Assisted reproduction technology in Australia and New Zealand 2005

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Please note that as with all statistical reports there is the potential for minor revisions of data in this report over its life. Please refer to the online version at <www.aihw.gov.au>.

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AND
FERTILITY SOCIETY OF AUSTRALIA

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Assisted reproduction technology in Australia and New Zealand 2005

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Requests for data

Enquiries about data for individual fertility centres should be directed to the centre concerned. Other enquiries should be made to the NPSU.

Abbreviations and symbols

ACT	Australian Capital Territory
AI	artificial insemination
AIHW	Australian Institute of Health and Welfare
ANZARD	Australian and New Zealand Assisted Reproduction Database
ART	assisted reproduction technology
DET	double-embryo transfer
DI	donor sperm insemination or artificial insemination with donated sperm
ET	embryo transfer
FSH	follicle-stimulating hormone
g	grams
GIFT	gamete intrafallopian transfer
ICSI	intracytoplasmic sperm injection
IVF	in-vitro fertilisation
LMP	last menstrual period
NPSU	National Perinatal Statistics Unit
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
OHSS	ovarian hyperstimulation syndrome
OPU	oocyte pick-up
PGD	preimplantation genetic diagnosis
Qld	Queensland
RTAC	Reproductive Technology Accreditation Committee
SA	South Australia
SET	single-embryo transfer
Tas	Tasmania
UNSW	The University of New South Wales
Vic	Victoria
WA	Western Australia
. .	not applicable
─	null cells

Summary

There were 51,017 treatment cycles reported to ANZARD in Australia and New Zealand in 2005. Of these cycles, 91.1% were from Australian fertility centres and 8.9% from New Zealand's centres. There is an increase of 13.7% of ART treatment cycles from 2004.

Average age of women who had ART treatment in 2005 was 35.5 years, slightly older than average age (35.2 years) of women who had ART treatment in 2002. The proportion of women aged older than 40 years has increased from 14.3% in 2002 to 15.3% in 2005.

Since ANZARD was established in 2002 there has been a significant increase in the number of embryos transfer cycles where women received single-embryo transfers (SET). SET cycles accounted for 48.3% of embryos transfer cycles in 2005, compared to 28.4% in 2002. The increase of SET cycles resulted more singleton deliveries. The proportion of singleton deliveries was 85.9% in 2005, the highest proportion ever reported.

Babies born to women who had a single-embryo transfer had better outcomes compared to babies born to women who had a double-embryo transfer (DET). In 2005, there were 3,681 SET babies and 5,589 DET babies. In SET babies, 96.1% were singletons, compared to 61.6% singletons in DET babies. SET babies had a lower proportion of preterm babies (11.7%), compared to 30.6% in DET babies. Similarly, 8.0% of SET liveborn babies were low birthweight, compared to 25.0% in DET liveborn babies.

Perinatal mortality rate is a measure of perinatal outcomes. In 2005, for all babies born following ART treatment, the perinatal mortality rate was 14.7 deaths per 1,000 births, a 23.8% decrease from 19.3 deaths per 1,000 births in 2004. The perinatal mortality rate was the lowest among singletons born following SET (7.3 deaths per 1,000 births) in 2005.

1 Introduction

Assisted reproduction technology in Australia and New Zealand 2005 is the 11th annual report on the use of assisted reproduction technology (ART) in Australia and New Zealand.

Fertility is defined as the ability of an individual to conceive and bear offspring. Infertility is the state of diminished or impaired capacity to do so. Infertility is not an absolute or irreversible condition but rather a clinical continuum (Carr et al. 2005). Clinicians in Australia and New Zealand have treated couples with infertility by using ART since the early 1980s.

ART treatment is available to couples in fertility centres in Australia and New Zealand. There were 30 fertility centres in Australia and 4 in New Zealand in 2005.

Aim of this report

The main objective of Australian and New Zealand Assisted Reproduction Database (ANZARD) is to assist in monitoring ART treatment and perinatal outcomes. The main aim of this report is to provide:

- information on ART treatment cycles and the resulting pregnancy outcomes in Australia and New Zealand;
- evidence of quality improvement through monitoring ART treatment practices, success rates and perinatal outcomes;
- information to inform standards for accreditation and monitoring of ART centres; and
- information for national and international comparisons.

Procedures included in this report

Assisted reproduction technology

Assisted reproduction technology encompasses procedures and techniques involving the manipulation of gametes, zygotes and embryos. The main ART procedures included in this report are:

- in-vitro fertilisation (IVF), where eggs and sperm are combined in the laboratory for fertilisation outside the body and replaced in the uterus;
- intracytoplasmic sperm injection (ICSI), where a single sperm is injected into an egg for fertilisation outside the body and replaced in the uterus; and
- gamete intrafallopian transfer (GIFT), where eggs and sperm are placed in the fallopian tubes for fertilisation inside the body.

Embryos arising from IVF and ICSI procedures can be frozen and then used in subsequent ART treatments where they are thawed and transferred to the uterus.

Donor sperm insemination

Artificial insemination (AI) is a term that covers a range of techniques of placing sperm into the female genital tract. Such inseminations may include intravaginal insemination, intracervical insemination, intrauterine insemination, intrafallopian insemination and intraperitoneal insemination. AI is provided in medical facilities in Australia and New Zealand. It is provided in fertility centres as part of ART treatment. Information on AI using donated sperm (donor sperm insemination (DI)) performed in fertility centres in Australia and New Zealand is included in this report.

Structure of this report

This report has six chapters. Following this introduction, which briefly describes the data used in this report, Chapter 2 presents data on oocyte pick-up (OPU), IVF, ICSI, embryo transfer, the success of these ART treatments and complications of the ART treatment. Chapter 3 presents data on the outcomes, including pregnancies, deliveries and births, from embryo transfer cycles. Chapter 4 presents data on GIFT cycles (including intended GIFT cycles) and surrogacy cycles, and their subsequent outcomes in pregnancies and births. Chapter 5 presents data on DI cycles, and their subsequent outcomes in pregnancies and births. Chapter 6 presents trends in all ART treatments from 2002 to 2005 and trends in the outcomes of ART treatment from 1996 to 2005. The Appendix presents the data items in the ANZARD.

The structure of the report differs from the Assisted reproduction technology in Australia and New Zealand 2004 report. In this report, GIFT, DI and surrogacy cycles are presented in separate chapters from the ART treatment chapter. In addition, the term autologous cycle has replaced non-donor cycle. An autologous cycle is an ART treatment cycle in which patients intend to use their own oocytes/gametes.

This report and additional data on the Internet

This report is available in PDF format on the NPSU website <www.npsu.unsw.edu.au>. This website also includes supplementary tables (in PDF format) which present data not included in the report.

Data

Data source

The data presented in this report are supplied by fertility centres in Australia and New Zealand. The data are compiled into ANZARD. ANZARD includes information about the ART treatment procedures of IVF, ICSI and GIFT. It also includes information about ART treatment using thawed embryos; treatment involving donated gametes or embryos; the use of techniques such as assisted hatching, preimplantation genetic diagnosis (PGD) and blastocyst culture; and DI cycles. ANZARD also contains information on outcomes in pregnancies and births. This includes method of birth, birth status, birthweight, gestational age, plurality, perinatal mortality and selected information on maternal morbidity.

ANZARD does not contain information about artificial insemination if the woman's partner's sperm was used.

Cohort

This report presents information on all treatment cycles that took place in fertility centres in Australia and New Zealand in 2005, and their resulting pregnancies and births. The babies included in this report were conceived through the treatment cycles undertaken in 2005 and were born in either 2005 or 2006.

Data validation

Most fertility centres have computerised data management systems and are able to provide the NPSU with high-quality data. The NPSU subjects all data to an extensive process of validation. Data queries are followed up with fertility centre staff. In 2005, information relating to pregnancy and birth outcomes was not stated for less than 0.3% of cycles. The Reproductive Technology Accreditation Committee (RTAC) plays a role in ensuring the quality of ANZARD data by validating selected records against clinic files in their triennial inspections.

Data presentation

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

The success rates of clinical pregnancy and live delivery were measured per initiated cycle. Where the number of initiated cycles was not available, e.g. using blastocysts or cleavage stage embryos, the success 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 percentage for the categories. This is due to rounding.

Data limitations

Follow-up of information on pregnancy and on 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 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. These data include pregnancy complications, complications of fertility treatment and infant morbidity. 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.

2 ART treatment in 2005

This chapter presents data on OPU, IVF, ICSI, embryo transfer, the success of ART treatment and complications of ART treatment. Since GIFT cycles (including intended GIFT cycles) and surrogacy cycles accounted for less than 0.4% of all treatment cycles, they are separately presented in Chapter 4. DI cycles are presented in Chapter 5.

2.1 ART treatment overview

ART treatment cycles

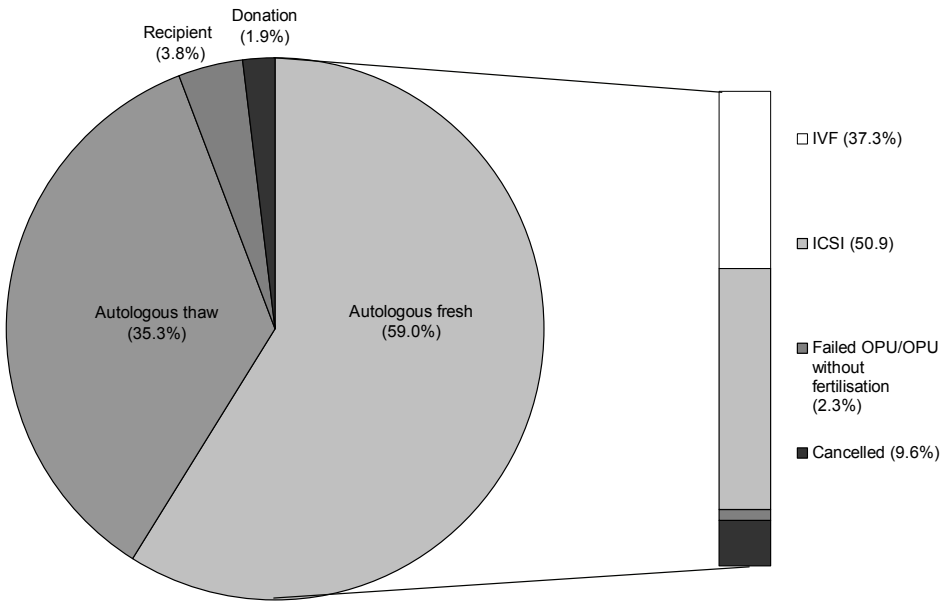
A total of 47,459 ART treatment cycles were reported to ANZARD in Australia and New Zealand in 2005 (Table 1). Of these, 91.6% (43,493) were from fertility centres in Australia and 8.4% (3,966) were in New Zealand. In Australia there were 10.1 cycles per 1,000 women of reproductive age (15–44 years) and in New Zealand there were 4.5 cycles per 1,000 women of reproductive age.

Types of ART treatment cycles

In 2005, about three-fifths (59.0%; 27,995) of cycles were autologous fresh cycles; and over a third (35.3%; 16,759) were autologous thaw cycles. Donation and recipient cycles accounted for a small portion of total treatment cycles, 3.8% (1,811) for oocytes/embryos recipient cycles and 1.9% (894) for oocyte donation cycles (Table 1 and Figure 1).

Table 1: Number of ART treatment cycles by treatment type, Australia and New Zealand, 2005

Treatment type	Number	Per cent
Autologous		
Fresh	27,995	59.0
Thaw	16,759	35.3
Recipient	1,811	3.8
Donation	894	1.9
Total	**47,459**	**100.0**



Note: GIFT, DI and surrogacy cycles are not included.

Figure 1: Proportion of ART treatment cycles by treatment type and procedure, Australia and New Zealand, 2005

Fresh cycles

Fresh cycles include cycles in which OPU was performed, cycles in which OPU was cancelled and cycles in which thawed oocyte(s) were used in fertilisation.

Slightly more than half (50.9%) of all autologous fresh cycles used ICSI procedures (14,239) and 37.3% were IVF procedures (10,432). The remaining 11.9% (3,324) of autologous fresh cycles included cycles in which oocytes were not retrieved, cycles in which oocytes were retrieved but no fertilisation occurred, and cycles in which OPU was cancelled (Table 2). There were 16 cycles in which thawed oocytes were used.

Table 2: Number of fresh cycles by treatment type and procedure, Australia and New Zealand, 2005

	Autologous		Recipient	
Procedure	**Number**	**Per cent**	**Number**	**Per cent**
IVF	10,432	37.3	310	38.0
ICSI	14,239	50.9	500	61.3
Other	3,324[(a)]	11.9	6[(b)]	0.7
Total	**27,995**	**100.0**	**816**	**100.0**

(a) Includes cycles in which oocytes were not retrieved, cycles with oocyte retrieval but no fertilisation and cancelled OPU.

(b) Oocyte recipient cycles without fertilisation.

There were 894 oocyte donation fresh cycles (Table 1) and 816 oocyte recipient fresh cycles (Table 2). Of oocyte recipient fresh cycles, 38.0% (310) had an IVF procedure, 61.3% (500) had an ICSI procedure. No fertilisation was occurred in six (0.7%) oocyte recipient fresh cycles.

Thaw cycles

Thaw cycles include ART treatment cycles, with or without embryo transfers, in which cryopreserved (frozen) embryos are thawed with the intention of a transfer.

In 2005, ICSI cycles were 48.1% (8,059) and IVF cycles were 45.2% (7,578) of all autologous thaw cycles. Oocytes/embryos recipient thaw cycles had similar proportions in IVF and ICSI cycles, 47.0% and 50.1% respectively (Table 3).

Table 3: Number of thaw cycles by treatment type and procedure, Australia and New Zealand, 2005

	Autologous		Oocytes/embryos recipient	
Procedure	**Number**	**Per cent**	**Number**	**Per cent**
IVF	7,578	45.2	468	47.0
ICSI	8,059	48.1	498	50.1
Not stated	1,122	6.7	29	2.9
Total	**16,759**	**100.0**	**995**	**100.0**

OPUs performed in 2005

OPU refers to a medical procedure that collects oocytes from ovaries by ultrasound-guided transvaginal aspiration or by laparoscopic surgery.

In 2005, there were 26,212 OPUs performed in Australia and New Zealand. The majority (96.9%) of OPUs was performed in retrieving oocytes for the patient's own use. A small proportion (3.1%; 826) of OPUs was performed for oocyte donation. Overall, more than one-third (34.4%) of OPUs was performed in women aged 38 years or older (Table 4).

Table 4: Number of OPUs by treatment type and age group, Australia and New Zealand, 2005

	Age groups (years)[(a)]					
	< 38		≥ 38		All	
Treatment type	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
OPU for own use	16,463	64.9	8,923	35.1	25,386	100.0
OPU for oocyte donation	720	87.2	106	12.8	826	100.0
Total	**17,183**	**65.6**	**9,029**	**34.4**	**26,212**	**100.0**

(a) Age at time of treatment.

Number of embryos transferred per embryo transfer cycle

In 2005, about half (48.2%) of the embryo transfer cycles had a single-embryo transfer and nearly half (49.8%) of the cycles had a double-embryo transfer. The proportion of embryo transfer cycles using three or more embryos was less than 2% of all embryo transfer cycles in 2005 (Table 5). The trend of transferring a single embryo has been continuously increasing from 28.4% in 2002 to 48.2% in 2005.

Table 5: Number of embryo transfer cycles by number of embryos transferred per cycle and women's age group, Australia and New Zealand, 2005

	Age group (years)[a]						
Number of embryos	**≤ 24**	**25–29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**Total**
				Number			
1	266	2,242	6,957	6,332	2,617	379	18,793
2	159	1,742	5,657	7,478	3,988	396	19,420
≥ 3	0	13	87	230	367	52	749
Total	**425**	**3,997**	**12,701**	**14,040**	**6,972**	**827**	**38,962**
				Per cent			
1	62.6	56.1	54.8	45.1	37.5	45.8	48.2
2	37.4	43.6	44.5	53.3	57.2	47.9	49.8
≥ 3	0.0	0.3	0.7	1.6	5.3	6.3	1.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Age at time of treatment.

The proportion of single-embryo transfer cycles decreased with advancing women's age. In general, women aged 38 years or older had more embryos transferred per cycle than those aged less than 38 years (Figures 2 and 3).

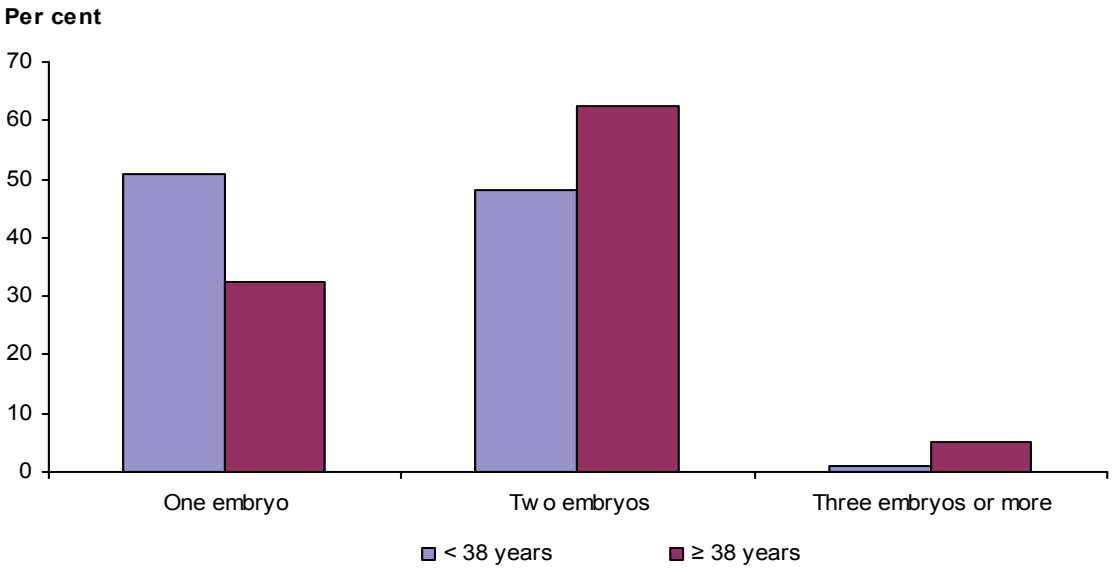


Figure 2: Proportion of fresh embryo transfer cycles by number of embryos transferred per cycle and women's age group, Australia and New Zealand, 2005

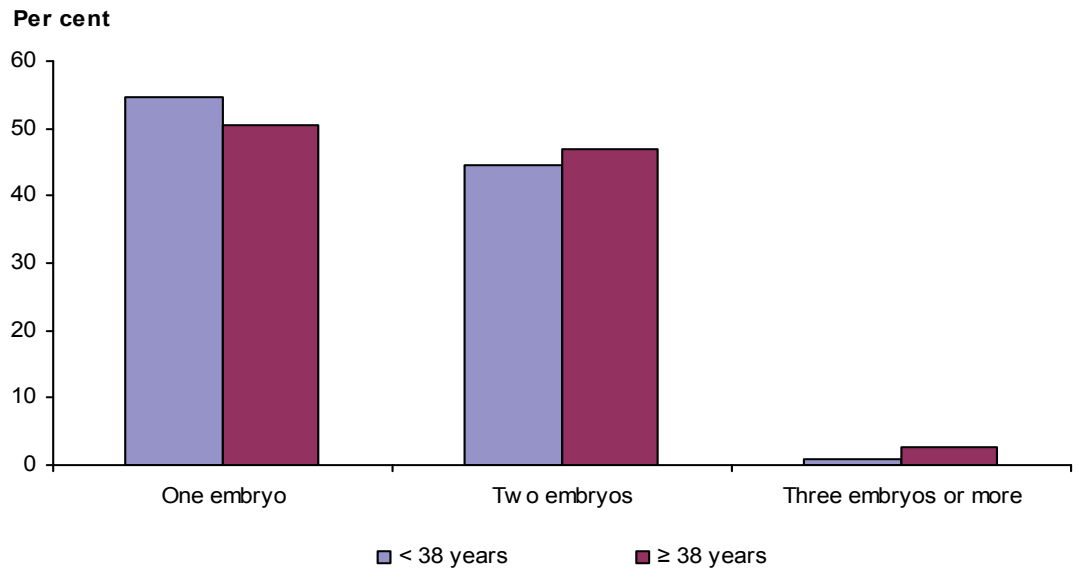


Figure 3: Proportion of thawed embryo transfer cycles by number of embryos transferred per cycle and women's age group, Australia and New Zealand, 2005

Embryo transfer cycles by stage of embryo development

In 2005, more than one in five (22.4%) embryo transfer cycles had a blastocyst transfer. The proportion of blastocyst transfer cycles was marginally higher in fresh cycles (23.0%) than in thaw cycles (21.6%) (Table 6).

Table 6: Number of embryo transfer cycles by treatment type and stage of embryo development, Australia and New Zealand, 2005

	Fresh		Thaw		All	
Stage of embryo development	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Cleavage stage embryo	17,445	77.0	12,776	78.4	30,221	77.6
Blastocyst	5,220	23.0	3,521	21.6	8,741	22.4
Total	**22,665**	**100.0**	**16,297**	**100.0**	**38,962**	**100.0**

Preimplantation genetic diagnosis (PGD)

In 2005, PGD was performed in 2.4% (991) of all cycles in which embryos were created or thawed. The majority (85.4%) of PGD cycles were fresh cycles (Table 7). Of all 991 PGD cycles, 71.2% (706) had embryos transferred, 19.7% (195) resulted in a clinical pregnancy and 15.1% (150) resulted in a live delivery.

Table 7: Stage/outcome of treatment cycles with preimplantation genetic diagnosis (PGD) by type of embryo, Australia and New Zealand, 2005

	Type of ART treatment		
Stage/outcome of treatment	**Fresh**	**Thaw**	**Total**
Number of cycles with PGD	846	145	991
Number of cycles with PGD that had embryo transferred	586	120	706
Number of cycles with PGD that resulted in a clinical pregnancy	164	31	195
Number of cycles with PGD that resulted in a live delivery	129	21	150
Clinical pregnancies per PGD cycle (%)	*19.4*	*21.4*	*19.7*
Live deliveries per PGD cycle (%)	*15.2*	*14.5*	*15.1*

Women's age and their partner's age

The average age of women who underwent ART treatment in 2005 was 35.5 years, with four in five aged less than 40 years (Table 8). The partners of the women tended to be older, with an average age of 37.9 years, and just over three in five aged less than 40 years (Table 9). On average, women who used donated oocytes or embryos were older (40.5 years) than women who used their own embryos. Similarly, the partners of women who used donated oocytes or embryos were older (40.8 years) than the partners of women who had autologous cycles.

Table 8: Number of ART treatment cycles by women's age group, treatment type and procedure, Australia and New Zealand, 2005

	Autologous cycle				Oocytes/embryos recipient	
Age group (years)[a]	**Fresh IVF**	**Fresh ICSI**	**Fresh other[b]**	**Thaw**		**All**
Mean age	*35.6*	*35.2*	*36.5*	*34.8*	*40.5*	*35.5*
			Number			
≤ 24	92	173	56	208	7	536
25–29	968	1,581	254	1,811	64	4,678
30–34	3,203	4,555	778	5,959	220	14,715
35–39	3,906	5,113	1,185	6,123	392	16,719
40–44	2,128	2,628	938	2,461	686	8,841
≥ 45	135	189	113	197	442	1,076
Total	**10,432**	**14,239**	**3,324**	**16,759**	**1,811**	**46,565**
			Per cent			
≤ 24	0.9	1.2	1.7	1.2	0.4	1.2
25–29	9.3	11.1	7.6	10.8	3.5	10.0
30–34	30.7	32.0	23.4	35.6	12.1	31.6
35–39	37.4	35.9	35.6	36.5	21.6	35.9
40–44	20.4	18.5	28.2	14.7	37.9	19.0
≥ 45	1.3	1.3	3.4	1.2	24.4	2.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Age at time of treatment.

(b) Includes cycles in which oocytes were not retrieved, cycles with oocyte retrieval but no fertilisation and cancelled OPU.

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

Table 9: Number of ART treatment cycles by women's partner's age group, treatment type and procedure, Australia and New Zealand, 2005

Age group (years)[a]	Autologous cycle				Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Fresh other[b]	Thaw		
Mean age	*37.1*	*38.4*	*39.0*	*37.6*	*40.8*	*37.9*
			Number			
≤ 24	50	57	24	48	1	180
25–29	688	813	166	986	62	2,715
30–34	2,835	3,404	631	4,408	212	11,490
35–39	3,470	4,296	962	5,508	430	14,666
40–44	2,158	2,991	789	3,407	436	9,781
≥ 45	1,010	2,337	579	2,049	429	6,404
Not stated	221	341	173	353	241	1,329
Total	**10,432**	**14,239**	**3,324**	**16,759**	**1,811**	**46,565**
			Per cent			
≤ 24	0.5	0.4	0.7	0.3	0.1	0.4
25–29	6.6	5.7	5.0	5.9	3.4	5.8
30–34	27.2	23.9	19.0	26.3	11.7	24.7
35–39	33.3	30.2	28.9	32.9	23.7	31.5
40–44	20.7	21.0	23.7	20.3	24.1	21.0
≥ 45	9.7	16.4	17.4	12.2	23.7	13.8
Not stated	2.1	2.4	5.2	2.1	13.3	2.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Age at time of treatment.

(b) Includes cycles in which oocytes were not retrieved, cycles with oocyte retrieval but no fertilisation and cancelled OPU.

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

Single embryo transfer by women's age

In autologous cycles, nearly three-quarters (74.6%) of single-embryo transfer cycles were in women aged less than 38 years. However, in oocytes/embryos recipient cycles, more than two-thirds (70.2%) of single-embryo transfer cycles were in women aged 38 years or older (Table 10).

Table 10: Number of ART treatment cycles with single embryo transfer by treatment type and women's age group, Australia and New Zealand, 2005

Treatment type	< 38 years		≥ 38 years		All	
	Number	Per cent	Number	Per cent	Number	Per cent
Autologous						
Fresh	7,422	75.5	2,413	24.5	9,835	100.0
Thaw	6,082	73.5	2,189	26.5	8,271	100.0
Oocytes/embryos recipient						
Fresh	85	34.3	163	65.7	248	100.0
Thaw	120	27.3	319	72.7	439	100.0

Cause of infertility

Causes of infertility are based on clinical diagnosis. However, the diagnostic definitions may vary among fertility centres.

In 2005, 27.0% of ART treatment cycles had male infertility factor listed as the only cause of infertility; 33.1% of cycles had female infertility factor(s) reported; 16.3% of cycles had combined male-female infertility factor(s); and 17.3% of cycles had unexplained infertility. Male infertility factor (alone and combined with female infertility factor) was reported for 43.3% of cycles.

Ovarian hyperstimulation syndrome

ANZARD includes morbidity information that is specifically related to ART treatment. Ovarian hyperstimulation syndrome (OHSS) is a complication of ovulation induction therapy which involves the administration of stimulation drugs. Symptoms of OHSS include abdominal pain and fluid retention.

OHSS and other morbidity data are reported by patients and clinicians, and validated with hospital records by fertility centre staff. It is possible there is under-reporting of this information as there is no nationally agreed definition for OHSS.

There were 306 OHSS cases reported for women who had ART treatment in 2005. Of these, 255 (83.3%) were reported as being admitted to hospital. There were 302 OHSS cases in which OPUs were performed. Overall, OHSS occurred in 1.2% cycles that involved an OPU (Table 11).

Table 11: Number of OPUs with ovarian hyperstimulation syndrome (OHSS) by number of oocytes collected, Australia and New Zealand, 2005

	Number of oocytes collected						
	None	1–4	5–9	10–14	15–19	≥ 20	All
OPUs with OHSS	0	3	45	75	74	105	302
All OPUs	435	5,615	8,971	6,186	3,031	1,974	26,212
OHSS per OPU cycle (%)	*0.0*	*0.1*	*0.5*	*1.2*	*2.4*	*5.3*	*1.2*

2.2 Autologous ART treatment in 2005

2.2.1 Autologous ART treatment overview

In this report, autologous ART treatment is defined as treatment in which the woman's own oocytes/embryos were used.

Of all autologous ART treatment cycles, 91.7% (41,020) were from fertility centres in Australia and 8.3% (3,734) were in New Zealand.

2.2.2 Autologous fresh cycles

Autologous fresh cycles include cycles in which OPU is performed, cycles in which thawed oocyte(s) were used in fertilisation, and cancelled cycles where follicle-stimulating hormone (FSH) was administrated.

Oocyte collections

Of the 27,995 initiated autologous fresh cycles, 90.4% had an OPU and 88.9% had oocyte(s) collection. Overall, the rate of transferring embryos from autologous fresh cycles was 78.4% in 2005.

The highest rate (81.8%) was among women in 30–34 years age group in 2005. Cycles of women aged 45 years or older had the lowest rates with only 84.0% of initiated cycles had an OPU, 76.9% had oocyte(s) collected, and 59.3% had embryo(s) transferred (Table 12).

Table 12: Stage/outcome of autologous fresh cycles by women's age group, Australia and New Zealand, 2005

Age group (years) [(a)]	Initiated cycles (number)	Cycles with OPU performed (per cent)	Cycles with oocyte collected (per cent)	Cycle with oocyte fertilised (per cent)	Cycles with embryo transferred (per cent)
≤ 24	321	85.7	85.4	81.0	71.7
25–29	2,803	91.8	91.2	88.1	79.9
30–34	8,536	92.0	91.5	88.3	81.8
35–39	10,204	90.5	89.1	84.5	79.2
40–44	5,694	87.7	84.4	77.6	72.8
≥ 45	437	84.0	76.9	62.9	59.3
Total	**27,995**	**90.4**	**88.9**	**84.2**	**78.4**

(a) Age at time of treatment.

Success in clinical pregnancies and live deliveries

The success of autologous fresh cycles can be measured in a number of ways, depending on the stage of treatment and the outcome used. Table 13 presents the various success measures that can be derived.

In 2005, the success rate for initiated cycles was 24.0% for clinical pregnancies and 19.1% for live deliveries. For embryo transfer cycles, however, the success rate was 30.6% for clinical pregnancies and 24.3% for live deliveries.

Table 13: Measure of success for autologous fresh cycles, Australia and New Zealand, 2005

Stage of treatment	Cycles that resulted in a clinical pregnancy	Cycles that resulted in a delivery	Cycles that resulted in a live delivery
		Per cent	
Initiated cycles	24.0 (6,724/27,995)	19.3 (5,394/27,995)	19.1 (5,337/27,995)
Embryo transfers	30.6 (6,724/21,949)	24.6 (5,394/21,949)	24.3 (5,337/21,949)

Figure 4 shows:

- the total number of initiated autologous fresh cycles;
- the total number of autologous fresh cycles in which oocytes were retrieved; and
- the number of cycles in which embryos were transferred.

It also shows the number of initiated autologous fresh cycles that resulted in:

- a clinical pregnancy
- a delivery
- a live delivery.

Treatment can be discontinued for a variety of reasons, including failure of ovaries to respond to drugs, failure of oocyte fertilisation, inadequate embryo growth, development of treatment side-effects, patient choice or failure of the embryo(s) to implant in the uterus.

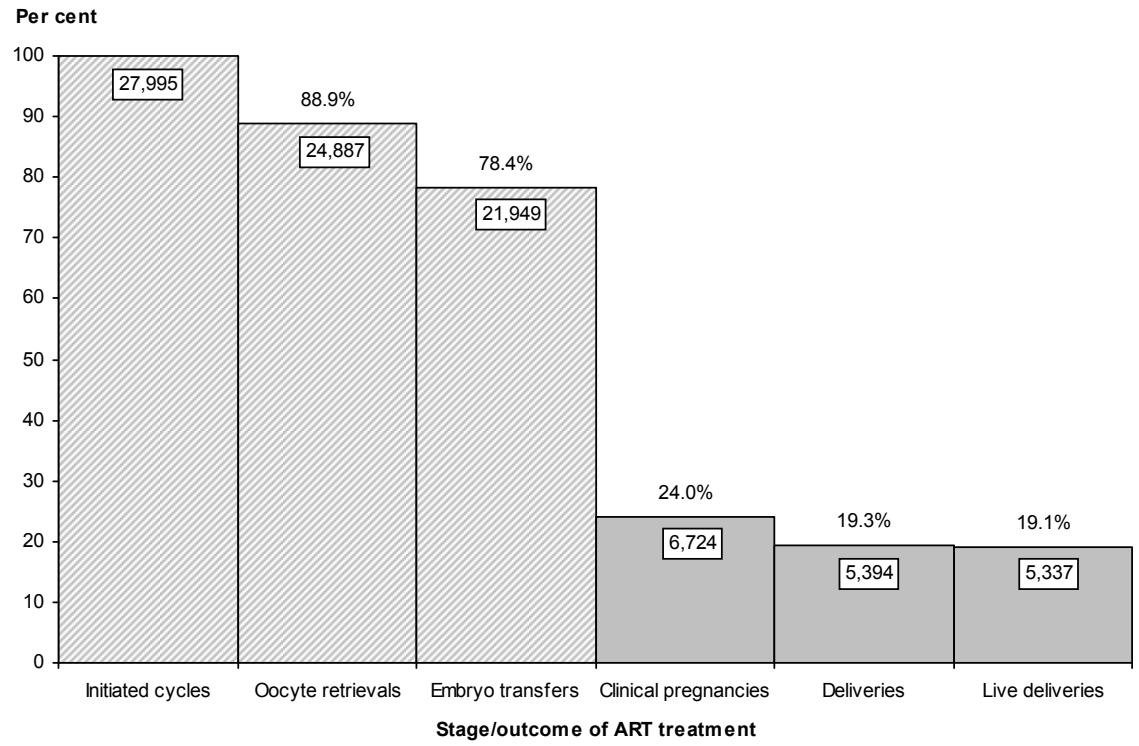


Figure 4: Progression of autologous fresh cycles, Australia and New Zealand, 2005

Success of autologous fresh cycles by women's age

Women's reproductive age is one of the key factors associated with success from ART treatment when women use their own oocytes. Figure 5 shows the success rates (measured as the proportion of initiated cycles that resulted in a live delivery) for autologous fresh cycles in 2005 by women's age. Women aged between 23 and 32 years had higher rates.

These rates then decline steadily for women older than 32 years. For women aged 45 years or more the live delivery rate was 1.6% in 2005.

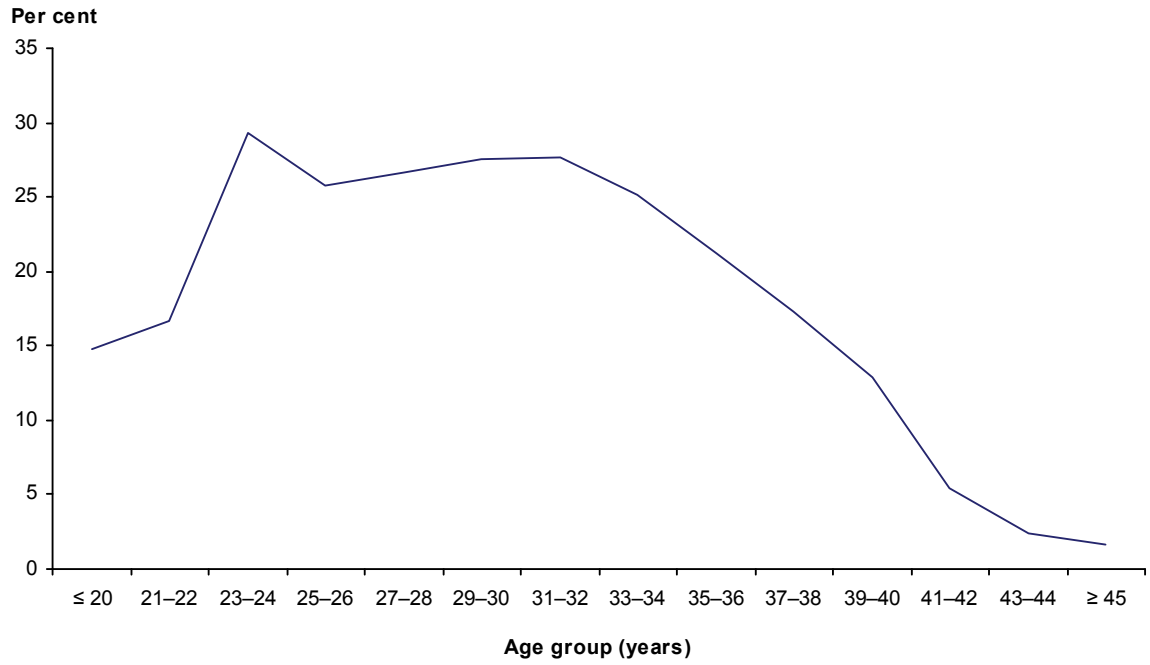


Figure 5: Proportion of autologous fresh cycles that resulted in a live delivery by women's age group, Australia and New Zealand, 2005

In 2005, the highest rate of live deliveries per embryo transfer cycle was in women aged 24 years or younger (35.2%), but declined with advancing women's age. For women aged 40–44 years, the chance of having a liveborn baby following an embryo transfer cycle was 8.7% in 2005. This rate declines to 2.7% in women aged 45 years or older (Table 14).

Table 14: Success of autologous fresh cycles by stage/outcome of treatment and women's age group, Australia and New Zealand, 2005

	Age group (years)[(a)]						
Stage/outcome of treatment	**≤ 24**	**25–29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**All**
Initiated cycles	321	2,803	8,536	10,204	5,694	437	27,995
Embryo transfers	230	2,246	6,987	8,081	4,146	259	21,949
Clinical pregnancies	94	880	2,668	2,412	659	11	6,724
Live deliveries	81	752	2,256	1,879	362	7	5,337
Live deliveries per initiated cycle (%)	*25.2*	*26.8*	*26.4*	*18.4*	*6.4*	*1.6*	*19.1*
Live deliveries per transfer cycle (%)	*35.2*	*33.5*	*32.3*	*23.3*	*8.7*	*2.7*	*24.3*
Live deliveries per clinical pregnancy (%)	*86.2*	*85.5*	*84.6*	*77.9*	*54.9*	*63.6*	*79.4*

(a) Age at time of treatment.

Success of autologous fresh embryo transfer cycles by ART procedure

For autologous fresh embryo transfer cycles undertaken in 2005, the success rates were similar in IVF cycles and ICSI cycles. For IVF embryo transfer cycles, 31.1% resulted in a clinical pregnancy and 24.5% resulted in a live delivery. For ICSI embryo transfer cycles, 30.3% resulted in a clinical pregnancy and 24.2% resulted in a live delivery (Table 15).

Table 15: Success of autologous fresh embryo transfer cycles by stage/outcome of treatment and procedure, Australia and New Zealand, 2005

Stage/outcome of treatment	IVF	ICSI
Embryo transfers	9,145	12,804
Clinical pregnancies	2,841	3,883
Live deliveries	2,242	3,095
Clinical pregnancies per transfer cycle (%)	*31.1*	*30.3*
Live deliveries per transfer cycle (%)	*24.5*	*24.2*

Success of autologous fresh embryo transfer cycles by stage of embryo development

For autologous fresh embryo transfer cycles undertaken in 2005, the success rates were higher in blastocyst transfer cycles than in cleavage stage embryo transfer cycles. Of blastocyst transfer cycles, 36.1% resulted in a clinical pregnancy and 28.8% resulted in a live delivery. Of cleavage stage embryo transfer cycles, 29.0% resulted in a clinical pregnancy and 23.0% resulted in a live delivery (Table 16).

Table 16: Success of autologous fresh embryo transfer cycles by stage/outcome of treatment and stage of embryo development, Australia and New Zealand, 2005

Stage/outcome of treatment	Cleavage stage embryo	Blastocyst
Embryo transfers	16,885	5,064
Clinical pregnancies	4,897	1,827
Live deliveries	3,879	1,458
Clinical pregnancies per transfer cycle (%)	*29.0*	*36.1*
Live deliveries per transfer cycle (%)	*23.0*	*28.8*

Success of autologous fresh cycles by cause of infertility

Couples with male infertility factor as the only cause of infertility had the highest success rate. For them, the proportion of initiated autologous fresh cycles that resulted in a live delivery was 21.0% (Table 17). Those with female infertility factors had comparatively less success, with a live delivery rate of 17.7% per initiated cycle.

Table 17: Number of autologous fresh cycles that resulted in a live delivery by cause of infertility, Australia and New Zealand, 2005

Cause of infertility	Initiated cycles (number)	Cycles with embryo transfer (per cent)	Cycles that resulted in a clinical pregnancy (per cent)	Cycles that resulted in a live delivery (per cent)
Male factor only	7,880	82.2	26.1	21.0
Female factor				
Tubal disease only	2,196	80.7	23.7	18.6
Endometriosis only	1,703	79.3	26.8	20.7
Other female factor only	3,768	71.4	20.2	16.2
Combined female factor	1,119	75.0	20.7	16.7
Combined male/female factor	5,003	78.2	23.6	18.4
Unexplained	5,157	78.7	23.6	18.8
Not stated	1,169	72.1	25.1	20.0
Total	**27,995**	**78.4**	**24.0**	**19.1**

Success of autologous fresh cycles among fertility centres

The success of autologous fresh ART treatment varied among the fertility centres in Australia and New Zealand. In 2005 among all centres, the success rates (measured as the proportion of autologous fresh cycles that resulted in a live delivery) ranged between 10.8% and 26.9% (Table 18).

Variation in success among fertility centres is best measured using quartiles which rank individual centres' success rates with the success of the top and bottom 25% of centres.

For autologous fresh cycles in 2005, the top 25% (first quartile) of fertility centres had a success rate between 20.9% and 26.9%. The bottom 25% (fourth quartile) of fertility centres had a lower success rate between 10.8% and 16.3%. The remaining 50% of fertility centres had success rates between 16.4% and 20.8% (Table 18).

Table 18: Success of autologous fresh cycles by women's age group and quartiles of success, fertility centres, Australia and New Zealand, 2005

	Live deliveries per initiated autologous fresh cycle (%)				
Age group (years)[(a)]	Mean	First quartile	Second quartile	Third quartile	Fourth quartile
< 38	24.2	24.9–31.3	23.2–24.8	20.6–23.1	15.2–20.5
≥ 38	9.9	12.1–18.4	9.5–12.0	7.3–9.4	1.8–7.2
All	**19.1**	**20.9–26.9**	**18.7–20.8**	**16.4–18.6**	**10.8–16.3**

(a) Age at time of treatment.

Overall the success rate was 19.1% for autologous fresh cycles in all centres in Australia and New Zealand. Women aged less than 38 years old had a much higher success rate (24.2%) in delivering a live child following an autologous fresh cycle than those aged 38 years or older (9.9%).

Figure 6 shows the average success rate (measured as the proportion of autologous fresh cycles with embryos transferred that resulted in a live delivery) and 25th and 75th percentiles by stage of embryo development among fertility centres. Single-blastocyst transfers (unadjusted for women's age) achieved a high average rate (31.8%) in live

deliveries per transfer. For fertility centres carried out single-blastocyst transfers in 2005, half of them had a success rate between 16.3% and 35.0% in live deliveries per transfer.

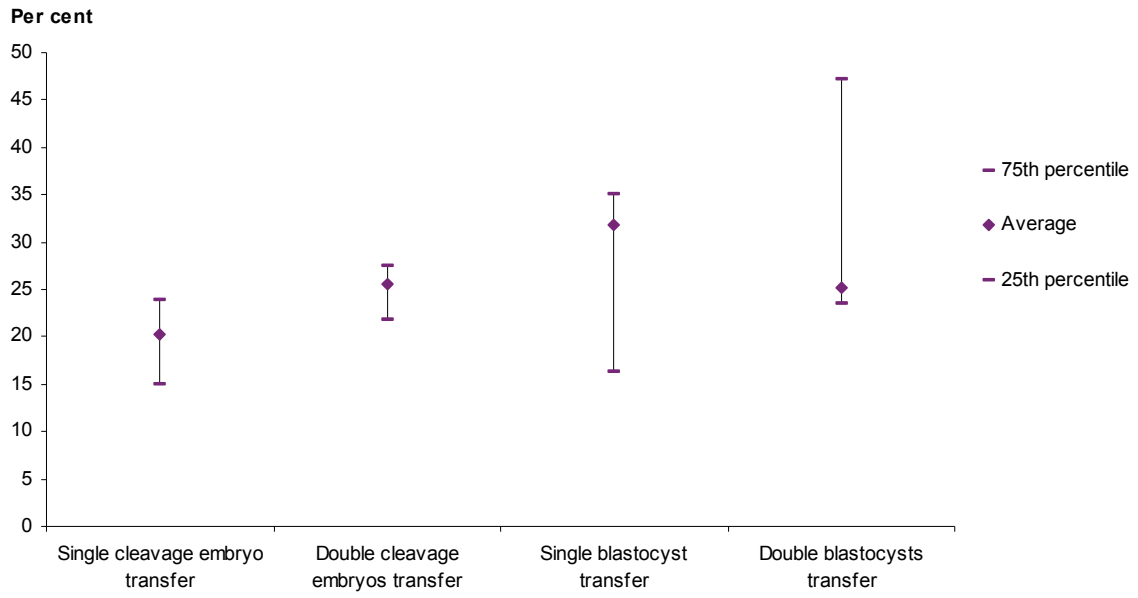


Figure 6: Proportion of autologous fresh cycles with embryo transfer that resulted in a live delivery by number of embryos transferred and stage of embryo development, fertility centres, Australia and New Zealand, 2005

2.2.3 Autologous thaw cycles

Autologous thaw cycles include cycles, with or without a transfer, that involve thawing woman's own cryopreserved (frozen) embryos with the intention of a transfer.

Success in clinical pregnancies and live deliveries

Figure 7 shows:

- the total number of initiated autologous thaw cycles; and
- the number of cycles in which embryos were transferred.

It also shows the number of initiated autologous thaw cycles that resulted in:

- a clinical pregnancy
- a delivery
- a live delivery.

Of 16,759 initiated autologous thaw cycles in 2005, 14.9% resulted in a live delivery. This is lower than the success rate of autologous fresh cycles in which 19.1% of initiated cycles resulted in a live delivery (Figures 4 and 7).

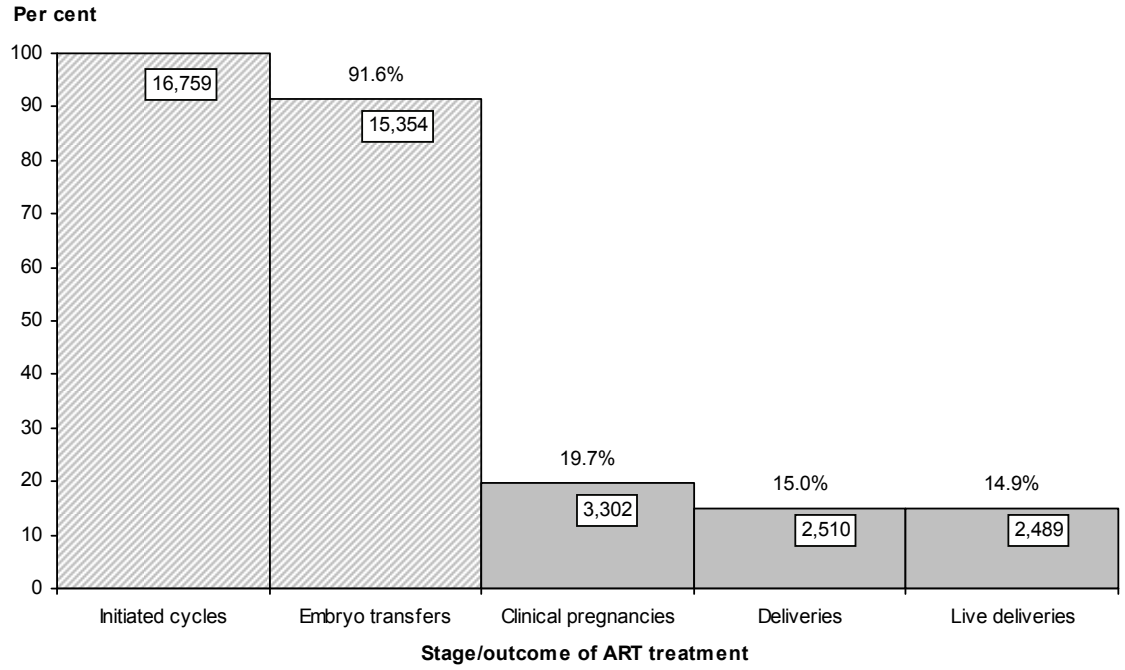


Figure 7: Progression of autologous thaw cycles, Australia and New Zealand, 2005

Success of autologous thaw cycles by women's age

The success rate (measured as the proportion of autologous thaw cycles that resulted in a live delivery) varied by women's age group. Women in the age group of 30–34 years had the highest success rate (17.8%). Similar to women in autologous fresh cycles, the success rates declined with advancing women's age. For women aged 40 years or older, the live delivery rate was less than 7% in autologous thaw cycles. Women aged 45 years or older had the lowest success rate (5.1%) in delivering a live child in 2005 (Table 19 and Figure 8).

Table 19: Success of autologous thaw cycles by stage/outcome of treatment and women's age group, Australia and New Zealand, 2005

	Age group (years)[(a)]						
Stage/outcome of treatment	**≤ 24**	**25–29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**All**
Initiated cycles	208	1,811	5,959	6,123	2,461	197	16,759
Embryo transfers	189	1,695	5,504	5,605	2,199	162	15,354
Clinical pregnancies	33	408	1,334	1,234	279	14	3,302
Live deliveries	27	309	1,060	912	171	10	2,489
Live deliveries per initiated cycle (%)	*13.0*	*17.1*	*17.8*	*14.9*	*6.9*	*5.1*	*14.9*
Live deliveries per transfer cycle (%)	*14.3*	*18.2*	*19.3*	*16.3*	*7.8*	*6.2*	*16.2*
Live deliveries per clinical pregnancy (%)	*81.8*	*75.7*	*79.5*	*73.9*	*61.3*	*71.4*	*75.4*

(a) Age at time of treatment.

Figure 8 shows that the success rates for autologous thaw cycles in 2005, measured as the proportion of initiated cycles that resulted in a live delivery, were higher in women aged

between 25 and 34 years. Similar to autologous fresh cycles, the success rates declined steadily for women aged 35 years or older.

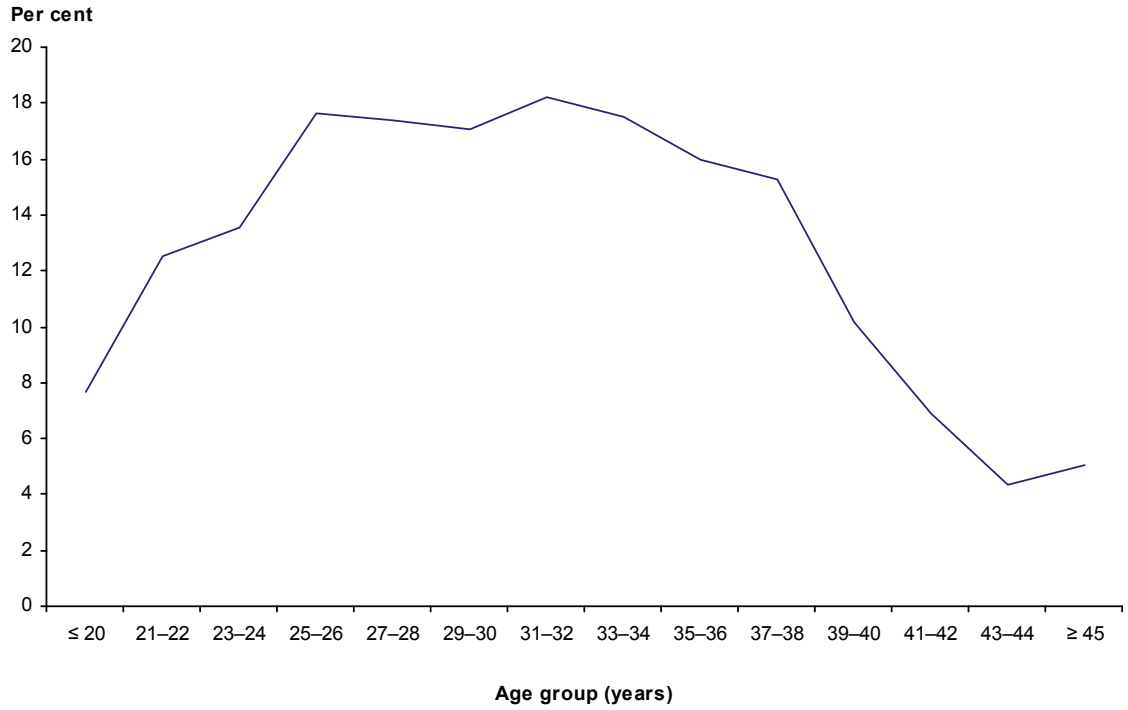


Figure 8: Proportion of autologous thaw cycles that resulted in a live delivery by women's age group, Australia and New Zealand, 2005

Success of autologous thaw cycles by ART procedure

For autologous thaw cycles with embryo transfers in 2005, the success rate (measured as the proportion of autologous thaw cycles with embryo transfers that resulted in a clinical pregnancy) was marginally higher for IVF cycles (21.9%) than for ICSI cycles (20.7%). The success rate (measured as the proportion of autologous thaw cycles with embryo transfers that resulted in a live delivery) was similar for IVF cycles (16.2%) and for ICSI cycles (15.8%) (Table 20).

Table 20: Success of autologous thaw cycles with embryo transfer by stage/outcome of treatment and procedure, Australia and New Zealand, 2005

Stage/outcome of treatment	IVF	ICSI	Unknown
Embryo transfers	7,075	7,681	598
Clinical pregnancies	1,546	1,593	163
Live deliveries	1,148	1,210	131
Clinical pregnancies per transfer cycle (%)	*21.9*	*20.7*	*27.3*
Live deliveries per transfer cycle (%)	*16.2*	*15.8*	*21.9*

Success of autologous thaw cycles by stage of embryo development

Similar to autologous fresh cycles, the rates for clinical pregnancies and live deliveries per autologous thaw embryo transfer cycle were higher for blastocyst transfers than for cleavage stage embryo transfers. Of blastocyst transfer cycles, 23.7% resulted in a clinical pregnancy and 17.3% resulted in a live delivery. Of cleavage stage embryo transfer cycles, 20.9% resulted in a clinical pregnancy and 15.9% resulted in a live delivery (Table 21). However, these rates were marginally lower compared to the rates in autologous fresh cycles (Table 16).

Table 21: Success of autologous thaw cycles with embryo transfer by stage/outcome of treatment and stage of embryo development, Australia and New Zealand, 2005

Stage/outcome of treatment	Cleavage stage embryo	Blastocyst
Embryo transfers	11,982	3,372
Clinical pregnancies	2,502	800
Live deliveries	1,904	585
Clinical pregnancies per transfer cycle (%)	*20.9*	*23.7*
Live deliveries per transfer cycle (%)	*15.9*	*17.3*

Success of autologous thaw cycles by cause of infertility

Couples who had male infertility factor as the only cause of infertility had a higher live delivery rate (15.8%) in autologous thaw cycle, compared to couples who had only female infertility factors (14.1%) (Table 22). The success rates in autologous thaw cycles in all categories of cause of infertility were lower compared with the rates in autologous fresh cycles (Table 17).

Table 22: Number of autologous thaw cycles that resulted in a live delivery by cause of infertility, Australia and New Zealand, 2005

Cause of infertility	Initiated cycles (number)	Cycles with embryo transfer (per cent)	Cycles that resulted in a clinical pregnancy (per cent)	Cycles that resulted in a live delivery (per cent)
Male factor only	4,708	91.1	20.2	15.8
Female factor				
Tubal disease only	1,647	91.7	18.3	13.2
Endometriosis only	1,075	91.1	22.3	16.7
Other female factor only	2,693	93.2	18.6	13.6
Combined female factor	640	92.5	19.4	14.4
Combined male/female factor	2,435	91.5	19.1	13.9
Unexplained	2,710	91.0	19.1	14.6
Not stated	851	91.4	23.7	18.0
Total	**16,759**	**91.6**	**19.7**	**14.9**

Success of autologous thaw cycles among fertility centres

For autologous thaw cycles in 2005, the success rates (measured as the proportion of autologous thaw cycles that resulted in a live delivery) among fertility centres ranged from 5.6% to 22.6% (Table 23).

For the top 25% (first quartile) of fertility centres, the success rates of live deliveries in autologous thaw cycles were between 17.7% and 22.6%. The bottom 25% (fourth quartile) of fertility centres had success rates between 5.6% and 11.7%. The remaining 50% of fertility centres had success rates between 11.8% and 17.6% (Table 23).

Similar to autologous fresh cycles, the success rate, on average, was much higher for women aged less than 38 years (17.1%) than for women aged 38 years or older (9.3%).

Table 23: Success of autologous thaw cycles by women's age group and quartiles of success, fertility centres, Australia and New Zealand, 2005

Age group (years)	Live deliveries per initiated autologous thaw cycle (%)				
	Mean	First quartile	Second quartile	Third quartile	Fourth quartile
< 38	17.1	20.6–24.7	16.7–20.5	13.7–16.6	5.1–13.6
≥ 38	9.3	10.1–17.9	8.5–10.0	5.4–8.4	0.0–5.3
All	**14.9**	**17.7–22.6**	**13.8–17.6**	**11.8–13.7**	**5.6–11.7**

Figure 9 shows the average success rate (measured as the proportion of autologous thaw cycles with embryos transferred that resulted in a live delivery) and 25th and 75th percentiles by stage of embryo development among fertility centres. In autologous thaw cycles, double-blastocyst transfers had the highest average success rate, followed by double-cleavage-embryo transfers. The average success rate of live deliveries in single-blastocyst transfers was higher (15.1%) than it was in single-cleavage-embryo transfers (13.4%) in all centres.

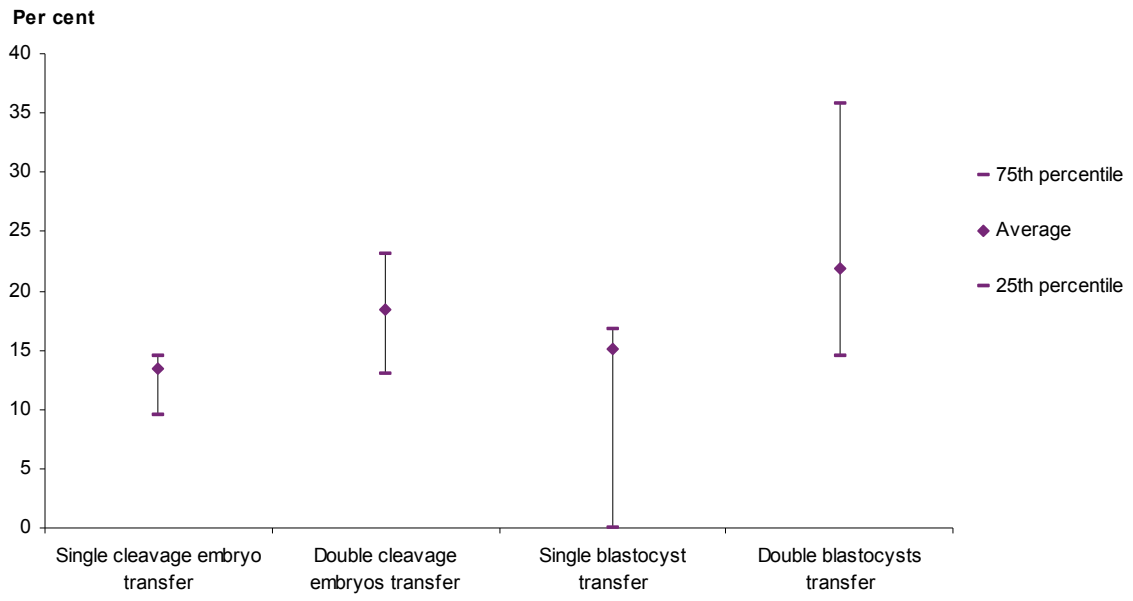


Figure 9: Proportion of autologous thaw cycles with embryo transfer that resulted in a live delivery by number of embryos transferred and stage of embryo development, Australia and New Zealand, 2005

2.3 Donation and recipient cycles in 2005

A donation cycle is a treatment cycle where the patients donate their oocytes, embryos or gametes to others. A recipient cycle is one in which the patients receive donated oocytes, embryos or gametes for their own ART treatment.

In 2005, donation and recipient cycles accounted for 5.7% (2,705) of all treatment cycles. Of all donation and recipient cycles, 1,710 (63.2%) cycles were fresh cycles and 995 (36.8%) were thaw cycles (Table 1).

2.3.1 Oocyte donation cycles

There were 894 initiated oocyte donation cycles reported in Australia and New Zealand in 2005, which included 68 (7.6%) cancelled cycles for oocyte donation (Figure 10). Over 90% of the initiated oocyte donation cycles resulted in donations.

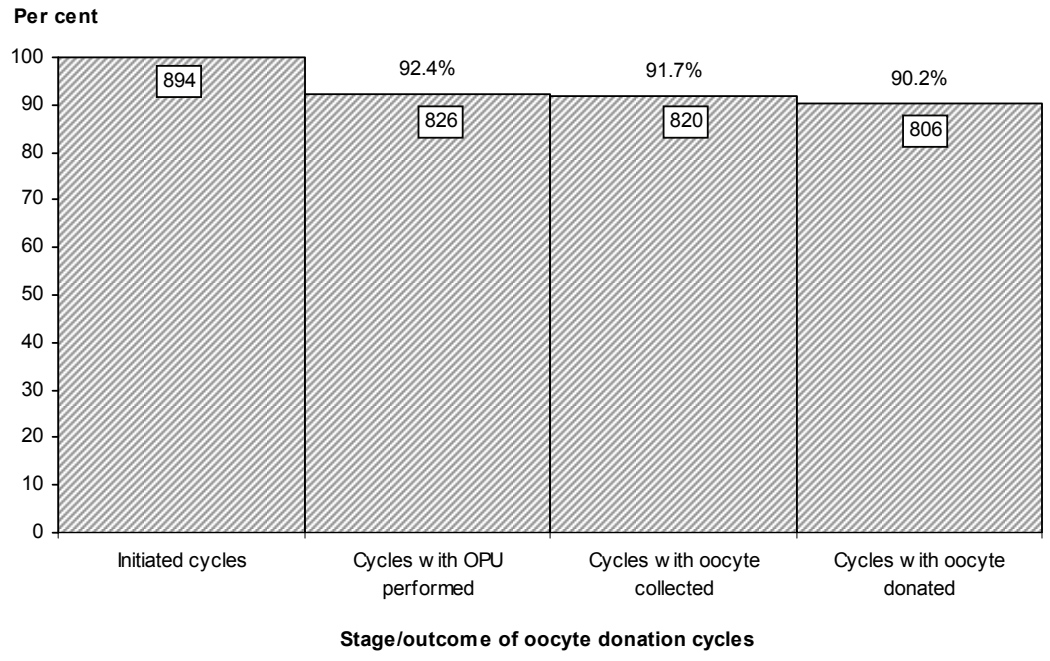


Figure 10: Progression of oocyte donation cycles, Australia and New Zealand, 2005

Of women who donated or intended to donate their oocytes in 2005, three-quarters were aged between 30 and 39 years. The most successful women in achieving an oocyte donation following initiated cycles were in the age group of 25–29 years old, with 93.8% of cycles donated oocytes (Table 24).

Table 24: Stage/outcome of oocyte donation cycles by donor's age group, Australia and New Zealand, 2005

Age group (years) [(a)]	Initiated cycles (number)	Cycles with OPU performed (per cent)	Cycles with oocyte collected (per cent)	Cycles with oocyte donated (per cent)
≤ 24	47	89.4	89.4	87.2
25–29	129	96.1	95.3	93.8
30–34	361	94.5	94.2	92.2
35–39	310	89.4	88.4	87.4
≥ 40	47	89.4	87.2	85.1
Total	**894**	**92.4**	**91.7**	**90.2**

(a) Age at time of treatment.

2.3.2 Oocytes/embryos recipient cycles

There were 1,811 oocytes/embryos recipient cycles reported in 2005 (Table 1). Of these recipient cycles, 88.5% (1,602) were oocyte recipient cycles and 11.5% (209) were embryo recipient cycles. The average age of women receiving donated oocytes/embryos was 40.5 years in 2005.

Success in clinical pregnancies and live deliveries

Figure 11 shows the number of recipient cycles in which embryos were transferred. It also shows the number of recipient cycles with embryo transfer that resulted in:

- a clinical pregnancy
- a delivery
- a live delivery.

Overall 18.6% (309 of 1,659) of recipient cycles following embryo transfers resulted in the delivery of a liveborn baby.

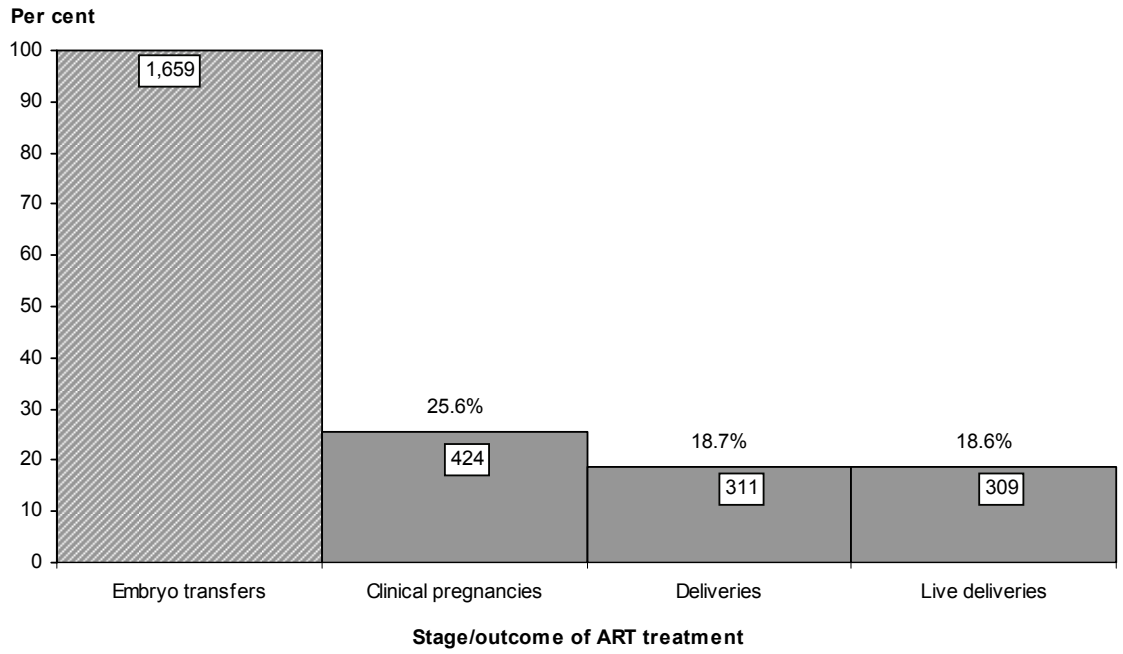


Figure 11: Progression of recipient cycles following embryo transfers, Australia and New Zealand, 2005

Success of oocytes/embryos recipient cycles by recipient's age

The success rate of recipient cycles (measured as the proportion of recipient cycles with embryo transfers that resulted in a live delivery) varied by recipient's age group. The success rates decline with advancing recipient's age. Younger recipients, aged less than 30 years, had a higher success rate of 24.2% in 2005 (Table 25). Among them, recipients aged 25 to 29 years had the highest success rate of 29.0%. Recipients aged 40 years or old had a lower success rate (< 18%) compared to the younger recipients.

Table 25: Success of oocytes/embryos recipient cycles by stage/outcome of treatment and recipient's age group, Australia and New Zealand, 2005

	Age group (years)[(a)]					
Stage/outcome of treatment	**≤ 29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**All**
Embryo transfers	62	210	354	627	406	1,659
Clinical pregnancies	22	63	86	148	105	424
Live deliveries	15	46	70	106	72	309
Live deliveries per transfer cycle (%)	*24.2*	*21.9*	*19.8*	*16.9*	*17.7*	*18.6*
Live deliveries per clinical pregnancy (%)	*68.2*	*73.0*	*81.4*	*71.6*	*68.6*	*72.9*

(a) Age at time of treatment.

Success of oocytes/embryos recipient cycles by ART procedure

The success rate (measured as the proportion of oocytes/embryos recipient cycles with embryo transfers that resulted in a live delivery) was higher in fresh cycles than in thaw cycles (Table 26). IVF cycles had higher success rates (27.2% in fresh cycles and 18.5% in thaw cycles) than ICSI cycles (21.9% and 11.5% respectively).

Table 26: Success of oocyte/embryo recipient cycles by treatment type and procedure, Australia and New Zealand, 2005

	Fresh		Thaw	
Stage/outcome of treatment	**IVF**	**ICSI**	**IVF**	**ICSI**
Embryo transfers	283	433	443	480
Clinical pregnancies	97	139	100	85
Live deliveries	77	95	82	55
Clinical pregnancies per transfer cycle (%)	*34.3*	*32.1*	*22.6*	*17.7*
Live deliveries per transfer cycle (%)	*27.2*	*21.9*	*18.5*	*11.5*

Success of oocytes/embryos recipient cycles by stage of embryo development

Transfer of fresh blastocysts in recipient cycles had a higher success rate of 26.9% (live deliveries per embryo transfer cycle), compared to transfer of fresh cleavage stage embryos (23.2%) (Table 27). In thaw cycles, cleavage stage embryo transfer cycles had a higher success rate (14.7%) than blastocyst transfer cycles (13.4%).

Table 27: Success of oocytes/embryos recipient cycles by treatment type and stage of embryo, Australia and New Zealand, 2005

	Fresh		Thaw	
Stage/outcome of treatment	**Cleavage stage embryo**	**Blastocyst**	**Cleavage stage embryo**	**Blastocyst**
Embryo transfers	560	156	794	149
Clinical pregnancies	181	55	165	23
Live deliveries	130	42	117	20
Clinical pregnancies per transfer cycle (%)	*32.3*	*35.3*	*20.8*	*15.4*
Live deliveries per transfer cycle (%)	*23.2*	*26.9*	*14.7*	*13.4*

3 Pregnancies, deliveries and births following embryo transfer cycles in 2005

3.1 Clinical pregnancies and deliveries following embryo transfer cycles in 2005

Clinical pregnancies overview

There were 10,450 embryo transfer cycles that resulted in a clinical pregnancy in 2005 in Australia and New Zealand. Of these cycles, 9,403 (89.9%) were in fertility centres in Australia, and 1,047 (10.1%) were in New Zealand.

In 2005, less than one in five (2,094 out of 10,450) of clinical pregnancies did not reach 20 weeks gestation. More than three-quarters (78.6%; 8,215) of clinical pregnancies had a delivery. There were 141 (1.4%) clinical pregnancies without information on gestational age and birthweight as it was lost in follow-up or contact by the fertility centres.

Early pregnancy loss

There were 2,094 early pregnancy losses reported following embryo transfers in 2005. Of these early pregnancy losses, 90.1% were miscarriages, 7.0% were ectopic or heterotopic pregnancies and 2.9% were due to fetal reduction or termination of pregnancy (Table 28).

Oocytes/embryos recipients had the highest proportion (95.4%) of miscarriages and the lowest proportion (3.7%) of ectopic or heterotopic pregnancies in early pregnancy losses. Compared to recipients, the women in autologous cycles had higher proportions (≥ 7.0%) of ectopic or heterotopic pregnancies.

Table 28: Number of embryo transfer cycles that resulted in a clinical pregnancy of < 20 weeks gestation by pregnancy outcome, treatment type and procedure, Australia and New Zealand, 2005

	Autologous			Oocytes/embryos recipient	All
Pregnancy outcome	**Fresh IVF**	**Fresh ICSI**	**Thaw**		
			Number		
Miscarriage	491	636	656	104	1,887
Reduction or termination	17	26	16	1	60
Ectopic or heterotopic pregnancy	39	50	54	4	147
Total	**547**	**712**	**726**	**109**	**2,094**
			Per cent		
Miscarriage	89.8	89.3	90.4	95.4	90.1
Reduction or termination	3.1	3.7	2.2	0.9	2.9
Ectopic or heterotopic pregnancy	7.1	7.0	7.4	3.7	7.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Deliveries

There were 8,215 women who gave birth following embryo transfers in 2005. Of these women, 99.0% had delivered at least one liveborn baby. Fetal deaths were 0.9% of all deliveries in 2005 (Table 29).

The proportion of live deliveries amongst all deliveries following autologous fresh cycles (98.9%) was slightly lower than the proportion of live deliveries following autologous thaw cycles (99.2%). For oocyte recipient cycles that resulted in a delivery, 99.6% were live deliveries. For embryo recipient cycles that resulted in a delivery, 97.0% were live deliveries.

Table 29: Number of embryo transfer cycles that resulted in a delivery by delivery outcome, treatment type and procedure, Australia and New Zealand, 2005

	Autologous			Oocytes/embryos	
Delivery outcome	Fresh IVF	Fresh ICSI	Thaw	recipient	All
			Number		
Live delivery	2,242	3,095	2,489	309	8,135
Fetal death[(a)]	22	31	16	2	71
Not stated	2	2	5	0	9
Total	2,266	3,128	2,510	311	8,215
			Per cent		
Live delivery	98.9	98.9	99.2	99.4	99.0
Fetal death[(a)]	1.0	1.0	0.6	0.6	0.9
Not stated	0.1	0.1	0.2	0.0	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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

Proportion of multiple gestation pregnancies by the number of embryos transferred

In 2005, double-embryo transfer cycles accounted for 54.7% of clinical pregnancies. Single-embryo transfer cycles contributed 43.9% of all clinical pregnancies. This proportion of single-embryo transfer cycles is higher than that in 2004 (34.6%) (Wang et al. 2006). A small proportion (1.4%) of clinical pregnancies was a result of a transfer of more than two embryos (Table 30).

Multiple gestation pregnancies are closely related to the number of embryos transferred in ART treatment. In double-embryo transfer cycles, two fetal hearts were detected in 21.3% of clinical pregnancies. This was markedly higher than the 1.9% of clinical pregnancies with two fetal heart detected in single-embryo transfer cycles (Table 30).

Table 30: Number of embryo transfer cycles that resulted in a clinical pregnancy by number of fetal hearts and number of embryos transferred, Australia and New Zealand, 2005

Number of fetal hearts	One		Two		Three or more		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
0[(a)]	420	9.2	393	6.9	18	11.9	831	8.0
1	3,953	86.3	3,789	66.3	91	60.3	7,833	75.0
2	87	1.9	1,217	21.3	22	14.6	1,326	12.7
3	3	0.1	26	0.5	6	4.0	35	0.3
Not stated	119	2.6	292	5.1	14	9.3	425	4.1
Total	**4,582**	**100.0**	**5,717**	**100.0**	**151**	**100.0**	**10,450**	**100.0**

(a) No fetal heart detected at the time of ultrasound.

Note: A clinical pregnancy that fulfils one of the following criteria: 1. Known to be ongoing at 20 weeks; 2. Evidence by ultrasound of an intrauterine sac (with or without a fetal heart); 3. Examination of products of conception reveal chorionic villi; or 4. An ectopic pregnancy has been diagnosed by laparoscope or by ultrasound.

Multiple gestation deliveries by the number of embryos transferred

In 2005, there were 8,215 deliveries from 10,450 clinical pregnancies following ART treatment. Of these deliveries, 14.0% (1,154) were twin or triplet deliveries (Table 31). This proportion of multiple deliveries is lower than that in 2004 (16.3%) (Wang et al. 2006).

There were 1,128 twin deliveries in 2005, accounting for 13.7% of all deliveries. The proportion of twin deliveries is lower than the 16.0% of twin deliveries in 2004 (Wang et al. 2006). The majority of twin deliveries were from double-embryo transfer cycles (92.5%; 1,043). In double-embryo transfer cycles that resulted in a delivery, the proportion of twin deliveries was 23.1%. Single-embryo transfer cycles that resulted in a delivery had 1.9% of twin deliveries.

There were a small number (26 out of 8,215) of triplet deliveries in 2005.

Table 31: Number of embryo transfer cycles that resulted in a delivery by gestation and number of embryos transferred, Australia and New Zealand, 2005

Gestation	One		Two		Three or more		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Singleton	3,539	98.1	3,446	76.4	76	77.6	7,061	86.0
Twin	68	1.9	1,043	23.1	17	17.3	1,128	13.7
Triplet	2	0.1	19	0.4	5	5.1	26	0.3
Total	**3,609**	**100.0**	**4,508**	**100.0**	**98**	**100.0**	**8,215**	**100.0**

Multiple gestation delivery by maternal age

The average age (at delivery) of women who had a delivery following embryo transfers in 2005 was 34.7 years, slightly older than the average age (34.5 years) of women who had a delivery following embryo transfers in 2004 (Wang et al. 2006). The average age of women who had a delivery following embryo transfers in 2005 is 5.0 years older than the average age (29.7 years) of all women who gave birth in Australia in 2004 (Laws et al. 2006).

Women aged less than 38 years had a higher proportion of multiple gestation deliveries compared to women aged 38 years or older in 2005 (14.7% and 12.2% respectively) (Table 32).

Table 32: Number of embryo transfer cycles that resulted in a delivery by gestation and maternal age group, Australia and New Zealand, 2005

	Age group (years)[a]					
	< 38		≥ 38		Total[b]	
Gestation	Number	Per cent	Number	Per cent	Number	Per cent
Singleton	5,229	85.3	1,832	87.8	7,061	86.0
Multiple	*899*	*14.7*	*254*	*12.2*	*1,154*	*14.0*
Twin	875	14.3	252	12.1	1,128	13.7
Triplet	24	0.4	2	0.1	26	0.3
Total	**6,128**	**100.0**	**2,086**	**100.0**	**8,215**	**100.0**

(a) Age at time of delivery.

(b) Includes less than 0.1% of deliveries in which maternal age was unknown.

Caesarean section

In 2005, one in two deliveries following embryo transfers was by caesarean section (Table 33). The proportion of deliveries by caesarean section has slightly increased compared to 49.7% in 2004 (Wang et al. 2006).

There was a marked difference in the caesarean section rate for singleton deliveries (45.4%) compared to twin deliveries (78.2%) (Table 33).

Table 33: Number of embryo transfer cycles that resulted in a delivery by gestation and method of delivery, Australia and New Zealand, 2005

	Singleton		Twin		Triplet		Total	
Method of delivery	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Caesarean section	3,205	45.4	882	78.2	23	88.5	4,110	50.0
Other	3,848	54.5	246	21.8	3	11.5	4,097	49.9
Not stated	8	0.1	0	0.0	0	0.0	8	0.1
Total	**7,061**	**100.0**	**1,128**	**100.0**	**26**	**100.0**	**8,215**	**100.0**

The rate of caesarean section deliveries increases with advancing women's age at delivery. For women aged less than 38 years who had embryo transfers in 2005, 46.9% had a caesarean section. For women aged 38 years or older, the rate was 59.2%. The lowest rate of caesarean section deliveries was 29.9% in women aged less than 24 years in 2005 (Table 34).

Table 34: Number of embryo transfer cycles that resulted in a delivery by method of delivery and maternal age group, Australia and New Zealand, 2005

	Age group (years)[a]								
Method of delivery	**≤ 24**	**25–29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**Total[b]**	**< 38**	**≥ 38**
					Number				
Caesarean section	20	346	1,474	1,625	552	92	4,110	2,874	1,235
Other	47	510	1,589	1,562	362	27	4,097	3,247	850
Not stated	0	2	2	4	0	0	8	7	1
Total	**67**	**858**	**3,065**	**3,191**	**914**	**119**	**8,215**	**6,128**	**2,086**
					Per cent				
Caesarean section	29.9	40.3	48.1	50.9	60.4	77.3	50.0	46.9	59.2
Other	70.1	59.4	51.8	49.0	39.6	22.7	49.9	53.0	40.7
Not stated	0.0	0.2	0.1	0.1	0.0	0.0	0.1	0.1	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 delivery.

(b) Includes less than 0.1% of deliveries in which maternal age was unknown.

3.2 Babies conceived from embryo transfer cycles in 2005

Babies in this section were born of 20 weeks or more gestational age or of 400 grams or more in birthweight following embryo transfers in 2005.

3.2.1 Baby outcomes

There were 9,395 babies born to women who had embryo transfers in 2005 (Table 35). Of these babies, 90.1% were conceived at fertility centres in Australia and 9.9% in New Zealand.

Of babies born to women who had embryo transfers in 2005, 75.2% were singletons, 24.0% were twins and 0.8% were triplets (Table 35). There were 9,283 liveborn babies, representing 98.8% of all babies. The proportion of liveborn babies has increased slightly compared to 98.4% in 2004 (Wang et al. 2006).

Proportion of preterm birth for babies

The average gestational age of babies born to women who had embryo transfers in 2005 was 37.5 weeks (Table 35). This is similar to the average gestational age of babies born to women who had ART treatment in 2004 (37.4 weeks) (Wang et al. 2006), but less than the average gestational age of 38.8 weeks for all babies born in Australia in 2004 (Laws et al. 2006).

Less than a quarter (23.3%) of babies were preterm (less than 37 weeks gestation), which is markedly higher than the proportion of preterm babies (8.2%) born in Australia in 2004

(Laws et al. 2006). The high proportion of babies born preterm is likely to be related to the higher proportion of multiple births among babies born to women who had ART treatment.

The average gestational age of singletons born to women who had embryo transfers in 2005 was 38.4 weeks, for twins it was 34.9 weeks and 31.0 weeks for triplets. One in ten singletons was born preterm. Multiples had much higher proportions of preterm babies. In twins it was 61.3% and 96.2% for triplets (Table 35).

Table 35: Number of babies born to women who had embryo transfer cycles by gestational age and plurality, Australia and New Zealand, 2005

Gestational age (weeks)	Singleton		Twin		Triplet		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Mean (weeks)	*38.4*		*34.9*		*31.0*		*37.5*	
20–27	79	1.1	110	4.9	18	23.1	207	2.2
28–31	67	0.9	164	7.3	15	19.2	246	2.6
32–36	582	8.2	1,110	49.2	42	53.8	1,734	18.5
≥ 37	6,333	89.7	868	38.5	3	3.8	7,204	76.7
Not stated	0	0.0	4	0.2	0	0.0	4	0.0
Total	**7,061**	**100.0**	**2,256**	**100.0**	**78**	**100.0**	**9,395**	**100.0**
≤ 36	*728*	*10.3*	*1,384*	*61.3*	*75*	*96.2*	*2,187*	*23.3*

Figure 12 shows the distribution of gestational age for babies born to women who had embryo transfers in 2005. Most were full-term (76.7%). This is slightly higher than the proportion (74.7%) of full-term babies born to women who had ART treatment in 2004 (Wang et al. 2006). Of babies born to women who had embryo transfers in 2005, 18.5% were born at 32–36 weeks and a further 4.8% were born at less than 32 weeks (Table 35).

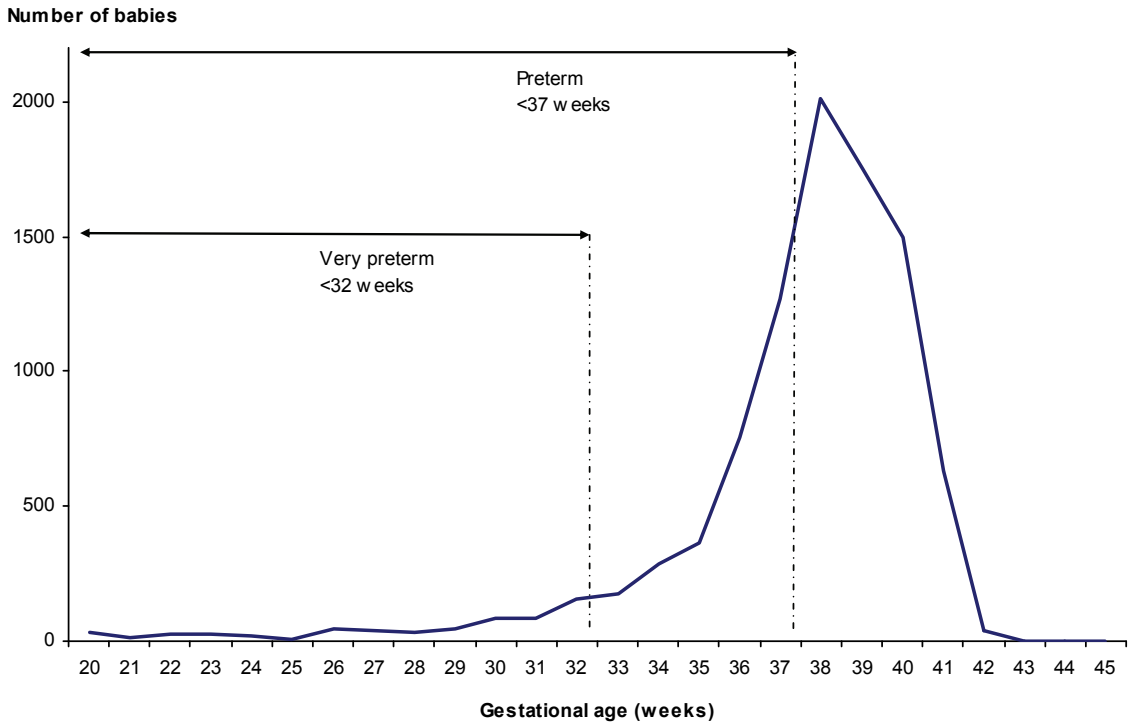


Figure 12: Number of babies born to women who had embryo transfer cycles by gestational age, Australia and New Zealand, 2005

Proportion of low birthweight in liveborn babies

The average birthweight for liveborn babies to women who had embryo transfers in 2005 was 3,079 grams. This is slightly higher than the average birthweight of 3,054 grams for liveborn babies to women who had ART treatment in 2004 (Wang et al. 2006).

Less than one in five (18.4%) liveborn babies in 2005 was classified as being low birthweight (< 2,500 grams), which included 3.6% very low birthweight (< 1,500 grams) (Table 36).

As with gestational age, the high proportion of low birthweight is possibly related to the high proportion of multiple births.

Table 36: Number of liveborn babies to women who had embryo transfer cycles by birthweight group and plurality, Australia and New Zealand, 2005

	Singleton		Twin		Triplet		Total	
Birthweight (g)	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Mean (g)	*3,320*		*2,369*		*1,597*		*3,079*	
< 1,000	30	0.4	76	3.4	14	19.2	120	1.3
1,000–1,499	67	1.0	135	6.1	15	20.5	217	2.3
1,500–1,999	89	1.3	312	14.1	27	37.0	428	4.6
2,000–2,499	294	4.2	634	28.6	12	16.4	940	10.1
2,500–2,999	1,161	16.6	749	33.8	4	5.5	1,914	20.6
3,000–3,499	2,560	36.6	261	11.8	0	0.0	2,821	30.4
3,500–3,999	2,016	28.8	35	1.6	0	0.0	2,051	22.1
≥ 4,000	708	10.1	2	0.1	0	0.0	710	7.6
Not stated	72	1.0	9	0.4	1	1.4	82	0.9
Total	**6,997**	**100.0**	**2,213**	**100.0**	**73**	**100.0**	**9,283**	**100.0**
< 2,500	*480*	*6.9*	*1,157*	*52.3*	*68*	*93.2*	*1,705*	*18.4*

Figure 13 shows the distribution of birthweights for liveborn babies to women who had embryo transfers in 2005 by plurality. It also shows the difference in the average birthweights of liveborn singletons and liveborn twins. Singletons had an average birthweight of 3,320 grams compared with 2,369 grams for twins (average birthweights indicated by vertical lines). Of liveborn singletons, 6.9% were low birthweight and of liveborn twins, 52.3% were low birthweight (Table 36).

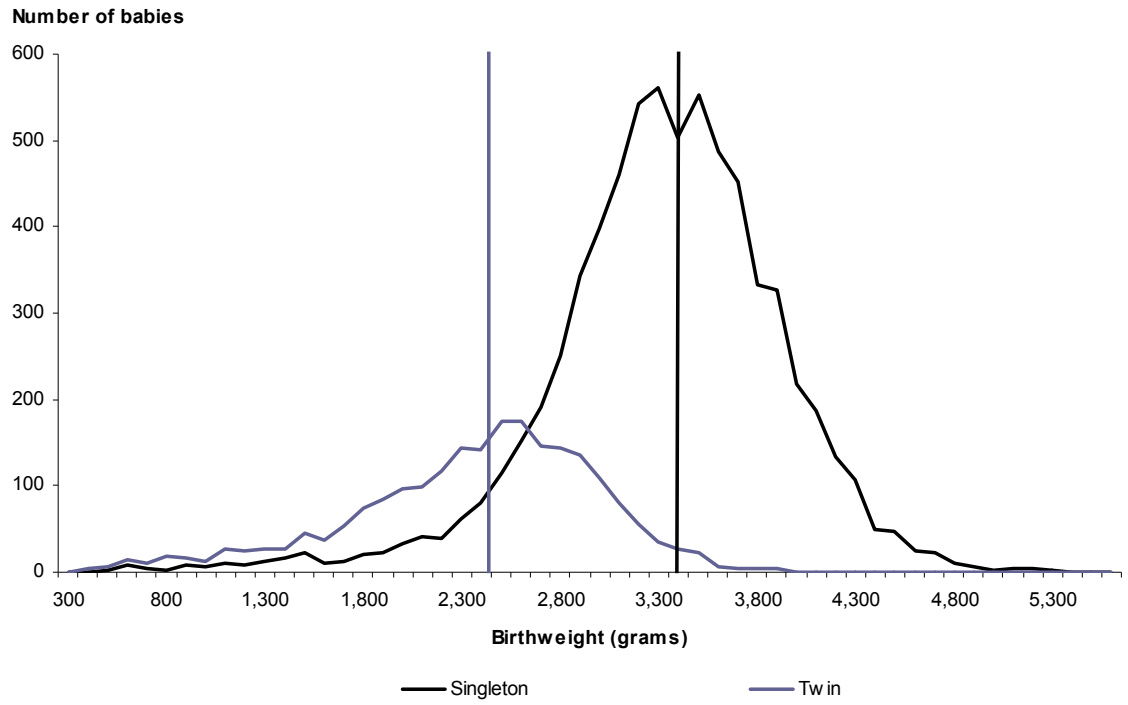


Figure 13: Number of liveborn babies to women who had embryo transfer cycles by birthweight and plurality, Australia and New Zealand, 2005

Sex distribution in liveborn babies

For liveborn babies to women who had embryo transfers in 2005, there were 105.1 male babies for every 100 female babies. For liveborn babies to women who had autologous fresh IVF embryo transfers in 2005, the ratio was 113.9. For liveborn babies to women who had autologous fresh ICSI embryo transfers, the ratio was 97.7 (Table 37).

Table 37: Number of liveborn babies to women who had embryo transfer cycles by sex, treatment type and procedure, Australia and New Zealand, 2005

Sex	Autologous			Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Thaw		
			Number		
Male	1,385	1,749	1,420	191	4,745
Female	1,216	1,791	1,337	171	4,515
Not stated	4	11	7	1	23
Total	2,605	3,551	2,764	363	9,283
			Per cent		
Male	53.2	49.3	51.4	52.6	51.1
Female	46.7	50.4	48.4	47.1	48.6
Ratio[(a)]	*113.9*	*97.7*	*106.2*	*111.7*	*105.1*

(a) Number of males to 100 females.

Perinatal mortality in all babies

Perinatal mortality is a measure for fetal deaths (stillbirths) and the deaths of liveborn babies occurring within 28 days of birth (neonatal deaths). There were 138 perinatal deaths in 2005. Of these, 102 were fetal deaths and 36 were neonatal deaths. The perinatal death rate in 2005 was 14.7 deaths per 1,000 births (Table 38). It is lower than the rate of 19.3 deaths per 1,000 births to women who had ART treatment in 2004 (Wang et al. 2006). However, this rate is higher than the rate of 10.2 deaths per 1,000 births women who gave birth in Australia in 2004 (Laws et al. 2006).

Table 38: Perinatal mortality of babies born to women who had embryo transfer cycles by type of death and plurality, Australia and New Zealand, 2005

Type of death	Singleton	Twin	Triplet	Total
		Number		
Fetal deaths	56	41	5	102
Neonatal deaths	12	20	4	36
Perinatal deaths[(a)]	68	61	9	138
		Rate per 1,000 births		
Fetal deaths per 1,000 births	*7.9*	*18.2*	*64.1*	*10.9*
Neonatal deaths per 1,000 live births	*1.7*	*9.0*	*54.8*	*3.9*
Perinatal deaths per 1,000 births[(b)]	*9.6*	*27.0*	*115.4*	*14.7*

(a) Perinatal deaths are reported by patients to fertility centre staff. These data are not official vital statistics.

(b) Fetal and perinatal death rates were calculated using all births (live births and fetal deaths) to women who had ART treatment in 2005. Neonatal death rates were calculated using all live births to women who had embryos transfer cycles in 2005.

Singletons had the lowest perinatal mortality rate of 9.6 deaths per 1,000 births and twins had a higher rate of 27.0 deaths per 1,000 births (Table 38).

In 2005, information relating to pregnancy and birth outcomes was not stated for less than 0.3% of cycles. Even for cycles in which there is successful follow-up, data are limited by the self-reported nature of the information, especially on pregnancy complications and infant morbidity. Data on perinatal mortality should be interpreted with caution because of the small numbers and potential variability in case reporting.

3.2.2 Baby outcomes — single-embryo transfers and double-embryo transfers

There were 3,681 babies born to women who had a single-embryo transfer (SET) in 2005, and 5,589 babies born to women who had a double-embryo transfer (DET). The majority (96.1%) of SET babies were singletons. Less than three in five (61.7%) DET babies were singletons (Tables 39 and 40).

Perinatal outcomes of babies born following SET and DET

The adverse perinatal outcomes of babies born to women who had ART treatment can be measured in the proportions of preterm babies (born before 37 weeks gestation), babies born in low birthweight (less than 2,500 grams) and perinatal deaths. Table 39 presents the perinatal outcomes of babies born to women who had single-embryo transfers in 2005. Table 40 presents the perinatal outcomes of babies from double-embryo transfers.

The proportion of preterm babies was 11.7% for SET babies and 30.6% for DET babies.

Similarly, only 8.0% of SET liveborn babies were low birthweight, compared to 25.0% of DET liveborn babies in 2005 (Tables 39 and 40). SET liveborn babies in 2005 on average had a birthweight of 3,302 grams. This is markedly higher than the average birthweight of 2,937 grams of DET liveborn babies.

SET babies in 2005 had a lower perinatal death rate (8.4 deaths per 1,000 births), compared to DET babies (18.6 deaths per 1,000 births) (Tables 39 and 40).

Table 39: Perinatal outcomes of babies born to women who had single embryo transfer cycles by plurality, Australia and New Zealand, 2005

	Singleton		Multiple		Total	
Perinatal outcome	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Gestational age (weeks)						
≥ 37	3,201	90.4	48	33.8	3,249	88.3
20–36	338	9.6	94	66.2	432	11.7
Total	**3,539**	**100.0**	**142**	**100.0**	**3,681**	**100.0**
Birthweight of liveborn babies (grams)						
≥ 2500	3,271	93.0	48	34.5	3,319	90.8
< 2500	204	5.8	89	64.0	293	8.0
Not stated	42	1.2	2	1.4	44	1.2
Total	**3,517**	**100.0**	**139**	**100.0**	**3,656**	**100.0**
Baby outcome						
Live birth–survived	3,511	99.2	137	96.5	3,648	99.1
Live birth–neonatal death	6	0.2	2	1.4	8	0.2
Fetal death	20	0.6	3	2.1	23	0.6
Not stated	2	0.1	0	0.0	2	0.1
Total	**3,539**	**100.0**	**142**	**100.0**	**3,681**	**100.0**
Perinatal deaths per 1,000 births[(a)(b)]	*7.3*		*35.2*		*8.4*	

(a) Perinatal deaths are reported by patients to fertility centre staff. These data are not official vital statistics.

(b) Perinatal death rates were calculated using all births (live births and fetal deaths) to women who had ART treatment in 2004.

Table 40: Perinatal outcomes of babies born to women who had double embryo transfer cycles by plurality, Australia and New Zealand, 2005

	Singleton		Multiple		Total	
Perinatal outcome	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Gestational age (weeks)						
≥ 37	3,066	89.0	806	37.6	3,872	69.3
20–36	380	11.0	1,333	62.2	1,713	30.6
Not stated	0	0.0	4	0.2	4	0.1
Total	**3,446**	**100.0**	**2,143**	**100.0**	**5,589**	**100.0**
Birthweight of liveborn babies (grams)						
≥ 2500	3,107	91.3	988	47.1	4,095	74.4
< 2500	269	7.9	1,104	52.6	1,373	25.0
Not stated	28	0.8	7	0.3	35	0.6
Total	**3,404**	**100.0**	**2,099**	**100.0**	**5,503**	**100.0**
Baby outcome						
Live birth–survived	3,398	98.6	2,079	97.0	5,477	98.0
Live birth–neonatal death	6	0.2	20	0.9	26	0.5
Fetal death	36	1.0	42	2.0	78	1.4
Not stated	6	0.2	2	0.1	8	0.1
Total	**3,446**	**100.0**	**2,143**	**100.0**	**5,589**	**100.0**
Perinatal deaths per 1,000 births[(a)(b)]	*12.2*		*28.9*		*18.6*	

(a) Perinatal deaths are reported by patients to fertility centre staff. These data are not official vital statistics.

(b) Perinatal death rates were calculated using all births (live births and fetal deaths) to women who had ART treatment in 2004.

Perinatal outcomes of singletons following SET and DET

There were 3,539 singletons born following SET and 3,446 born following DET in 2005. Singletons born following SET had better perinatal outcomes than singletons born following DET.

The proportion of preterm SET singletons (born before 37 weeks gestation) was 9.6% (338) and 11.0% (380) for DET singletons. In liveborn singletons, low birthweight (< 2,500g) babies accounted for 5.8% from single-embryo transfers and 7.9% from double-embryos transfers. Similarly, the perinatal death rate was lower in SET singletons than in DET singletons (7.3 deaths and 12.2 deaths per 1,000 births respectively) (Tables 39 and 40).

4 GIFT and surrogacy cycles in 2005

4.1 GIFT cycles

The use of gamete intrafallopian transfer (GIFT) procedure as part of ART treatment provided in Australia and New Zealand is in decline in recent years. In 2005, there were 138 GIFT cycles reported to ANZARD. Of these GIFT cycles, 123 (89.1%) had oocytes transferred. One in four (25.4%; 35) GIFT cycles resulted in a clinical pregnancy. Less than one in five (18.1%; 25) women had a live delivery after GIFT treatment in 2005. Multiple gestation deliveries accounted for 28.0% (7 of 25) of all deliveries.

All 33 babies born to women who had GIFT treatment in 2005 were liveborn. Of these, 36.4% (12) were born preterm and 36.4% (12) were low birthweight.

4.2 Surrogacy cycles

There were 64 surrogacy cycles reported to ANZARD in 2005. Thirty-nine were surrogacy carrier cycles. Among surrogacy carrier cycles, seven (17.9%) resulted in a clinical pregnancy and six (15.4%) resulted in a live delivery. All six babies born to surrogacy carriers in 2005 were liveborn.

5 Donor sperm insemination (DI) cycles in 2005

5.1 DI cycles performed in 2005

The information presented here does not include DI cycles undertaken in hospitals or private clinics that are not fertility centres. Only DI cycles undertaken in fertility centres in Australia and New Zealand are included in this section.

The success of DI cycles is measured as the proportion of DI cycles that resulted in a clinical pregnancy or the proportion of DI cycles that resulted in a live delivery. In 2005, there were 3,356 DI cycles reported to ANZARD. Of these DI cycles, 11.8% resulted in a clinical pregnancy and 9.2% resulted in a live delivery (Table 41). The average age of women who had a DI cycle in 2005 was 35.0 years.

Table 41: Success of DI cycles by stage/outcome of treatment and women's age group, Australia and New Zealand, 2005

	Age group (years)[(a)]						
Stage/outcome of treatment	**≤ 24**	**25–29**	**30–34**	**35–39**	**40–44**	**≥ 45**	**Total**
DI cycles	61	430	965	1,213	628	59	3,356
Clinical pregnancies	10	61	142	146	37	0	396
Live deliveries	10	52	115	109	24	0	310
Clinical pregnancies per DI cycle (%)	*16.4*	*14.2*	*14.7*	*12.0*	*5.9*	*0.0*	*11.8*
Live deliveries per DI cycle (%)	*16.4*	*12.1*	*11.9*	*9.0*	*3.8*	*0.0*	*9.2*
Live deliveries per clinical pregnancy (%)	*100.0*	*85.2*	*81.0*	*74.7*	*64.9*	*. .*	*78.3*

(a) Age at time of treatment.

Success of DI cycles by women's age

Women in age group of less than 25 years old had the highest proportion (16.4%) of live deliveries. The proportions of live deliveries declined with advancing women's age (Table 41).

About two-thirds (64.9%) of women who had DI treatment in 2005 were aged between 30 and 39 years. Women in 30–34 years age group had a live delivery rate of 11.9%. Among women aged between 35 and 39, less than one in ten (9.0%) DI cycles resulted in a live delivery. For women in 40–44 years age group, less than one in 25 (3.8%) DI cycles resulted in a live delivery. There were no clinical pregnancies in all 59 DI cycles in which women were aged 45 years or older (Table 41).

5.2 DI cycles resulting in clinical pregnancies in 2005

In 2005, 396 DI cycles resulted in a clinical pregnancy. Ectopic or heterotopic pregnancies occurred in 0.5% and terminations due to various pregnancy complications occurred in about 1.0%. More than three-quarters of clinical pregnancies (312 of 396) resulted in a delivery. The majority (310 of 312) of deliveries resulted in giving birth to at least one liveborn baby. Multiple gestation deliveries accounted for 5.1% (16 of 312) of all deliveries.

5.3 Babies conceived through DI treatment in 2005

There were 330 babies born to women who had DI treatment in Australia and New Zealand in 2005. Of these babies, 13.9% (46) were born preterm. The mean birthweight of liveborn babies following DI treatment was 3,278 grams. Thirty (9.2%) babies were born with low birthweight. The perinatal death rate was 9.1 per 1,000 births to women who had DI treatment in 2005.

6 Trends in ART treatment and outcomes of ART treatment

This chapter includes autologous cycles, donation and recipient cycles, GIFT cycles, surrogacy cycles and unclassified cycles from 2002 to 2005.

6.1 Trends in ART treatment – 2002 to 2005

Use of ART treatment

In 2005, 47,661 ART treatment cycles (including all autologous, donation and recipient cycles, GIFT cycles, surrogacy cycles and unclassified cycles) were reported to ANZARD in Australia and New Zealand. This is an increase of 13.7% of ART treatment cycles from 2004 and an increase of 39.1% of ART treatment cycles from 2002 (Table 42).

The number of ART treatment cycles in Australia and New Zealand in 2005 that resulted in a clinical pregnancy was 10,492. This is 19.3% more than the number of clinical pregnancies following ART treatment in 2004 and 44.1% more than the number of clinical pregnancies following ART treatment in 2002. In 2005, the rates of clinical pregnancies and live deliveries per cycle started were marginally higher than previous years (Table 42).

Table 42: Success of ART treatment, Australia and New Zealand, 2002 to 2005

Stage/outcome of treatment	2002	2003	2004	2005
Cycles started[(a)]	34,267	36,966	41,904	47,661
Oocytes/embryos transfers	28,036	30,184	34,232	39,121
Clinical pregnancies	7,279	7,977	8,794	10,492
Live deliveries	5,552	6,022	6,792	8,166
Clinical pregnancies per cycles started (%)	*21.2*	*21.6*	*21.0*	*22.0*
Live deliveries per cycles started (%)	*16.2*	*16.3*	*16.2*	*17.1*

(a) Includes all ART treatment (autologous cycles, oocytes/embryos donation and recipient cycles, GIFT cycles, surrogacy cycles and unclassified cycles).

Types of ART treatment and ART procedure

In fresh cycles, the proportions of use of IVF procedure and ICSI procedure were similar between 2002 and 2005. The use of GIFT procedure has declined from 0.7% of all fresh cycles in 2002 to 0.3% in 2005 (Table 43).

In thaw cycles, the use of IVF procedure slightly increased between 2002 and 2005, from 18.4% in 2002 to 19.3% in 2005. The proportion of ICSI thaw cycles slightly decreased from 21.9% in 2002 to 20.9% in 2005 (Table 43).

Table 43: Number of ART treatment cycles with oocytes/embryos transfer by treatment type and procedure, Australia and New Zealand, 2002 to 2005

Treatment type/procedure	2002		2003		2004		2005	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Fresh								
IVF	6,874	24.5	7,362	24.4	8,383	24.5	9,414	24.1
ICSI	9,354	33.4	10,069	33.4	11,560	33.8	13,251	33.9
GIFT	190	0.7	183	0.6	138	0.4	123	0.3
Thaw								
IVF	5,150	18.4	5,586	18.5	6,447	18.8	7,545	19.3
ICSI	6,153	21.9	6,449	21.4	7,181	21.0	8,169	20.9
Not stated	274	1.0	523	1.7	517	1.5	618	1.6
Unclassified	41	0.1	12	0.0	6	0.0	1	0.0
Total	**28,036**	**100.0**	**30,184**	**100.0**	**34,232**	**100.0**	**39,121**	**100.0**

Women's age

Women who had ART treatment in 2005 were on average slightly older (35.5 years) than women who had treatment in 2002 (35.2 years). The majority of women who had treatment were aged between 30 and 40 years old. The proportions of these women were 71.6% in 2002, 71.5% in 2003, 72.1% in 2004 and 72.3% in 2005. The proportion of women aged older than 40 years has increased from 14.3% in 2002 to 15.3% in 2005 (Table 44).

Table 44: Number of ART treatment cycles by women's age group, Australia and New Zealand, 2002 to 2005

Age group (years)[(a)]	2002		2003		2004		2005	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Mean (years)	*35.2*		*35.2*		*35.4*		*35.5*	
≤ 24	412	1.2	474	1.3	504	1.2	544	1.1
25–29	3,790	11.1	4,085	11.1	4,298	10.3	4,724	9.9
30–34	10,937	31.9	11,914	32.2	13,340	31.8	14,868	31.2
35–37	7,102	20.7	7,746	21.0	9,090	21.7	10,589	22.2
38–40	6,516	19.0	6,775	18.3	7,776	18.6	9,007	18.9
41–42	2,727	8.0	3,134	8.5	3,476	8.3	3,941	8.3
43–44	1,389	4.1	1,480	4.0	1,886	4.5	2,249	4.7
≥ 45	754	2.2	789	2.1	999	2.4	1,084	2.3
Other/not stated	640	1.9	569	1.5	535	1.3	655	1.4
Total	**34,267**	**100.0**	**36,966**	**100.0**	**41,904**	**100.0**	**47,661**	**100.0**

(a) Age at time of treatment.

Number of embryos transferred per transfer cycle

The majority of embryo transfer cycles over the period 2002 to 2005 had one or two embryos transferred (Figure 14). There has been a significant decline in the number of cycles where three or more embryos were transferred from 6.0% in 2002 to 1.9% in 2005 ($p<0.01$). There

has been a highly significant shift in recent years to the transfer of one embryo per cycle. The proportion of single-embryo transfer cycles increased from 28.4% in 2002 to 48.3% in 2005 ($p<0.01$) in Australia and New Zealand.

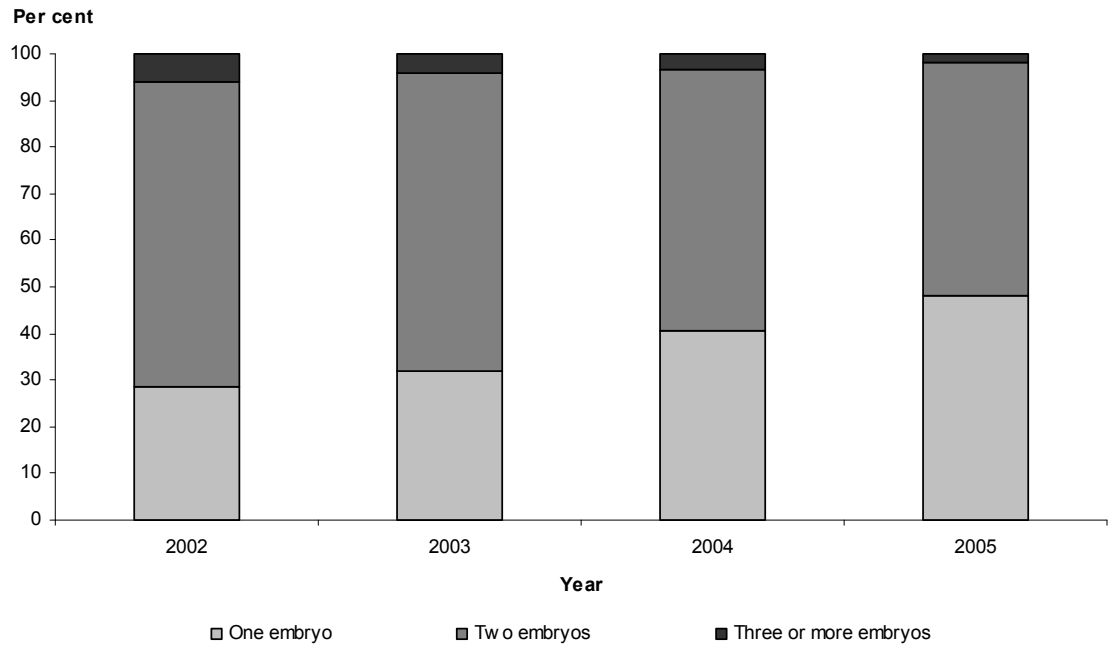


Figure 14: Proportion of embryo transfer cycles by number of embryos transferred, Australia and New Zealand, 2002 to 2005

Success of embryo transfer cycles

The proportion of fresh cycles with single-embryo transfers in 2005 that resulted in a clinical pregnancy was 29.3%, which is 1.2 times the proportion (23.4%) in 2002 ($p<0.01$). The proportion of thaw cycles with single-embryo transfers that resulted in a clinical pregnancy has significantly increased from 14.2% in 2002 to 18.8% in 2005 ($p<0.01$) (Table 45).

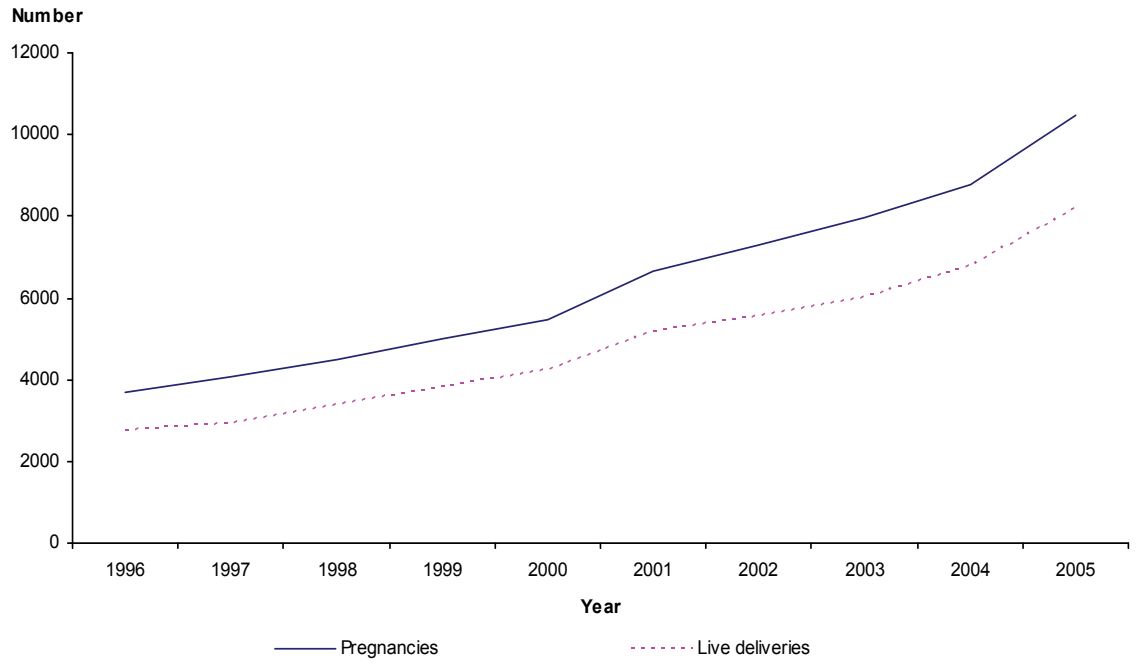
Table 45: Number of ART treatment cycles with embryo transfer by stage/outcome of treatment, treatment type and number of embryos transferred, Australia and New Zealand, 2002 to 2005

	Fresh				Thaw			
Stage/outcome of treatment	**2002**	**2003**	**2004**	**2005**	**2002**	**2003**	**2004**	**2005**
Single embryo transfer								
Embryo transfer cycles	3,965	4,894	7,410	10,084	3,942	4,713	6,385	8,734
Clinical pregnancies	929	1,253	1,987	2,950	560	768	1,049	1,638
Clinical pregnancies per transfer cycle (%)	*23.4*	*25.6*	*26.8*	*29.3*	*14.2*	*16.3*	*16.4*	*18.8*
Double embryo transfer								
Embryo transfer cycles	11,149	11,651	11,725	12,052	7,114	7,447	7,479	7,379
Clinical pregnancies	3,714	3,894	3,708	3,917	1,620	1,686	1,744	1,801
Clinical pregnancies per transfer cycle (%)	*33.3*	*33.4*	*31.6*	*32.5*	*22.8*	*22.6*	*23.3*	*24.4*

6.2 Trends in the outcomes of ART treatment – 1996 to 2005

Clinical pregnancies and live deliveries

Between 1996 and 2005, there was a steady increase in the numbers of clinical pregnancies and live deliveries resulting from ART treatment in Australia and New Zealand (Figure 15). This increase is a result of the increase in the number of ART treatment cycles provided by fertility centres in Australia and New Zealand. In 2005, there were 8,166 live deliveries, 2.8 times the 2,765 live deliveries in 1996. This significant increase represents a growth of 725 clinical pregnancies per year and 575 live deliveries per year ($p<0.01$) between 1996 and 2005 in Australia and New Zealand.



Note: 1996–2001 data are from the Assisted Conception Data Collection.

Figure 15: Number of ART treatment cycles that resulted in a clinical pregnancy and a live delivery, Australia and New Zealand, 1996 to 2005

Multiple gestation deliveries

Between 1996 and 2005, there was a decrease in the number of triplet or higher order multiple gestation deliveries that resulted from ART treatment. In 1996, 1.9% of deliveries were triplet or higher order multiple, compared with 0.3% in 2005 (Table 46). Of all deliveries, the proportion of twin deliveries significantly declined to 13.8% in 2005. It is also the lowest proportion in twin deliveries since ANZARD was established in 2002 ($p<0.01$).

Table 46: Number of ART treatment cycles that resulted in a delivery by plurality, Australia and New Zealand, 1996 to 2005

	Singleton		Twin		Higher order multiple		
Year	Number	Per cent	Number	Per cent	Number	Per cent	Total
1996	2,250	80.1	508	18.1	52	1.9	2,810
1997	2,480	79.4	591	18.9	51	1.6	3,122
1998	2,748	79.9	645	18.8	47	1.4	3,440
1999	3,014	78.2	789	20.5	50	1.3	3,853
2000	3,335	78.0	901	21.1	42	1.0	4,278
2001	4,087	78.3	1,097	21.0	35	0.7	5,219
2002	4,536	80.0	1,068	18.8	33	0.6	5,671 [(a)]
2003	4,951	80.9	1,124	18.4	21	0.3	6,123 [(a)]
2004	5,740	82.8	1,114	16.1	23	0.3	6,932 [(a)]
2005	7,085	85.9	1,134	13.8	27	0.3	8,246

(a) Includes cycles in which plurality was unknown.

Note: 1996–2001 data are from the Assisted Conception Data Collection.

Appendix: ANZARD data items

Variable	Data domain
Unit identifier	3-digit code for clinics provided by NPSU
Site of main treatment	For centres with multiple sites, this identifies location of most significant part of the treatment.
Unit patient ID/Medical record number	Unique ID for patient.
Woman's date of birth	Day/month/year.
Husband/male partner DOB	Day/month/year.
Oocytes/embryos donor's age	Completed years at time of donation.
Previous Medicare item 13200s	The number of billed Australian Medicare item 13200. New Zealand units leave this field blank.
Cause of infertility: tubal disease	Yes—in the opinion of the treating clinician or clinic there is significant tubal disease present.
	No—other.
Cause of infertility: endometriosis	Yes—in the opinion of the treating clinician or clinic there is significant endometriosis contributing to this couple's subfertility.
	No—other.
Cause of infertility: male factor	Yes—in the opinion of the treating clinician or clinic there is a significant male factor problem.
	No—other.
Cause of infertility: other factors	Yes—in the opinion of the treating clinician or clinic there is subfertility due to any other factors apart from female age, tubal disease, male factor or endometriosis. Possible examples are fibroids, ovulation disorders or premature ovarian failure. There is no clinical subfertility (e.g. egg donor, preimplantation genetic diagnosis or other non-fertility reason for ART).
	No—other.
Cause of infertility: idiopathic	Yes—in the opinion of the treating clinician or clinic there is clinical subfertility without any apparent explanation.
	No—other, including case of PGD for genetic disease.
Previous pregnancies < 20 weeks	Number of known pregnancies less than 20 weeks in the female partner regardless of whether by ART or by a different partner.
Previous pregnancies ≥ 20 weeks	Number of known pregnancies reaching 20 weeks or more in the female partner regardless of whether by ART or by a different partner.
Cycle ID	Unique cycle identifier.
Cycle date	For treatment cycles this is according to the Medicare definition and is the date of LMP for unstimulated cycles or, where FSH is used, the first day of FSH administration. For cycles where the only process is movement or disposal of embryos, this is the date of embryo movement. This date defines the year in which a cycle is reported to NPSU.
Surrogacy	Yes—the procedure is part of a surrogate arrangement.
	No—the procedure is not part of a surrogate arrangement.
Injectable FSH stimulation given	Yes—FSH administered. Does not include clomiphene or hCG alone unless FSH was also given.
	No—other.
DI date	Date of first insemination with donor sperm.
OPU date	Date of oocyte retrieval.
Number of eggs retrieved	Number of eggs retrieved at OPU. Include any immature oocytes that are identified.
Number of eggs donated	Number of eggs donated to someone else.
Number of eggs received	Number of eggs received from someone else.

Variable	Data domain
Number of eggs GIFT	Number of eggs replaced in a GIFT procedure.
Number of eggs IVF	Number of eggs treated with IVF.
Number of eggs ICSI	Number of eggs treated with ICSI.
Site of sperm used	Site of sperm extraction: ejaculated, epididymal (whether by open biopsy or by PESA), testicular or other.
Person from which sperm derives	Husband/partner (h), known donor (k), Anonymous Donor (a), Embryo received or embryo transferred is a donated embryo (e)
Number of eggs fertilised normally	Number of eggs fertilised normally.
Preimplantation genetic diagnosis	Yes—preimplantation genetic diagnosis in any form (including aneuploidy screening or sex selection) has been performed on any of the embryos (transferred or not).
	No—PGD not performed.
Assisted hatching	Yes—where assisted hatching in any form has been performed on any of the embryos (transferred or not).
	No—assisted hatching not performed.
Number of embryos received from someone else or imported into the unit	To minimise the number of required fields in the data collection, this field serves two purposes: 1. Records the number of embryos to be received from donation (recipient cycle); or 2. Records the number of embryos to be imported into the current unit from another unit.
Number of cleavage embryos thawed	Number of zygotes or cleavage stage embryos (up to 4 days) thawed with intention of performing an embryo transfer if they survive.
Number of blastocysts thawed	Number of blastocysts (i.e. greater than 4 days culture from fertilisation) thawed with intention of performing an embryo transfer if they survive.
ET date	Embryo transfer date.
Number of early embryos transferred	Number of zygote or cleavage stage embryos (i.e. up to 4 days since fertilisation) transferred.
Number of blastocysts transferred	Number of blastocyst embryos (i.e. > 4 days since fertilisation) transferred.
Any embryos ICSI?	Yes—any embryos transferred were fertilised by ICSI.
	No—no transferred embryos were fertilised by ICSI.
Number of zygotes/cleavage stage embryos frozen	Number of zygote or cleavage stage embryos (i.e. up to 4 days since fertilisation) frozen.
Number of blastocysts frozen	Number of blastocyst embryos (i.e. > 4 days since fertilisation) frozen.
Number of embryos donated to someone else or exported from the unit of treatment	To minimise the number of required fields in the data collection, this field serves two purposes: 1. Records the number of embryos to be donated to someone else (donor cycle); or 2. Records the number of embryos to be exported from the current unit to another unit.
Number of potentially usable frozen embryos discarded	Potentially usable embryos disposed of in accordance with patient or government request.
Clinical pregnancy	A pregnancy that fulfils one of the following criteria: 1. Known to be ongoing at 20 weeks; 2. Evidence by ultrasound of an intrauterine sac (with or without a fetal heart); 3. Examination of products of conception reveal chorionic villi; or 4. A definite ectopic pregnancy that has been diagnosed laparoscopically or by ultrasound.
Date pregnancy ended	Date on which delivery, miscarriage or termination takes place.
Number of fetal hearts	Number of fetal hearts seen on first ultrasound (intrauterine only).
Ectopic pregnancy	Yes—pregnancy is an ectopic pregnancy, or a combined ectopic and uterine (heterotopic) pregnancy.
	No—pregnancy not ectopic or heterotopic.
Elective termination of pregnancy	Yes—pregnancy is terminated.
	No—pregnancy not terminated.
Selective reduction performed	Yes—selective reduction was performed owing to fetal abnormality.
	No—selective reduction not performed.

Variable	Data domain
Fetal abnormality in a pregnancy ending < 20 weeks or in a fetus removed by selective reduction	Details of elective terminations of pregnancy and fetal reductions due to fetal abnormality.
Maternal complications of pregnancy	Describes morbidity related to pregnancy.
Number of babies delivered	Include all liveborn and stillborn babies.
Caesarean delivery	Yes—delivery by planned or emergency caesarean section.
	No—other.
Baby 1 outcome	Liveborn, stillborn or neonatal death.
Baby 1 sex	Male or female.
Baby 1 birthweight	Weight in grams.
Baby 1 abnormality	Describes any known congenital malformation.
Baby 1 date of neonatal death	Date of neonatal death.
Baby 2 outcome	Liveborn, stillborn or neonatal death.
Baby 2 sex	Male or female.
Baby 2 weight	Weight in grams.
Baby 2 abnormality	Describes any known congenital malformation.
Baby 2 date of neonatal death	Date of neonatal death.
Baby 3 outcome	Liveborn, stillborn or neonatal death.
Baby 3 sex	Male or female.
Baby 3 weight	Weight in grams.
Baby 3 abnormality	Describes any known congenital malformation.
Baby 3 date of neonatal death	Date of neonatal death.
Baby 4 outcome	Liveborn, stillborn or neonatal death.
Baby 4 sex	Male or female.
Baby 4 weight	Weight in grams.
Baby 4 abnormality	Describes any known congenital malformation.
Baby 4 date of neonatal death	Date of neonatal death.
Admitted with ART morbidity	Yes—woman is admitted to hospital with any condition (excluding any pregnancy-related issues, such as ectopic pregnancy) that could be in any way related to fertility treatment.
OHSS	Yes—admission to hospital is due to symptoms of OHSS.
Morbidity detail	Describes symptoms of treatment-related morbidity.

Terminology used in this report

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

Autologous cycle: an ART treatment cycle in which patients intend to use their own oocytes/gametes.

Cancelled cycle: a cycle which is started and no further procedures undertaken.

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 reveal chorionic villi; or
- an ectopic pregnancy has been diagnosed by laparoscope or by ultrasound.

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

DI cycle: an artificial insemination cycle in which donated sperm is used in the procedure.

Donation cycle: an ART treatment cycle in which a woman intends to donate or donates her oocytes/embryos.

ET: an embryo transfer cycle in which embryo(s) are placed in the uterus or fallopian tube. The embryo(s) can be fresh or thawed following cryopreservation. Embryo transfer includes transfer of cleavage stage embryos (two to three days after fertilisation) or transfer of blastocysts (five to six days after fertilisation).

Fresh cycle: an ART treatment cycle in which oocyte pick-up (OPU) is performed. It also includes cancelled OPU cycles, failed OPU cycles and cycles where thawed oocytes were used in fertilisation.

Full-term: a gestation of at least 37 weeks.

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

- Fresh and thaw cycles with embryo transfer (cleavage):

  (pregnancy end date – embryo transfer date) + 16 days
- Fresh and thaw cycles with embryo transfer (blastocyst):

  (pregnancy end date – embryo transfer date) + 19 days

  In this report, for cycles with blastocyst transfer, gestational age was estimated using the calculation that is used for cycles with cleavage transfer.
- GIFT cycles:

  (pregnancy end date – OPU date) + 14 days

- DI cycles:

  (pregnancy end date – date of insemination) + 14 days

GIFT cycle: an ART treatment cycle in which a GIFT procedure is used. Cycles using both GIFT and IVF/ICSI procedures are included.

ICSI cycle: an ART treatment cycle in which embryos are fertilised using an ICSI procedure. Mixed IVF–ICSI cycles are included.

Live delivery: a delivery in which one or more baby is a live birth.

IVF cycle: an ART treatment cycle in which embryos are fertilised using an IVF procedure. Mixed IVF–ICSI cycles are excluded.

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 of gestation or 400 grams or more in birthweight.

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

Mixed IVF–ICSI cycle: an ART treatment cycle in which two or more embryos are fertilised, and at least one embryo is fertilised using an IVF procedure and another is fertilised using an ICSI procedure. Mixed IVF–ICSI cycles are included in ICSI cycles.

OHSS: ovarian hyperstimulation syndrome refers to the complication of ovulation induction therapy which involves the administration of stimulation drugs. OHSS symptoms include abdominal pain and fluid retention.

OPU: oocyte pick-up refers to the procedure to collect oocytes from ovaries by ultrasound-guided transvaginal aspiration or by laparoscopic surgery.

Preterm: a gestation of less than 37 weeks.

Recipient cycle: an ART treatment cycle in which donated oocytes/embryos are used.

Surrogacy cycle: an ART treatment cycle which involves a surrogate arrangement. Surrogacy cycles in this report include both commission and carrier cycles.

Thaw cycle: an ART treatment cycle in which cryopreserved (frozen) embryos are thawed with or without transfer.

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

Treatment cycle: an ART cycle initiates with the intention to treat a patient.

Very low birthweight: a birthweight of less than 1,500 grams.

Very preterm: a gestation of less than 32 weeks.

The International Committee for the Monitoring of Assisted Reproductive Technologies (ICMART) has published an ART glossary for the terms used in ART data collections (Zegers-Hochschild et al. 2006). However, the terminology used in this report may differ from that in the ICMART glossary.

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Supplementary tables

The supplementary tables are available on the Internet at <www.npsu.unsw.edu.au>.

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