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Assisted reproduction technology in Australia and New Zealand 2006

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List of tables

Table W1: Embryo transfer cycles by number of embryos transferred, treatment type and procedure, Australia and New Zealand, 2006	1
Table W2: Treatment cycles by cause of infertility, treatment type and procedure, Australia and New Zealand, 2006	1
Table W3: Autologous treatment cycles by cause of infertility and source of sperm, Australia and New Zealand, 2006	2
Table W4: Stage/outcome of embryo transfer cycles by technique of sperm retrieval, Australia and New Zealand, 2006	2
Table W5: Stage/outcome of embryo transfer cycles by stage of embryo development, Australia and New Zealand, 2006	2
Table W6: Stage/outcome of oocytes/embryos recipient cycles by donor's age, Australia and New Zealand, 2006	3
Table W7: Clinical pregnancies of <20 weeks gestation by cause of infertility and pregnancy outcome, Australia and New Zealand, 2006	3
Table W8: Deliveries by cause of infertility and delivery outcome, Australia and New Zealand, 2006	3
Table W9: Deliveries by gestational age and cause of infertility, Australia and New Zealand, 2006.....	4
Table W10: Clinical pregnancies of < 20 weeks gestation by pregnancy outcome and maternal age, Australia and New Zealand, 2006	4
Table W11: Deliveries by plurality and maternal age, Australia and New Zealand, 2006	5
Table W12: Deliveries by gestational age and maternal age, Australia and New Zealand, 2006.....	5
Table W13: Deliveries by delivery outcome and maternal age, Australia and New Zealand, 2006	6
Table W14: Clinical pregnancies of <20 weeks gestation by pregnancy outcome and number of embryos transferred, Australia and New Zealand, 2006	6
Table W15: Deliveries by delivery outcome and number of embryos transferred, Australia and New Zealand, 2006	7
Table W16: Deliveries by gestational age and number of embryos transferred, Australia and New Zealand, 2006	7
Table W17: Deliveries by plurality, treatment type and procedure, Australia and New Zealand, 2006	8
Table W18: Gestational age of babies by birth outcomes, Australia and New Zealand, 2006	8
Table W19: Birthweight of babies by birth outcomes, Australia and New Zealand, 2006	9
Table W20: Birthweight of liveborn babies by treatment type and procedure, Australia and New Zealand, 2006	10
Table W21: Perinatal mortality of babies by type of death and treatment type and procedure, Australia and New Zealand, 2006	11
Table W22: Perinatal mortality of babies by type of death and maternal age, Australia and New Zealand, 2006	11

Introductory Notes

The assisted reproduction technology (ART) data presented in this supplement are for autologous cycles and donation/recipient cycles that took place in fertility centres Australia and New Zealand in 2006, and the resulting pregnancies and births. Donor sperm insemination (DI), gamete intrafallopian transfer (GIFT) and surrogacy cycles are not included in this supplement.

Data source

The data presented in this report are supplied by fertility centres in Australia and New Zealand. The data are compiled into Australia and New Zealand Assisted Reproduction Database (ANZARD). ANZARD includes information about the ART treatment procedures of in-vitro fertilisation (IVF), intracytoplasmic sperm injection (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.

Data validation

Most fertility centres have computerised data management systems and are able to provide the National Perinatal Statistics Unit (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 2006, information relating to pregnancy and birth outcomes was not stated for less than 0.6% 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. It is possible for an individual woman to 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, is based on calculations in which individuals may be counted more than once.

The 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 rates were measured per embryo transfer cycle.

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

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.

Abbreviations and symbols

ANZARD	Australian and New Zealand Assisted Reproduction Database
ART	Assisted reproduction technology
ET	embryo transfer
GIFT	gamete intrafallopian transfer
g	grams
ICSI	intracytoplasmic sperm injection
IVF	in-vitro fertilisation
LMP	last menstrual period
NPSU	National Perinatal Statistics Unit
OPU	oocyte pick-up
PESA	percutaneous epididymal sperm aspiration
..	not applicable

Table W1: Embryo transfer cycles by number of embryos transferred, treatment type and procedure, Australia and New Zealand, 2006

Number of embryos	Autologous			Oocytes/ embryos recipient	All
	Fresh IVF	Fresh ICSI	Thaw		
			Number		
1	5,244	7,392	9,988	836	23,460
2	4,188	6,315	6,064	835	17,402
≥ 3	98	222	74	7	401
Total	9,530	13,929	16,126	1,678	41,263
			Per cent		
1	55.0	53.1	61.9	49.8	56.9
2	43.9	45.3	37.6	49.8	42.2
≥ 3	1.0	1.6	0.5	0.4	1.0
Total	100.0	100.0	100.0	100.0	100.0

Table W2: Treatment cycles by cause of infertility, treatment type and procedure, Australia and New Zealand, 2006

Cause of infertility	Autologous			Thaw	Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Fresh other ^(a)			
			Number			
Male factor only	944	7,129	774	5,112	252	14,211
<i>Female factor</i>	5,742	2,520	1,431	6,356	823	16,872
Tubal disease only	1,473	496	239	1,558	76	3,842
Endometriosis only	1,133	511	234	1,149	80	3,107
Other female factor only	2,484	1,236	801	3,014	594	8,129
Combined female factor	652	277	157	635	73	1,794
Combined male/female factor	867	3,156	564	2,665	265	7,517
Unexplained	3,023	2,402	744	3,042	294	9,505
Not stated	240	210	145	577	193	1,365
All causes	10,816	15,417	3,658	17,752	1,827	49,470
			Per cent			
Male factor only	8.7	46.2	21.2	28.8	13.8	28.7
<i>Female factor</i>	53.1	16.3	39.1	35.8	45.0	34.1
Tubal disease only	13.6	3.2	6.5	8.8	4.2	7.8
Endometriosis only	10.5	3.3	6.4	6.5	4.4	6.3
Other female factor only	23.0	8.0	21.9	17.0	32.5	16.4
Combined female factor	6.0	1.8	4.3	3.6	4.0	3.6
Combined male/female factor	8.0	20.5	15.4	15.0	14.5	15.2
Unexplained	27.9	15.6	20.3	17.1	16.1	19.2
Not stated	2.2	1.4	4.0	3.3	10.6	2.8
All causes	100.0	100.0	100.0	100.0	100.0	100.0

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

Table W3: Autologous treatment cycles by cause of infertility and source of sperm, Australia and New Zealand, 2006

Cause of infertility	Husband/partner		Donor		Not stated		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Male factor only	12,140	29.6	711	33.4	1,108	24.6	13,959	29.3
<i>Female factor</i>	13,638	33.3	698	32.8	1,713	38.0	16,049	33.7
Tubal disease only	3,377	8.2	57	2.7	332	7.4	3,766	7.9
Endometriosis only	2,652	6.5	72	3.4	303	6.7	3,027	6.4
Other female factor only	6,117	14.9	520	24.4	898	19.9	7,535	15.8
Combined female factor	1,492	3.6	49	2.3	180	4.0	1,721	3.6
Combined male/female factor	6,249	15.2	295	13.9	708	15.7	7,252	15.2
Unexplained	8,013	19.5	367	17.3	827	18.3	9,207	19.3
Not stated	964	2.4	56	2.6	152	3.4	1,172	2.5
All causes	41,004	100.0	2,127	100.0	4,508	100.0	47,639	100.0

Table W4: Stage/outcome of embryo transfer cycles by technique of sperm retrieval, Australia and New Zealand, 2006

Stage/outcome of treatment	Site of sperm extraction				
	Ejaculate	Epididymis ^(a)	Testicular	Other	Not stated
Embryo transfers	37,426	864	1,779	179	1,015
Clinical pregnancies	10,576	265	539	56	240
Live deliveries	8,103	209	434	47	170
<i>Clinical pregnancies per transfer cycle (%)</i>	28.3	30.7	30.3	31.3	23.6
<i>Live deliveries per transfer cycle (%)</i>	21.7	24.2	24.4	26.3	16.7

(a) Epididymal sperm is extracted by either open biopsy or PESA.

Table W5: Stage/outcome of embryo transfer cycles by stage of embryo development, Australia and New Zealand, 2006

Stage/outcome of treatment	Fresh		Thaw		
	Cleavage embryos	Blastocysts	Thawed and transferred cleavage embryos	Thawed cleavage embryos and transferred blastocysts	Thawed and transferred blastocysts
Embryo transfers	17,759	6,428	12,342	884	3,850
Clinical pregnancies	5,385	2,404	2,690	265	932
Live deliveries	4,227	1,833	2,018	197	688
<i>Clinical pregnancies per transfer cycle (%)</i>	30.3	37.4	21.8	30.0	24.2
<i>Live deliveries per transfer cycle (%)</i>	23.8	28.5	16.4	22.3	17.9

Table W6: Stage/outcome of oocytes/embryos recipient cycles by donor's age, Australia and New Zealand, 2006

Stage/outcome of treatment	Donor's age group (years) ^(a)						Total
	≤ 24	25–29	30–34	35–39	≥ 40	Not stated	
Embryo transfers	83	247	669	565	85	29	1,678
Clinical pregnancies	30	78	200	143	16	3	470
Live deliveries	25	57	153	107	10	2	354
<i>Live deliveries per transfer cycle (%)</i>	<i>36.1</i>	<i>31.6</i>	<i>29.9</i>	<i>25.3</i>	<i>18.8</i>	<i>10.3</i>	<i>28.0</i>
<i>Live deliveries per clinical pregnancy (%)</i>	<i>30.1</i>	<i>23.1</i>	<i>22.9</i>	<i>18.9</i>	<i>11.8</i>	<i>6.9</i>	<i>21.1</i>

(a) Age at time of donation.

Table W7: Clinical pregnancies of <20 weeks gestation by cause of infertility and pregnancy outcome, Australia and New Zealand, 2006

Cause of infertility	Miscarriage		Fetal reduction or termination		Ectopic/heterotopic pregnancy		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Male factor only	630	30.6	18	23.7	45	26.9	693	30.1
<i>Female factor</i>	<i>665</i>	<i>32.3</i>	<i>25</i>	<i>32.9</i>	<i>58</i>	<i>34.7</i>	<i>748</i>	<i>32.5</i>
Tubal disease only	115	5.6	7	9.2	19	11.4	141	6.1
Endometriosis only	135	6.6	3	3.9	8	4.8	146	6.3
Other female factor only	331	16.1	13	17.1	29	17.4	373	16.2
Combined female factor	84	4.1	2	2.6	2	1.2	88	3.8
Combined male/female factor	311	15.1	16	21.1	36	21.6	363	15.8
Unexplained	397	19.3	15	19.7	23	13.8	435	18.9
Not stated	56	2.7	2	2.6	5	3.0	63	2.7
All causes	2,059	100.0	76	100.0	167	100.0	2,302	100.0

Table W8: Deliveries by cause of infertility and delivery outcome, Australia and New Zealand, 2006

Cause of infertility	Live birth		Fetal death		Total ^(a)	
	Number	Per cent	Number	Per cent	Number	Per cent
Male factor only	2,845	31.7	26	25.7	2873	31.7
<i>Female factor</i>	<i>2,730</i>	<i>30.5</i>	<i>33</i>	<i>32.7</i>	<i>2769</i>	<i>30.5</i>
Tubal disease only	637	7.1	5	5.0	643	7.1
Endometriosis only	531	5.9	6	5.9	537	5.9
Other female factor only	1,271	14.2	19	18.8	1293	14.3
Combined female factor	291	3.2	3	3.0	296	3.3
Combined male/female factor	1,342	15.0	18	17.8	1361	15.0
Unexplained	1,820	20.3	20	19.8	1840	20.3
Not stated	226	2.5	4	4.0	230	2.5
All causes	8,963	100.0	101	100.0	9073	100.0

(a) Includes deliveries where birth outcome was unknown.

Table W9: Deliveries by gestational age and cause of infertility, Australia and New Zealand, 2006

Gestational age (weeks)	Female factor						Un-explained	Not stated	All causes
	Male factor only	Tubal disease only	Endometriosis only	Other female factor only	Combined female factor	Combined male/female factor			
<i>Mean (weeks)</i>	38.1	37.8	38.1	37.8	37.9	37.9	37.9	37.7	37.9
	Number								
≤ 27	34	11	7	30	4	33	23	7	149
28–31	55	9	10	28	6	23	30	2	163
32–36	372	97	61	171	38	166	265	29	1,199
≥ 37	2,412	526	459	1,064	248	1,139	1,522	192	7,562
Total	2,873	643	537	1,293	296	1,361	1,840	230	9,073
20–36	461	117	78	229	48	222	318	38	1,511
	Per cent								
≤ 27	1.2	1.7	1.3	2.3	1.4	2.4	1.3	3.0	1.6
28–31	1.9	1.4	1.9	2.2	2.0	1.7	1.6	0.9	1.8
32–36	12.9	15.1	11.4	13.2	12.8	12.2	14.4	12.6	13.2
≥ 37	84.0	81.8	85.5	82.3	83.8	83.7	82.7	83.5	83.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
20–36	16.0	18.2	14.5	17.7	16.2	16.3	17.3	16.5	16.7

Table W10: Clinical pregnancies of < 20 weeks gestation by pregnancy outcome and maternal age, Australia and New Zealand, 2006

Pregnancy outcome	Age group (years) ^(a)						Total
	≤ 24	25–29	30–34	35–39	40–44	≥ 45	
	Number						
Miscarriage	18	192	507	841	450	51	2,059
Fetal reduction or termination	1	6	20	30	18	1	76
Ectopic or heterotopic pregnancy	3	17	61	59	27	0	167
Total	22	215	588	930	495	52	2,302
	Per cent						
Miscarriage	81.8	89.3	86.2	90.4	90.9	98.1	89.4
Fetal reduction or termination	4.5	2.8	3.4	3.2	3.6	1.9	3.3
Ectopic or heterotopic pregnancy	13.6	7.9	10.4	6.3	5.5	0.0	7.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) Age at end of pregnancy

Table W11: Deliveries by plurality and maternal age, Australia and New Zealand, 2006

Gestation	Age group (years) ^(a)						Total
	≤ 24	25–29	30–34	35–39	40–44	≥ 45	
	Number						
Singleton	88	888	2,753	3,120	998	140	7,987
Twin	8	113	406	434	85	18	1,064
High order multiple	0	4	9	7	1	1	22
Total	96	1,005	3,168	3,561	1,084	159	9,073
	Per cent						
Singleton	91.7	88.4	86.9	87.6	92.1	88.1	88.0
Twin	8.3	11.2	12.8	12.2	7.8	11.3	11.7
High order multiple	0.0	0.4	0.3	0.2	0.1	0.6	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) Age at time of delivery.

Table W12: Deliveries by gestational age and maternal age, Australia and New Zealand, 2006

Gestational age (weeks)	Age group (years) ^(a)						Total
	≤ 24	25–29	30–34	35–39	40–44	≥ 45	
<i>Mean (weeks)</i>	38.7	37.9	37.9	38.0	38.1	37.7	37.9
	Number						
≤ 27	0	25	64	44	15	1	149
28–31	1	22	56	67	15	2	163
32–36	12	122	445	472	118	30	1,199
≥ 37	83	836	2,603	2,978	936	126	7,562
Total	96	1,005	3,168	3,561	1,084	159	9,073
20–36	13	169	565	583	148	33	1,511
	Per cent						
≤ 27	0.0	2.5	2.0	1.2	1.4	0.6	1.6
28–31	1.0	2.2	1.8	1.9	1.4	1.3	1.8
32–36	12.5	12.1	14.0	13.3	10.9	18.9	13.2
≥ 37	86.5	83.2	82.2	83.6	86.3	79.2	83.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
20–36	13.5	16.8	17.8	16.4	13.7	20.8	16.7

(a) Age at time of delivery.

Table W13: Deliveries by delivery outcome and maternal age, Australia and New Zealand, 2006

Delivery outcome	Age group (years) ^(a)						Total
	≤ 24	25–29	30–34	35–39	40–44	≥ 45	
	Number						
Live birth	95	986	3,129	3,521	1,074	158	8,963
Fetal death	1	18	36	36	9	1	101
Not stated	0	1	3	4	1	0	9
Total	96	1,005	3,168	3,561	1,084	159	9,073
	Per cent						
Live birth	99.0	98.1	98.8	98.9	99.1	99.4	98.8
Fetal death	1.0	1.8	1.1	1.0	0.8	0.6	1.1
Not stated	0.0	0.1	0.1	0.1	0.1	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) Age at time of delivery.

Table W14: Clinical pregnancies of <20 weeks gestation by pregnancy outcome and number of embryos transferred, Australia and New Zealand, 2006

Pregnancy outcome	Number of embryos transferred			All
	1	2	≥ 3	
	Number			
Miscarriage	1,090	942	27	2,059
Fetal reduction or termination	35	41	0	76
Ectopic or heterotopic pregnancy	85	80	2	167
Total	1,210	1,063	29	2,302
	Per cent			
Miscarriage	90.1	88.6	93.1	89.4
Fetal reduction or termination	2.9	3.9	0.0	3.3
Ectopic or heterotopic pregnancy	7.0	7.5	6.9	7.3
Total	100.0	100.0	100.0	100.0

Table W15: Deliveries by delivery outcome and number of embryos transferred, Australia and New Zealand, 2006

Delivery outcome	Number of embryos transferred			All
	1	2	≥ 3	
	Number			
Live birth	4,991	3,920	52	8,963
Fetal death	55	45	1	101
Not stated	5	4	0	9
Total	5,051	3,969	53	9,073
	Per cent			
Live birth	98.8	98.8	98.1	98.8
Fetal death	1.1	1.1	1.9	1.1
Not stated	0.1	0.1	0.0	0.1
Total	100.0	100.0	100.0	100.0

Table W16: Deliveries by gestational age and number of embryos transferred, Australia and New Zealand, 2006

Gestational age (weeks)	Number of embryos transferred			All
	1	2	≥ 3	
<i>Mean (weeks)</i>	38.4	37.4	37.7	37.9
	Number			
≤ 27	61	86	2	149
28–31	67	96	0	163
32–36	446	745	8	1,199
≥ 37	4,477	3,042	43	7,562
Total	5,051	3,969	53	9,073
20–36	574	927	10	1,511
	Per cent			
≤ 27	1.2	2.2	3.8	1.6
28–31	1.3	2.4	0.0	1.8
32–36	8.8	18.8	15.1	13.2
≥ 37	88.6	76.6	81.1	83.3
Total	100.0	100.0	100.0	100.0
20–36	11.4	23.4	18.9	16.7

Table W17: Deliveries by plurality, treatment type and procedure, Australia and New Zealand, 2006

Gestation	Autologous			Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Thaw		
	Number				
Singleton	2,121	3,058	2,498	310	7,987
Twin	287	448	280	49	1,064
Higher order multiple	9	7	5	1	22
Total	2,417	3,513	2,783	360	9,073
	Per cent				
Singleton	87.8	87.0	89.8	86.1	88.0
Twin	11.9	12.8	10.1	13.6	11.7
Higher order multiple	0.4	0.2	0.2	0.3	0.2
Total	100.0	100.0	100.0	100.0	100.0

Table W18: Gestational age of babies by birth outcomes, Australia and New Zealand, 2006

Gestational age (weeks)	Live birth		Fetal death ^(a)		Total ^(b)	
	Number	Per cent	Number	Per cent	Number	Per cent
<i>Mean (weeks)</i>	37.7		27.1		37.6	
20–27	124	1.2	83	61.9	208	2.0
28–31	233	2.3	8	6.0	243	2.4
32–36	1,716	17.1	18	13.4	1,734	17.0
≥ 37	7,965	79.3	25	18.7	7,997	78.5
Total	10,038	100.0	134	100.0	10,182	100.0
20–36	2,073	20.7	109	81.3	2,185	21.5

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

(b) Includes babies where birth outcome was unknown

Table W19: Birthweight of babies by birth outcomes, Australia and New Zealand, 2006

Birthweight (grams)	Live birth		Fetal death ^(a)		Total ^(b)	
	Number	Per cent	Number	Per cent	Number	Per cent
<i>Mean (grams)</i>	3,110		1,446		3,098	
< 1000	118	1.2	39	29.1	157	1.5
1,000–1,499	195	1.9	6	4.5	201	2.0
1,500–1,999	408	4.1	6	4.5	414	4.1
2,000–2,499	970	9.7	3	2.2	973	9.6
2,500–2,999	2,002	19.9	8	6.0	2,010	19.7
3,000–3,499	3,243	32.3	5	3.7	3,248	31.9
3,500–3,999	2,262	22.5	4	3.0	2,266	22.3
≥ 4,000	771	7.7	3	2.2	774	7.6
Not stated	69	0.7	60	44.8	139	1.4
Total	10,038	100.0	134	100.0	10,182	100.0
< 2500	1,691	16.8	54	40.3	1,745	17.1

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

(b) Includes babies where birth outcome was unknown.

Table W20: Birthweight of liveborn babies by treatment type and procedure, Australia and New Zealand, 2006

Birthweight (grams)	Autologous			Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Thaw		
<i>Mean (grams)</i>	3,041	3,066	3,246	2,971	3,110
	Number				
< 1000	39	48	21	10	118
1000–1499	61	96	32	6	195
1500–1999	133	162	91	22	408
2000–2499	273	412	228	57	970
2500–2999	563	826	531	82	2,002
3000–3499	873	1,266	978	126	3,243
3500–3999	551	837	795	79	2,262
≥ 4000	165	256	331	19	771
Not stated	21	21	24	3	69
Total	2,679	3,924	3,031	404	10,038
< 2500	506	718	372	95	1,691
	Per cent				
< 1000	1.5	1.2	0.7	2.5	1.2
1000–1499	2.3	2.4	1.1	1.5	1.9
1500–1999	5.0	4.1	3.0	5.4	4.1
2000–2499	10.2	10.5	7.5	14.1	9.7
2500–2999	21.0	21.0	17.5	20.3	19.9
3000–3499	32.6	32.3	32.3	31.2	32.3
3500–3999	20.6	21.3	26.2	19.6	22.5
≥ 4000	6.2	6.5	10.9	4.7	7.7
Not stated	0.8	0.5	0.8	0.7	0.7
Total	100.0	100.0	100.0	100.0	100.0
< 2500	18.9	18.3	12.3	23.5	16.8

Table W21: Perinatal mortality of babies by type of death and treatment type and procedure, Australia and New Zealand, 2006

Perinatal deaths ^(a)	Autologous			Oocytes/embryos recipient	All
	Fresh IVF	Fresh ICSI	Thaw		
Fetal death	41	48	40	5	134
Neonatal death	15	18	10	1	44
Total	56	66	50	6	178
<i>Fetal deaths per 1,000 births^(b)</i>	15.1	12.1	13.0	12.2	13.2
<i>Neonatal deaths per 1,000 live births^(c)</i>	5.6	4.6	3.3	2.5	4.4
<i>Perinatal deaths per 1,000 births^(b)</i>	20.6	16.6	16.3	14.6	17.5

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

(b) Fetal deaths and perinatal death rates were calculated using all births (live births and fetal deaths) as the denominator.

(c) Neonatal death rates were calculated using all live births as the denominator.

Table W22: Perinatal mortality of babies by type of death and maternal age, Australia and New Zealand, 2006

Perinatal deaths ^(a)	Age group (years) ^(b)						Total
	≤ 24	25–29	30–34	35–39	40–44	≥ 45	
Fetal death	1	23	49	48	12	1	134
Neonatal death	0	4	24	12	4	0	44
Total	1	27	73	60	16	1	178
<i>Fetal deaths per 1,000 births^(c)</i>	9.6	20.4	13.6	12.0	10.2	5.6	13.2
<i>Neonatal deaths per 1,000 live births^(d)</i>	0.0	3.6	6.8	3.0	3.5	0.0	4.4
<i>Perinatal deaths per 1,000 births^(c)</i>	9.6	24.0	20.3	15.0	13.7	5.6	17.5

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

(b) Age at time of delivery.

(c) Fetal deaths and perinatal death rates were calculated using all births (live births and fetal deaths) as the denominator.

(d) Neonatal death rates were calculated using all live births as the denominator.