Assisted reproductive technologies (ART) in Canada: 2006 results from the Canadian ART Register

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Objective: To present a report on assisted reproductive technologies (ART) cycles performed in 2006 in Canada and show trends in outcomes over time. This is the sixth annual report from the Canadian ART Register (CARTR).
Design: Prospective cohort study.
Setting: Twenty-five of 25 ART centers in Canada.
Patient(s): Couples undergoing ART treatment in Canada during 2006.
Intervention(s): ART treatments, including in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), and frozen embryo transfer (FET).
Main Outcome Measure(s): Clinical pregnancy, live birth, and multiple birth rates.
Result(s): A total of 12,052 ART cycles was reported to CARTR. In 8278 IVF/ICSI cycles using the woman's own oocytes, the clinical pregnancy rate per cycle started was 33.7% (38.6% per ET), and the live birth rate was 27.1%; the multiple birth rate per delivery was 30.3%, with a high-order multiple birth rate of 1.5%. In 64% of cycles, ICSI was performed. One or two embryos were transferred in 67% of cycles. In 350 IVF/ICSI cycles using donor oocytes, the clinical pregnancy rate was 42.3%, and the live birth rate was 33.6%; the multiple birth rate was 37.3%, with no triplet birth. In 2838 FET cycles using the woman's own oocytes, the clinical pregnancy rate was 24.3%, and the live birth rate was 18.6%; the multiple birth rate was 22.5%, with a triplet birth rate of 0.6%. Birth outcomes were unknown for 3.6% of ongoing pregnancies.
Conclusion(s): For 2006, CARTR achieved 100% voluntary participation from Canadian ART centers for the fourth consecutive year. Clinical pregnancy and live birth rates continued to increase in 2006 compared with previous years, but multiple birth rates decreased only slightly. (Fertil Steril® 2009;■:■–■. ©2009 by American Society for Reproductive Medicine.)

Key Words: Assisted reproductive technologies, frozen embryo transfer, intracytoplasmic sperm injection, in vitro fertilization, multiple births, oocyte donation, pregnancy rates

The Canadian Assisted Reproductive Technologies Register (CARTR) was first established in 1999 for the collection of treatment cycle data from Canadian fertility centers that were using assisted reproductive technologies (ART), including in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), and frozen embryo transfer (FET). The IVF Directors Group of the Canadian Fertility and Andrology Society (CFAS) directs the CARTR program, which is financially supported by participating ART centers. Participation of ART centers in CARTR is voluntary.

The first report from the Canadian ART Register, describing results from ART cycles performed in 2001, was published in 2005 (1). Subsequent reports described CARTR results from 2002 (2), 2003 (3), 2004 (4), and 2005 (5). This is the sixth published annual report of Canadian ART outcomes.

The purpose of this paper is to report on ART cycles performed in Canadian centers in the 2006 calendar year and submitted to CARTR. Trends in outcomes over 3 years will also be examined.

MATERIALS AND METHODS

Data Collection

For CARTR, 2006 marked a year of transition in data collection. A revised set of outcome variables was developed, in collaboration with an advisory committee consisting of physicians and embryologists from several ART centers. Changes included collecting some information in a different format (e.g., obstetric history, infertility diagnosis, ovarian stimulation protocols, and birth outcomes) and collecting new information (e.g., total dose of follicle-stimulating hormone, number of oocytes inseminated or injected, number of oocytes fertilized, number of cleaved embryos, number of frozen embryos that survived thawing, and method of assisted hatching). The list of new variables was distributed

Received February 8, 2009; revised March 23, 2009; accepted March 26, 2009.
J.G. has nothing to disclose. F.B. has nothing to disclose. C.L. has nothing to disclose. L.C. has nothing to disclose.
Supported by the IVF Directors Group of the Canadian Fertility and Andrology Society, Montreal, Quebec, Canada.
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to the centers in December 2006. Because many centers had already entered their 2006 data using the old variable set, centers were given the option to submit their data using either variable set.

In December 2007, the new CARTR data entry computer program, called CARTR Treatment Outcome Reporting System (CARTR-TORS; CompuArt Technology, Richmond Hill, Ontario, Canada), was distributed to all Canadian ART centers. The CARTR-TORS software replaced the Society for Assisted Reproductive Technology (SART) Clinical Outcome Reporting System (CORS), version 2 (Redshift Technologies Inc., New York, NY), which CARTR had been using since 1999. The SART-CORS data could be imported into CARTR-TORS and were automatically converted to the new variable format. Updates to old data (such as birth outcomes) could be made in CARTR-TORS; however, retrospectively filling in missing data for the new variables (mainly embryology data) was not required. The export file for the 2006 final submission to CARTR was created in CARTR-TORS.

Nine centers submitted 2006 data via CARTR-TORS, eight centers submitted data using the old variable set directly from their own clinic database, and eight centers submitted data from their own database using the new variable set. After data from centers using the old variable set were converted into the new variable format, they were combined with data from the other centers. Data for the new variables (that had no corresponding variable in the old system) were missing for most centers using CARTR-TORS and those submitting in the old variable format, representing about two thirds of cycles.

Staff at each center entered information about patient demographics, diagnosis, and obstetric history; details of treatment; complications; and pregnancy and birth outcomes for each ART treatment cycle initiated. The completed anonymous case records were sent electronically from each ART center to the CARTR coordinating center, where they were manually checked for accuracy and completeness. Corrections or clarifications were requested from the centers as necessary. No on-site data validation from source documents was performed. The records from each center were then aggregated for data analysis using the computer program Statistical Package for the Social Sciences (SPSS), version 15 (SPSS Inc., Chicago, IL). The ART cycles started between January 1 and December 31, 2006, were submitted to CARTR in batch mode twice: once in mid-2007 when the pregnancy outcomes were known, for an internal interim report, and again in mid-2008, when all the birth outcomes were known, for this published report.

It was not necessary to obtain institutional review board approval for this study because data collection is one of the requirements for accreditation of centers providing ART services as organized by the CFAS in conjunction with Accreditation Canada (formerly the Canadian Council on Health Services Accreditation). Although participation in accreditation is voluntary, most of the ART centers in Canada have agreed to the process and are obliged to inform patients that such data will be collected in a manner that is anonymous.

Definitions of Outcomes

The definitions established by the International Committee Monitoring Assisted Reproductive Technologies (ICMART) are followed by CARTR (6). A treatment cycle is considered to have "started" when a woman undergoing ovarian stimulation receives the first dose of gonadotropins or, in a nonstimulated cycle (e.g., for FET), when a decision is made to attempt ART treatment in that cycle. A canceled cycle is one that is stopped before the oocyte retrieval procedure or thawing of embryos.

Clinical pregnancy includes intrauterine gestation (presence of a gestational sac on ultrasonography), ectopic pregnancy, and miscarriage diagnosed by histology. Cycles with only a positive pregnancy test (biochemical pregnancy) are not considered to have a clinical pregnancy. Implantation rate is the number of gestational sacs observed on ultrasonography divided by the number of embryos transferred.

Pregnancy loss includes miscarriage and therapeutic abortion of a clinical intrauterine pregnancy occurring at $\leq$20 weeks' gestation. Any pregnancy termination, either spontaneous or therapeutic, occurring after 20 weeks' gestation with no liveborn infant is considered a stillbirth. A delivery is the birth of one or more infants, either living or not, after 20 weeks' gestation. A live birth is a delivery that results in at least one living infant (but, if a multiple birth, may include one or more stillborn infants). A neonatal death is the death of a liveborn infant in the first 28 days of life. A multiple birth is the delivery of more than one infant, either liveborn or stillborn, including deliveries with all infants stillborn. High-order multiple births (triplets or more) are reported separately. A preterm birth is a delivery at $<$37 weeks of gestation, and a very preterm birth is a delivery at $<$34 weeks.

Statistical Analysis

The statistics used in this report are mainly descriptive: rates, proportions, means, and medians. The chi-square test was used occasionally to compare proportions. The chi-square test with trend was used to evaluate the change over time in pregnancy, live birth, and multiple birth rates.

Unless otherwise noted, the clinical pregnancy rate is reported per cycle started. Cycle cancellation, ectopic pregnancy, and other complications are reported per cycle started. The miscarriage or pregnancy loss rate is reported per intrauterine pregnancy. The live birth rate is reported per cycle started, excluding from both the numerator and the denominator cycles in which the outcome of the clinical pregnancy has not been reported. Because of these missing data, the live birth rates reported may underestimate the

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true live birth rates. The multiple birth rate, which includes stillbirths, is reported per delivery.

These data from CARTR for 2006 were presented at the annual IVF Directors' Meetings in September 2007 (pregnancy outcomes) and November 2008 (birth outcomes). A brief summary of the national clinical pregnancy and live birth rates was provided to the media immediately after each meeting. As agreed among all IVF directors, clinic-specific data are not presented to the public or published. Through CARTR, Canada contributes to the international ART data collection organized by ICMART.

RESULTS

Participating Centers

All 25 Canadian ART centers operating in 2006 voluntarily contributed to CARTR for that year (listed in the appendix). One of the 25 centers performed more than 1000 ART cycles (of all types) in 2006, 10 centers performed between 500 and 1000 cycles, 10 centers performed between 200 and 500 cycles, and four centers performed fewer than 200 cycles.

Overall Results

In total, 12,052 treatment cycles involving ART were reported to CARTR for 2006. Overall, 3784 ART cycles (31.4% of cycles started) resulted in a clinical pregnancy, at least 3006 cycles resulted in a delivery (25.2%), and at least 2974 cycles resulted in a live birth (24.9%). There were 112 cycles with ongoing pregnancies (3.6% of ongoing pregnancies) for which the birth outcome was not reported. Overall, there were at least 883 multiple births (29.4% of known births): 846 twin births (28.1%), 36 triplet births (1.2%), and one quadruplet birth.

The various procedures and their outcome rates are described in the following sections. The cycle outcomes of the four most common procedures are summarized in Table 1.

IVF/ICSI with Own Oocytes

The most common procedure performed was IVF, including ICSI, with 8278 cycles reported. This category (referred to hereafter as IVF/ICSI), to distinguish it from those of oocyte donation (OD) and gestational carrier cycles, includes only cycles in which the parenting woman's own oocytes are used and the same woman receives the resulting embryos. However, cycles using donated sperm are included. Because the decision to use ICSI might not be made until the sperm and oocytes are assessed in the embryology laboratory, cycles canceled before oocyte retrieval cannot be classified by type of insemination procedure; thus, outcomes per cycle started can only be calculated for IVF and ICSI cycles grouped together.

Per IVF/ICSI cycle started, the clinical pregnancy rate was 33.7%, the live birth rate was 27.1%, and the singleton live birth rate was 18.9%. Donated sperm was used in 3.9% of cycles with oocytes retrieved. There were 58 ectopic pregnancies (0.7%), including five heterotopic pregnancies: one ended in spontaneous abortion, one in therapeutic abortion, and three resulted in a singleton live birth. The pregnancy loss rate was 14.9% (miscarriage 14.2%, therapeutic abortion 0.7%). Of the 2244 known births (96% of ongoing pregnancies), 30.3% were multiple births (28.8% twins, 1.5% high-order multiples [including one set of quadruplets]). Included in these figures are 10 pregnancies, three miscarriages, six singleton live births, and one twin live birth that resulted from intrauterine insemination performed after the IVF/ICSI cycle was cancelled.

Rates for IVF and ICSI separately can only be provided per successful retrieval (i.e., one or more oocytes retrieved). Of 7640 IVF/ICSI cycles with a successful retrieval, 35.5% had insemination by standard IVF, 59.3% by ICSI, and 5.2% by IVF/ICSI split (some oocytes inseminated by each method). The clinical pregnancy rates per successful retrieval were 35.0%, 37.1%, and 37.5%, respectively. Including the IVF/ICSI split cycles in the ICSI group, the clinical pregnancy rates were 35.0% for IVF and 37.1% for ICSI, and the live birth rates were 28.4% and 29.8%, respectively. The ectopic pregnancy rate was 0.7% with IVF and 0.8% with ICSI, and the pregnancy loss rates were 14.2% (miscarriage 13.5%, therapeutic abortion 0.6%) and 15.1% (miscarriage 14.5%, therapeutic abortion 0.7%), respectively. Of 769 known births after IVF, 29.1% were multiple births (28.1% twins, 1.0% triplets); of 1468 known births after ICSI, 31.1% were multiple births (29.3% twins, 1.8% high-order multiples).

IVF/ICSI with Oocyte Donation

In 2006, IVF/ICSI with OD was reported in 350 cycles. In IVF/ICSI-OD, one woman undergoes ovarian stimulation and then donates some or all of the retrieved oocytes to another woman, usually anonymously. These oocytes are inseminated with sperm from the recipient's partner (or a sperm donor), and the resulting embryos are transferred to the uterus of the recipient.

In OD cycles, the clinical pregnancy rate per cycle started was 42.3%, the live birth rate was 33.6%, and the singleton live birth rate was 20.9%. Donated sperm was used in 10.2% of cycles with oocytes donated. There were three ectopic pregnancies (0.9%). The pregnancy loss rate was 15.2% (all miscarriages). Of 118 known births (96% of ongoing pregnancies), 37.3% were multiple births (all twins).

Of 332 cycles with a successful retrieval and known insemination method, 39.2% had insemination by standard IVF, 52.1% by ICSI, and 8.7% by IVF/ICSI split. The clinical pregnancy rates per successful retrieval were 47.7%, 42.2%, and 44.8%, respectively.

Information about the oocyte donor's age was first collected in 2006 but was available for only 48% of cycles. Donor age was <30 years in 46% of cycles for which age

TABLE 1

Cycle outcomes for the four most common types of ART procedures.

Outcome	IVF/ICSI	IVF/ICSI-OD	FET	FET-OD
Cycles started	8278	350	2838	163
Canceled cycles (% of cycles started)	592 (7.2)	15 (4.3)	80 (2.8)	3 (1.8)
Oocyte retrievals (% of cycles started)	7686 (92.8)	335 (95.7)	2758 (97.2)[a]	160 (98.2)[a]
Embryo transfers (% of cycles started)	7195 (86.9)	317 (90.6)	2613 (92.1)	154 (94.5)
Clinical pregnancy (% per cycle started)	2786 (33.7)	148 (42.3)	690 (24.3)	56 (34.4)
Ectopic pregnancy (% per cycle started)	58 (0.7)	3 (0.9)	17 (0.6)	2 (1.2)
Miscarriage (% per IU pregnancy)	388 (14.2)	22 (15.2)	126 (18.7)	12 (22.2)
Therapeutic abortion (% per IU pregnancy)	18 (0.7)	0	5 (0.7)	1 (1.9)
Delivery[b] (% per cycle started)	2244 (27.4)	118 (34.2)	529 (18.7)	41 (25.2)
Live birth[b] (% per cycle started)	2219 (27.1)	116 (33.6)	524 (18.6)	41 (25.2)
Singleton live birth[b] (% per cycle started)	1547 (18.9)	72 (20.9)	406 (14.4)	27 (16.6)
Singleton delivery[b] (% of deliveries)	1563 (69.7)	74 (62.7)	410 (77.5)	27 (65.9)
Twin delivery[b](% of deliveries)	647 (28.8)	44 (37.3)	116 (21.9)	14 (34.1)
Triplet or more delivery[b] (% of deliveries)	34 (1.5)	0	3 (0.6)	0

Abbreviations: FET, frozen embryo transfer; ICSI, intracytoplasmic sperm injection; IU, intrauterine; IVF, in vitro fertilization; OD, oocyte donation.

[a] Cycles with embryos thawed.

[b] Cycles with unknown delivery status omitted: 83 IVF/ICSI, 5 IVF/ICSI-OD, and 15 FET.

Gunby. Canadian ART Register 2006. Fertil Steril 2009.

was reported, 30 to 34 years in 39%, 35 to 39 years in 14%, and ≥40 years in 1%. The clinical pregnancy rates were 39.0%, 29.2%, 50.0%, and 0%, respectively.

FET with Own Oocytes

With FET, embryos created and cryopreserved in a previous IVF/ICSI cycle are thawed and transferred to the uterus of the woman who provided the oocytes in the original cycle. In 2006, 2838 such cycles were reported.

Per cycle started, the clinical pregnancy rate was 24.3%, the live birth rate was 18.6%, and the singleton live birth rate was 14.4%. There were 17 ectopic pregnancies (0.6%), including two heterotopic pregnancies that both ended in miscarriage. The pregnancy loss rate was 19.4% (miscarriage 18.7%, therapeutic abortion 0.7%). Of 529 known births (97% of ongoing pregnancies), 22.5% were multiple births (21.9% twins, 0.6% triplets).

FET with Oocyte or Embryo Donation

The category FET-OD includes transfer of cryopreserved embryos created from donor oocytes in a previous OD cycle (106 cycles) and cryopreserved donated embryos (57 cycles). In the latter case, both the male and female gametes were provided by persons other than the intended parenting couple. The thawed embryos are transferred to the woman who intends to raise the child.

In this category, the clinical pregnancy rate per cycle started was 34.4%, the live birth rate was 25.2%, and the singleton live birth rate was 16.6%. There were two ectopic pregnancies (1.2%). The pregnancy loss rate was 24.1% (miscarriage 22.2%, therapeutic abortion 1.9%). Of 41 known

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births (100% of ongoing pregnancies), 34.1% were multiple births (all twins).

Gestational Carrier Cycles

There were 123 cycles in which embryos were transferred into the uterus of a woman other than the one who intended to raise the child. Gestational carriers were used in 49 IVF/ICSI and 52 FET cycles with the parenting woman's own oocytes and 12 IVF/ICSI and 10 FET cycles with donated oocytes. Use of donated sperm was not reported for any cycle.

In fresh embryo cycles using a gestational carrier, the clinical pregnancy rate per cycle started was 41.0%, the live birth rate was 31.6%, and the singleton live birth rate was 17.5%; in frozen embryo cycles, the rates were 37.1%, 28.3%, and 21.7%, respectively. Of the 48 clinical intrauterine pregnancies in gestational carriers, 14.6% ended in miscarriage; there was no ectopic pregnancy. Of 35 known births (85% of ongoing pregnancies), 34.3% were multiple births (all twins).

Other Cycle Types

Several other types of ART procedures that did not fit into the categories previously described were reported to CARTR for 2006. Natural (unstimulated) IVF was performed in 92 cycles, with clinical pregnancy rates of 12.0% per cycle started and 22.0% per ET, and live birth rates of 8.8% and 16.3%, respectively; there was one twin birth (12.5% of known births). Twenty cycles were reported in which oocyte retrieval was performed for the sole purpose of freezing oocytes. In 19 cycles, previously frozen oocytes were thawed and inseminated, with a clinical pregnancy rate of 15.8% and a live birth rate of 11.1%, all singletons. Four cycles involving fresh donor embryos resulted in two pregnancies and two singleton live births. Seventy-seven cycles of in vitro oocyte maturation were reported, with a clinical pregnancy rate of 24.7% and a live birth rate of 15.6%; of 12 live births, five were twins (41.7%). Fifteen cycles were performed for the purpose of embryo banking. Nine IVF/ICSI cycles (four pregnancies, three live births, one twin birth) were considered as research and thus were not included in the main analysis.

Preimplantation genetic diagnosis (PGD) was performed in 59 IVF/ICSI cycles and five FET cycles, resulting in 17 pregnancies and 12 live births (six singleton and six twin births). In addition, preimplantation genetic screening (PGS) for aneuploidy was reported for 44 IVF/ICSI cycles, two FET cycles, and one IVF/ICSI-OD cycle, resulting in 25 pregnancies and 21 live births (12 singleton, eight twin, and one triplet birth). However, use of PGD and PGS may be underreported as information on these techniques was not specifically requested in the old variable set.

Birth Outcomes for All ART Procedures

At least 3927 infants were born from all types of ART cycles started in 2006 in Canada: 2123 infants from 2123 singleton births (54.1% of infants), 1692 infants from 846 twin births (43.1%), 108 infants from 36 triplet births (2.8%), and four infants from one quadruplet birth (0.1%). Thus, 46% of infants were born from multiple gestations. An additional 112 pregnancies had no delivery information reported. Of these pregnancies, 84 had one viable fetus, 23 had two viable fetuses, and two had three viable fetuses at last report; thus, as many as 136 additional babies may have been born.

Of the 2123 infants born as singletons, there were 22 stillbirths and three neonatal deaths, a total perinatal mortality rate of 1.2%. The median gestational age at birth was 39 weeks (range: 23 to 44 weeks) for liveborn infants and 29 weeks (range: 20 to 43 weeks) for stillborn infants. Preterm delivery (<37 weeks) occurred in 15.9% of births and very preterm delivery (<34 weeks) in 4.6% of births. The birth weight was >2500 g for 90.3% of liveborn singletons, 2000–2500 g for 6.4%, 1000–1999 g for 2.4%, and <1000 g for 0.9%. Some type of birth defect was reported for 47 infants (2.2%).

Of the 1692 infants born as twins, there were 31 stillbirths and 20 neonatal deaths, a total perinatal mortality rate of 3.0%. The median gestational age at birth was 36 weeks (range: 21 to 43 weeks) for live births and 21 weeks (range: 20 to 24 weeks) for stillbirths. Preterm delivery occurred in 69.1% of births and very preterm delivery in 21.0% of births. Birth weight was >2500 g for 48.4% of liveborn twins, 2000–2500 g for 32.7%, 1000–1999 g for 15.9%, and <1000 g for 3.0%. Some type of birth defect was reported for 40 infants (2.4%).

Of the 112 infants born as triplets or quadruplets, there were three stillbirths and two neonatal deaths, a total perinatal mortality rate of 4.5%. The median gestational age at birth was 32 weeks (range: 24 to 36 weeks) for live births and 23 weeks for the one stillbirth. Preterm delivery occurred in 100% of births and very preterm delivery in 77.8% of births. Birth weight was >2500 g for 3.8% of liveborn infants, 2000–2500 g for 15.1%, 1000–1999 g for 61.3%, and <1000 g for 19.8%. Some type of birth defect was reported for five infants (4.5%).

The information provided on birth defects was limited. Overall, some type of birth defect was reported for 92 infants (2.3%): 13 cases of chromosome aneuploidy (four stillbirths), 25 cases of cardiac defect (one stillbirth and two neonatal deaths), 11 cases of limb defect (one stillbirth), six cases of cleft lip or palate (four stillbirths and one neonatal death), and 37 cases of other unspecified defects (four stillbirths and two neonatal deaths).

Sex of the infant was a new variable for 2006. Data were available for only 32% of babies: 51.7% were male, and 48.3% were female.

The risk of a couple experiencing perinatal death was related to multiple birth. Perinatal death of one or more infants occurred in 1.2% of singleton deliveries, 4.1% of twin deliveries, and 8.1% of triplet or quadruplet deliveries (risk ratio 2.1; 95% confidence interval, 1.7–2.5; $P<.0001$, multiple

vs. singleton). The risk of perinatal death of all infants was 1.2%, 1.9%, and 2.7%, respectively (P=.11, multiple vs. singleton). By type of ART procedure, perinatal death of one or more infants occurred in 2.0% of deliveries resulting from IVF/ICSI cycles (1.8% in IVF cycles and 2.2% in ICSI cycles), 4.2% from OD cycles, and 1.7% from FET cycles.

Effect of Female Age

The clinical pregnancy and birth outcomes for women categorized into three age groups are given in Table 2. The mean female age was 35 years in IVF/ICSI and FET cycles and 40 years in OD cycles. The proportion of cycles in women aged 40 years and older was 17% in IVF/ICSI cycles, 15% in FET cycles, and 60% in OD cycles. In IVF/ICSI cycles, the clinical pregnancy and live birth rates declined with female age, especially after age 40 years. In FET cycles, the decline with female age was less apparent. In OD cycles, clinical pregnancy and live birth rates were slightly higher in the youngest age group, but similar in the two older age groups. The multiple birth rates declined with age in IVF/ICSI cycles but were similar in all age groups in FET cycles; in OD cycles, age had no clear effect on multiple births because the middle age group had the highest rate.

In IVF/ICSI cycles using the woman's own oocytes, the age-related decline in ART success can be attributed to suboptimal outcomes at several steps in the process. The proportion of started cycles with successful retrieval decreased with age (95.3% for women aged <35 years, 91.5% for those aged 35 to 39 years, and 86.6% for those aged ≥40 years), as did the mean number of oocytes retrieved (13.2, 11.1, and 8.8, respectively). In women who had one or more embryos replaced, the mean implantation rate declined with increasing female age (30.8%, 22.4%, and 10.7%, respectively), as did the clinical pregnancy rate (44.5%, 38.1%, and 23.2%, respectively), even though older women had more embryos transferred (mean, 2.1, 2.5, and 2.9, respectively). The proportion of women who had surplus embryos available for cryopreservation gradually decreased from the younger to older women (51.1%, 36.9%, and 15.5%, respectively). In women who achieved clinical intrauterine pregnancy, the pregnancy loss rate became higher as women aged (10.4%, 16.4%, and 33.0%, respectively). However, adverse birth outcomes were not found to be related to advanced female age: the risks of preterm birth, very preterm birth, and perinatal death were similar across age groups after adjusting for multiple births.

Effect of Infertility Diagnosis

For 2006, information on infertility diagnosis was collected somewhat differently by CARTR. Previously, the primary and secondary diagnoses had been recorded. From 2006 on, as many of the listed diagnoses can be selected as apply for a given cycle, but the primary diagnosis is not indicated. Thus, a couple may have more than one diagnosis, and an

TABLE 2

Clinical pregnancy and birth outcomes by female age for the three most common ART procedures.

Outcome/female age group	IVF/ICSI	IVF/ICSI-OD	FET
Mean female age, years (range)	35 (20–52)	40 (22–51)	35 (21–50)
Cycles started, n (% of cycles within procedure)[a]			
<35	3625 (43.8)	68 (19.4)	1294 (45.6)
35–39	3208 (38.8)	72 (20.6)	1131 (39.9)
≥40	1443 (17.4)	210 (60.0)	413 (14.6)
Clinical pregnancy, n (% per cycle started)			
<35	1457 (40.2)	32 (47.1)	334 (25.8)
35–39	1059 (33.0)	28 (38.9)	262 (23.2)
≥40	270 (18.7)	88 (41.9)	94 (22.8)
Live birth, n (% per cycle started)[b]			
<35	1223 (34.2)	25 (38.5)	260 (20.2)
35–39	833 (26.1)	23 (31.9)	197 (17.5)
≥40	163 (11.4)	68 (32.7)	67 (16.3)
Multiple birth, n (% per delivery)[b]			
<35	416 (33.7)	9 (34.6)	58 (22.0)
35–39	233 (27.6)	15 (62.5)	46 (23.2)
≥40	32 (19.5)	20 (29.4)	15 (22.4)

Abbreviations: FET, frozen embryo transfer; ICSI, intracytoplasmic sperm injection; IVF, in vitro fertilization; OD, oocyte donation.

[a] Two cycles with unknown female age omitted.

[b] 103 cycles with unknown delivery status omitted.

Gunby. Canadian ART Register 2006. Fertil Steril 2009.

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individual cycle may be included under more than one diagnostic category. A new category, diminished ovarian reserve, was added mainly as a diagnosis for women receiving oocyte donation. In a few cases, women with this diagnosis underwent IVF/ICSI using their own oocytes but with poor results (Table 3).

In IVF/ICSI cycles, the reason for ART treatment was most commonly male factor infertility (32% of cycles) or a single female infertility factor (30%). Idiopathic or unexplained infertility was the diagnosis in 20% of cycles. Both female and male infertility factors were diagnosed in 14% of cycles and more than one female factor in 5%. The clinical pregnancy rate per cycle started was highest when male factor infertility was the only diagnosis (39.4%) . Couples with idiopathic infertility had a clinical pregnancy rate of 34.1%. The clinical pregnancy rate was reduced in the presence of a single female factor alone (30.0%) or in combination with male factor (30.6%). It was lowest in the presence of multiple female infertility factors without male factor (25.4%). These differences across diagnostic groups were statistically significant ($P<.0001$).

The distribution of diagnostic categories was quite different in IVF and ICSI cycles (see Table 3). The most common diagnosis for couples having IVF was tubal factor, whereas for couples having ICSI it was male factor infertility. The clinical pregnancy rates per successful retrieval were similar across diagnostic categories for IVF (excluding diminished ovarian reserve) ($P=.16$) but were more variable for ICSI ($P<.0001$), with the highest rates being achieved in couples with a diagnosis of male factor infertility (39.9%), followed by idiopathic infertility (36.8%) and ovulatory disorder (36.7%) (see Table 3).

Effect of Number of Embryos Transferred

The number of embryos transferred in IVF/ICSI cycles ranged from one to 12 with a mean of 2.4. A single embryo was transferred in 11% of transfer cycles. More commonly, either two (56% of cycles) or three (24% of cycles) embryos were transferred. More embryos were transferred in older women: the mean age of women receiving four or more embryos (9% of cycles) was 39 years, compared with 36 years for those receiving three embryos and 34 years for those receiving two embryos.

Overall, the clinical pregnancy rate was 38.6% per ET. Clinical pregnancy and birth outcomes by number of embryos transferred are shown in Table 4. The clinical pregnancy rate per ET was low when only one embryo was transferred (23.1%). Transferring three or more embryos did not increase the clinical pregnancy rate beyond the high level observed with two embryos (43.0%); indeed, the clinical pregnancy rate declined when more than two embryos were transferred (36.3%). The mean implantation rates followed a similar pattern: 23.1% with one embryo, 29.2% with two embryos, 18.9% with three embryos, and 10.1% with four or more embryos.

Twenty-four percent of two-embryo transfers were performed on day 5 after oocyte retrieval and 68% on day 3, with similar clinical pregnancy rates: 44.7% on day 5 and 43.8% on day 3 (the remaining 8% had ET on day 2, 4, 6, or 7). In contrast, only 5% of three-embryo transfers and 3% of ≥four-embryo transfers were performed on day 5.

Of IVF/ICSI cycles with more than one embryo transferred, the multiple birth rate was similar whether two

TABLE 3

Clinical pregnancy rates per successful retrieval for in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) cycles by infertility diagnosis category.

	IVF		ICSI	
Diagnostic category	No. of cycles (% of all IVF cycles)	No. of pregnancies (% per retrieval)	No. of cycles (% of all ICSI cycles)	No. of pregnancies (% per retrieval)
Male factor	270 (9.9)	84 (31.1)	3214 (65.7)	1281 (39.9)
Tubal factor	899 (33.1)	294 (32.7)	567 (11.6)	168 (29.6)
Idiopathic	795 (29.3)	293 (36.9)	737 (15.1)	271 (36.8)
Endometriosis	496 (18.3)	178 (35.9)	497 (10.2)	159 (32.0)
Ovulatory disorder	283 (10.4)	107 (37.8)	409 (8.4)	150 (36.7)
Other female factor	312 (11.5)	97 (31.1)	425 (8.7)	126 (29.6)
Diminished ovarian reserve	40 (1.5)	2 (5.0)	61 (1.2)	9 (14.8)

Notes: 31 cycles with unknown diagnosis omitted. An individual cycle may be included under more than one category. "Ovulatory disorder" includes polycystic ovary syndrome.

Gunby. Canadian ART Register 2006. Fertil Steril 2009.

TABLE 4

Clinical pregnancy rate per embryo transfer and multiple birth rate per known birth by number of embryos transferred in IVF/ICSI cycles.

No. of embryos transferred	No. of cycles (% of all ET cycles)	No. of pregnancies (% per ET)	No. of births (% of all births)[a]	No. of total multiple births (% per birth)	No. of triplet births (% per birth)
1	784 (10.9)	181 (23.1)	140 (6.3)	2 (1.4)	0
2	4018 (55.8)	1726 (43.0)	1427 (63.8)	452 (31.7)	5 (0.4)
3	1712 (23.8)	666 (38.9)	521 (23.3)	173 (33.2)	22 (4.2)
4 or more	681 (9.5)	203 (29.8)	149 (6.7)	53 (35.6)	7 (4.7)

Abbreviations: ET, embryo transfer; ICSI, intracytoplasmic sperm injection; IVF, in vitro fertilization.
[a] 83 cycles with unknown delivery status omitted.

Gunby. Canadian ART Register 2006. Fertil Steril 2009.

embryos (31.7%) or three or more embryos (33.7%) were transferred (see Table 4). The triplet birth rate was 4.3% when three or more embryos were transferred.

When the effect of number of embryos transferred was examined by female age group, different patterns emerged, for both the distribution of number of embryos transferred and the resulting pregnancy rates (Table 5). Within each age group, multiple birth rates increased as the number of embryos transferred increased.

The number of thawed embryos transferred in FET cycles ranged from one to eight, with a mean of 2.2. A single embryo was transferred in 18% of cycles, two embryos in 50%, three embryos in 25%, and four or more embryos in 7%. Overall, the clinical pregnancy rate was 26.4% per ET, increasing with number of embryos transferred, up to three (16.4% with one embryo, 25.8% with two embryos, 33.5% with three embryos, and 31.3% with four or more embryos). The mean implantation rates were more uniform: 16.0% with one embryo, 15.6% with two embryos, 15.5% with three embryos, but only 9.9% with four or more embryos. The multiple birth rate increased with number of thawed embryos transferred, up to three: 2.2% with one embryo, 20.8% with two embryos, 28.9% with three embryos, and 28.2% with four or more embryos. The triplet birth rate was 1.4% when three or more embryos were transferred.

TABLE 5

Clinical pregnancy rate per embryo transfer and multiple birth rate per known birth by female age and number of embryos transferred in IVF/ICSI cycles.

Female age group (years)	No. of embryos transferred	No. of cycles (% within age group)[a]	No. of pregnancies (% per ET)	No. of multiple births (% per birth)[b]
<35	1	349 (10.7)	115 (33.0)	1 (1.0)
	2	2355 (72.1)	1102 (46.8)	331 (35.3)
	3	467 (14.3)	202 (43.3)	69 (40.4)
	4 or more	97 (3.0)	34 (35.1)	14 (50.0)
35–39	1	282 (10.2)	50 (17.7)	1 (2.9)
	2	1336 (48.4)	552 (41.3)	116 (26.1)
	3	918 (33.2)	380 (41.4)	95 (31.3)
	4 or more	225 (8.1)	71 (31.6)	21 (37.5)
≥40	1	153 (13.1)	16 (10.5)	0
	2	327 (28.1)	72 (22.0)	5 (11.4)
	3	327 (28.1)	84 (25.7)	9 (19.6)
	4 or more	357 (30.7)	98 (27.5)	18 (27.7)

Abbreviations: ET, embryo transfer; ICSI, intracytoplasmic sperm injection; IVF, in vitro fertilization.
[a] Two cycles with unknown female age omitted.
[b] 83 cycles with unknown delivery status omitted.

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Effect of Day of Embryo Transfer

In IVF/ICSI cycles, ET was performed on day 2 (after oocyte retrieval) in 6% of transfers, day 3 in 72%, day 5 in 18%, and day 6 in 2%. More embryos were transferred to each woman on day 2 and day 3 (mean, 2.8 and 2.5) than on day 5 and day 6 (mean, 2.0 and 2.0). The proportion of cycles with two embryos transferred was 31% on day 2, 52% on day 3, 76% on day 5, and 82% on day 6.

The clinical pregnancy rates per ET were 27.7% on day 2, 38.6% on day 3, 44.0% on day 5, and 29.7% on day 6. The mean implantation rates were 14.4%, 23.4%, 32.7%, and 19.4%, respectively. The multiple birth rates were 24.5% on day 2, 30.8% on day 3, 31.3% on day 5, and 18.4% on day 6.

Effect of Surplus Embryos

The availability of surplus embryos may be an indicator of embryo quality as well as embryo number. Thus, it is interesting to compare clinical pregnancy rates for cycles with and without embryos available for cryopreservation. The clinical pregnancy rate was 30.0% when all available embryos were transferred (60% of transfers) and 51.5% when surplus embryos were available (40% of transfers). The mean implantation rates were 16.9% and 35.4%, respectively.

In Canada in 2006, a single embryo was transferred by choice (elective SET) in 205 IVF/ICSI cycles (26% of single ETs and 2.8% of all transfer cycles). The clinical pregnancy rate per ET was 52.2% in elective SETs, compared with 12.8% when only one embryo was available. Some of this difference can be explained by female age, as 74% of elective SETs were performed in women <35 years and only 1.5% in women ≥ 40 years. Looking at it another way, when a single embryo was transferred, it was elective SET in 43% of women <35 years and 18% of women 35 to 39 years, but only 2% of women ≥ 40 years. The clinical pregnancy rate was 41.2% when elective SET was done on day 3 (33% of transfers) and 59.1% when it was done on day 5 (64% of transfers).

Two embryos were transferred by choice (elective DET) in 2029 IVF/ICSI cycles (51% of double ETs and 28% of all transfer cycles). In these cycles, the clinical pregnancy rate was 53.0%, compared with 32.7% when only two embryos were available. Again, female age was a factor in this result: 67% of elective DETs were performed in women <35 years and only 3% in women ≥ 40 years. When two embryos were transferred, it was elective DET in 57% of women <35 years and 46% of women 35 to 39 years, but only 18% of women ≥ 40 years. The clinical pregnancy rate was 53.9% when elective DET was done on day 3 (73% of transfers) and 51.9% when it was done on day 5 (25% of transfers). The multiple birth rate was 36.0% with elective DET and 24.3% when only two embryos were available.

Complications and Fetal Reduction

Complications were reported in 171 IVF/ICSI cycles (2.1% per cycle started). There were 105 cases of moderate ovarian hyperstimulation syndrome (1.3% per cycle started), 17 of which (16%) required hospitalization, and 18 cases of severe ovarian hyperstimulation syndrome (0.2% per cycle started), 12 of which (67%) required hospitalization. Also reported were 26 complications related to medications (no hospitalization), 12 complications related to procedures (five hospitalizations), one case of infection (not hospitalized), and nine other unspecified complications (no hospitalization). No maternal death was reported.

Of 1090 multiple pregnancies from all types of ART cycles, outcomes were known for 1065 pregnancies. Of these, 189 (17.7%) had fetal reduction (loss of one or more, but not all fetuses) after ultrasonographic confirmation of fetal viability at 6 to 8 weeks' gestation; the reduction was spontaneous in 144 cases (76%) and therapeutic in 45 cases (24%). Of 966 pregnancies that were originally twins, reduction to one fetus occurred spontaneously in 12.2% and therapeutically in 1.2%, and loss of the whole pregnancy occurred in 3.5%; 83% of viable twin gestations resulted in a twin birth. Of 94 pregnancies that were originally triplets, reduction to two fetuses occurred spontaneously in 20.2% and therapeutically in 24.5%; reduction to one fetus occurred spontaneously in 7.4% and therapeutically in 6.4%; and loss of the whole pregnancy occurred in 3.2% (including one loss after a therapeutic reduction). Thus, only 38% of viable triplet pregnancies resulted in a triplet birth. Of five pregnancies that were originally quadruplets, two were reduced therapeutically to two fetuses, one was reduced therapeutically to one fetus, one miscarried, and one resulted in a quadruplet birth.

DISCUSSION

In this sixth annual publication from the Canadian ART Register, we have presented a report on ART cycles performed in Canada in 2006. All 25 ART centers operating in Canada in 2006 contributed to CARTR, representing 100% participation for the fourth consecutive year. One new ART center in British Columbia opened in 2006; however, because two centers in Quebec that are under the same administration asked to be considered as a single center, the number of centers participating in CARTR remained constant at 25. The voluntary involvement of all Canadian centers in CARTR is a reflection of the enthusiastic commitment to the project by members of the IVF Directors Group and the dedication of their staff. In 2006, for the first time, all centers submitted cycle-specific data; thus, analyses involving detailed characteristics such as infertility diagnosis, day of ET, and number of embryos transferred now include complete data.

At present, CARTR is not regulated by federal or provincial governments and receives no government funding. It is responsible only to the IVF Directors Group of the CFAS and is financed solely by funds generated from a small per-cycle fee charged to participating centers. These very limited resources do not permit validation of data through auditing; thus, the reliability of the CARTR report rests on the trust

that personnel from each center have submitted accurate and complete data to the best of their ability. The government of Canada has recently established Assisted Human Reproduction Canada (AHRC, http://www.ahrc-pac.gc.ca), whose responsibilities will include collection of ART data, superseding CARTR. It is expected that, once AHRC has their data collection function in operation, a system of on-site data validation will be established. Currently, data are submitted to CARTR in yearly batches; however, CARTR is working with AHRC to explore ways to improve data collection in future, including more frequent Internet-based data submissions.

Although CARTR collects data on all ART cycles performed in Canadian centers, an unknown number of Canadian couples travels to other countries (in particular, the United States) to undergo ART treatment. These treatment cycles, and the infants thus conceived and born in Canada, are not included in CARTR. In addition, unlike many other national ART registers, CARTR does not currently collect data on treatment cycles involving intrauterine insemination (as the intended procedure) with either the male partner's sperm or donated sperm. However, it is expected that AHRC will be doing so in the future.

The trend over time toward increasing numbers of cycles reported to CARTR and increasing pregnancy and birth rates that was noted for 2002 (2), 2003 (3), 2004 (4), and 2005 (5) continued into 2006 (Table 6). Compared with 2005, there was a 5.6% increase in the total number of ART cycles reported to CARTR for 2006, from 11,414 to 12,052. There was a 9.9% increase in the number of clinical pregnancies resulting from all types of ART cycles, from 3443 in 2005 to 3784 in 2006, which is attributable to both the higher number of cycles performed and a 4.0% relative increase in clinical pregnancy rate (from 30.2% to 31.4% per cycle started). It is interesting that this overall increase in pregnancy rate occurred despite the fact that more than half of the increase in cycle numbers involved FET cycles. The 10.7% increase in the number of live births reported, from 2687 in 2005 to 2974 in 2006, was a result of the 4.6% relative increase in live birth rate (from 23.8% to 24.9% per cycle started) as well as the higher number of cycles performed. Because the proportion of missing birth outcomes was not much lower in 2006 than in 2005 (3.6% vs. 3.8% of ongoing pregnancies), more complete reporting was not a factor in increasing live birth rates this year. As in previous years, the live birth data for 2006 are underestimates of the true figures because of the 112 pregnancies for which birth outcomes were unavailable.

Although it is encouraging to see improvements in pregnancy, birth, and multiple birth rates from one year to the next, realistically such differences may be attributable mainly to random variation, especially with the relatively small number of cycles involved in CARTR. For this reason, statistical testing has been done on the trend over 3 years rather than just the difference between 2005 and 2006. However, multiple comparisons may produce some statistically significant results by chance alone. Therefore, the small changes over time described in the following paragraphs should not be overinterpreted.

In IVF/ICSI cycles, there was a 5.0% relative increase in the clinical pregnancy rate in 2006 over the previous year (see Table 6; *P* for trend .009 over 3 years). Rates increased in the two younger age groups and stayed stable in the $\geq$40 years age group. At 27.1%, the live birth rate per cycle started showed a relative increase of 5.9% over 2005 (*P* for trend $<$0.0001 over 3 years), partially attributable to lower pregnancy loss rates in the two younger age groups. The proportion of IVF/ICSI cycles with only one or two embryos transferred did not increase in 2006 (*P* for trend .66 over 3 years); however, there was a continuing increase in the singleton live birth rate (*P* for trend .03 over 3 years) (see Table 6). The multiple birth rate for 2006 was not much lower than that of the previous year and still substantially higher than that of 2004, but the low triplet birth rate of the previous 3 years was maintained (see Table 6).

In FET cycles, the clinical pregnancy rate increased by 6.6%, live birth rate by 6.9%, and singleton live birth rate by 9.9% in 2006 compared with 2005 (see Table 6). There was an 8.2% relative decrease in the multiple birth rate. The triplet birth rate decreased from 1.6% in 2005 to 0.6% in 2006, but this variability can be attributed to small numbers, as these percentages represent only seven and three triplet births, respectively. The only outcome for FET cycles to show a statistically significant improvement over the period 2004 to 2006 was singleton live birth rate (*P* for trend .02) (see Table 6).

In IVF/ICSI-OD cycles reported to CARTR, the clinical pregnancy, live birth, and singleton live birth rates decreased in 2006 compared with the previous year, although the differences were not statistically significant (see Table 6). The multiple birth rate in OD cycles showed an increase in 2006, but there was no triplet birth. The only outcome for OD cycles to show a statistically significant improvement over the period of 2004 to 2006 was the high-order multiple birth rate (*P* for trend .007) (see Table 6).

Although the IVF Directors Group supports the goal of reducing multiple births resulting from ART in Canada, as recommended by a recent consensus meeting about this issue (7), only minimal reductions in multiple birth rate were seen in 2006 compared with 2005: from 29.6% to 29.4% for all ART cycles and from 30.8% to 30.3% for IVF/ICSI cycles. This lack of progress in reducing multiple births occurred despite the fact that, in 2006, Canadian ART centers were already close to meeting the recommendations of a Canadian guideline published in that year on how many embryos to transfer after IVF/ICSI (8). The guideline recommends transfer of a maximum of two embryos in women $<$35 years of age, three embryos in women 35 to 39 years of age, and four embryos in women $\geq$40 years, with transfer of fewer embryos being considered in women with high-quality embryos and good prognosis (e.g., first or second ART attempt or previous successful ART cycle). The issues remain

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TABLE 6

Comparison of cycle outcomes from the Canadian ART Register (CARTR) for the years 2004 to 2006.

Outcome	CARTR 2004 (4)	CARTR 2005 (5)	CARTR 2006	*P* for trend
No. of clinics participating (%)	26 (100)	25 (100)	25 (100)	
Total no. of ART cycles reported	11,068	11,414	12,052	
IVF/ICSI cycles				
No. of cycles reported	7874	8195	8278	
Cycles with ICSI (%)	58	60	64	<.0001
Cycles in women aged ≥40 years (%)	18	18	17	.73
Cycles with ≤2 embryos transferred (%)	66	68	67	.66
Clinical pregnancy rate per cycle (%)	31.7	32.1	33.7	.009
Live birth rate per cycle (%)	24.2	25.6	27.1	<.0001
Singleton live birth rate per cycle (%)	17.6	17.7	18.9	.03
Multiple delivery rate per delivery (%)	27.8	30.8	30.3	.08
Triplet or more rate per delivery (%)	1.5	1.4	1.5	.98
FET cycles				
No. of cycles reported	2431	2498	2838	
Clinical pregnancy rate per cycle (%)	22.8	22.8	24.3	.18
Live birth rate per cycle (%)	16.5	17.4	18.6	.05
Singleton live birth rate per cycle (%)	12.2	13.1	14.4	.02
Multiple delivery rate per delivery (%)	26.0	24.5	22.5	.21
Triplet or more rate per delivery (%)	1.0	1.6	0.6	.44
IVF/ICSI-OD cycles				
No. of cycles reported	365	301	350	
Clinical pregnancy rate per cycle (%)	44.9	46.5	42.3	.48
Live birth rate per cycle (%)	33.7	35.2	33.6	.98
Singleton live birth rate per cycle (%)	23.0	23.4	20.9	.51
Multiple delivery rate per delivery (%)	32.5	33.3	37.3	.44
Triplet or more rate per delivery (%)	4.3	0	0	.007

Abbreviations: FET, frozen embryo transfer; ICSI, intracytoplasmic sperm injection; IVF, in vitro fertilization; OD, oocyte donation.

Gunby. Canadian ART Register 2006. Fertil Steril 2009.

of how to identify women with "good prognosis" and convince them of the benefits of transferring fewer embryos. Guidelines recently published by the British Fertility Society and Association of Clinical Embryologists are more strict than the Canadian guidelines: women <37 years in their first IVF/ICSI cycle who have several high-quality embryos should be considered for elective SET (9).

Increased use of elective SET in appropriate couples is the obvious way to reduce multiple births. A few countries have substantially increased their use of SET, resulting in low multiple birth rates. In Sweden, 69% of embryo transfers in 2005 were SET, with a 6.1% multiple birth rate (twins only) (10). In Australia and New Zealand, 57% of transfers in 2006 were SET, with a 12% multiple birth rate (0.3% triplets) (11). These figures are in sharp contrast to those of Canada and the United States, which both used SET for only 11% of transfers in 2006, resulting in a 30% multiple birth rate (1.5% triplets) in Canada and a 31% multiple birth rate (1.9% triplets) in the United States (12).

In Canada, the lack of government funding for ART treatment works against widespread acceptance of SET. In 2006, ART treatment was partially covered by the provincial health plan only in Ontario and only for women with bilateral tubal blockage for up to three treatment cycles. Because the majority of couples pay the full cost of the treatment cycle, understandably, they want to maximize their chance of pregnancy by transferring more than one embryo. Although couples undergoing ART treatment are made aware of the high probability of multiple pregnancy after transfer of two or more embryos, they may have a poor understanding of the resulting risks to mother and babies and often still wish to proceed with multiple embryo transfer. However, if couples were relieved of the financial burden of ART treatment through government funding, it is likely that more of them would be willing to accept SET. In such cases, more high-quality embryos could be frozen to extend the chance of pregnancy from a single oocyte retrieval procedure. In addition, advances in embryo freezing and thawing techniques are improving pregnancy rates after FET.

The province of Quebec is leading the way in Canada in providing financial support to couples undergoing ART treatment. In 2008, the Quebec government introduced a 50% income tax credit for ART fees. In addition, they have proposed that the Quebec provincial health plan should cover the cost of the first two ART cycles for all couples. It is hoped that other Canadian provinces will follow suit.

In summary, for the 2006 reporting year, 100% of Canadian centers again participated voluntarily in a compilation of ART cycles in Canada. Clinical pregnancy rates per cycle started of 34% in IVF/ICSI cycles, 42% in OD cycles, and 24% in FET cycles, and live birth rates of 27%, 34%, and 19%, respectively, compare favorably with rates around the world (10–12). Multiple birth rates remained high, at about 30%. Clinical pregnancy and live birth rates and number of ART cycles performed continued to increase in 2006 compared with previous years.

Acknowledgments: The authors thank the personnel from each center responsible for data entry for CARTR for their hard work and devotion to detail.

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APPENDIX: CANADIAN ART CENTERS REPORTING DATA TO CARTR FOR 2006

Victoria Fertility Center, Victoria, British Columbia

University of British Columbia Center for Reproductive Health, Vancouver, British Columbia

Genesis Fertility Center, Vancouver, British Columbia

Pacific Centre for Reproductive Medicine, Burnaby, British Columbia

Regional Fertility Program, Calgary, Alberta

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Assisted Reproductive Technology at University of Saskatchewan (ARTUS), Saskatoon, Saskatchewan

Heartland Fertility Clinic, Winnipeg, Manitoba

London Health Sciences Center, London, Ontario

Hamilton Health Sciences Center for Reproductive Care, Hamilton, Ontario

ISIS Regional Fertility Center, Mississauga, Ontario

Astra Fertility Center, Mississauga, Ontario

NewLife Fertility Center, Mississauga, Ontario

CReATe IVF Program, Toronto, Ontario

LifeQuest Center for Reproductive Medicine, Toronto, Ontario

Mt. Sinai Reproductive Biology Unit, Toronto, Ontario

Toronto Center for Advanced Reproductive Technology (TCART), Toronto, Ontario

IVF Canada & LIFE Program, Scarborough, Ontario

Markham Fertility Center, Markham, Ontario

The Fertility Center at the Ottawa Hospital, Ottawa, Ontario

McGill University Reproductive Center, Montreal, Quebec

Montreal Fertility Clinic, Montreal, Quebec

OVO Fertility Clinic, Montreal, Quebec

Procrea, Montreal and Quebec, Quebec

Conceptia Clinic, Moncton, New Brunswick

Atlantic Assisted Reproductive Therapies (AART), Halifax, Nova Scotia

1 **Assisted reproductive technologies (ART) in Canada: 2006 results from the Canadian ART Register**

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Burlington and Toronto, Ontario; Montreal, Quebec; and Victoria, British Columbia, Canada

The Canadian Assisted Reproductive Technologies (ART) Register compiled a report on ART treatments for 2006, with all 25 Canadian centers participating. Pregnancy and birth rates continued to increase in 2006 compared with previous years.

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