payment; 4 allow compensation for time and expenses; 4 for payment in addition to expenses; and, respondents from 32 countries did not answer this question or responded with "unknown" (Table 6).

This year the new questionnaire attempted to determine the range of compensation. Respondents from 36 countries answered this question regarding the amount of compensation permitted, therefore limited data was received and specific currencies were inconsistently provided. Respondents from three countries listed actual values for compensation for gestational carrier arrangements, but without a denomination. Respondents from seven countries stated there is no stipulated minimum or maximum fee (also for traditional carrier arrangements in three countries), and

Chapter 15. Table 4

How Often is Gestational Carrier Arrangements Performed in Programmes within Your Country?

Country	Gestational Carriers	Traditional Gestational Carriers
Argentina	Infrequently Used	Infrequently Used
Australia	Infrequently Used	Infrequently Used
Austria	Never Performed	Never Performed
Bangladesh	Never Performed	Never Performed
Barbados	Never Performed	Never Performed
Belarus	Commonly Used	Never Performed
Belgium	Infrequently Used	Infrequently Used
Brazil	Infrequently Used	Infrequently Used
Bulgaria	Never Performed	Never Performed
Cameroon	Never Performed	Never Performed
Canada	Commonly Used	Infrequently Used
Chile	Unknown	Unknown
China	Never Performed	Never Performed
Colombia	Infrequently Used	Commonly Used
Czech Republic	Infrequently Used	Never Performed
Ecuador	Infrequently Used	Never Performed
El Salvador	Never Performed	Never Performed
Estonia	Never Performed	Never Performed
Finland	Never Performed	Never Performed
France	Never Performed	Never Performed
Germany	Never Performed	Never Performed
Greece	Commonly Used	Never Performed
Guatemala	Infrequently Used	Infrequently Used
Honduras	Never Performed	Infrequently Used
Hungary	Never Performed	Never Performed
India	Commonly Used	Unknown
Iran	Infrequently Used	Never Performed
Ireland	Infrequently Used	Infrequently Used
Israel	Infrequently Used	Never Performed
Italy	Never Performed	Never Performed
Japan	Infrequently Used	Unknown
Kazakhstan	Infrequently Used	Infrequently Used
Malaysia	Unknown	Unknown
Mali	Never Performed	Never Performed
Mexico	Infrequently Used	Infrequently Used
Netherlands	Infrequently Used	Never Performed
Nigeria	Commonly Used	Infrequently Used
Norway	Never Performed	Never Performed
Panama	Unknown	Unknown
Paraguay	Unknown	Unknown
Peru	Infrequently Used	Infrequently Used
Portugal	Never Performed	Never Performed
Romania	Infrequently Used	Infrequently Used
Russian Federation	Commonly Used	Never Performed
Saudi Arabia	Never Performed	Never Performed
Senegal	Never Performed	Never Performed
Singapore	Never Performed	Never Performed
Slovak Republic	Never Performed	Never Performed
South Africa	Commonly Used	Never Performed
South Korea	Infrequently Used	Unknown
Sri Lanka	Infrequently Used	Unknown
Sweden	Never Performed	Never Performed
Switzerland	Never Performed	Never Performed
Taiwan (China*)	Never Performed	Never Performed
Trinidad and Tobago	Never Performed	Never Performed
Turkey	Never Performed	Never Performed
UK	Infrequently Used	Infrequently Used
Uruguay	Commonly Used	
USA	Commonly Used	Infrequently Used
Venezuela	Infrequently Used	Unknown

*Reporting separately for this report.

respondents from 16 countries answered with "unknown" or "not addressed".

Regarding the topic, "if third party reproduction is permitted in your country, are the qualifications to be a gestational carrier based upon medical, mental health and/or any lifestyle (age and occupational) criteria", respondents from 61 countries answered but details regarding the relevant criteria were not sought (Table 7). For gestational carrier arrangements, respondents from 23 countries reported that there are medical or other criteria required, five had no criteria, and respondents from seven countries answered with "not known". Thirteen stated that the issue is "not addressed". Respondents from 13 countries provided no response to this question. For traditional carrier arrangements the responses were as follows: "yes" from14 countries, "no" from seven; "not known" from seven, "not

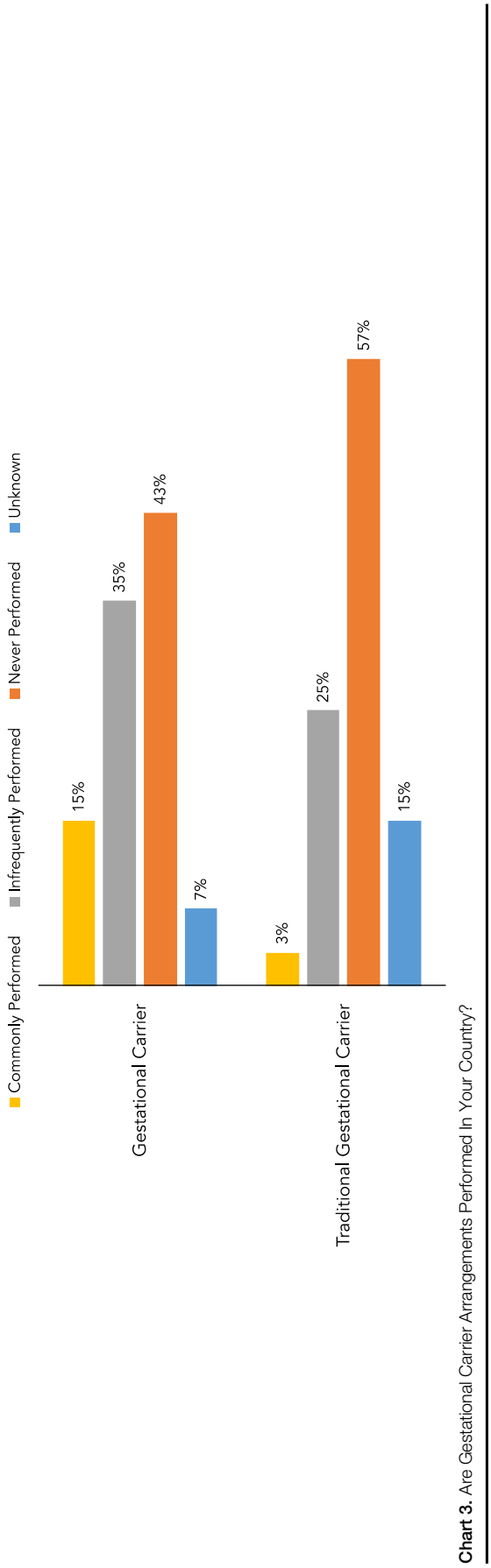


Chart 3. Are Gestational Carrier Arrangements Performed In Your Country?

Chapter 15. Table 5

If Gestational Carriers are Allowed/Permitted in Your Country, are Gestational Carriers Compensated?

Country	Gestational Carriers	Traditional Gestational Carriers
Argentina	Unknown	Unknown
Australia	Reimbursement for time and expenses	Reimbursement for time and expenses
Austria		
Bangladesh	Unknown	Unknown
Barbados	No	No
Belarus	Compensated Beyond Reimbursement	
Belgium	Reimbursement for time and expenses	Reimbursement for time and expenses
Brazil	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement
Bulgaria	No	No
Canada	No	No
Chile	Unknown	Unknown
China	No	No
Colombia	UNKNOWN	No
Czech Republic	No	No
Denmark		
Ecuador	Reimbursement for time and expenses	Reimbursement for time and expenses
El Salvador	Unknown	Unknown
Estonia		
Finland	No	No
France	No	No
Germany	No	No
Greece	Reimbursement for time and expenses	No
Guatemala	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement
Honduras		Unknown
Hungary	No	No
India	Compensated Beyond Reimbursement	Unknown
Iran	Unknown	Unknown
Ireland	No	No
Israel	Reimbursement for time and expenses	
Kazakhstan	No	No
Malaysia	Unknown	Unknown
Mali	No	No
Mexico	Unknown	Unknown
Netherlands	Unknown	Unknown
Nigeria	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement
Panama	Unknown	Unknown
Paraguay	Unknown	Unknown
Peru	Unknown	Unknown
Romania	No	No
Russian Federation	Compensated Beyond Reimbursement	No
Saudi Arabia	No	No
Senegal	Unknown	Unknown
Slovak Republic	No	No
South Africa	Reimbursement for time and expenses	No
Spain	No	No
Sri Lanka	Unknown	Unknown
Taiwan (China*)	No	No
Trinidad and Tobago	Unknown	Unknown
UK	Reimbursement for time and expenses	Reimbursement for time and expenses
USA	Compensated Beyond Reimbursement	Compensated Beyond Reimbursement
Venezuela	Compensated Beyond Reimbursement	Unknown

*Reporting separately for this report.

Chapter 15. Table 6

What is Gestational Carrier Compensation?

Country	Gestational Carrier	Min Amount	Max Amount	Traditional Gestational Carrier
Argentina	Unknown			Unknown
Bangladesh	Unknown			Unknown
Belarus	Enter values	10,000	50,000	
Belgium	No min or max			No min or max
Brazil	No min or max			No min or max
Bulgaria	Unknown			Unknown
Cameroon	Unknown			Unknown
Chile	Unknown			Unknown
Colombia	NO			
Ecuador	Enter values	10,000	10,000	
Estonia	Not addressed			Not addressed
Greece	Enter values	10,000	10,000	Unknown
Guatemala	Unknown			Unknown
Hungary	Not addressed			Not addressed
India	No min or max			Unknown
Israel	No min or max			
Mali	Not addressed			Not addressed
Netherlands				Not addressed
Nigeria	Enter values			Unknown
Panama	Unknown			Unknown
Paraguay	Not addressed			Not addressed
Peru	Unknown			Unknown
Romania	Not addressed			Not addressed
Russian Federation	No min or max			
Slovak Republic	Not addressed			Not addressed
South Africa	No min or max			Not addressed
UK	Not addressed			Not addressed
USA	No min or max			No min or max
Venezuela	Unknown			Unknown

addressed" by 14, and 17 countries did not complete the question.

Discussion

Gestational carrier arrangements remain a contentious practice worldwide. Respondents from the 65 countries that answered questions on this issue for the current surveillance report that 24 (37%) of these countries allow and perform gestational carrier arrangements, and that they are practiced in an additional nine countries without guidelines or legislation. In those countries where respondents reported gestational carrier arrangements were being conducted and from which statistics were available, gestational carrier arrangements appear to account for 0.05-0.2% of IVF/ART treatment cycles. However, several countries are reported to practice gestational carrier arrangements for couples or individuals from other countries (Cross-Border Reproduction, see Chapter 23) because it is unavailable or more expensive in their own country. Both types of gestational carrier arrangements are fraught with multiple potential conflicts when the interests of the various stakeholders clash, and these issues are further exacerbated when conducted in an international arena, as several highly publicized cases have demonstrated.

Payment of gestational carriers continues to be an issue that provokes much debate. Many countries are reported to prohibit any form of compensation, which likely serves to significantly reduce the number of potential carriers. In countries where payment is reportedly not allowed, gestational carriers are usually relatives or personal friends of the intended couple or individual who likely receive only "reasonable expenses". Eight of 61 countries are reported to allow payment of gestational carriers, which consistently provides a larger potential group of women willing to become a gestational carrier but has been claimed to promote the commercialization of these gestational carrier arrangements. This is particularly a concern in less developed countries or lower resource settings with greater potential for exploitation.

Recent, limited studies have offered reassurance regarding the psychological and physical well-being of children produced through gestational carrier arrangements as well as their gestational carriers and the intended couples or individuals [1,2]. In most countries, the "birth mother" has been recognized as the legal mother of a child. This issue has been resolved in many countries or states by legislation enabling the genetic parent(s) to become a legal parent(s) at the birth of the child. The majority of gestational carrier arrangements proceed without problems and provide a positive and successful treatment option for a small group of women or individuals who otherwise would be unable to have their or their partner's own genetic children.

Both the European Society of Human Reproduction and Embryology (ESHRE) [3] and the American Society for Reproductive Medicine (ASRM) have published ethical and clinical guidelines pertaining to gestational carrier relationships [4,5], advocating thorough evaluation and provisions for managing the small group of women or individuals who require this

Chapter 15. Table 7

If Gestational Carrier Arrangements are Allowed/Permitted in Your Country, are the Qualifications to be a Gestational Carrier Based Upon Medical, Mental Health and/or any Lifestyle (Age and Occupational) Criteria

Country	Gestational Carrier	Traditional Gestational Carrier
Argentina	Not addressed	Not addressed
Australia	YES	YES
Bangladesh	Unknown	Unknown
Belarus	YES	
Belgium	YES	YES
Brazil	YES	YES
Bulgaria	Unknown	Unknown
Cameroon	NO	NO
Canada	YES	YES
Chile	Unknown	Unknown
China	NO	NO
Colombia	YES	YES
Czech Republic	Not addressed	Not addressed
Ecuador	YES	
Estonia	Not addressed	Not addressed
Finland	NO	NO
France	Not addressed	Not addressed
Germany	Not addressed	Not addressed
Greece	YES	NO
Guatemala	YES	YES
Honduras	Not addressed	YES
Hungary	Not addressed	Not addressed
India	YES	Not addressed
Iran	YES	YES
Ireland	NO	NO
Israel	YES	
Kazakhstan	YES	YES
Malaysia	Not addressed	Not addressed
Mali	Not addressed	Not addressed
Mexico	Not addressed	Not addressed
Netherlands	YES	Not addressed
Nigeria	YES	YES
Panama	Unknown	Unknown
Paraguay	Unknown	Unknown
Peru	YES	YES
Romania	YES	YES
Russian Federation	YES	
Senegal	Not addressed	Not addressed
Slovak Republic	Not addressed	Not addressed
South Africa	YES	NO
Sri Lanka	YES	Not addressed
Sweden	Not addressed	Not addressed
Taiwan (China*)	NO	NO
Trinidad and Tobago	Unknown	Unknown
UK	YES	YES
Uruguay	YES	
USA	YES	YES
Venezuela	Unknown	Unknown

*Reporting separately for this report.

specialized treatment to have a genetically related child or children.

Summary

Gestational carrier arrangements represent a useful and effective treatment option allowing the intended parent or parents to have their own children. These arrangements are important options especially for women who have no uterus, or are otherwise unable to bear children for other medical reasons. It is also an option for individuals who are not in a partnership or are in a same sex relationship (see Chapter 23). Gestational carrier arrangements remain controversial and are permitted in a relatively few countries, usually with significant limitations particularly regarding compensation. The topic engenders considerable international debate regarding indications for its application and potential for exploitation of its participants.

References

[1] Golombok S, MacCallum F, Murray C, et al. Surrogacy families: parental functioning, parent-child relationships and children's psychological development at age 2. J Child Psychol Psychiatry 2006;47(2):213-222.

[2] MacCallum F, Lycett E, Murray C, et al. Surrogacy: the experience of commissioning couples. Hum Reprod 2003;18 (6):1334-1342.

[3] Shenfield F, Pennings G, Cohen J, et al; ESHRE Task Force on Ethics and Law. ESHRE Task Force on Ethics and Law 10: Surrogacy. Hum Reprod 2005;20:2705-2707.

[4] Practice Committee of the American Society for Reproductive Medicine; Practice Committee of the Society for Assisted Reproductive Technology. Fertil Steril 2015;103(1):e1-8.

[5] Ethics Committee of the American Society for Reproductive Medicine. Using family members as gamete donors or surrogates. Fertil Steril 2012;98(4):797-803.

CHAPTER 16: EXPERIMENTATION WITH EMBRYONIC CELLS

Introduction

The topic "experimentation on the embryo" spans a range of applications including technical refinements of assisted reproductive technology (ART), such as assessment of media conditions to whole alterations of the genome with a consequent range of potential beneficial and harmful results. As such, there are inherent ethical conflicts that emerge as the intent to prevent or alleviate human suffering may diverge from the obligation to respect the value of human life. The issue of the status of the embryo is discussed in Chapter 18. On the other hand, the topic of working with embryonic cells taken from embryos generated in vitro has been reviewed in the literature and parameters for the conduct of embryonic cell research have been developed, with regulations and guidelines that differ worldwide [1-3]. Although many ethical, legal, political, and social arguments for and against embryonic cells have been written, they have helped frame the debate but have not mitigated many of the concerns that such research has raised. The literature reflects a broad range of approaches that various countries have undertaken to address these issues and whether or not embryonic stem cell research is permitted.

Analysis of the Survey (Tables 1 and 2 and Charts 1–4)

Respondents from 64 countries answered the questions concerning the topic of experimental research on cells from the pre-implantation embryo and their responses are included in the survey. Human embryonic research on donated unused pre-implantation embryos was reportedly allowable in seven countries, not allowed in 21 countries, and permissible with some restrictions in 21 countries. The respondents from nine countries reported that the status was "unknown". Although respondents from 23 countries reported that embryos were used for stem cell research with or without restrictions, generating embryos for embryonic stem cell research was reported to be forbidden in 27 countries. For a larger proportion of countries in which experimentation was permissible on donated or un-used pre-implantation embryos, specific approval for the research on either stem cells or embryonic stem cells was reported to be required. Research involving stem cells (including embryonic stem cells) were reported to be regulated by either national ethics/oversight panels, local or national Institutional Review Boards, or local

Chapter 16. Table.1a

Is Experimentation on Preimplantation Embryo Allowed?

	Research on Donated Unused Pre-implantation Embryos				Research on Donated Unused Pre-implantation Embryos for Stem Cell Research				Embryonic Stem Cell Research (Generating Embryos Specifically for Research)			
Country	Yes	Yes (with Restrictions)	No	Unknown	Yes	Yes (with Restrictions)	No	Unknown	Yes	Yes (with Restrictions)	No	Unknown
Argentina				X				X				X
Australia		X				X				X		
Austria			X				X				X	
Bangladesh				X				X				X
Barbados			X				X				X	
Belarus		X				X					X	
Belgium		X				X				X		
Brazil			X		X						X	
Bulgaria		X				X				X		
Cameroon			X				X				X	
Canada	X				X						X	
Chile			X				X				X	
China	X				X				X			
Colombia			X				X				X	
Czech Republic	X					X				X		
Denmark		X				X					X	
Ecuador			X				X				X	
Estonia		X				X					X	
Finland		X				X					X	
France	X					X					X	
Germany			X				X				X	
Greece		X				X					X	
Guatemala			X				X				X	
Hong Kong (China*)		X				X					X	
Hungary		X				X				X		
India		X					X					X
Iran	X				X						X	
Ireland			X				X				X	
Israel			X									
Italy			X				X				X	
Japan		X				X				X		
Jordan			X				X				X	
Kazakhstan			X				X				X	
Malaysia			X				X				X	
Mali			X				X				X	
Mexico				X				X				X
Netherlands		X				X					X	
Nigeria			X				X				X	
Norway		X				X					X	
Panama				X				X			X	
Paraguay				X				X				X
Peru			X				X				X	
Philippines			X				X				X	
Portugal		X				X					X	
Romania			X				X				X	
Russian Federation	X				X				X			
Saudi Arabia		X				X				X		
Senegal			X				X				X	
Singapore		X				X					X	
Slovak Republic			X				X				X	
South Africa		X				X				X		
South Korea	X				X				X			
Spain		X				X					X	
Sri Lanka				X				X				X
Sweden	X				X						X	
Switzerland		X					X				X	
Taiwan (China*)				X				X				X
Trinidad and Tobago				X				X				X
Tunisia			X				X				X	
Turkey			X				X				X	
UK	X				X						X	
Uruguay		X				X						
USA	X				X					X		
Venezuela			X				X				X	

*Reporting separately for this report.

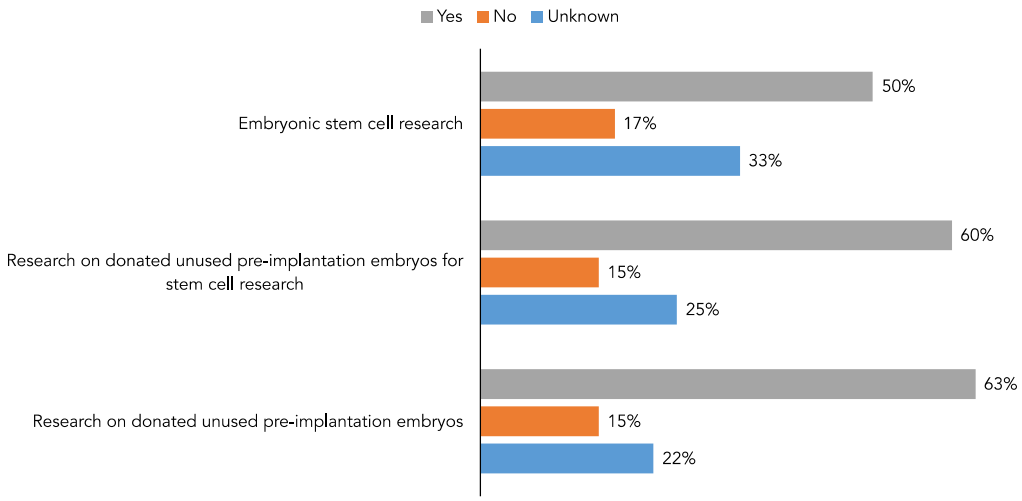


Chart 1. Is Experimentation/Research on the Pre-implantation Embryo Allowed/Permitted in Your Country?

Chapter 16. Table 1b

Is Experimentation on Preimplantation Embryo Performed?

	Research on Donated Unused Pre-implantation Embryos				Research on Donated Unused Pre-implantation Embryos for Stem Cell Research				Embryonic Stem Cell Research			
Country	**Yes**	**Yes (with Restrictions)**	**No**	**Unknown**	**Yes**	**Yes (with Restrictions)**	**No**	**Unknown**	**Yes**	**Yes (with Restrictions)**	**No**	**Unknown**
Argentina				X				X				X
Australia		X				X				X		
Austria			X				X				X	
Bangladesh				X				X				X
Barbados			X				X				X	
Belarus		X					X				X	
Belgium		X				X				X		
Brazil									X			
Bulgaria		X				X				X		
Cameroon			X				X				X	
Canada	X				X				X			
Chile			X				X				X	
China		X				X				X		
Czech Republic	X				X				X			
Denmark		X				X						
El Salvador			X				X				X	
Estonia		X						X				X
Finland		X				X					X	
France	X						X				X	
Germany			X				X				X	
Greece		X				X				X		
Guatemala			X				X				X	
Hong Kong (China*)		X				X						
Hungary				X				X				X
India	X					X				X		
Iran		X				X				X		
Ireland		X				X				X		
Italy			X				X				X	
Japan		X				X				X		
Jordan			X				X				X	
Kazakhstan			X				X				X	
Malaysia				X				X				X
Mali			X				X				X	
Mexico	X							X				X
Netherlands			X				X				X	
Nigeria				X				X				X
Norway		X				X					X	
Panama			X				X				X	
Paraguay				X				X				X
Peru							X				X	
Philippines			X				X				X	
Portugal			X				X					
Romania			X				X				X	
Russian Federation				X				X				X
Saudi Arabia		X				X				X		
Senegal				X				X				X
Singapore		X				X				X		
			X				X				X	

Chapter 16. Table 1b

(Continued)

Country	Research on Donated Unused Pre-implantation Embryos				Research on Donated Unused Pre-implantation Embryos for Stem Cell Research				Embryonic Stem Cell Research			
	Yes	Yes (with Restrictions)	No	Unknown	Yes	Yes (with Restrictions)	No	Unknown	Yes	Yes (with Restrictions)	No	Unknown
Slovak Republic												
South Africa		X				X				X		
South Korea		X				X				X		
Spain		X				X					X	
Sri Lanka				X				X				X
Sweden	X				X							
Switzerland		X					X				X	
Trinidad and Tobago			X				X				X	
Tunisia			X				X				X	
Turkey			X				X				X	
UK		X				X				X		
USA	X				X					X		
Venezuela			X				X				X	

*Reporting separately for this report.

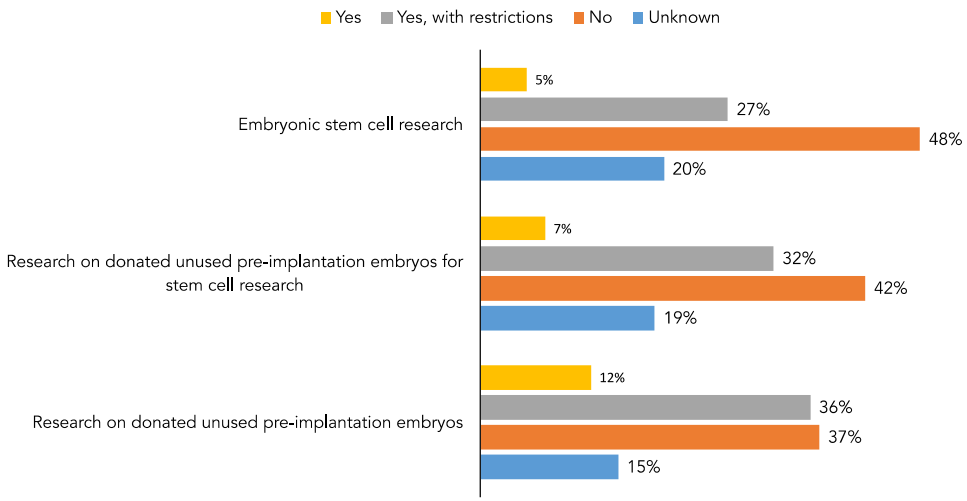


Chart 2. Is Experimentation/Research on the Pre-implantation Embryo Performed in Your Country?

Chapter 16. Table 1c

Is Experimentation on the Pre-implantation Embryo Being Performed by Clinical or Research Programmes?

Country	Embryonic Stem Cell Research				Research on Donated Unused Embryos for Stem Cell Research			
	Commonly Performed	Infrequently Performed	Never Performed	Unknown	Commonly Performed	Infrequently Performed	Never Performed	Unknown
Argentina				X				X
Australia		X				X		
Austria			X				X	
Bangladesh				X				X
Barbados			X				X	
Belarus			X				X	
Belgium		X				X		
Brazil		X				X		
Bulgaria		X				X		
Cameroon			X				X	
Canada	X					X		
Chile			X				X	
China		X				X		
Colombia								
Czech Republic		X				X		
Denmark		X						
El Salvador			X				X	
Estonia				X				X
Finland			X			X		

Chapter 16. Table 1c

(Continued)

Country	Embryonic Stem Cell Research				Research on Donated Unused Embryos for Stem Cell Research			
	Commonly Performed	Infrequently Performed	Never Performed	Unknown	Commonly Performed	Infrequently Performed	Never Performed	Unknown
France			X			X		
Germany		X					X	
Greece				X				X
Guatemala			X				X	
Hong Kong (China*)		X				X		
Hungary		X						X
India				X				X
Iran		X				X		
Ireland			X			X		
Italy			X				X	
Japan	X					X		
Jordan			X				X	
Kazakhstan			X				X	
Malaysia			X				X	
Mali			X				X	
Mexico				X				X
Netherlands			X				X	
Nigeria			X				X	
Norway		X				X		
Panama				X				X
Paraguay				X				X
Peru			X				X	
Philippines			X				X	
Portugal							X	
Romania			X				X	
Russian Federation				X				X
Saudi Arabia		X				X		
Senegal				X				X
Singapore		X				X		
Slovak Republic			X				X	
South Africa			X				X	
South Korea	X				X			
Spain			X		X			
Sri Lanka				X				X
Sweden				X	X			
Switzerland			X					X
Taiwan (China*)				X				X
Trinidad and Tobago			X				X	
Tunisia			X				X	
Turkey				X			X	
UK		X				X		
USA		X				X		
Venezuela			X				X	

*Reporting separately for this report.

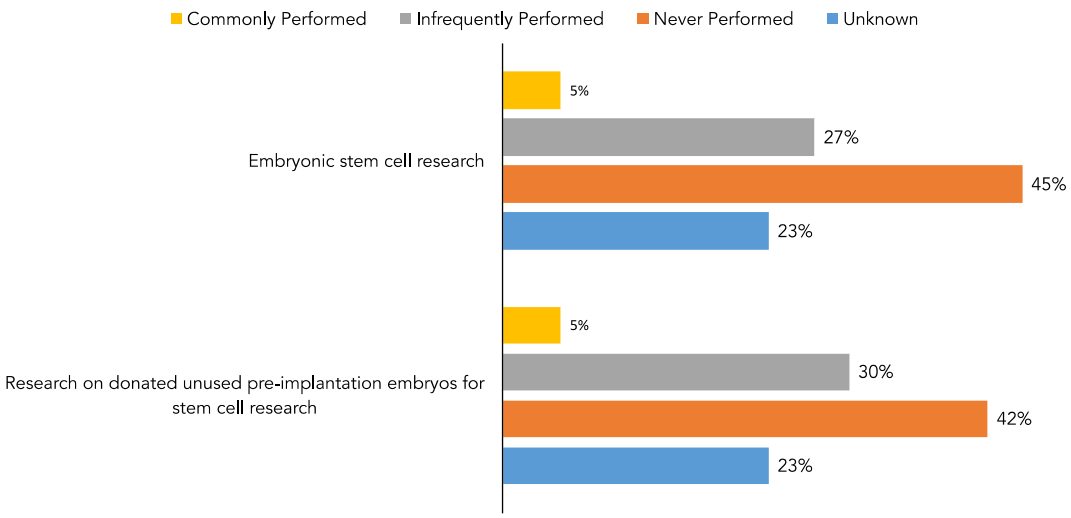


Chart 3. Is experimentation on the pre-implantation embryo being performed by clinical or research programs in your country?

Chapter 16. Table 2a

Are there Regulations that Address Experimentation on the Pre-implantation Embryo?

	Embryonic Stem Cell Research				Research on Donated Unused Embryos for Stem Cell Research Embryos for Stem Cell Research			
Country	**Yes**	**No**	**Banned**	**Unknown**	**Yes**	**No**	**Banned**	**Unknown**
Australia	X				X			
Austria	X				X			
Bangladesh				X				X
Barbados		X				X		
Belarus			X				X	
Belgium	X				X			
Brazil	X				X			
Bulgaria				X				X
Cameroon		X				X		
Canada	X				X			
Chile			X				X	
China	X				X			
Colombia								
Czech Republic	X				X			
Denmark				X				X
Finland			X		X			
France	X				X			
Germany	X						X	
Greece	X				X			
Guatemala		X				X		
Hong Kong (China*)	X				X			
Hungary	X				X			
India	X				X			
Iran		X				X		
Ireland		X				X		
Israel	X				X			
Italy			X				X	
Japan	X				X			
Jordan			X				X	
Kazakhstan		X				X		
Malaysia		X				X		
Mali		X				X		
Mexico		X				X		
Netherlands	X				X			
Nigeria		X				X		
Norway	X				X			
Panama	X				X			
Paraguay		X				X		
Peru		X				X		
Philippines		X				X		
Portugal						X		
Romania	X						X	
Russian Federation		X				X		
Saudi Arabia	X				X			
Senegal				X				X
Singapore	X				X			
Slovak Republic			X				X	
South Africa	X				X			
South Korea	X				X			
Spain	X				X			
Sri Lanka		X				X		
Sweden				X	X			
Switzerland				X		X		
Taiwan (China*)				X				X
Trinidad and Tobago		X				X		
Tunisia			X				X	
Turkey			X				X	
UK	X				X			
USA	X				X			
Venezuela		X				X		

*Reporting separately for this report.

ethics panels. Respondents reported a considerable range that was permitted for the stage of development for embryos able to be used for experimentation but respondents from the majority of countries reported that experimentation using a non-implanted embryo can be performed up to 14 days of development. None of the respondents from 64 countries acknowledged performing reproductive cloning (see Chapter 17), with respondents from 54 countries reporting that cloning was never performed; the situation was unknown in 10 countries. Stem cell research and embryonic stem cell research with embryos

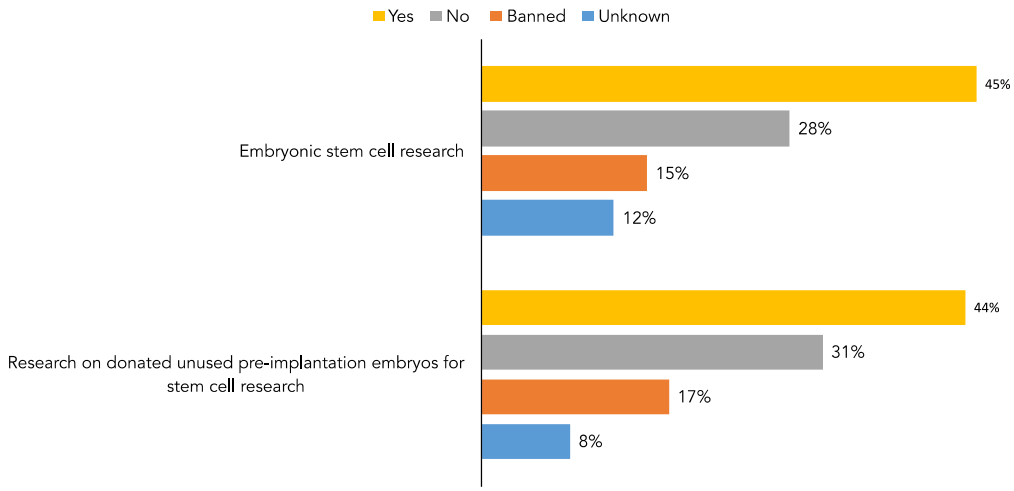


Chart 4. Are there regulations that address experimentation on the pre-implantation embryo?

Chapter 16. Table 2b

Regulations that Govern Experimentation on Preimplantation Embryo

Country	Research on Donated Unused Embryos	Embryonic Stem Cell Research	Use of Donated Unused Embryos for Stem Cell Research
Australia	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Agency Regulations/Oversight Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Agency Regulations/Oversight Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Agency Regulations/Oversight Professional Organization Standards/Guidelines
Austria	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances
Bangladesh	No regulations	No regulations	No regulations
Belgium	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines
Brazil	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Agency Regulations/Oversight	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Agency Regulations/Oversight	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Agency Regulations/Oversight
Cameroon	No regulations		
Canada	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances
China	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances/	Federal/National Laws/Statutes/Ordinances State/Provincial/Regional Laws/Statutes/Ordinances
Czech Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Estonia	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Finland	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany		Federal/National Laws/Statutes/Ordinances	
Greece	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
Hong Kong (China*)	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Hungary	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
India	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances Federal/National Laws/Statutes/Ordinances
Israel	Federal/National Laws/Statutes/Ordinances		
Japan	Professional Organization Standards/Guidelines	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Mali	No regulations	No regulations	No regulations
Mexico	No regulations	No regulations	No regulations
Netherlands	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Paraguay	No regulations	No regulations	No regulations

Chapter 16. Table 2b

(*Continued*)

Country	Research on Donated Unused Embryos	Embryonic Stem Cell Research	Use of Donated Unused Embryos for Stem Cell Research
Portugal			No regulations
Romania	Federal/National Laws/Statutes/Ordinances		
Saudi Arabia	Religious decree Cultural practice Professional Organization Standards/Guidelines Agency Regulations/Oversight	Cultural practice Professional Organization Standards/Guidelines Agency Regulations/Oversight	Cultural practice Professional Organization Standards/Guidelines
Senegal	Unknown	Unknown	Unknown
Singapore	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
South Africa	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
South Korea	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Spain	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Sri Lanka	No regulations	No regulations	No regulations
Sweden		Federal/National Laws/Statutes/Ordinances	
Switzerland		Federal/National Laws/Statutes/Ordinances	
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Uruguay		Federal/National Laws/Statutes/Ordinances	
USA	Professional Organization Standards/Guidelines State/Provincial/Regional Laws/Statutes/Ordinances Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines State/Provincial/Regional Laws/Statutes/Ordinances Federal/National Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances
Venezuela	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances

*Reporting separately for this report.

Chapter 16. Table.2c

What Body/Agency Approves Experimentation/Research?

Country	Research on Donated Unused Pre-implantation Embryos	Research on Donated Unused Pre-implantation Embryos for Stem Cell Research	Embryonic Stem Cell Research	Comments
Argentina	Unknown	Unknown	Unknown	The subject is proposed in a bill presented to Parliament, but no resolution for the time being.
Australia	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	Reproductive cloning not permitted. National Licensing body for all other research.
Bangladesh	Unknown	Unknown	Unknown	Not established yet in our country.
Belarus	Unknown	Unknown	Unknown	
Belgium	Ethics Panel, Local or National Institutional Review Board	Ethics Panel, Local or National Institutional Review Board	Ethics Panel, Local or National Institutional Review Board	First, every experimentation/research should be approved by the local institutional ethical board of a university health care programme. Secondly, the approval of the federal commission on medical and scientific research on embryos is warranted
Brazil			National Ethics/Oversight Panel	There is a law from 2005, but no project has been accepted since them. As far as I know researches are based on human stem cells lines that came from abroad.
Bulgaria	National Ethics/Oversight Panel	National Ethics/Oversight Panel		
Cameroon	Unknown	Unknown	Unknown	
Canada	Ethics Panel	National Ethics/Oversight Panel		
Chile				no research in pre implantation embryos is allowed
China	Ethics Panel	Ethics Panel	Ethics Panel	
Czech Republic	Ethics Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Denmark	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Finland	Local or national Institutional Review Board	Local or national Institutional Review Board		
France	Local or national Institutional Review Board	Local or national Institutional Review Board		
Greece	Other	Other	Other	National Authority for Medically Assisted Reproduction.
Guatemala	Unknown	Unknown	Unknown	
Hong Kong (China*)	Other	Other		Council on Human Reproductive Technology
Hungary	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
India	Local or national Institutional Review Board	Local or national Institutional Review Board	Local or national Institutional Review Board,Unknown	
Iran	Local or national Institutional Review Board	Local or national Institutional Review Board	Local or national Institutional Review Board	
Italy				Not allowed
Japan	Local or national Institutional Review Board	National Ethics/Oversight Panel Local or national Institutional Review Board	National Ethics/Oversight Panel Local or national Institutional Review Board	
Jordan				Not allowed
Kazakhstan	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Malaysia	Unknown	Unknown	Unknown	
Mali	Unknown	Unknown	Unknown	
Mexico	Unknown	Unknown	Unknown	
Netherlands	Local or national Institutional Review Board	Local or national Institutional Review Board	Local or national Institutional Review Board	

Chapter 16. Table.2c

(*Continued*)

Country	Research on Donated Unused Pre-implantation Embryos	Research on Donated Unused Pre-implantation Embryos for Stem Cell Research	Embryonic Stem Cell Research	Comments
Nigeria	Unknown	Unknown	Unknown	
Norway	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Panama	Unknown	Unknown	Unknown	
Paraguay	Unknown	Unknown	Unknown	
Portugal	Other	Other		ART National Authority after consulting the Scientific National Board
Romania	Unknown	Unknown	Unknown	
Russian Federation	Ethics Panel	Ethics Panel	Ethics Panel	
Saudi Arabia	National Ethics/Oversight Panel, Ethics Panel, Local or national Institutional Review Board	National Ethics/Oversight Panel, Ethics Panel, Local or national Institutional Review Board	National Ethics/Oversight Panel, Ethics Panel, Local or national Institutional Review Board	
Singapore	National Ethics/Oversight Panel	National Ethics/Oversight Panel		Additional approval by Ministry of Health required
South Africa	Other	Other	Other	Needs permission from the National Minister of Health
South Korea	Local or national Institutional Review Board	Local or national Institutional Review Board	Local or national Institutional Review Board	
Spain	Local or national Institutional Review Board	Local or national Institutional Review Board		CNRHA- for research on IVF for stem cells research
Sri Lanka	Ethics Panel	Ethics Panel	Ethics Panel	
Sweden	Local or national Institutional Review Board	Local or national Institutional Review Board		
Switzerland	Ethics Panel			
Trinidad and Tobago	Ethics Panel	Ethics Panel	Unknown	
Turkey	National Ethics/Oversight Panel	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
UK	National Ethics/Oversight Panel	National Ethics/Oversight Panel		
USA	Local or national institutional review board, National Ethics/Oversight Panel			
Venezuela	Unknown	Unknown	Unknown	

*Reporting separately for this report.

were both reported to be infrequently conducted in the majority of countries in which experimentation is permitted.

Summary

Embryonic stem cell research remains controversial and is performed in very few countries. Experimentation on human embryonic cells remains a contentious and complex issue based upon the outcome from this 2016 Surveillance. Despite this, an increase in the amount of research performed when compared to the Surveillance 2013 is depicted for countries in which stem cell research has been reported to be permissible.

References

[1] National Institutes of Health. Report of the Human Embryo Research Panel: Final Draft. September 27, 1994. Bethesda, MD: National Institutes of Health; 1994.
[2] Council on Human Reproductive Technology. For embryo researchers. Available at: http://www.chrt.org.hk/english/embryo/embryo.html. Accessed August 10, 2016.
[3] Cattapan A, Snow D Of research and reproduction: defining embryo "research" in Canada. Monash Bioeth Rev 2015;33 (4):379-395.

CHAPTER 17: CLONING

Reproductive cloning is a process in which an animal with the nuclear somatic cell DNA of another animal is generated. The technique, called somatic cell nuclear transfer (SCNT), produces an almost identical twin that differs from being a true identical twin in that the clone has the mitochondrial DNA of the recipient (usually genetically unrelated) egg. The historical first mammalian prototype, a sheep named Dolly, was a product of reproductive cloning. Reproductive cloning has been, thus far, extremely inefficient. The number of oocytes undergoing SCNT that subsequently develop to a live birth is approximately 1-2%. These observations and pervasive ethical concerns preclude its application to clinical practice [1-3].

Therapeutic cloning is a process in which stem cells are harvested from the inner cell mass of blastocysts from embryonic clones generated for this purpose. These embryonic stem cells may be expanded in vitro with the intent of allowing them to undergo controlled differentiation to various developmental cell types for therapeutic purposes. Therefore, embryonic stem cell lines that could be of therapeutic value can be created by SCNT using a nucleus from a particular person or animal. This procedure offers the advantage of avoiding rejection since these generated therapeutic cells, tissues, or organs may be transplanted back into the same person or animal as they would be immunologically homologous [1,3].

Analysis of the Survey (Tables 1–5 and Charts 1 and 2)

Reproductive Cloning

Human reproductive cloning is not allowed (often with formal statues, laws, and guidelines), or its status is unstated, as reported by respondents from 65 out of the 66 countries. A respondent

Chapter 17. Table 1

Is Cloning Allowed/permitted in Your Country?

Country	Reproductive Cloning	Therapeutic Cloning	If yes, is there a Requirement for Specific Approval of a Experimentation/Research Proposal? Reproductive Cloning	Therapeutic Cloning
Argentina	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Australia	NO	YES With restrictions		YES
Austria	NO	NO		
Bangladesh	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Barbados	NO	NO		
Belarus	NO	NO	UNKNOWN	UNKNOWN
Belgium	NO	YES With restrictions		YES
Brazil	NO	NO		
Bulgaria	NO	NO	UNKNOWN	UNKNOWN
Cameroon	NO	NO	NO	NO
Canada	NO	NO		
Chile	NO	NO		
China	NO	YES	NO	YES
Colombia	NO	NO	UNKNOWN	UNKNOWN
Czech Republic	NO	YES With restrictions	UNKNOWN	YES
Denmark	NO	NO		
Ecuador	NO	NO		
Estonia	NO	NO		
Finland	NO	NO		
France	NO	NO		
Germany	NO	NO		
Greece	NO	YES With restrictions		YES
Guatemala	NO	NO	UNKNOWN	UNKNOWN
Hong Kong (China*)	NO	NO		
Hungary	NO	NO		
India	NO	NO	UNKNOWN	UNKNOWN
Iran	NO	YES	NO	YES
Ireland	NO	NO		
Italy	NO	NO		
Japan	NO	NO		
Jordan	NO	NO		
Kazakhstan	NO	NO		
Malaysia	NO	NO		
Mali	NO	NO		
Mexico	UNKNOWN	UNKNOWN		
Netherlands	NO	NO	UNKNOWN	UNKNOWN
Nigeria	NO	NO	NO	NO
Norway		NO		
Panama	NO	NO	UNKNOWN	UNKNOWN
Paraguay	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Peru	NO	NO	NO	NO
Philippines	NO	NO		
Portugal	NO	NO		
Romania	NO	NO	NO	NO
Russian Federation	NO	NO		
Saudi Arabia	NO	NO		
Senegal	NO	NO		
Singapore	NO	NO		
Slovak Republic	NO	NO		
South Africa	NO	YES With restrictions	NO	YES
South Korea	NO	NO		
Spain	NO	NO		
Sri Lanka	UNKNOWN	UNKNOWN		
Sweden	NO	NO		
Switzerland	NO	NO		
Taiwan (China*)	UNKNOWN	UNKNOWN		
Trinidad and Tobago	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Tunisia	NO	NO		
Turkey	NO	NO		
UK	NO	NO		
Uruguay	YES With restrictions			
USA	NO	NO	UNKNOWN	
Venezuela	NO	NO	UNKNOWN	UNKNOWN

*Reporting separately for this report.

reported that reproductive cloning is allowed in one country (Uruguay) however with restrictions. (Table 1) Laws, regulations, statutes, or guidelines prohibit the use reproductive human cloning as reported by the respondents of the 2016 Surveillance. None of the respondents representing 66 countries report current practice or research in reproductive cloning.

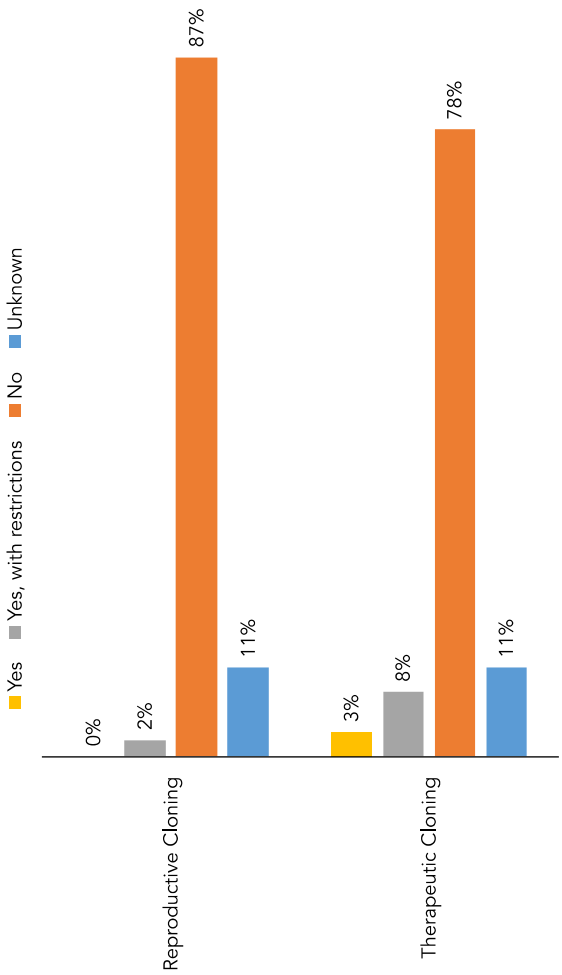


Chart 1. Is Cloning Allowed/Permitted In Your Country?

Chapter 17. Table 2

What Body and/or Agency Approves Cloning?

Country	Reproductive Cloning	Therapeutic Cloning	Comments
Argentina	Unknown	Unknown	
Australia		National Ethics/Oversight Panel	Reproductive cloning not permitted.
National Licensing body for all other research.			
Bangladesh	Unknown	Unknown	
Belarus	Unknown	Unknown	
Belgium		Ethics Panel Local or National Institutional Review Board	
Cameroon	Unknown	Unknown	
China	Ethics Panel	Ethics Panel	
Czech Republic	Unknown	National Ethics/Oversight Panel	
Greece		Other	
Guatemala	Unknown	Unknown	
India	Local or national Institutional Review Board Unknown	Local or national Institutional Review Board Unknown	
Iran		Local or national Institutional Review Board	Reproductive cloning is banned in Iran
Kazakhstan	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Malaysia	Unknown	Unknown	
Mali	Unknown	Unknown	
Mexico	Unknown	Unknown	
Netherlands	Unknown	Unknown	
Nigeria	Unknown	Unknown	
Panama	Unknown	Unknown	
Paraguay	Unknown	Unknown	
Romania	Unknown	Unknown	
South Africa		Other (Please name in comment section)	
Sri Lanka	Ethics Panel	Ethics Panel	
Trinidad & Tobago	Unknown	Unknown	
Turkey	National Ethics/Oversight Panel	National Ethics/Oversight Panel	
Venezuela	Unknown	Unknown	

Chapter 17. Table 3

Is Cloning Performed in Your Country?

Participant Country	Reproductive Cloning	Therapeutic Cloning
Argentina	UNKNOWN	UNKNOWN
Australia	NO	YES With restrictions
Austria	NO	NO
Bangladesh	UNKNOWN	UNKNOWN
Barbados	NO	NO
Belarus	NO	NO
Belgium		YES With restrictions
Bulgaria	NO	NO
Cameroon	NO	NO
Canada	NO	NO
Chile	NO	NO
China	NO	YES With restrictions
Czech Republic	NO	YES
El Salvador	NO	NO
Estonia	NO	NO
Finland	NO	NO
France	NO	NO
Germany	NO	NO
Greece	NO	UNKNOWN
Guatemala	NO	NO
Hungary	NO	NO
India	UNKNOWN	UNKNOWN
Iran	NO	YES With restrictions
Ireland	no	No
Italy	NO	NO
Japan	NO	NO
Jordan	NO	NO
Kazakhstan	NO	NO
Malaysia	UNKNOWN	UNKNOWN
Mali	NO	NO
Mexico	NO	NO
Netherlands	NO	NO
Nigeria	UNKNOWN	UNKNOWN
Norway	NO	NO
Panama	NO	NO
Paraguay	UNKNOWN	UNKNOWN
Peru	NO	NO
Philippines	NO	NO
Portugal		
Romania	NO	NO
Russian Federation	NO	NO
Senegal	UNKNOWN	UNKNOWN
Singapore	NO	NO
Slovak Republic	NO	NO
South Africa	NO	YES With restrictions
Spain	NO	NO
Sri Lanka	UNKNOWN	UNKNOWN
Sweden	NO	NO
Switzerland	NO	NO
Trinidad and Tobago	NO	NO
Tunisia	NO	NO
Turkey	NO	NO
UK	NO	NO
USA	NO	NO
Venezuela	NO	NO

Therapeutic Cloning

Therapeutic cloning is reported by respondents to be allowed in five of the 66 countries via formal statutes, laws, or guidelines. Specific approval involving national ethics committees are reported to be required and involve oversight by various local and national bodies. Therapeutic cloning is reported to be prohibited, or its status was left unstated, in 61 of the 66 countries. (Table 2) Laws, regulations, statutes or guidelines in virtually all countries where it was reported to be officially allowed, restrict the use of therapeutic cloning to stem cell research and not transplantation back into the same person as a form of therapy or treatment. Respondents from six of the 66 countries reported that active research in therapeutic stem cell cloning exists.

Discussion

Reproductive cloning, despite early reported success in experimental animals and well-publicized initiatives with humans, has not produced a verified human birth. As reflected in Surveillance 2016, reproductive cloning was reported to be prohibited in all but one country (Uruguay). However, there are no reports of attempted reproductive cloning in Uruguay. Therapeutic cloning, in which a human in vitro fertilization (IVF) somatic cell nuclear transfer (SNCT) generated blastocyst serves as a source of human stem cells, was reported by the respondents to be permitted in five of 66 countries.

Summary

Human reproductive cloning is almost uniformly prohibited by countries whose respondents reported on this issue. The United Nations Declaration on Human Cloning, which prohibits all forms of human cloning, passed in 2005 during its 82[nd] General Assembly with 84 member nations voting in favor, 34 against, and with 37 abstentions. Therefore, there was no global consensus on this issue through the Declaration as there were concerns by some member nations that there could be misconceptions concerning the wording in the Declaration about prohibitions that would be applied to all forms of cloning. This 2016 Surveillance does show that therapeutic cloning, with significant potential clinical therapeutic benefits, is practiced where

Chapter 17. Table 4

Are there Regulations that Address Cloning in Your Country?

Country	Reproductive Cloning	Therapeutic Cloning	If the Answer is Yes, who Regulates Experimentation on the Pre-implantation Embryo?	
			Reproductive Cloning	Therapeutic Cloning
Argentina	Banned	Banned		
Australia	Banned	Yes	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Agency Regulations/ Oversight State/Provincial/Regional Laws/Statutes/ Ordinances	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Agency Regulations/ Oversight State/Provincial/Regional Laws/Statutes/ Ordinances
Austria	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Bangladesh	Unknown		No regulations	No regulations
Barbados	No	No		
Belarus	Banned	Banned		
Belgium	Banned	Yes		Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines
Brazil	Banned	Banned		
Bulgaria	Unknown	Unknown		
Cameroon	No	No		
Canada	Banned	Banned		
Chile	Banned	Banned		
China	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Czech Republic	Banned	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Denmark	Unknown	Unknown		
Estonia	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Finland	Banned	Banned	Federal/National Laws/Statutes/Ordinances Agency Regulations/Oversight	Federal/National Laws/Statutes/Ordinances Agency Regulations/Oversight
France	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany	Banned	Banned		
Greece	Yes	No	Federal/National Laws/Statutes/Ordinances Agency Regulations/Oversight	No regulations
Guatemala	No	No		
Hungary	Yes	Banned		
India	Yes	Yes	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances
Iran	Banned	No		
Ireland	NO	NO		
Israel	Yes	Yes		
Italy	Banned	Banned		
Japan	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Jordan	Banned	Banned		
Kazakhstan	No	No		
Malaysia	No	No		
Mali	No	No	No regulations	No regulations
Mexico	No	No	No regulations	No regulations
Netherlands	Unknown	Unknown	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Nigeria	No	No		
Norway	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Paraguay	No	No	No regulations	No regulations
Peru	No	No		
Philippines	No	No		
Romania	Banned	Banned		
Russian Federation	Banned	Banned	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Saudi Arabia	Banned	Banned		
Senegal	Unknown	Unknown		
Singapore	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Slovak Republic	Banned	Banned		
South Africa	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
South Korea	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Spain	Yes	Yes	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Sri Lanka	No	No	No regulations	No regulations
Sweden	Banned	Banned		
Switzerland	No	No		
Taiwan (China*)	Unknown	Unknown		
Trinidad and Tobago	No	No		
Tunisia	Banned	Banned		
Turkey	Banned	Banned		
UK	Banned	Banned		
USA	Banned	Yes	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines State/Provincial/ Regional Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines State/Provincial/ Regional Laws/Statutes/Ordinances
Venezuela	No	No	No regulations	No regulations

*Reporting separately for this report.

Chapter 17. Table 5

Is Cloning Being Performed by Clinical or Research Programmes in Your Country?

Country	Reproductive Cloning by Clinical or Research Programmes	Therapeutic Cloning by Clinical or Research Programmes
Argentina	Never Performed	Never Performed
Australia	Never Performed	Infrequently Performed
Austria	Never Performed	Never Performed
Bangladesh	Unknown	Unknown
Barbados	Never Performed	Never Performed
Belarus	Never Performed	Never Performed
Belgium	Never Performed	Unknown
Brazil	Never Performed	Never Performed
Bulgaria	Unknown	Unknown
Cameroon	Never Performed	Never Performed
Canada	Never Performed	Never Performed
Chile	Never Performed	Never Performed
China	Never Performed	Infrequently Performed
Czech Republic	Never Performed	Unknown
Denmark	Never Performed	Never Performed
El Salvador	Never Performed	Never Performed
Estonia	Never Performed	Never Performed
Finland	Never Performed	Never Performed
France	Never Performed	Never Performed
Germany	Never Performed	Never Performed
Greece	Never Performed	Unknown
Guatemala	Never Performed	Never Performed
Hong Kong (China*)	Never Performed	Never Performed
Hungary	Never Performed	Never Performed
India	Never Performed	Never Performed
Iran	Never Performed	Infrequently Performed
Ireland	Never Performed	Never Performed
Italy	Never Performed	Never Performed
Japan	Never Performed	Never Performed
Jordan	Never Performed	Never Performed
Kazakhstan	Never Performed	Never Performed
Malaysia	Never Performed	Never Performed
Mali	Never Performed	Never Performed
Mexico	Never Performed	Never Performed
Netherlands	Never Performed	Never Performed
Nigeria	Never Performed	Never Performed
Norway	Never Performed	Never Performed
Panama	Unknown	Unknown
Paraguay	Unknown	Unknown
Peru	Never Performed	Never Performed
Philippines	Never Performed	Never Performed
Portugal	Never Performed	Never Performed
Romania	Never Performed	Never Performed
Russian Federation	Never Performed	Never Performed
Saudi Arabia	Never Performed	Never Performed
Senegal	Unknown	Unknown
Singapore	Never Performed	Never Performed
Slovak Republic	Never Performed	Never Performed
South Africa	Never Performed	Never Performed
South Korea	Never Performed	Never Performed
Spain	Never Performed	Never Performed
Sri Lanka	Unknown	Unknown
Sweden	Never Performed	Never Performed
Switzerland	Never Performed	Never Performed
Taiwan (China*)	Unknown	Unknown
Trinidad and Tobago	Never Performed	Never Performed
Tunisia	Never Performed	Never Performed
Turkey	Never Performed	Never Performed
UK	Never Performed	Never Performed
USA	Never Performed	Infrequently Performed
Venezuela	Never Performed	Never Performed

*Reporting separately for this report.

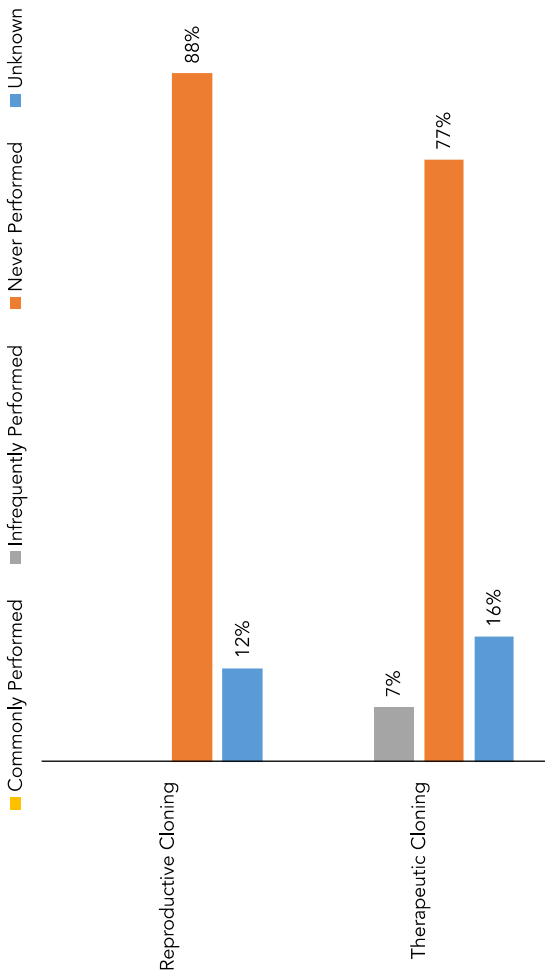


Chart 2. How Often Is Cloning Performed In Your Country?

allowed under restriction in a limited number of the countries surveyed.

References

[1] Ogura A, Inoue K, Wakayama T Recent advancements in cloning by somatic cell nuclear transfer. Philos Trans R Soc Lond B Biol Sci 2013;5;368(1609):20110329.

[2] Trounson AO Future and applications of cloning. Methods Mol Biol 2006;348:319-332.

[3] Hill JR Incidence of abnormal offspring from cloning and other assisted reproductive technologies. Ann Rev Anim Biosci 2014;2:307-321.

CHAPTER 18: STATUS OF THE EMBRYO

Ultimately, the practice of assisted reproductive technology (ART) in all countries in which it is offered is governed by the status conferred on the embryo. There are significant differences among countries' approaches to this issue, which are determined by their individual interpretation of guidelines and statutes unique to their locale [1-3]. Practices are also influenced by religious doctrines and universal moral and ethical principles. In essence, these policies focus on two issues: the point at which an embryo, fetus or child becomes a potential entity with personhood, and the legal status afforded before and after that point is reached. Clinical interventions resulting in pregnancy pose unique challenges as decision making is governed by classical ethical concerns for autonomy, beneficence, and non-maleficence for both mother and the ultimate live born child. Resolution of potential conflicts when each may be differentially affected pose unique challenges. While universally accepted ethical principles exist, there are very significant international differences in the way these considerations are approached and resolved. It is worth noting that many countries do have points at which the fetus is legally protected (often the point of viability if outside of the mother), and this distinction was not addressed by the

Chapter 18. Table 1

Is there a Recognized Point in Time During Human Development at which a Human Person is Considered to Exist and thus Provided Human Rights?

Country	Response	If Yes, what is the Recognized Time of Existence? (Days)
Argentina	Yes	7
Australia	Yes	0
Austria	No	
Bangladesh	Unknown	
Barbados	Unknown	
Belarus	Unknown	
Belgium	No	
Brazil	Yes	1
Bulgaria	No	
Cameroon	Unknown	
Canada	Unknown	
Chile	No	
China	Unknown	
Colombia	YES	0
Czech Republic	No	
Denmark	Unknown	
Ecuador	Yes	1
El Salvador	Unknown	
Estonia	No	
Finland	No	
France	No	
Germany	No	
Greece	Yes	0
Guatemala	Yes	1
Hong Kong (China*)	Unknown	
Hungary	Yes	2
India	Unknown	
Iran	Yes	120
Ireland	YES	0
Israel	Yes	
Italy	Yes	1
Japan	No	
Jordan	Yes	126
Kazakhstan	No	
Kenya	No	
Malaysia	No	
Mali	Unknown	
Mexico	Unknown	
Netherlands	Unknown	
Nigeria	No	
Norway	No	
Panama	Unknown	
Peru	No	
Philippines	Yes	
Portugal	No	
Romania	No	
Russian Federation	Yes	280
Saudi Arabia	Yes	40
Senegal	Unknown	
Singapore	No	
Slovak Republic	Yes	84
South Africa	No	
South Korea	No	
Spain	No	
Sri Lanka	No	
Sweden	Unknown	
Switzerland	Unknown	
Taiwan (China*)	No	
Trinidad and Tobago	No	
Tunisia	Unknown	
Turkey	No	
UK	Yes	1
Uruguay	Unknown	
USA	No	

*Reporting separately for this report.

Chapter 18. Table 2

Is there a Recognized Point in Time During Human Development before which a Human Person is Considered Not to Exist, and thus Not Provided Human Rights?

Country	Response	If Yes, what is the Recognized time of Non-Existence? (d)
Argentina	Yes	7
Australia	No	
Austria	No	
Bangladesh	Unknown	
Barbados	Unknown	
Belarus	Unknown	
Belgium	No	
Brazil	No	
Bulgaria	No	
Cameroon	Unknown	
Canada	Yes	
Chile	No	
China	Unknown	
Colombia	Unknown	DEATH
Czech Republic	Unknown	
Denmark	Unknown	
Ecuador	No	
El Salvador	Unknown	
Estonia	No	
Finland	No	
France	No	
Germany	No	
Greece	Yes	0
Guatemala	No	
Hong Kong (China*)	Unknown	
Hungary	No	
India	Unknown	
Iran	Yes	
Ireland	Yes	0
Italy	No	
Japan	No	
Jordan	Yes	125
Kazakhstan	No	
Kenya	No	
Malaysia	Unknown	
Mali	Unknown	
Mexico	Unknown	
Netherlands	Unknown	
Nigeria	No	
Norway	No	
Panama	No	
Paraguay	Unknown	
Peru	No	
Philippines	Yes	
Portugal	No	
Romania	No	
Russian Federation	No	
Saudi Arabia	Yes	39
Senegal	Unknown	
Singapore	No	
Slovak Republic	Yes	84
South Africa	No	
South Korea	No	
Spain	No	
Sri Lanka	No	
Sweden	Unknown	
Switzerland	Unknown	
Taiwan (China*)	No	
Trinidad and Tobago	No	
Tunisia	Unknown	
Turkey	No	
UK	Yes	0
Uruguay	Unknown	
USA	Yes	

*Reporting separately for this report.

Chapter 18. Table 3

Through which Governing Bodies or Agencies, is this Time of Human Existence Determined?

Country	Federal/National Laws/ Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Argentina	YES	NO	NO	NO	YES	NO	YES
Australia	YES	YES					
Austria	Unknown						
Bangladesh	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	YES
Barbados	Unknown						
Belarus	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Belgium	YES						Unknown
Brazil	YES						
Bulgaria	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Cameroon	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Canada	YES	NO	NO	NO	NO	NO	NO
Chile	NO						
China	Unknown						
Czech Republic	YES						YES
Ecuador	YES						YES
El Salvador					YES		
Finland	YES	NO	NO	NO	NO	NO	NO
Germany						YES	YES
Greece	YES	NO	NO	NO	NO	NO	NO
Guatemala	YES	YES	YES	YES	YES	YES	YES
Hong Kong (China*)				Unknown			
Hungary	YES						
India					YES		
Iran	YES						
Israel	YES					YES	YES
Italy	YES	NO	NO	NO	NO	NO	NO
Jordan	YES	YES					YES
Kazakhstan	YES	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	YES	NO	NO
Mexico	Unknown	Unknown	Unknown	NO	NO	NO	YES
Netherlands	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Panama	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	YES	YES
Philippines	YES				YES		
Romania	NO	NO	NO	NO	NO	NO	NO
Russian Federation	YES						
Saudi Arabia					YES	YES	YES
Senegal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Singapore	YES						
Slovak Republic	YES				YES		
South Africa	NO						
Switzerland	YES						
Taiwan (China*)	NO	NO	NO	NO	NO	NO	NO
Tunisia	Unknown						
Turkey	YES						
UK	YES						
Uruguay	YES						
USA	NO	NO	NO		NO	NO	YES

*Reporting separately for this report.

respondents in this context, presumably because the surveillance questions pertained to ART only.

Analysis of the Survey

Two questions were posed for the 2015 survey questionnaire: "For your country, is there a recognized point in time during human development at which a human person is considered to exist and thus provided human rights?" (Table 1) and "For your country, is there a recognized point in time during human development before which a human person is considered not to exist and thus not provided human rights?" (Table 2) Respondents were then asked if such a determination were made for each circumstance, the recognized time that the status of personhood was conferred, and the

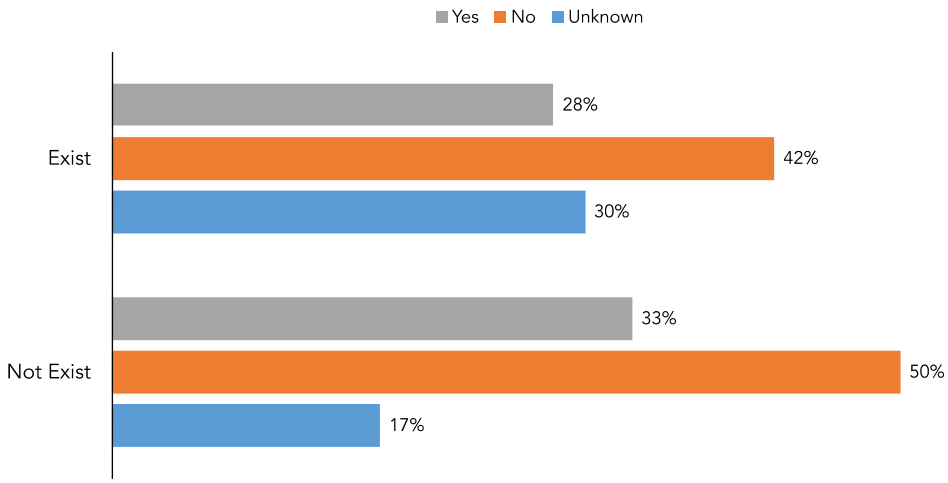


Chart 1. Is there a recognized point in time during human development at which a human person is considered to exist or not exist?

Chapter 18. Table 4

If Yes, through Which Governing Bodies or Agencies is this Time Frame Determined?

Country	Federal/National Laws/ Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Professional Organization Standards/Guidelines	Cultural Practice	Religious Decree
Argentina	YES	NO	NO	NO	YES	NO	YES
Belgium	YES						
Cameroon	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Canada	YES	NO	NO	NO	NO	NO	NO
Finland	YES	NO	NO	NO	NO	NO	NO
Greece	NO	NO	NO	NO	Unknown	Unknown	Unknown
Guatemala	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Hong Kong (China*)				Unknown			
Iran	YES						
Jordan	YES	YES					YES
Mali	NO	NO	NO	NO	YES	NO	NO
Mexico	Unknown	Unknown	Unknown	NO	NO	NO	YES
Netherlands	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Panama	NO	NO	NO	NO	NO	NO	NO
Paraguay	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Philippines	YES				YES		
Romania	NO	NO	NO	NO	NO	NO	NO
Saudi Arabia					YES	YES	YES
Senegal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Slovak Republic	YES				YES		
South Africa	NO	NO	NO	NO	NO	NO	NO
South Korea	Unknown						
UK	YES						
USA		YES					

*Reporting separately for this report.

governing body or agency making the determination. (Tables 3 and 4) The second question was a new addition to the 2015 questionnaire. Respondents from a total of 64 countries recorded responses to both questions, but the respondent from Israel responded to the first question but not the second, and the respondent from Paraguay responded only to the second. For each of the two questions, respondents from 19 and 21 countries, respectively, replied that the answers to the first and second questions were "unknown". Respondents from 27 countries reported that no recognized point in human development existed in which a human person existed and rights were conferred. However, respondents representing 18 countries did report that such a point had been defined and it ranged from the first day post fertilization (Brazil, Ecuador, Guatemala, Italy, and the UK) to 280 days (the Russian Federation). Where personhood status was conferred, it was most often reported to be achieved through federal or national laws and statutes (24 countries).

Regarding the converse question, pertaining to a point before which personhood is not considered to exist, of the respondents for 44 countries who had entered a yes or no answer, 32 had responded "no" that such a point had not been defined. Of the affirmative responses representing 12 countries, only seven of these had noted a specific time ranging from day 0, the moment of fertilization (Greece, Ireland, and the UK) to 125 days (Jordan).

Discussion

Although a greater number of responses were received for the current survey when compared to the previous one, there were participants and thus countries represented in 2013 that did not provide responses this time. Overall, there did not appear to be many significant changes noted by the respondents over the ensuing three years. Nevertheless, there have been pertinent, noteworthy events that have occurred.

In Surveillance 2013, we noted that the Inter-American Court of Human Rights (IACHR), based in San Jose, Costa Rica had reversed the Cost Rica Constitutional Chamber of the Supreme Court's (Sala IV) 2000 ruling declaring that in vitro fertilization (IVF) was unconstitutional on the basis that it violated the constitutional guarantee to the embryo of the right to life. By July 2013, no action had been taken to make IVF available and compensate the 18 plaintiffs in the original suit as ordered by IACHR. Subsequently, in September 2015, President Luis Guillermo Solis issued an executive decree legalizing IVF and a subsequent government report outlined a process for reinstating IVF services. The executive decree went into effect October 11, 2015 but was subsequently challenged by legislators and the decree was reversed by Sala a month later. The original decree was upheld by IACHR in a report issued February 26, 2016 and currently there are no legal impediments to IVF in Cost Rica. However, it is not clear whether IVF cycles have been performed yet. Costa Rica did not participate in either the 2012 or 2015 Surveillance questionnaires. There have been reports of a high incidence of high order multiple pregnancies attributed to gonadotropin therapy occurring in Costa Rica during the 15 year period in which the ban was in place.

In the USA, several states have attempted to enact "personhood amendments" that seek to confer legal rights and protection to the embryo from the moment of fertilization. The primary intent of these proposed laws has been to restrict access to abortion but they also effectively ban several forms of contraception and have potential profound implications for the practice of IVF, including holding patients and clinicians legally liable for the fate of all in vitro generated embryos. Over the past four years, two federal proposals and over 70 bills from 25 states have been generated with the intent of enacting personhood legislation. To date only two states, Kansas and Missouri, have passed bills with personhood language. Both have evaded being declared unconstitutional by including provisions that make them subject to the USA Constitution and Supreme Court, which has previously upheld the legitimacy of abortion. In addition to the legislative efforts, there have been 13 attempts at ballot initiatives to pass state constitutional amendments. Only Colorado and Mississippi had actual referendums and both measures failed.

Summary

Although IVF appears to be almost universally available and there are no longer extant legal obstacles to its application, there are significant differences among countries in terms of the status and protection that they confer to the embryo. These differences

have been responsible for regional variations in practice patterns (e.g. oocyte vs. embryo cryopreservation) but the current survey does not note significant changes related to status conferred to the embryo by respondents representing their countries. Nevertheless, controversies within many countries regarding the point at which the embryo or fetus should be given legal protection continue unabated.

References

[1] Arias L Human rights court backs Costa Rica's decree on legalizing IVF. Available at: http://www.ticotimes.net/2016/03/01/human-rights-court-validates-executive-decree-rein state-ivf-costa-rica. Accessed August 10, 2016.

[2] Morgan LM IVF ban lifted in Costa Rica: a success for reproductive rights? Available at: http://blogs.plos.org/globalhealth/2016/03/ivf-ban-lifted-in-costa-rica-a-success-for-reproductive-rights/. Accessed August 10, 2016.

[3] "Personhood". Available at: https://rewire.news/legislative-tracker/law-topic/personhood/. Accessed August 10, 2016.

CHAPTER 19: SEX SELECTION

Introduction

Sex selection is used frequently for social reasons, mostly to balance families. It is less often used to prevent transmission of sex-linked inherited genetic disorders [1,2]. Reliable technologies for pre-implantation sex selection did not exist prior to the advent of the assisted reproductive technologies (ART).

In the most recent 2015 questionnaire, four different strategies were surveyed:

- *Preimplantation genetic testing (PGT)-A and PGT-SR (previously PGS):* PGT-A with sex chromosome identification on in vitro fertilization (IVF) embryos is performed and embryos of the desired sex are selected for transfer. IVF with PGT is more precise than other sex selection methods, being successful for the desired sex in up to 99% of cases [2]. Some clinics combine sorting with IVF and PGT to enrich sperm toward X or Y to then obtain larger numbers of embryos of the desired sex [3].
- *PGT-M/ PGT-A and PGT-SR (previously PGD/PGS)*: PGT-M for single gene disorders and PGT-A for embryo/sex selection are frequently combined in tandem [3].
- *Intrauterine Insemination (IUI) with sperm sorting:* Sperm cells are separated by flow cytometry, an automated *in vitro* process that separates sperm into X- or Y-enriched semen for insemination [4].
- *Selective fetal reduction:* Reduction is performed to select embryos of the desired sex.

Analysis of the Survey

Respondents representing 66 countries submitted replies in response to this topic (Tables 1–4 and Charts 1–3).

PGT-A/PGT-SR (Previously PGS)

Sex selection by PGT-A (aneuploidy screening and sex chromosome selection) was reported by respondents to be allowed and performed in 38 countries per statutes, laws, or guidelines. It was reported not to be allowed in 23 countries and its status was reported to not be mentioned in statutes four countries. PGT-A for sex selection in various combinations was reported to be performed in 20 countries. Sex selection by PGT-A was reported to be most often performed in larger university hospital centres and large clinics where the technology is available.

Chapter 19. Table 1

Is Sex Selection and Sex-selective Fetal Reduction Allowed/permitted in your Country?

Country	Pre-implantation Genetic Testing (PGT-M-), Performed in Tandem with PGT-A for Sex Selection	Pre-implantation Genetic Testing (PGT-A for Sex Selection)	Sperm Sorting	Selective Fetal Reduction
Argentina	YES	YES	UNKNOWN	NO
Australia	YES	UNKNOWN	UNKNOWN	UNKNOWN
Austria	YES	NO	NO	YES
Bangladesh	NO	No	no	UNKNOWN
Barbados	NO	NO	NO	NO
Belarus	YES	YES	NO	NO
Belgium	NO	NO	NO	NO
Brazil	YES	NO	UNKNOWN	YES
Bulgaria	NO	NO	YES	YES
Cameroon	NO	NO	NO	YES
Canada	NO	NO	NO	NO
Chile	YES	YES	NO	NO
China	YES	NO	NO	NO
Colombia	YES	YES	UNKNOWN	YES
Czech Republic	NO	NO	UNKNOWN	NO
Denmark	YES	NO	NO	UNKNOWN
Ecuador	YES	YES	YES	UNKNOWN
Estonia	NO	NO	NO	UNKNOWN
Finland	NO	NO	NO	NO
France	YES	NO	NO	NO
Germany	UNKNOWN	UNKNOWN	YES	YES
Greece	YES	YES	UNKNOWN	YES
Guatemala	YES	YES	YES	NO
Hong Kong (China*)	UNKNOWN			
Hungary	NO	NO	NO	YES
India	YES	NO	NO	YES
Iran	YES	YES	UNKNOWN	YES
Ireland	YES	NO	YES	YES
Israel	YES	NO		NO
Italy	NO	NO	NO	NO
Japan	NO	NO	UNKNOWN	UNKNOWN
Jordan	YES	YES	UNKNOWN	NO
Kazakhstan	NO	NO	YES	YES
Malaysia	YES	YES	YES	YES
Mali	NO	NO	NO	NO
Mexico	YES	YES	YES	NO
Netherlands	UNKNOWN	UNKNOWN	UNKNOWN	YES
Nigeria	YES	YES	YES	NO
Norway	NO	NO	NO	YES
Panama	YES	YES	YES	NO
Paraguay	YES	YES	UNKNOWN	NO
Peru	YES	YES	YES	NO
Philippines	NO	NO	NO	NO
Portugal	NO	NO	YES	NO
Romania	NO	NO	NO	NO
Russian Federation	NO	NO	NO	UNKNOWN
Saudi Arabia	YES	YES	YES	YES
Senegal	NO	NO	NO	NO
Singapore	YES	NO	NO	NO
Slovak Republic	NO	NO	NO	NO
South Africa	NO	NO	NO	NO
South Korea	NO	NO	NO	NO
Spain	NO	NO	NO	YES
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	NO	NO	UNKNOWN	UNKNOWN
Switzerland	NO	NO	NO	UNKNOWN
Taiwan (China*)	NO	NO	UNKNOWN	UNKNOWN
Trinidad and Tobago	YES	YES	YES	NO
Tunisia	NO	NO	NO	NO
Turkey	NO	NO	NO	NO
UK	NO	NO	NO	YES
Uruguay	NO	NO	NO	NO
USA	YES	YES	YES	YES
Venezuela	YES	YES	YES	NO

*Reporting separately for this report.

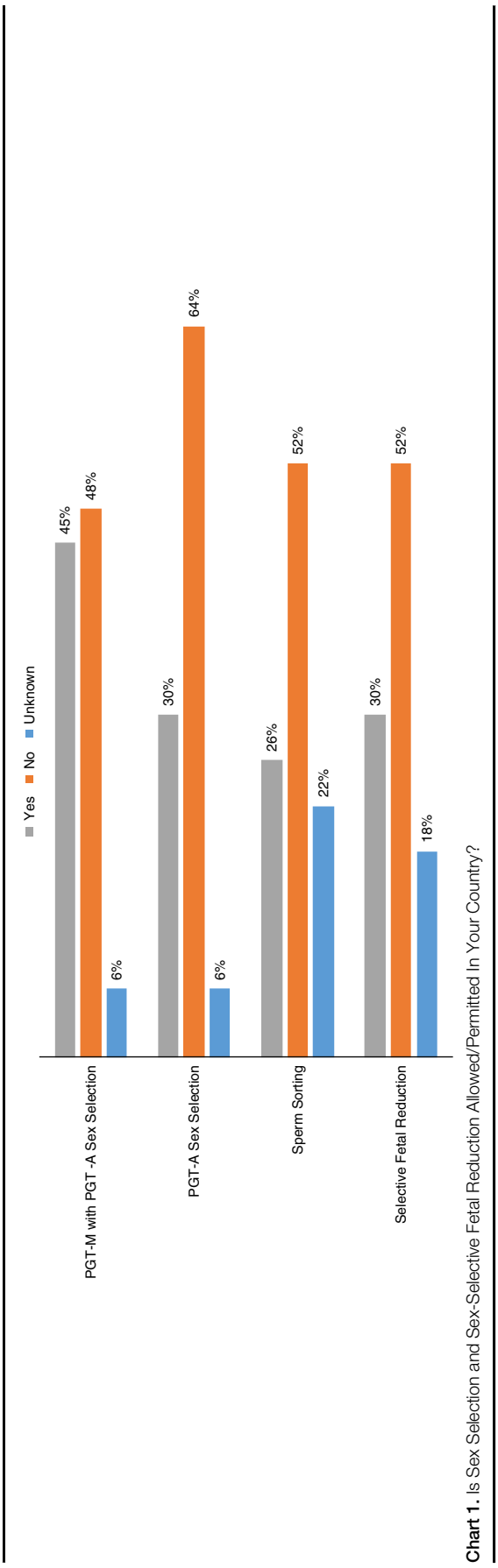


Chart 1. Is Sex Selection and Sex-Selective Fetal Reduction Allowed/Permitted In Your Country?

Chapter 19. Table 2

If Allowed/Permitted, are there Regulations that Govern these Techniques in your Country?

Country	Pre-implantation Genetic Testing (PGT-M with PGT-A Sex Selection)	Pre-implantation Genetic Testing (PGT-A for Sex Selection)	Sperm Sorting	Selective Fetal Reduction
Argentina	NO	NO	UNKNOWN	UNKNOWN
Australia	YES	YES	UNKNOWN	YES
Austria	YES	YES	YES	NO
Bangladesh	NO	NO	NO	NO
Barbados	NO	NO	NO	NO
Belarus	NO	NO	NO	NO
Belgium	NO	NO	NO	YES
Brazil	YES	NO	UNKNOWN	YES
Bulgaria	YES	YES	YES	YES
Cameroon	NO	NO	NO	YES
Canada				UNKNOWN
Chile	NO	NO	NO	NO
China	YES	YES	YES	YES
Colombia	NO	NO	NO	YES
Czech Republic	NO	NO	UNKNOWN	NO
Denmark	YES			
Ecuador	NO	NO	NO	NO
Estonia	YES	YES	YES	UNKNOWN
Finland	YES	YES	YES	YES
France	YES	YES	YES	YES
Germany	YES	YES	NO	YES
Greece	YES	YES	UNKNOWN	YES
Guatemala	NO	NO	NO	YES
Hungary	YES	NO	NO	YES
India	NO	NO	NO	NO
Iran	NO	NO	NO	NO
Ireland	NO	NO	NO	NO
Italy	NO	NO	NO	NO
Japan	YES	YES	UNKNOWN	UNKNOWN
Jordan	NO	NO	NO	UNKNOWN
Kazakhstan	NO	YES	YES	YES
Malaysia	NO	NO	NO	
Mali	NO	NO	NO	NO
Mexico	NO	NO	NO	YES
Netherlands	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Nigeria	YES	YES	YES	NO
Norway	YES	YES	YES	YES
Panama	NO	NO	NO	NO
Paraguay	NO	NO	NO	NO
Peru	NO	NO	NO	NO
Portugal			NO	
Romania	YES	YES	YES	YES
Russian Federation	NO	YES	YES	NO
Saudi Arabia		NO	NO	YES
Singapore	YES			
Slovak Republic	NO	NO	NO	NO
South Africa	YES	YES	YES	YES
Spain	YES	YES	NO	YES
Sri Lanka	NO	NO	NO	NO
Sweden	YES			
Switzerland	YES	YES	YES	YES
Trinidad and Tobago	NO	NO	NO	
Turkey	NO	NO	NO	NO
UK	NO	NO		YES
Uruguay	NO	NO	NO	NO
USA	NO	NO	YES	NO
Venezuela	NO	NO	NO	NO

PGT-M/ PGT-A and PGT-SR (Previously PGD/PGS)

PGT-M for single gene disorders with PGT-A for aneuploidy, embryo selection, and sex chromosome selection are reported to be commonly performed in tandem. PGT-M/PGT-A was reported to be allowed and performed in 38 of the 66 countries with statutes, laws, and guidelines. However, this procedure was reported to not be allowed in 24 countries. The procedure was reported to not be addressed in the statutes of four of these countries. PGT-MA/PGT-A for sex selection in various combinations were reported by respondents to be performed in 20 countries. Sex selection by PGT-M/PGT-A was most often reported to be performed in larger university hospital centres.

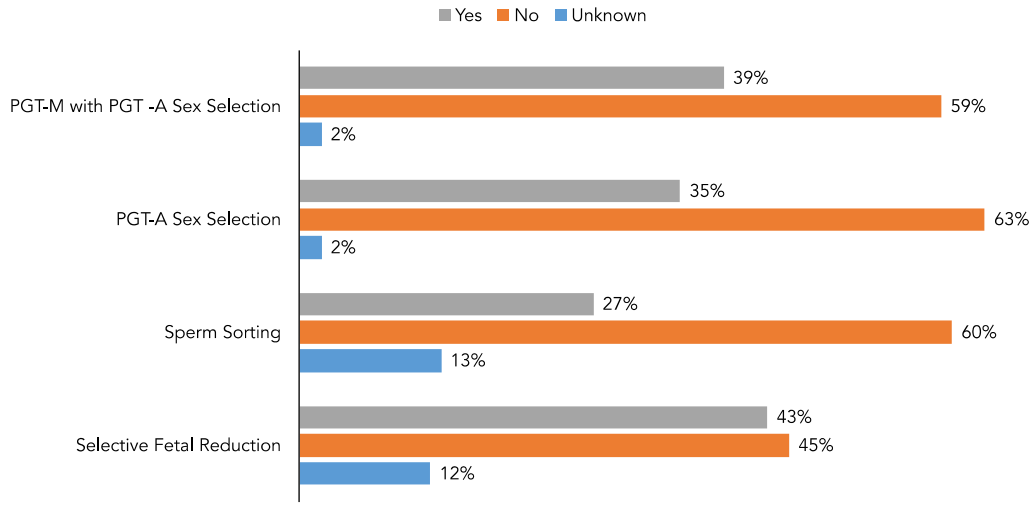


Chart 2. Are There Regulations That Govern These Techniques In Your Country?

Chapter 19. Table 3

If These Techniques are Regulated in your Country, how is it Done?

Country	Pre-implantation Genetic Testing for Sex Selection	Sperm Sorting	Selective Fetal Reduction
Argentina	No regulations Professional Organization Standards/Guidelines	No regulations	Unknown
Australia	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/ Ordinances	State/Provincial/Regional Laws/Statutes/ Ordinances
Austria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines
Bangladesh	No regulations	No regulations	
Barbados	No regulations	No regulations	No regulations
Belarus	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Belgium	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Brazil			Professional Organization Standards/Guidelines
Bulgaria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Canada			Professional Organization Standards/Guidelines
China	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Colombia	No regulations	Unknown	Municipal Laws/Statutes/Ordinances
Czech Republic	Federal/National Laws/Statutes/Ordinances	Unknown	Unknown
Ecuador	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Estonia	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Unknown
Finland	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany	Federal/National Laws/Statutes/Ordinances	No regulations	Federal/National Laws/Statutes/Ordinances
Greece	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Unknown	Federal/National Laws/Statutes/Ordinances
Guatemala	No regulations	No regulations	No regulations
Hungary	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Ireland	No regulations	No regulations	No regulations
Italy	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Japan	Professional Organization Standards/Guidelines	No regulations	No regulations
Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Kenya	No regulations	No regulations	No regulations
Malaysia	No regulations	No regulations	No regulations
Mali	No regulations	No regulations	No regulations
Mexico	No regulations	No regulations	Municipal Laws/Statutes/Ordinances
Netherlands	Unknown	Unknown	Unknown
Nigeria	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	No regulations	No regulations	State/Provincial/Regional Laws/Statutes/ Ordinances
Paraguay	No regulations	No regulations	No regulations
Peru	No regulations	No regulations	No regulations
Romania	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Russian Federation	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations
Saudi Arabia	No regulations	No regulations	

Chapter 19. Table 3

(*Continued*)

Country	Pre-implantation Genetic Testing for Sex Selection	Sperm Sorting	Selective Fetal Reduction
			Religious decree
			Cultural practice
			Professional Organization Standards/Guidelines
South Africa	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations
Spain	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Sri Lanka	No regulations	No regulations	State/Provincial/Regional Laws/Statutes/ Ordinances
Switzerland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Taiwan (China*)		Unknown	Unknown
Trinidad & Tobago	No regulations	No regulations	
		Federal/National Laws/Statutes/Ordinances	
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK			State/Provincial/Regional Laws/Statutes/ Ordinances
USA	No regulations	Agency Regulations/Oversight	No regulations
	Professional Organization Standards/Guidelines		Professional Organization Standards/Guidelines
Venezuela	No regulations	No regulations	No regulations
	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines

*Reporting separately for this report.

Chapter 19. Table 4

Are These Techniques Performed in your Country?

Country	Pre-implantation Genetic Testing for Sex Selection	Sperm Sorting	Selective Fetal Reduction
Argentina	Infrequently Performed	Unknown	Unknown
Australia	Unknown	Unknown	Infrequently Performed
Austria	Never Performed	Never Performed	Infrequently Performed
Bangladesh	Never Performed	Never Performed	Never Performed
Barbados	Never Performed	Never Performed	Never Performed
Belarus	Infrequently Performed	Never Performed	Never Performed
Belgium	Unknown	Unknown	Unknown
Brazil	Unknown	Unknown	Unknown
Bulgaria	Unknown	Commonly Performed	Commonly Performed
Cameroon	Never Performed	Infrequently Performed	Infrequently Performed
Canada	Never Performed	Never Performed	Infrequently Performed
Chile	Infrequently Performed	Never Performed	Never Performed
China	Never Performed	Never Performed	Never Performed
Colombia	Infrequently Performed	Never Performed	Infrequently Performed
Czech Republic	Never Performed	Unknown	Never Performed
Ecuador	Infrequently Performed	Never Performed	Infrequently Performed
El Salvador	Never Performed	Never Performed	Never Performed
Estonia	Unknown	Never Performed	Unknown
Finland	Never Performed	Never Performed	Never Performed
France	Infrequently Performed	Never Performed	Never Performed
Germany	Unknown	Unknown	Infrequently Performed
Greece	Commonly Performed	Unknown	Commonly Performed
Guatemala	Never Performed	Infrequently Performed	Unknown
Hungary	Unknown	Unknown	Infrequently Performed
India		Never Performed	
Iran	Infrequently Performed	Never Performed	Never Performed
Ireland	Infrequently Performed	Infrequently Performed	Infrequently Performed
Israel	Commonly Performed	Infrequently Performed	
Italy	Never Performed	Never Performed	Infrequently Performed
Japan	Unknown	Unknown	Infrequently Performed
Jordan	Infrequently Performed	Infrequently Performed	Unknown
Kazakhstan	Never Performed	Commonly Performed	Infrequently Performed
Kenya	Unknown	Unknown	Unknown
Malaysia	Infrequently Performed	Unknown	Infrequently Performed
Mali	Never Performed	Never Performed	Never Performed
Mexico	Infrequently Performed	Commonly Performed	Unknown
Netherlands	Never Performed	Never Performed	Infrequently Performed
Nigeria	Commonly Performed	Commonly Performed	Infrequently Performed
Norway	Never Performed	Never Performed	Infrequently Performed
Panama	Commonly Performed	Infrequently Performed	Unknown
Paraguay	Infrequently Performed	Never Performed	Unknown

Chapter 19. Table 4

(Continued)

Country	Pre-implantation Genetic Testing for Sex Selection	Sperm Sorting	Selective Fetal Reduction
Peru	Infrequently Performed	Unknown	Unknown
Portugal		Infrequently Performed	
Romania		Infrequently Performed	
Russian Federation	Infrequently Performed	Unknown	Unknown
Saudi Arabia	Commonly Performed	Infrequently Performed	Infrequently Performed
Senegal	Never Performed	Never Performed	Never Performed
Singapore	Never Performed	Never Performed	Never Performed
Slovak Republic	Never Performed	Never Performed	Never Performed
South Africa	Never Performed	Never Performed	Never Performed
South Korea	Never Performed	Unknown	Commonly Performed
Spain	Never Performed	Never Performed	Commonly Performed
Sri Lanka	Unknown	Unknown	Unknown
Sweden	Never Performed	Unknown	Unknown
Switzerland	Never Performed	Never Performed	Never Performed
Taiwan (China*)	Never Performed	Unknown	Unknown
Trinidad and Tobago	Infrequently Performed	Never Performed	Never Performed
Tunisia	Never Performed	Never Performed	Never Performed
Turkey	Never Performed	Never Performed	Unknown
UK	Never Performed	Never Performed	Infrequently Performed
USA	Commonly Performed	Infrequently Performed	Infrequently Performed
Venezuela	Infrequently Performed	Infrequently Performed	Infrequently Performed

*Reporting separately for this report.

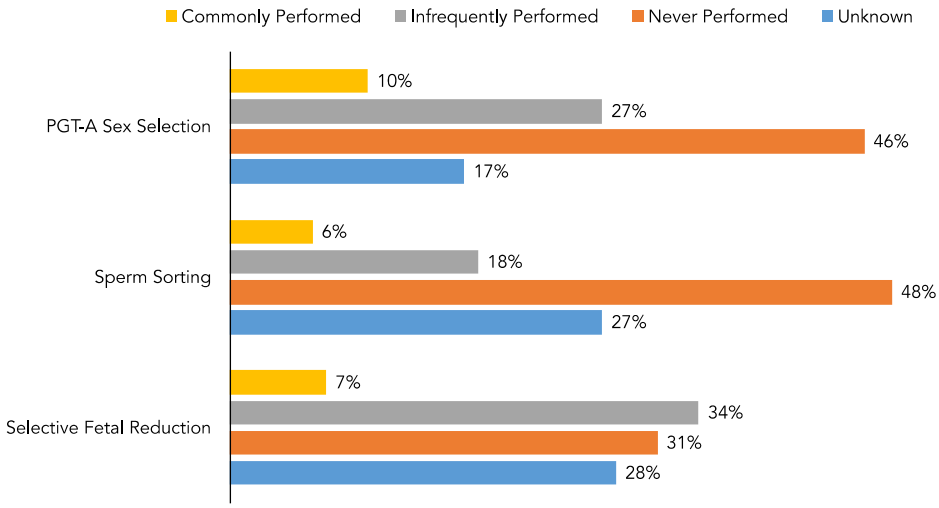


Chart 3. Are These Techniques Performed In Your Country?

IUI with Sperm Sorting

Sex selection by IUI with sperm sorting was reported to be allowed in 19 countries with statutes, laws, or guidelines, and reported to not be allowed in 32 countries. According to the respondents IUI with sperm sorting was not addressed in statutes of 15 countries. Sex selection by IUI with sperm sorting was reported to be performed in 11 countries. Sex selection by IUI with sperm sorting was most often reported to be performed in larger university hospital centres, large clinics, and smaller clinics.

Selective Fetal Reduction

Sex selection by selective fetal reduction was reported to be allowed in 18 of the 66 countries with statutes, laws, and guidelines. However, respondents reported that this procedure was not allowed in 26 countries and was not mentioned in the statutes of 12 countries. Sex selection by selective fetal reduction was reported to be performed in 25 countries. Selective reductions were reported to be performed in all clinical environments ranging from sole practitioner clinics to large university hospital centres.

Sex selection involving these methods was reported by respondents to be governed in 37 of the 66 countries by regulations originating from combinations of federal authorities, provincial authorities, mandated agencies, and professional organizations.

In 24 countries, sex selection was reported to not be governed by specific regulations. Sex selection by PGT was reported to be considered as an established medical practice in 12 of 66

Chapter 19. Table 5

Are there Specific Centres or Institutions where these Techniques are Only Allowed/Permitted to be Performed?

Country	PGS-Sex Selection	Sperm Sorting	Selective Fetal Reduction
Argentina	Unknown	Unknown	Unknown
Austria	Unknown		Unknown
Bangladesh			Small Private physician clinic < 5 physician Sole Practitioner clinic
Belarus	Large, Private physician clinic 5 or > physicians		University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians
Brazil	Unknown	Unknown	Unknown
Bulgaria		Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician	Hospital-based clinic Large, Private physician clinic 5 or > physicians
Cameroon	Unknown		Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician
Chile	Unknown		
Colombia	Sole Practitioner clinic Hospital-based clinic		Sole Practitioner clinic
Denmark			Unknown
Ecuador	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians	Large, Private physician clinic 5 or > physicians
Germany	Unknown	Unknown	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician
Greece	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician	Unknown	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic
Guatemala	Unknown	Small Private physician clinic < 5 physician	Unknown
Hungary	Unknown	Unknown	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic
India			Public Hospital-based Large, Private physician clinic 5 or > physicians
Iran	Unknown	Unknown	Unknown
Ireland			Unknown
Jordan	Public Hospital-based University-based clinic Hospital-based clinic	Public Hospital-based University-based clinic Hospital-based clinic	
Kazakhstan	Sole Practitioner clinic	Sole Practitioner clinic	Sole Practitioner clinic
Mali	Unknown	Unknown	Unknown
Mexico	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic	Unknown
Netherlands	Unknown	Unknown	University-based clinic
Nigeria	Large, Private physician clinic 5 or > physicians		
Panama	Small Private physician clinic < 5 physician	Unknown	Unknown
Paraguay	Unknown	Unknown	Unknown
Peru	Sole Practitioner clinic		
Saudi Arabia	University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians	University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians	University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians
Senegal	Unknown	Unknown	Unknown
South Africa			Large, Private physician clinic 5 or > physicians
South Korea			University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians
Spain			Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians
Sri Lanka	Unknown	Unknown	Unknown
Trinidad & Tobago	Unknown	Unknown	Unknown
UK			Unknown
USA	Public Hospital-based Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic	Public Hospital-based Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic	Public Hospital-based University-based clinic Hospital-based clinic Large, Private physician clinic 5 or > physicians Small Private physician clinic < 5 physician Sole Practitioner clinic
Venezuela	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician	Small Private physician clinic < 5 physician

Chapter 19. Table 6

Are these Techniques Considered Experimental or Part of Established Medical Practice?

Country	Pre-implantation Genetic Testing (PGT-A for Sex Selection)	Sperm Sorting	Selective Fetal Reduction
Argentina	Established medical practice	Unknown	Unknown
Australia	Unknown	Unknown	Established medical practice
Austria	Not addressed	Not addressed	Established medical practice
Bangladesh	Not addressed	Not addressed	Established medical practice
Barbados	Not addressed	Not addressed	Not addressed
Belarus	Experimental	Experimental	Established medical practice
Brazil	Established medical practice	Unknown	Established medical practice
Bulgaria	Not addressed	Established medical practice	Established medical practice
Cameroon	Not addressed	Not addressed	Established medical practice
Canada	Not addressed	Not addressed	Established medical practice
Chile	Not addressed		
China	Unknown	Unknown	Unknown
Colombia	Not addressed	UNKNOWN	Established medical practice
Czech Republic	Not addressed	Unknown	Not addressed
Ecuador	Established medical practice	Established medical practice	Established medical practice
Estonia	Experimental	Unknown	Unknown
Finland	Not addressed	Not addressed	Not addressed
France	Established medical practice	Not addressed	Unknown
Germany	Unknown	Not addressed	Established medical practice
Greece	Established medical practice	Unknown	Established medical practice
Guatemala	Not addressed	Established medical practice	Unknown
Hungary	Experimental	Not addressed	Established medical practice
India	Established medical practice	Not addressed	Established medical practice
Iran	Unknown	Unknown	Established medical practice
Ireland	Not addressed	Not addressed	Established medical practice
Israel	Experimental	Established medical practice	Established medical practice
Italy	Not addressed	Not addressed	Established medical practice
Japan	Unknown	Unknown	Unknown
Jordan	Established medical practice	Established medical practice	
Kazakhstan	Unknown	Established medical practice	Established medical practice
Malaysia	Not addressed	Not addressed	Not addressed
Mali	Experimental	Not addressed	Established medical practice
Mexico	Not addressed	Not addressed	Not addressed
Netherlands	Not addressed	Not addressed	Established medical practice
Nigeria	Established medical practice	Established medical practice	Established medical practice
Norway	Not addressed	Experimental	Not addressed
Panama	Established medical practice	Experimental	Experimental
Paraguay	Not addressed	Not addressed	Not addressed
Peru	Not addressed	Not addressed	Not addressed
Portugal		Experimental	
Romania	Not addressed	Not addressed	Not addressed
Russian Federation	Not addressed	Not addressed	Not addressed
Saudi Arabia	Established medical practice	Not addressed	Established medical practice
Senegal	Unknown	Unknown	Unknown
Slovak Republic	Not addressed	Not addressed	Not addressed
South Africa			Established medical practice
South Korea	Not addressed	Not addressed	
Spain	Not addressed	Not addressed	Established medical practice
Sri Lanka	Established medical practice	Unknown	Unknown
Switzerland	Not addressed	Not addressed	Not addressed
Trinidad and Tobago	Not addressed	Not addressed	Not addressed
Turkey	Not addressed	Not addressed	Not addressed
UK	Not addressed	Not addressed	Established medical practice
USA	Established medical practice	Experimental	Established medical practice
Venezuela	Established medical practice	Established medical practice	Established medical practice

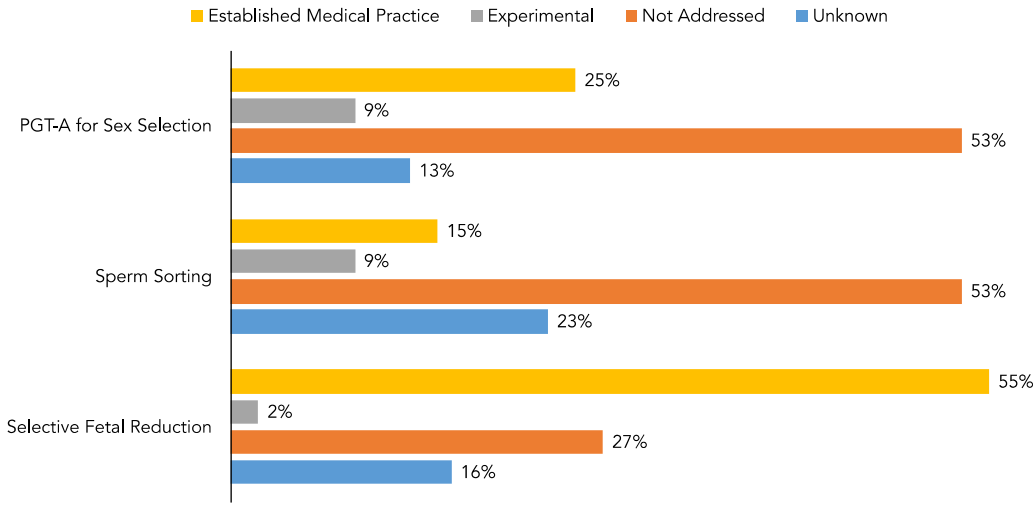


Chart 4. Are These Techniques Performed In Your Country?

countries, experimental in four of 66 countries, and was not reported as either for 50 of 66 countries. Sex selection by IUI with sperm sorting was reported to be considered an established medical practice in eight countries and experimental in five countries. Its status was not reported for 53 countries. Sex selection by selective fetal reduction was reported to be considered as an established medical practice in eight of 66 countries, experimental in five of 66 countries, and not reported for 27 of 66 countries. Sex selection by PGT was reported to be the favored method in most countries.

Discussion

A long-standing debate has surrounded the legitimacy of the sex selection methods evaluated in this survey [1,2]. Historically, it has been customary not to disclose sex selection as a practice. PGT-A appears to be changing this practice and use of this sex selection technology has increased. In Surveillance 2013, sex selection was reported to be permitted by statute in only nine countries and not allowed in 29 others. In Surveillance 2016, sex selection by PGS alone is allowed in 38 of 66 countries.

IVF with PGT-A is the most accurate and reliable method for sex selection because it allows chromosomal identification of preimplantation embryo selection of the desired sex before embryo transfer but it is a relatively expensive procedure.

IUI with sperm sorting with insemination of X- or Y-enriched semen has reported success rates of 75% for boys and 85% for girls [1]. Sperm sorting thus carries considerable risk of having not having a child of the desired sex. Although available by license internationally, sperm sorting was reported to be allowed in 19 of 66 countries but was reported to be performed in only 11 countries. Sex selection by IVF with PGT-A, combined with sorted insemination has been reported as more efficient than PGT-A or sorting alone.

Selective fetal reduction was reported to be openly practiced and performed in 26 of 66 countries even though it was reported to be only officially approved 18 of 66 countries.

Summary

While still controversial, use of sex selection technology has become more widely available and prevalent. Increased demand for sex selection technology is likely to be reflected in future surveys. Sex selection and gender-biased sex selection for nonmedical reasons remains highly controversial. Normal sex ratio at birth should range from 102 to 106 males per 100 females, yet rates in some regions have been reported to be as high as 130. The bias to have a boy can be rooted in social, economic, and cultural values, with a concurrent lower bias against having a girl. Therefore, the Office of the United Nations High Commissioner for Human Rights (OHCHR), the United Nations Population Fund (UNFPA), the United Nations Children's Emergency Fund (UNICEF), United Nations Women, and the World Health Organization (WHO) have generated a UN interagency statement titled *Preventing gender-biased sex selection.*[5]. This joint interagency statement was generated to "reaffirm the commitment of United Nations agencies to encourage and support efforts by States, international and national organizations, civil society and communities to uphold the rights of girls and women and to address the multiple manifestations of gender discrimination including the problem of imbalanced sex ratios caused by sex selection. It thus seeks to highlight the public health and human rights dimensions and implications of the problem and to provide recommendations on how best to take effective action" [5] In a consensus statement, the American Society for Reproductive Medicine (ASRM) Ethics Committee wrote: "Recognizing reasoned differences of opinion, the ASRM Ethics Committee has not reached consensus on whether it is ethical for providers to offer ART for sex selection for nonmedical purposes. Arguments regarding patient autonomy and reproductive liberty have been offered in support of the practice. Risks and burdens of the procedure, gender bias, sex stereotyping and no acceptance of offspring, efforts to guard against coercion, and issues of justice all raise concerns about the practice. Practitioners must take care to ensure that parents are fully informed" [6]

References

[1] Dondorp W, De Wert G, Pennings G, et al. ESHRE Task Force on ethics and Law 20: sex selection for non-medical reasons. Hum Reprod 2013;28(6):1448-1454.
[2] Macklin R The ethics of sex selection and family balancing. Semin Reprod Med 2010;28(4):315-321.
[3] Harper JC, Sengupta SB Preimplantation genetic diagnosis: state of the art 2011. Hum Genet 2012;131(2):175-186.
[4] Garner DL, Evans KM, Seidel GE Sex-sorting sperm using flow cytometry/cell sorting. Methods Mol Biol 2013;927: 279-295.
[5] World Health Organization. Preventing gender-biased sex selection: an interagency statement OHCHR, UNFPA, UNICEF, UN Women and WHO. Available at: http://apps.who.int/iris/bitstream/10665/44577/1/9789241501460_eng.pdf. Accessed August 10, 2016.
[6] Ethics Committee of the American Society for Reproductive Medicine. Use of reproductive technology for sex selection for nonmedical reasons. Fert Steril 2015;103:1418-1422.

CHAPTER 20: FERTILITY PRESERVATION

Utilization of assisted reproductive technology (ART) for fertility preservation in patients facing loss of fertility potential as a result of a malignancy, chronic inflammatory disease, or their treatment is a relatively new application. Increased public awareness of the adverse impact of malignant disease on reproductive potential and the development of new preservation technology has increased demand for fertility preservation services [1]. This need is further enhanced by increased cancer survival rates in reproductive age women hoping to reproduce. The Oncofertility Consortium, a large USA initiative, reported that over 40,000 reproductive age women face loss of fertility from cancer treatment each year [2].

The 2016 survey collected information regarding five principal technologies, which make fertility preservation feasible: oocyte cryopreservation, embryo cryopreservation, ovarian tissue cryopreservation, testicular tissue cryopreservation, and semen cryopreservation [3-6].

Analysis of the Survey (Chapters 1-5)

Oocyte Cryopreservation

Oocyte cryopreservation is allowed in 49 of 66 countries for medical reasons with formal statutes, laws, and guidelines and in 55 of 66 countries for medical reasons. It is not mentioned or is unstated in the statutes of seven of these 66 countries for nonmedical reasons and in two of the 66 for medical reasons. It is

Chapter 20. Table 1

Is Fertility Preservation of Reproductive Tissues Allowed/Permitted in Your Country?

Country	Sperm (Non-medical Indications)	Sperm (Medical Indications)	Oocytes (Non-medical)	Oocytes (Medical Indications)	Pre-implantation Embryos (Non-medical Indications)	Pre-implantation Embryos (Medical Indications)	Ovarian Tissue (Non-medical Indications)	Ovarian Tissue (Medical Indications)	Testicular Tissue (non-medical Indications)	Testicular Tissue (Medical Indications)
Argentina	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Australia	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Austria	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Bangladesh	NO	UNKNOWN	NO	NO	NO	NO	NO	NO	NO	NO
Barbados	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES
Belarus	UNKNOWN	YES	UNKNOWN	YES	NO	YES	NO	YES	NO	YES
Belgium	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Brazil	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bulgaria	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
Cameroon	NO	YES	NO	YES	NO	NO	NO	NO	NO	YES
Canada	YES	YES	YES	YES	YES	YES	UNKNOWN	YES	YES	YES
Chile	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
China	YES	YES	YES	YES	NO	YES	NO	YES	NO	YES
Colombia	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Czech Republic	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Denmark	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES
Ecuador	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES
El Salvador	YES	YES	YES	YES	no	no	no	no	no	No
Estonia	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Finland	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
France	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES
Germany	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES
Greece	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Guatemala	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Honduras	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Hong Kong (China*)		YES		YES	YES	YES		YES		YES
Hungary	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES
India	YES	YES	YES	YES	YES	YES	UNKNOWN	YES	UNKNOWN	YES
Iran	YES	YES	YES	YES	YES	YES	NO	YES	NO	YES
Ireland	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Israel	YES	YES		YES	NO	YES	NO	YES	YES	YES
Italy	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES
Japan	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Jordan	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Kazakhstan	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Malaysia	YES	YES	YES	YES			YES	YES	YES	YES
Mali	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mexico	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Netherlands	UNKNOWN	YES	YES	YES	UNKNOWN	YES	UNKNOWN	YES	UNKNOWN	YES
Nigeria	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
Norway	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Panama	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Paraguay	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Peru	YES	YES	YES	YES	YES	YES	YES	YES		YES
Philippines	YES	YES	YES	YES	YES	YES	NO	YES	NO	YES
Portugal	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES
Romania	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Russian Federation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Saudi Arabia	YES	YES	NO	YES	NO	YES		YES	YES	YES
Senegal	UNKNOWN	YES	UNKNOWN	UNKNOWN		UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Singapore	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES
Slovak Republic	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
South Africa	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
South Korea	YES	YES	YES	YES	YES	YES	UNKNOWN	YES	UNKNOWN	YES
Spain	UNKNOWN	YES	UNKNOWN	YES	NO	YES	UNKNOWN	YES	UNKNOWN	YES
Sri Lanka	UNKNOWN	YES	UNKNOWN	YES	UNKNOWN	YES	UNKNOWN	YES	UNKNOWN	YES
Sweden	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Switzerland	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES
Taiwan (China*)	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
Trinidad and Tobago	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Tunisia		YES		YES		YES		YES		YES
Turkey	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
UK	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Uruguay	NO	YES	NO	NO	NO	NO	NO	NO	YES	YES
USA	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Venezuela	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

*Reporting separately for this report.

prohibited in 11 of the 66 countries for nonmedical reasons and in two of the 66 countries (Uruguay and Bangladesh) for medical reasons. Frozen thawed oocytes are used commonly or infrequently in 50 of the 66 countries for non-medical reasons and in 61 of the 66 countries for medical reasons. Storage limits for cryopreserved oocytes regardless of indication range from no limit to 10 years depending on the country [5] (Table 1).

Embryo Cryopreservation

Embryo cryopreservation is allowed for nonmedical reasons in 40 of the 66 countries with formal statutes, laws, and guidelines and in 56 of 66 for medical indications. It is not mentioned or is not known in the statutes of five of these 66 countries for non-medical reasons and in two of the 66 for medical reasons. It is not

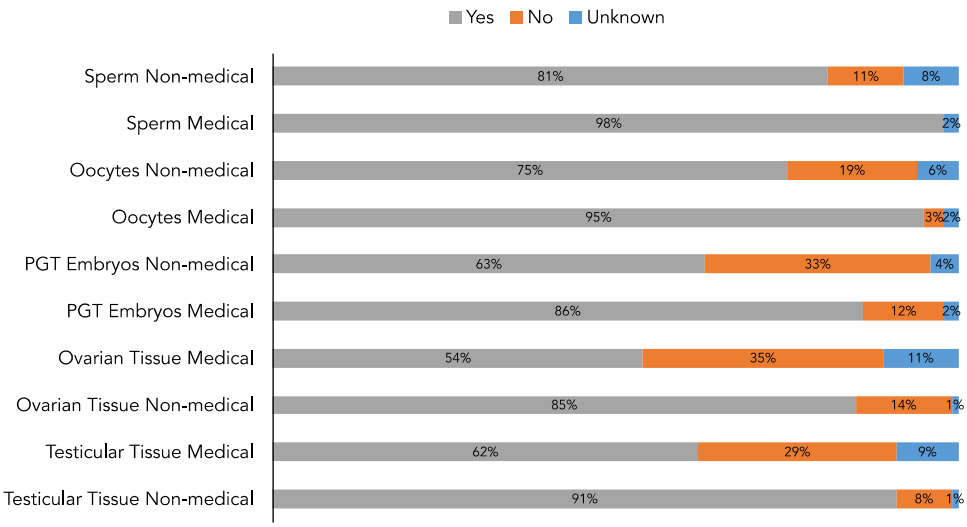


Chart 1. Is Fertility Preservation Allowed/Permitted In Your Country?

permitted in 21 of the 66 countries for non-medical reasons and in eight of the 66 countries for medical indications. Frozen thawed preimplantation embryos are used commonly or infrequently in 49 of the 66 countries for non-medical reasons and in 59 of the 66 countries for medical reasons. Storage limits for preimplantation embryos regardless of indication range from no limit to 10 years depending on the country (Table 2).

Ovarian Tissue Cryopreservation

Ovarian cryopreservation is allowed in 35 of the 66 countries with statutes for non-medical reasons and in 55 of the 66 countries for medical reasons. It is not mentioned in the statutes of 10 of these 66 countries for non-medical reasons and in two of the 66 for medical reasons. Ovarian cryopreservation is prohibited in 21 of the 66 countries for non-medical reasons and in nine of the 66 countries for medical reasons. Frozen ovarian tissue is used commonly or infrequently in 22 of the 66 countries for non-medical reasons and in 54 of the 66 countries for medical reasons. Storage limits for ovarian tissue regardless of indication range from no limit to 10 years depending on the country [3,4] (Table 3).

Testicular Tissue Cryopreservation

Testicular tissue cryopreservation is allowed in 39 of the 66 countries with statutes for non-medical reasons and in 59 of the 66 countries for medical reasons. It is not mentioned in the statutes of 10 of these 66 countries for non-medical reasons and in two of the 66 for medical reasons. Testicular tissue cryopreservation is prohibited in 17 of the 66 countries for non-medical reasons and in five of the 66 countries for medical reasons. Frozen testicular tissue is used commonly or infrequently in 32 of the 66 countries for non-medical reasons and in 39 of the 66 countries for medical reasons. Storage limits for testicular tissue regardless of indication range from no limit to 10 years depending on the country [6]. (Table 4)

Semen Cryopreservation

Semen cryopreservation is allowed in 56 of the 66 countries for non-medical indications and in 65 of the 66 for medical indications. It is not mentioned in the statutes of five of these 66 countries for non-medical indications and in one of 66 for medical indications. It is prohibited in Turkey and Uruguay for non-medical indications and in 0 of 66 for medical indications. Frozen thawed sperm is used commonly or infrequently in 55 of the 66 countries for non-medical reasons and in 62 of the 66 countries for medical reasons. Storage limits for cryopreserved sperm regardless of indication ranges from no limit to 10 years depending on the country. (Table 5)

In countries where cryopreservation of oocytes, ovarian tissue, sperm, testicular tissue, and embryos is permitted for personal reasons, there is governance by federal ordinances in 21, provincial in two, mandated agencies in five, professional organizations in 15, and cultural religious practices in four. In countries where cryopreservation of oocytes, ovarian tissue, sperm, testicular tissue, and embryos is permitted for medical reasons, there is governance by federal ordinances in 39, provincial in one, mandated agencies in seven, professional organizations in 21, and cultural religious practices in four.

Discussion

Currently, in vitro fertilization (IVF) technology combined with embryo or oocyte cryopreservation is the best option for preserving fertility in women. This survey tabulated five technology paradigms commonly embodied into fertility preservation programmes [3,4].

Oocyte Cryopreservation

Oocyte cryopreservation has become an increasingly viable option over the past three years. Its major advantage is that a potential male partner is not needed at the time of oocyte collection. Except for unresolved concerns about future birth rates and insurance coverage, oocyte cryopreservation, as reflected in survey statistics, is a less controversial method of fertility preservation. Oocyte cryopreservation is allowed in all of

Chapter 20. Table 2

Is Fertility Preservation Performed in Your Country?

Country	Sperm (Non-medical Indications)	Sperm (Medical Indications)	Oocytes (Non-medical)	Oocytes (Medical Indications)	Pre-implantation Embryos (Non-medical Indications)	Pre-implantation Embryos (Medical Indications)	Ovarian Tissue (Non-medical Indications)	Ovarian Tissue (Medical Indications)	Testicular Tissue (Non-medical indications)	Testicular Tissue (Medical Indications)
Argentina	Infrequently Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Australia	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used
Austria	Never Performed	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Commonly Used
Bangladesh	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed		Never Performed
Barbados	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Never Performed	Never Performed	Infrequently Used	Infrequently Used
Belarus	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Never Performed		Infrequently Used
Belgium	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Unknown	Commonly Used	Infrequently Used	Commonly Used	Unknown	Commonly Used
Brazil	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Bulgaria	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Commonly Used	Commonly Used	Unknown	Unknown	Unknown	Unknown
Cameroon	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Infrequently Used	Infrequently Used	Never Performed	Never Performed
Canada	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Unknown	Infrequently Used	Unknown	Unknown
Chile	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
China	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
Colombia	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Czech Republic	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Commonly Used
Denmark	Infrequently Used	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
Ecuador	Commonly Used	Commonly Used		Commonly Used	Infrequently Used		Never Performed	Never Performed	Commonly Used	Commonly Used
El Salvador	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Estonia	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Finland	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used
France	Commonly Used	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
Germany	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Never Performed	Infrequently Used	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used
Greece	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Commonly Used
Guatemala	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Never Performed
Honduras	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed
Hong Kong (China*)	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Commonly Used	Commonly Used	Unknown	Infrequently Used	Never Performed	Commonly Used
Hungary	Infrequently Used	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
India	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Unknown	Commonly Used	Unknown	Commonly Used
Iran	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Unknown	Infrequently Used	Unknown	Infrequently Used
Ireland	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Commonly Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed
Israel			Commonly Used	Commonly Used	Commonly Used		Infrequently Used	Commonly Used	Infrequently Used	Commonly Used
Italy	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Never Performed	Never Performed	Commonly Used	Unknown	Unknown
Japan	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Jordan	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
Kazakhstan	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used
Kenya	Unknown	Infrequently Used	Unknown	Infrequently Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Unknown	Unknown
Malaysia	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used			Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Mali	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Never Performed	Never Performed	Infrequently Used	Never Performed
Mexico	Infrequently Used	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Netherlands	Unknown	Commonly Used	Infrequently Used	Infrequently Used	Unknown	Commonly Used	Unknown	Infrequently Used	Unknown	Infrequently Used
Nigeria	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Unknown	Unknown	Unknown	Unknown
Norway	Infrequently Used	Commonly Used	Never Performed	Infrequently Used	Never Performed	Commonly Used	Never Performed	Commonly Used	Never Performed	Infrequently Used
Panama	Unknown	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Never Performed	Never Performed	Never Performed
Paraguay	Infrequently Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed	Commonly Used
Peru	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used		Commonly Used
Philippines	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Infrequently Used	Infrequently Used	Infrequently Used
Portugal	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used			Never Performed	Infrequently Used	Never Performed	Infrequently Used
Romania	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Never Performed	Never Performed
Russian Federation	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Saudi Arabia	Infrequently Used	Commonly Used	Never Performed	Infrequently Used	Infrequently Used	Commonly Used	Never Performed	Unknown	Never Performed	Commonly Used
Senegal	Never Performed	Infrequently Used	Never Performed		Never Performed	Never Performed	Never Performed	Never Performed	Never Performed	Never Performed
Singapore	Infrequently Used	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used	Never Performed	Infrequently Used	Never Performed	Never Performed
Slovak Republic	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
South Africa	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used	Never Performed	Commonly Used
South Korea	Infrequently Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Commonly Used	Unknown	Commonly Used

Spain	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Never Performed	Commonly Used	Never Performed	Infrequently Used
Sri Lanka	Unknown	Infrequently Used	Unknown	Infrequently Used	Unknown	Infrequently Used	Unknown	Infrequently Used	Unknown	Unknown
Sweden	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Never Performed	Commonly Used	Never Performed	Infrequently Used
Switzerland	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Never Performed	Never Performed	Commonly Used	Commonly Used	Commonly Used	Commonly Used
Taiwan (China*)	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Infrequently Used	Commonly Used	Unknown	Unknown	Unknown	Unknown
Trinidad and Tobago	Infrequently Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used		Never Performed	Never Performed	Never Performed	Never Performed
Tunisia	Unknown	Commonly Used	Unknown	Commonly Used	Unknown	Commonly Used	Unknown	Never Performed	Never Performed	Commonly Used
Turkey	Never Performed	Commonly Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used	Never Performed	Infrequently Used
UK	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Uruguay		Commonly Used			Commonly Used	Commonly Used			Commonly Used	Commonly Used
USA	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used	Infrequently Used
Venezuela	Commonly Used	Commonly Used	Commonly Used	Commonly Used	Infrequently Used	Infrequently Used	Unknown	Unknown	Infrequently Used	Infrequently Used

*Reporting separately for this report.

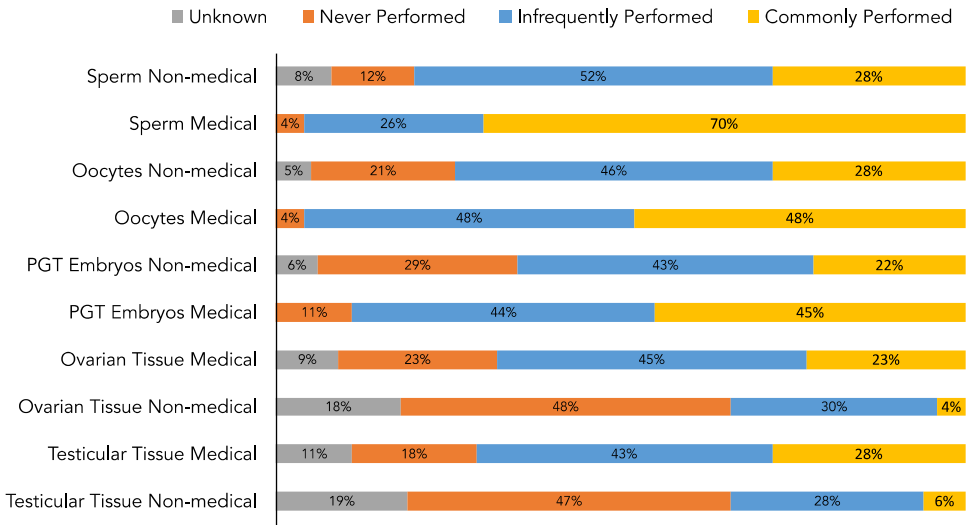


Chart 2. Is Fertility Preservation Performed In Your Country?

Chapter 20. Table 3

If Cryopreservation is Permitted in Your Country, how is Fertility Preservation for the Following Cells and Tissues, for Non-medical Indications, e.g. Deliberate Deferral of Child Bearing for Personal Reasons, Regulated in Your Country?

Country	Sperm	Oocytes	Pre-implantation Embryos	Ovarian Tissue	Testicular Tissue
Argentina	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Australia	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/ Ordinances	Professional Organization Standards/Guidelines Agency Regulations/Oversight State/Provincial/Regional Laws/Statutes/ Ordinances
Austria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Bangladesh	No regulations	No regulations	No regulations	No regulations	No regulations
Barbados	No regulations	No regulations	No regulations	No regulations	No regulations
Belarus	No regulations	No regulations	No regulations	No regulations	No regulations
Belgium	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Brazil	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight
Bulgaria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Cameroon	No regulations	No regulations	No regulations	No regulations	No regulations
Canada	No regulations	No regulations	No regulations	No regulations	No regulations
Chile	No regulations	No regulations	No regulations	No regulations	No regulations
China	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations
Colombia	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Czech Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Ecuador	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines		No regulations Professional Organization Standards/Guidelines
El Salvador	No regulations	No regulations	No regulations	No regulations	No regulations
Estonia	No regulations	No regulations	Federal/National Laws/Statutes/Ordinances	No regulations	No regulations
Finland	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/ Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
France	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Germany	No regulations	No regulations	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	No regulations	No regulations
Greece	No regulations	No regulations	No regulations	No regulations	No regulations
Guatemala	No regulations	No regulations	No regulations	No regulations	No regulations
Honduras	No regulations	No regulations	No regulations	No regulations	No regulations
Hong Kong (China*)			Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	No regulations	No regulations	No regulations	No regulations	No regulations
Ireland	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines	No regulations Professional Organization Standards/Guidelines
Israel	Religious decree Cultural practice Federal/National Laws/Statutes/Ordinances	Religious decree Cultural practice Federal/National Laws/Statutes/Ordinances	Religious decree Cultural practice Federal/National Laws/Statutes/Ordinances	Religious decree Cultural practice Federal/National Laws/Statutes/Ordinances	Religious decree Cultural practice
Italy	No regulations	No regulations	No regulations	No regulations	No regulations
Japan	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Jordan	Religious decree Cultural practice	Religious decree Cultural practice	Religious decree Cultural practice	Religious decree Cultural practice	Religious decree Cultural practice
Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Kenya	No regulations	No regulations	No regulations	No regulations	No regulations
Malaysia	No regulations	No regulations	No regulations	No regulations	No regulations
Mali	No regulations	No regulations	No regulations	No regulations	No regulations
Mexico	No regulations	No regulations	No regulations	No regulations	No regulations
Netherlands	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Nigeria	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	No regulations	No regulations
Panama	No regulations	No regulations	No regulations	No regulations	No regulations
Paraguay	No regulations	No regulations	No regulations	No regulations	No regulations
Peru	No regulations	No regulations	No regulations	No regulations	No regulations
Philippines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Portugal	Agency Regulations/Oversight	Agency Regulations/Oversight		Agency Regulations/Oversight	Agency Regulations/Oversight
Romania	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Russian Federation	No regulations	No regulations	No regulations	No regulations	No regulations
Saudi Arabia	Unknown	Unknown	Unknown	Unknown	Unknown
Senegal	Professional Organization Standards/Guidelines		Professional Organization Standards/Guidelines		
Singapore	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Slovak Republic	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances
South Africa	No regulations	No regulations	No regulations	No regulations	No regulations

Spain	No regulations	No regulations	No regulations	No regulations	No regulations
Sri Lanka	No regulations	No regulations	No regulations	No regulations	No regulations
Sweden	No regulations	No regulations	State/Provincial/Regional Laws/Statutes/ Ordinances	No regulations	Professional Organization Standards/Guidelines
Switzerland	Federal/National Laws/Statutes/Ordinances				
Taiwan (China*)	No regulations	No regulations	Unknown	Unknown	Unknown
Trinidad and Tobago	No regulations	No regulations	No regulations	No regulations	No regulations
Tunisia	No regulations	No regulations	No regulations	No regulations	No regulations
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Uruguay	No regulations				
USA	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Venezuela	No regulations	No regulations	No regulations	No regulations	No regulations
	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines

*Reporting separately for this report.

Chapter 20. Table 4

If Cryopreservation is Allowed in Your Country, how is Fertility Preservation for Medical Indications, (e.g. Malignancies, Required Treatment with or Exposure to Toxic Agents) Regulated?

Country	Sperm	Oocytes	Pre-implantation Embryos	Ovarian Tissue	Testicular Tissue
Argentina	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations
Austria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Bangladesh	Unknown	Unknown	Unknown	Unknown	Unknown
Barbados	No regulations	No regulations	No regulations	No regulations	No regulations
Belarus	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	No regulations	No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations
Belgium	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Brazil	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight
Bulgaria	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Cameroon	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances			No regulations	No regulations
Canada	No regulations	No regulations	No regulations	No regulations	No regulations
Chile	No regulations	No regulations	No regulations	No regulations	No regulations
China				No regulations	No regulations
Colombia	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Czech Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances			
Denmark	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Ecuador	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances
El Salvador	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Estonia	Federal/National Laws/Statutes/Ordinances	Pre-implantation Embryos Federal/National Laws/Statutes/Ordinances		Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Finland	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
France	Unknown	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Unknown

Chapter 20. Table 4

(Continued)

Country	Sperm	Oocytes	Pre-implantation Embryos	Ovarian Tissue	Testicular Tissue
Germany	No regulations	No regulations	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	No regulations	No regulations
Greece	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances	Agency Regulations/Oversight Federal/National Laws/Statutes/Ordinances
Guatemala	No regulations	No regulations	No regulations	No regulations	No regulations
Honduras	No regulations	No regulations	No regulations	No regulations	No regulations
Hong Kong (China*)	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Hungary	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight	Agency Regulations/Oversight
Ireland	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations
Israel	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Italy	No regulations	No regulations	No regulations	No regulations	No regulations
Japan	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Jordan	Religious decree Cultural practice Professional Organization Standards/Guidelines	Religious decree Cultural practice Professional Organization Standards/Guidelines	Religious decree Cultural practice Professional Organization Standards/Guidelines	Religious decree Cultural practice Professional Organization Standards/Guidelines	Religious decree Cultural practice Professional Organization Standards/Guidelines
Kazakhstan	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Kenya	No regulations	No regulations	No regulations	No regulations	No regulations
Malaysia	No regulations	No regulations	No regulations	No regulations	No regulations
Mali	No regulations	No regulations	No regulations	No regulations	No regulations
Mexico	No regulations	No regulations	No regulations	No regulations	No regulations
Netherlands	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Nigeria	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Unknown	Unknown
Norway	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Panama	No regulations	No regulations	No regulations	No regulations	No regulations
Paraguay	No regulations	No regulations	No regulations	No regulations	No regulations
Peru	No regulations	No regulations	No regulations	No regulations	No regulations
Philippines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Portugal	Agency Regulations/Oversight	Agency Regulations/Oversight		Agency Regulations/Oversight	Agency Regulations/Oversight
Romania	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Russian Federation	No regulations	No regulations	No regulations	No regulations	No regulations
Saudi Arabia	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight	Professional Organization Standards/Guidelines Agency Regulations/Oversight
Senegal	Pre-implantation Embryos Professional Organization Standards/Guidelines		Professional Organization Standards/Guidelines		Professional Organization Standards/Guidelines
Singapore	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Slovak Republic	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances
South Africa	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
South Korea					
Spain	No regulations	No regulations	No regulations	No regulations	No regulations
Sri Lanka	No regulations	No regulations	No regulations	No regulations	No regulations
Sweden	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines State/Provincial/Regional Laws/Statutes/ Ordinances Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Switzerland	Federal/National Laws/Statutes/Ordinances				
Taiwan (China*)	No regulations	No regulations	Federal/National Laws/Statutes/Ordinances	Unknown	Unknown
Trinidad & Tobago	No regulations	No regulations	No regulations	No regulations	No regulations
Turkey	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Uruguay	Federal/National Laws/Statutes/Ordinances				
USA	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Venezuela	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations	Professional Organization Standards/Guidelines No regulations

*Reporting separately for this report.

Chapter 20. Table 5

Maximum Duration of Storage Allowed?

Country	Sperm (non-medical indications)	Sperm (medical indications)	Oocytes (non-medical indications)	Oocytes (medical indications)	Pre-implantation embryos (non-medical indications)	Pre-implantation embryos (medical indications)	Ovarian tissue (non-medical indications)	Ovarian tissue (medical indications)	Testicular tissue (non-medical indications)	Testicular tissue (medical indications)
Argentina	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Australia	10 y	10 y	10 y	10 y	Unknown	10 y	Unknown	Unknown	Unknown	Unknown
Austria		Not addressed		Not addressed		10 y		Not addressed		Not addressed
Bangladesh	Unknown	Unknown	Unknown	Unknown	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Barbados	No Limit	No Limit	No Limit	No Limit	5 y	5 y	Not addressed	Not addressed	No Limit	No Limit
Belarus		10 y		10 y		10 y				
Belgium	10 y	10 y	10 y	10 y	5 y	5 y	10 y	10 y	10 y	10 y
Brazil	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Bulgaria	No Limit	No Limit	No Limit	No Limit	Unknown	Unknown	Not addressed	Not addressed	Not addressed	Unknown
Cameroon	Not addressed	Not addressed	Not addressed	Unknown	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Canada	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Chile	No Limit	No Limit	No Limit	No Limit	Not addressed	No Limit	Not addressed	No Limit	Not addressed	No Limit
China	Not addressed	5 y	Not addressed	Not addressed	Not addressed	5 y	Not addressed	Not addressed	Not addressed	Not addressed
Colombia	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Czech Republic	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Denmark	No Limit	No Limit		Not addressed		Not addressed		No Limit		No Limit
Ecuador	No Limit	No Limit	49 y	49 y	49 y	49 y			No Limit	No Limit
Estonia	No Limit	No Limit	No Limit	No Limit	7 y	7 y	No Limit	No Limit	No Limit	No Limit
France	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Germany	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Greece	5 y	5 y	5 y	5 y	5 y	5 y	5 y	5 y	5 y	5 y
Guatemala	No Limit	No Limit	No Limit	No Limit	Not addressed	No Limit	Not addressed	Not addressed	Not addressed	Not addressed
Honduras	5 y	10 y	5 y	10 y	No Limit	No Limit				
Hong Kong (China*)	10 y	10 y	10 y	10 y	10 y	10 y	10 y	10 y	10 y	10 y
Hungary	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	10 y	Not addressed	Not addressed	Not addressed	Not addressed
India	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Iran	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Ireland	No Limit	No Limit	No limit	No Limit	No limit	No limit	No limit	No limit	No limit	No limit
Israel	No Limit	No Limit		No Limit	No Limit	No Limit		No Limit		
Italy	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Japan	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Jordan	Not addressed	Not addressed	Not addressed		Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Kazakhstan	No Limit	No Limit			No Limit	No Limit	No Limit	No Limit	No Limit	
Malaysia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Mali	5 y		5 y		5 y				5 y	
Mexico	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Netherlands	Unknown	No Limit	No Limit	No Limit	Unknown	No Limit	Unknown	No Limit	Unknown	No Limit
Nigeria	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	Not addressed	No Limit	Not addressed	Not addressed
Norway		No Limit		No Limit		5 y		No Limit		No Limit
Panama	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Paraguay	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Peru	No Limit	No Limit		No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Portugal	No Limit	No Limit	No Limit	No Limit			No Limit	No Limit	No Limit	No Limit
Romania	5 y	No Limit	5 y	5 y	5 y	Unknown	Unknown	Unknown	5 y	5 y
Russian Federation	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Saudi Arabia		No Limit		No Limit	No Limit	No Limit	Unknown	Unknown	No Limit	No Limit
Senegal	No Limit	Not addressed	Not addressed	Not addressed	No Limit	Not addressed		Not addressed	No Limit	Not addressed
Singapore	10 y	Not addressed	Unknown	Not addressed	Unknown	Not addressed	Unknown	Not addressed	Unknown	Not addressed
Slovak Republic	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
South Africa	10 y	10 y	10 y	10 y	10 y	10 y	No Limit	No Limit	10 y	10 y
South Korea						Not addressed				
Spain				50 y		50 y				
Sri Lanka	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Sweden	No Limit	56 y	No Limit	45 y	50 y	45 y	Not addressed	Not addressed	Unknown	Not addressed
Switzerland	5 y	No Limit	5 y	No Limit	Not addressed	Not addressed	Not addressed	No Limit	Not addressed	No Limit
Taiwan (China*)	Not addressed	Not addressed	Not addressed	Not addressed	10 y	10 y	Not addressed	Not addressed	Not addressed	Not addressed
Trinidad and Tobago	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Tunisia	Unknown	No Limit	Unknown	No Limit	Not addressed	No Limit	Unknown	Not addressed	Unknown	No Limit
Turkey	5 y	5 y		5 y		5 y		5 y		5 y
UK	10 y	55 y	10 y	55 y	10 y	55 y	No Limit	No Limit	No Limit	No Limit
Uruguay	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
USA	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Venezuela	No Limit	No Limit	No Limit	No Limit	Unknown	Unknown	Unknown	Unknown	No Limit	No Limit

*Reporting separately for this report.

countries surveyed, but laws, regulations, statutes, or guidelines in virtually all countries where it is officially permitted limit its use.

Embryo Cryopreservation

Embryo cryopreservation has been a viable method of fertility preservation for over 25 years. Its major disadvantage is that it requires sperm from a specific male partner to be used at the time of oocyte retrieval for fertilization. Embryo cryopreservation is allowed in all but one country with time limits for storage specified in many of the countries surveyed.

Ovarian Tissue Cryopreservation

Ovarian tissue cryopreservation is an option that has emerged over the past 10 years. Reproductive tissues (ovarian or testicular) can be cryopreserved, as can other tissues such as bone marrow, but there is considerable uncertainty about revitalization after thaw. Successful re-implantation and revascularization of ovarian tissue has been described in a limited number of case reports and many failures have also been reported [5]. Methods of restoring oocyte viability by in vitro maturation of primordial oocytes have been successful in laboratory animals but not for human subjects. Despite these unresolved concerns, ovarian or testicular cryopreservation is practiced as a clinical service in 38 of the 43 countries with statutes, laws, and guidelines where it may be offered as a method of fertility preservation for patients diagnosed with malignant disease.

Testicular Tissue Cryopreservation

Testicular tissue cryopreservation, given the routine use of intracytoplasmic sperm injection (ICSI) with sperm dissected from testicular tissue, is a logical application and is now available as a fertility-sparing paradigm [6].

Semen Cryopreservation

Semen cryopreservation is the traditional and best-established fertility-sparing paradigm now established throughout the world except in a limited number of cultures, which ban this practice.

Summary

Continued increased survival rates of reproductive age cancer patients and increasing expectations of survival in these individuals is likely to fuel expanding international demand for fertility preservations that will be reflected in the next 3-year survey. Fertility preservation for these applications was first assessed in Surveillance 2016 and there are no prior data available for historical comparison.

References

[1] McLaren JF, Bates GW Fertility preservation in women of reproductive age with cancer. Am J Obstet Gynecol 2012;207 (6):455-462.
[2] Woodruff TK Oncofertillity: a grand collaboration between reproductive medicine and oncology. Reproduction 2015;150(3):S1-10.
[3] MACROBUTTON HTMLDirect Meirow D, Roness H, Kristensen SG, et al. Optimizing outcomes from ovarian tissue cryopreservation and transplantation; activation versus preservation. Hum Reprod 2015;30(11): 2453-2456.
[4] Rosendahl M, Greve T, Andersen C The safety of transplanting cryopreserved ovarian tissue in cancer patients: a review of the literature. J Assist Reprod Genet 2013;30(1):11-24.
[5] Argyle CE, Harper JC, Davies MC Oocyte cryopreservation: where are we now? Hum Reprod Update 2016;22(4):440-449.
[6] Picton HM, Wyns C, Anderson RA, et al; ESHRE Task Force On Fertility Preservation In Severe Diseases. A European perspective on testicular tissue cryopreservation for fertility preservation in prepubertal and adolescent boys. Hum Reprod 2015;30(11):2463-2475.

CHAPTER 21: REPORTING MECHANISMS

Assisted reproductive technology (ART) monitoring, reporting, and follow-up are paramount for the delivery of safe and efficient medically assisted reproductive (MAR) care. Reporting mechanisms measure performance but also register trends in time and changes in practice. The impact on overall safety may be noted while collecting important epidemiologic information [1]. Monitoring mechanisms are also utilized for governing, licensing and credentialing individual professionals and clinics and are an integral part of quality control and quality assurance programmes [2]. Finally, reporting and monitoring are essential for long-term follow up of children born via different ART techniques [3]

The respondents from different countries who completed the International Federation of Fertility Societies (IFFS) questionnaire have presented diverse means for reporting mechanisms including obligatory, legally sanctioned reporting and voluntary reporting to governments, non-governmental organizations, or scientific/clinical societies. Several countries have no regulation whatsoever.

Analysis of the Survey

The respondents from a majority of countries who completed the IFFS questionnaire (49/70, 70%) reported that some form of reporting requirement is in place, especially in Europe, Australia, Canada, Israel, South Africa, and some Middle Eastern and Asian countries, where the practice of ART was reported to be controlled by laws. In 10 countries (Australia, Austria, Bulgaria, Canada, Germany, Indonesia, Italy, Russian Federation, Sweden and Switzerland), there is even more than one law (e.g.: national and provincial and/or municipal) addressing the matter. In the USA there are multiple statutes (e.g., national, state, and municipal) that have been reported to be addressing ART. Respondents from 20 countries reported that they have no regulations regarding reporting mechanisms, including some in Latin America (Chile, Colombia, Ecuador, El Salvador, Honduras, Mexico, Paraguay, and Venezuela), the Caribbean (Barbados, Trinidad & Tobago), Africa (Cameroon, Nigeria, Kenya, Senegal), India, and Asia (Myanmar, Philippines, Sri Lanka, and Japan). The respondent from Ireland reported there were no reporting mechanisms. Argentina was reported to have a new, expanded, more detailed ART bill including provisions for reporting mechanisms pending in Parliament after an insurance coverage law was reported to have been passed in 2013 (Table 1 and Chart 1).

Respondents from 16 countries (Australia, Brazil, Bulgaria, China, Denmark, Estonia, Finland, France, Germany, Greece, Guatemala, Indonesia, Iran, Portugal, Romania, USA) reported that ART clinics must report to a governmental agency, and respondents from 31 countries a indicated that reports must be made to a licensing body (in some cases with simultaneous reporting to a governmental agency). Finally, respondents from 46 countries (65.7%) reported that ART clinics must report to a professional organization or scientific society, which represents the most prevalent reporting mechanism in place globally (Table 2 and Chart 2).

The questionnaire also asked respondents about monitoring mechanisms for governance, licensure, or credentialing for centres and for individual professionals (physicians and embryologists). Respondents from a majority of countries (64.2%) reported to have monitoring mechanisms for governance or credentialing of ART centres; respondents from 26 countries (37.1%) reported having monitoring mechanisms applied to individual professionals, including respondents from three countries who reported that monitoring of ART centres does not take place (Canada, Mali and the Netherlands). Respondents from several countries, including Turkey, Austria, and Belgium, reported that there is no

Chapter 21. Table 1

Are there Monitoring Mechanisms for Governance, Licensure or Credentialing in Your Country?

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff
Argentina	YES	YES	YES	YES	YES	YES
Australia	YES	YES	YES	YES	UNKNOWN	UNKNOWN
Austria	YES	NO	YES	NO	YES	NO
Bangladesh	NO	NO	NO	NO	NO	NO
Barbados	NO	NO	NO	NO	NO	NO
Belarus	YES	YES	YES	YES	UNKNOWN	UNKNOWN
Belgium	YES	NO	YES	YES	NO	NO
Brazil	YES	YES	YES	YES	YES	YES
Bulgaria	YES	YES	YES	YES	YES	
Cameroon	NO	NO	NO	NO	NO	NO
Canada	NO	YES	YES	NO	NO	NO
Chile	NO	NO	NO	NO	NO	NO
China	YES	YES	YES	YES	YES	YES
Colombia	YES	NO	NO	YES	YES	NO
Czech Republic	YES	YES	YES	YES	YES	YES
Denmark	YES	UNKNOWN	UNKNOWN	NO	NO	NO
Ecuador	YES	NO	NO	NO	NO	NO
El Salvador	NO	NO	NO	NO	NO	NO
Estonia	YES			YES		YES
Finland	YES	YES	YES	YES	YES	YES
France	YES	NO	NO	YES	YES	NO
Germany	YES	YES	NO	YES	YES	NO
Greece	YES	YES	UNKNOWN	YES	YES	UNKNOWN
Guatemala	NO	NO	NO	NO	NO	NO
Honduras	NO	NO	NO	NO	NO	NO
Hong Kong (China*)	YES	YES				
Hungary	YES	NO	NO	YES	NO	NO
India	YES			YES		
Indonesia	YES	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN
Iran	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Iraq	NO	NO	NO	NO	NO	NO
Ireland	YES	YES	YES	YES	YES	YES
Israel	YES	NO	NO	YES	YES	NO
Italy	YES	NO	NO	YES	NO	NO
Japan	YES	YES	YES	NO	NO	NO
Jordan	NO	NO	NO	NO	NO	NO
Kazakhstan	YES	YES	YES	YES	NO	NO
Kenya	NO	NO	NO	NO	NO	NO
Malaysia	NO	NO	NO	NO	NO	NO
Mali	NO	YES	YES	NO	NO	UNKNOWN
Mexico	YES	NO	NO	YES	NO	NO
Myanmar	NO	NO	NO	NO	UNKNOWN	UNKNOWN
Netherlands	NO	YES	UNKNOWN	YES	YES	NO
Nigeria	NO	NO	NO	NO	NO	NO
Norway	YES	NO	NO	YES	NO	NO
Panama	NO	NO	NO	NO	NO	NO
Paraguay	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO
Philippines	NO	NO	NO	NO	NO	NO
Portugal	YES	NO	NO	YES	NO	NO
Romania	YES	YES		YES		
Russian Federation	YES	NO	NO	NO	NO	NO
Saudi Arabia	YES	YES	YES	YES	YES	YES
Senegal	NO	NO	NO	NO	NO	NO
Singapore	YES	YES	YES	YES	YES	YES
Slovak Republic	YES	YES	YES	YES	YES	YES
South Africa	YES	YES	NO	YES	YES	YES
South Korea	YES			YES		
Spain	YES					
Sri Lanka	NO	NO	NO	NO	NO	NO
Sweden	YES	NO	NO			
Switzerland	YES	YES		YES		
Taiwan (China*)	YES		NO	YES	YES	NO
Trinidad and Tobago	NO	NO	NO	NO	NO	NO
Tunisia	NO	NO	NO	NO	NO	NO
Turkey	YES	NO	YES	YES	YES	NO
UK	YES	YES	YES	YES	YES	YES
Uruguay	YES	NO	NO	YES	NO	NO
USA	YES	YES	YES	YES	YES	YES
Venezuela	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

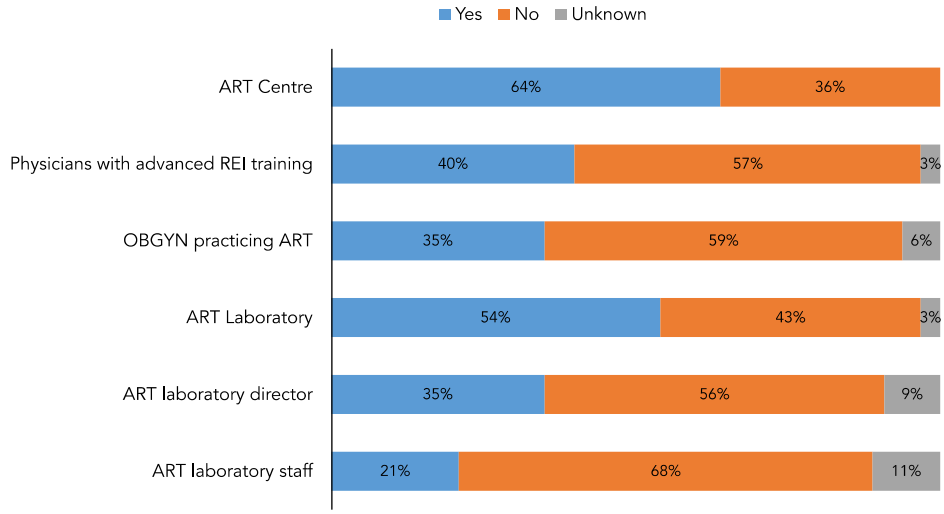


Chart 1. Are There Monitoring Mechanisms In Your Country?

Chapter 21. Table 2

How is ART Monitored in Your Country

Country	No Regulations	Federal/National Laws/ Statutes/Ordinances/Policies	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Licensing Body	Professional Organization Standards/Guidelines
Argentina	NO	YES	YES	NO	NO	YES	YES
Australia	NO	YES	YES	NO	YES	YES	YES
Austria	NO	YES	NO	YES	NO	YES	YES
Bangladesh	NO	NO	NO	NO	NO	NO	NO
Barbados	YES	NO	NO	NO	NO	NO	YES
Belarus	NO	YES	NO	NO	NO	YES	YES
Belgium	NO	YES	NO	NO	NO	NO	NO
Brazil	NO	YES	NO	NO	YES	NO	YES
Bulgaria	NO	YES	NO	YES	YES	YES	YES
Cameroon	YES	NO	NO	NO	NO	NO	YES
Canada	NO	YES	YES	NO	NO	NO	YES
Chile	YES	NO	NO	NO	NO	NO	YES
China	NO	YES	NO	NO	YES	YES	YES
Colombia	YES	NO	NO	NO	NO	NO	YES
Czech Republic	NO	YES	NO	NO	NO	YES	YES
Denmark	NO	YES	NO	NO	YES	YES	YES
Ecuador	YES	NO	NO	NO	NO	NO	YES
El Salvador	YES	NO	NO	NO	NO	NO	NO
Estonia	NO	YES	NO	NO	YES	YES	NO
Finland	NO	YES	NO	NO	YES	YES	YES
France	NO	YES	NO	NO	YES	YES	NO
Germany	NO	YES	YES	NO	YES	YES	YES
Greece	NO	YES	NO	NO	YES	YES	NO
Guatemala	NO	NO	NO	NO	YES	YES	YES
Honduras	YES	NO	NO	NO	NO	NO	NO
Hong Kong (China*)	NO	NO	NO	NO	NO	YES	YES
Hungary	NO	YES	NO	NO	NO	NO	YES
India	YES	NO	NO	NO	NO	NO	YES
Indonesia	NO	YES	YES	YES	YES	YES	YES
Iran	NO	YES	NO	NO	YES	Unknown	Unknown
Iraq	NO	YES	NO	NO	NO	YES	YES
Ireland	YES	NO	NO	NO	NO	NO	YES
Israel	NO	YES	NO	NO	NO	YES	YES
Italy	NO	YES	YES	NO	NO	NO	YES
Japan	YES	NO	NO	NO	NO	NO	YES
Jordan	NO	NO	NO	NO	NO	YES	YES
Kazakhstan	NO	YES	NO	NO	NO	YES	YES
Kenya	YES	NO	NO	NO	NO	NO	NO
Malaysia	NO	NO	NO	NO	NO	NO	NO
Mali	NO	NO	NO	NO	NO	NO	NO
Mexico	YES	NO	NO	NO	NO	NO	NO
Myanmar	YES	NO	NO	NO	NO	NO	NO
Netherlands	NO	YES	NO	NO	NO	YES	YES
Nigeria	YES	NO	NO	NO	NO	NO	YES
Norway	NO	YES	NO	NO	NO	YES	NO
Panama	NO	YES	NO	NO	NO	NO	NO
Paraguay	YES	NO	NO	NO	NO	NO	NO
Peru	NO	NO	NO	NO	NO	NO	NO
Philippines	YES	NO	NO	NO	NO	Unknown	YES
Portugal	NO	YES	NO	NO	YES	YES	NO
Romania	NO	YES	NO	NO	YES	YES	YES
Russian Federation	NO	YES	YES	NO	NO	YES	NO
Saudi Arabia	NO	NO	NO	NO	NO	YES	YES
Senegal	YES	NO	NO	NO	NO	NO	YES
Singapore	NO	NO	NO	NO	NO	YES	NO

Chapter 21. Table 2

(Continued)

Country	No Regulations	Federal/National Laws/ Statutes/Ordinances/Policies	State/Provincial/Regional Laws/Statutes/Ordinances	Municipal Laws/ Statutes/Ordinances	Agency Regulations/ Oversight	Licensing Body	Professional Organization Standards/Guidelines
Slovak Republic	NO	YES	NO	NO	NO	NO	YES
South Africa	NO	YES	NO	NO	NO	NO	YES
South Korea	NO	YES	NO	NO	NO	NO	YES
Spain	NO	YES	NO	NO	NO	NO	YES
Sri Lanka	YES	NO	NO	NO	NO	NO	YES
Sweden	NO	YES	YES	YES	NO	YES	YES
Switzerland	NO	YES	YES	NO	NO	YES	YES
Taiwan (China*)	NO	YES	NO	NO	NO	YES	YES
Trinidad and Tobago	YES	NO	NO	NO	NO	NO	NO
Tunisia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Turkey	NO	YES	NO	NO	NO	NO	NO
UK	NO	YES	NO	NO	NO	YES	YES
Uruguay	NO	YES	NO	NO	NO	NO	NO
USA	NO	YES	YES	NO	YES	NO	YES
Venezuela	YES	NO	NO	NO	NO	NO	YES

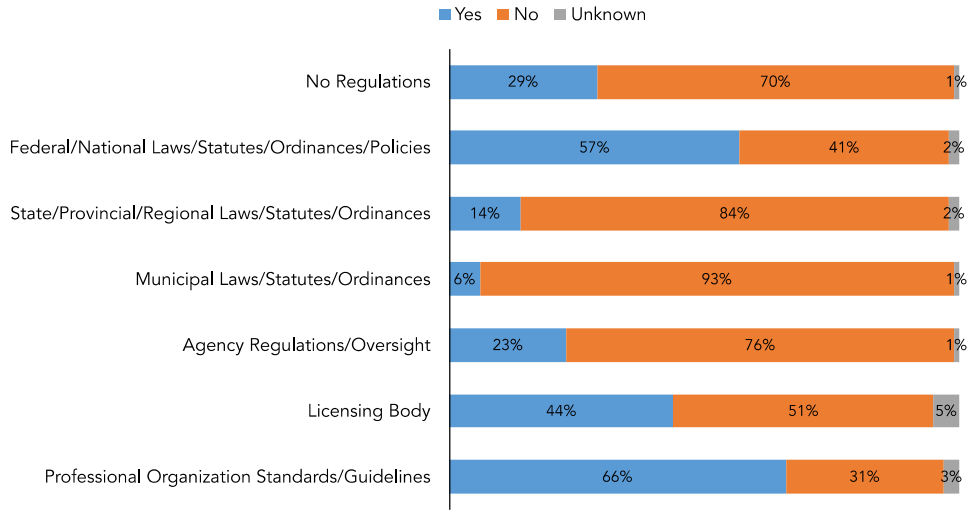


Chart 2. How Is ART Monitored In Your Country?

monitoring of reproductive endocrinologists, but those countries do have monitoring for Obstetrics and Gynecology (OBGYN) physicians dedicated to reproductive care. Respondents from 36 countries reported monitoring of ART laboratory facilities and procedures, including respondents from 35 of the 45 countries (77.8%) reporting as having ART centre monitoring. The respondent from the Netherlands reported that ART centres are not monitored. Finally, respondents from 22 countries reported having monitoring mechanisms for the ART laboratory director, eight of which do not monitor the rest of laboratory personnel (Austria, Colombia, France, Germany, Israel, the Netherlands, Taiwan [China (Reporting separately for this report.)] and Turkey). Table 3a and b show the distribution and use of these monitoring mechanisms around the world.

Table 4a and b show who monitors the adherence to governance, licensure, or credentialing around the world. Adherence to monitoring mechanisms by ART centres was reported to be usually controlled by government officials, or a combination of government officials and agencies (38 of 70 countries, 54.2%). Respondents from nine countries (12.8%) (Austria, France, Greece, Iraq, Ireland, Myanmar, Portugal, South Africa, UK) indicated that the control of this activity was charged to independent agencies, and in Denmark and Japan, by medical officials. Respondents from 11 countries (15.7%) (Bangladesh, Barbados, Cameroon, El Salvador, Guatemala, Malaysia, Nigeria, Senegal, Sri Lanka, Trinidad & Tobago, and Venezuela) reported that there are no mechanisms in place to monitor adherence.

Adherence control in the ART laboratory was similarly distributed, with respondents from 29 countries (41.4%) using government officials or a combination of government officials and agencies. Seven countries (10%) utilized independent agencies, and 13 (18.6%) reported that no mechanisms were in place for checking adherence.

The same trend was observed in the monitoring of adherence control of clinicians, as reported from respondents. Nineteen countries (27.1%) were reported to use governmental officials, independent agencies, or a combination thereof to monitor adherence to regulation. Six countries (8%) were reported to control adherence through independent agencies, 6 (8%) via medical officials, and 16 countries (22.8%) were reported to have no monitoring of adherence.

Chapter 21. Table 3a

How is Monitoring of Governance, Licensure or Credentialing Carried Out?

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	Comments
Argentina	National registry, International Registry Periodic report On-site Inspection Recertification	Other *(Please explain in comments section)*	Other (Please explain in comments section)	Scientific Society (SAMeR) accreditation process
Australia	Periodic report On-site Inspection	National registry	National registry	Self-regulatory accreditation process for clinics, required in a number of states by law. Clinics may be audited, or inspected. Medical practitioners all must be registered under national system of registration, yearly.
Austria	National registry On-site Inspection Recertification		Unknown	
Bangladesh	On-site Inspection	Unknown	Unknown	we do not have regulatory bodies in our country. ART centers are just upcoming and no public hospitals have ART centres. Mostly private hospitals and few practicing physician has started their own.
Barbados			Other (Please explain in comments section)	As all Doctors CME
Belarus	On-site Inspection Recertification	National registry Periodic report On-site Inspection Recertification	National registry Periodic report On-site Inspection Recertification	
Belgium	National registry International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification		National registry International Registry (e.g. ICMART)	
Brazil	National registry Periodic report On-site Inspection Recertification Other (Please explain in comments section)	National registry Periodic report On-site Inspection Recertification Other (Please explain in comments section)	National registry Periodic report On-site Inspection Recertification Other (Please explain in comments section)	REDLARA includes all the procedures while ANVISA, the national registry only check indicators: number of oocytes, fertilization and cleavage rates and Embryo cryopreservation
Bulgaria	Periodic report On-site Inspection	Periodic report On-site Inspection	Periodic report On-site Inspection	
Cameroon				Not yet available
Canada	Other (Please explain in comments section)	Other (Please explain in comments section)		Voluntary participation in a national database of ART outcomes by Canadian clinics. No standard national or provincial monitoring process in place specific to ART. physicians are monitored through respective provincial colleges.
Chile				
China	National registry Periodic report	National registry Periodic report	National registry Periodic report	
Colombia	International Registry (e.g. ICMART) Recertification	International Registry (e.g. ICMART) Recertification		
Czech Republic	National registry Periodic report On-site Inspection Recertification	On-site Inspection	On-site Inspection	
Denmark	National registry On-site Inspection	Unknown	Unknown	
Ecuador	On-site Inspection			
El Salvador	Unknown	Unknown	Unknown	
Estonia	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification			
Finland	National registry Periodic report On-site Inspection	National registry On-site Inspection	National registry On-site Inspection	
France	National registry Periodic report On-site Inspection	Unknown	Unknown	
Germany	National registry International Registry (e.g.	On-site Inspection	Unknown	

Chapter 21. Table 3a

(*Continued*)

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	Comments
	ICMART) Periodic report On-site Inspection			
Greece	Other (Please explain in comments section)	Other (Please explain in comments section)	Unknown	In preparation.
Guatemala	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	Unknown	
Hong Kong (China*)	National registry Periodic report On-site Inspection Recertification	National registry		
Hungary	National registry On-site Inspection	Recertification	Recertification	
India				
Indonesia	National registry International Registry (e.g. ICMART) On-site Inspection Recertification	Recertification	Recertification	
Iran	On-site Inspection	Unknown	Unknown	
Iraq	National registry	National registry	National registry	
Ireland	International Registry (e.g. ICMART)	Recertification	Recertification	
Israel	National registry		Other (Please explain in comments section)	
Italy	National registry On-site Inspection			
Japan	National registry Periodic report Recertification	National registry Recertification	National registry Recertification	
Jordan	Unknown	Unknown	Unknown	
Kazakhstan	Periodic report On-site Inspection	Recertification	Recertification	
Mali				The laws are under review
Mexico	National registry Periodic report On-site Inspection	Recertification		
Myanmar	Recertification	Recertification	Recertification	
Netherlands	On-site Inspection Recertification	Recertification	Unknown	
Nigeria	Unknown	Unknown	Unknown	
Norway	National registry Periodic report On-site Inspection			
Panama	National registry	National registry	National registry	
Peru			National registry	
Philippines	Periodic report	Periodic report		
Portugal	National registry Periodic report On-site Inspection			
Romania	National registry Periodic report On-site Inspection Recertification	Periodic report	Periodic report	
Russian Federation	On-site Inspection			
Saudi Arabia	National registry Periodic report On-site Inspection Recertification	National registry Recertification	National registry Recertification	
Senegal	Periodic report	Periodic report	Periodic report	
Singapore	Periodic report On-site Inspection Recertification	Periodic report On-site Inspection Recertification	Periodic report On-site Inspection Recertification	
Slovak Republic	Periodic report On-site Inspection Recertification Other (Please explain in comments section)			Monitoring by health insurance companies
South Africa	National registry International Registry (e.g. ICMART) On-site Inspection			

Chapter 21. Table 3a

(Continued)

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	Comments
South Korea	Periodic report On-site Inspection			
Spain	National registry On-site Inspection Recertification			
Sweden	National registry Recertification			
Switzerland	National registry Periodic report On-site Inspection Recertification			ART centers include physicians and lab
Taiwan (China*)	National registry Periodic report On-site Inspection Recertification	National registry Recertification	Unknown	
Trinidad and Tobago	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	No monitoring of any kind required for ART. The government only inspects private hospitals to license them. Private practice is not licensed in any way at all.
Tunisia	National registry	On-site Inspection	Unknown	
Turkey	National registry Periodic report On-site Inspection	Unknown	National registry Recertification	
UK	National registry On-site Inspection	Recertification	Recertification	
Uruguay	National registry			
USA	National registry International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	Recertification	Recertification	
Venezuela	International Registry (e.g. ICMART)	Unknown	Unknown	Monitoring is done by the REDLARA in some centers

*Reporting separately for this report.

Chapter 21. Table 3b

How is Monitoring of Governance, Licensure or Credentialing Carried Out?

Country	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff	ART Outcomes	Comments
Argentina	National registry On-site Inspection Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Scientific Society (SAMeR) accreditation process
Australia	On-site Inspection	Unknown	Unknown	Unknown	
Austria		On-site Inspection Recertification		National registry Periodic report	
Bangladesh	Unknown	Unknown	Unknown	Unknown	
Barbados					As all Doctors CME
Belarus	On-site Inspection	On-site Inspection	On-site Inspection	International Registry (e.g. ICMART) Periodic report Unknown	
Belgium	National registry International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification			National registry International Registry (e.g. ICMART)	
Brazil	National registry Periodic report On-site Inspection Recertification Other *(Please explain in comments section)*	National registry Periodic report On-site Inspection Recertification Other *(Please explain in comments section)*	National registry Periodic report On-site Inspection Recertification Other *(Please explain in comments section)*	National registry Periodic report Other *(Please explain in comments section)*	REDLARA includes all the procedures while ANVISA, the national registry only check indicators: number of oocytes, fertilization and cleavage rates and Embryo cryopreservation
Bulgaria	On-site Inspection	On-site Inspection	On-site Inspection	Periodic report On-site Inspection	
Cameroon					Not yet available
Canada		Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Voluntary participation in a national database of ART outcomes by Canadian clinics. No standard national or provincial monitoring process in place specific to ART. physicians are monitored through respective provincial colleges.

Chapter 21. Table 3b

(*Continued*)

Country	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff	ART Outcomes	Comments
China	National registry Periodic report	Periodic report	Periodic report	Periodic report	
Colombia	International Registry (e.g. ICMART) Recertification	International Registry (e.g. ICMART) Recertification	International Registry (e.g. ICMART) Recertification	International Registry (e.g. ICMART) Recertification	
Czech Republic	National registry Periodic report On-site Inspection Recertification	On-site Inspection	On-site Inspection	National registry Periodic report On-site Inspection	
Denmark	Unknown	Unknown	Unknown	Unknown	
Ecuador					
El Salvador	Unknown	Unknown	Unknown	Unknown	
Estonia	On-site Inspection		On-site Inspection	International Registry (e.g. ICMART), Periodic report	
Finland	Periodic report On-site Inspection	On-site Inspection	On-site Inspection	National registry Periodic report On-site Inspection	
France	National registry Periodic report On-site Inspection	Unknown	Unknown	National registry	
Germany	National registry International Registry (e.g. ICMART) Periodic report On-site Inspection	National registry Periodic report On-site Inspection	National registry Periodic report On-site Inspection	National registry Periodic report On-site Inspection	
Greece	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Unknown	Other *(Please explain in comments section)*	In preparation.
Guatemala	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	International Registry (e.g. ICMART) Periodic report On-site Inspection Recertification	
Hungary	On-site Inspection	On-site Inspection	On-site Inspection	National registry	
India	On-site Inspection				
Indonesia	Unknown	Unknown	Unknown	National registry International Registry (e.g. ICMART)	
Iran	Unknown	Unknown	Unknown	Unknown	
Iraq	National registry	National registry	National registry	National registry	
Ireland		Recertification	Recertification	International Registry (e.g. ICMART)	
Israel	On-site Inspection	National registry On-site Inspection	Unknown	National registry	
Italy	National registry On-site Inspection			National registry	
Japan				National registry Periodic report	
Jordan	Unknown	Unknown	Unknown	Unknown	
Kazakhstan	Periodic report	Unknown	Unknown	Periodic report	
Mexico		National registry Periodic report On-site Inspection		Periodic report	
Myanmar	Unknown	Unknown	Unknown	Unknown	
Netherlands	Recertification	Recertification	Recertification	Periodic report	
Nigeria	Unknown	Unknown	Unknown	Unknown	
Norway	Periodic report On-site Inspection			National registry	
Panama	Unknown	Unknown	Unknown	Unknown	
Philippines	Periodic report	Periodic report	Periodic report	On-site Inspection	
Portugal		Unknown		National registry Periodic report On-site Inspection	
Romania	National registry Periodic report On-site Inspection Recertification	Periodic report	Periodic report	National registry Periodic report	
Saudi Arabia	Periodic report On-site Inspection	National registry Recertification	National registry Recertification	Unknown	
Senegal	Periodic report	Periodic report	Periodic report	Periodic report	
Singapore	Periodic report On-site Inspection Recertification	Periodic report On-site Inspection Recertification	Periodic report On-site Inspection Recertification	Periodic report On-site Inspection Recertification	
Slovak Republic	Periodic report On-site Inspection Recertification Other *(Please explain in comments section)*			Periodic report, Other *(Please explain in comments section)*	Monitoring by health insurance companies
South Africa	On-site Inspection Recertification			National registry ,International Registry (e.g. ICMART)	

Chapter 21. Table 3b

(Continued)

Country	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff	ART Outcomes	Comments
South Korea	Periodic report On-site Inspection				
Switzerland					ART centers include physicians and lab
Taiwan (China*)	National registry Periodic report On-site Inspection Recertification	Periodic report	Unknown	National registry Periodic report	
Trinidad and Tobago	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	Other *(Please explain in comments section)*	No monitoring of any kind required for ART. The government only inspects private hospitals to license them. Private practice is not licensed in any way at all.
Tunisia	On-site Inspection	Unknown	Unknown	National registry	
Turkey	National registry Periodic report On-site Inspection	National registry Periodic report On-site Inspection Recertification	National registry On-site Inspection	National registry Periodic report On-site Inspection	
UK	On-site Inspection	Recertification	Recertification	National registry On-site Inspection	
Uruguay	National registry			National registry	
USA	On-site Inspection	Recertification	Recertification	National registry International Registry (e.g. ICMART) Periodic report On-site Inspection	
Venezuela	International Registry (e.g. ICMART)	Unknown	Unknown	International Registry (e.g. ICMART)	

*Reporting separately for this report.

Chapter 21. Table 4a

Who Monitors the Adherence of Governance, Licensure or Credentialing in Your Country?

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	Comments
Argentina	Government Employees Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Scientific Society (SAMeR) accreditation process
Australia	Government Employees Independent Agencies	Government Employees Medical Officials	Government Employees Medical Officials	
Austria	Independent Agencies		Government Employees	
Bangladesh	No one	No one	No one	No monitoring mechanism has been established as yet
Barbados	No one	No one	Medical Officials	Barbados Medical Council
Belarus	Government Employees Medical Officials	Medical Officials	Medical Officials	
Belgium	Government Employees		Government Employees	Government employees are from AFMPS and SPF
Brazil	Government Employees Other (Please explain in comments section)	Government Employees Other (Please explain in comments section)	Government Employees, Other (Please explain in comments section)	REDLARA includes all the procedures while ANVISA, the national registry only check indicators: number of oocytes, fertilization and cleavage rates and Embryo cryopreservation
Bulgaria	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Cameroon	No one	No one	No one	
Canada	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Where license is tied to funding, the provincial health authority will monitor. A voluntary program to test lab staff knowledge and competence is being implemented through CFAS. Clinics voluntarily report and track ART outcomes in a national database
China	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Colombia	Unofficial Agencies	Unofficial Agencies	Unknown	
Czech Republic	Government Employees	Government Employees		
Denmark	Medical Officials	No one	No one	
Ecuador	Government Employees Independent Agencies	Independent Agencies	Independent Agencies	
El Salvador	No one	No one	No one	
Estonia	Government Employees			
Finland	Government Employees	Government Employees	Government Employees	
France	Independent Agencies	Medical Officials	Medical Officials	
Germany	Government Employees Medical Officials	Government Employees Medical Officials	Unknown	
Greece	Independent Agencies	Independent Agencies	No one	The National Authority for Medically Assisted Reproduction.
Guatemala	No one	No one	No one	
Hong Kong (China*)	Government Employees	Medical Officials		
Hungary	Government Employees	Government Employees Medical Officials	Medical Officials	
India	Government Employees Other (Please explain in comments section)			ICMR panel
Indonesia	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Iran	Government Employees	Government Employees	Government Employees	
Iraq	Independent Agencies	Government Employees	Government Employees	
Ireland	Independent Agencies	Medical Officials	Medical Officials	
Israel	Government Employees	No one	No one	

Chapter 21. Table 4a

(*Continued*)

Country	ART Centers	Physicians with Advanced REI Training	OB/GYN Physicians who Practices ART	Comments
Italy	Government Employees	No one	No one	
Japan	Medical Officials	Medical Officials	Medical Officials	
Jordan				Self monitoring by hospital medical directors
Kazakhstan	Government Employees	Government Employees No one	Government Employees No one	
Malaysia	No one	No one	No one	
Mali	Government Employees Other (Please explain in comments section)	Government Employees Other (Please explain in comments section)	Government Employees Other (Please explain in comments section)	The College of Physicians and Pharmacists
Mexico	Government Employees	Unofficial Agencies		
Myanmar	Independent Agencies	Independent Agencies	Independent Agencies	
Netherlands	Unknown No one	Unknown	Unknown No one	
Nigeria	No one	No one	No one	
Norway	Government Employees			
Panama	Government Employees	Government Employees	Government Employees	
Philippines	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	The ART arm of PSRM
Portugal	Independent Agencies	No one	No one	
Romania	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Russian Federation	Government Employees			
Saudi Arabia	Government Employees Medical Officials	Independent Agencies	No one	
Senegal	No one	No one	No one	
Singapore	Government Employees Independent Agencies	Government Employees Independent Agencies	Government Employees Independent Agencies	Re-accreditation also undertaken by the Reproductive Technologies Accreditation Committee (RTAC) of Australia and New Zealand
Slovak Republic	Government Employees Medical Officials Other (Please explain in comments section)	Government Employees Medical Officials	Government Employees Medical Officials	Health insurance companies
South Africa	Independent Agencies	Independent Agencies	No one	
South Korea	Government Employees			
Spain	Government Employees			
Sri Lanka	No one	No one	No one	No special licensing system.
Sweden	Government Employees			
Switzerland	Government Employees Medical Officials Independent Agencies			ART centers include physicians and lab
Taiwan (China*)	Government Employees	Medical Officials	Unknown	
Trinidad and Tobago	No one	No one	No one	
Tunisia	Government Employees	No one	No one	
Turkey	Government Employees Medical Officials	Government Employees	Government Employees Medical Officials	
UK	Independent Agencies Other (Please explain in comments section)	Independent Agencies	Independent Agencies	Inspection and licensing of ART is performed by the HFEA. Professional Bodies deal with the training and revaluation of staff.
Uruguay	Government Employees			
USA	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Venezuela	No one	No one	No one	

*Reporting separately for this report.

Chapter 21. Table 4b

Who Monitors the Adherence of Governance, Licensure or Credentialing in Your Country?

Country	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff	ART Outcomes	Comments
Argentina	Government Employees Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Scientific Society (SAMeR) accreditation process
Australia	Government Employees Independent Agencies	Unknown	Unknown	Unknown	
Austria	Independent Agencies	Independent Agencies	Independent Agencies	Government Employees	
Bangladesh	No one	No one	No one	No one	No monitoring mechanism has been established as yet
Barbados	No one	No one	No one	No one	Barbados Medical Council
Belarus	Government Employees,Medical Officials	Medical Officials	Medical Officials	Medical Officials	
Belgium	Government Employees				Government employees are from AFMPS and SPF
Brazil	Government Employees, Other (Please explain in comments section)	Government Employees, Other (Please explain in comments section)	Government Employees, Other (Please explain in comments section)	Government Employees, Other (Please explain in comments section)	REDLARA includes all the procedures while ANVISA, the national registry only check indicators: number of oocytes, fertilization and cleavage rates and Embryo cryopreservation
Bulgaria	Government Employees,Medical Officials	Government Employees, Medical Officials	Government Employees, Medical Officials	Government Employees, Medical Officials	
Cameroon	No one	No one	No one	No one	
Canada	No one	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Where license is tied to funding, the provincial health authority will monitor. A voluntary program to test lab staff knowledge and competence is being implemented through CFAS. Clinics voluntarily report and track ART outcomes in a national database
China	Government Employees,Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Colombia	Medical Officials Unofficial Agencies	Unofficial Agencies	Unofficial Agencies	Unofficial Agencies	

Chapter 21. Table 4b

(Continued)

Country	ART Laboratory	ART Laboratory Director	ART Laboratory Technical Staff	ART Outcomes	Comments
Czech Republic	Government Employees	Government Employees	Government Employees	Government Employees Medical Officials	
Denmark	No one	No one	No one	No one	
Ecuador	Independent Agencies	Independent Agencies	Independent Agencies	Independent Agencies	
El Salvador	No one	No one	No one	No one	
Estonia	Government Employees		Government Employees	Government Employees	
Finland	Government Employees	Government Employees	Government Employees	Government Employees	
France	Medical Officials	Medical Officials	Medical Officials	Medical Officials	
Germany	Government EmployeesMedical Officials	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	
Greece	Independent Agencies	Independent Agencies	No one	Independent Agencies	The National Authority for Medically Assisted Reproduction.
Guatemala	No one	No one	No one	No one	
Hong Kong					
Hungary	Government Employees	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees	
India	Government Employees,Other (Please explain in comments section)				ICMR panel
Indonesia	Unknown	Unknown	Unknown	Government Employees Medical Officials	
Iran	Government Employees	Government Employees			
Iraq	Medical Officials	Medical Officials	Medical Officials	Unofficial Agencies	
Ireland	Independent Agencies	Independent Agencies	Independent Agencies	Independent Agencies	
Israel	Government Employees	Government Employees	No one	Government Employees	
Italy	Government Employees	No one	No one	Government Employees	
Japan				Medical Officials	
Jordan					Self monitoring by hospital medical directors
Kazakhstan	Government Employees	No one	No one	Other (Please explain in comments section)	Report to Association of reoriductiv medecin
Malaysia	No one	No one	No one	No one	
Mali	Government EmployeesOther (Please explain in comments section)	Government Employees Other (Please explain in comments section)	Government Employees Other (Please explain in comments section)	Government Employees Other (Please explain in comments section)	The college of Physicians and Pharmacists
Mexico	Government Employees			Medical Officials	
Myanmar	Unknown	Unknown	Unknown	Unknown	
Netherlands	Independent Agencies	Unknown	Unknown	No one	
Nigeria	No one	No one	No one	No one	
Norway	Government Employees	Government Employees		Government Employees	
Panama	Unknown	Unknown	Unknown	Unknown	
Philippines	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	Other (Please explain in comments section)	The ART arm of PSRM
Portugal	Independent Agencies	No one	No one	Independent Agencies	
Romania	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees	
Russian Federation					
Saudi Arabia	Medical Officials	Medical Officials	Medical Officials	No one	
Senegal	No one	No one	No one	No one	
Singapore	Government Employees Independent Agencies	Government Employees Independent Agencies	Government Employees Independent Agencies	Government Employees Independent Agencies	Re-accreditation also undertaken by the Reproductive Technologies Accreditation Committee (RTAC) of Australia and New Zealand
Slovak Republic	Government Employees Medical Officials Other (Please explain in comments section)	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials Other (Please explain in comments section)	Health insurance companies
South Africa	Independent Agencies	Independent Agencies	Independent Agencies	Independent Agencies	
South Korea	Government Employees				
Spain					
Sri Lanka	No one	No one	No one	No one	No special licensing system.
Sweden					
Switzerland					ART centers include physicians and lab
Taiwan (China*)	Government Employees	Government Employees	Medical Officials	Government Employees	
Trinidad and Tobago	No one	No one	No one	No one	
Tunisia	Government Employees	No one	Government Employees	Government Employees	
Turkey	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees Medical Officials	Government Employees,Medical Officials	
UK	Other (Please explain in comments section)	Independent Agencies	Independent Agencies	Independent Agencies Other (Please explain in comments section)	Inspection and licensing of ART is performed by the HFEA. Professional Bodies deal with the training and revaluation of staff.
Uruguay	Government Employees			Government Employees	
USA	Government Employees Medical Officials	Government Employees Medical Officials Independent agencies	Government Employees Medical Officials Independent agencies	Government Employees Medical Officials Independent agencies	
Venezuela	No one	No one	No one	No one	

*Reporting separately for this report.

Regarding laboratory personnel, respondents from 17 countries (24.3%) reported the regulation of issues surrounding activities through governmental officials, independent agencies, or a combination thereof Six (8%) use just independent agencies, four rely on medical officials, and 16 countries (22.8%) were reported to have no regulation.

ART outcome monitoring was also addressed in the questionnaire. The majority of countries were reported to rely on

Chapter 21. Table 5

Violations of ART Policies

Country	Have There Been Instances where Violations of National ART Policies have Been Reported?	Are Penalties Designated for Violation of Governance, Licensure or Credentialing?	Describe Penalties
Argentina	No	No	
Australia	Yes	Yes	Can lose registration and therefore entitlement to practice. Doctors can be subject to disciplinary proceedings with various consequences. All units and health professionals subject to the general law and related penalties.
Austria	No	Yes	Money and or closure of clinic
Bangladesh	No	Unknown	
Barbados	No	Yes	registration not renewed if not compliant with CM
Belarus	Unknown	Unknown	
Belgium	Yes	Yes	
Brazil	Yes	Yes	REDLARA- restrictions to the center . changes in accreditation ANVISA- fines, penalties until the closing of the center
Bulgaria	Unknown	Yes	Administrative
Cameroon	No	No	
Canada	Yes	No	
Chile	No	NO	
China	Yes	Yes	1. Fine 2. Be disqualified the ART License
Colombia	NO	YES	Temporary or definite closure
Czech Republic	Yes	Yes	Depending on the severity of violation, the clinic can be (and already was) closed.
Denmark	No	Yes	Fine
Ecuador	Unknown	Unknown	
El Salvador	No	Unknown	
Estonia	No	Yes	Fines. Revocation of license.
Finland	No	Yes	Possibility of fine, losing license
France	No	No	
Germany	Yes	Yes	on site visit, re-visit, in worst case scenarios IVF license is not renewed
Greece	Yes	Yes	Imprisoning, License removal, Financial penalties
Guatemala	No	Unknown	
Honduras		NO	
Hong Kong	Unknown	Yes	Criminal charges against the Person Responsible
Hungary	No	Yes	financial penalties, in serious cases possible withdraw of licenses
India	Unknown	Yes	Sealing lab Suspension of license Imprisonment
Indonesia	No	Yes	ART center will be closed
Iran	Yes	No	
Iraq	No	No	
Ireland	No	No	
Israel	Yes	Yes	court/license
Italy	No	Yes	Fine Suspension of license
Japan	Yes	No	
Jordan	No	No	
Kazakhstan	Yes	Yes	
Kenya		NO	
Malaysia	Unknown	Unknown	
Mali	Unknown	Unknown	
Mexico	No	Unknown	
Myanmar	No	Unknown	
Netherlands	No	Unknown	
Nigeria	No	No	
Norway	No	Yes	Fines, imprisonment, revoke license
Panama	Yes	Yes	Suspension license
Paraguay	No	No	
Peru	No	No	
Philippines	No	Yes	One IVF practitioner was admonished regarding practice of surrogacy which is not acceptable based on the PSRM ethical guidelines.
Portugal	No	Yes	Prosecution if procedures out of legal limits. Fee penalties related to several wrong attitudes
Romania	Yes	Yes	The National Transplant Agency and Health Ministry will revoke the license. Related with how serious is the violation it can go even in court for criminal prosecution .
Russian Federation	Yes	Yes	Unknown
Saudi Arabia	Unknown	Yes	MONEY PAYMENT AND CLOSURE
Senegal	No	No	
Singapore	No	Yes	License may be revoked
Slovak Republic	No	Yes	
South Africa	No	Yes	10 year jail sentence if commit offence against Health Act. Can lose Health professions Council Registration in a specialty if commits a individual offence
South Korea	Unknown	Yes	
Spain	Unknown	Yes	Financial penalties
Sri Lanka		No	
Sweden	No	Yes	
Switzerland	No	Yes	possible imprisonment
Taiwan (China*)	No	Yes	
Trinidad and Tobago	No	No	
Tunisia	No	Unknown	
Turkey	Unknown	Yes	It changes from money penalties to close the center dependent on violation.
UK	No	Yes	All ART is covered by primary legislation and so it is a criminal offence to undertake licensable activities without being licensed.
Uruguay	No	NO	
USA	Yes		
Venezuela	No		

*Reporting separately for this report.

governmental officials and independent agencies (28/70, 40%) for outcome assessments. Four countries were reported to utilize medical officials for monitoring outcomes, and 14 (20%) were reported to have no requirement for follow-up. In many countries, outcomes were reported to also be monitored by professional organizations or scientific societies (including most Latin American countries, which report to the Redlara Society, and specially created licensing and/or regulatory agencies in the UK and Australia). Monitoring of ART centres was carried out with a variety of mechanisms. Respondents from five countries (7.1%; Colombia, Estonia, Guatemala, Ireland and Venezuela) claimed that they reported to an international registry, and respondents from 18 countries (25.7%) claimed that they reported sending results to national registries. Respondents from 11 countries (Argentina, Austria, Belgium, Denmark, Germany, Indonesia, Italy, South Africa, Spain, UK, and the US) reported also having onsite inspections to validate their reports or had periodic reporting. Respondents from six countries (Australia, Bulgaria, Kazakhstan, Singapore, Slovak Republic, and South Korea) noted that monitoring was carried out through periodic reporting and on-site inspection only, and respondents from two countries (Philippines and Senegal) reported use of only periodic reporting. Bangladesh, Belarus, Ecuador, India, Iran, the Netherlands, and The Russian Federation reportedly have only on-site inspection. The respondent from Canada reported that voluntary reporting to a national database was taking place, and the respondent from Greece reported that they were in the process of instituting new regulatory measures.

Monitoring of reproductive endocrinologists and other physicians practicing ART was reported to be performed through national registries in 11 countries (11/70, 15.7%), in 12 countries (17.1%) through on-site inspection or periodic reporting (in some cases jointly with an accreditation process), and in seven cases (10%) through a recertification process. Nine respondents (12.8%) did not know how physicians were monitored.

Monitoring of the ART laboratory followed the same trend as ART centres as a whole, with respondents from 13 countries (18.6%) reporting to a national registry and undergoing on-site inspections and periodic reporting. Five (7.1%) report to international registries and 22 (31.4%) utilize only on-site inspections, periodic reporting, or both.

Respondents from 16 countries (16/70, 22.8%) reported the occurrence of previous violations of national policies pertaining to the practice of ART. These countries include Australia, Belgium, Brazil, Canada, China, Czech Republic, Germany, Greece, Iran, Israel, Japan, Kazakhstan, Panama, Romania, Russian Federation, and the US. Furthermore, respondents from 40 countries (57.1%) reported that there had been no violations and the violation history was reported by respondents from 11 countries (15.7%) as unknown (Table 5).

Respondents from 40 countries (57.1%) reported that specific penalties exist for such violations, and a variety of punishments were reported including financial penalties, loss of accreditation or license to practice, closure of the centre, and criminal charges including fines and imprisonment.

Summary

In brief, monitoring and reporting mechanisms are reported to be in place in most of Europe, Australia, the USA, Southeast Asia, and Latin America. A wide array of mechanisms was reported to be in place to accomplish monitoring and ensure enforcement. These mechanisms include utilization of government officials and independent agencies, but primarily professional organizations and scientific societies. The latter also were reported to play a prominent role in auditing clinical and laboratory outcomes, as well as licensing and certifying ART procedures.

References

[1] European IVF-Monitoring Consortium (EIM); for the European Society of Human Reproduction and Embryology (ESHRE). Kupka MS, D'Hooghe T, Ferraretti AP, et al. Assisted reproductive technology in Europe, 2011: results generated from European registers by ESHRE. Hum Reprod 2016;31(2):233-248.

[2] McTavish A, Akande V, Cutting R, et al. Quality Manual. Incorporating HFEA Standard Licence Conditions. Available at: http://www.hfea.gov.uk/docs/Quality_Manual_June_2011.pdf Accessed August 11, 2016.

[3] Belva F, Roelants M, Painter R, et al. Pubertal development in ICSI children. Hum Reprod 2012;27(4):1156-1161.

CHAPTER 22: SAME SEX AND SINGLE PARENTING POLICIES

Requirement for Recognized or Stable Heterosexual Relationship

Participants were asked whether a couple or an individual was required to be in a recognized or stable heterosexual relationship in order to access in vitro fertilization (IVF) or assisted reproductive technology (ART) services in their country (Table 1). Of the 70 respondents, 36 (51%) responded that there was no such requirement in their country. Thirty-one (44%) responded that there was a requirement for a recognized or stable heterosexual relationship. Three respondents did not know.

Where there did exist a requirement, countries differed on whether such a requirement was found in law, ordinances, guidelines, cultural practice, and/or religious decree. Eighteen of the countries that required a recognized or stable heterosexual relationship reported that this requirement was found in federal or state laws or ordinances. Of these, the Slovak Republic and Jordan also mentioned cultural practice, and Jordan also religious decree. Hong Kong [China (Reporting separately for this report.)] reported the requirement was governed by agency regulation and oversight. Nine countries reported the requirement as stemming from professional organization standards and guidelines, noting that of these, Senegal and Bangladesh also mentioned cultural standards, and Bangladesh and Saudi Arabia also mentioned religious decree. Indonesia and Iran reported their requirement as being found only in religious decree. The Philippines did not report where the requirement came from.

Single, Transgender, and Intersex People, and Same Sex Couple Policies

Introduction

This is the first time data on access to ART by single males or females, transgender, or intersex people, and people in same sex male or female couples, has been comprehensively considered in Surveillance (Table 2).

While Chapter 4 considered the marital status question, this Chapter considers first questions directed at countries that do not

Chapter 22. Table 1

Access to IVF or ART Services

Country	To Access IVF or ART Services in your Country, are a Couple or an Individual Required to be in a Recognized or Stable Heterosexual Relationship?	Are These Requirements Governed by?
Argentina	No requirement	
Australia	No requirement	
Austria	Yes	Federal/National Laws/Statutes/Ordinances
Bangladesh	Yes	Professional Organization Standards/Guidelines Cultural practice Religious decree
Barbados	No requirement	
Belarus	No requirement	
Belgium	No requirement	
Brazil	No requirement	
Bulgaria	No requirement	
Cameroon	Yes	Professional Organization Standards/Guidelines
Canada	No requirement	
Chile	No requirement	
China	Yes	State/Provincial/Regional Laws/Statutes/Ordinances
Colombia	No requirement	
Czech Republic	Yes	Federal/National Laws/Statutes/Ordinances
Denmark	No requirement	
Ecuador	No requirement	
El Salvador	No requirement	
Estonia	No requirement	
Finland	No requirement	
France	Yes	Federal/National Laws/Statutes/Ordinances
Germany	No requirement	
Greece	No requirement	
Guatemala	No requirement	
Honduras	No requirement	
Hong Kong (China*)	Yes	Agency Regulations/Oversight
Hungary	Yes	Federal/National Laws/Statutes/Ordinances
India	Yes	Professional Organization Standards/Guidelines
Indonesia	YES	Religious decree
Iran	Yes	Federal/National Laws/Statutes/Ordinances
Iraq	YES	Religious decree
Ireland	No requirement	
Israel	No requirement	
Italy	Yes	Federal/National Laws/Statutes/Ordinances
Japan	Yes	Professional Organization Standards/Guidelines
Jordan	Yes	Federal/National Laws/Statutes/Ordinances Cultural practice Religious decree
Kazakhstan	Yes	Federal/National Laws/Statutes/Ordinances
Kenya	Unknown	
Malaysia	Yes	Professional Organization Standards/Guidelines
Mali	Yes	Professional Organization Standards/Guidelines Cultural practice
Mexico	No requirement	
Myanmar	Unknown	
Netherlands	No requirement	
Nigeria	No requirement	
Norway	Yes	Federal/National Laws/Statutes/Ordinances
Panama	No requirement	
Paraguay	No requirement	
Peru	No requirement	
Philippines	Yes	
Portugal	Yes	Federal/National Laws/Statutes/Ordinances
Romania	No requirement	
Russian Federation	No requirement	
Saudi Arabia	Yes	Professional Organization Standards/Guidelines Cultural practice Religious decree
Senegal	Yes	Professional Organization Standards/Guidelines Cultural practice
Singapore	Yes	Federal/National Laws/Statutes/Ordinances
Slovak Republic	Yes	Federal/National Laws/Statutes/Ordinances Professional Organization Standards/Guidelines Cultural practice
South Africa	No requirement	
South Korea	Yes	Professional Organization Standards/Guidelines
Spain	No requirement	
Sri Lanka	Unknown	
Sweden	Yes	Federal/National Laws/Statutes/Ordinances
Switzerland	Yes	Federal/National Laws/Statutes/Ordinances
Taiwan (China*)	Yes	Federal/National Laws/Statutes/Ordinances
Trinidad and Tobago	No requirement	
Tunisia	Yes	Federal/National Laws/Statutes/Ordinances
Turkey	Yes	Federal/National Laws/Statutes/Ordinances
UK	No requirement	
Uruguay	No requirement	
USA	No requirement	
Venezuela	No requirement	

*Reporting separately for this report.

Chapter 22. Table 2

If there is no Requirement for an Official or Stable Heterosexual Union, is IVF or ART Services Accessible to?

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
Argentina	YES	NO	YES	NO	NO	NO
Australia	YES	YES	YES	YES	YES	YES
Barbados	YES	NO	YES	NO	NO	NO
Belarus	YES	NO	UNKNOWN	UNKNOWN	UNKNOWN	
Belgium	YES	YES	YES	YES	YES	YES
Brazil	YES	YES	YES	YES	YES	YES
Bulgaria	YES	NO	YES	NO	UNKNOWN	UNKNOWN
Canada	YES	YES	YES	YES	YES	YES
Chile	YES	YES	YES	NO	NO	UNKNOWN
Colombia	NO	NO	NO	NO	NO	NO
Denmark	YES	NO	YES	NO	YES	YES
Ecuador	YES	NO	YES	NO	NO	NO
El Salvador	YES	YES	YES	NO	UNKNOWN	UNKNOWN
Estonia	YES	NO	YES	NO	UNKNOWN	UNKNOWN
Finland	YES	YES	YES	YES	NO	NO
Germany	YES	NO	YES	NO	UNKNOWN	UNKNOWN
Greece	YES	NO	NO	NO	NO	NO
Guatemala	YES	NO	YES	NO	NO	NO
Honduras	YES	YES	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Ireland	YES	YES	YES	YES	YES	YES
Israel	YES	NO	NO	NO	NO	NO
Mexico	YES	YES	YES	YES	YES	YES
Netherlands	YES	UNKNOWN	YES	UNKNOWN	UNKNOWN	UNKNOWN
Nigeria	YES	NO	NO	NO	NO	NO
Panama	YES	NO	YES	NO	NO	NO
Paraguay	YES	YES	YES	YES	YES	YES
Peru	YES	YES	YES	YES	YES	YES
Romania	YES	NO	NO	NO	NO	NO
Russian Federation	YES	NO	UNKNOWN	NO	UNKNOWN	UNKNOWN
South Africa	YES	YES	YES	YES	YES	YES
Spain	YES		YES	NO	YES	YES
Trinidad and Tobago	YES	NO	YES	NO	YES	YES
UK	YES	YES	YES	YES	YES	YES
Uruguay	YES	NO	YES	NO	NO	NO
USA	YES	YES	YES	YES	YES	YES
Venezuela	YES	YES	YES	YES	UNKNOWN	UNKNOWN

have a specified requirement for a stable heterosexual relationship for access to ART or IVF. Thus, 36 countries were asked if single women, single men, same sex female couples, same sex male couples, transgender, and/or intersex people could access ART or IVF services. Questions were also asked of these respondents regarding whether their respective countries recognize the same sex partner of someone who has accessed treatment as the legal parent of any child born as a result.

Following this, analysis of the types of treatments and practices available to single males or females, transgender, or intersex people, and people in same sex male and/or female couples, in *all* responding countries is undertaken. This includes consideration of whether diagnostic evaluation was available, intra-uterine insemination, IVF, pre-implantation genetic diagnosis, pre-implantation genetic screening, donor sperm, eggs and embryos, and consideration of traditional and gestational forms of surrogacy.

Access to ART and IVF in Countries that do Not have a Specified Heterosexual Relationship Requirement

Of the 70 respondents, there were 36 countries that had no requirement for a recognized or stable heterosexual relationship to access IVF or ART. Respondents from these 36 countries were asked if single women, single men, same sex female couples, same sex male couples, transgender, and/or intersex people could access services.

Columbia answered negative to all services, suggesting that while there was no official law, guidance, or religious decree governing such practices in that jurisdiction, single people, people in same sex relationships, transgender and intersex people could not be provided access IVF or ART services.

The other 35 countries all reported that single women would be able to access services. They then varied regarding single men, people in same sex relationships, and transgender or intersex people. Access to IVF or ART services by (Chart 1):

- *Single men* were reported as possible by 16 respondents, with the Netherlands stating it was unknown, and 18 reporting it was not possible;
- *Same sex female couples* were reported as possible by 28 respondents, with three unknown, and four reporting it was not possible;
- *Same sex male couples* were reported as possible by 13 respondents, with three unknown, and 19 reporting it was not possible;

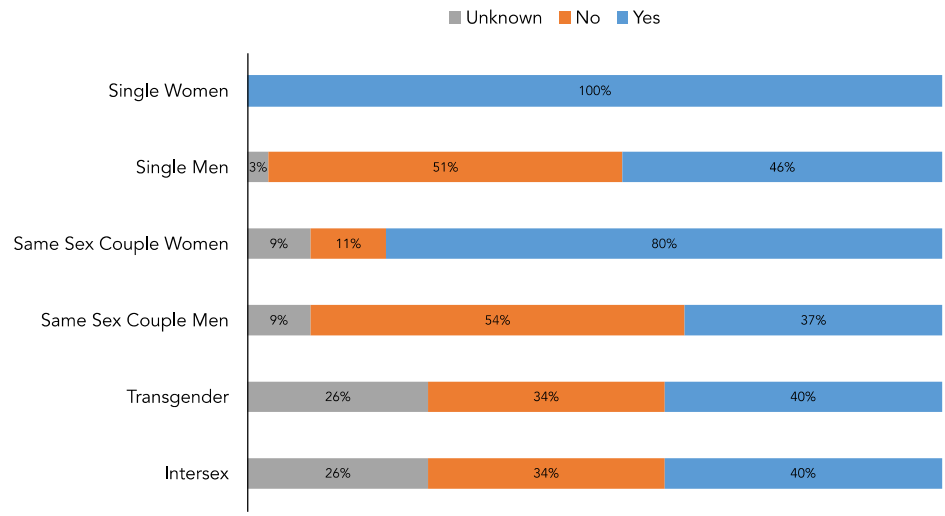


Chart 1. Who Has Access to ART In Your Country?

Chapter 22. Table 3

Does Your Country have Laws that Recognize the Same Sex Partner of a Person Who has Used Assisted Reproduction as a Legal Parent of the Resulting Child?

Country	Same Sex Partner of a Woman	Same Sex Partner of a Man
Argentina	YES	YES
Australia	YES	YES
Austria	YES	NO
Bangladesh	NO	NO
Barbados	NO	NO
Belarus	NO	NO
Belgium	YES	YES
Brazil	YES	YES
Bulgaria	NO	NO
Cameroon	NO	NO
Canada	UNKNOWN	UNKNOWN
Chile	NO	NO
China	NO	NO
Colombia	NO	NO
Czech Republic	NO	NO
Denmark	YES	YES
Ecuador	NO	NO
El Salvador	NO	NO
Estonia	NO	NO
Finland	YES	YES
France	NO	NO
Germany	UNKNOWN	UNKNOWN
Greece	NO	NO
Guatemala	NO	NO
Honduras	NO	NO
Hong Kong (China*)	NO	NO
Hungary	NO	NO
India	NO	NO
Indonesia	NO	NO
Iran	NO	NO
Iraq	NO	NO
Ireland	YES	YES
Israel	YES	NO
Italy	NO	NO
Japan	NO	NO
Jordan	NO	NO
Kazakhstan	NO	NO
Kenya	NO	NO
Malaysia	NO	NO
Mali	NO	NO
Mexico	YES	NO
Myanmar	UNKNOWN	UNKNOWN
Netherlands	YES	YES
Nigeria	NO	NO
Norway	YES	NO
Panama	NO	NO
Paraguay	NO	NO
Peru	NO	NO
Philippines	NO	NO
Portugal	NO	NO
Romania	NO	NO
Russian Federation	NO	NO
Saudi Arabia	NO	NO
Senegal	NO	NO
Singapore	NO	NO
Slovak Republic	NO	NO
South Africa	YES	YES
South Korea	NO	NO
Spain	YES	NO
Sri Lanka	NO	NO
Sweden	YES	YES
Switzerland	NO	NO
Taiwan (China*)	NO	NO
Trinidad and Tobago	NO	NO
Tunisia	NO	NO
Turkey	NO	NO
UK	YES	YES
Uruguay	YES	NO
USA	YES	YES
Venezuela	NO	NO

*Reporting separately for this report.

- *Transgender people* was reported as possible by 14 respondents, with nine unknowns, and 12 reporting it was not possible; and
- *Intersex people* was reported as possible by 14 respondents, with nine unknowns, and 12 reporting it was not possible.

Same Sex Couples: Recognition of Same Sex Partner as Parent of Resulting Child

Participants were also asked whether their country has laws that recognize the same sex partner of a person who has used assisted reproduction as a legal parent of the resulting child (Table 3).

Eighteen countries (52%) recognized the same sex partner of a woman as a legal parent of the resulting child, while 12 (34%) recognized the same sex partner of a man as a legal parent of the resulting child.

Interestingly, this may indicate that although same sex coupled women are permitted to access treatment in a greater number of countries than men in same sex couples, the recognition of legal parentage of the resulting child for both people in the couple did not necessarily follow for women. For men, countries that allow same sex coupled males to access treatment also generally recognize both members of the couple as legal parents.

Types of ART Accessible by Single, Transgender or Intersex People, and Same Sex Female or Male Couples

All respondent countries were also asked questions about access by single, transgender, intersex people, and people in same sex relationships, to certain ART techniques; procedures; egg, sperm and embryo donation practices; and surrogacy (Table 4 and Charts 2–4).

It was reported that none of the above ART treatments or practices are available to single, transgender, or intersex people, or same sex couples in Bangladesh, Colombia, Hong Kong [China (Reporting separately for this report.)], Indonesia, Iraq, Japan, Jordan, Kenya, Mali, Myanmar, Portugal, Sri Lanka, Taiwan [China (Reporting separately for this report.)], or Tunisia. Other procedures varied across countries. It is noteworthy that in many countries some practices are not available to anyone, and it may not just be a matter of relationship status, sex, or gender identity that determines the availability of services. For example, egg donation, embryo donation, and/or surrogacy are prohibited in many countries.

The following is nevertheless useful in considering which services are available and to whom in relation to non-heterosexual relationship status, sex, and/or gender identity.

Diagnostic Evaluation

Twenty four (34%) of the 70 respondent countries reported that diagnostic evaluation was available to all people regardless of relationship status, sex, or gender identity. Many others reported limited and varied availability of diagnostic evaluation to single, transgender or intersex people, and/or same sex female or male couples.

Respondents from Saudi Arabia and Senegal specified diagnostic evaluation being available only for intersex people. In France, it was only reported to be available for transgender people.

Other respondent countries included only single women (Barbados, Greece, Nigeria, and Uruguay); same sex female married couples (Austria and Sweden); single women and same sex women in married relationships (Chile, Ecuador, Estonia, Finland); single women, same sex women in married relationships, and intersex people (the Netherlands); and single women, same sex women in married relationships, intersex, and transgender people (Denmark).

Chapter 22. Table 4

To Whom are Treatments Allowed/Permitted?

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
Argentina	Diagnostic Evaluation IUI IVF Donor Egg Donor Sperm Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI Donor Egg Donor Sperm Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Australia	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Embryos Donor Egg GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC
Austria			Diagnostic Evaluation IUI PGD PGS Donor Sperm			
Barbados	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos					
Belarus	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Belgium	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC
Brazil	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI PGD PGS Donor Sperm Donor Embryos GC Traditional GC
Bulgaria	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Cameroon	Diagnostic Evaluation	Diagnostic Evaluation				
Canada	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor

Chapter 22. Table 4

(*Continued*)

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
	Donor Embryos GC Traditional GC	Donor Embryos GC Traditional GC	Donor Embryos GC Traditional GC	Donor Embryos GC Traditional GC	Donor Embryos GC Traditional GC	Embryos GC Traditional GC
Chile	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos		Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos			
China	Diagnostic Evaluation	Diagnostic Evaluation				
Czech Republic	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Denmark	Diagnostic Evaluation IUI IVF PGD Donor Sperm		Diagnostic Evaluation IUI IVF PGD Donor Sperm		Diagnostic Evaluation IUI IVF PGD Donor Sperm	Diagnostic Evaluation IUI IVF PGD Donor Sperm
Ecuador	Diagnostic Evaluation IUI IVF PGS Donor Sperm		Diagnostic Evaluation IUI IVF PGS Donor Sperm			
El Salvador	Diagnostic Evaluation IUI IVF Donor Sperm Donor Egg	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF Donor Sperm			
Estonia	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos		Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos			
Finland	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos		Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos			
France					Diagnostic Evaluation IUI IVF PGD Donor Egg	Donor Embryos
Germany	Diagnostic Evaluation IUI IVF Donor Sperm	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF Donor Sperm	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Greece	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	GC				
Guatemala	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Honduras	Diagnostic Evaluation IUI IVF Donor Sperm	Diagnostic Evaluation IUI IVF Donor Sperm				

Chapter 22. Table 4

(Continued)

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
	Donor Egg Donor Embryos GC Traditional GC	Donor Egg Donor Embryos GC Traditional GC				
Hungary	Diagnostic Evaluation IUI IVF Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation				
India	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IVF PGD PGS Donor Egg GS - donated ova/ donated sperm				
Iran	Diagnostic Evaluation	Diagnostic Evaluation				
Ireland	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos
Israel	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg	Diagnostic Evaluation PGS Donor Egg Donor Embryos GC Traditional GC				
Italy	Diagnostic Evaluation	Diagnostic Evaluation				
Kazakhstan	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI				
Malaysia	Diagnostic Evaluation	Diagnostic Evaluation				
Mexico	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC	Diagnostic Evaluation IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg GC Traditional GC
Netherlands	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos GC Traditional GC		Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos GC Traditional GC			Diagnostic Evaluation
Nigeria	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC					
Norway						

Chapter 22. Table 4

(*Continued*)

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD Donor Sperm	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Panama	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI	Diagnostic Evaluation IUI IVF	Diagnostic Evaluation IUI IVF	Diagnostic Evaluation	Diagnostic Evaluation
Paraguay	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI	Diagnostic Evaluation IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Peru	Diagnostic Evaluation IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IVF PGS Single Women Donor Sperm Donor Egg Donor Embryos				
Philippines	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation		
Romania	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC
Russian Federation	Diagnostic Evaluation IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation Single Women			Diagnostic Evaluation	Diagnostic Evaluation
Saudi Arabia						Diagnostic Evaluation IUI IVF PGD PGS
Senegal						Diagnostic Evaluation IUI IVF
Singapore	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Slovak Republic	Diagnostic Evaluation	Diagnostic Evaluation			Diagnostic Evaluation	Diagnostic Evaluation
South Africa	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC
South Korea	Diagnostic Evaluation IUI IVF PGD	Diagnostic Evaluation PGD PGS Donor Sperm	Diagnostic Evaluation IUI IVF PGD	Diagnostic Evaluation PGD PGS Donor Sperm	Diagnostic Evaluation IUI IVF PGD	Diagnostic Evaluation IUI IVF PGD

Chapter 22. Table 4

(Continued)

Country	Single Women	Single Men	Same Sex Female Couples	Same Sex Male Couples	Transgender	Intersex Individuals
	PGS Donor Sperm Donor Egg Donor Embryos GC	Donor Egg Donor Embryos GC	PGS Donor Sperm Donor Egg Donor Embryos GS - donated ova/donated sperm	Donor Egg Donor Embryos GC	PGS Donor Sperm Donor Egg Donor Embryos GS - donated ova/donated sperm	PGS Donor Sperm Donor Egg Donor Embryos GC
Spain	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF	Diagnostic Evaluation IUI IVF
Sweden			Diagnostic Evaluation IUI IVF PGD Donor Sperm			
Switzerland	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation	Diagnostic Evaluation
Trinidad and Tobago	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos
Turkey	Diagnostic Evaluation	Diagnostic Evaluation			Diagnostic Evaluation	Diagnostic Evaluation
UK	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD Donor Sperm Donor Egg Donor Embryos
Uruguay	Diagnostic Evaluation IUI IVF Donor Sperm Donor Egg Donor Embryos GC	Diagnostic Evaluation IUI				
USA	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos GC Traditional GC
Venezuela	Diagnostic Evaluation IUI PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI IVF PGD PGS Donor Sperm Donor Egg Donor Embryos	Diagnostic Evaluation IUI PGD PGS Donor Sperm Donor Egg Donor Embryos		

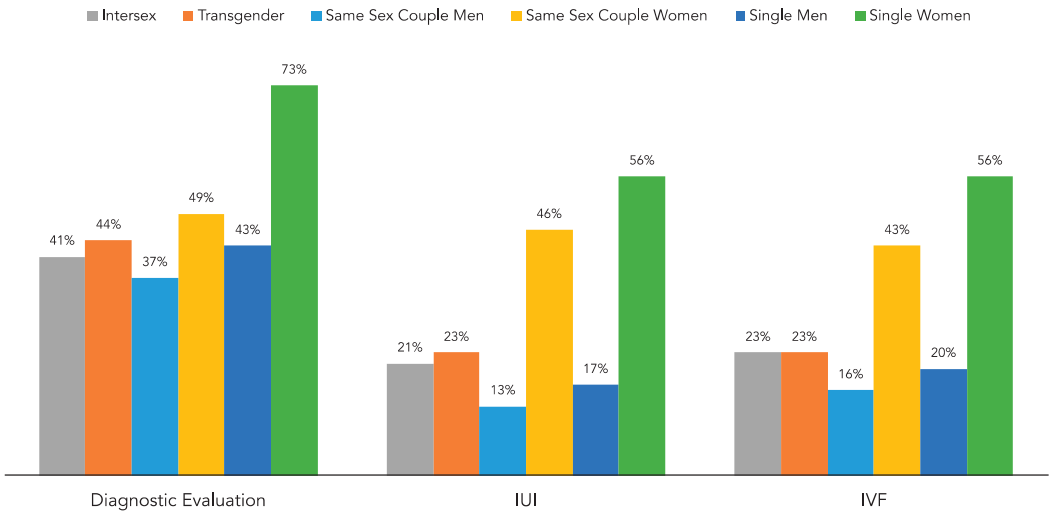


Chart 2. Who Has Access to ART In Your Country?

Cameroon, China, Honduras, Hungary, India, Iran, Israel, Italy, Kazakhstan, Malaysia, and Peru reported diagnostic evaluation as available for single women and single men. El Salvador added to that women in same sex married relationships. The Philippines and Venezuela added to that again by including men in same sex married relationships.

The Russian Federation, Slovak Republic, and Turkey reported that diagnostic evaluation was available in their respective countries to single women, single men, transgender, and intersex people.

Access to diagnostic evaluation by single women was mentioned by 51 (73%) of the respondents; women in same sex relationships by 34 (49%) of the respondents; intersex people by 31 (44%) of the respondents; single men by 30 (43%) of the respondents; transgender people by 29 (41%) of the respondents; and men in same sex relationships by 26 (37%) of the respondents.

Intra-Uterine Insemination (IUI)

Twenty four respondent countries did not report on any availability of IUI for non-heterosexual coupled people. Australia, Belgium, Brazil, Canada, Ireland, Romania, and the UK reported that IUI is available to all people regardless of relationship status, sex, or gender identity. The USA was similar, although did not select same sex male married couples in this section.

Saudi Arabia and Senegal reported its availability for intersex people, whereas France reported for transgender people.

Barbados, Greece, Nigeria, Uruguay, Hungary, India, Israel, Peru, Belarus, and the Russian Federation for single women. Austria, Sweden, and Norway for same sex female married couples. Chile, Ecuador, Estonia, Finland, the Netherlands, El Salvador, Argentina, Bulgaria, Germany, Guatemala, and Paraguay for both single women and women in same sex married couples.

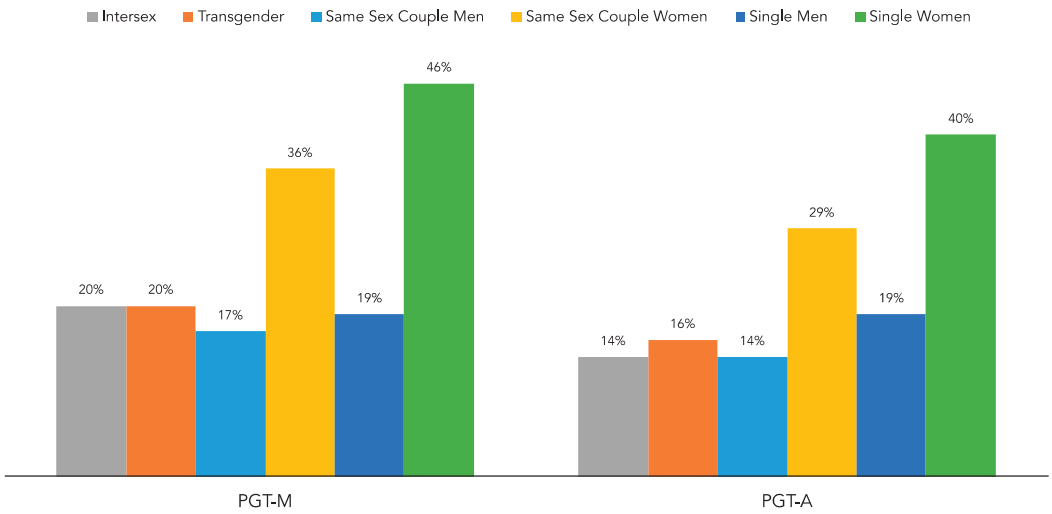


Chart 3. Who Has Access to ART In Your Country?

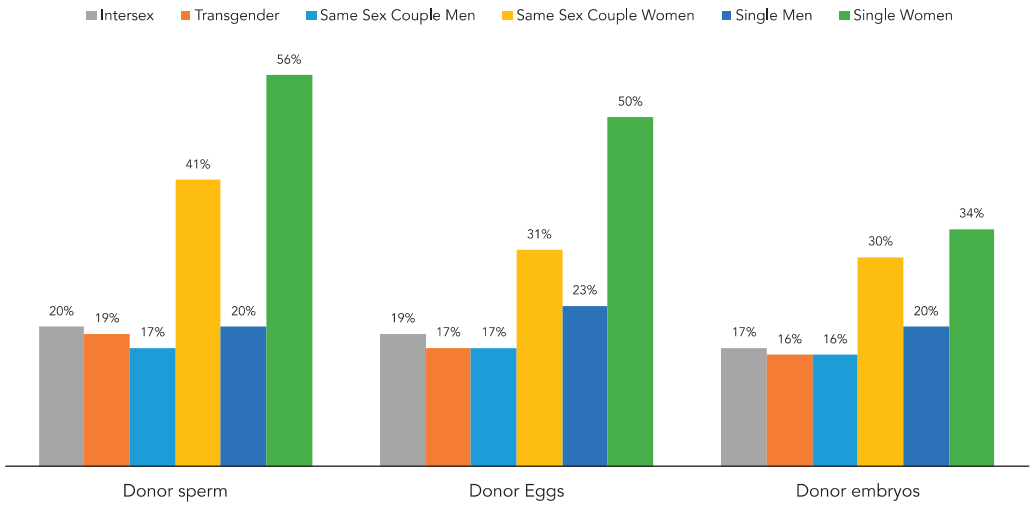


Chart 4. Who Has Access to ART In Your Country?

Denmark, Mexico, South Africa, South Korea, Spain, and Trinidad and Tobago reported IUI for single women and women in same sex married couples, and transgender and intersex people.

Honduras and Kazakhstan reported IUI for single women and single men. Venezuela and Panama adding to single women and men, same sex female and same sex male couples.

Access to IUI by single women was therefore mentioned by thirty nine of the respondents (56%); women in same sex relationships by thirty two of the respondents (46%); intersex people by sixteen of the respondents (23%); transgender people by fifteen of the respondents (21%); single men by twelve of the respondents (17%); and men in same sex relationships by nine of the respondents (13%). Presumably the countries that responded that men may access IUI must be alluding to circumstances in which that male seeks the treatment of a female (e.g., a gestational carrier mother).

In-Vitro Fertilization (IVF)

Twenty five countries (36%) did not select IVF as being available to single people, people in same sex relationships, or transgender or intersex people. In contrast, Mexico, Australia, Belgium, Canada, Ireland, Romania, the UK, and the USA all report the availability of IVF to all such people. The respondent from Brazil also selected all such people, except intersex.

Other respondents selected varied availability of IVF as follows:

Saudi Arabia and Senegal reported its availability for intersex people. France reported for transgender people.

Barbados, Greece, Nigeria, Uruguay, Hungary, Israel, Belarus, the Russian Federation, and Kazakhstan report IVF is available for single women. Austria, Sweden, and Norway for same sex female married couples. Chile, Ecuador, Estonia, Finland, the Netherlands, El Salvador, Argentina, Bulgaria, Germany, Guatemala, and Paraguay for both single women and women in same sex married couples.

Denmark, South Africa, South Korea, Spain, and Trinidad and Tobago reported the availability of IVF for single women and women in same sex married couples, and transgender and intersex people.

India, Peru, and Honduras report the availability of IVF for single women, and single men. Venezuela and Panama report the available of IVF for single women, single men, same sex female married couples, and same sex male married couple.

Access to IVF by single women was therefore mentioned by 39 (56%) of the respondents; women in same sex relationships by 30 (43%) of the respondents; intersex people by 16 (23%) of the respondents; transgender people by 16 (23%) of the respondents; single men by 14 (20%) of the respondents; and men in same sex relationships by 11 (16%). Presumably, the availability of IVF to men would entail them having to enter an arrangement for a woman to carry the pregnancy.

Pre-Implantation Genetic Diagnosis (PGD)

Thirty two (46%) of the 70 respondents did not select PGD as being available to single people, people in same sex relationships, or to transgender or intersex people. Again, it is noteworthy that PGD may also not be available to heterosexual people in some cases as it may not be practiced or may be against the law.

Where availability was selected, it again varied as to whom may access PGD. Respondents from South Africa, South Korea, Brazil, Mexico, Australia, Belgium, Canada, Ireland, Romania, UK, and USA reported its availability to all people regardless of sex, gender identity, or relationship status.

Saudi Arabia reported its availability for intersex individuals. France, for transgender people. Barbados, Greece, Nigeria, Israel, Belarus, the Russian Federation, Kazakhstan, Peru, and Panama reported its availability for single women. Austria, Sweden, and Norway reported PGD is available for same sex women married couples. Chile, Estonia, Finland, the Netherlands, Bulgaria, Guatemala, Paraguay, and Spain reported PGD as available to both single women, and same sex female married couples.

Denmark, and Trinidad and Tobago, reported PGD as available for single women, women in same sex married couples, transgender, and intersex individuals. India reported IVF availability for single women and single men. Venezuela reported availability for single women, single men, same sex female married couples, and same sex male married couples.

Access to PGD by single women was therefore mentioned by 32 (46%) of the respondents; women in same sex relationships by 25 (36%) of the respondents; intersex people by 14 (20%) of the respondents; transgender people by 14 (20%) of the respondents; single men by 13 (19%) of the respondents; and men in same sex relationships by 12 (17%) of the respondents. It should be stated that the circumstances in which PGD is available were not made explicit here, and there may be further conditions, such as risk of passing on a genetic disease, that must be met in some locations.

Pre-Implantation Genetic Screening (PGS)

Thirty nine of seventy respondents (56%) reported that PGS was not available to single, transgender, intersex people, or to people in same sex couples. Again, PGS may or may not be available to heterosexual couples, or permitted at all in these countries.

PGS was reported to be available to all people regardless of relationship status, sex, or gender identity in South Africa, South Korea, Brazil, Mexico, Australia, Belgium, Canada, Romania, and the USA. In Saudi Arabia, PGS was reported to be available to intersex people. In Barbados, Greece, Nigeria, Belarus, the Russian Federation, Kazakhstan, and Panama, it was reported to be available for single women. In Austria, it is available to women in same sex married couples. In Chile, Ecuador, Estonia, Finland, Bulgaria, Guatemala, Paraguay, and Spain it was reported that PGS as available to both single women and women in same sex married couples.

The respondent from Trinidad and Tobago reported PGS as available for single women, women in same sex married couples, transgender individuals, and intersex individuals. In Israel, PGS was reported to be available to single men. It is available to both single women and single men in India and Peru. In Venezuela, PGS was reported as available to single women, single men, women in same sex married couples, and men in same sex married couples.

Access to PGS by single women was therefore mentioned by 28 (40%) of the respondents; women in same sex relationships by 20 (29%) of the respondents; single men by 13 (19%) of the respondents; intersex people by 11 (16%) of the respondents; transgender people by 10 (14%) of the respondents; and men in same sex relationships by 10 (14%) of the respondents. It is important to note that the circumstances in which PGS is available were not made explicit here, and there may be conditions - such as risk of passing on a genetic disease - that must be met in some locations.

Donor Sperm

Twenty seven (39%) of 70 respondents reported that donor sperm was not available to single, transgender, intersex people, or to people in same sex couples. Again, donor sperm may or may not be available to heterosexual couples, or permitted at all in these countries.

Donor sperm was reported to be available to all people regardless of relationship status, sex, or gender identity in South Africa, South Korea, Brazil, Mexico, Australia, Belgium, Canada, Romania, Ireland, the UK, and the USA.

In France, donor sperm was reported as being available for transgender people. In Israel, Barbados, Greece, Nigeria, Belarus, the Russian Federation, Kazakhstan, Panama, India, Uruguay, and Hungary it was reported to be available for single women. In Austria, Sweden, and Norway donor sperm is available to women in same sex married couples. In Chile, Ecuador, Estonia, Finland, Bulgaria, Guatemala, Paraguay, Spain, the Netherlands, El Salvador, Argentina, and Germany it was reported that donor sperm was available to both single women and women in same sex married couples. Respondents from Denmark and Trinidad and Tobago reported donor sperm as available for single women, women in same sex married couples, transgender individuals, and intersex individuals. Peru and Honduras reported availability for single women and single men. In Venezuela, donor sperm was available for single women, single men, women in same sex married couples, and men in same sex married couples.

Access to donor sperm by single women was therefore mentioned by 39 (56%) of the respondents; women in same sex relationships by 29 (41%) of the respondents; single men by 14 (20%) of the respondents; transgender people by 14 (20%) of the respondents; intersex people by 13 (19%) of the respondents; and men in same sex relationships by 12 (17%) of the respondents.

Donor Egg

Thirty three (47%) of 70 respondents reported that donor eggs were not available to single, transgender, intersex people, or to people in same sex couples. Again, donor eggs may or may not be available to heterosexual couples, or permitted at all in these countries.

Donor eggs were reported as being available to all people regardless of relationship status, sex, or gender identity in South Africa, South Korea, Brazil, Mexico, Australia, Belgium, Canada, Romania, Ireland, the United Kingdom, and the USA. In France, donor eggs were reported as being available for transgender people.

Respondents from Barbados, Greece, Nigeria, Belarus, the Russian Federation, Kazakhstan, Panama, Uruguay, and Hungary reported that donor eggs were available for single women. In Chile, Estonia, Finland, Bulgaria, Guatemala, Paraguay, Spain, the Netherlands, and Argentina, it was reported that donor eggs are available to both single women, and women in same sex married couples. Trinidad and Tobago reported donor eggs as available for single women, women in same sex married couples, transgender, and intersex individuals. Israel, India, Peru and Honduras report that donor eggs are available for single women and single men.

In Venezuela, donor eggs were reported as available for single women, single men, women in same sex married couples, and men in same sex married couples.

Access to donor eggs by single women was therefore mentioned by 35 (50%) of the respondents; women in same sex relationships by 22 (31%) of the respondents; single men by 16 (23%) of the respondents; transgender people by 13 (19%) of the respondents; intersex people by 12 (17%) of the respondents; and men in same sex relationships by 12 (17%) of the respondents (17%).

Donor Embryos

Thirty five (50%) of 70 respondents reported that donor embryos were not available to single, transgender, intersex people, or to

people in same sex couples. Again, donor embryos may or may not be available to heterosexual couples, or permitted at all in these countries. Donor embryos were reported as being available to all people regardless of relationship status, sex, or gender identity in South Africa, South Korea, Brazil, Australia, Belgium, Canada, Romania, Ireland, the United Kingdom, and the USA. In France, donor embryos were reported as being available for transgender people. In Israel, donor embryos were reported as being available to single men.

In Barbados, Greece, Nigeria, Belarus, the Russian Federation, Kazakhstan, Panama, Uruguay, India, and Hungary, donor embryos were reported to be available for single women. In Chile, Estonia, Finland, Bulgaria, Guatemala, Paraguay, Spain, the Netherlands, and Argentina, it was reported that donor embryos are available to both single women, and women in same sex married couples. Trinidad and Tobago reported donor embryos as available for single women, women in same sex married couples, transgender individuals, and intersex individuals. Peru and Honduras report that donor embryos are available for single women and single men. In Venezuela donor embryos were reported as available for single women, single men, women in same sex married couples, and men in same sex married couples.

Access to donor eggs by single women was therefore mentioned by 24 (34%) of the respondents; women in same sex married couples by 21 (30%) of the respondents; single men by 14 (20%) of the respondents; transgender people by 12 (17%) of the respondents; intersex people by 11 (16%) of the respondents; and men in same sex relationships by 11 (16%) of the respondents.

Gestational Carrier Arrangements

Traditional gestational carrier - i.e. in which the gestational carrier (mother's) ova are inseminated with a prospective parent's sperm. Fifty five (79%) of the 70 responding countries did not report permitting traditional gestational carrier (TGC) arrangements.

Seven countries (Brazil, Australia, Belgium, Canada, Romania, USA, and Mexico) reported allowing traditional gestational carriers regardless of relationship status, sex, or gender identity. Israel reported allowing single men to access traditional gestational carriers, while Nigeria, the Russian Federation, Kazakhstan, and Peru reported allowing single women to access traditional gestational carriers. The Netherlands reported allowing access by single women and women in same sex relationships. Honduras reported allowing access to traditional gestational carriers by single women and single men.

It is important to note that within these countries, the circumstances, in which; such arrangements were permitted (i.e. altruistic vs. commercial; any criteria to be met—such as infertility, age, screening, etc.), were not further detailed.

Gestational Carrier Arrangements Using Donated Ova and Commissioning Person's Sperm. Fifty two (74%) of the 70 responding countries did not report permitting gestational carrier arrangements GC) using donated ova and the commissioning person's sperm.

Seven countries (Brazil, Australia, Belgium, Canada, Mexico, South Africa, and South Korea) reported allowing gestational carriers in such circumstances regardless of relationship status, sex, or gender identity. The USA reported allowing all such people other than intersex individuals.

The respondent from India reported allowing single men to access gestational carriers using donated ova and the commissioning person's sperm. Nigeria, the Russian Federation, Kazakhstan, Greece, Belarus, Uruguay, and Peru reported allowing single women to access gestational carriers using donated ova and the commissioning person's sperm.

The Netherlands reported allowing access by single women and women in same sex relationships. Honduras reported allowing access to gestational carriers using a donated ova and the commissioning person's sperm by single women and single men.

Again, it is important to note that within these countries the circumstances in which such arrangements were permitted (i.e. altruistic vs. commercial; any criteria to be met—such as infertility, age, screening, etc.) were not further detailed.

Gestational Carrier Arrangements Using Donated Ova and Donated Sperm. Fifty three (76%) of the 70 responding countries did not report permitting gestational carriers using donated ova and donated sperm.

Seven countries (Brazil, Australia, Belgium, Canada, Mexico, Romania, and the USA) reported allowing gestational carriers in such circumstances regardless of relationship status, sex, or gender identity. The respondent from Israel reported allowing single men to access gestational carriers using donated ova and donated sperm. Respondents from Nigeria, the Russian Federation, Kazakhstan, Greece, Belarus, and Peru reported allowing single women to access gestational carriers using donated ova and donated sperm. Honduras respondents reported allowing access to gestational carriers using a donated ova and donated sperm by single women and single men.

The Netherlands and Bulgaria reported allowing its use by women in same sex married couples. Bulgaria also allowed its use by single women.

Note again, within these countries the circumstances in which such arrangements were permitted (i.e. altruistic vs. commercial; any criteria to be met—such as infertility, age, screening, etc.) were not further detailed.

Discussion

Thirty six of the 70 respondents that participated in Surveillance reported that they had no formal laws, ordinances, guidelines, or religious decrees that required a recognized stable heterosexual relationship to access ART or IVF. These respondents were then asked if single women, single men, same sex female couples, same sex male couples, transgender individuals, and/or intersex people could access ART or IVF services. Thirty five of the respondents answered in the positive, with access by identified group then varying. Single women were reported to have access in all 35 (100%) countries, women in same sex couples were reported to have access in 80% of the countries, single men had access in 46% of the countries, transgender and intersex people in 40% of the countries, and men in same sex couples, access in 37% of the respondent countries.

Questions were also asked regarding whether the respective countries recognize the same sex partner of someone who has accessed treatment as the legal parent of any child born as a result. Interestingly, while the above had reported allowing rates of 80% for access to ART or IVF for women in same sex couples, the recognition of same sex female partners as parents of the resulting child was only 52%. For men in same sex couples, the recognition

of the partner as a legal parent of any resulting child also low (34%), and much closer to the actual permitted access rate.

Further scrutiny of *all* 70 responding countries was undertaken to examine access to a variety of treatments and practices by single males or females, transgender individuals, intersex people, and people in same sex male or female couples. This included consideration of whether diagnostic evaluation was available; intra-uterine insemination; IVF; pre-implantation genetic diagnosis; pre-implantation genetic screening; and access to donor sperm, eggs and embryos.

When access was available, single women generally had the most access, but also the greatest variability of access across treatments. Single women's reported access ranged from 34% for donor embryos to 73% for diagnostic evaluation across the 70 respondent countries. This was followed by women in same sex couples, whose rates of access ranged from 29% for donor embryos to 49% for diagnostic evaluation. Single men, transgender individuals, and intersex people, as well as men in same sex couples, often had similar rates of access (within 1-3% of each other) with countries showing only slight differences at times in relation to the service or practice available to them. The reported range of access for single males was 17% (access to IUI) to 43% (access to diagnostic evaluation). For same sex male couples, reported access rates ranged from 13% (access to IUI) to 44% (access to diagnostic evaluation). For transgender people, reported rates of access ranged from 14% (access to PGS) to 41% (access to diagnostic evaluation). For intersex people, access rates ranged from 16% (access to PGS and to donor embryos) to 44% (access to diagnostic evaluation).

Overall the results indicate that single men, men in same sex couples, and transgender and intersex people had less access than single women to treatments and ART practices such as diagnostic evaluation; intra-uterine insemination; IVF; pre-implantation genetic diagnosis; pre-implantation genetic screening; and access to donor sperm, eggs and embryos. Women in same sex couples had only slightly higher access than men, transgender and intersex people, and had less access than single women. The reasons for such differences were not explored, however it is noted that some of the included treatment types may have been less suitable for application in men (e.g., IUI). There may also have been some differences in interpretation of questions by respondents. For example, it is difficult to know why people selected access to IUI for single men or men in same sex relationships, unless they had assumed a female's presence.

Finally, access to surrogacy by the above mentioned groups was also explored. Many countries reported not permitting access to surrogacy at all (79% traditional; 74% gestational with donated ova and commissioning person's sperm; 76% gestational with donated ova and donated sperm). It is likely, given the extensive prohibitions of such practices across the globe, that these countries' positions most often would apply to all people, and are not based on relationship status, sex, or gender identity, although there may be some countries that only permit surrogacy for stable heterosexual couples. In the countries that did report permitting some form of surrogacy, access was generally available to people regardless of relationship status, sex, or gender identity, while there were some countries that specified single male, single female, or same sex female couple. There were slight variations also among whether countries permitted traditional gestational carriers (using the birth mother's own ova), gestational carriers using donated ova and commissioning person's sperm, and/or gestational carriers using donated ova and donated sperm. Note, however, that data collected in relation to surrogacy for this chapter only gives some indication regarding access by the respective groups of people examined. The circumstances in which such arrangements were permitted (i.e. altruistic vs. commercial; criteria to be met—such as infertility, age, screening, counseling, approvals, etc.), was not further explored or detailed.

CHAPTER 23: CROSS-BORDER REPRODUCTION

Respondents from 64 countries replied to some or all of the questions concerning cross-border reproduction.

Of particular interest was whether or not people travel to or from the respondent's country to engage in assisted reproductive technology (ART), including whether they do so to seek lower cost services, higher quality services, or services not available in their home country, as well as whether people seek egg, embryo, or sperm donations, and/or gestational carrier arrangements.

In addition, information was gathered about whether there exists regulation of inbound and outbound people wishing to engage in cross-border reproduction, and regarding the import and export of tissue.

Do People Visit Your Country to Seek Cross-border Reproduction? (Table 1 and Charts 1–3)

Incoming for Lower Cost Services

Charts 1–3 Respondents from 47 countries (73%) reported people traveling to their country to seek lower cost ART services. Respondents from Chile, France, Italy, Japan, Norway, Singapore, and Switzerland (11%) reported that people do not travel to their country for lower cost services. In Australia, Greece, Ireland, the Netherlands, Portugal, Sweden, and the United Kingdom (11%) the respondents reported that this information was unknown. Respondents from 3 (5%) of the 64 countries that reported on questions concerning cross-border reproduction did not address this question.

Incoming for Higher Quality ART Services

Respondents from 51 countries (80%) reported that people travel to their country for higher quality services. Respondents from Norway, Bangladesh, and Estonia (5%) reported that people do not travel to their country for higher quality services. In Australia, Greece, Ireland, the Netherlands, Portugal, the United Kingdom, Kenya, and Trinidad and Tobago (13%) such actions were reported by the respondents as unknown. Respondents from 2 (2%) of the 64 countries that answered the cross-border reproduction questions did not answer this question.

Incoming for ART Services Unavailable in their Home Country

Respondents from 52 countries (82%) reported that people travel to their country to access services that are not available in their home country. Respondents from Norway, Japan, China, Romania, and Tunisia (8%) reported that people do not visit their country for cross-border reproduction. Respondents from Bangladesh, Australia, and the Netherlands (5%) replied that this was unknown. Respondents from four (5%) of the countries that responded to questions on cross-border reproduction did not address this query.

Incoming for Egg Donation

Respondents from 33 countries (52%) reported that people travel to their country to access egg donation. Seventeen respondents (27%) reported that people from other countries do not travel to their country to engage in egg donation. Respondents from Australia, the Netherlands, Ireland, the United Kingdom, Kenya, and Argentina (9%) reported that this was unknown. Respondents from eight of the 64 countries that responded to questions on cross-border reproduction did not address this issue.

Incoming for Embryo Donation

Respondents from 21 countries (33%) reported that people travel to their country to access embryo donation. Twenty-one respondents (33%) reported that people from other countries do not travel to their country to engage in embryo donation. Respondents from

Chapter 23. Table 1

Do People Visit your Country to Seek Assisted Reproduction?

Country	Lower Cost ART Services	Higher Quality ART Services	ART Services Unavailable in Their Home Country	Egg Donation	Embryo Donation	Sperm Donation	Gestational Carriers	Traditional Gestational Carriers
Argentina	YES	YES	YES	Unknown	Unknown	Unknown	Not addressed	Not addressed
Australia	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	NO	NO
Austria		YES	YES	NO	NO	YES	NO	NO
Bangladesh	YES	NO	Unknown	NO	NO	NO	NO	NO
Barbados	YES	YES	YES	YES	YES	YES	NO	NO
Belarus	YES	YES	YES				YES	
Belgium	YES	YES	YES	YES	YES	YES	YES	YES
Brazil	YES	YES	YES		Unknown	Unknown	Unknown	Unknown
Bulgaria	YES	YES	YES	YES	NO	YES	NO	NO
Cameroon	YES	YES	YES	YES		YES	YES	YES
Canada	YES	YES	YES	NO	NO	NO	Unknown	Unknown
Chile	NO	YES	YES	YES	NO	NO	NO	NO
China	YES	YES	NO	NO	NO	NO	NO	NO
Colombia	YES	YES	YES	YES	YES	YES	Unknown	Unknown
Czech Republic	YES	YES	YES	YES	YES	YES	NO	NO
Denmark	YES	YES	YES	YES		YES		
Ecuador	YES	YES	YES	YES	YES	YES	YES	NO
El Salvador	YES	Not addressed						
Estonia	YES	NO	YES	YES	Unknown	NO	NO	NO
Finland	YES	YES	YES	YES	YES	YES	NO	NO
France	NO	YES	YES	NO	NO	YES	NO	NO
Germany	YES	YES	YES	NO	NO	Unknown	NO	NO
Greece	Unknown	Unknown	YES	YES	YES	YES	YES	NO
Guatemala	YES	YES	YES	YES	YES	YES	YES	YES
Hong Kong (China*)		YES						
Hungary	YES	YES	YES	NO	Unknown	NO	Not addressed	Not addressed
India	YES	YES	YES	YES	YES	YES	YES	Unknown
Iran	YES	YES	YES	YES	NO	NO	Unknown	Unknown
Ireland	Unknown	Unknown	YES	Unknown	Unknown	Unknown	YES	
Israel	YES	YES	YES	YES	NO	YES	YES	
Italy	NO	YES	YES	NO	NO	NO	NO	NO
Japan	NO	YES	NO	NO	NO	NO	NO	NO
Jordan	YES	YES	YES					
Kenya	YES	Unknown	YES	Unknown	Unknown	Unknown	Unknown	Unknown
Malaysia	YES	YES	YES	YES	Unknown	YES	Unknown	Unknown
Mali	YES	YES	YES	YES	YES	NO	NO	NO
Mexico	YES	YES	YES	YES	Unknown	YES	YES	YES
Netherlands	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Nigeria	YES	YES	YES	YES	YES	YES	YES	Unknown
Norway	NO	NO	NO	NO	NO	NO	NO	NO
Panama	YES	YES	YES	YES	YES	YES	Unknown	Unknown
Paraguay	Not addressed	YES	Not addressed	YES	YES	Not addressed	NO	NO
Peru	YES	YES	YES	YES		YES		
Philippines	YES		YES					
Portugal	Unknown	Unknown	YES	YES	Unknown	NO		
Romania	YES	YES	NO	NO	NO	NO	NO	NO
Russian Federation	YES	YES	YES	YES	YES	YES	YES	NO
Saudi Arabia	YES	YES	YES	NO	NO	NO	NO	NO
Senegal	YES	YES	YES	NO	NO	NO	NO	NO
Singapore	NO	YES	YES	NO	NO	NO	NO	NO
Slovak Republic	YES	YES	YES	YES	YES	YES	NO	NO
South Africa	YES	YES	YES	YES	YES	YES	NO	NO
South Korea	YES	YES						
Spain	YES	YES	YES	YES	YES	YES	NO	NO
Sri Lanka	YES	YES	YES	YES	YES	YES	Unknown	Unknown
Sweden	Unknown	YES	YES	NO	NO	NO	NO	NO
Switzerland	NO	YES	YES	NO	NO	UNKNOWN	NO	NO
Taiwan (China*)	YES	YES	YES	YES	NO	YES	NO	NO
Trinidad and Tobago	YES	Unknown	YES	YES	YES	YES	NO	NO
Tunisia	YES	YES	NO	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Turkey	YES	YES	YES	NO	NO	NO	NO	NO
UK	Unknown	Unknown	YES	Unknown	Unknown	Unknown	YES	YES
Uruguay	YES	YES	YES	YES	YES	YES		
USA	YES	YES	YES	YES	YES	YES	YES	YES

*Reporting separately for this report.

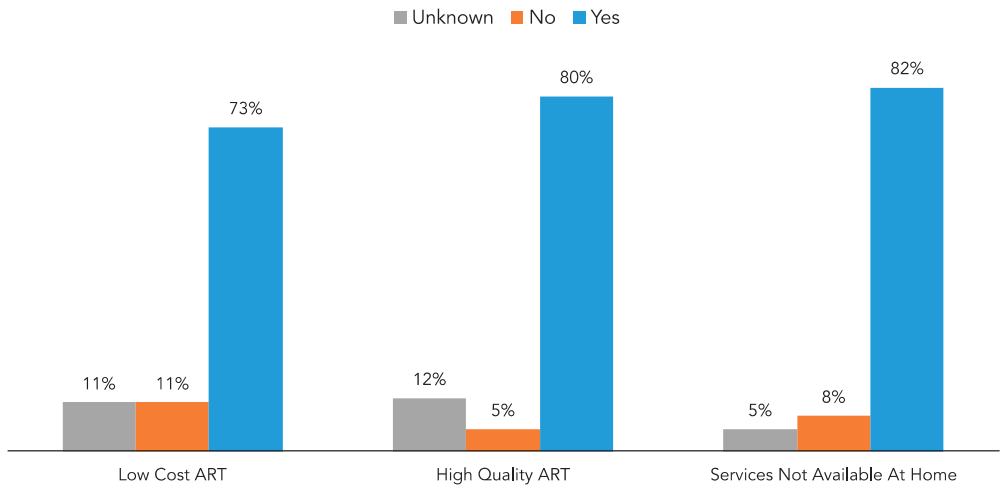


Chart 1. Why Do People Visit Your Country for ART Services?

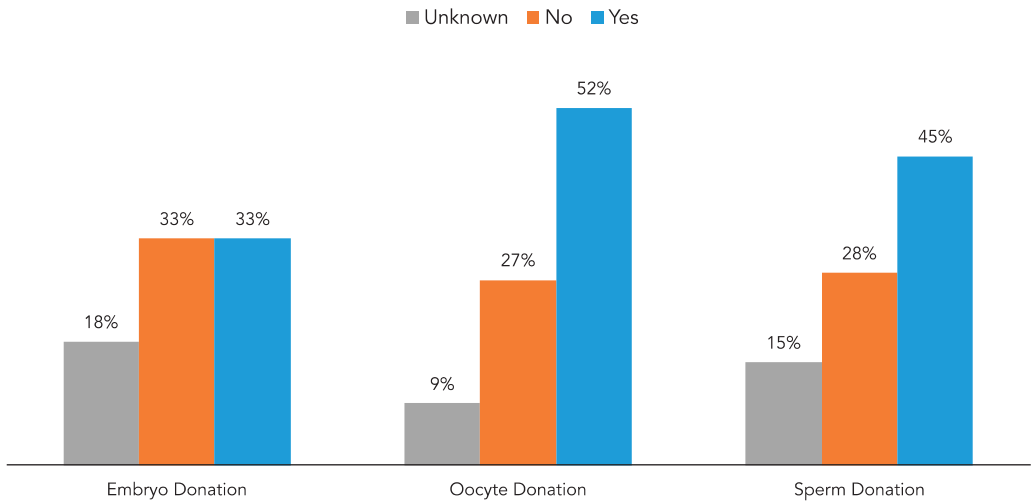


Chart 2. Do People Who Visit Your Country Access Donation?

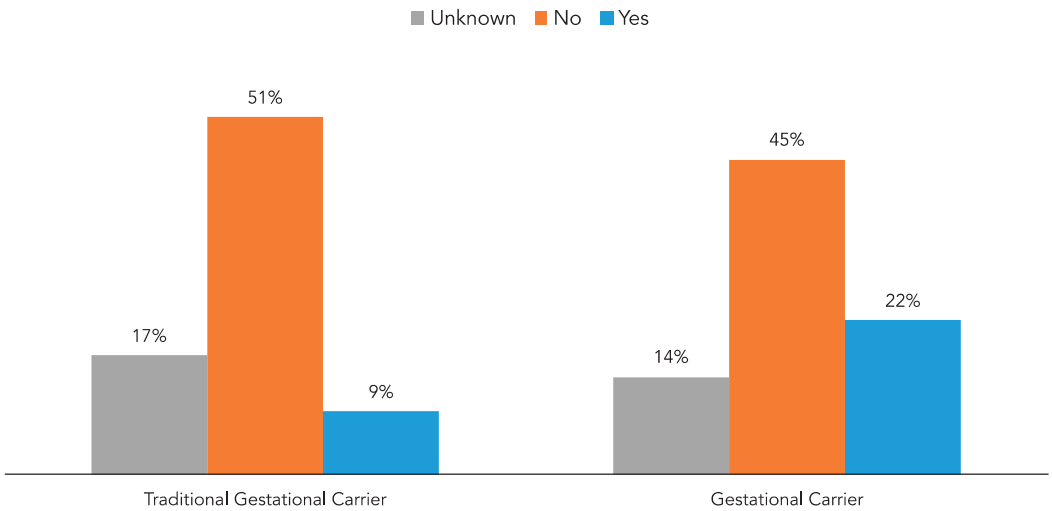


Chart 3. Do People Who Visit Your Country Access Gestational Carrier Arrangements?

Chapter 23. Table 2

Do People Travel From your Country to Seek Assisted Reproduction?

Country	Lower Cost ART Services	Higher Quality ART Services	ART Services Unavailable in Their Home Country	Egg Donation	Embryo Donation	Sperm Donation	Gestational Carriers	Traditional Surrogacy
Argentina	Unknown	Unknown	Unknown	Unknown		Unknown	YES	Unknown
Australia	YES	Unknown	YES	YES	YES	YES	YES	YES
Austria	NO	NO	NO	YES	YES	NO	YES	YES
Bangladesh		YES	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Barbados							YES	YES
Belarus		YES	YES	YES	YES		YES	
Belgium	NO	NO	YES	YES	YES	Unknown	Unknown	Unknown
Brazil	NO	YES	YES	YES	NO	NO	Unknown	Unknown
Bulgaria	YES	YES	YES	YES	NO	YES	NO	NO
Cameroon	YES	YES		YES		YES	YES	YES
Canada	YES	Unknown	NO	YES	YES	Unknown	YES	Unknown
Chile	NO	NO	NO	NO	NO	NO	YES	YES
China	YES	YES	NO	NO	NO	NO	NO	NO
Colombia	YES	YES	YES	YES	YES	YES	Unknown	Unknown
Czech Republic	NO	NO	YES	NO	NO	NO	NO	NO
Denmark							YES	YES
Ecuador	YES	YES	YES	YES	YES	YES	YES	
El Salvador		YES	YES					
Estonia	NO	Unknown	YES	Unknown	Unknown	Unknown	YES	Unknown
Finland	NO	NO	YES	NO	NO	NO	YES	YES
France	NO	NO	YES	YES	YES	YES	YES	YES
Germany	YES	YES	YES	YES	YES	NO	YES	YES
Greece	Unknown	YES	NO	NO	NO	NO	NO	Unknown
Guatemala	NO	YES	YES	NO	Not addressed	YES	YES	YES
Hong Kong (China*)	YES		YES					
Hungary	NO	NO	YES	YES	YES	NO	Unknown	Unknown
India	YES	YES	YES	YES	YES	YES	YES	Unknown
Iran	Not addressed	Not addressed	Not addressed	Not caddressed	Not addressed	Not addressed	Not addressed	Not addressed
Ireland	YES	NO	YES	YES	YES	YES	Unknown	Unknown
Israel	YES	YES	YES	YES	NO	NO	YES	
Italy	YES	YES	YES	YES	YES	YES	YES	YES
Japan	YES	YES	YES	YES	YES	YES	YES	YES
Jordan	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed		
Kenya	Unknown	YES	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Malaysia	NO	YES	YES	YES	Unknown	YES	YES	Unknown
Mali	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not addressed	Not addressed
Mexico	YES	YES	YES	YES	YES	YES	YES	YES
Netherlands	NO	YES	YES	YES	YES	NO	NO	NO
Nigeria	YES	YES	YES	YES	YES	YES	YES	YES
Norway	YES	YES	YES	YES		YES	YES	NO
Panama	NO	YES	NO	NO	NO	NO		
Paraguay	YES	YES	Not addressed	UNKNOWN	Unknown	Unknown	Unknown	Unknown
Peru	NO	NO	NO	NO	NO	NO		
Philippines	YES	YES	Not addressed	NO	NO	NO	YES	YES
Portugal	NO	Unknown	YES	NO	NO	NO	YES	Unknown
Romania	NO	YES	NO	YES	YES	NO	NO	NO
Russian Federation	YES	YES	NO	NO	NO	NO	NO	NO
Saudi Arabia	YES	YES	NO				Not addressed	Not addressed
Senegal	NO	YES	NO	YES	NO	YES	NO	NO
Singapore	YES	YES	YES	YES	Unknown	Unknown	YES	YES
Slovak Republic	Unknown	Unknown	NO	YES	YES	YES	Unknown	Unknown
South Africa	NO	NO	NO	NO	NO	NO	NO	NO
South Korea	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Spain	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed	Not addressed
Sri Lanka	Unknown	Unknown	NO	YES	YES	Unknown	YES	Unknown
Sweden			YES	YES	YES	YES	YES	Unknown
Switzerland	YES	NO	YES	YES	Unknown	NO	Unknown	Unknown
Taiwan (China*)	Unknown	YES	YES	YES	Unknown	YES	YES	YES
Trinidad and Tobago	NO	Unknown	NO	YES	YES	Unknown	YES	YES
Tunisia				Not addressed	Unknown	Unknown	Unknown	Unknown
Turkey	NO	YES	NO	YES	YES	YES	YES	YES
UK	YES	NO	YES	YES	YES	YES	Unknown	Unknown
Uruguay	YES	YES	YES	YES	YES	YES		
USA	YES	NO	NO	NO	NO	NO	NO	NO

*Reporting separately for this report.

Hungary, Australia, the Netherlands, Ireland, the United Kingdom, Kenya, Argentina, Estonia, Portugal, Malaysia, Mexico, and Brazil (19%) reported that this information was unknown. Respondents from 10 of the 64 countries (15%) that responded to questions on cross-border reproduction did not address this issue.

Incoming for Sperm Donation

Respondents from 29 countries (45%) reported that people travel to their country to access sperm donation. Eighteen respondents (28%) reported that people from other countries do not travel to their country to engage in sperm donation. Respondents from

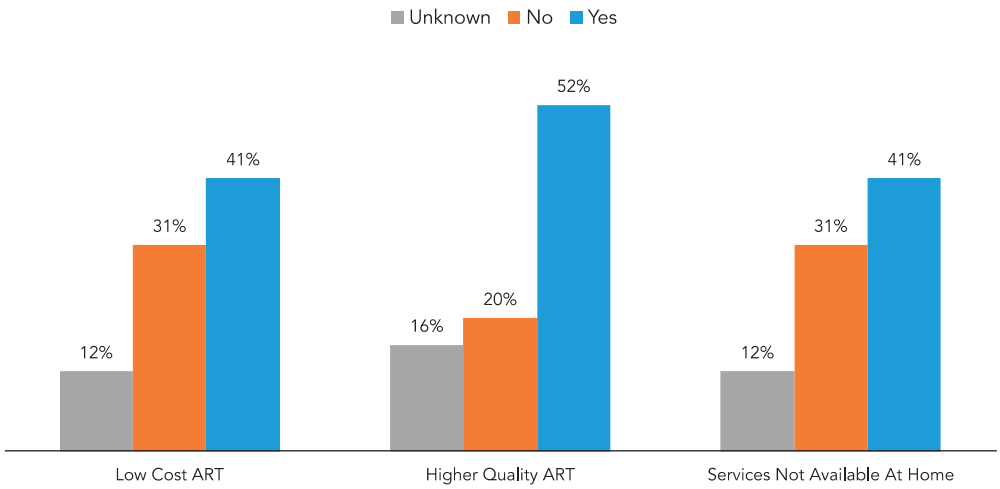


Chart 4. Why Do People Travel From Your Country For ART Services?

Switzerland, Germany, Australia, the Netherlands, Ireland, the United Kingdom, Kenya, Argentina, and Brazil (14%) reported

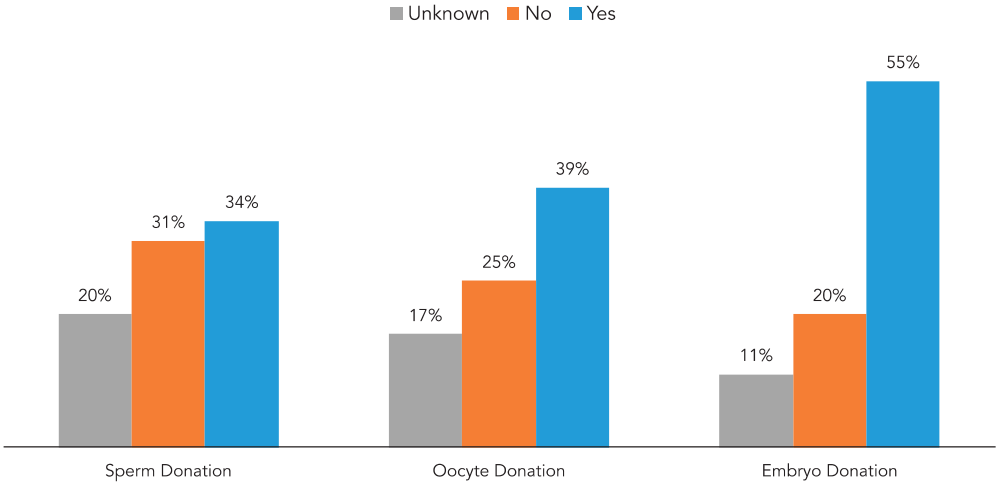


Chart 5. People Who Travel From Your Country Access Donation?

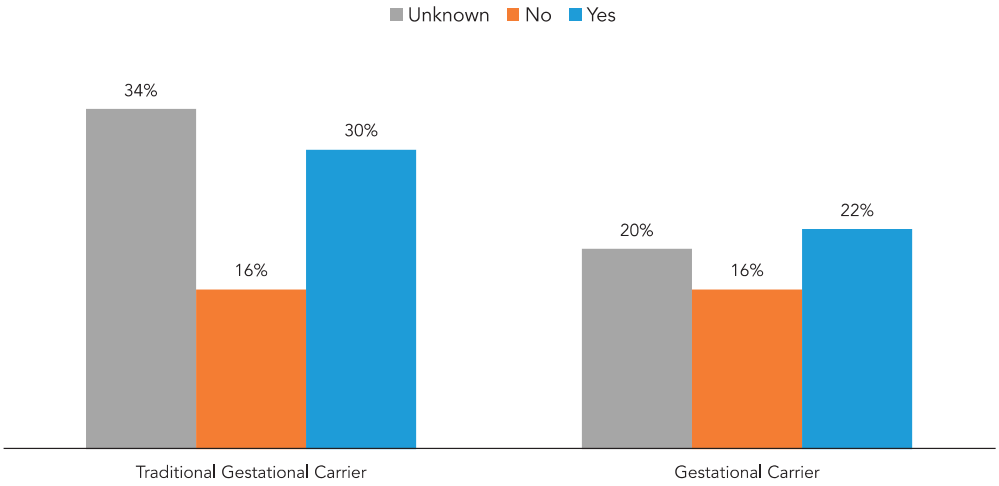


Chart 6. People Who Travel From Your Country Access Gestational Carrier Arrangements?

Chapter 23. Table 3

Are there Regulations that Govern Cross Border Reproduction in Your Country?

Participant Country	Patients that Visit your Country Seeking Treatment	Citizens that Visit Other Countries Seeking Treatment
Argentina	No regulations	No regulations
Australia		State/Provincial/Regional Laws/Statutes/Ordinances
Austria	No regulations	No regulations
Bangladesh	No regulations Federal/National Laws/Statutes/Ordinances	
Barbados	No regulations	No regulations
Belarus	Professional Organization Standards/Guidelines Federal/National Laws/Statutes/Ordinances	Professional Organization Standards/Guidelines
Belgium	Federal/National Laws/Statutes/Ordinances	No regulations
Brazil	No regulations	No regulations
Bulgaria	No regulations	No regulations
Cameroon	No regulations	No regulations
Canada	No regulations	No regulations
Chile	No regulations	
China	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Colombia	No regulations	No regulations
Czech Republic	No regulations	No regulations
Denmark	No regulations	Federal/National Laws/Statutes/Ordinances
Ecuador	No regulations	No regulations
El Salvador	No regulations	
Estonia	No regulations	No regulations
Finland	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
France	No regulations	No regulations
Germany	No regulations	Federal/National Laws/Statutes/Ordinances
Greece	Federal/National Laws/Statutes/Ordinances	No regulations
Guatemala	No regulations	No regulations
Hong Kong (China*)	No regulations	
Hungary	No regulations	No regulations
India	Professional Organization Standards/Guidelines	Professional Organization Standards/Guidelines
Iran	No regulations	No regulations
Ireland	No regulations	No regulations
Israel	No regulations	
Italy	No regulations	No regulations
Japan	No regulations	No regulations
Jordan	No regulations	No regulations
Kenya	No regulations	No regulations
Malaysia	No regulations	No regulations
Mali	No regulations	No regulations
Mexico	No regulations	No regulations
Netherlands	No regulations	No regulations
Nigeria	No regulations	No regulations
Norway	Federal/National Laws/Statutes/Ordinances	No regulations
Panama	No regulations	No regulations
Paraguay	No regulations	No regulations
Peru	No regulations	No regulations
Philippines	No regulations	
Portugal	No regulations	No regulations
Romania	No regulations	No regulations
Russian Federation	No regulations	No regulations
Saudi Arabia	No regulations Religious decree Cultural practice	
Senegal	Unknown	Unknown
Singapore	Federal/National Laws/Statutes/Ordinances	
Slovak Republic	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
South Africa	No regulations	No regulations
South Korea	No regulations	
Spain	No regulations	
Sri Lanka	No regulations	No regulations
Sweden		Professional Organization Standards/Guidelines
Switzerland	No regulations	No regulations
Taiwan (China*)	Federal/National Laws/Statutes/Ordinances	Federal/National Laws/Statutes/Ordinances
Trinidad and Tobago	No regulations	No regulations
Tunisia	No regulations	No regulations
Turkey	State/Provincial/Regional Laws/Statutes/Ordinances	State/Provincial/Regional Laws/Statutes/Ordinances
UK	Federal/National Laws/Statutes/Ordinances	No regulations
Uruguay	No regulations	
USA	No regulations	No regulations

*Reporting separately for this report.

that this was unknown. Respondents from eight of the 64 countries that responded to questions on cross-border reproduction did not address this issue.

Incoming for Gestational Carrier Arrangements

Respondents were asked if people travelled to their countries to engage in gestational carrier arrangements, defined as "the gestational carrier is implanted with an embryo(s) created using

Chapter 23. Table 4

Are there Regulations Regarding the Import of Reproductive Tissue Into Your Country?

Country	Ova	Spermatozoa	Zygotes
Argentina	YES	YES	YES
Australia	YES	YES	YES
Austria	NO	NO	NO
Bangladesh	NO	NO	NO
Barbados	NO	NO	NO
Belarus	UNKNOWN	UNKNOWN	UNKNOWN
Belgium	YES	YES	YES
Brazil	YES	YES	YES
Bulgaria	UNKNOWN	UNKNOWN	UNKNOWN
Cameroon	NO	YES	NO
Canada	NO	YES	UNKNOWN
Chile	YES	YES	Not addressed
China	Not addressed	Not addressed	Not addressed
Colombia	YES	YES	YES
Czech Republic	YES	YES	YES
Denmark	YES	YES	YES
Ecuador	YES	YES	YES
El Salvador	UNKNOWN	UNKNOWN	UNKNOWN
Estonia	YES	YES	YES
Finland	YES	YES	YES
France	YES	YES	YES
Germany	YES	YES	YES
Greece	YES	YES	YES
Guatemala	NO	NO	NO
Hong Kong (China*)	YES	YES	YES
Hungary	YES	YES	YES
India	YES	YES	YES
Iran	UNKNOWN	UNKNOWN	UNKNOWN
Ireland	YES	YES	YES
Israel	YES	YES	
Italy	YES	YES	YES
Japan	NO	NO	NO
Jordan	Not addressed	Not addressed	Not addressed
Kenya	NO	NO	NO
Malaysia	NO	NO	NO
Mali	NO	NO	NO
Mexico	NO	NO	NO
Netherlands	UNKNOWN	UNKNOWN	UNKNOWN
Nigeria	NO	NO	NO
Norway	YES	YES	YES
Panama	NO	NO	NO
Paraguay	Not addressed	Not addressed	Not addressed
Peru	NO	NO	NO
Philippines	YES	YES	YES
Portugal	YES	YES	YES
Romania	NO	YES	NO
Russian Federation	YES	YES	YES
Saudi Arabia	YES	YES	YES
Senegal	UNKNOWN	UNKNOWN	UNKNOWN
Singapore	YES	YES	YES
Slovak Republic	YES	YES	YES
South Africa	YES	YES	YES
South Korea	Not addressed	Not addressed	Not addressed
Spain	YES	YES	YES
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	YES	YES	YES
Switzerland	YES	YES	YES
Taiwan (China*)	UNKNOWN	UNKNOWN	UNKNOWN
Trinidad and Tobago	UNKNOWN	UNKNOWN	UNKNOWN
Tunisia	Not addressed	Not addressed	Not addressed
Turkey	Not addressed	Not addressed	Not addressed
UK	YES	YES	YES
Uruguay	YES	YES	YES
USA	YES	YES	YES

*Reporting separately for this report.

the gametes of both prospective parents; or donated ova and commissioning male's sperm; or a donated embryo". Fourteen respondents (22%) answered in the affirmative, 29 (45%) answered "no", nine respondents (14%) said that this was unknown, and 12 respondents (19%) did not address the question.

Incoming for Traditional Gestational Carrier Arrangements

Respondents were asked if people travelled to their countries to engage in traditional gestational carrier arrangements, defined as being a procedure "in which the gestational carrier's ova are inseminated with a prospective parent's sperm". Six respondents (9%) answered in the affirmative, 32 (50%) answered "no", 11 respondents (17%) said that this was unknown, and 15 respondents did not address the question.

Do People Travel from Your Country to Another Country to Seek Cross-border Reproduction? (Table 2 and Charts 4–6)

Outgoing for Lower Cost Services

Respondents from 26 countries (41%) reported people traveling from their country to other countries to seek lower cost ART services. Twenty respondents (31%) said that people from their country do not travel to other countries for lower cost services. Respondents from Argentina, Greece, Kenya, Mali, the Slovak Republic, South Korea, Sri Lanka, and Taiwan [China (Reporting separately for this report.)], (12.5%) reported that this information was unknown. Respondents from 10 of the 64 countries that responded to questions on cross-border reproduction did not address this question.

Outgoing for Higher Quality ART Services

Respondents from 33 countries (52%) reported that people travel from their country to another country to access higher quality services. Respondents from 13 countries (Austria, Belgium, Chile, Czech Republic, Finland, France, Hungary, Ireland, Peru, South Africa, Switzerland, the United Kingdom, and the USA) (20%) reported that people do not travel from their country to other countries for higher quality services. Respondents from 10 countries (15.5%) reported such actions as unknown. Respondents from eight (12.5%) of the 64 countries that answered the cross-border reproduction questions did not answer this question.

Outgoing for ART Services Unavailable in their Home Country

Respondents from 33 countries (52%) reported that people travel from their country to other countries to access services not available in their home country. Respondents from 17 countries (26.5%; including Austria, Chile, Peru, South Africa, USA, Canada, Slovak Republic, Sri Lanka, Trinidad and Tobago, China, Greece, Panama, Romania, Russian Federation, Saudi Arabia, Senegal, and Turkey) reported that people do not travel to other countries for these purposes. Respondents from Argentina, Mali, Bangladesh, South Korea, and Kenya (8%) replied that this was unknown. Respondents from nine of the 64 countries (14%) that responded to questions on cross-border reproduction did not address this issue.

Outgoing for Egg Donation

Respondents from 35 countries (55%) reported that people travel from their country to another country to access egg donation.

Chapter 23. Table 5

Are there Regulations Regarding the Export of Reproductive Tissue into Your Country?

Country	Ova	Spermatozoa	Zygotes
Argentina	YES	YES	YES
Australia	YES	YES	YES
Austria	NO	NO	NO
Bangladesh	NO	NO	NO
Barbados	NO	NO	NO
Belarus	UNKNOWN	UNKNOWN	UNKNOWN
Belgium	YES	YES	YES
Brazil	YES	YES	YES
Bulgaria	UNKNOWN	UNKNOWN	UNKNOWN
Cameroon	NO	NO	NO
Canada	UNKNOWN	UNKNOWN	UNKNOWN
Chile	YES	YES	Not addressed
China	Not addressed	Not addressed	Not addressed
Colombia	YES	YES	YES
Czech Republic	YES	YES	YES
Denmark	YES	YES	YES
Ecuador	YES	YES	YES
El Salvador	UNKNOWN	UNKNOWN	UNKNOWN
Estonia	YES	YES	YES
Finland	YES	YES	YES
France	YES	YES	YES
Germany	YES	YES	YES
Greece	YES	YES	YES
Guatemala	NO	NO	NO
Hong Kong (China*)	NO	NO	NO
Hungary	UNKNOWN	UNKNOWN	UNKNOWN
India	YES	YES	YES
Iran	NO	NO	NO
Ireland	YES	YES	YES
Israel	NO	NO	NO
Italy	YES	YES	YES
Japan	NO	NO	NO
Jordan	Not addressed	Not addressed	Not addressed
Kenya	NO	NO	NO
Malaysia	NO	NO	NO
Mali	NO	NO	NO
Mexico	NO	NO	NO
Netherlands	UNKNOWN	UNKNOWN	UNKNOWN
Nigeria	NO	NO	NO
Norway	YES	YES	YES
Panama	NO	NO	NO
Paraguay	Not addressed	Not addressed	Not addressed
Peru	NO	NO	NO
Philippines	YES	YES	YES
Portugal	YES	YES	YES
Romania	YES	YES	YES
Russian Federation	YES	YES	YES
Saudi Arabia	YES	YES	YES
Senegal	NO	NO	NO
Singapore	YES	YES	YES
Slovak Republic	YES	YES	YES
South Africa	YES	YES	YES
South Korea	Not addressed	Not addressed	Not addressed
Spain	YES	YES	YES
Sri Lanka	UNKNOWN	UNKNOWN	UNKNOWN
Sweden	YES	YES	YES
Switzerland	YES	YES	YES
Taiwan (China*)	UNKNOWN	UNKNOWN	YES
Trinidad and Tobago	NO	NO	NO
Tunisia	Not addressed	Not addressed	Not addressed
Turkey	Not addressed	Not addressed	Not addressed
UK	YES	YES	YES
Uruguay	YES	YES	YES
USA	YES	YES	YES

*Reporting separately for this report.

Thirteen respondents from 13 countries (20%; Chile, Peru, South Africa, USA, China, Greece, Panama, Russian Federation, the Philippines, Czech Republic, Finland, Portugal, and Guatemala) reported that people from their countries do not travel to other countries to seek egg donation. Respondents from Paraguay, Argentina, Mali, South Korea, Bangladesh, Kenya, and Estonia (11%) reported that this information was unknown. Respondents from nine of the 64 countries that responded to questions on cross-border reproduction did not address this issue.

Outgoing for Embryo Donation

Respondents from 25 countries (39%) reported that people travel from their country to another country to access embryo donation. Sixteen respondents (25%) reported that people from their country do not travel to other countries for embryo donation. Respondents from Paraguay, Mali, South Korea, Bangladesh, Kenya, Switzerland, Estonia, Malaysia, Singapore, Taiwan [China (Reporting separately for this report.)], Tunisia, (18%) reported that this information was unknown. Respondents from 12 of the 64 countries that responded to questions on cross-border reproduction did not address this issue.

Outgoing for Sperm Donation

Respondents from 22 countries (34%) reported that people travel from their country to another country to access sperm donation. Twenty respondents (31%) reported that people from other countries do not travel to their country to engage with sperm donation. Respondents from 13 countries (20%) reported that this information was unknown. Respondents from nine of the 64 countries that responded to questions on cross-border reproduction did not address this issue.

Outgoing for Gestational Carrier Arrangements

Respondents were asked if people travelled from their countries to other countries to engage in gestational carrier arrangements, defined as "the gestational carrier is implanted with an embryo(s) created using the gametes of both prospective parents; or donated ova and commissioning male's sperm; or a donated embryo". Respondents from 31 countries (48%) answered "yes"; respondents from 10 countries (16%; South Africa, USA, China, Greece, Russian Federation, Czech Republic, Romania, the Netherlands, Senegal, and Bulgaria) answered "no"; respondents from 13 countries (20%; Brazil, Switzerland, Hungary, Paraguay, South Korea, Bangladesh, Kenya, Tunisia, Belgium, Slovak Republic, Ireland, United Kingdom, and Colombia) said that this information was unknown; and respondents from 10 countries (16%) did not address the question.

Outgoing for Traditional Gestational Carrier Arrangements

Respondents were asked if people travelled to their countries to engage in traditional gestational carrier arrangements, defined as being a process "in which the gestational carrier's ova are inseminated with a prospective parent's sperm". Respondents from 19 countries (30%) answered in the affirmative ("yes"). Respondents from 10 countries (16%; South Africa, USA, China, Russian Federation, Czech Republic, Romania, the Netherlands, Senegal, Bulgaria, and Norway) answered "no". Respondents from 22 countries (34%) said that this information was unknown, and respondents from 13 countries (20%) did not address the question.

Regulation of Cross-Border Reproduction (Table 3)

Respondents were also asked if their country had regulations that governed cross-border gestational carrier arrangements. Specifically, they were asked about regulations governing citizens that visit other countries seeking treatment, and people visiting their home country seeking treatment.

No Regulation of Certain Practices

Respondents from 64 countries answered the queries within the cross-border reproductive care section. Respondents from 4 countries (6%) (Belgium, Greece, Norway, and the United Kingdom) said that they do not have regulations governing their citizens that visit other countries seeking treatment. Respondents from 12 countries (19%; Denmark, Germany, Bangladesh, Chile, El Salvador, Hong Kong [China (Reporting separately for this report.)], Israel, Philippines, Saudi Arabia, South Korea, Spain, and Uruguay) reported not having regulations regarding patients visiting their country seeking treatment. Respondents from 37 countries (58%) reported having neither regulations governing people going to other countries nor people coming to their own country to seek treatment.

Regulation of Outbound People Visiting other Countries to Seek Treatment

Respondents from two countries, Denmark and Germany, reported having federal laws. Respondents from Australia indicated that state laws are in effect. Respondents from Sweden reported that professional organization standards/guidelines govern their citizens who travel *from* their country to visit other countries for treatment.

Regulation of Inbound People Seeking Treatment

Respondents from Belarus, Belgium, Greece, Norway, the United Kingdom, Bangladesh, and Singapore reported having federal laws. People who travel *to* Saudi Arabia must adhere to cultural practice and religious decrees that govern treatment in that country.

Regulation of Both Outbound and Inbound Cross-border Reproduction

Respondents from Finland, Slovak Republic, and Taiwan (China (Reporting separately for this report.)), reported having federal laws that govern people going to other countries, and people who travel to their own country, seeking treatment. Respondents from Turkey reported having state laws that governed both, and respondents from Belarus and India reported having professional organization standards/guidelines governing both travel to and from their respective countries for treatment.

Note that respondents from some countries reported that they had/did not have one particular type of regulation, but did not make reference elsewhere to the other type of regulation. For example, a respondent from one country may have noted the existence of regulation of people travelling *from* their country to seek treatment, but did not answer (or did not select "no regulation") regarding people traveling *to* their country.

Regulation of the Import and Export of Tissue (Tables 4 and 5)

Import

Ova: Respondents from 34 countries (53%) reported that there was regulation of the import of ova into their countries, while respondents from 15 countries (23%) reported no regulations. Respondents from nine countries (14%) reported that the information was "unknown" and respondents from six countries (9%) did not answer the query.

Spermatozoa: Respondents from 37 countries (58%) reported that there was regulation of the import of spermatozoa into their countries, while respondents from 12 countries (19%) reported no regulations. Respondents from nine countries (14%) reported that the information was "unknown" and respondents from six countries (9%) did not answer the query.

Zygotes: Respondents from 32 countries (50%) reported that there was regulation of the import of zygotes into their countries, while respondents from 14 countries (22%) reported no regulations. Respondents from 10 countries (15.5%) reported that the information was "unknown" and respondents from eight countries (12.5%) did not answer the query.

Export

Ova: Respondents from 32 countries (50%) said that there was regulation of the import of ova into their countries, while respondents from 18 countries (28%) reported no regulations. Respondents from eight countries (12.5%) reported that the information was "unknown" and respondents from six countries (9%) did not answer the query.

Spermatozoa: Respondents from 32 countries (50%) reported that there was regulation of the import of spermatozoa into their countries, while respondents from 18 countries (28%) reported no regulations. Respondents from eight countries (12.5%) reported that the information was "unknown" and respondents from six countries (9%) did not answer the query.

Zygotes: Respondents from 32 countries (50%) reported that there was regulation of the import of ova into their countries, while respondents from 18 countries (28%) reported no regulations. Respondents from seven countries (11%) reported that the information was "unknown" and respondents from seven countries (11%) did not answer the query.

Discussion: Cross-Border Reproduction

Movement

Overall, a high proportion of respondents reported people travelling *to* their home country to seek treatments that were lower cost, higher quality, and/or not available in the country from which the person was travelling (73%, 80%, and 83%, respectively). Fewer respondents reported people travelling to their country for egg, embryo, or sperm donation (52%, 43%, and 45%, respectively), and even fewer again for gestational or traditional gestational carrier arrangements (22% and 9%, respectively). One might draw from this that the people travelling to a majority of countries seek more standard services (such as intracytoplasmic sperm injection (ICSI), in vitro fertilization (IVF), intrauterine insemination (IUI), etc.), and are not primarily engaging in cross-border reproduction to seek donor egg, embryo, or sperm, or to engage in gestational carrier

arrangements. When people seek the latter services, they may travel to particular destinations.

A lower proportion of respondents reported people travelling *from* their home country to seek treatment elsewhere for lower cost, higher quality, or services not available at home (41%, 52%, and 52%, respectively). Similar figures to inbound people (those travelling *to* the country on which the respondent reported) were found for outbound people (people travelling *from* the country on which the respondent reported) seeking egg, embryo, and sperm donation (55%, 39%, and 34%, respectively). Rates for outbound people seeking gestational carrier arrangements were higher than inbound figures, with 40% of respondents reporting people travelling out of the country for gestational carrier arrangements, and 30% reporting people travelling out of the country for traditional gestational carrier arrangements. This again intuitively makes sense, as many countries prohibit some or all of the examined practices, and so if people wanted to access them, they might travel elsewhere.

Of course it is imperative to note that such figures and percentages give no indication as to *how many* people actually travel; these data simply indicate the perception that if people seek certain services they may travel to or from another country to engage with them due to cost, quality, and/or type of service required.

The other factor perhaps of note is that there were less responses of "unknown" in relation to inbound people than for outbound people, presumably because the practicing clinicians (respondents) who filled in the questionnaire have more direct knowledge of the type of treatments people seek in their own clinics and countries, but not of what people do externally.

Regulation

Concerning regulation, despite a significantly high level of perceived movement across borders, the responses indicated that there was very little regulation of people travelling to or from other countries to seek ART treatment. Regulation of the import and export of tissue appeared more prevalent; however, a number of respondents reported no regulation, did not know if regulation existed, or did not answer the question.

The lack of regulation, or lack of knowledge about regulation, may be of particular relevance in areas of egg, embryo, and sperm donation, as well as gestational carrier arrangements, in which children born as a result may seek information about their donors and/or gestational carriers in the future (an increasing occurrence all over the world).

Tracking and reporting of treatments and treatment outcomes may also become difficult. Patient follow-up may not occur across borders.

It should be noted that the data gathered in this section on regulation related only to whether or not regulations existed in relation to *cross-border gestational carrier arrangements* and/or the *import and export of tissues*. It did not ascertain whether there were other types of regulations. Other laws or regulations relevant to ART generally, and/or general laws governing professional practice, laws regarding civil liability, contract laws, human rights law, and more, would likely be relevant in cross-border situation.

CHAPTER 24: CONCLUSIONS

Surveillance 2016 captured more data from a larger proportion of countries actively providing assisted reproductive technology (ART) services than previous surveys. The data confirms that respondents from most countries have experienced a modest growth in the number of ART centres in their respective nations, reflecting further maturation of ART as a clinical service. The responses from the 74 countries suggest that collectively they contain over 5300 ART centres.

Over 80% of countries were reported to rely on legislation, guidelines, or a combination of both to promote the safety, efficacy, standardization, and access to ART. Monitoring and reporting mechanisms were reported to be in place in most of Europe, Australia, the USA, Southeast Asia, and Latin America. Over a third of respondents have noted the passage of new legislation since the last questionnaire, most often perceived as salutary by the respondents; and, with a majority of countries now implementing legislation or guidelines restricting the number of embryos permissible for transfer to women undergoing in vitro fertilization (IVF)/ART cycles.

Preimplantation genetic testing (PGT) was reported to constitute a greater proportion of IVF cycles than previously. A variety of techniques was reported to be available in almost all countries represented in this 2016 Surveillance report for fertility preservation, including gamete and embryo cryopreservation, and are reported to be widely performed. Historical comparisons could not be obtained for this topic since it was not previously queried. Practices such as cryopreservation, posthumous reproduction, and gamete donation have been reported to receive more attention from stakeholders over the past three years and are overall reported to be more widely performed; however, there are significant regional differences in practice, access, and frequency of application. Intracytoplasmic sperm injection (ICSI) was reported to be almost universally available and performed. Access to and utilization of donor gametes and embryos and gestational carriers, while reported to be greater than previously noted, was reported to remain restricted in many countries due to legal, ethical, and religious constraints. Significant differences in available options and restrictions were reported to exist even among countries in close proximity and this phenomenon has contributed greatly to a reported increased demand for cross-border reproductive services raising a new set of ethical concerns. There have been some highly publicized adverse outcomes involving some of these activities and several measures have been reported to have been enacted to address perceived abuses.

Social aspects of ART including the pre-treatment assessment for the potential welfare of the child, addressing the issues of anonymity and disclosure for families utilizing donor gametes, and the status accorded the embryo were all reported to have received more intensive scrutiny over the last three years. A wide variety of new measures were reported to have been proposed and undertaken to address all of these issues, but the topics remain highly contentious and no universal recommendations have been reported to have been endorsed. There are reported incremental increases in utilization of ART techniques (e.g., oocyte maturation, assisted hatching) but no new significant trends were identified.

Experimentation on the embryonic cells was reported to be permitted to a limited extent. Stem cell research on embryonic cells was reported to be allowed, however with rigid guidelines in less than half of countries featured in this report. The amount of

research actually performed has been reported to have increased. Therapeutic cloning research has been reported to be performed in very few countries, and respondents from one country (Uruguay) indicated that reproductive cloning is not expressly prohibited.

Overall, the Surveillance 2016 report depicts that worldwide, ART services have been made more accessible to a larger number of individuals. Barriers to utilization of ART services based on location, marital status, and gender are reported to still exist. There are also reports of ongoing efforts to curtail the practice of ART in some locales. However, the expanding application of ART and participation of all stakeholders acknowledges ART's great clinical value. Much of the legislative and other initiatives over the past three years have sought to promote safety, efficacy, and availability. Surveillance 2016 attests to an expanding scope of ART practices, policies, and activities among nations around the world while highlighting significant and important differences. Several encouraging trends were identified over the triennium and it is hoped that they will promote safety, efficacy, and availability of needed fertility services.

The 2016 IFFS Surveillance was made possible, in part, through the funding of an MSD grant.