

ICSI results – involving frozen embryo transfers for women using their own eggs for treatment cycles started in 2006

► Introduction

- The information we collect about fertility treatment can be analysed in many ways. In this report we present key information about those patients having ICSI involving frozen embryo transfer:
 - where the embryos created following ICSI were frozen
 - where the embryos were created using the woman's own eggs
 - where women were having treatment with the intention of conceiving immediately rather than storing or donating eggs and embryos; surrogacy treatment is excluded
 - and the treatment cycle started in 2006 resulting in births in either 2006 or 2007.
- This report does not include information about cycles of IVF that do not involve ICSI, fresh embryo transfer ICSI or the small number of cycles that involved transferring fresh and frozen embryos in the same cycle.
- Similar reports are available for fresh embryo transfer in IVF and ICSI, IVF involving frozen embryo transfer, and treatment involving donor eggs and embryos.
- At some points in the report the small numbers involved mean that some of the information cannot be presented for confidentiality reasons.
- Information about how the data for this report were gathered is given in the appendix together with a glossary of terms.

► Summary

- In 2006 2,074 women started 3,612 cycles of treatment where the intention was to carry out a frozen embryo transfer using embryos created from the woman's own eggs following ICSI, and treatment was undertaken with the purpose of conceiving immediately.
- Of the 3,612 cycles of frozen embryo ICSI started 3,353 cycles resulted in an embryo transfer (93%).
- The majority (79%) of embryo transfers involved the transfer of two embryos; 19% of cycles involved a single embryo transfer; and 2% were three embryo transfers.
- A total of 695 cycles resulted in an ultrasound confirmed pregnancy which represents 19% of treatment cycles started and 612 women gave birth to at least one baby (17%).
- The chances of a baby being born following frozen embryo ICSI treatment was affected by the age of the woman when she was treated and also by the number of embryos transferred. Women who were 39 years old or younger were more likely to conceive than women 40 years and older.

- Of the 695 women who had a confirmed ultrasound pregnancy 11% had a miscarriage. Older women were more likely than younger women to miscarry.
- Of the women who conceived following frozen embryo ICSI 80% conceived a singleton pregnancy and 20% conceived a multiple pregnancy. Younger women were more likely to conceive a multiple pregnancy than older women.
- Having conceived a pregnancy following frozen embryo ICSI 89% of women gave birth to at least one baby (a live birth).
- Having conceived a singleton pregnancy 86% of women gave birth whereas 14% lost their pregnancy to miscarriage, an ectopic pregnancy, termination or the baby was stillborn.
- Having conceived a multiple pregnancy 90% of women gave birth to all the babies, that is both twins or all three triplets were live born; 8% gave birth to at least one baby but fewer babies than she originally conceived; whereas 2% of women had a miscarriage, an ectopic pregnancy, a termination or stillbirth and none of the babies were born alive.

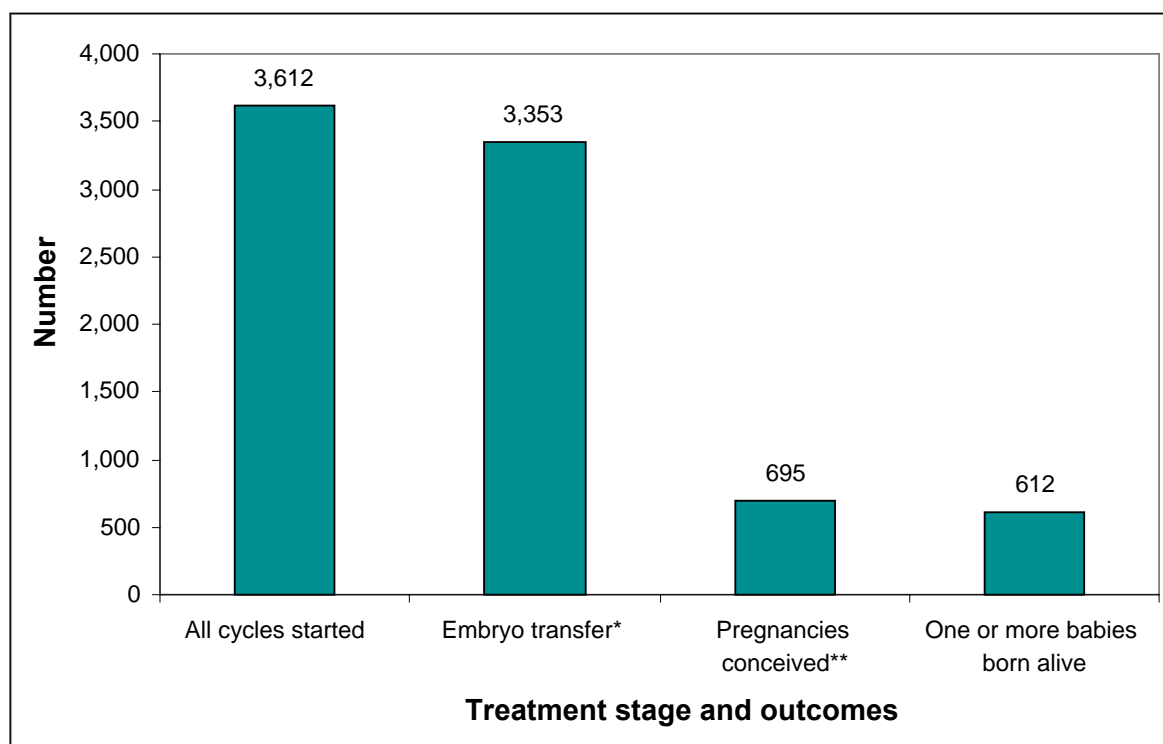
▶ How are treatment results calculated?

- The results of IVF and ICSI treatment (both fresh and frozen) can be calculated using treatment cycles as the starting point. This gives figures which are useful to help understand what the chances of pregnancy and of having a baby are when a woman starts treatment.
- However, not all treatment cycles which are started reach the embryo transfer stage. The results of treatment can also be calculated from the point that an embryo transfer occurs. This is useful to understand what the chances of pregnancy and of having a baby are once an embryo transfer has taken place.
- In this report we show:
 - Treatment outcomes from the point of view of starting a treatment cycle and these results are given per 100 treatment cycles
and
 - Treatment outcomes from the point at which the embryo transfer has been carried out and these results are given as per 100 embryo transfers.

▶ 1. How many women were treated with frozen embryo ICSI and what were the outcomes? [5.1-5.8]

- In 2006 2,074 women started 3,612 cycles of ICSI where the intention was to carry out a frozen embryo transfer cycle using embryos created using ICSI from the woman's own eggs and the treatment was undertaken to try to conceive straight away.
- For a variety of reasons not all cycles of treatment which are started reach the embryo transfer stage.
- The majority of cycles reaching the embryo transfer stage do not result in the conception of a pregnancy (Figure 1).

Figure 1: Outcome of frozen embryo ICSI treatment cycles⁺ started in 2006 [5.1]



+ Frozen ICSI cycles where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

* Cycles in which an embryo transfer took place

** Ultrasound confirmed pregnancies

Results relating to treatment cycles:

- Of the 3,612 cycles started :
 - 3,353 cycles resulted in a frozen embryo transfer - 93 in every 100 treatment cycles started reached the frozen embryo transfer stage (93%).
 - 695 cycles resulted in a pregnancy (confirmed on ultrasound) -19 in every 100 cycles started resulted in an ultrasound confirmed pregnancy (19%) and
 - 612 cycles led to birth to one or more babies - 17 in 100 cycles started resulted in one or more live births (17%).

Results relating to frozen embryo transfers:

- There were 3,353 cycles of frozen embryo ICSI using women's own eggs which reached the embryo transfer stage:
 - 695 cycles resulted in a pregnancy confirmed by ultrasound - 21 in every 100 frozen embryo transfer procedures resulted in an ultrasound confirmed pregnancy (21%) and
 - 612 cycles led to the birth of one or more babies - 18 in every 100 frozen embryo transfers resulted in one or more live births (18%).

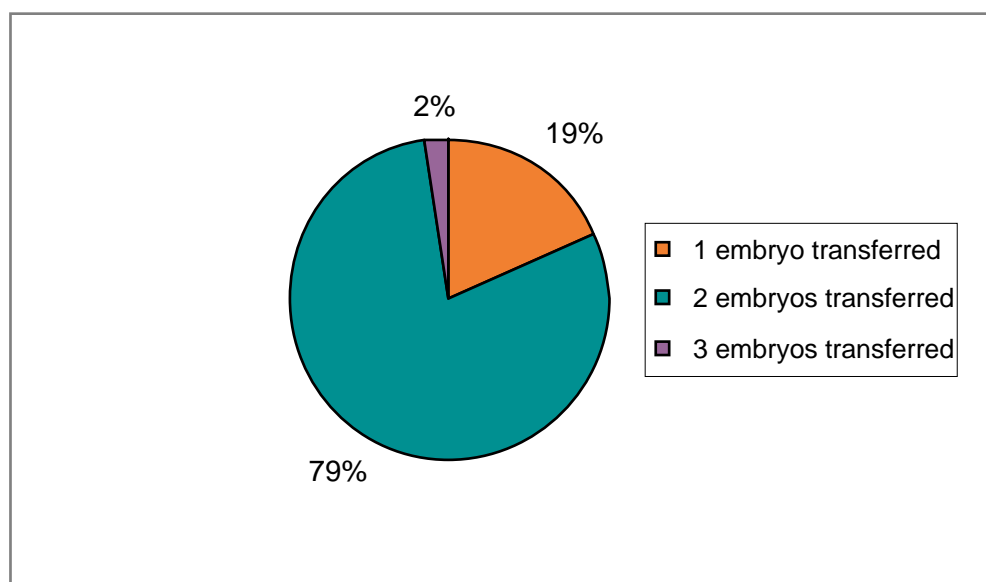
▶ **2. Why were treatment cycles cancelled? [5.9]**

- For a variety of reasons not all cycles of frozen embryo transfer treatment reach the embryo transfer stage.
- The main reason why frozen embryo transfer cycles of IVF were cancelled is that when the frozen embryos were taken out of storage they were damaged during the thawing process and were not of sufficiently good quality to be transferred.

▶ 3. How many embryos were transferred in each treatment cycle? [5.23]

- Overall in 2006 the majority of ICSI frozen embryo transfers involved the transfer of two embryos (Figure 2):
 - 19 in every 100 treatment cycles (19%) reaching the embryo transfer stage involved a single embryo transfer (1ET).
 - 79 in every 100 treatment cycles (79%) reaching the embryo transfer stage involved a double embryo transfer (2ET) and
 - 2 in every 100 treatment cycles (2%) reaching embryo transfer involved the transfer of three embryos (3ET).

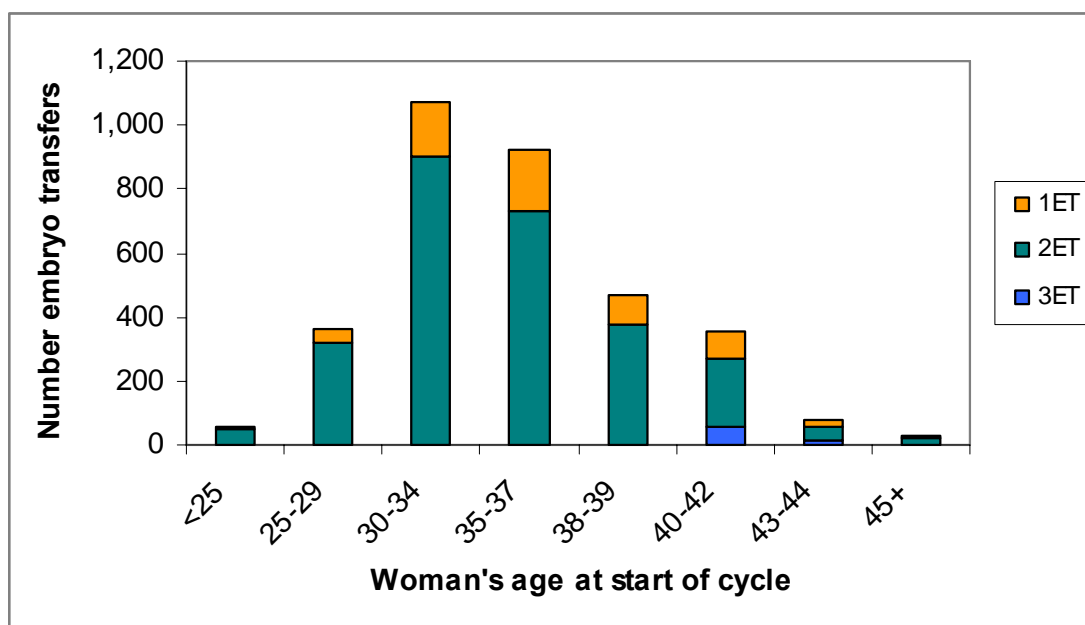
Figure 2: Number of embryos transferred in each cycle of treatment [5.24]



- Transferring a single embryo reduces the risk of a multiple pregnancy, although a small number of twins can result from spontaneous splitting of a single embryo resulting in identical twins.
- Single embryo transfer can be 'elective', where women choose to transfer just one embryo in order to minimise the risk of a multiple pregnancy, even if there is more than one embryo available. Single embryo transfer can also be 'non-elective', where women only have one embryo available to transfer.
- From the information collected on the HFEA register during 2006 it is not possible to separate elective single embryo transfer from single embryo transfer where only one embryo was available; although this will be possible in the future.
- Important: It is likely that the small increase in the proportion of single embryo transfers seen in older women in 2006 is due to most women only having one frozen embryo available for transfer. This will place these women in a poorer prognosis group, with a lower chance of conception than women who are younger and/or have more embryos available for transfer.

- The data from 2006 does not reflect current practice. Since January 2009 clinics are required by the HFEA to have a strategy setting out how they will minimise the risk of multiple births. Clinics are increasingly encouraging women with the greatest chance of conception (for example, women aged 37 years and younger who have several good quality embryos available for transfer) to have elective single embryo transfer to try and minimise the risk of multiple births.
- The proportion of single frozen embryo transfer increased with increasing age of the women being treated (Figure 3):
 - About 18 in every 100 women under the age of 40 yrs had a single embryo transfer (18%) whereas
 - 24 in 100 women 40 yrs and over had a single embryo transfer (24%).
- Transfer of three embryos was performed in 15 of every 100 transfers carried out to treat women aged 40 years and older.
- A total of 5 cycles involving transfer of three embryos were carried out in women under the age of 40.

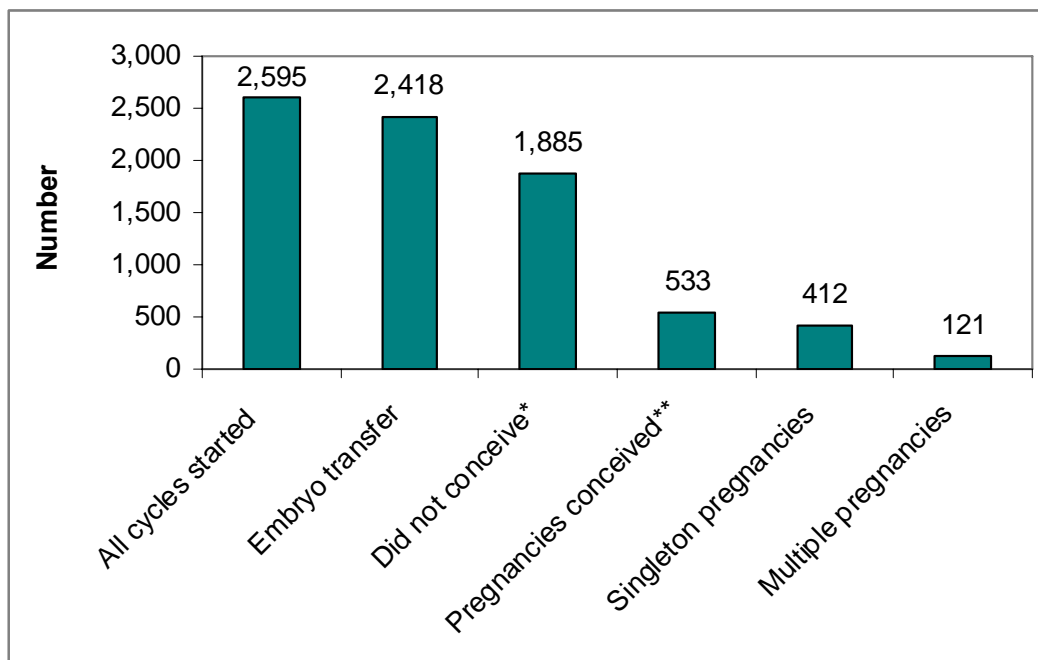
Figure 3: Number of embryos transferred by the woman's age [5.23]



► 4a. How does the woman's age affect the chances of pregnancy following ICSI? [5.18]

- The outcomes following frozen embryo ICSI are affected by the age of the women when she undergoes treatment. The results of treatment are shown for women in two different age groups (Figures 4 and 5).

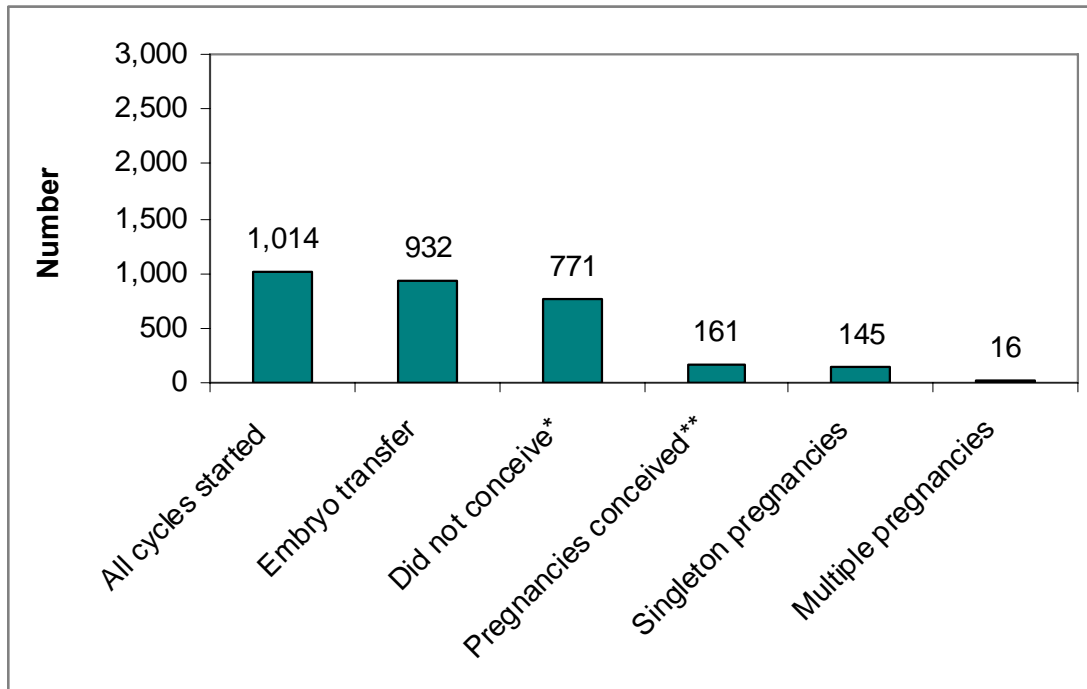
Figure 4: Treatment outcomes for women aged 37 years or younger when they started treatment in 2006 [5.18a]



* Did not conceive a pregnancy confirmed on ultrasound, although a pregnancy test may have been positive

**Ultrasound confirmed pregnancies

Figure 5: Treatment outcomes for women aged 38 years and older when they started treatment in 2006 [5.18b]



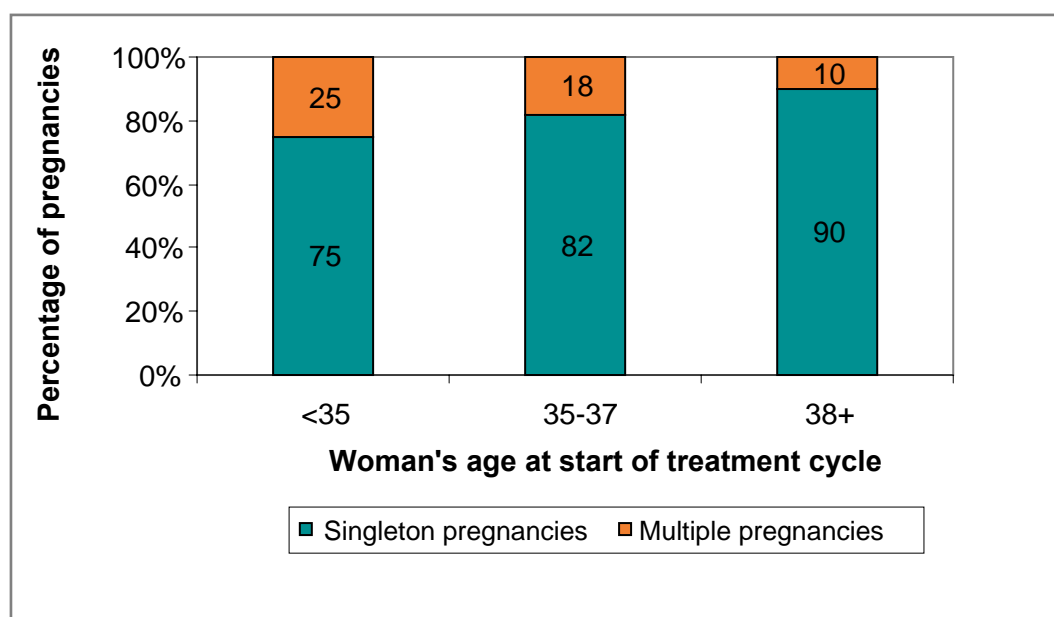
* Did not conceive a pregnancy confirmed on ultrasound, although a pregnancy test may have been positive

**Ultrasound confirmed pregnancies

► 4b. Which women are most likely to conceive a multiple pregnancy? [5.21]

- The chance of conceiving a multiple pregnancy is affected by the age of the women when she starts treatment and the number of embryos transferred.
- Figure 6 shows the split between singleton and multiple pregnancies by the woman's age at the start of her treatment for women who became pregnant following frozen embryo ICSI treatment starting in 2006.

Figure 6: Split between singleton and multiple pregnancies by the women's age at the start of frozen embryo ICSI⁺ treatment, cycles started in 2006 [5.21]



+ Frozen ICSI cycles where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

The following figures only relate to the women who became pregnant following frozen embryo ICSI:

- Three-quarters of the women who were younger than 35 years old and conceived following frozen embryo ICSI were pregnant with a singleton pregnancy;
 - 75 in every 100 women less than 35 years old who conceived was pregnant with a singleton (75%) and 25 in every 100 conceived a multiple pregnancy (25%).
- The chances of conceiving following frozen embryo ICSI decline as the age of the woman increases. At the same time, for those who do conceive, the chance of conceiving a singleton rather than a multiple pregnancy increases as women get older.
- 90 in 100 women who were 38 years or older when they conceived were pregnant with a singleton (90%) and 10 in 100 conceived a multiple pregnancy (10%).

- ▶ **5a. What can happen to a pregnancy conceived by frozen embryo ICSI – will a baby always be born? [5.10-5.17, 5.19]**
- Overall 695 women conceived a pregnancy following frozen embryo ICSI treatment which started in 2006:
 - 612 of these pregnancies resulted in the birth of at least one baby (live birth – see glossary);
 - 88 in every 100 women who conceived a frozen embryo ICSI pregnancy gave birth to at least one baby (88%).
 - 558 of these women were pregnant with a single pregnancy:
 - 418 of these singleton pregnancies resulted in the birth of a baby (live births);
 - 86 in every 100 women who conceived a frozen embryo ICSI singleton pregnancy gave birth to a baby (86%)
and
 - 14 in every 100 women who conceived a frozen embryo ICSI singleton pregnancy had a miscarriage, an ectopic pregnancy, a termination or the baby was stillborn (14%).
 - 137 of these women were pregnant with a multiple pregnancy:
 - 123 of the multiple pregnancies resulted in the birth of all the babies (all the babies were born alive; that is both twins or all three triplets);
 - 90 in every 100 women who conceived a frozen embryo ICSI multiple pregnancy gave birth to all the babies (90%).
 - 11 of the multiple pregnancies resulted in the birth of at least one baby, that is one of the twins and one or two of the triplets;
 - 8 in every 100 women who conceived a frozen embryo ICSI multiple pregnancy gave birth to at least one baby but fewer babies than she was originally pregnant with (8%).
 - The multiple pregnancies that resulted in miscarriage, an ectopic pregnancy, a termination, or a stillbirth and none of the babies were born alive, have not been presented here because the numbers involved are too small.

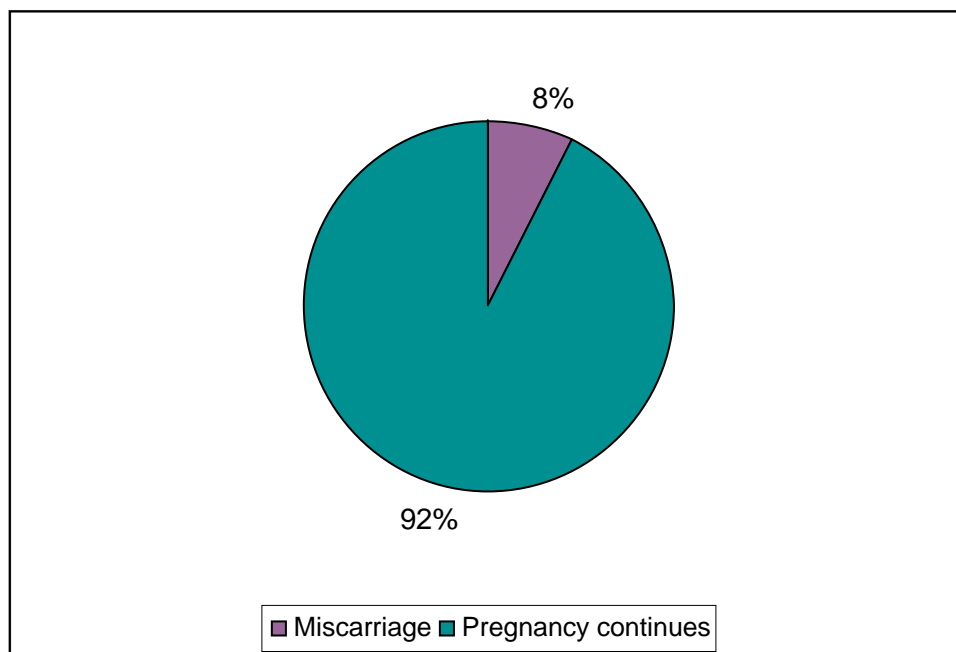
► 5b. What is the risk of miscarriage following frozen embryo ICSI? [5.20]

- A total of 695 women became pregnant following frozen embryo ICSI treatment which started in 2006; this includes only those pregnancies confirmed by an ultrasound scan.
- A total of 74 of these women miscarried the pregnancy - 11 in every 100 women with an ultrasound confirmed pregnancies (11%) experienced a miscarriage, usually in early pregnancy.

Risk of miscarriage by the woman's age

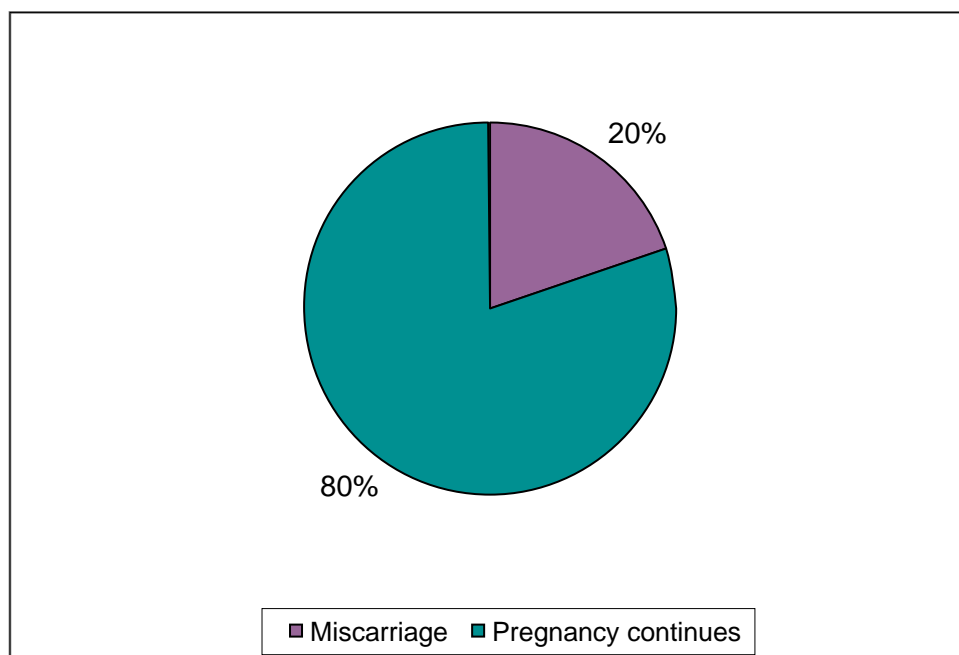
- Women who were older when they were treated were more likely to miscarry than younger women (Figures 7 and 8):
 - Eight in every 100 women who were 37 years old or younger when they started treatment (8%) miscarried the pregnancy whereas
 - 20 in every 100 women who were 38 years or older when treated (20%) had a miscarriage.

Figure 7: Risk of miscarriage for pregnancies* conceived by women aged 37 years and younger [5.20a]



*Ultrasound confirmed pregnancies, excludes those pregnancies with only a positive blood test and not confirmed on ultrasound

Figure 8: Risk of miscarriage for pregnancies* conceived by women aged 38 years and older [5.20b]



*Ultrasound confirmed pregnancies, excludes those pregnancies with only a positive blood test and not confirmed on ultrasound

Risk of miscarriage in singleton and multiple pregnancies

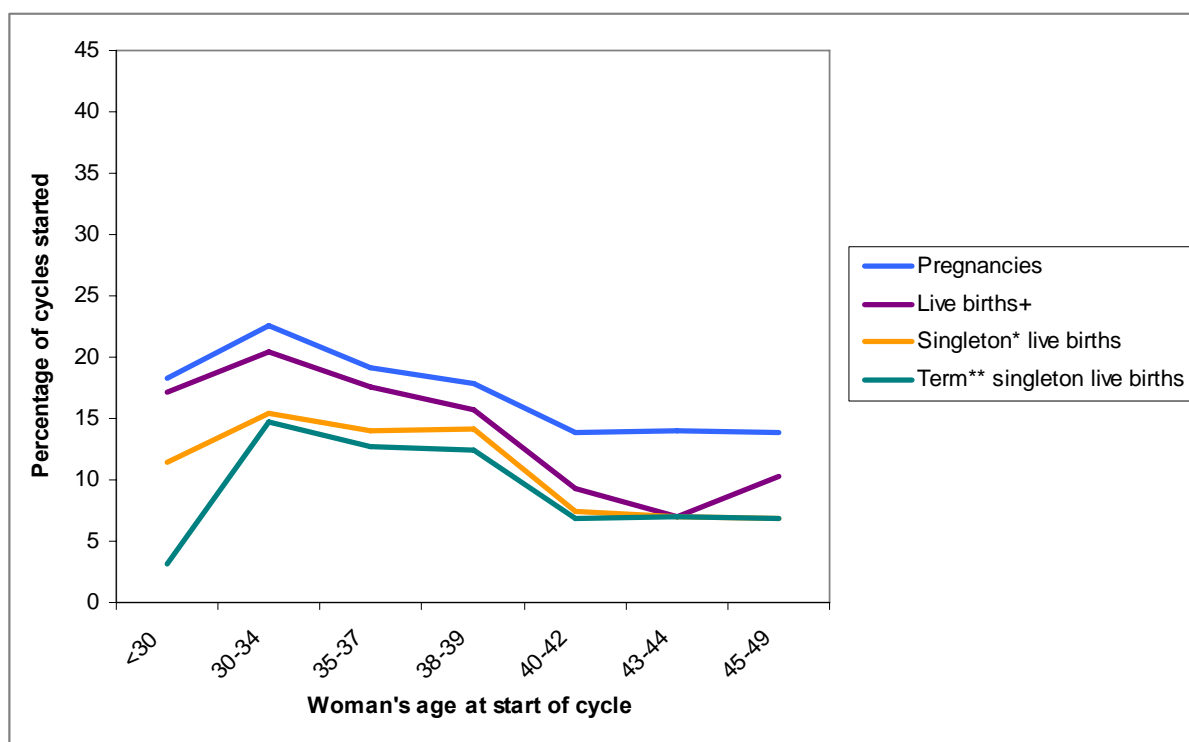
- A total of 695 women became pregnant following frozen embryo ICSI treatment which started in 2006; this includes only those pregnancies confirmed by an ultrasound scan.
- Of the 695 women:
 - 558 women were pregnant with a single fetus (80%) and
 - 135 women were pregnant with a multiple pregnancy (20%).
- It is important to know that even though a pregnancy may be conceived as a multiple pregnancy, sometimes one of the fetuses miscarries (and this may or may not be accompanied by bleeding), resulting in the birth of only one baby from a pregnancy that started as a multiple pregnancy.
- The risk of miscarriage was different for women who were carrying a singleton pregnancy compared with a multiple pregnancy:
 - 14 in every 100 women pregnant with a singleton had a miscarriage (14%) whereas
 - 2 in every 100 women with a multiple pregnancy experienced a miscarriage and lost the pregnancy completely (2%). However, a further 11 in every 100 women (11%) with a multiple pregnancy experienced the loss of one of the fetuses and delivered fewer babies than she was originally pregnant with, for example a woman pregnant with twins delivered a single live baby.

▶ 6. How does a woman's age affect birth outcomes following ICSI?
[5.10-5.16]

Results starting from the point a treatment cycle begins:

- The effects of the woman's age on the chances of becoming pregnant and delivering a baby are shown in Figure 9 as a proportion of the treatment cycles started in 2006.

Figure 9: Pregnancy and birth outcomes for treatment cycles started in 2006
[5.10-5.16a]



+ Live births - pregnancies resulting in the delivery of one or more live births

*Singleton live births - live births resulting from singleton pregnancies, excludes multiple pregnancies which result in just one live birth

** Term – refers to a live birth born following a full-term pregnancy at 37 or more weeks gestation of pregnancy

- The results for women under 40 years of age are broadly similar and so are presented for all women under this age combined. Similarly the results for women 40 years and older are much the same and are also combined in the presentation below.

- Women who were **39 years old or younger** when they started treatment had 3,104 cycles of treatment between them which resulted in:
 - 624 ultrasound confirmed pregnancies;
 - 20 in every 100 treatment cycles started (20%) resulted in a pregnancy confirmed on an ultrasound scan.
 - 566 pregnancies which resulted in the birth of one or more babies (live births of which some were singletons, twins or triplets);
 - 18 in every 100 treatment cycles started (18%) resulted in the birth of at least one baby.
 - 440 singleton pregnancies which resulted in a live birth;
 - 14 in every 100 treatment cycles started (14%) led to a singleton pregnancy which resulted in the birth of a baby.
 - 372 singleton pregnancies which resulted in the birth of a baby (live birth) following a full-term pregnancy;
 - 12 in every 100 treatment cycles started (12%) resulted in a live birth born at term.

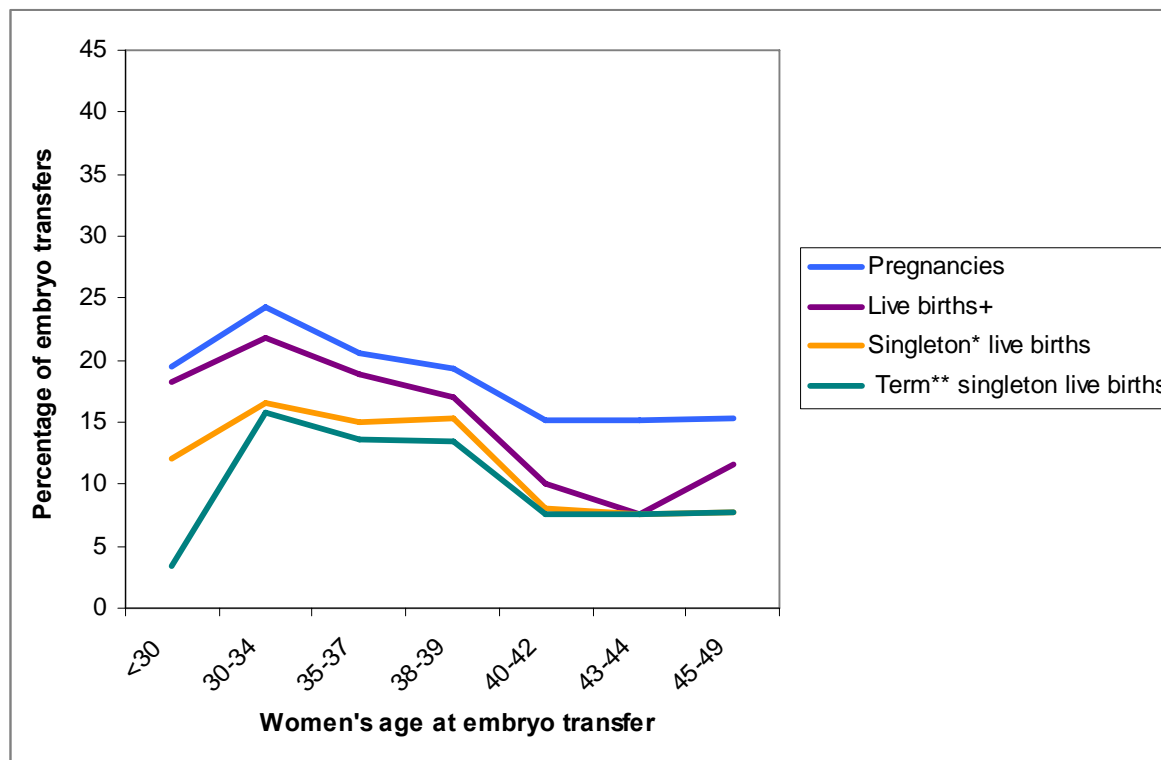
- Women who were **40 years or older** when they started treatment received 505 cycles of treatment between them which resulted in:
 - 70 ultrasound confirmed pregnancies;
 - 14 in every 100 treatment cycles started (14%) resulted in a pregnancy confirmed on an ultrasound scan.
 - 45 pregnancies which resulted in the birth of one or more babies (live births of which some were singletons, twins or triplets);
 - 9 in every 100 treatment cycles started (9%) resulted in the birth of at least one baby.
 - 37 singleton pregnancies which resulted in a live birth;
 - 7 in every 100 treatment cycles started (7%) led to a singleton pregnancy which resulted in the birth of a baby.
 - 35 singleton pregnancies which resulted in the birth of a baby (live birth) following a full-term pregnancy;
 - 7 in every 100 treatment cycles started (7%) resulted in a live birth born at term.

Results starting from the point of embryo transfer:

- For a variety of reasons (see section 2) not all treatment cycles which are begun reach the stage of embryo transfer. The results of treatment from the point that an embryo transfer has been carried out are shown below. These figures are useful to help understand what the chances of pregnancy and of having a baby are once an embryo transfer has taken place.

- The effects of the woman's age on the chances of becoming pregnant and delivering a baby are shown from the point of embryo transfer as a proportion of the embryo transfers for treatment started in 2006 (Figure 10).

Figure 10: Pregnancy and birth outcomes for frozen embryo transfers as part of treatment started 2006 [5.10-5.16b]



+ Live births - pregnancies resulting in the delivery of one or more live births

*Singleton live births - live births resulting from singleton pregnancies, excludes multiple pregnancies which result in just one live birth

** Term – refers to a live birth born following a full-term pregnancy at 37 or more weeks gestation of pregnancy

- Women who were **39 years old or younger** when they were treated had 2,887 frozen ICSI embryo transfers between them which resulted in:
 - 624 ultrasound confirmed pregnancies;
 - 22 in every 100 embryo transfers (22%) resulted in a pregnancy confirmed on an ultrasound scan.
 - 566 pregnancies which resulted in the birth of one or more babies (live births of which some were singletons, twins or triplets);
 - 20 in every 100 embryo transfers (20%) resulted in the birth of at least one baby.
 - 440 singleton pregnancies which resulted in a live birth;
 - 15 in every 100 (15%) embryo transfers led to a singleton pregnancy which resulted in the birth of a baby.
 - 372 singleton pregnancies which resulted in the birth of a baby (live birth) following a full-term pregnancy;
 - 13 in every 100 embryo transfers (13%) resulted in a live birth born at term.

- Women who were **aged 40 years and older** when they started treatment had 463 ICSI frozen embryo transfers between them which resulted in:
 - 70 ultrasound confirmed pregnancies;
 - 15 in every 100 embryo transfers (15%) resulted in a pregnancy confirmed on an ultrasound scan.
 - 45 pregnancies which resulted in the birth of one or more babies (live births of which some were singletons, twins or triplets);
 - 10 in every 100 embryo transfers (10%) resulted in the birth of at least one baby.
 - 37 singleton pregnancies which resulted in a live birth;
 - 8 in every 100 embryo transfers (8%) led to a singleton pregnancy which resulted in the birth of a baby.
 - 35 singleton pregnancies which resulted in the birth of a baby (live birth) following a full-term pregnancy;
 - 8 in every 100 embryo transfers (8%) resulted in a live birth born at term.

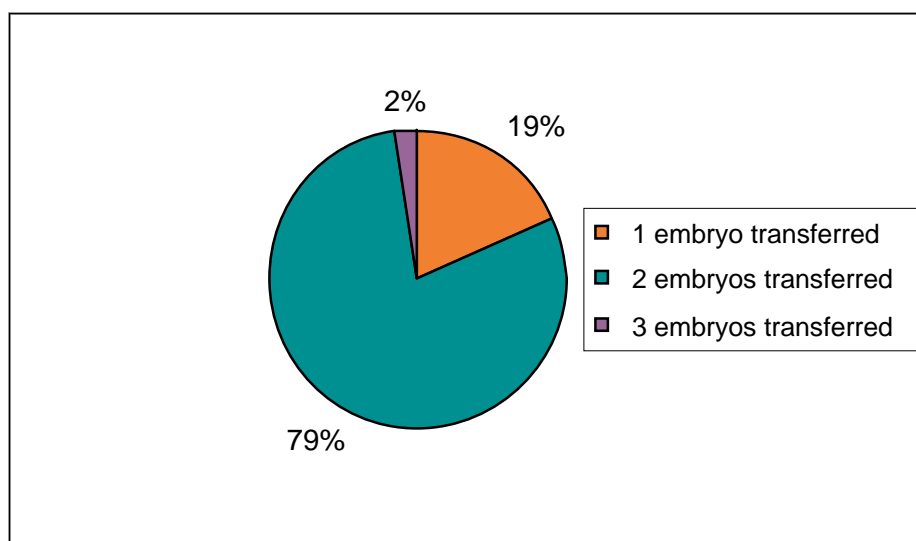
▶ **7. Are the outcomes of treatment affected by whether the sperm used comes from the woman's partner or a donor? [5.43]**

- In 2006 only 45 cycles of frozen embryo transfer treatment followed ICSI which had involved the use of donor sperm. This is not surprising since ICSI was developed as a treatment of male factor infertility which enables, in most cases, the woman's partner's sperm to be used in treatment.
- Because of the very small numbers involved it is not possible to present the treatment outcomes when donor sperm has been used in ICSI frozen embryo transfer. Since the vast majority of cycles involve the use of partner sperm the results overall give a close indication of the outcomes following frozen ICSI involving partner sperm.

► 8. What is the effect of the number of embryos transferred on the number of babies born? [5.24]

- 3,353 cycles of frozen embryo ICSI treatment which started in 2006 reached the embryo transfer stage, of these (Figure 11):
 - 19% involved the transfer of a single embryo (SET).
 - 79% involved the transfer of two embryos (DET) – a double embryo transfer.
 - 2% involved the transfer of three embryos.

Figure 11: Number of embryos transferred in each cycle of treatment [5.24]

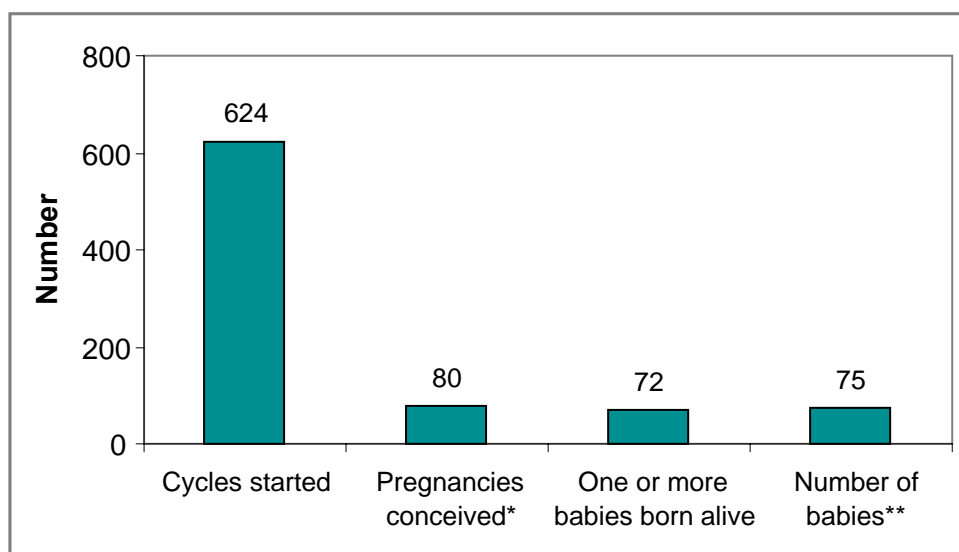


- The 624 single embryos transfers (SET) led to 80 pregnancies and 72 women gave birth to at least one baby (live birth) and in total 75 babies were born (live births) (Figure 12):
 - 87 in every 100 single embryo transfer procedures did not lead to an ultrasound confirmed pregnancy (87%)
whereas
 - 13 in every 100 single embryo transfer led to a pregnancy (13%).
 - 12 in every 100 women who had a single embryo transfer gave birth to at least one baby (12%).
 - a small number of these women gave birth to twins which would have resulted from the spontaneous splitting of the single embryo transferred resulting in identical twins.
- Single embryo transfer can be 'elective', where women choose to transfer just one embryo in order to minimise the risk of a multiple pregnancy, even if there is more than one embryo available. Single embryo transfer can also be 'non-elective', where women only have one embryo available to transfer.
- From the information collected on the HFEA register during 2006 it is not possible to separate elective single embryo transfer from single embryo transfer where only one embryo was available; although this will be possible in the future.
- Important: It is likely that the majority of women who had single embryo transfer in 2006 only had one frozen embryo available for transfer. This will place these

women in a poorer prognosis group, with a lower chance of conception than women who are younger and/or have more embryos available for transfer.

- The data from 2006 does not reflect current practice. Since January 2009 clinics are required by the HFEA to have a strategy setting out how they will minimise the risk of multiple births. Clinics are increasingly encouraging women with the greatest chance of conception (for example, women aged 37 years and younger who have several good quality embryos available for transfer) to have elective single embryo transfer to try and minimise the risk of multiple births.

Figure 12: Outcome of frozen embryo ICSI treatment cycles⁺ involving single embryo transfer (SET) started in 2006 [5.24b]



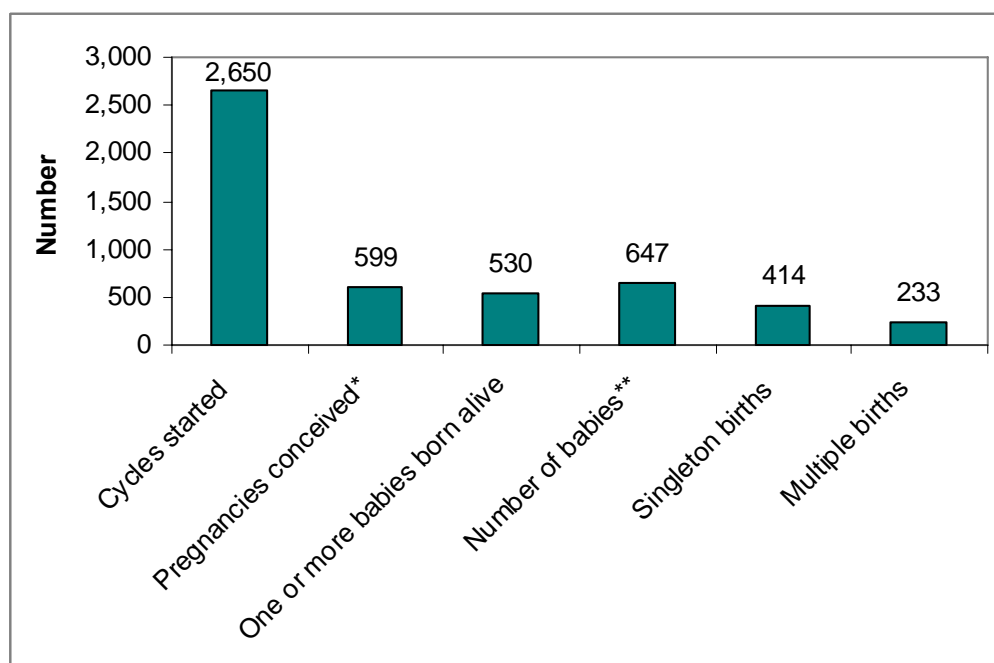
+ Frozen ICSI cycles where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

*Ultrasound confirmed pregnancies

** The total number of babies born alive – which include a small number of multiples

- 2,650 double embryo transfers (DET) led to 599 pregnancies and 530 women gave birth to at least one baby. In total 647 babies were born (live births) and 233 of them were multiple births (Figure 13):
 - 77 in every 100 double embryo transfer procedures did not lead to an ultrasound confirmed pregnancy (77%) whereas
 - 23 in every 100 double embryo transfers led to a pregnancy (23%).
 - 20 in every 100 women who had a double embryo transfer gave birth to at least one baby (20%).
 - 22 in every 100 of the pregnancies following double embryo transfer were multiple pregnancies (22%).
 - 36 in every 100 of the babies born following double embryo transfer were born as one of a multiple birth (36%).

Figure 13: Outcome of frozen embryo ICSI treatment cycles⁺ involving double embryo transfer (DET) started in 2006 [5.24c]



+ Frozen ICSI cycles where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

*Ultrasound confirmed pregnancies

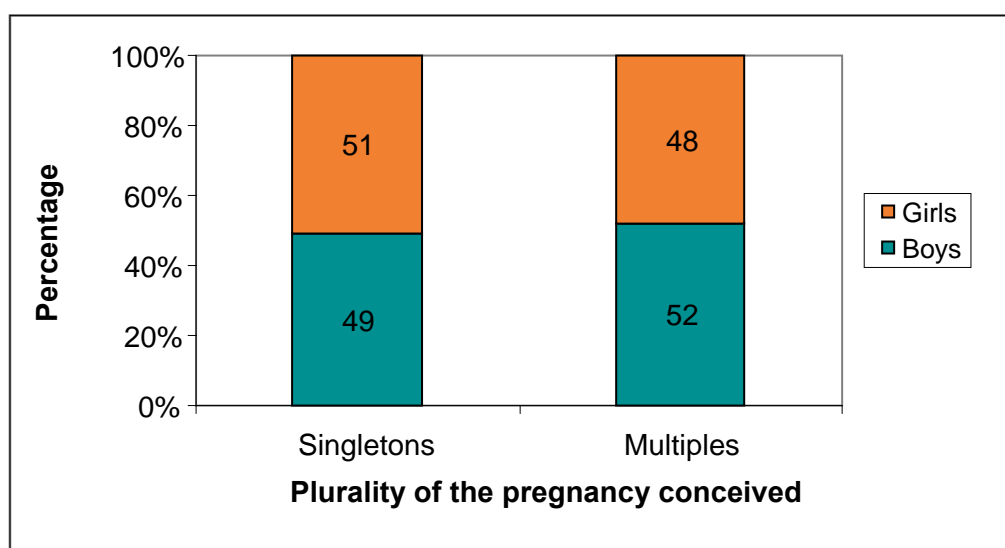
** The total number of babies born alive

- Only 76 cycles involving three embryo transfer were performed. The number of pregnancies that resulted have not been presented here because the numbers involved are too small.

► 9. How many boys and girls are born following frozen embryo ICSI? [6.51]

- Following frozen embryo ICSI treatment which started in 2006 736 babies were born alive and of these half (50%) were boys and half (50%) were girls.
- About two-thirds of the babies were born to women carrying a singleton pregnancy and of these 234 (49%) were boys and 244 (51%) were girls (Figure 14).
- For the babies born from a multiple pregnancy the split between boys and girls was 52% boys and 48% girls with 134 boys and 124 girls (Figure 14).

Figure 14: Sex of the babies* born following frozen embryo ICSI⁺ started in 2006 [5.51]



+ Frozen ICSI cycles where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

*Includes only babies born alive

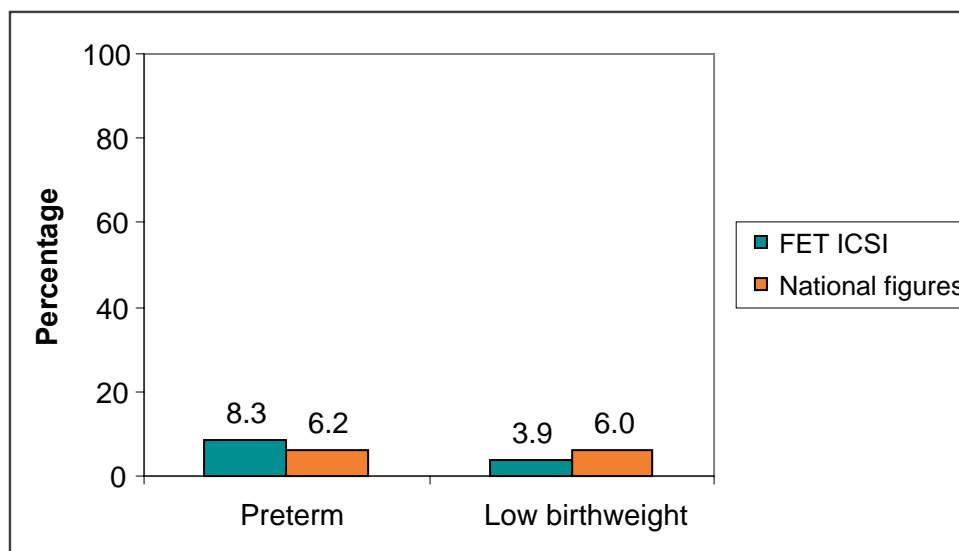
▶ 10a. How did babies born following frozen embryo ICSI in 2006 fare?
[5.26-5.29]

- The majority of babies born following frozen embryo ICSI conception are born following a full-term pregnancy (37 weeks gestation or greater) and with a normal birthweight (greater than 2.5Kg or 5½lbs):
 - 80 in every 100 woman giving birth following a frozen embryo ICSI conception in 2006 delivered after a full term pregnancy (80%)
and
 - 84 in every 100 babies were born with a normal birthweight (84%).
- Babies who are born preterm (before the pregnancy has reached full-term which is 37 or greater weeks gestation) and babies who are born with a low birthweight (less than 2.5kg or about 5½lbs) have an increased chance of developing problems during the first few days and weeks after birth. These problems include difficulties with breathing and feeding, having an abnormal level of consciousness and an increased risk of infection. Because multiples are more likely to be born preterm and with a low birthweight they have an increased chance of experiencing these types of problems compared with singletons. Preterm and low birthweight babies also tend to have a small, but increased chance, of developing problems in the long-term such as cerebral palsy.
- Importantly, there is a large but not complete overlap between preterm birth and low birthweight; some babies who are born at term are low birthweight and some babies born preterm have a normal birthweight.
- Using information collected on the HFEA register it is possible to look at the chances of prematurity and low birthweight for babies born following IVF and ICSI and to compare these to national figures collected by the Office for National Statistics on all babies born in England and Wales; the results are similar for Scotland and Northern Ireland.
- As the results shown below indicate frozen embryo ICSI multiples tend to have slightly better outcomes in terms of prematurity compared with the national figures overall. This is thought to be mainly due to the fact that very few ICSI multiple babies are identical. Identical twins who share a single placenta and amniotic sac tend to have poorer outcomes than non-identical twins who have their own placenta and amniotic sac. Most ICSI twins result from the transfer of two embryos with less than 5% overall due to a single embryo dividing into two. Whereas about a third of spontaneously conceived twins in the UK are identical and result from the division of a single embryo.

► 10b. Chances of being born preterm (<37 weeks gestation): [5.26-5.27]

- To compare the preterm birth rate with national figures for England and Wales, those babies born as singletons from multiple pregnancies are included as singleton births.
- 8.3% of singleton live births following frozen embryo ICSI conception in 2006 were born preterm compared with 6.2% of all live singleton births in England and Wales (Moser et al, 2007)¹ (Figure 15).
- 41% of multiple live births following frozen embryo ICSI conception in 2006 were born preterm compared with 53% of all live multiple births in England and Wales (Moser et al, 2007)² (Figure 16).

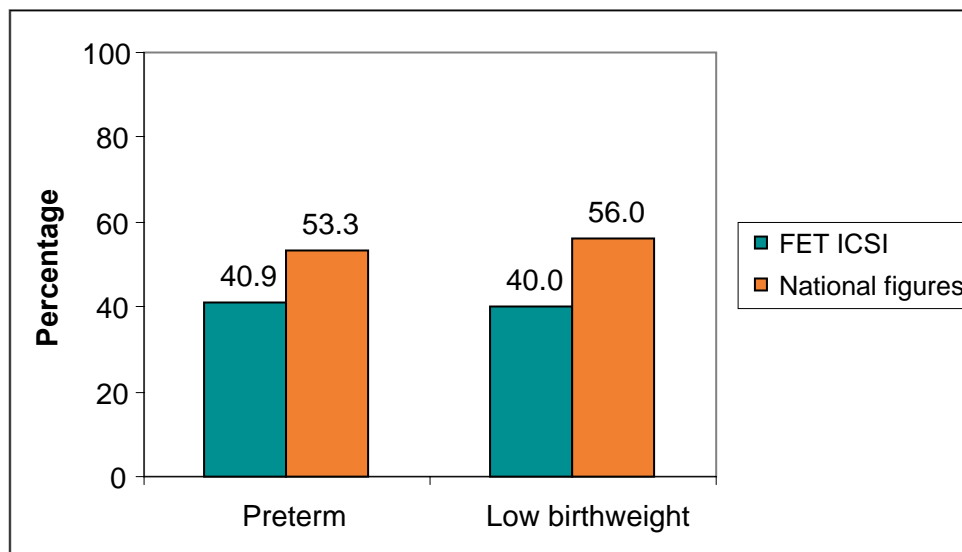
Figure 15: Preterm and low birthweight rate for singleton births comparing frozen embryo ICSI⁺ conceptions and England & Wales rates [5.28a]



+ Frozen ICSI cycles (FET) where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy
 Low birthweight <2.5kg or <5½lbs; preterm <37 weeks gestation

¹ Moser K, Macfarlane A, Huang Chow Y, Hilder L, Dattani N. Introducing new data on gestation-specific infant mortality among babies born in 2005 in England and Wales. Health Statistics Quarterly 2007; 35: 13-27.

Figure 16: Preterm and low birthweight rate for multiple births comparing frozen embryo ICSI⁺ conceptions and England & Wales rates [5.28b]



+ Frozen ICSI cycles (FET) where women used their own eggs and treatment was undertaken to try to conceive immediately; excludes treatment for storage, donation and surrogacy

*Low birthweight <2.5kg or <5½lbs; preterm <37 weeks gestation

► 10c. Chances of being born low birthweight (<2.5kg or 5½lbs): [5.28 & 5.29]

- To compare the low birthweight (<2.5kg or 5½lbs) rate with national figures for England and Wales, those babies born as singletons from multiple pregnancies are included as singleton births.
- 3.9% of singleton live births born following frozen embryo ICSI conception in 2006 were born with a low birthweight compared with 6.0% of all live singleton births in England and Wales² (Figure 15).
- 40% of multiple live births born following frozen embryo ICSI conception in 2006 were born with a low birthweight compared with 56% of all live multiple births in England and Wales³ (Figure 16).

² Office for National Statistics. Mortality statistics. Childhood, infant and perinatal. Review of the National Statistician on deaths in England and Wales, 2007. Series DH3 No. 40. Surrey: Office for National Statistics, 2009. ISSN 1469-2783. (Table 26)

Appendix D

▶ How we gathered the data

- Clinics are required by law to provide information to the HFEA Register about all licensed fertility treatments they carry out. The Register started operating in August 1991 and is a rich source of information about fertility treatment, its outcomes and the factors that contribute to the birth of a baby following treatment.

▶ Understanding the results presented

- This analysis is of just treatment cycles involving frozen embryo transfers using embryos created following ICSI using women's own eggs in treatment cycles started at some stage during 2006. While the outcomes of some treatment started in 2006 may not be known until 2007 these treatment outcomes are nevertheless included in this analysis.
- Clinics are not always told by every patient the outcome of each treatment cycle, especially if the woman has travelled to the UK for treatment from abroad. A small number of pregnancy outcomes are therefore not included in the Register. However, since most of the pregnancy outcomes are known, it is likely that any underestimate in the outcome rates is very small.
- The information that the HFEA publishes is a snapshot of data provided to us by licensed clinics at a particular time. This information may be subject to change as individual centres notify us of amendments. Before publication, we perform a preliminary checking process on the data, and ask the clinic to confirm the accuracy, for which they remain responsible.