National Perinatal Epidemiology and Statistics Unit (NPESU)

Assisted Reproductive Technology in New Zealand 2019

October 2023

Foreword

The Advisory Committee on Assisted Reproductive Technology (ACART) presents this report, Assisted Reproductive Technology in New Zealand 2019, the eleventh New Zealand-specific report based on the Australian and New Zealand Assisted Reproduction Database (ANZARD). The report provides a quantitative summary of the numbers, types and outcomes of assisted reproductive technology (ART) in Aotearoa New Zealand.

This report is provided to contribute largely to ACART's statutory role to monitor the outcomes of ART in Aotearoa New Zealand.

This is the first ANZARD report to include reporting on outcomes by ethnicity. This is consistent with other reporting in Aotearoa New Zealand.

We trust that the report and associated eleven years of data trends obtained from these reports (in table form, available among the monitoring reports, at acart.health.govt.nz) will be useful to the sector including consumers, and researchers of ART health outcomes.

It is interesting to note the overall increase in use of ARTs, and in particular the increase in the percentage of frozen/thawed embryo transfer cycles that were cryopreserved using an ultra-rapid method between 2017 (68.3 percent) and 2018 (81.2 percent). The growth in use of this method over the ten years is indicative of ongoing technological advances in ART. It is important that research is enabled and supported in ART so these technological advances can progress safely. ACART expects to be able to consult on human reproductive research guidelines in the near future.

ACART thanks the Ministry of Health for procuring this report. We also thank the National Perinatal Epidemiology and Statistics Unit at the University of New South Wales for collaborating with ACART to develop the report.

Calum Barrett
Chair, Advisory Committee on Assisted Reproductive Technology
October 2023

Acknowledgments

The Australian and New Zealand Assisted Reproduction Database (ANZARD) is a collaborative effort between the National Perinatal Epidemiology and Statistics Unit (NPESU), the Fertility Society of Australia and New Zealand (FSANZ) and fertility clinics in Australia and New Zealand. The NPESU is a unit within the Centre for Big Data Research in Health and the School of Women's and Children's Health of the University of New South Wales (UNSW), Sydney.

We would like to thank all staff in the fertility centres for their efforts in compiling the data and providing additional information when requested. A list of all contributing fertility clinics can be found in Appendix A.

Abbreviations

ANZARD	Australian and New Zealand Assisted Reproduction Database
ART	assisted reproductive technology
DET	double embryo transfer
DI	donor sperm insemination
FSANZ	Fertility Society of Australia and New Zealand
FSH	follicle stimulating hormone
GIFT	gamete intrafallopian transfer
ICSI	intracytoplasmic sperm injection
IVF	in vitro fertilisation
NPESU	National Perinatal Epidemiology and Statistics Unit
OPU	oocyte pick-up
PGD	preimplantation genetic diagnosis
PGT	preimplantation genetic testing
SD	standard deviation
SET	single embryo transfer
UNSW	University of New South Wales

Symbols

..	not applicable

Contents

Summary

Use of ART treatment cycles

There were 7,880 assisted reproductive technology (ART) treatment cycles reported from New Zealand fertility clinics in 2019. This represented 7.8 cycles per 1,000 women of reproductive age (15-44 years) in New Zealand. Women used their own oocytes/embryos (autologous) in 91.5% of treatments and 47.4% of autologous cycles involved frozen/thawed embryos.

Treatment outcomes and number of babies

Of all the ART treatments in 2019, 28.9% (2,276) resulted in a clinical pregnancy, 22.2% (1,751) resulted in a birth and 21.9% (1,729) in a live birth. There were 1,746 liveborn babies, of which 86.4% (1,508) were singletons at term (gestational age of 37-41 weeks) with normal birthweight (≥2,500 grams).

Women's age and parity

The average age of women undertaking autologous and oocyte/embryo recipient cycles was 35.6 years. For women undergoing oocyte/embryo recipient cycles, the mean age was 39.7 years, four years older than for autologous cycles (mean 35.4 years). Of all autologous and oocyte/embryo recipient cycles, one in five (20.8%) was undertaken by women aged 40 years or older. Where parity was stated, 87.5% of autologous cycles were undertaken by nulliparous women compared with 89.7% for oocyte/embryo recipient cycles.

Autologous fresh cycles

The overall live birth rate per autologous fresh embryo transfer cycle was 29.7%. The highest live birth rate per autologous fresh embryo transfer cycle was in women aged less than 30 years (49.0%) and declined with an increase in women's age. Overall, 96.8% of autologous fresh embryo transfer cycles were single embryo transfer (SET) cycles, 3.2% were double embryo transfer (DET) cycles. The rates of clinical pregnancy and live birth were higher in blastocyst transfer cycles than in cleavage stage embryo transfer cycles regardless of a woman's age.

Autologous thaw cycles

The overall live birth rate per autologous thaw embryo transfer cycle was 31.6%. The highest live birth rate per embryo transfer cycle was in women aged 30-34 years (36.6%). Of the 3,329 frozen/thawed embryo transfer cycles 98.7% were SET cycles and 1.3% were DET cycles. The rates of clinical pregnancy and live birth were higher in blastocyst transfer cycles than in cleavage stage embryo transfer cycles for all women, except for those aged 35-39 years of age.

Births by plurality and maternal age

Of the 1,736 births following autologous and recipient cycles in 2019, 1.3% were multiple gestation births. The proportion of multiple gestation births was less than 2% in all age groups.

Cumulative live birth rates

ANZARD includes data items which make it possible to follow a woman from her first fresh ART treatment cycle through subsequent fresh and thaw cycles. There were 1,785 women identified as having their first fresh autologous cycle in 2017. These women were followed through their subsequent fresh and thaw cycles until 31st December 2019 or until they achieved a live birth (up to October 2020). For women identified in this cohort, the cumulative live birth rate was 28.4% after the first cycle, increasing to 43.7% after two cycles, 51.1% after three cycles, 54.9% after four cycles and 56.5% after five cycles.

1 Introduction

It is estimated that around 15% of couples at any given time experience infertility, representing the source of much personal suffering to millions around the world (World Health Organization, 2010). The common medical definition of 'infertility' is the failure to achieve a clinical pregnancy after 12 or more months of regular unprotected sexual intercourse (Zegers-Hochschild et al. 2017). Infertility is increasingly being overcome through advancements in fertility treatment, such as assisted reproductive technologies (ARTs). ARTs have evolved over the last four decades into a suite of mainstream medical interventions that have resulted in the birth of more than 8 million children worldwide (ESHRE, 2018).

The purpose of this annual report is to inform clinicians, researchers, government and the community about ART treatment and the resulting pregnancy and birth outcomes; to provide ongoing monitoring of ART treatment practices, success rates and perinatal outcomes; and to facilitate national and international comparisons.

The Fertility Society of Australia and New Zealand (FSANZ), in collaboration with the University of New South Wales (UNSW), is committed to providing informative annual statistics on ART treatments and is pleased to present the annual report on the use of ART in New Zealand in 2019.

Treatments covered in this report

ART is a group of procedures that involve the *in vitro* (outside of body) handling of human oocytes (eggs) and sperm or embryos for the purposes of establishing a pregnancy (Zegers-Hochschild et al. 2017). A typical fresh *in vitro* fertilisation (IVF) cycle involves the following five steps:

1. controlled ovarian hyperstimulation during which an ovarian stimulation regimen, typically using follicle stimulating hormone (FSH), is administered to a woman over a number of days to induce the maturation of multiple oocytes
2. oocyte pick-up (OPU) where mature oocytes are aspirated from ovarian follicles
3. fertilisation of the collected oocytes by incubating them with sperm (from the woman's partner or donor) over a few hours in the laboratory
4. embryo maturation during which a fertilised oocyte is cultured for 2–4 days to form a cleavage stage embryo (6–8 cells) or 5–6 days to create a blastocyst (60–100 cells)
5. transfer of one or more fresh embryos into the uterus in order to achieve a pregnancy.

Treatment may be discontinued at any stage during a treatment cycle due to various reasons including inadequate response of ovaries to medication, excessive ovarian stimulation, failure to obtain oocytes, failure of oocyte fertilisation, inadequate embryo growth or patient choice.

Over the last four decades, ART has evolved to encompass complex ovarian hyperstimulation protocols and numerous variations to the typical fresh IVF treatment cycle described above. Some of these variations include:

- Intracytoplasmic sperm injection (ICSI) – when a single sperm is injected directly into the oocyte
- Assisted hatching – when the outer layer of the embryo, the zona pellucida, is either thinned or perforated in the laboratory to aid 'hatching' of the embryo

- Gamete intrafallopian transfer (GIFT) – when mature oocytes and sperm are placed directly into a woman's fallopian tubes so that fertilisation may take place in vivo (inside the body). While once popular, this procedure now accounts for only a very small percentage of ART cycles.
- Preimplantation genetic diagnosis (PGD) – when one or more cells are removed from the embryo and analysed for chromosomal disorders or genetic diseases
- Oocyte donation – when a woman donates her oocytes to others
- Oocyte/embryo recipient – when a woman receives oocytes or embryos from another woman
- Cryopreservation and storage of embryos that are not transferred in the initial fresh treatment cycle. Once thawed or warmed, the embryos can be transferred in subsequent treatment cycles. Cryopreservation techniques include both the traditional slow freezing method and a newer technique called 'vitrification'. Vitrification can be used to cryopreserve gametes and embryos, and uses an ultra-rapid temperature change with exposure to higher concentrations of cryoprotectants.
- Cryopreservation and storage of oocytes and embryos for fertility preservation
- Surrogacy arrangement – where a woman, known as the 'gestational carrier', agrees to carry a child for another person or couple, known as the 'intended parent(s)', with the intention that the child will be raised by the intended parent(s).

Along with ART, there are other fertility treatments that are undertaken in New Zealand. Artificial insemination is one such treatment by which sperm are placed into the female genital tract (for example, intracervical or intrauterine), and can be used with controlled ovarian hyperstimulation or in natural cycles. Artificial insemination can be undertaken using a partner's sperm, or donated sperm, also known as 'donor sperm insemination' (DI).

Data used in this report

This report provides information on ART and DI treatments and the resulting pregnancy and birth outcomes. The data presented in this report were supplied by eight fertility centres and compiled into the Australian and New Zealand Assisted Reproduction Database (ANZARD).

As a joint initiative of the NPESU and FSANZ, ANZARD was upgraded in 2009 to accommodate new ART treatment types and to transform ANZARD from a cycle-based data collection to a woman-based data collection (ANZARD 2.0). A more detailed description of ANZARD 2.0 can be found in Appendix B.

Structure of this report

This report has eight chapters, including this introductory chapter (Chapter 1).

Chapter 2 – 'Overview of ART treatment in 2019', provides an outline of the numbers and outcomes of all ART treatments undertaken in New Zealand.

Chapter 3 – 'Autologous and donation/recipient cycles in 2019', presents data on women undergoing treatment, cycle types, and the outcomes of treatment.

Chapter 4 – 'Pregnancy and birth outcomes following autologous and recipient cycles in 2019', presents data on the outcomes of clinical pregnancies and births following autologous and recipient cycles including a description of perinatal outcomes.

Chapter 5 – ‘Preimplantation genetic testing in 2019’, includes information on the numbers of embryos that had cells removed and analysed for chromosomal disorders or genetic diseases before transfer.

Chapter 6 – ‘Donor insemination cycles in 2019’, presents data on DI cycles and their outcomes, including a description of pregnancy and perinatal outcomes.

Chapter 7 – ‘Trends in ART treatment and outcomes 2015-2019’, presents trends in ART treatment over the last five years of data collection in New Zealand.

Chapter 8 – ‘Cumulative success rates for women undertaking autologous treatment 2017-2019’, presents information on all women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.

Appendices – Appendix A lists the contributing fertility clinics. Appendix B provides an overview of the ANZARD 2.0 data collection that was used to prepare this report.

2 Overview of ART treatment in 2019

There were 7,880 assisted reproductive technology (ART) treatment cycles reported from New Zealand clinics in 2019. This represented 7.8 cycles per 1,000 women of reproductive age (15-44 years) in New Zealand (Statistics New Zealand, 2019). Of these, 91.5% of cycles were autologous cycles (where a woman used or intended to use her own oocytes or embryos).

There were, 7,208 autologous cycles in 2019. Of these, 3,788 (52.6%) were fresh cycles and 3,420 (47.4%) were thaw cycles. Other treatment cycles accounted for a small proportion of cycles comprising 5.5% oocyte recipient cycles, 0.6% embryo recipient cycles, 1.8% oocyte donation cycles and 0.5% surrogacy cycles.

Of all the ART cycles in 2019 in New Zealand, 2,276 (28.9%) resulted in a clinical pregnancy, 1,751 (22.2%) resulted in a birth and 1,729 (21.9%) resulted in a live birth. Of the 1,746 liveborn babies, 1,508 (86.4%) were singletons at term (gestational age of 37-41 weeks) with normal birthweight (≥ 2,500 grams).

Table 1: Number of initiated ART treatment cycles by treatment type, New Zealand, 2019

Treatment type	Number of initiated ART cycles	Percent of treatment types	Number of clinical pregnancies	Number of live births	Number of liveborn babies	Number of liveborn singletons at term with normal birthweight
Autologous	7,208	91.5	2,084	1,569	1,586	1,374
Fresh	*3,788*	*48.1*	*669*	*516*	*521*	*443*
Thaw	*3,420*	*43.4*	*1,415*	*1,053*	*1,065*	*931*
Oocyte recipient	437	5.5	149	128	128	105
Embryo recipient	51	0.6	25	17	17	14
Oocyte donation	143	1.8	..	..	..	..
Surrogacy arrangement cycles	41	0.5	18	15	15	15
Commissioning cycles[(a)]	5	0.1	..	..	..	..
Gestational carrier cycles[(b)]	36	0.5	18	15	15	15
Total	**7,880**	**100.0**	**2,276**	**1,729**	**1,746**	**1,508**

(a) A variety of cycle types undertaken as part of surrogacy arrangements, e.g. cycles undertaken by intended parents or women donating their oocytes or embryos for use by the gestational carrier.
(b) A cycle undertaken by a woman who carries, or intends to carry, a pregnancy on behalf of the intended parents with an agreement that the child will be raised by the intended parent(s).
Note: 'not applicable' is denoted by ..

Ethnicity

In 2019, there were 4,557 women that undertook 7,839 initiated ART treatment cycles (excluding surrogacy cycles) (Table 2 and Table 3). The largest proportion of these cycles was undertaken by women of European ethnicity (54.5%), followed by women of Asian ethnicity (19.9%). Approximately 6% of treatment cycles were undertaken by women of Maori and Pacific Peoples ethnicity (Table 2).

Table 2: Number of initiated ART treatment cycles (excluding surrogacy) by ethnicity, New Zealand, 2019

Ethnicity[a]	Autologous					Total	Mean age (years)[b]
	Fresh	Thaw	Oocyte recipient	Embryo recipient	Oocyte donation		
			n				
European	1,946	1,920	275	34	98	4,273	35.6
Maori	166	135	16	0	6	323	34.2
Pacific Peoples	82	69	7	0	2	160	34.6
Asian	802	698	50	5	6	1,561	35.4
Middle Eastern/Latin American/African	80	70	7	1	5	163	35.9
Other ethnicity	83	84	13	1	2	183	36.6
Residual categories[c]	629	444	69	10	24	1,176	36.0
Total	**3,788**	**3,420**	**437**	**51**	**143**	**7,839**	**35.6**
			%				
European	51.4	56.1	62.9	66.7	68.5	54.5	n/a
Maori	4.4	3.9	3.7	0.0	4.2	4.1	n/a
Pacific Peoples	2.2	2.0	1.6	0.0	1.4	2.0	n/a
Asian	21.2	20.4	11.4	9.8	4.2	19.9	n/a
Middle Eastern/Latin American/African	2.1	2.0	1.6	2.0	3.5	2.1	n/a
Other ethnicity	2.2	2.5	3.0	2.0	1.4	2.3	n/a
Residual categories[c]	16.6	13.0	15.8	19.6	16.8	15.0	n/a
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	n/a

(a) Ethnicity groups descriptions are sourced from the Ministry of Health, New Zealand website.
(b) Age at start of initiated treatment cycle.
(c) Cycles where ethnicity data was not provided by ART Units or was reported as “Don’t know”, “Refused to answer”, “Response unidentifiable” or “Not stated”.

Note: Data are collected for each treatment cycle. Therefore, some individuals may be counted more than once

There were 4,557 women that undertook at least one ART treatment cycle (excluding surrogacy) in 2019. Of these, 1,714 women (37.6%) had a live birth. The mean age of women undertaking ART treatment cycles was 35.5 years. Women of European ethnicity made up more than half (59.2%) of the women that had a live birth. Approximately 23% of women who reported more than one ethnicity (multiple) had a live birth (Table 3).

Table 3: Number of women undertaking ART treatment cycles (excluding surrogacy) by ethnicity, New Zealand, 2019

	Women		Women who had a live birth[b]		Mean age (years) [c]
Ethnicity[a]	**n**	**%**	**n**	**%**	
European	2,451	53.8	1,014	59.2	35.5
Maori	203	4.5	81	4.7	34.3
Pacific Peoples	95	2.1	28	1.6	35.3
Asian	921	20.2	301	17.6	35.5
Middle Eastern/Latin American/African	96	2.1	27	1.6	36.2
Other ethnicity	112	2.5	34	2.0	36.3
Residual categories	657	14.4	224	13.1	35.7
Multiple[d]	22	0.5	5	0.3	36.1
Total	**4,557**	**100.0**	**1,714**	**100.0**	**35.5**

(a) Ethnicity groups descriptions are sourced from the Ministry of Health, New Zealand website.
(b) Excludes oocyte donation cycles because oocyte donation cycles do not involve and embryo transfer in that woman.
(c) Age at start of the first initiated treatment cycle in the treatment year.
(d) Multiple means the woman reported more than one ethnicity.

3 Autologous and donation/recipient cycles in 2019

This chapter presents data on initiated autologous cycles, oocyte donation cycles and oocyte/embryo recipient cycles.

An ‘autologous cycle’ is defined as an ART treatment cycle in which a woman uses or intends to use her own oocytes.

A ‘donation cycle’ is defined as an ART treatment cycle in which a woman donates or intends to donate her oocytes or embryos to others. The use of donor sperm does not influence the donor status of the cycle.

A ‘recipient cycle’ is defined as an ART treatment cycle in which a woman receives oocytes or embryos from another woman.

Autologous and donor/recipient cycles can involve the use of, or intended use of, either fresh or frozen/thawed embryos.

3.1 Overview of autologous and recipient cycles

Age of women and their partners

The average age of women undertaking autologous and oocyte/embryo recipient cycles was 35.6 years (SD 4.6). For women undergoing oocyte/embryo recipient cycles, the mean age was 39.7 years (SD 5.3); an average four years older than women undertaking autologous cycles (mean 35.4 years; SD 4.4). Of all autologous and oocyte/embryo recipient cycles, one in five (20.8%) was undertaken by women aged 40 years or older (Table 4). The average age of partners was 37.9 years (SD 6.2), with one-third (31.7%) aged 40 years or older (Table 5). For 8.1% of autologous and oocyte/embryo recipient cycles, the partner's age was not stated, or no partner was involved.

Table 4: Number of autologous and recipient cycles by women's age group and treatment type, New Zealand, 2019

	Autologous							
	Fresh		Thaw		Oocyte/Embryo Recipient		All	
Age group (years)[(a)]	n	%	n	%	n	%	n	%
<30	398	10.5	310	9.1	19	3.9	727	9.4
30-34	1,133	29.9	1,146	33.5	58	11.9	2,337	30.4
35-39	1,492	39.4	1,399	40.9	139	28.5	3,030	39.4
40-44	725	19.1	532	15.6	196	40.2	1,453	18.9
≥45	40	1.1	33	1.0	76	15.6	149	1.9
Total	**3,788**	**100.0**	**3,420**	**100.0**	**488**	**100.0**	**7,696**	**100.0**

(a) Age at start of treatment cycle.
Note: Data are collected for each treatment cycle. Therefore, some individuals may be counted more than once.

Table 5: Number of autologous and recipient cycles by women's male partners' age group and treatment type, New Zealand, 2019

	Autologous							
	Fresh		Thaw		Oocyte/Embryo Recipient		All	
Age group (years)[(a)]	n	%	n	%	n	%	n	%
<30	222	5.9	170	5.0	14	2.9	406	5.3
30-34	885	23.4	837	24.5	56	11.5	1,778	23.1
35-39	1,137	30.0	1,180	34.5	130	26.6	2,447	31.8
40-44	702	18.5	691	20.2	128	26.2	1,521	19.8
≥45	427	11.3	375	11.0	116	23.8	918	11.9
Not stated	415	11.0	167	4.9	44	9.0	626	8.1
Total	**3,788**	**100.0**	**3,420**	**100.0**	**488**	**100.0**	**7,696**	**100.0**

(a) Age at start of treatment cycle.
Note: Data are collected for each treatment cycle. Therefore, some individuals may be counted more than once.

Parity

Parity is the number of previous pregnancies of 20 weeks or more gestation experienced by a woman. A woman who has had no previous pregnancies of 20 or more weeks gestation is called nulliparous. A woman who has had at least one previous pregnancy of 20 weeks or more gestation is described as parous. Where parity was stated, 87.5% of autologous cycles compared with 89.7% of oocyte/embryo recipient cycles, were undertaken by nulliparous women (Table 6).

Table 6: Number of autologous and recipient cycles by parity and treatment type, New Zealand, 2019

	Autologous							
	Fresh		Thaw		Oocyte/Embryo Recipient		All	
Parity	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Nulliparous	813	21.5	600	17.5	79	16.2	1,492	19.4
Parous	86	2.3	116	3.4	9	1.8	211	2.7
Not stated	2,889	76.3	2,704	79.1	400	82.0	5,993	77.9
Total	**3,788**	**100.0**	**3,420**	**100.0**	**488**	**100.0**	**7,696**	**100.0**

Note: Data are collected for each treatment cycle. Therefore, some individuals may be counted more than once.

Intracytoplasmic sperm injection (ICSI) procedures

Of the 3,115 autologous fresh cycles where fertilisation was attempted, 1,645 (52.8%) used ICSI procedures and 1,470 (47.2%) used IVF procedures.

Table 7: Number of autologous and recipient cycles with fertilisation attempted by treatment type and procedure, New Zealand, 2019

	Autologous				Oocyte/Embryo Recipient			
	Fresh[(a)]		Thaw[(b)]		Fresh[(a)]		Thaw[(b)]	
Procedure	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
IVF	1,470	47.2	1,535	46.1	70	50.4	144	41.9
ICSI[(c)]	1,645	52.8	1,794	53.9	69	49.6	198	57.6
Not stated	0	0	0	0	0	0	2	0.6
Total	**3,115**	**100.0**	**3,329**	**100.0**	**139**	**100.0**	**344**	**100.0**

(a) Fresh cycles where fertilisation was attempted.
(b) Thaw cycles where embryos were transferred.
(c) Mixed IVF/ICSI cycles were classed as ICSI cycles.

Number of embryos transferred

Of the 5,421 fresh and thawed autologous and recipient embryo transfer cycles, 98.2% were single embryo transfer (SET) cycles and 1.8% were double embryo transfer (DET) cycles. There were no cycles that involved the transfer of three or more embryos. In women aged under 35, 99.6% of embryo transfer cycles were SET cycles and 0.4% were DET cycles. In women aged 35 or older, 97.2% of cycles were SET cycles and 2.8% were DET cycles (Table 8).

Table 8: Number of embryo transfer cycles by number of embryos transferred per cycle and women's age group, New Zealand, 2019

	Number of embryos transferred							
	One		Two		Three or more		All	
Age group (years)[(a)]	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
<30	464	99.6	2	0.4	0	0.0	466	100.0
30-34	1,675	99.6	7	0.4	0	0.0	1,682	100.0
35-39	2,134	98.3	38	1.7	0	0.0	2,172	100.0
40-44	945	95.0	50	5.0	0	0.0	995	100.0
≥45	103	97.2	3	2.8	0	0.0	106	100.0
Total	**5,321**	**98.2**	**100**	**1.8**	**0.0**	**0.0**	**5,421**	**100.0**

(a) Age at start of a treatment cycle.

Stage of embryo development

Of the 5,421 embryo transfer cycles, 84.5% involved the transfer of blastocysts (day 5-6 embryos) with the remaining transfers involving cleavage stage embryos (day 2-4 embryos). Of autologous cycles, blastocyst transfers made up 98.9% of thaw cycles compared with 54.2% of fresh cycles (Table 9).

Table 9: Number of embryo transfer cycles by treatment type and stage of embryo development, New Zealand, 2019

	Autologous				Oocyte/embryo recipient			
	Fresh		Thaw		Fresh		Thaw	
Type and procedure	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cleavage embryo	796	45.8	35	1.1	1	8.3	8	2.3
Blastocyst	942	54.2	3,294	98.9	11	91.7	334	97.7
Total	**1,738**	**100.0**	**3,329**	**100.0**	**12**	**100.0**	**342**	**100.0**

Transfer of cryopreserved embryos

Embryos created in a fresh cycle can be cryopreserved by either slow freezing or ultra-rapid cryopreservation (vitrification) methods. Slow frozen and vitrified embryos can be thawed/warmed and then transferred in subsequent cycles. Of the 3,671 frozen/thawed embryo transfer cycles, 88.9% involved the transfer of vitrified embryos.

Table 10: Number of embryo transfer cycles by freezing method and stage of embryo development, New Zealand, 2019

	Autologous				Oocyte/embryo recipient			
	Cleavage embryo		Blastocyst		Cleavage embryo		Blastocyst	
Type and procedure	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Slow frozen embryo	27	77.1	374	11.4	5	62.5	41	12.3
Vitrified embryo[(a)]	8	22.9	2,920	88.6	3	37.5	293	87.7
Total	**35**	**100.0**	**3,294**	**100.0**	**8**	**100.0**	**334**	**100.0**

(a) Ultra-rapid cryopreservation.

3.2 Autologous fresh cycles

Clinical pregnancies and live births from autologous fresh cycles by women's age

The overall live birth rate per autologous fresh embryo transfer cycle was 29.7%. The highest live birth rate per embryo transfer cycle was in women aged less than 30 years (49.0%). This rate declined with advancing women's age (Table 11).

Table 11: Outcomes of autologous fresh cycles by women's age group, New Zealand, 2019

	Age group (years) [a]					
Stage/outcome of treatment	**< 30**	**30-34**	**35-39**	**40-44**	**≥ 45**	**All**
Initiated cycles	398	1,133	1,492	725	40	3,788
Freeze-all cycles	209	463	499	149	7	1,327
Cycles with OPU	378	1,057	1,351	582	30	3,398
Embryo transfers	149	519	717	335	18	1,738
Clinical pregnancies	79	231	283	73	3	669
Live births	73	195	202	45	1	516
Live births per initiated cycle (%)	*18.3*	*17.2*	*13.5*	*6.2*	*2.5*	*13.6*
Live births per initiated cycle (excluding freeze-all) (%)	*38.6*	*29.1*	*20.3*	*7.8*	*3.0*	*21.0*
Live births per embryo transfer cycle (%)	*49.0*	*37.6*	*28.2*	*13.4*	*5.6*	*29.7*
Live births per clinical pregnancy (%)	*92.4*	*84.4*	*71.4*	*61.6*	*33.3*	*77.1*

(a) Age at start of a treatment cycle.
(b) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

Clinical pregnancies and live births by number of embryos transferred from autologous fresh cycles

Overall, 96.8% of autologous fresh embryo transfer cycles were SET cycles and 3.2% were DET cycles. Overall, the live birth rate per embryo transfer cycle was 30.1% for SET cycles and 18.2% for DET cycles (Table 12).

Table 12: Outcomes of autologous fresh embryo transfer cycles by women's age and number of embryos transferred, New Zealand, 2019

	Age group (years)[a]							
	< 35		**35-39**		**≥ 40**		**All**	
Stage/outcome of treatment	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**
Embryo transfer cycles	666	2	701	16	316	37	1,683	55
Clinical pregnancies	310	0	277	6	71	5	658	11
Live births	268	0	197	5	41	5	506	10
Clinical pregnancies per embryo transfer cycle (%)	*46.5*	*0.0*	*39.5*	*37.5*	*22.5*	*13.5*	*39.1*	*20.0*
Live births per embryo transfer cycle (%)	*40.2*	*0.0*	*28.1*	*31.3*	*13.0*	*13.5*	*30.1*	*18.2*

(a) Age at start of a treatment cycle.
(b) SET: single embryo transfer.
(c) DET: double embryo transfer.

Clinical pregnancies and live births by stage of embryo development from autologous fresh cycles

The rates of clinical pregnancy and live birth were higher in blastocyst transfer cycles than in cleavage stage embryo transfer cycles regardless of a woman's age (Table 13). Overall, the live birth rate for blastocyst transfer cycles (38.1%) was 18 percentage points higher than for cleavage stage embryo transfer cycles (19.7%).

Table 13: Outcomes of autologous fresh embryo transfer cycles by women's age and stage of embryo development, New Zealand, 2019

	Age group (years)[a]							
	< 35		35-39		≥ 40		All	
Stage/outcome of treatment	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**
Embryo transfer cycles	260	408	342	375	194	159	796	942
Clinical pregnancies	84	226	110	173	27	49	221	448
Live births	70	198	74	128	13	33	157	359
Clinical pregnancies per embryo transfer cycle (%)	*32.3*	*55.4*	*32.2*	*46.1*	*13.9*	*30.8*	*27.8*	*47.6*
Live births per embryo transfer cycle (%)	*26.9*	*48.5*	*21.6*	*34.1*	*6.7*	*20.8*	*19.7*	*38.1*

a) Age at start of a treatment cycle.
(b) CL: cleavage stage embryo.
(c) BL: blastocyst.

3.3 Autologous thaw cycles

Clinical pregnancies and live births from autologous thaw cycles by women's age

The overall live birth rate per autologous thaw embryo transfer cycle was 31.6%. The highest live birth rate per embryo transfer cycle (36.6%) was among women aged 30-34 years and the highest live birth rate per clinical pregnancy (83.2%) was in women aged less than 30 years (Table 14). It is important to note that embryos thawed during a thaw cycle were created during an earlier initiated fresh cycle, therefore a women's age at the start of a thaw cycle is older than her age at the start of the initiated fresh cycle.

Table 14: Outcomes of autologous thaw cycles by women's age group, New Zealand, 2019

	Age group (years) [a]					
Stage/outcome of treatment	**<30**	**30-34**	**35-39**	**40-44**	**≥ 45**	**All**
Initiated cycles	310	1,146	1,399	532	33	3,420
Embryo transfers	304	1,127	1,351	516	31	3,329
Clinical pregnancies	131	550	557	173	4	1,415
Live births	109	413	413	114	4	1,053
Live births per initiated cycle (%)	*35.2*	*36.0*	*29.5*	*21.4*	*12.1*	*30.8*
Live births per embryo transfer cycle (%)	*35.9*	*36.6*	*30.6*	*22.1*	*12.9*	*31.6*
Live births per clinical pregnancy (%)	*83.2*	*75.1*	*74.1*	*65.9*	*100.0*	*74.4*

(a) Age at start of a treatment cycle.

Clinical pregnancies and live births by number of embryos transferred from autologous thaw cycles

Of the 3,329 autologous thaw embryo transfer cycles, 98.7% were SET cycles and 1.3% were DET cycles. In total, there were 1,415 clinical pregnancies and 1,053 live births. SET cycles had a higher percentage of live births per embryo transfer cycle (31.8%) than DET cycles (20.5%) (Table 15).

Table 15: Outcomes of autologous thaw embryo transfer cycles by women's age and number of embryos transferred, New Zealand, 2019

	Age group (years) [a]							
	<35		**35-39**		**≥ 40**		**All**	
Stage/outcome of treatment	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**	**SET[b]**	**DET[c]**
Embryo transfer cycles	1,424	7	1,329	22	532	15	3,285	44
Clinical pregnancies	677	4	543	14	174	3	1,394	21
Live births	519	3	408	5	117	1	1,044	9
Clinical pregnancies per embryo transfer cycle (%)	*47.5*	*57.1*	*40.9*	*63.6*	*32.7*	*20.0*	*42.4*	*47.7*
Live births per embryo transfer cycle (%)	*36.4*	*42.9*	*30.7*	*22.7*	*22.0*	*6.7*	*31.8*	*20.5*

(a) Age at start of a treatment cycle.
(b) SET: single embryo transfer.
(c) DET: double embryo transfer.

Clinical pregnancies and live births by stage of embryo development from autologous thaw cycles

The rates of clinical pregnancy and live birth were higher for blastocyst transfer cycles than for cleavage stage embryo transfer cycles for women regardless of age, except for women aged 35-39 years of age. Overall, the rate of live birth for blastocyst transfer cycles (31.7%) was 6 percentage points higher than for cleavage stage embryo transfer cycles (25.7%) (Table 16).

Table 16: Outcomes of autologous thaw embryo transfer cycles by women's age and stage of embryo development, New Zealand, 2019

	Age group (years) [a]							
	<35		35-39		≥ 40		All	
Stage/outcome of treatment	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**	**CL[b]**	**BL[c]**
Embryo transfer cycles	10	1,421	16	1,335	9	538	35	3,294
Clinical pregnancies	2	679	7	550	1	176	10	1,405
Live births	2	520	6	407	1	117	9	1,044
Clinical pregnancies per embryo transfer cycle (%)	*20.0*	*47.8*	*43.8*	*41.2*	*11.1*	*32.7*	*28.6*	*42.7*
Live births per embryo transfer cycle (%)	*20.0*	*36.6*	*37.5*	*30.5*	*11.1*	*21.7*	*25.7*	*31.7*

(a) Age at start of a treatment cycle.
(b) CL: cleavage stage embryo.
(c) BL: blastocyst.

3.4 Donation and recipient cycles

Oocyte donation cycles

Of the 143 cycles where the intention was to donate oocytes to a recipient, all but seven cycles proceeded to OPU with 136 (95.1%) of these cycles resulting in oocytes being donated. The average age of women donating oocytes was 32.1 years with 37.1% of oocyte donation cycles undertaken by women aged 35 or older (Table 17).

Table 17: Number of oocyte donation cycles by donor's age group, New Zealand, 2019

Age group (years)[(a)]	Initiated cycles (number)	Cycles with OPU performed (number)	Cycles with OPU performed (percent)	Cycles with oocytes donated (number)	Cycles with oocytes donated (percent)
< 30	42	42	100.0	42	100.0
30-34	48	47	97.9	47	97.9
35-39	49	43	87.8	43	87.8
≥40	4	4	100.0	4	100.0
Total	**143**	**136**	**95.1**	**136**	**95.1**

(a) Age at start of a treatment cycle.

Clinical pregnancies and live births from oocyte/embryo recipient cycles by type of recipient cycle

There were 488 oocyte/embryo recipient cycles in 2019, the majority of which were oocyte recipient cycles (89.5%). Of the 437 cycles involving donated oocytes, 68.2% were thaw cycles (Table 18). Of the 293 thaw oocyte recipient cycles that proceeded to embryo transfer, 42.3% resulted in a live birth, nearly as similar rate per embryo transfer for fresh oocyte recipient cycles (40.0%). The live birth rate per embryo transfer for embryo recipient cycles was 33.3%.

Table 18: Outcomes of oocyte/embryo recipient cycles by treatment type, New Zealand, 2019

Stage/outcome of treatment	Oocyte recipient		Embryo recipient	All
	Fresh	Thaw		
Initiated cycles	139	298	51	488
Embryo transfers	10	293	51	354
Clinical pregnancies	4	145	25	174
Live births	4	124	17	145
Live births per initiated cycle (%)	*2.9*	*41.6*	*33.3*	*29.7*
Live births per embryo transfer cycle (%)	*40.0*	*42.3*	*33.3*	*41.0*
Live births per clinical pregnancy (%)	*100.0*	*85.5*	*68.0*	*83.3*

Clinical pregnancies and live births from oocyte/embryo recipient cycles by recipient's age

The clinical pregnancy and live birth rates of recipient cycles varied by recipient's age group. The overall live birth rate per initiated cycle was 29.7%. Across the five age categories, live birth rates per initiated cycle ranged between 27.6% and 31.6% (Table 19). Recipients aged less than 30 or 45 or more years of age had the highest live birth rate per oocyte/embryo recipient cycle (31.6%). These rates compare to live birth rates in Table 11 and Table 14 from autologous fresh and thaw cycles for women aged <30 (18.3% and 35.2% respectively) and women aged 45 or more (2.5% and 12.1% respectively).

Table 19: Outcomes of oocyte/embryo recipient cycles by recipient's age group, New Zealand, 2019

	Age group (years)[(a)]					
Stage/outcome of treatment	**< 30**	**30-34**	**35-39**	**40-44**	**≥ 45**	**All**
Initiated cycles	19	58	139	196	76	488
Embryo transfers	13	36	104	144	57	354
Clinical pregnancies	7	20	49	69	29	174
Live births	6	16	41	58	24	145
Live births per initiated cycle (%)	*31.6*	*27.6*	*29.5*	*29.6*	*31.6*	*29.7*
Live births per embryo transfer cycle (%)	*46.2*	*44.4*	*39.4*	*40.3*	*42.1*	*41.0*
Live births per clinical pregnancy (%)	*85.7*	*80.0*	*83.7*	*84.1*	*82.8*	*83.3*

(a) Age at start of a treatment cycle.

Clinical pregnancies and live births from oocyte/embryo recipient cycles by donor's age

The overall live birth rate per embryo transfer cycle was 41.0%. Across age categories, the live birth rate per initiated cycle ranged between 15.4% and 34.3%, with the highest live birth rate in the 30 to 34 years old age group (Table 20).

Table 20: Outcomes of oocyte/embryo recipient cycles by donor's age group, New Zealand, 2019

	Age group (years)[(a)]				
Stage/outcome of treatment	**< 30**	**30-34**	**35-39**	**≥ 40**	**All[)]**
Initiated cycles	141	181	153	13	488
Embryo transfers	97	138	111	8	354
Clinical pregnancies	46	73	53	2	174
Live births	39	62	42	2	145
Live births per initiated cycle (%)	*27.7*	*34.3*	*27.5*	*15.4*	*29.7*
Live births per embryo transfer cycle (%)	*40.2*	*44.9*	*37.8*	*25.0*	*41.0*
Live births per clinical pregnancy (%)	*84.8*	*84.9*	*79.2*	*100.0*	*83.3*

(a) Age at start of treatment cycle.

4 Pregnancy and birth outcomes following autologous and recipient cycles in 2019

There were 2,258 clinical pregnancies following autologous and recipient embryo transfer cycles in 2019. Three out of four clinical pregnancies (76.9%) resulted in a birth and 22.8% resulted in early pregnancy loss (less than 20 weeks gestation or less than 400 grams birthweight). The outcomes of 0.3% clinical pregnancies were not known because women could not be followed up or contacted by fertility centres.

Early pregnancy loss

Of the 515 early pregnancy losses, 90.3% were miscarriages, 7.0% were due to termination of pregnancy, and 2.7% were ectopic/heterotopic pregnancies. Pregnancies following SET resulted in a lower rate of early pregnancy loss (22.6%) than pregnancies following DET (36.4%).

Table 21: Early pregnancy losses by pregnancy outcome and treatment type, New Zealand, 2019

	Autologous							
	Fresh		Thaw		Oocyte/embryo recipient		All	
	n	%	n	%	n	%	n	%
Early pregnancy loss	147	22.0	342	24.2	26	14.9	515	22.8
Miscarriage	*130*	*19.4*	*309*	*21.8*	*26*	*14.9*	*465*	*20.6*
Termination	*10*	*1.5*	*26*	*1.8*	*0*	*0.0*	*36*	*1.6*
Ectopic or heterotopic pregnancy	*7*	*1.0*	*7*	*0.5*	*0*	*0.0*	*14*	*0.6*
Birth	521	77.9	1067	75.4	148	85.1	1,736	76.9
Not stated	1	0.1	6	0.4		0.0	7	0.3
Total	**669**	**100.0**	**1,415**	**100.0**	**174**	**100.0**	**2,258**	**100.0**

Birth outcomes and treatment type

There were 1,736 women who gave birth to at least one baby of 20 weeks or more gestation or at least 400 grams birthweight following embryo transfer cycles. Of these, 98.7% (1,714) gave birth to at least one liveborn baby (live birth) (Table 22).

Table 22: Births by birth outcome and treatment type, New Zealand, 2019

	Autologous							
	Fresh		Thaw		Oocyte/embryo recipient		All	
	n	%	n	%	n	%	n	%
Live birth	516	99.0	1053	98.7	145	98.0	1,714	98.7
< 37 weeks	*50*	*9.6*	*83*	*7.8*	*19*	*12.8*	*152*	*8.8*
≥ 37 weeks	*466*	*89.4*	*970*	*90.9*	*126*	*85.1*	*1,562*	*90.0*
Gestational age unknown		*0.0*		*0.0*	*0*	*0.0*	*0*	*0.0*
Stillbirth[(a)]	4	0.8	14	1.3	3	2.0	21	1.2
Not stated	1	0.2	0	0.0	0	0.0	1	0.1
Total	**521**	**100.0**	**1067**	**100.0**	**148**	**100.0**	**1,736**	**100.0**

(a) Stillbirth is reported by patients to fertility centre staff. These data are not vital statistics.

Births by plurality and maternal age

The average age of women at the time of birth was 35.7 years. Of the 1,736 autologous and recipient births, 1.3% were multiple gestation births (Table 23).

Table 23: Births by plurality and maternal age, New Zealand, 2019

	Age group (years)[a]								
	< 35			35-39			≥ 40		
	One embryo	Two embryos	All	One embryo	Two embryos	All[b]	One embryo	Two embryos	All[b]
				n					
Singleton	701	2	703	688	8	696	312	7	319
Multiple	9	1	10	4	2	6	1	1	2
Twin	*9*	*1*	*10*	*4*	*2*	*6*	*1*	*1*	*2*
Higher order multiple	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total	**710**	**3**	**713**	**692**	**10**	**702**	**313**	**8**	**321**
				%					
Singleton	98.7	66.7	98.6	99.4	80.0	99.1	99.7	87.5	99.4
Multiple	1.3	33.3	1.4	0.6	20.0	0.9	0.3	12.5	0.6
Twin	*1.3*	*33.3*	*1.4*	*0.6*	*20.0*	*0.9*	*0.3*	*12.5*	*0.6*
Higher order multiple	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Age at time of birth.
(b) Includes three or more embryos.

Gestational age of babies

The average gestational age of babies born following autologous and recipient embryo transfer cycles was 38.3 weeks (Table 24). One in ten babies (10.5%) were preterm (less than 37 weeks gestation); the average gestational age of ART singletons was 38.4 weeks, while the average gestational age for ART twins was 32.9 weeks.

Table 24: Babies by gestational age and plurality, New Zealand, 2019

Gestational age (weeks)	Singletons		Twins		Higher order multiples		Total	
Mean (SD)	*38.4 (2.5)*		*32.9 (4.1)*		-		*38.3 (2.7)*	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
≤ 27	23	1.3	4	11.1	0	0.0	27	1.5
28-31	19	1.1	6	16.7	0	0.0	25	1.4
32-36	113	6.6	20	55.6	0	0.0	133	7.6
≥ 37	1,563	91.0	6	16.7	0	0.0	1,569	89.5
Total	**1,718**	**100.0**	**36**	**100.0**	**0**	**0.0**	**1,754**	**100.0**

Birth outcomes

The average birthweight for liveborn babies to women who had autologous and recipient embryo transfer cycles was 3,319 grams. Of all liveborn babies, 8.4% were low birthweight (less than 2,500 grams) (Table 25). The average birthweight was 3,346 grams and 2,006 grams for liveborn ART singletons and twins, respectively. Low birthweight was reported for 7.1% of liveborn singletons following SET and 5.9% of liveborn singletons following DET.

Table 25: Liveborn babies by birthweight group and plurality, New Zealand, 2019

	Singletons				
Birthweight (grams)	**SET[(a)]**	**DET[(b)]**	**Twins**	**Higher order multiples**	**Total**
			n		
< 1,000	*7*	*0*	*4*	*0*	*11*
1,000-1,499	*10*	*0*	*3*	*0*	*13*
1,500-1,999	*27*	*0*	*8*	*0*	*35*
2,000-2,499	*75*	*1*	*11*	*0*	*87*
< 2,500	119	1	26	0	146
2,500-2,999	269	0	6	0	275
3,000-3,499	575	7	2	0	584
3,500-3,999	501	6	0	0	507
≥ 4,000	204	3	0	0	207
Not stated	12	0	0	0	12
Total	**1,680**	**17**	**34**	**0**	**1,731**
			%		
< 1,000	*0.4*	*0.0*	*11.8*	..	*0.6*
1,000-1,499	*0.6*	*0.0*	*8.8*	..	*0.8*
1,500-1,999	*1.6*	*0.0*	*23.5*	..	*2.0*
2,000-2,499	*4.5*	*5.9*	*32.4*	..	*5.0*
< 2,500	7.1	5.9	76.5	..	8.4
2,500-2,999	16.0	0.0	17.6	..	15.9
3,000-3,499	34.2	41.2	5.9	..	33.7
3,500-3,999	29.8	35.3	0.0	..	29.3
≥ 4,000	12.1	17.6	0.0	..	12.0
Not stated	0.7	0.0	0.0	..	0.7
Total	**100.0**	**100.0**	**100.0**	..	**100.0**

(a) SET: single embryo transfer.
(b) DET: double embryo transfer.
.. not applicable

5 Preimplantation genetic testing in 2019

Preimplantation genetic testing (PGT) is a procedure where DNA from oocytes or embryos is tested for chromosomal disorders or genetic diseases before embryo transfer. This term includes preimplantation genetic diagnosis (PGD) and preimplantation genetic screening (PGS). The indication for PGT is not recorded in ANZARD. In 2019, PGT was performed in 637 cycles, representing 9.2% of cycles in which embryos were created or thawed. Among the 637 PGT cycles, 245 (38.7%) were part of a freeze-all cycle. Of the 392 PGT cycles (excluding freeze-all cycles), 326 (83.2%) had embryos transferred, resulting in 141 (36%) clinical pregnancies and 115 (29.3%) live births.

Table 26: Number of cycles with PGT by type of embryo, New Zealand, 2019

	Stage of treatment			
Type of embryo	**Number of cycles with fresh or thawed embryos**	**Number of cycles with PGT**	**Number of embryo transfers following PGT**	**Number of live births following PGT**
Fresh	3,147	289	32	10
Freeze-all cycles	*1,089*	*245*	*..*	*..*
Thaw	3,767	348	294	105
Total	**6,914**	**637**	**326**	**115**

.. not applicable
PGT: Preimplantation genetic testing

6 Donor insemination cycles in 2019

Donor sperm insemination (DI) covers a range of techniques of placing sperm into the female genital tract using donated sperm from a man who is not the woman's partner. The information presented in this section only describes DI cycles undertaken in fertility centres in New Zealand and does not include DI undertaken outside of this setting.

In 2019, there were 376 DI cycles reported, which included 1 (<1%) undertaken with controlled ovarian hyperstimulation and 375 (99.7%) undertaken in unstimulated cycles. Of all DI cycles, 20.2% resulted in a clinical pregnancy and 16.0% resulted in a live birth (Table 27). There was one multiple birth following DI cycles in 2019. The average age of women who had a DI cycle was 34.8 years. The clinical pregnancy rate and live birth rate were highest in women aged less than 30 years. The live birth rate decreased with advancing woman's age. Of the DI cycles in women aged under 35 years, 22.2% resulted in a live birth, compared with 2.9% of DI cycles in women aged 40 years or older (Table 25).

Table 27: Outcomes of DI cycles by women's age group, New Zealand, 2019

	Age group (years)[(a)]				
	< 30	**30-34**	**35-39**	**≥ 40**	**Overall**
DI cycles	50	134	124	68	376
Controlled ovarian hyperstimulation	*0*	*0*	*0*	*1*	*1*
Unstimulated cycles	*50*	*134*	*124*	*67*	*375*
Clinical pregnancies	13	33	26	4	76
Live births	13	28	17	2	60
Clinical pregnancies per DI cycle (%)	*26.0*	*24.6*	*21.0*	*5.9*	*20.2*
Live births per DI cycle (%)	*26.0*	*20.9*	*13.7*	*2.9*	*16.0*
Live births per clinical pregnancy (%)	*100.0*	*84.8*	*65.4*	*50.0*	*78.9*

(a) Age at start of treatment cycle.
DI: Donor sperm insemination

Clinical pregnancies

Of the 76 clinical pregnancies following DI cycles, 16 (21.1%) ended in early pregnancy loss. Of the 60 live births, 59 (98.3%) were singleton births and 1 (1.7%) was a twin birth.

Perinatal outcomes of babies

There were 61 babies born to women who had DI treatment, all of which were liveborn. Of these, 2 were born preterm (less than 37 weeks gestation). The mean birthweight of liveborn babies was 3,406 grams (SD 632). There were 3 liveborn babies (4.9%) born with low birthweight (less than 2,500 grams).

7 Trends in ART treatment and outcomes 2015-2019

This section includes autologous cycles, donation/recipient cycles and surrogacy cycles undertaken in New Zealand from 2015 to 2019. It does not include DI cycles.

In 2019, 7,880 initiated fresh or thaw ART treatment cycles were undertaken in New Zealand. This was an increase of 2.0% compared to 2018 and an increase of 26.2% from 2015 (Table 28). Between 2015 and 2019, the live birth rates per initiated cycle ranged from 21.9% to 23.2%. The live birth rate per initiated cycle (excluding freeze-all) has been relatively stable between 24.6% and 27% since 2015 (Table 28).

Table 28: Number of fresh and thaw cycles by stage/outcome of treatment, New Zealand, 2015-2019

Stage/outcome of treatment	2015	2016	2017	2018	2019
Initiated cycles[(a)]	6,242	6,705	7,273	7,723	7,880
Cycles with OPU[(b)]	3,397	3,404	3,488	3,502	3,537
Freeze-all	542	766	986	1,213	1,327
Embryo transfers	4,821	4,884	5,055	5,416	5,457
Clinical pregnancies	1,766	1,924	2,060	2,194	2,276
Live births	1,401	1,556	1,625	1,755	1,729
Clinical pregnancies per initiated cycle (%)	*28.3*	*28.7*	*28.3*	*28.4*	*28.9*
Clinical pregnancies per embryo transfer (%)	*36.7*	*39.4*	*40.8*	*40.5*	*41.7*
Live births per initiated cycle (%)	*22.4*	*23.2*	*22.3*	*22.7*	*21.9*
Live births per initiated cycle (excluding freeze-all[(c)]) (%)	*24.6*	*26.2*	*25.8*	*27*	*26.4*
Live births per embryo transfer (%)	*29.1*	*31.9*	*32.1*	*32.4*	*31.7*

(a) Included autologous cycles, oocyte donation cycles, oocyte/embryo recipient cycles, and surrogacy cycles.
(b) Cycles with OPU included cycles where no oocytes were collected during the procedure.
(c) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

8 Cumulative success rates for women undertaking autologous treatment 2017-2019

This section presents information on all women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017. The first cycle is identified according to first stimulation data reported by clinics plus the first occurrence of the woman's autologous fresh cycle in 2017. Women were followed from the start of their first autologous fresh cycle through subsequent fresh and thaw cycles, excluding freeze-all cycles, until 31st December 2019 or until they achieved a live birth (a birth of at least one liveborn baby) up to and including 31st October 2020. This longitudinal perspective provides a measure of the outcomes of successive ART treatment cycles undertaken by the same woman up to her first birth following ART treatment. These women might have had additional treatment cycles after 2019 and their treatment information and resulting outcomes will be captured in subsequent annual reports. Therefore, in this dynamic cohort of women undergoing their first autologous fresh ART treatment between 1st January 2017 and 31st December 2017, the cumulative success rates may increase over time as women return for treatment at a later date.

ART treatment cycles presented in Tables 29 to 34 include all initiated autologous fresh and thaw cycles, excluding freeze-all cycles. Cycles which were cancelled at any stage and did not proceed to oocyte collection or embryo transfer are included. Donor sperm insemination cycles, oocyte/embryo recipient cycles, oocyte/embryo donation cycles, surrogacy arrangement cycles and gamete intrafallopian transfer (GIFT) cycles are not included. A pregnancy that ends before 20 weeks gestation or a stillbirth are not counted as a live birth.

Table 29 presents the number of cycles by women's age group. Tables 30 to 34 present cycle-specific live birth rates, non-progression rates and cumulative live birth rates for all age groups and women aged under 30 years, between 30-34 years, between 35-39 years and over 40 years. Only the first five cycles are presented due to the small number of women undertaking six or more treatment cycles between 1st January 2017 and 31st December 2019.

Definitions and calculations

- The cycle-specific live birth rate for a specific number of cycles is calculated as the number of live births resulting from the specific number of cycles divided by the number of women who undertook that cycle number. For instance, in Table 30, the cycle-specific live birth rate of 24.4% for cycle number three represents the proportion of women who undertook a third cycle and achieved a live birth in that cycle.
- The non-progression rate for a specific cycle is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that cycle. For example, the non-progression rate of 31.7% for a third cycle represents the proportion of women who did not achieve a live birth in their third cycle and did not progress to a fourth cycle (Table 30). The reasons surrounding a woman's or couple's choice to not return to or progress with further treatment, include poor prognosis, natural pregnancy, migration, financial, psychological, and other unrelated reasons; these are not collected by ANZARD.

The cumulative live birth rate for a specific cycle is calculated as the total number of live births following this cycle and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017. For example, the cumulative live birth rate of 51.1% for the third cycle represents the proportion of women who started ART treatment in 2017 and achieved a live birth following their first three cycles (Table 28). Note that only the first birth to a woman is counted in cumulative live birth rates.

Table 29: Number of cycles by women's age group for all women who started their first autologous fresh cycle (excluding freeze-all cycles[a]) between 1st January 2017 and 31st December 2017, New Zealand

	Age group (years)[b]				
Cycle number	**< 30**	**30-34**	**35-39**	**≥ 40**	**All**
			n		
One	134	266	256	118	774
Two	59	146	185	75	465
Three	24	93	111	36	264
Four	10	47	60	17	134
Five or more	19	51	61	17	148
Total	**246**	**603**	**673**	**263**	**1,785**
			%		
One	54.5	44.1	38.0	44.9	43.4
Two	24.0	24.2	27.5	28.5	26.1
Three	9.8	15.4	16.5	13.7	14.8
Four	4.1	7.8	8.9	6.5	7.5
Five or more	7.7	8.5	9.1	6.5	8.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.
(b) Age at start of first autologous fresh ART treatment cycle undertaken in 2017.

Note: Women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017 were followed through subsequent fresh and thaw cycles (excluding freeze-all cycles) until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020. Totals and subtotals may not equal 100.0 due to rounding. Data should be interpreted with caution due to small numbers in certain cells.

Table 30: Cycle-specific and cumulative live birth rates for all women who started their first autologous fresh cycle (excluding freeze-all cycles[f]) between 1st January 2017 and 31st December 2017, New Zealand, 2017-2019

Cycle Number[a]	Number of women starting cycle	Number of women who had a live birth[b]	Cycle-specific live birth rate (%)[c]	Number of women who did not progress to next treatment	Non-progression rate (%)[d]	Cumulative live birth rate (%)[e]
One	1,785	507	28.4	267	20.9	28.4
Two	1,011	273	27.0	192	26.0	43.7
Three	546	133	24.4	131	31.7	51.1
Four	282	67	23.8	67	31.2	54.9
Five	148	29	19.6	48	40.3	56.5

(a) Cycle one represents a woman's first autologous (excluding freeze-all) fresh ART treatment cycle between 1st January 2017 and 31st December 2017. Cycles two to five could be either a fresh or thaw cycle (excluding freeze-all cycles) undertaken by a woman until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020.
(b) A live birth is the birth of one or more liveborn infants, with the birth of twins or higher order multiples counted as one live birth.
(c) The cycle-specific live birth rate is calculated as the number of live births resulting from a specific 'cycle number' divided by the number of women who undertook that same 'cycle number'.
(d) The non-progression rate for a specific 'cycle number' is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that 'cycle number'.
(e) The cumulative live birth rate for a specific 'cycle number' is calculated as the total number of live births following this 'cycle number' and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.
(f) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

Note: Further treatment cycles after the fifth cycle and resulting live births are not presented in this table due to small numbers. Data should be interpreted with caution due to small numbers in certain cells and measures of statistical variance are not supplied.

Table 31: Cycle-specific and cumulative live birth rates for women aged less than 30 years who started their first autologous fresh cycle (excluding freeze-all cycles[f]) between 1st January 2017 and 31st December 2017, New Zealand, 2017-2019

Cycle number[a]	Number of women starting cycle	Number of women who had a live birth[b]	Cycle-specific live birth rate (%)[c]	Number of women who did not progress to next treatment	Non-progression rate (%)[d]	Cumulative live birth rate (%)[e]
One	246	110	44.7	24	17.6	44.7
Two	112	42	37.5	17	24.3	61.8
Three	53	15	28.3	9	23.7	67.9
Four	29	5	17.2	5	20.8	69.9
Five	19	7	36.8	3	25.0	72.8

(a) Cycle one represents a woman's first autologous (excluding freeze-all) fresh ART treatment cycle between 1st January 2017 and 31st December 2017. Cycles two to five could be either a fresh or thaw cycle (excluding freeze-all cycles) undertaken by a woman until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020.
(b) A live birth is the birth of one or more liveborn infants, with the birth of twins or higher order multiples counted as one live birth.
(c) The cycle-specific live birth rate is calculated as the number of live births resulting from a specific 'cycle number' divided by the number of women who undertook that same 'cycle number'.
(d) The non-progression rate for a specific 'cycle number' is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that 'cycle number'.
(e) The cumulative live birth rate for a specific 'cycle number' is calculated as the total number of live births following this 'cycle number' and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.
(f) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

Note: Further treatment cycles after the fifth cycle and resulting live births are not presented in this table due to small numbers. Data should be interpreted with caution due to small numbers in certain cells and measures of statistical variance are not supplied.

Table 32: Cycle-specific and cumulative live birth rates for women aged 30-34 years who started their first autologous fresh cycle (excluding freeze-all cycles[f]) between 1st January 2017 and 31st December 2017, New Zealand, 2017-2019

Cycle number[a]	Number of women starting cycle	Number of women who had a live birth[b]	Cycle-specific live birth rate (%)[c]	Number of women who did not progress to next treatment	Non-progression rate (%)[d]	Cumulative live birth rate (%)[e]
One	603	221	36.7	45	11.8	36.7
Two	337	103	30.6	43	18.4	53.7
Three	191	58	30.4	35	26.3	63.3
Four	98	29	29.6	18	26.1	68.2
Five	51	9	17.6	21	50.0	69.7

(a) Cycle one represents a woman's first autologous (excluding freeze-all) fresh ART treatment cycle between 1st January 2017 and 31st December 2017. Cycles two to five could be either a fresh or thaw cycle (excluding freeze-all cycles) undertaken by a woman until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020.
(b) A live birth is the birth of one or more liveborn infants, with the birth of twins or higher order multiples counted as one live birth.
(c) The cycle-specific live birth rate is calculated as the number of live births resulting from a specific 'cycle number' divided by the number of women who undertook that same 'cycle number'.
(d) The non-progression rate for a specific 'cycle number' is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that 'cycle number'.
(e) The cumulative live birth rate for a specific 'cycle number' is calculated as the total number of live births following this 'cycle number' and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.
(f) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved and an embryo transfer does not take place.

Note: Further treatment cycles after the fifth cycle and resulting live births are not presented in this table due to small numbers. Data should be interpreted with caution due to small numbers in certain cells and measures of statistical variance are not supplied.

Table 33: Cycle-specific and cumulative live birth rates for women aged 35-39 years who started their first autologous fresh cycle (excluding freeze-all cycles[f]) between 1st January 2017 and 31st December 2017, New Zealand, 2017-2019

Cycle number[a]	Number of women starting cycle	Number of women who had a live birth[b]	Cycle-specific live birth rate (%)[c]	Number of women who did not progress to next treatment	Non-progression rate (%)[d]	Cumulative live birth rate (%)[e]
One	673	153	22.7	103	19.8	22.7
Two	417	109	26.1	76	24.7	38.9
Three	232	54	23.3	57	32.0	47.0
Four	121	29	24.0	31	33.7	51.3
Five	61	10	16.4	17	33.3	52.7

(a) Cycle one represents a woman's first autologous (excluding freeze-all) fresh ART treatment cycle between 1st January 2017 and 31st December 2017. Cycles two to five could be either a fresh or thaw cycle (excluding freeze-all cycles) undertaken by a woman until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020.
(b) A live birth is the birth of one or more liveborn infants, with the birth of twins or higher order multiples counted as one live birth.
(c) The cycle-specific live birth rate is calculated as the number of live births resulting from a specific 'cycle number' divided by the number of women who undertook that same 'cycle number'.
(d) The non-progression rate for a specific 'cycle number' is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that 'cycle number'.
(e) The cumulative live birth rate for a specific 'cycle number' is calculated as the total number of live births following this 'cycle number' and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.
(f) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

Note: Further treatment cycles after the fifth cycle and resulting live births are not presented in this table due to small numbers. Data should be interpreted with caution due to small numbers in certain cells and measures of statistical variance are not supplied.

Table 34: Cycle-specific and cumulative live birth rates for women aged 40 years and over who started their first autologous fresh cycle (excluding freeze-all cycles[f]) between 1st January 2017 and 31st December 2017, New Zealand, 2017-2019

Cycle number[a]	Number of women starting cycle	Number of women who had a live birth[b]	Cycle-specific live birth rate (%)[c]	Number of women who did not progress to next treatment	Non-progression rate (%)[d]	Cumulative live birth rate (%)[e]
One	263	23	8.7	95	39.6	8.7
Two	145	19	13.1	56	44.4	16.0
Three	70	6	8.6	30	46.9	18.3
Four	34	4	11.8	13	43.3	19.8
Five	17	3	17.6	7	50.0	20.9

(a) Cycle one represents a woman's first autologous (excluding freeze-all) fresh ART treatment cycle between 1st January 2017 and 31st December 2017. Cycles two to five could be either a fresh or thaw cycle (excluding freeze-all cycles) undertaken by a woman until 31st December 2019 or birth of a liveborn baby up to and including 31st October 2020.
(b) A live birth is the birth of one or more liveborn infants, with the birth of twins or higher order multiples counted as one live birth.
(c) The cycle-specific live birth rate is calculated as the number of live births resulting from a specific 'cycle number' divided by the number of women who undertook that same 'cycle number'.
(d) The non-progression rate for a specific 'cycle number' is calculated as the number of women who did not return for further ART treatment cycles before 31st December 2019 divided by the number of women who did not have a live birth in that 'cycle number'.
(e) The cumulative live birth rate for a specific 'cycle number' is calculated as the total number of live births following this 'cycle number' and all previous cycles divided by the total number of women who started their first autologous fresh ART treatment cycle between 1st January 2017 and 31st December 2017.
(f) Freeze-all cycles are fresh ART treatment cycles where all oocytes or embryos are cryopreserved, and an embryo transfer does not take place.

Note: Further treatment cycles after the fifth cycle and resulting live births are not presented in this table due to small numbers. Data should be interpreted with caution due to small numbers in certain cells and measures of statistical variance are not supplied.

Appendix A: Contributing fertility clinics

Fertility Associates, Auckland (Dr Simon Kelly)

Fertility Associates Christchurch, Christchurch (Dr Sarah Wakeman)

Fertility Associates Hamilton, Hamilton (Dr VP Singh)

Fertility Associates Otago, Dunedin (Associate Professor Wayne Gillett)

Fertility Associates Wellington, Wellington (Dr Andrew Murray)

Fertility Plus, Auckland (Dr Cindy Farquhar)

Genea Oxford Women's Health, Christchurch (Dr Robert Woolcott) – now closed

Repromed Auckland, Auckland (Dr Guy Gudex)

Appendix B: Data used in this report

The data presented in this report are supplied by eight fertility clinics in New Zealand and are compiled into ANZARD 2.0. ANZARD 2.0 includes autologous treatment cycles, treatment involving donated oocytes or embryos and treatment involving surrogacy arrangements. ANZARD 2.0 collects data on the use of ART techniques such as ICSI, oocyte/embryo freezing methods, PGD and cleavage stage/blastocyst transfers. In addition to ART procedures, ANZARD 2.0 also collects data from fertility centres about artificial insemination cycles using donated sperm (DI). The outcomes of pregnancies, births and babies born following ART and DI treatments are also maintained in ANZARD 2.0. This includes the method of birth, birth status, birthweight, gestational age, plurality, perinatal mortality, and selected information on maternal morbidity.

This report presents information on ART and DI treatment cycles that took place in fertility clinics in New Zealand in 2019, and the resulting pregnancies and births. The babies included in this report were conceived through treatment cycles undertaken in 2019 and were born in either 2019 or 2020.

Data validation

Most fertility centres have computerised data information management systems and provide the National Perinatal Epidemiology and Statistics Unit (NPESU) with high-quality data. All data processed by NPESU undergo a validation process, with data queries being followed up with fertility centre staff.

The Reproductive Technology Accreditation Committee of the Fertility Society of Australia and New Zealand also plays a role in ensuring the quality of ANZARD 2.0 data by validating selected records against clinic files in their annual inspections.

Data presentation

Data presented in Chapters 2 to 6 are for treatment cycles and not patients. It is possible for an individual woman to undergo more than one treatment cycle in a year or experience more than one pregnancy. This means that information reported about patient characteristics, such as age, parity, and cause of infertility, is based on calculations in which individuals may be counted more than once.

The rates of clinical pregnancy and live birth in Chapters 2 to 6 were measured per initiated cycle. Where the number of initiated cycles was not available, the rates were measured per embryo transfer cycle.

Where applicable, percentages in tables have been calculated including the ‘Not stated’ category. Throughout the report, for totals, percentages may not add up to 100.0 and, for subtotals, they may not add up to the sum of the percentages for the categories. This is due to rounding error.

Data limitations

Follow-up of pregnancy and birth outcomes is limited because the ongoing care of pregnant patients is often carried out by non-ART practitioners. The method of follow-up varies by fertility centre and includes follow-up with the patient or clinician, or the use of routine data sourced from a health department. In a small proportion of cases this information is not available. For pregnancies in which there is successful follow-up, data are limited by the self-

reported nature of the information. Fertility centre staff invest significant effort in validating such information by obtaining medical records from clinicians or hospitals. Data about previous ART treatment and history of pregnancies are, in some cases, reported by patients.

Glossary

This report categorises ART treatments according to whether a woman used her own oocytes or embryos, or oocytes/embryos were donated by another woman/couple, and whether the embryos were transferred soon after fertilisation or following cryopreservation.

Artificial insemination: a range of techniques of placing sperm into the female genital tract and can be used with controlled ovarian hyperstimulation or in unstimulated cycles. These techniques are referred to as donor insemination (DI) in this report.

ART (assisted reproductive technology): treatments or procedures that involve the in vitro handling of human oocytes (eggs) and sperm or embryos for the purposes of establishing a pregnancy. ART does not include artificial insemination.

Assisted hatching: when the outer layer of the embryo, the zona pellucida, is either thinned or perforated in the laboratory to aid 'hatching' of the embryo, the aim being to potentially improve the chance of implantation in the uterus.

Autologous cycle: an ART treatment cycle in which a woman intends to use or uses her own oocytes or embryos. GIFT cycles are classified separately from autologous cycles.

Birth: a birth event in which one or more babies of 20 weeks or more gestation, or of 400 grams or more birthweight are born.

Blastocyst: an embryo comprising about 100 cells usually developed by 5 or 6 days after fertilisation.

Caesarean section: an operative birth by surgical incision through the abdominal wall and uterus.

Cleavage stage embryo: an embryo comprising about 8 cells usually developed by 2 or 4 days after fertilisation.

Clinical pregnancy: a pregnancy in which at least one of the following criteria is met:

- known to be ongoing at 20 weeks
- evidence by ultrasound of an intrauterine sac (with or without a fetal heart)
- examination of products of conception reveals chorionic villi, or
- an ectopic pregnancy has been diagnosed by laparoscope or by ultrasound.

Controlled ovarian hyperstimulation: medical treatment to induce the development of multiple ovarian follicles in order to obtain multiple oocytes at oocyte pick-up (OPU).

Cryopreservation: freezing embryos for potential future ART treatment.

DI (donor insemination) cycle: an artificial insemination cycle in which sperm not from the woman's partner (donor sperm) is used.

Discontinued cycle: an ART cycle that does not proceed to oocyte pick-up (OPU) or embryo transfer.

Donation cycle: an ART treatment cycle where a woman intends to donate or donates her oocytes to others. A donation cycle may result in the donation of either oocytes or embryos to a recipient woman. The use of donor sperm does not alter the donor status of the cycle.

Ectopic pregnancy: a pregnancy in which implantation takes place outside the uterine cavity.

Embryo: an egg that has been fertilised by a sperm and has undergone one or more divisions.

Embryo transfer: a procedure whereby embryo(s) are placed in the uterus or fallopian tube. The embryo(s) can be fresh or thawed following cryopreservation and may include the transfer of cleavage stage embryos or blastocysts.

Freeze-all cycle: a fresh cycle where all oocytes or embryos that are potentially suitable for transfer are cryopreserved for potential future use.

Fresh cycle: an ART treatment cycle that intends to use or uses embryo(s) that have not been cryopreserved (frozen).

Gestational age: the completed weeks of gestation of the fetus. This is calculated as follows:

- Cycles with embryos transferred: (pregnancy end date – embryo transfer date + 16 days) for transfer of cleavage stage embryos and (pregnancy end date – embryo transfer date + 19 days) for transfer of blastocysts.
- GIFT cycles: (pregnancy end date – OPU date) + 14 days.
- DI cycles: (pregnancy end date – date of insemination) + 14 days.

GIFT (gamete intrafallopian transfer): an ART treatment where mature oocytes and sperm are placed directly into a woman's fallopian tubes so that in vivo fertilisation may take place. GIFT cycles are classified separately from autologous cycles.

Heterotopic pregnancy: a double gestation pregnancy in which implantation takes place both inside and outside the uterine cavity.

ICSI (intracytoplasmic sperm injection): a procedure whereby a single sperm is injected directly into the oocyte to aid fertilisation. If an embryo transfer cycle involves the transfer of at least one embryo created using ICSI, it is counted as an ICSI cycle.

IVF (In vitro fertilisation): an ART procedure that involves extracorporeal fertilisation.

Live birth: according to the World Health Organization (WHO) definition, a live birth is defined as the complete expulsion or extraction from its mother of a product of conception irrespective of the duration of the pregnancy, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of the voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered liveborn. In this report, live births are included if they meet the WHO definition and if they are of 20 weeks or more gestation or 400 grams or more birthweight. Live births are counted as birth events, (i.e. the birth of one or more liveborn infants). For example, where a multiple birth (e.g., twins, triplets) results in a liveborn and a stillborn baby, this is still considered one live birth event.

Low birthweight: a birthweight of less than 2,500 grams.

Nulliparous: refers to a woman who has never had a pregnancy of 20 weeks or more gestation.

Oocyte (egg): a female reproductive cell.

OPU (oocyte pick-up): the procedure to collect oocytes from ovaries, usually by ultrasound guided transvaginal aspiration and rarely by laparoscopic surgery.

Parity: a classification of a woman in terms of the number of previous pregnancies experienced that reached 20 weeks or more gestation.

Parous: refers to a woman who has had at least one previous pregnancy of 20 weeks or more gestation.

PGD (preimplantation genetic diagnosis): a procedure where embryonic cells are removed and screened for chromosomal disorders or genetic diseases before embryo transfer.

Perinatal death: a stillbirth or neonatal death of at least 20 weeks gestation or at least 400 grams birthweight.

Preterm: a gestation of less than 37 weeks.

Recipient cycle: an ART treatment cycle in which a woman receives oocytes or embryos from another woman.

Secondary sex ratio: the number of male liveborn babies per 100 female liveborn babies.

Stillbirth: the birth of an infant after 20 or more weeks gestation or 400 grams or more birthweight that shows no signs of life.

Surrogacy arrangement: an arrangement where a woman, known as the gestational carrier agrees to carry a child for another person or couple, known as the intended parent(s), with the intention that the child will be raised by the intended parent(s). The oocytes and/or sperm used to create the embryo(s) in the surrogacy cycle can be either from the intended parents or from donor(s).

Thaw cycle: an ART treatment cycle in which cryopreserved embryos are thawed with the intention of performing embryo transfer.

Thawed embryo: an embryo thawed after cryopreservation. It is used in thaw cycles.

Vitrification: an ultra-rapid cryopreservation method that prevents ice formation within the suspension which is converted to a glass-like solid.

Note: The International Committee Monitoring Assisted Reproductive Technologies (ICMART) has published an ART glossary for the terms used in ART data collections (Zegers-Hochschild et al. 2009). However, the terminology used in this report may differ from that in the ICMART glossary.

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List of tables