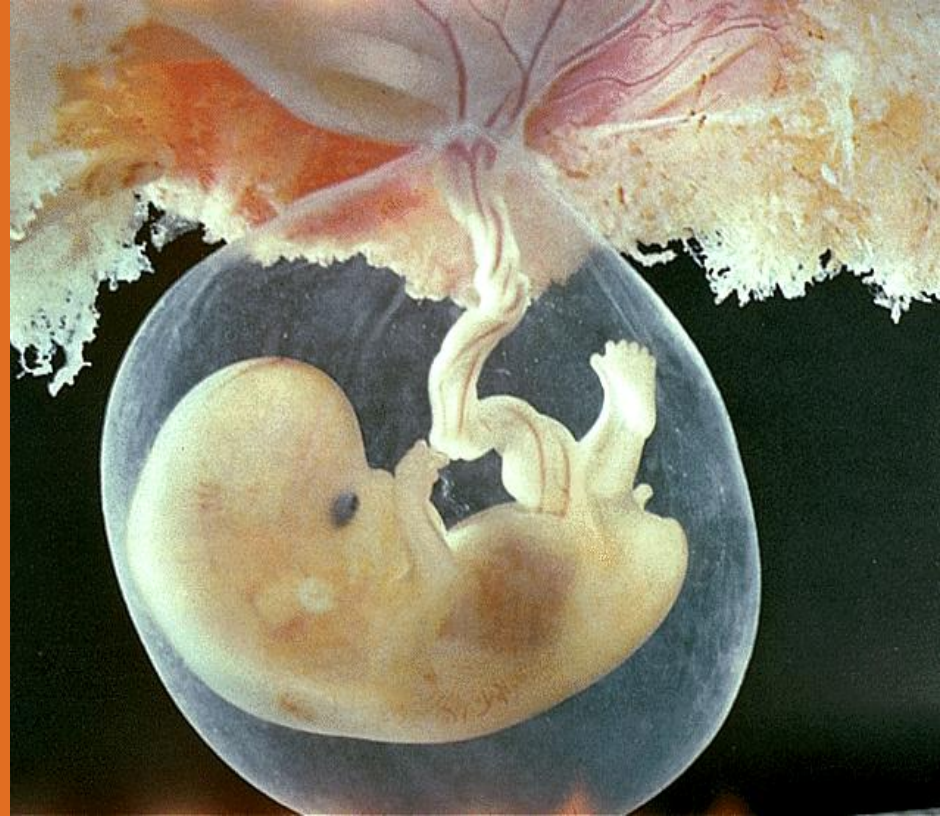


**Canadian Assisted  
Reproductive  
Technologies Register  
Plus  
(CARTR Plus)**



**Canadian Fertility and Andrology Society  
61<sup>st</sup> Annual Meeting – Halifax  
October 1–4, 2015**

# CARTR Plus presentation outline

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- All ART treatment cycles 2011–2014
- Birth outcomes – 2013
- All ART treatment cycles – 2014
- Primary transfer rate
- Cumulative pregnancy rate
- Key messages

# List of abbreviations

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<b>CS</b>	<b>Cycle start</b>
<b>RET</b>	<b>Oocyte retrieval</b>
<b>ET</b>	<b>Embryo transfer</b>
<b>IVF</b>	<b>In vitro fertilization</b>
<b>FET</b>	<b>Frozen embryo transfer</b>
<b>PGS/PGD</b>	<b>Preimplantation genetic screening/diagnosis</b>
<b>IVM</b>	<b>In vitro maturation</b>
<b>OHSS</b>	<b>Ovarian hyperstimulation syndrome</b>
<b>eSET</b>	<b>Elective single embryo transfer</b>
<b>neSET</b>	<b>Non-elective single embryo transfer</b>
<b>eDET</b>	<b>Elective double embryo transfer</b>
<b>neDET</b>	<b>Non-elective double embryo transfer</b>

# Disclaimer

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- This report is based on data submitted by assisted reproductive technology clinics from across Canada to the CARTR Plus database. Although significant effort has been made to ensure the accuracy of the information presented in this report, neither the authors nor BORN Ontario nor any other parties make any representation or warranties as to the accuracy, reliability or completeness of the information contained herein.
- Permission is granted for the reproduction of these materials solely for non-commercial and educational purposes.

## Suggested citations

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***Canadian Assisted Reproductive Technologies Registry (CARTR) Plus. Final treatment cycle and pregnancy outcome data for 2013. Better Outcomes Registry & Network Ontario. Ottawa ON, October 2015.***

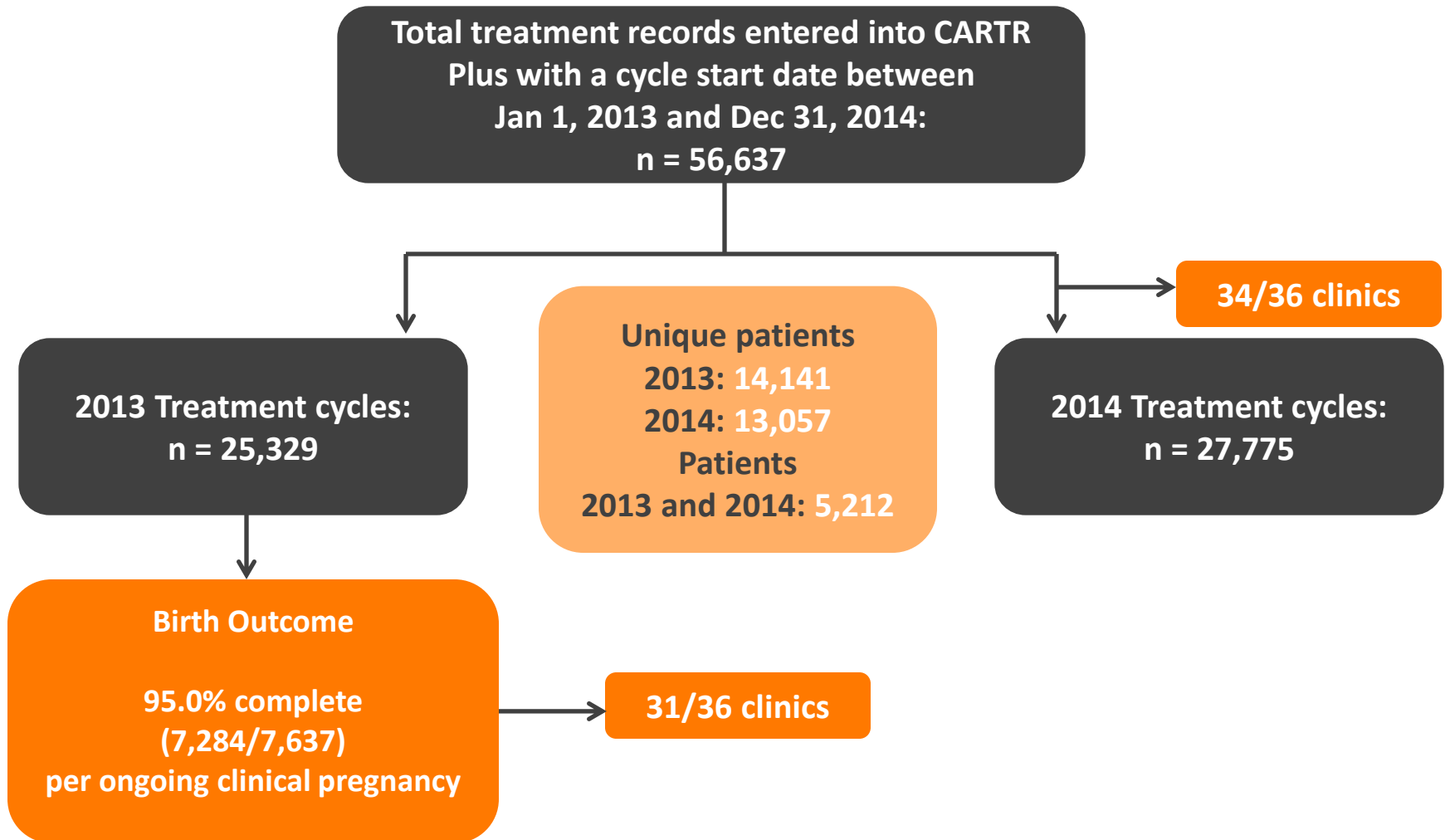
***Canadian Assisted Reproductive Technologies Registry (CARTR) Plus. Preliminary treatment cycle data for 2014. Better Outcomes Registry & Network Ontario. Ottawa ON, October 2015.***

# Notes

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- All data current as of July 15, 2015
- Final treatment cycle and birth outcome data for 2013:
  - Based on 31 clinics
  - Draft cycles are excluded
- Preliminary treatment cycle data for 2014:
  - Based on 34
  - Draft cycles are included

# CARTR Plus records extracted July 15, 2015



\* Unacknowledged records were included if they were "submitted" or if they linked to an outcome

# Notes

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- These slides present descriptive estimates on which no formal statistical tests have been carried out; therefore, differences across treatment cycles, patient characteristics or embryo transfer characteristics may not be statistically significant and should be interpreted cautiously
- Unless otherwise specified, denominators for birth outcomes are based on the pregnancy level



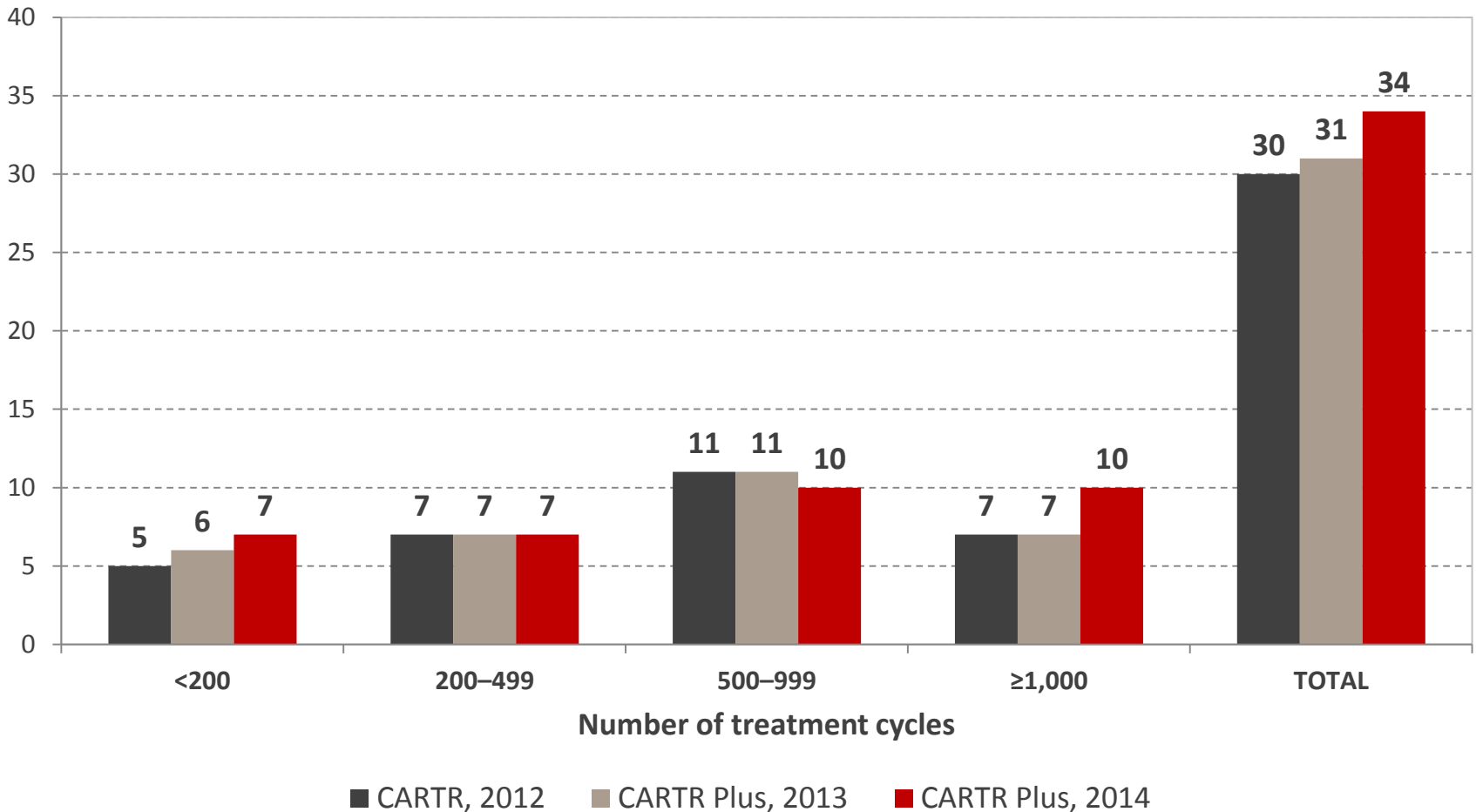
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*All ART treatment cycles (fresh and frozen)*

# INTRODUCTION

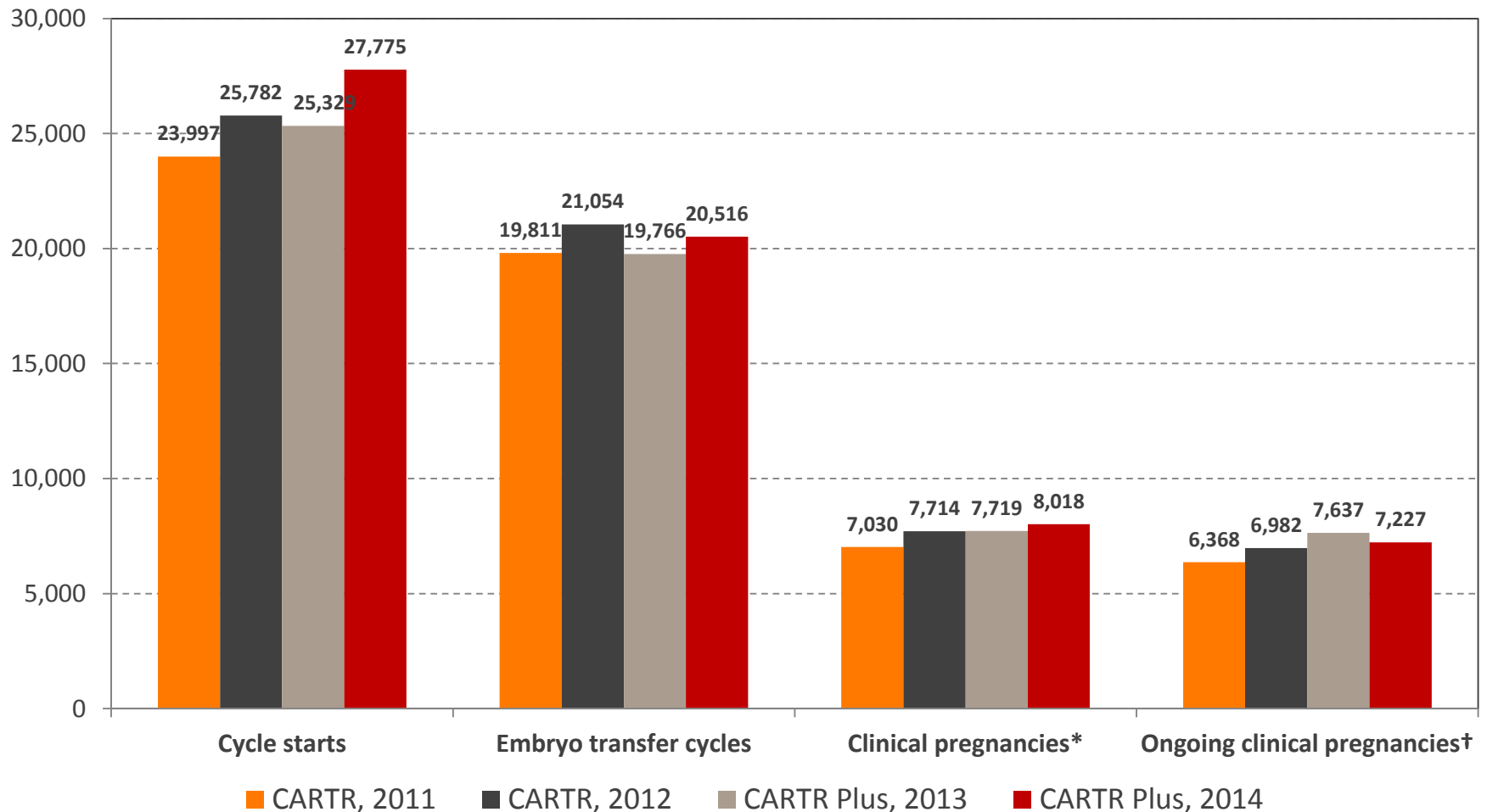
# Number of clinics, by number of treatment cycles

*All ART treatment cycles types*



# Number of cycles and clinical pregnancies

All ART treatment cycles types

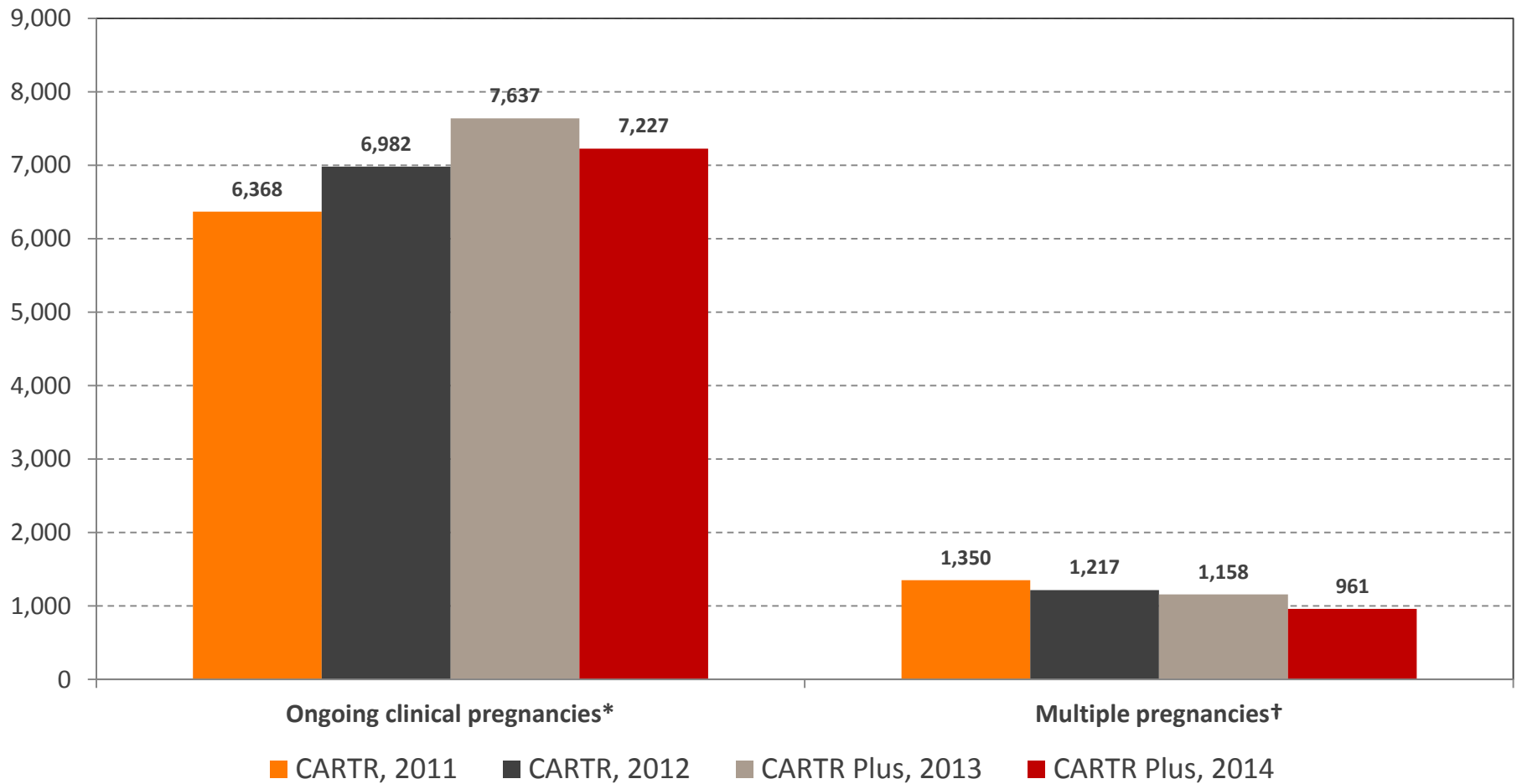


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

# Number of multiple pregnancies

All ART treatment cycles types

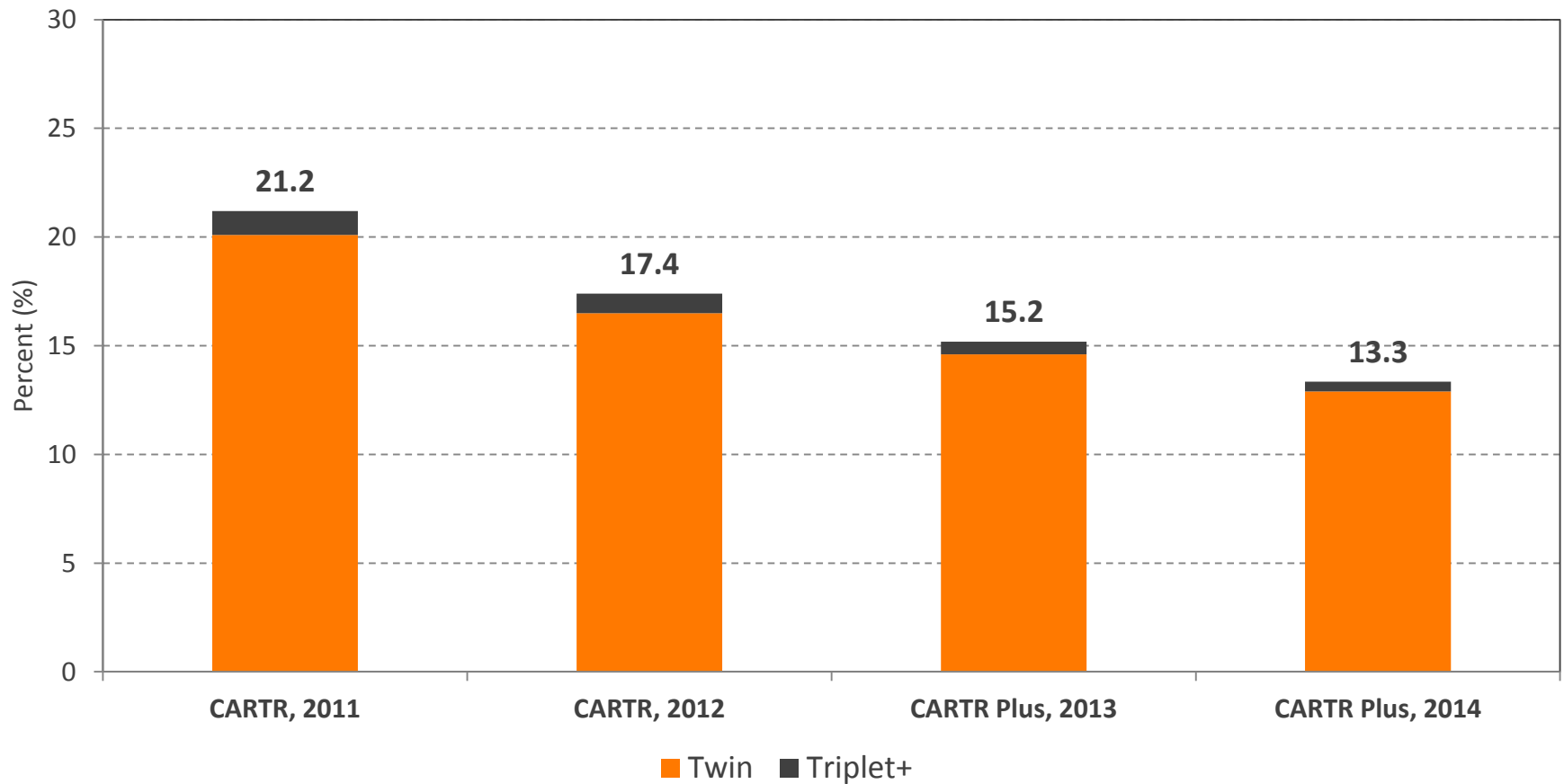


\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Percentage of multiple pregnancies, per ongoing clinical pregnancy

All ART treatment cycles types



Twin pregnancies	1,278	1,152	1,113	929
Triplet+ pregnancies	72	65	45	32

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound  
 † Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

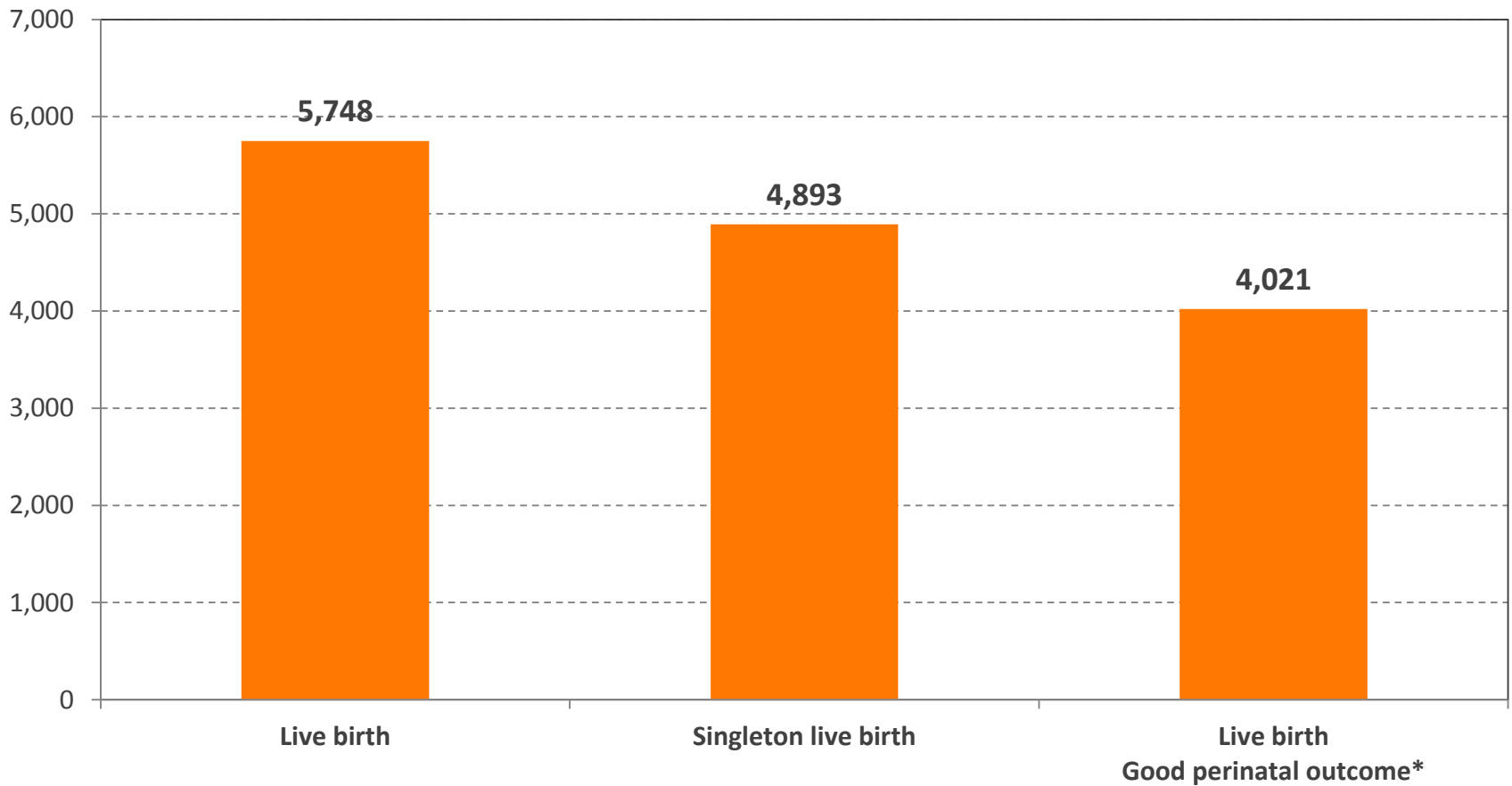
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*All ART treatment cycles (fresh and frozen)*

# BIRTH OUTCOMES FOR 2013

# Birth outcomes success rates

All ART treatment cycles types (fresh and frozen), 2013

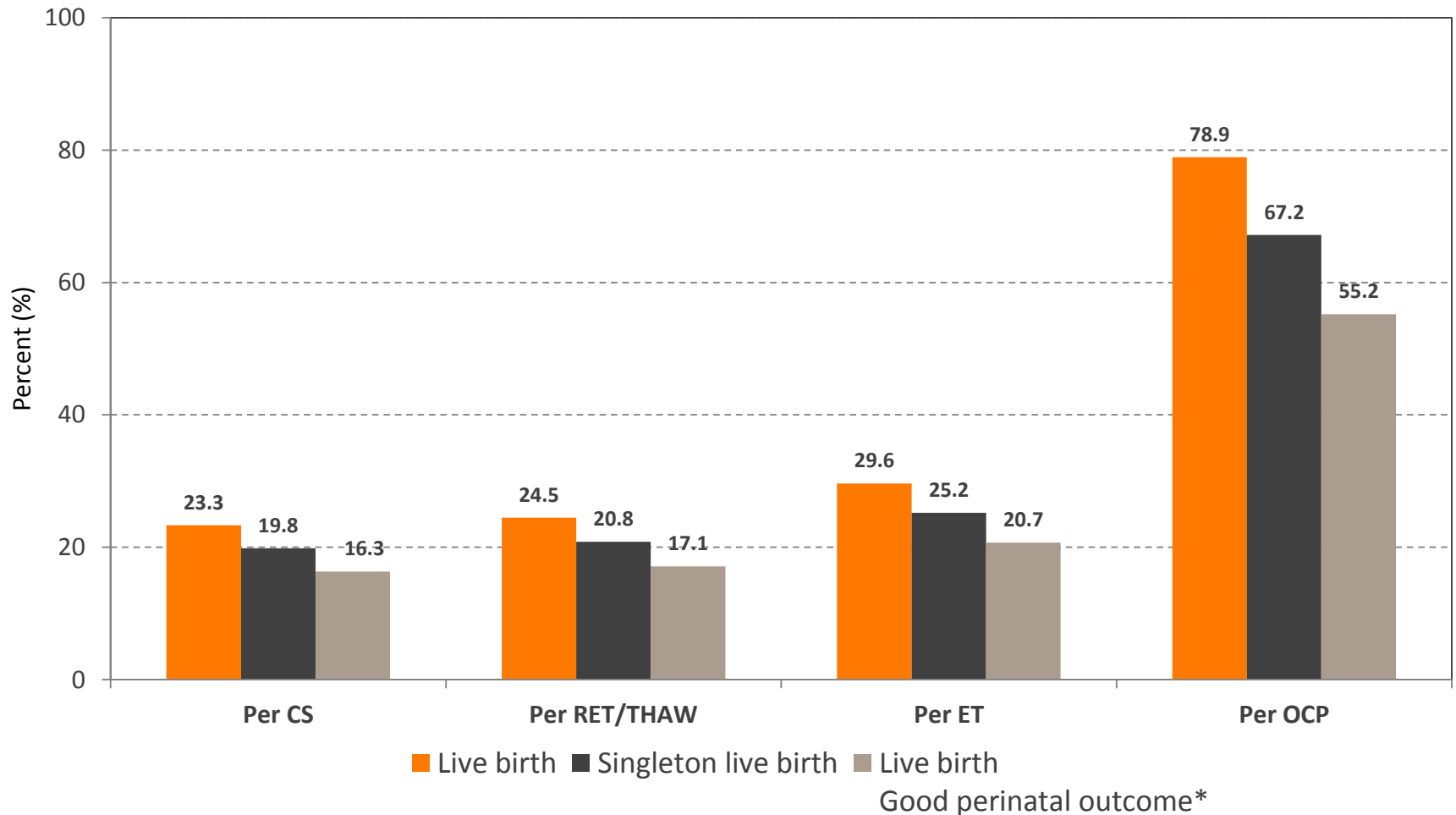


\* Good perinatal outcome: singleton live birth at  $\geq 37$  weeks' gestation and a birth weight  $\geq 2,500$  grams

† Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=353)

# Birth outcomes success rates

All ART treatment cycles types (fresh and frozen), 2013



\* Good perinatal outcome: singleton live birth at  $\geq 37$  weeks' gestation and a birth weight  $\geq 2,500$  grams

OCP - Ongoing clinical pregnancy: a clinical pregnancy with documentation of at least one fetal heart beat on ultrasound

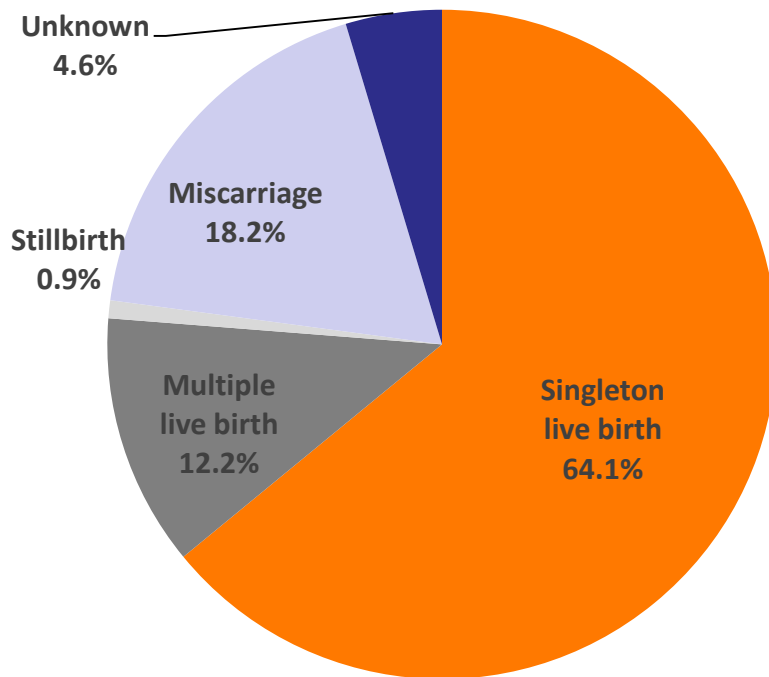
Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=353)



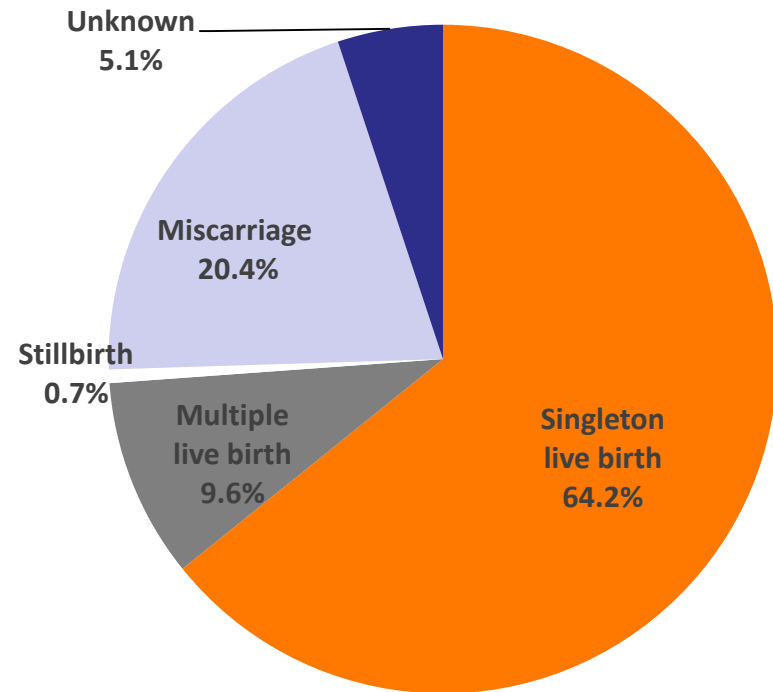
# Distribution of birth outcomes among ongoing clinical pregnancies

*ART cycles using fresh IVF and FET – own oocytes, 2013*

Fresh IVF – own oocytes  
n= 4,176

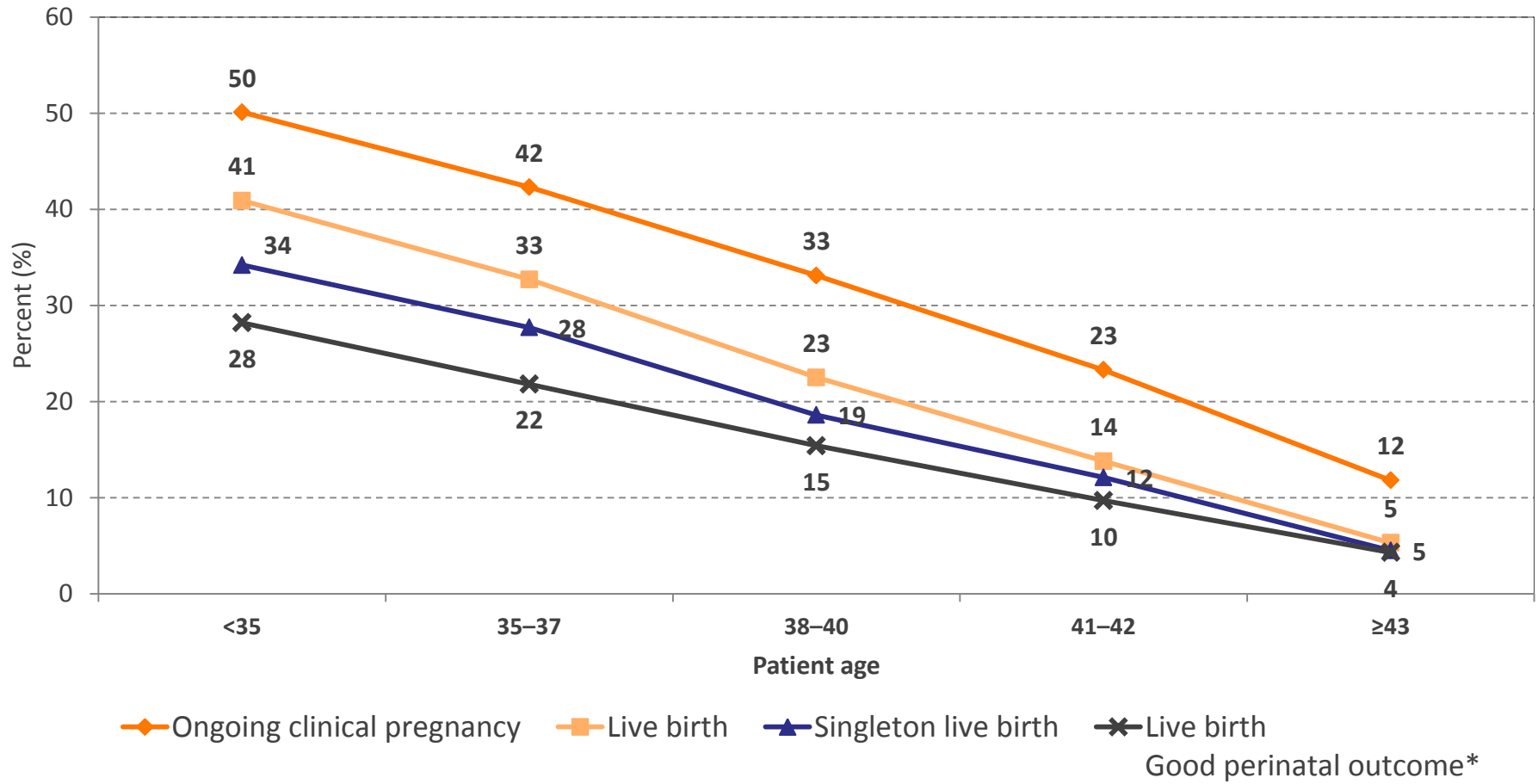


FET – own oocytes  
n= 2,593



# Birth outcome success rates by patient age, per ET cycle

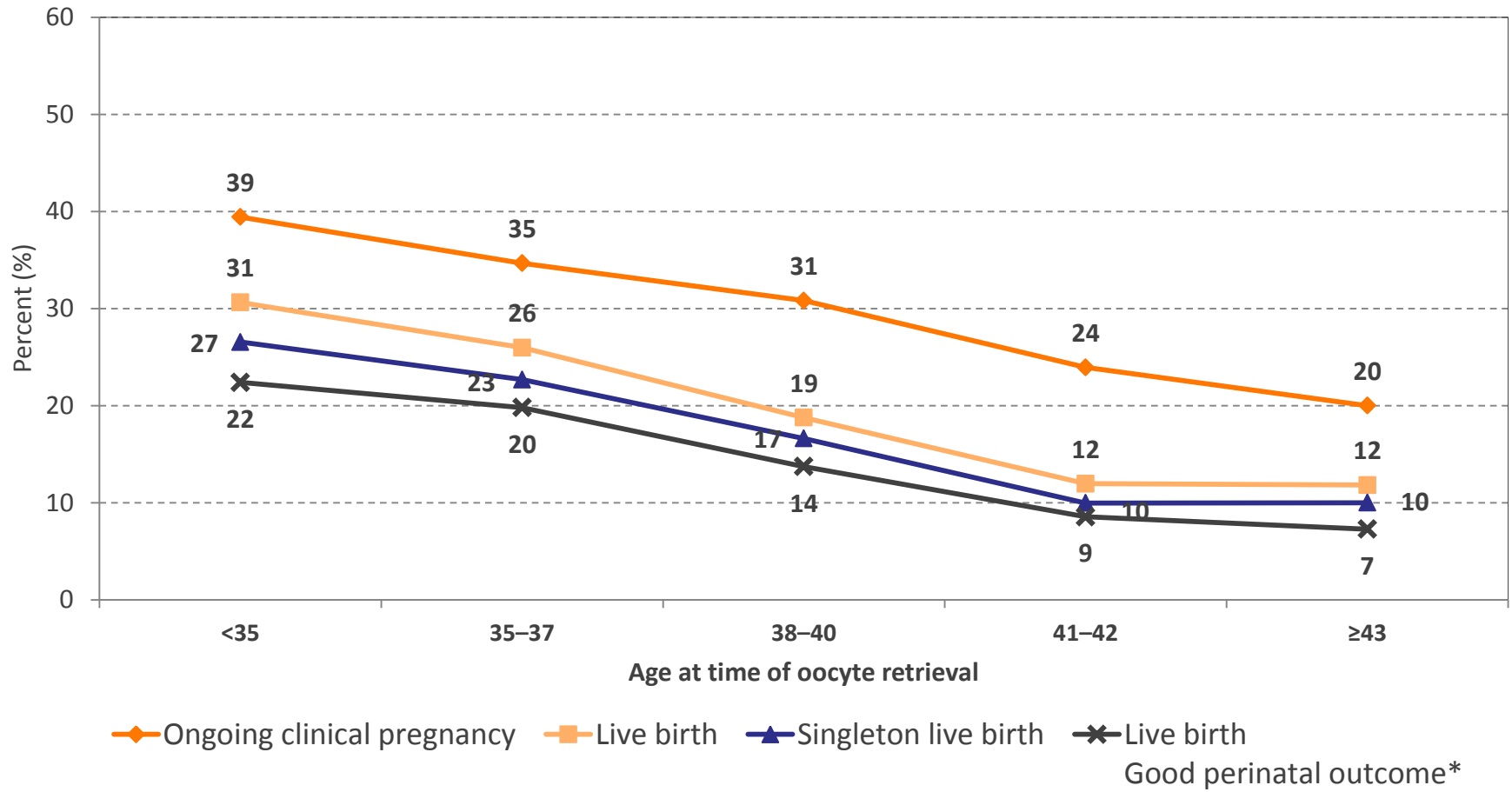
ART cycles using fresh IVF – own oocytes, 2013



\* Good perinatal outcome: singleton live birth at ≥37 weeks' gestation and a birth weight ≥2,500 grams

# Birth outcome success rates by age at time of oocyte retrieval, per ET cycle

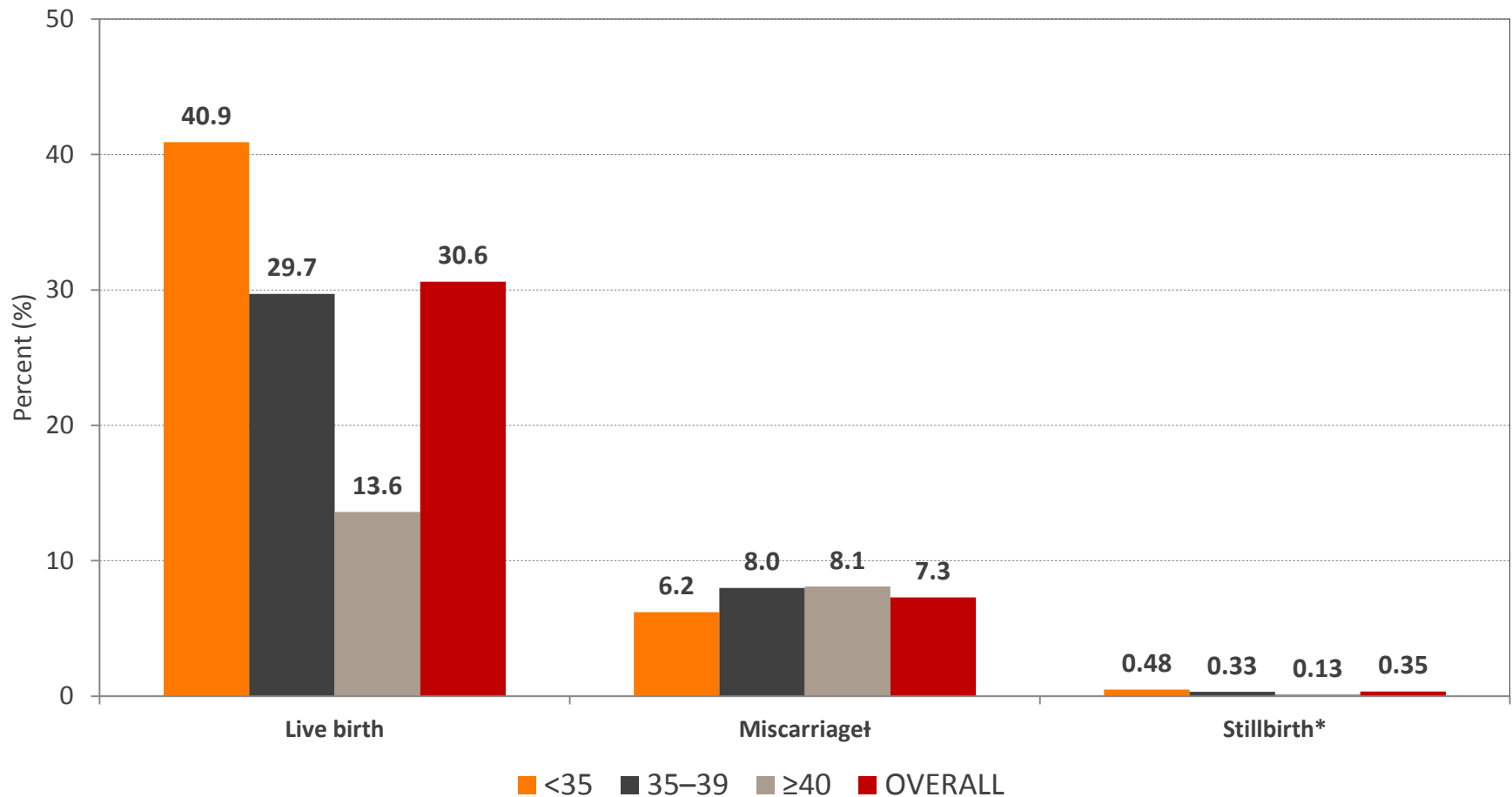
ART cycles using FET – own oocytes, 2013



\* Good perinatal outcome: singleton live birth at ≥37 weeks' gestation and a birth weight ≥2,500 grams

# Proportion of miscarriage and stillbirth rates by patient age, per ET cycle

ART cycles using fresh IVF – own oocytes, 2013

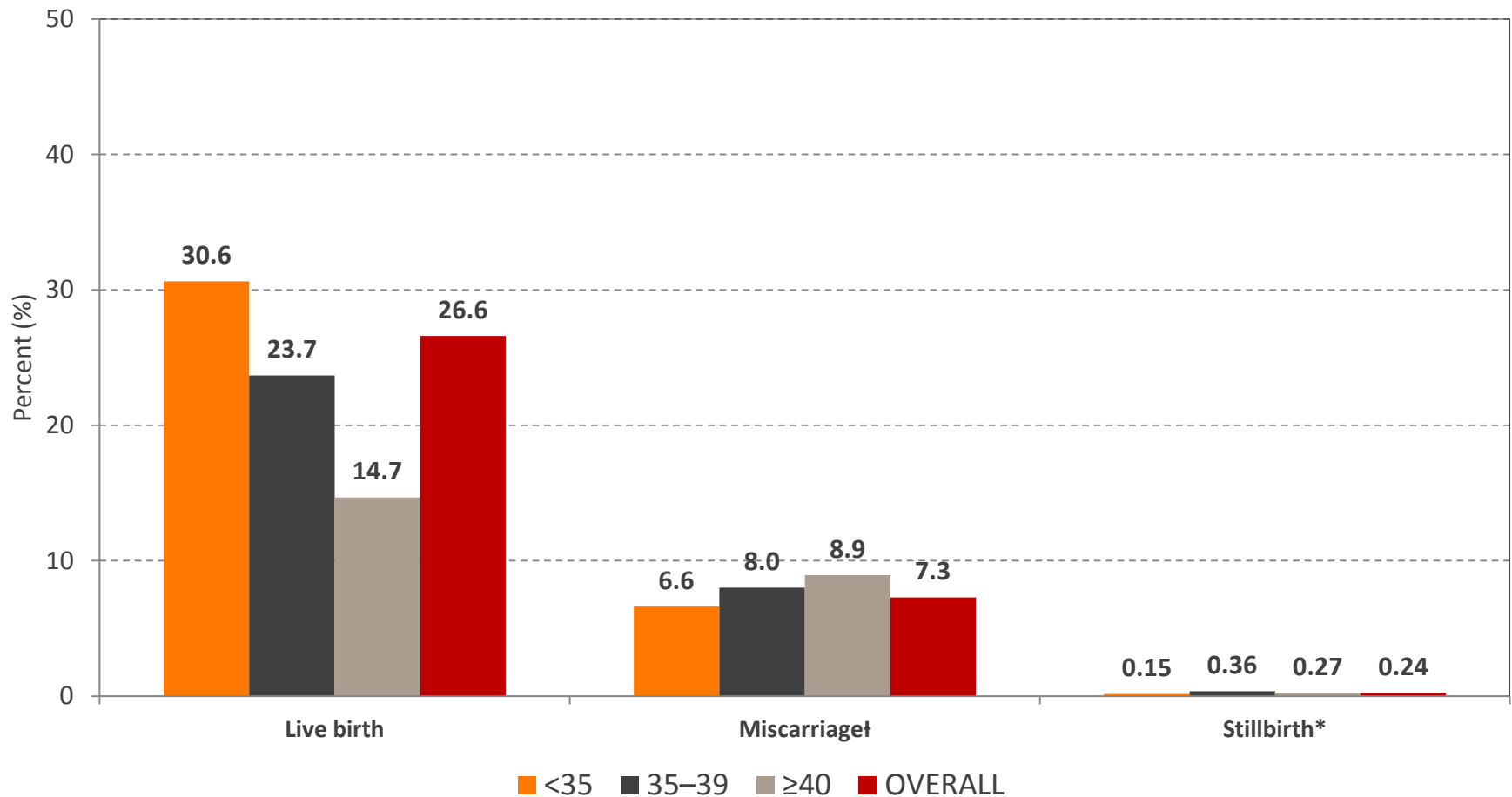


\* Stillbirths: birth outcome where no fetus(es) was born alive and at least one stillbirth at ≥ 20 weeks' gestation

† Miscarriage: birth outcome where all fetuses were a 'pregnancy loss' at <20 weeks' gestation

# Proportion of miscarriage and stillbirth rates by age at time of oocyte retrieval, per ET cycle

ART cycles using FET– own oocytes, 2013

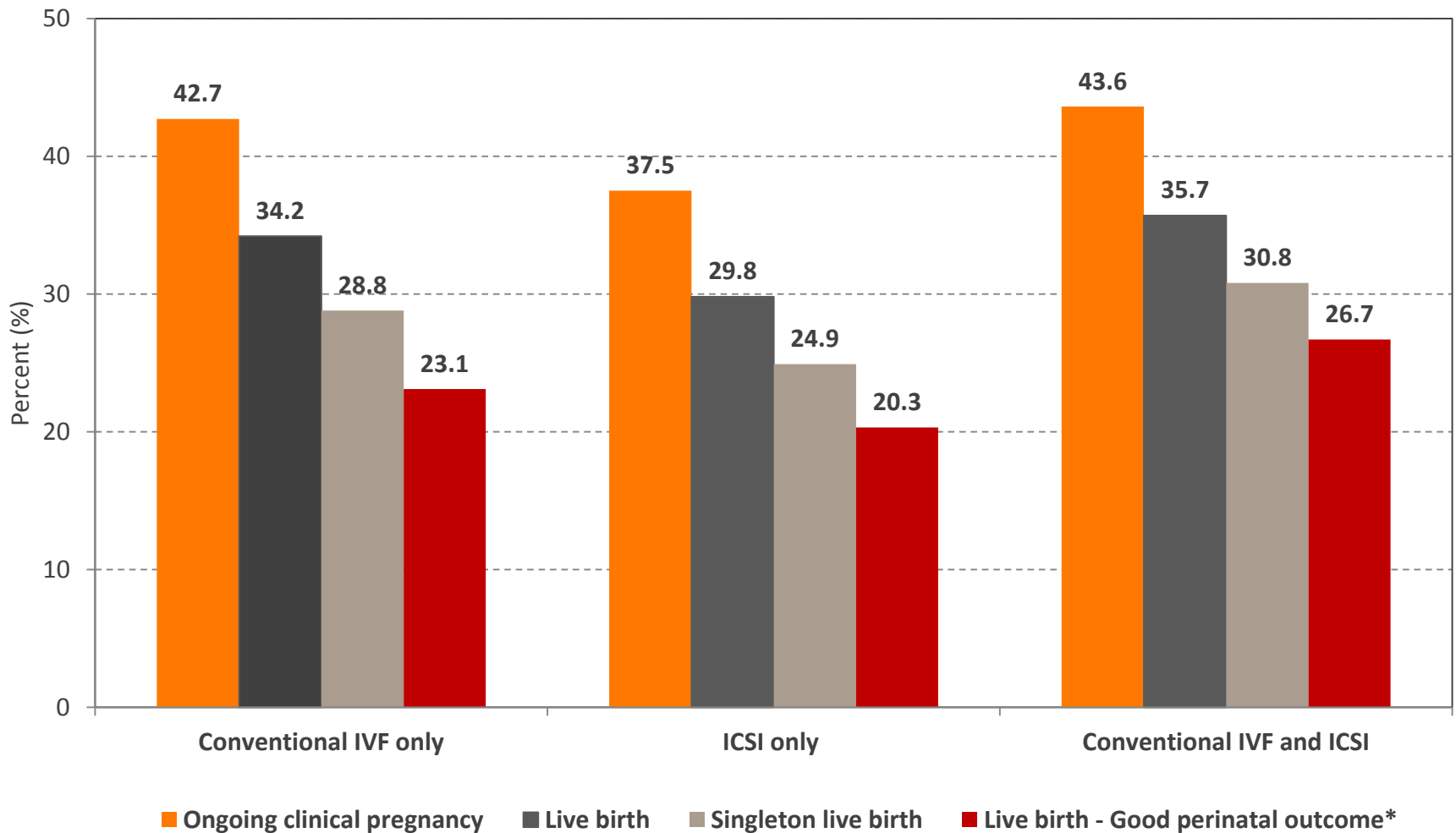


\* Stillbirths: birth outcome where no fetus(es) was born alive and at least one stillbirth at ≥ 20 weeks' gestation

† Miscarriage: birth outcome where all fetus(es) were a 'pregnancy loss' at <20 weeks' gestation

# Percentage of birth outcomes by method of insemination, per ET cycle

ART cycles using fresh IVF – own oocytes, 2013

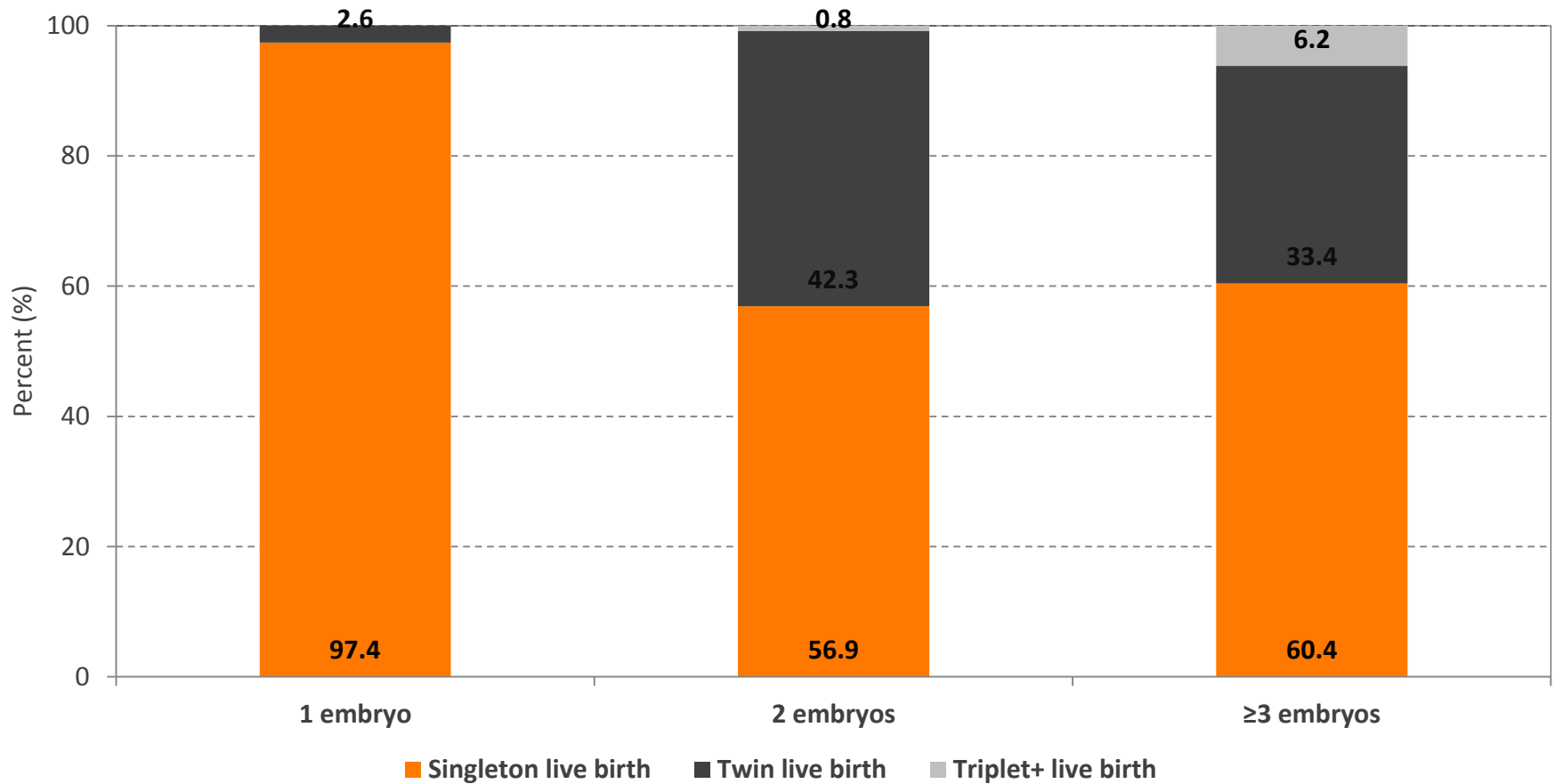


\* Good perinatal outcome: singleton live birth at  $\geq 37$  weeks' gestation and a birth weight  $\geq 2,500$  grams

† Conventional IVF and ICSI: a single ET cycle used both conventional IVF and ICSI

# Proportion singleton and multiple live births by number of embryos transferred

*Baby level - All ART treatment cycles types (fresh and frozen), 2013*



Live births

2,741

3,490

389

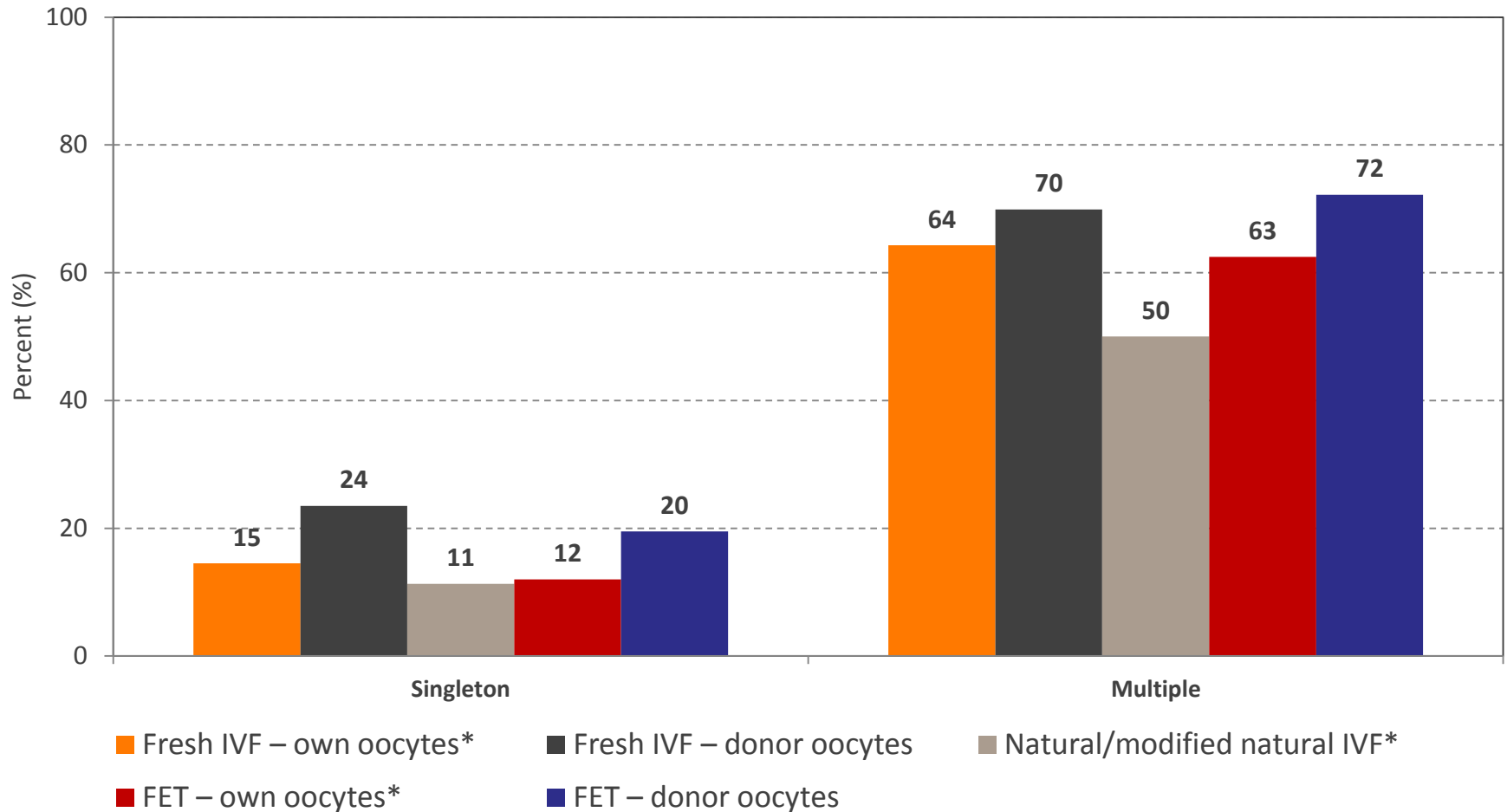
*Singleton live birth: one live birth*

*Twin live birth: two births and at least one live birth*

*Triplet+ live birth: three or more births and at least one live birth*

# Proportion of preterm births by plurality, per live birth

*Baby level - All ART treatment cycles types (fresh and frozen), 2013*



\* Own oocytes exclusively

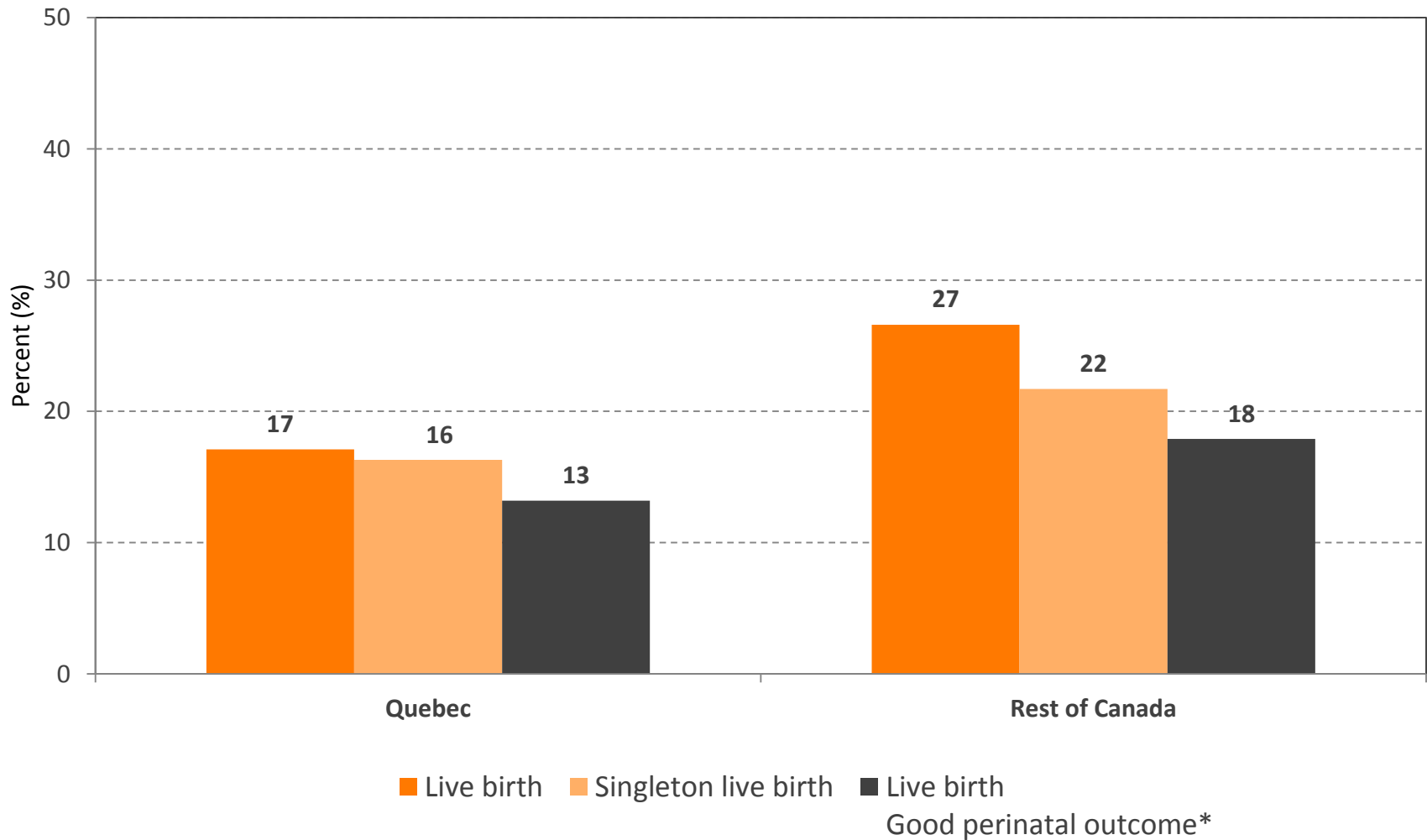
Preterm birth <37 weeks' gestation

Total number of live births were used as the denominator for these calculations.



# Birth outcomes by province, per cycle start

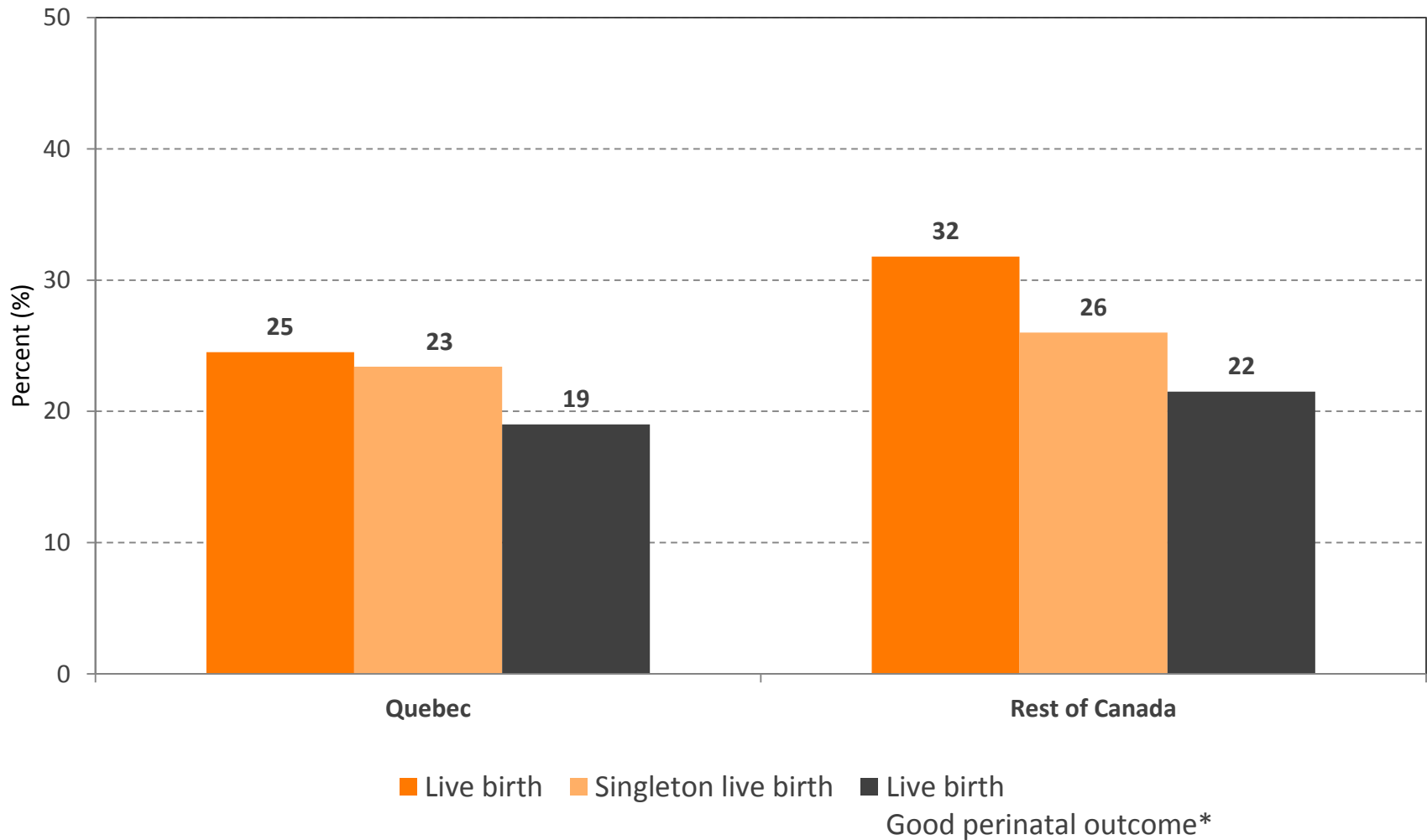
All ART treatment cycles types (fresh and frozen), 2013



\* Good perinatal outcome: singleton live birth at  $\geq 37$  weeks' gestation and a birth weight  $\geq 2,500$  grams  
Cycle starts, and embryo transfers with an unknown birth outcome were removed from the denominator (n=353)

# Birth outcomes by province, per ET cycle

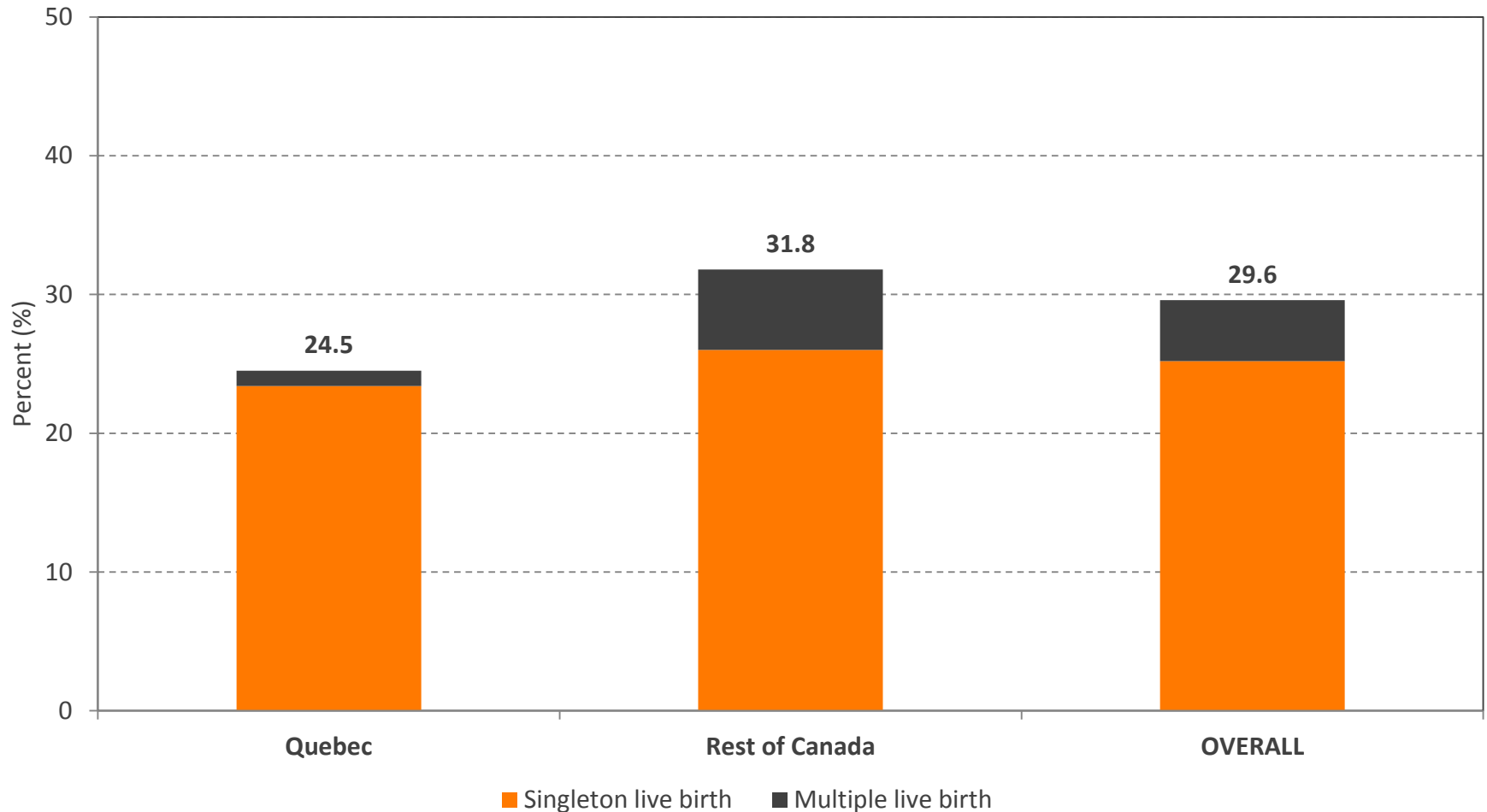
All ART treatment cycles types (fresh and frozen), 2013



\* Good perinatal outcome: singleton live birth at  $\geq 37$  weeks' gestation and a birth weight  $\geq 2,500$  grams  
Cycle starts, and embryo transfers with an unknown birth outcome were removed from the denominator (n=353)

# Proportion of cycles resulting in a live birth by plurality and province, per ET cycle

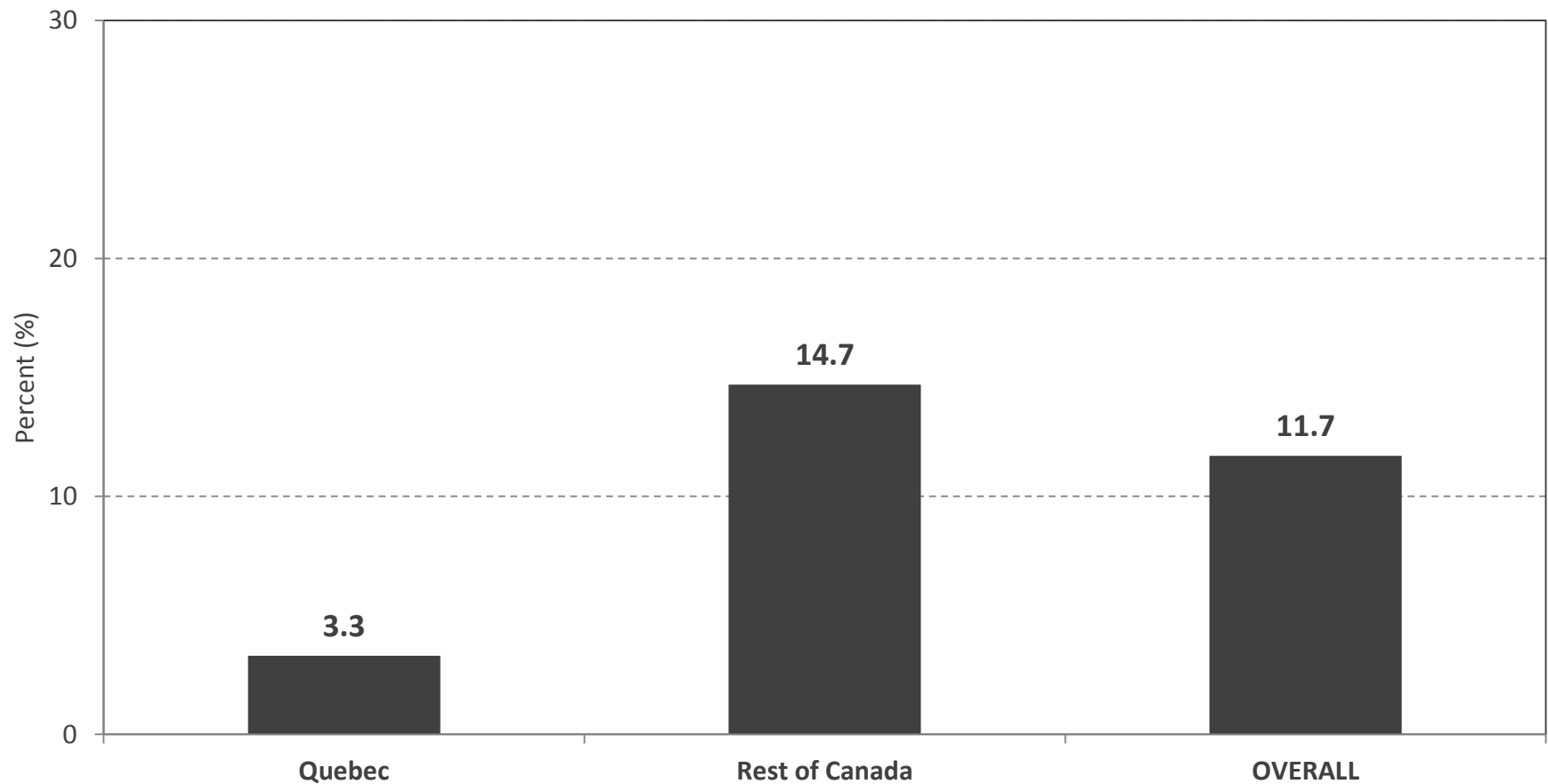
All ART treatment cycles types (fresh and frozen), 2013



Singleton live birth: live birth from a singleton pregnancy  
Multiple birth: At least one live birth from a multiple pregnancy

# Percentage of multiple live births by province, per ongoing clinical pregnancy

All ART treatment cycles types (fresh and frozen), 2013



Multiple  
births

64

791

855

Ongoing clinical pregnancy: documentation of at least one fetal heart beat on ultrasound

Multiple birth: At least one live birth from a multiple pregnancy

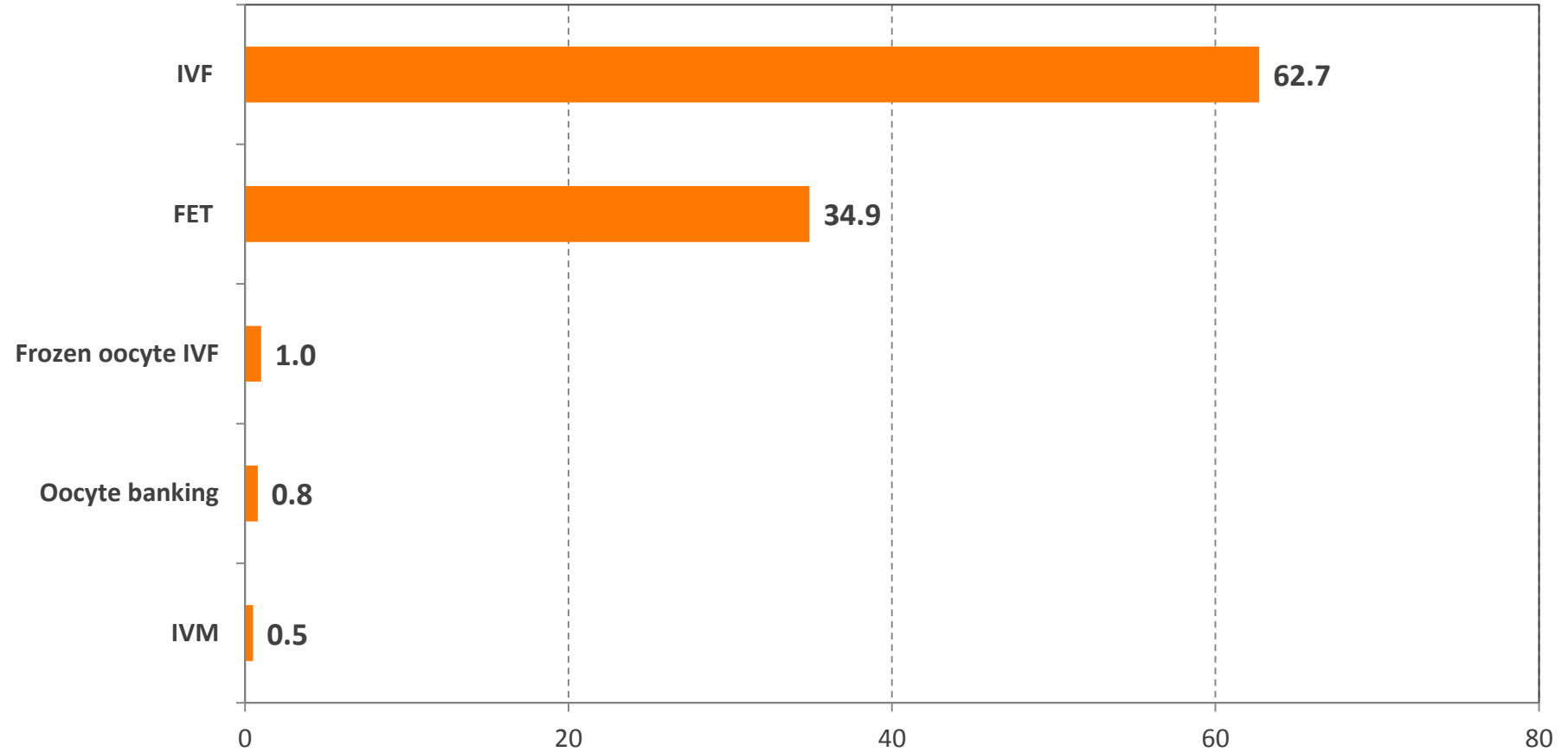
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*All ART treatment cycles (fresh and frozen)*

# TREATMENT CYCLES FOR 2014

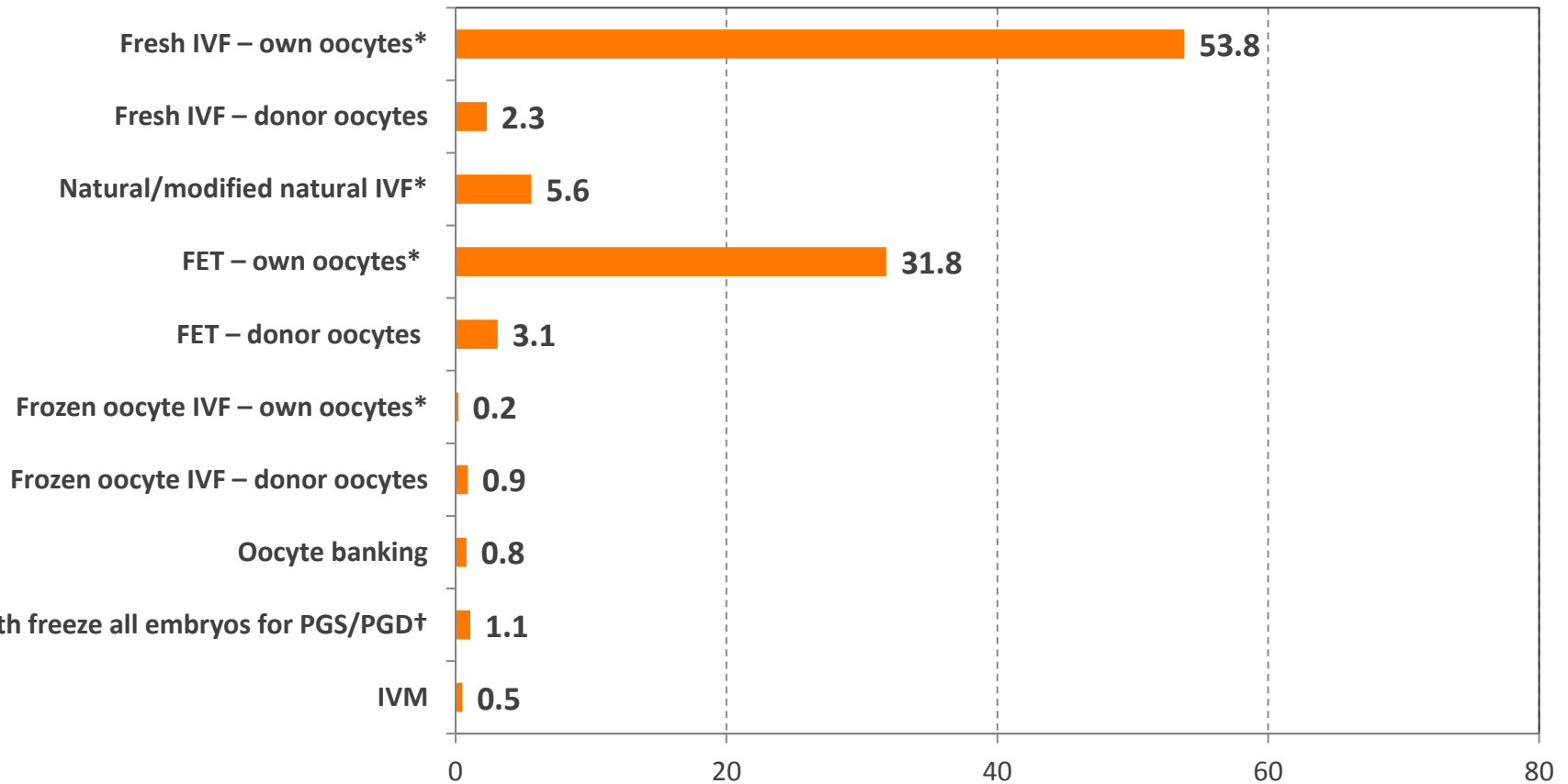
# Type of treatment cycle, per cycle start

*All ART treatment cycles (fresh and frozen), 2014*



# Type of treatment cycle, per cycle start

*All ART treatment cycles (fresh and frozen), 2014*



\* Own oocytes exclusively

† IVF cycles in which all embryos were frozen and had documented PGD or PGS

# Type of treatment cycle, per cycle start

*All ART treatment cycles (fresh and frozen), 2014*

Type of treatment cycle	Number	Percent
Fresh IVF – own oocytes*	14,946	53.8
Fresh IVF – donor oocytes	631	2.3
Natural/modified natural IVF*	1,544	5.6
FET – own oocytes*	8,832	31.8
FET – donor oocytes	871	3.1
Frozen oocyte IVF – own oocytes*	47	0.2
Frozen oocyte IVF – donor oocytes	243	0.9
Oocyte banking	220	0.8
IVF with freeze all embryos for PGD/PGS†	300	1.1
IVM	141	0.5
<b>TOTAL TREATMENT CYCLES</b>	<b>27,775</b>	

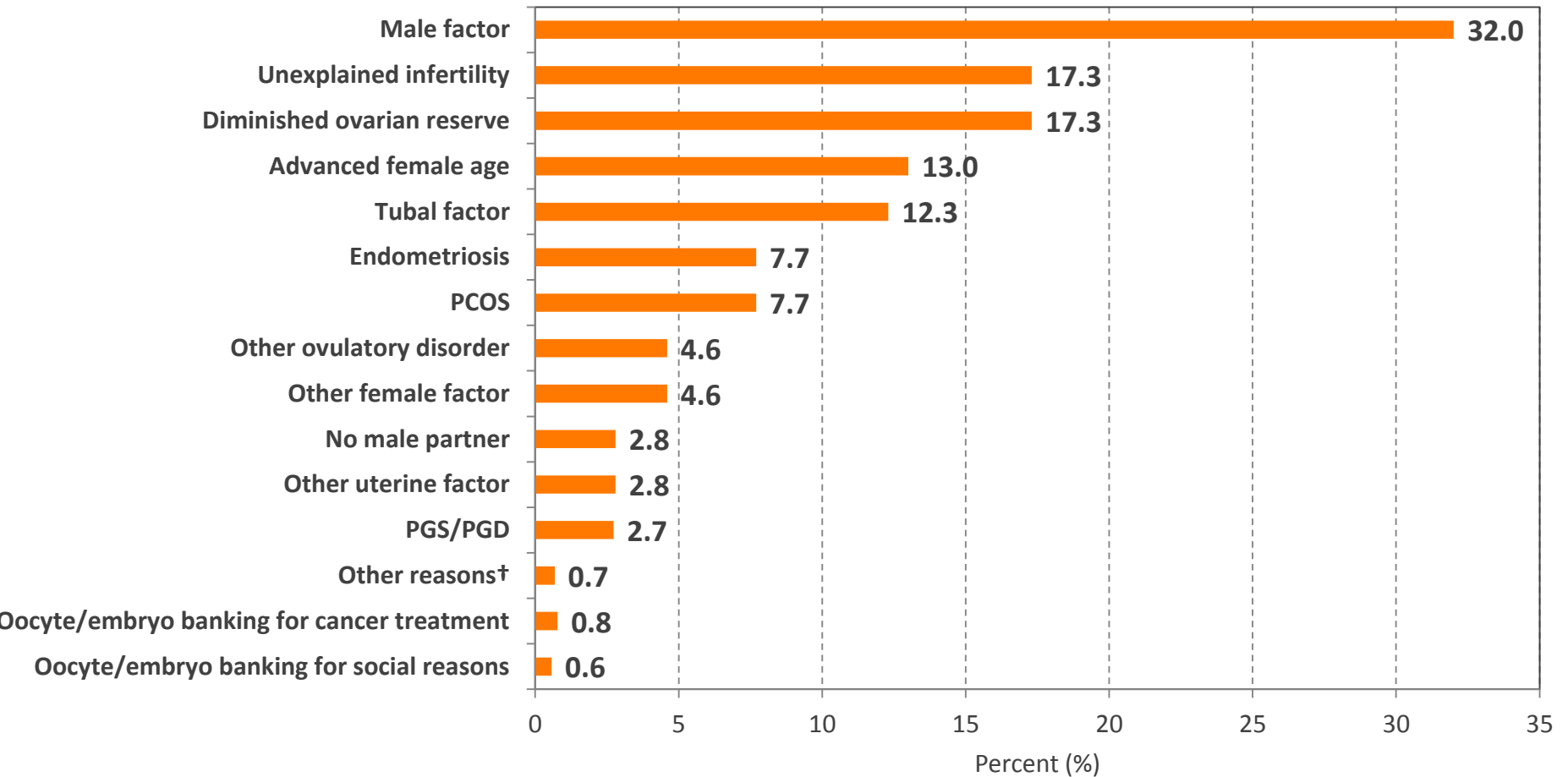
\* Own oocytes exclusively

† IVF cycles in which all retrieved oocytes were frozen and had documented PGD or PGS



# Reasons for treatment, per cycle start

All ART treatment cycles (fresh and frozen), 2014



\* Categories are not mutually exclusive

† Other reasons include: gonadotoxic therapy, no female partner and peritoneal factor or severe adhesions

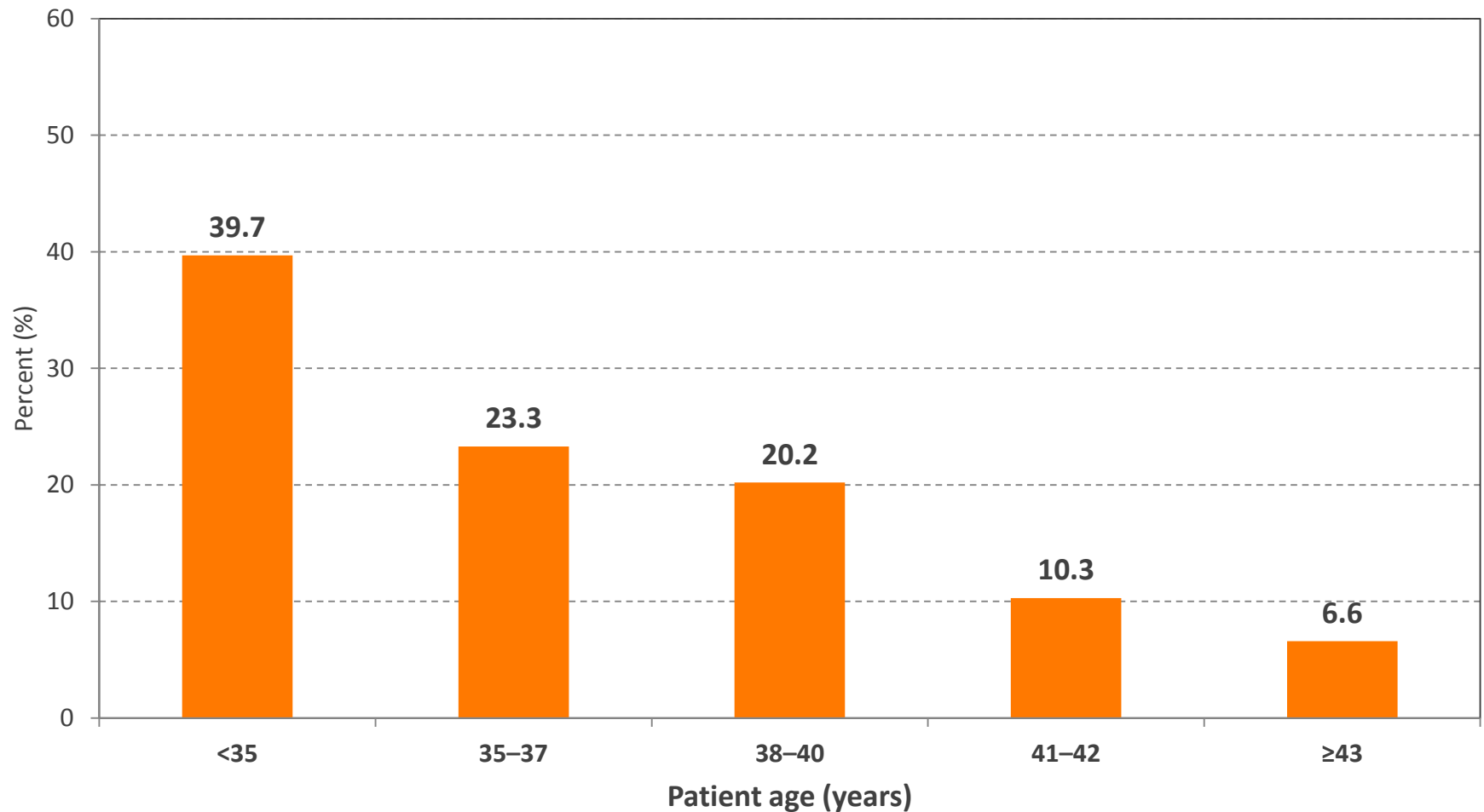
# Specialized services

*All ART treatment cycles (fresh and frozen), 2014*

Description	Number of cycles
Gestational carrier	417
Preimplantation genetic screening and/or diagnosis (PGS/PGD)	762
Oocyte or embryo banking due to cancer treatment	217
Oocyte or embryo banking due to social reasons	159
Any use of donor oocytes or embryos	1,753

# Patient age, per cycle start

*All ART treatment cycles (fresh and frozen), 2014*



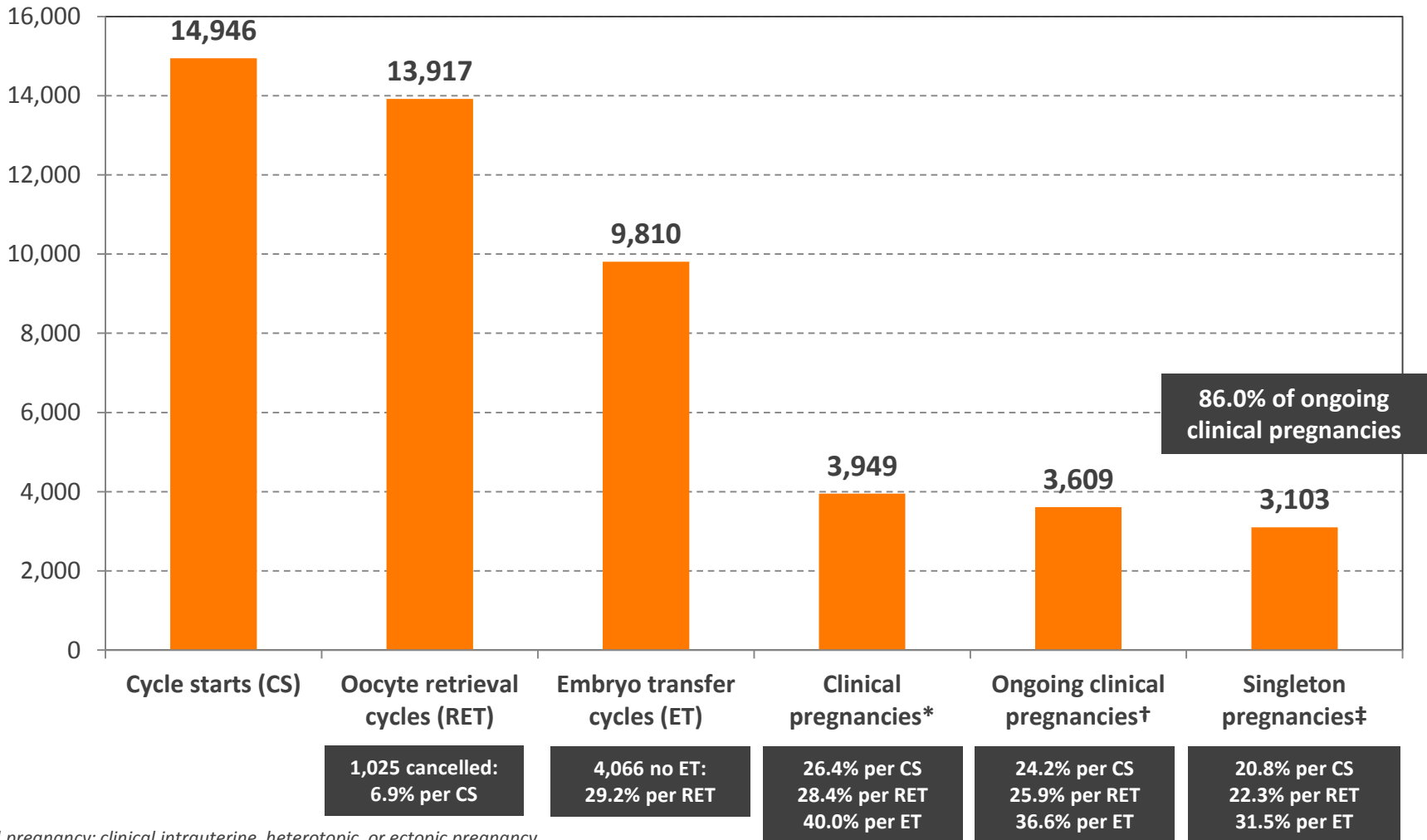
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*ART cycles using fresh IVF – own oocytes*

# TREATMENT CYCLES FOR 2014

# Stage of treatment and treatment outcomes

ART cycles using fresh IVF – own oocytes, 2014



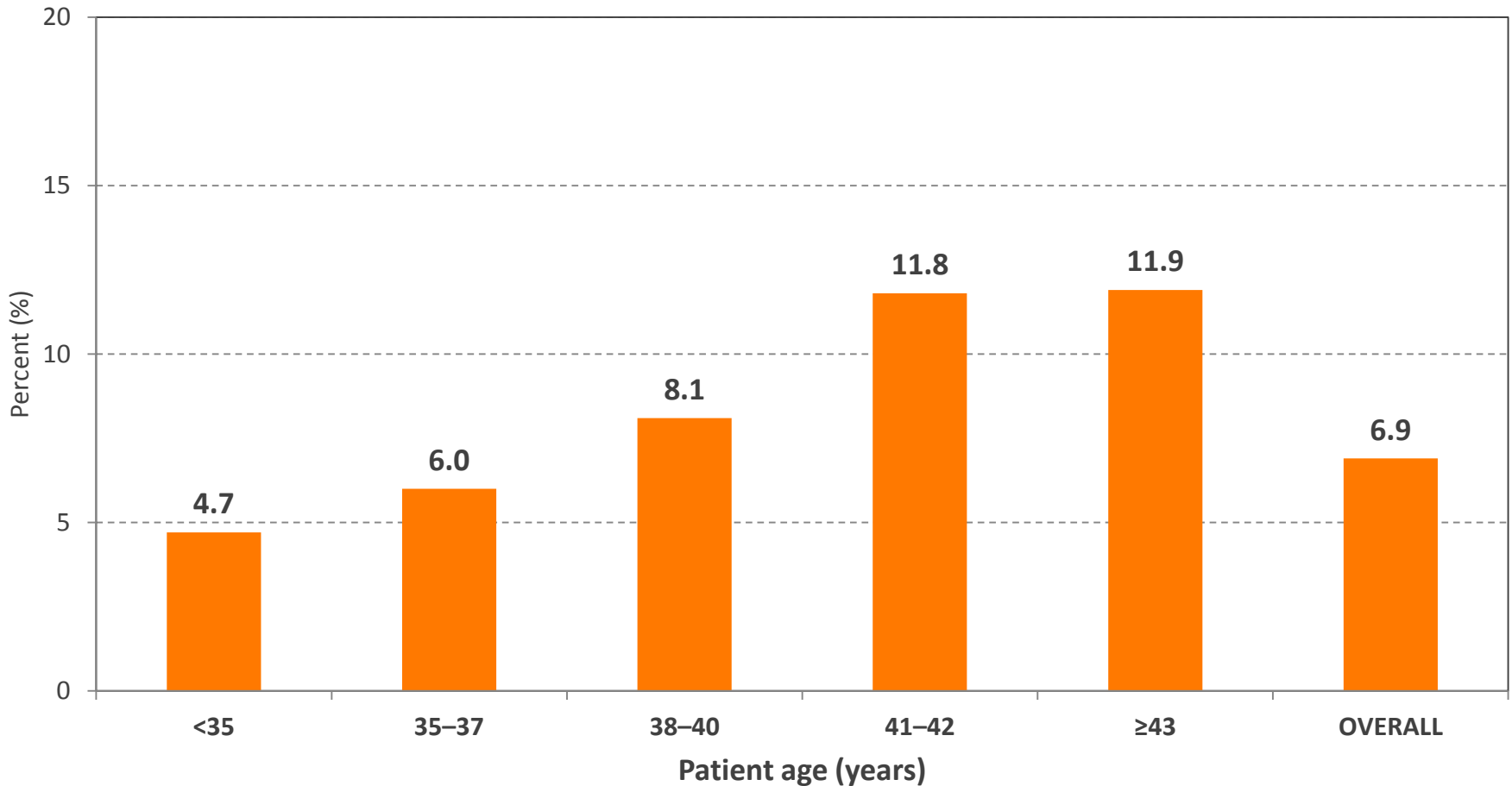
\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Ongoing clinical pregnancy: clinical pregnancy with ≥1 fetal heart beat on ultrasound

‡ Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

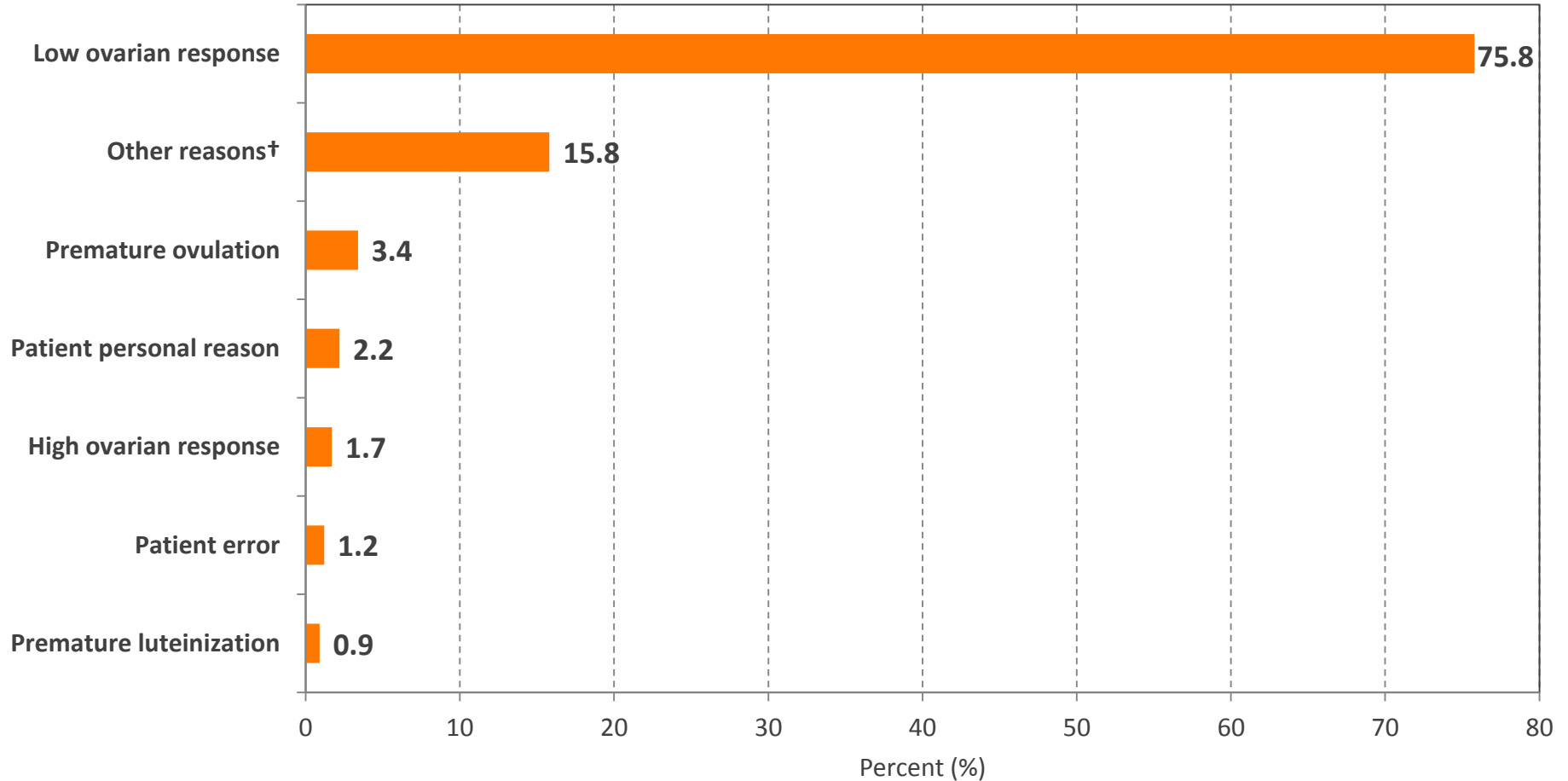
# Percentage of cancelled cycles by patient age, per cycle start

*ART cycles using fresh IVF – own oocytes, 2014*



# Reasons for cycle cancellation, per cancelled cycle

*ART cycles using fresh IVF – own oocytes, 2014*

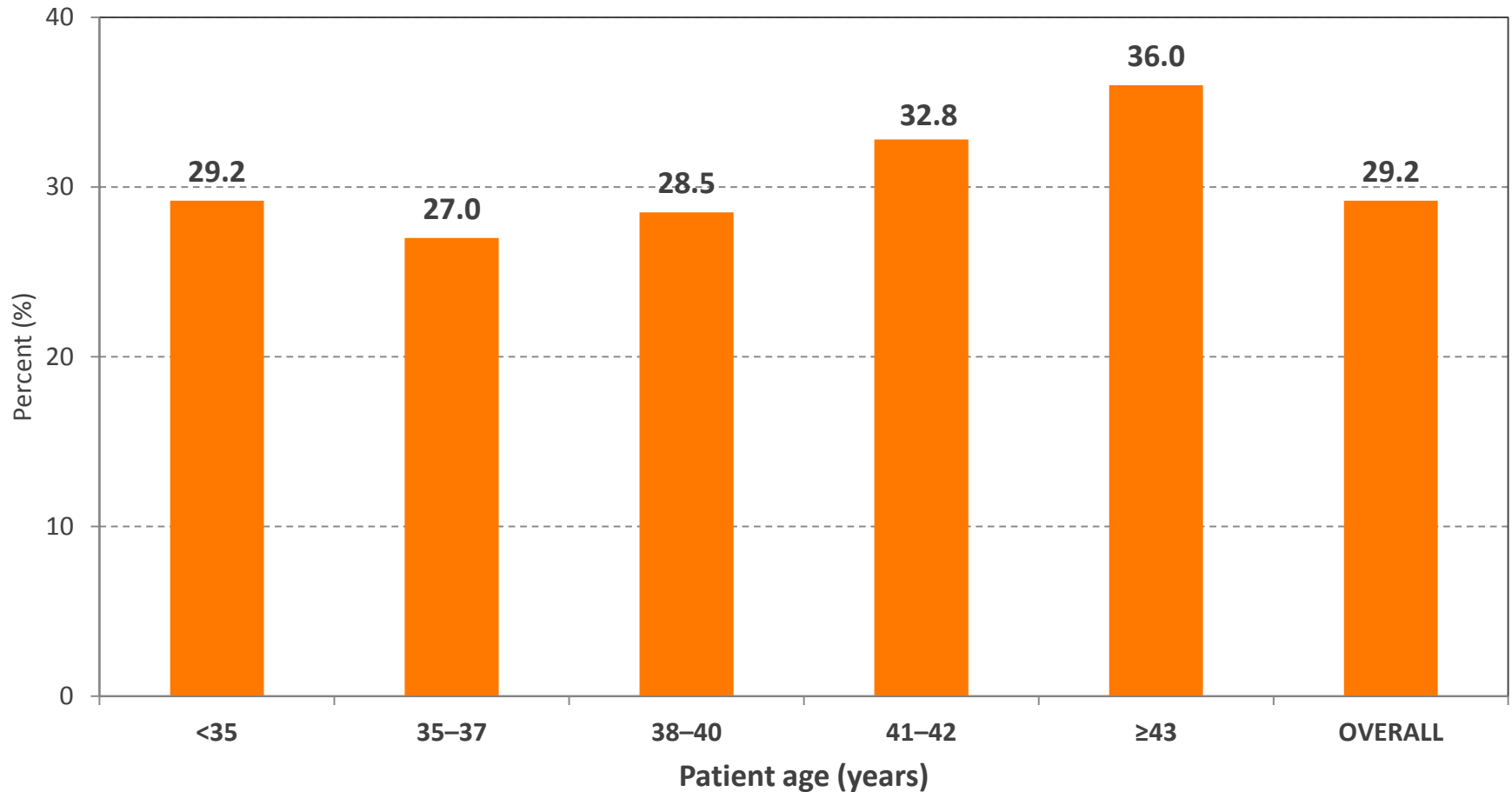


\* Categories are not mutually exclusive

† Other reasons include: patient illness, donor illness, donor personal reason, donor error, no access to ovaries, other (unspecified)

# Percentage of cycles with no embryo transfer by patient age, per oocyte retrieval cycle

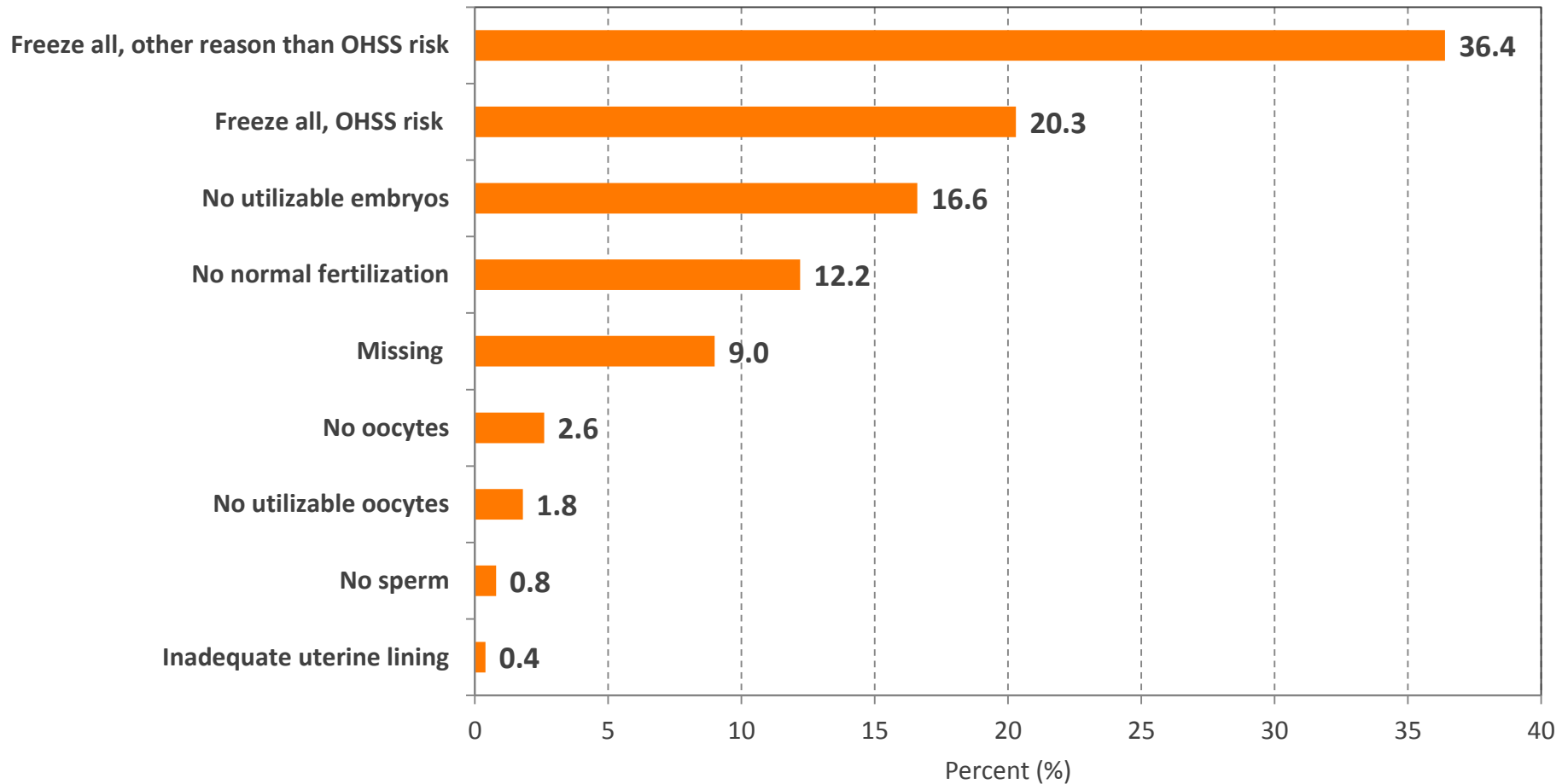
*ART cycles using fresh IVF – own oocytes, 2014*





# Reasons for no embryo transfer, per oocyte retrieval cycle with no embryo transfer

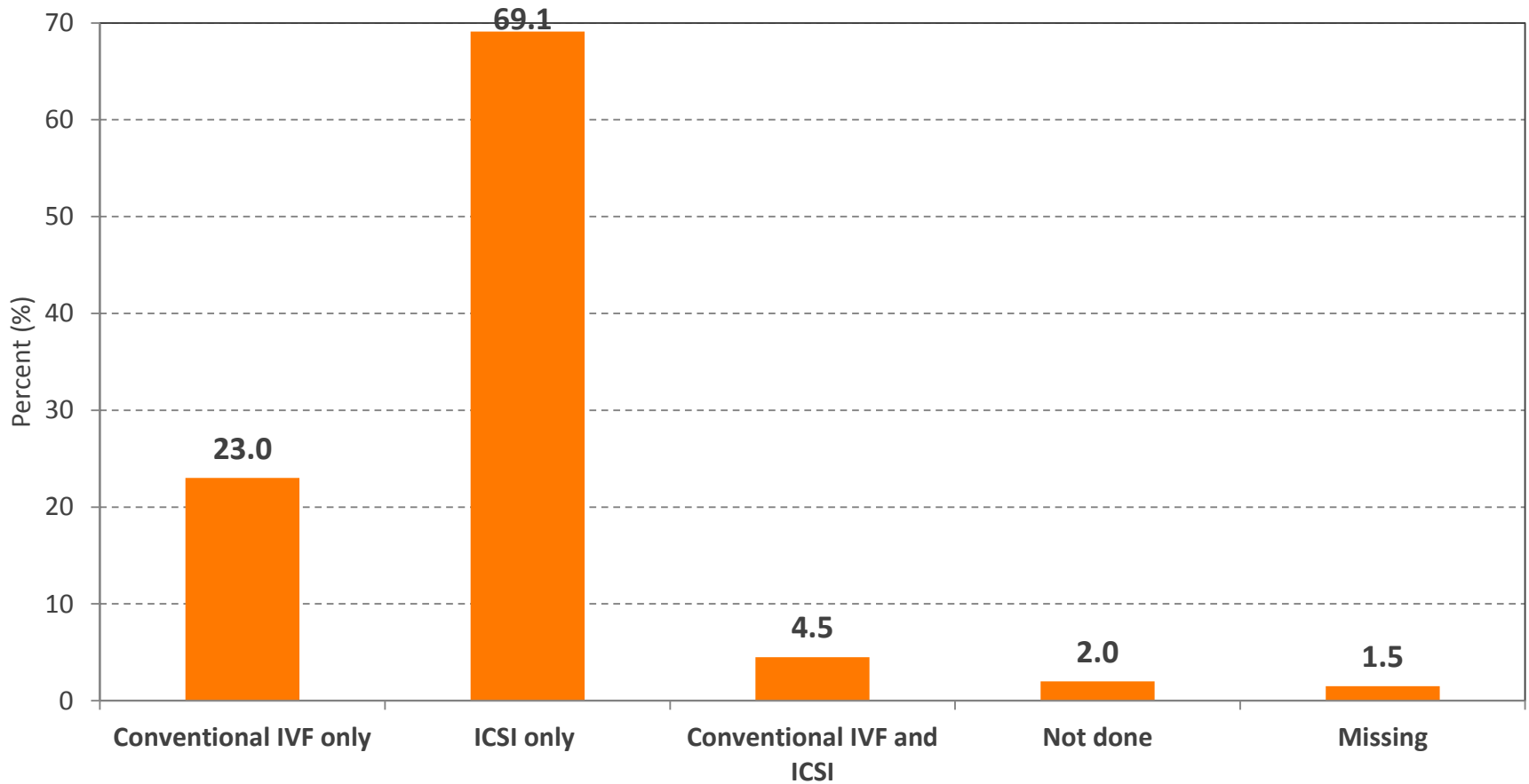
*ART cycles using fresh IVF – own oocytes, 2014*



\* Categories are mutually exclusive

# Method of insemination, per oocyte retrieval cycle

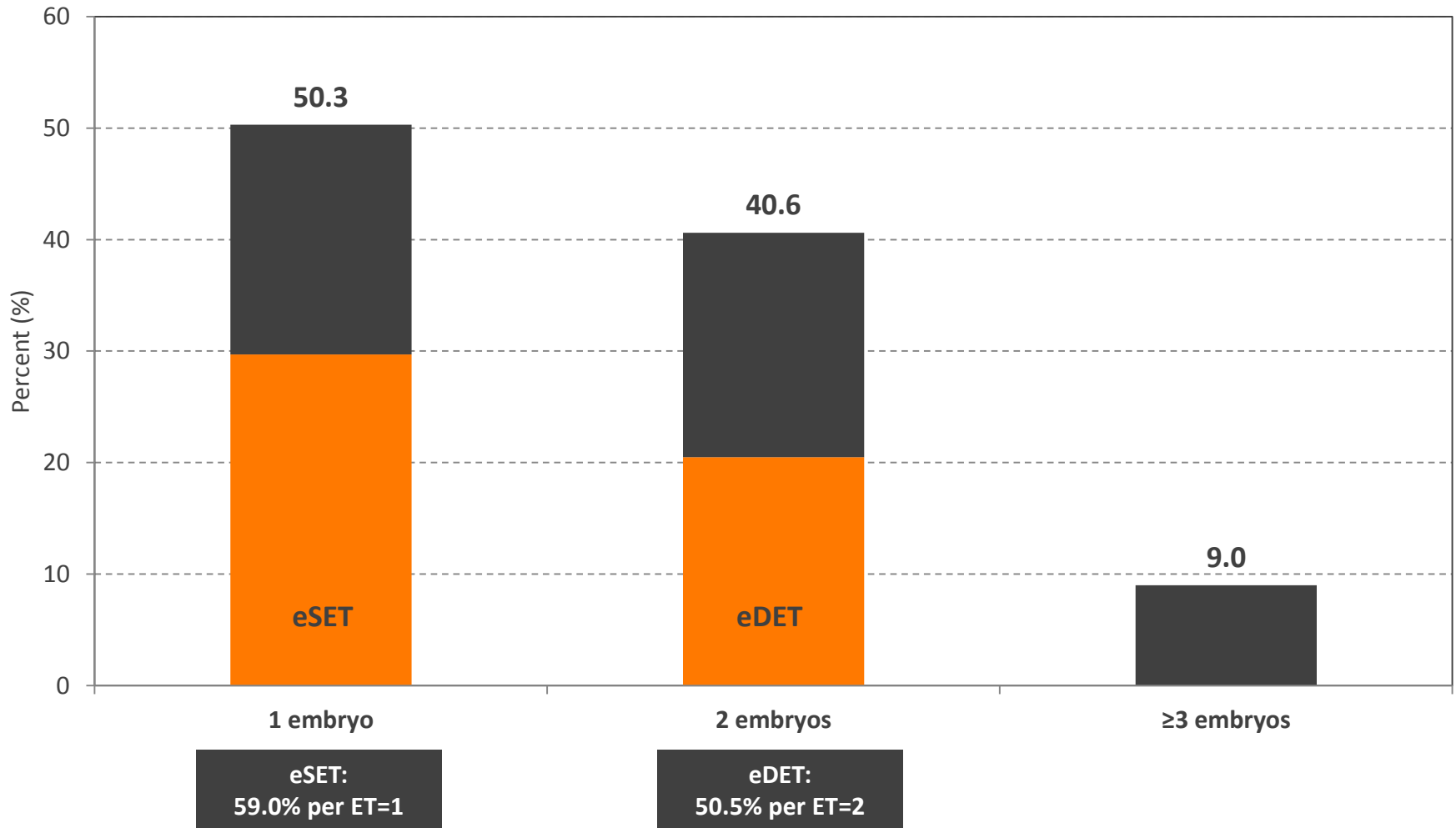
*ART cycles using fresh IVF – own oocytes, 2014*



*Conventional IVF and ICSI: a single ET cycle used both conventional IVF and ICSI*

# Number of embryos transferred, per ET cycle

ART cycles using fresh IVF – own oocytes, 2014

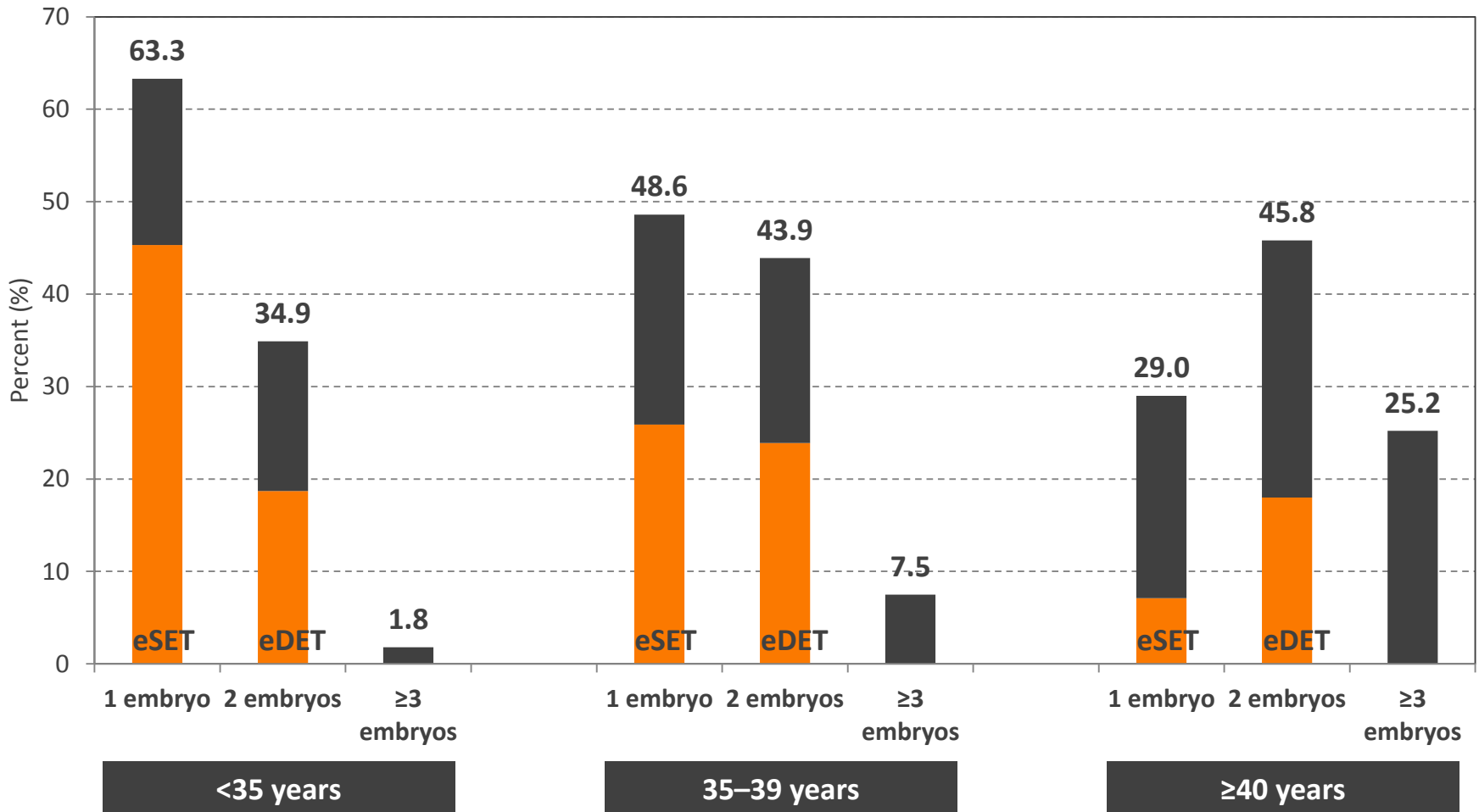


\* Excludes records with missing number of embryos transferred

† Elective single (eSET) and double (eDET) embryo transfer: transfer of one embryo (eSET) or two embryos (eDET), selected from a larger cohort of available embryos

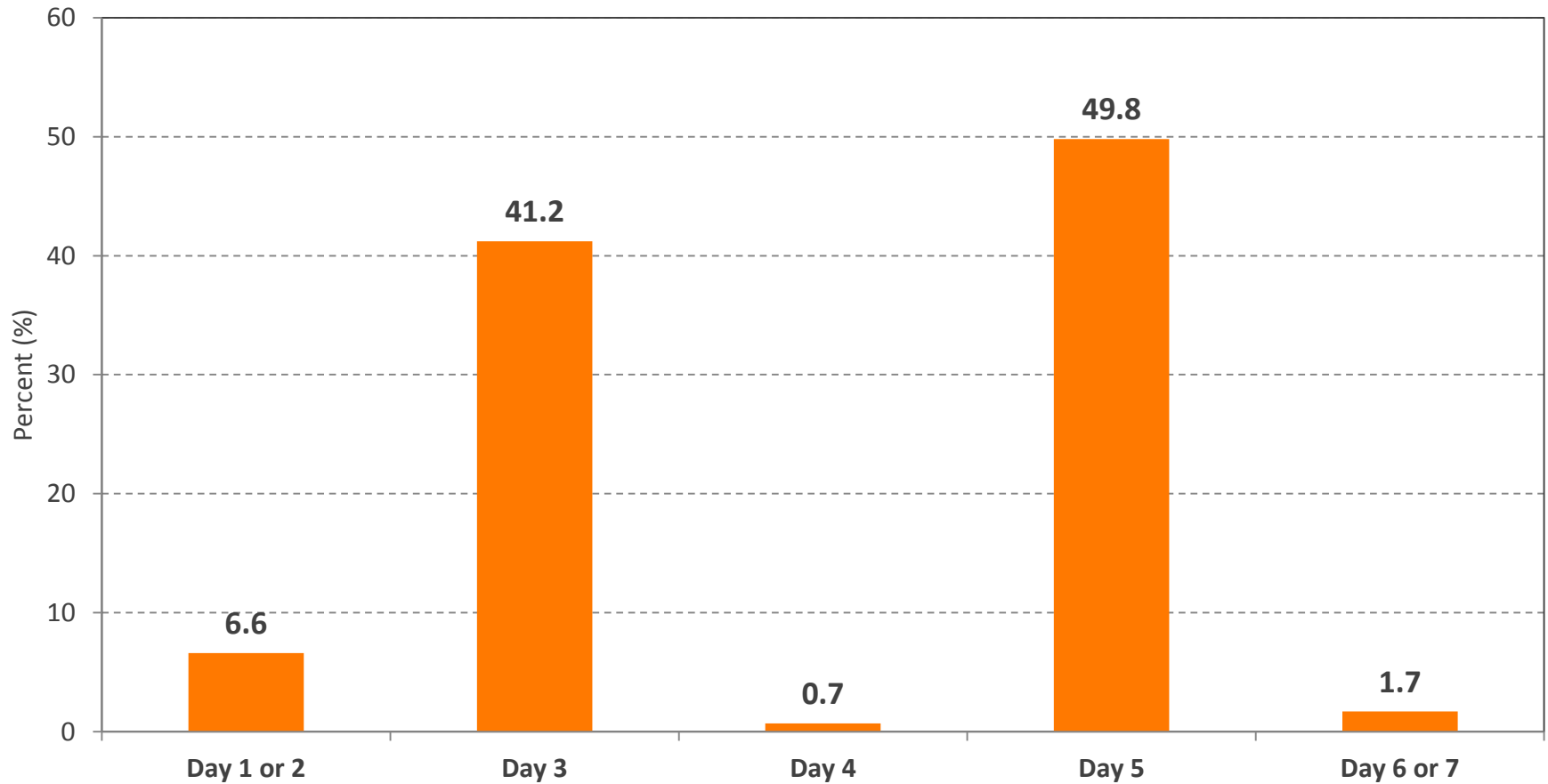
# Number of embryos transferred by patient age, per ET cycle

*ART cycles using fresh IVF – own oocytes, 2014*



# Embryo transfer day, per ET cycle

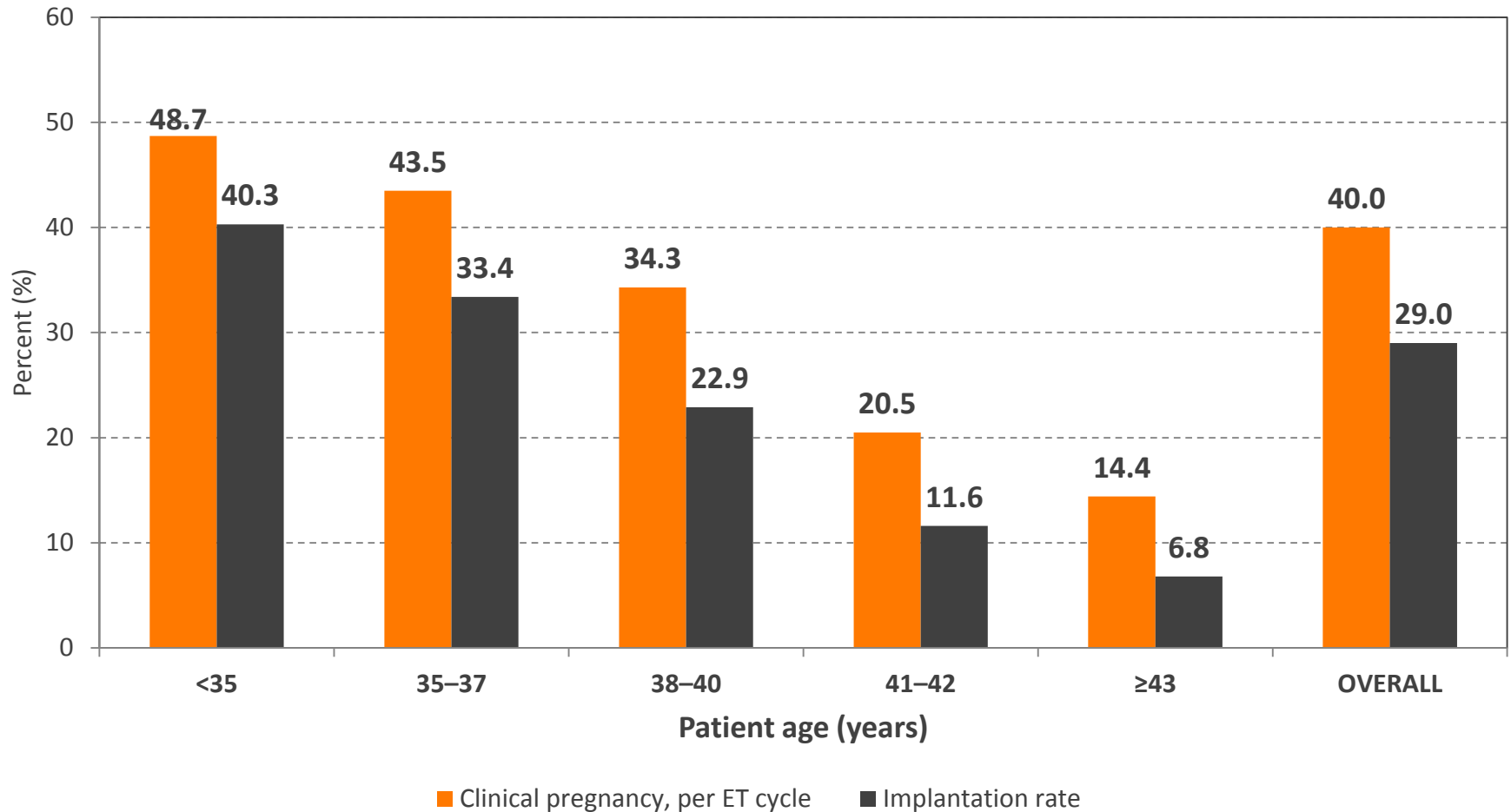
*ART cycles using fresh IVF – own oocytes, 2014*



\* Excludes records with missing embryo transfer day

# Clinical pregnancy and implantation rate by patient age

ART cycles using fresh IVF – own oocytes, 2014

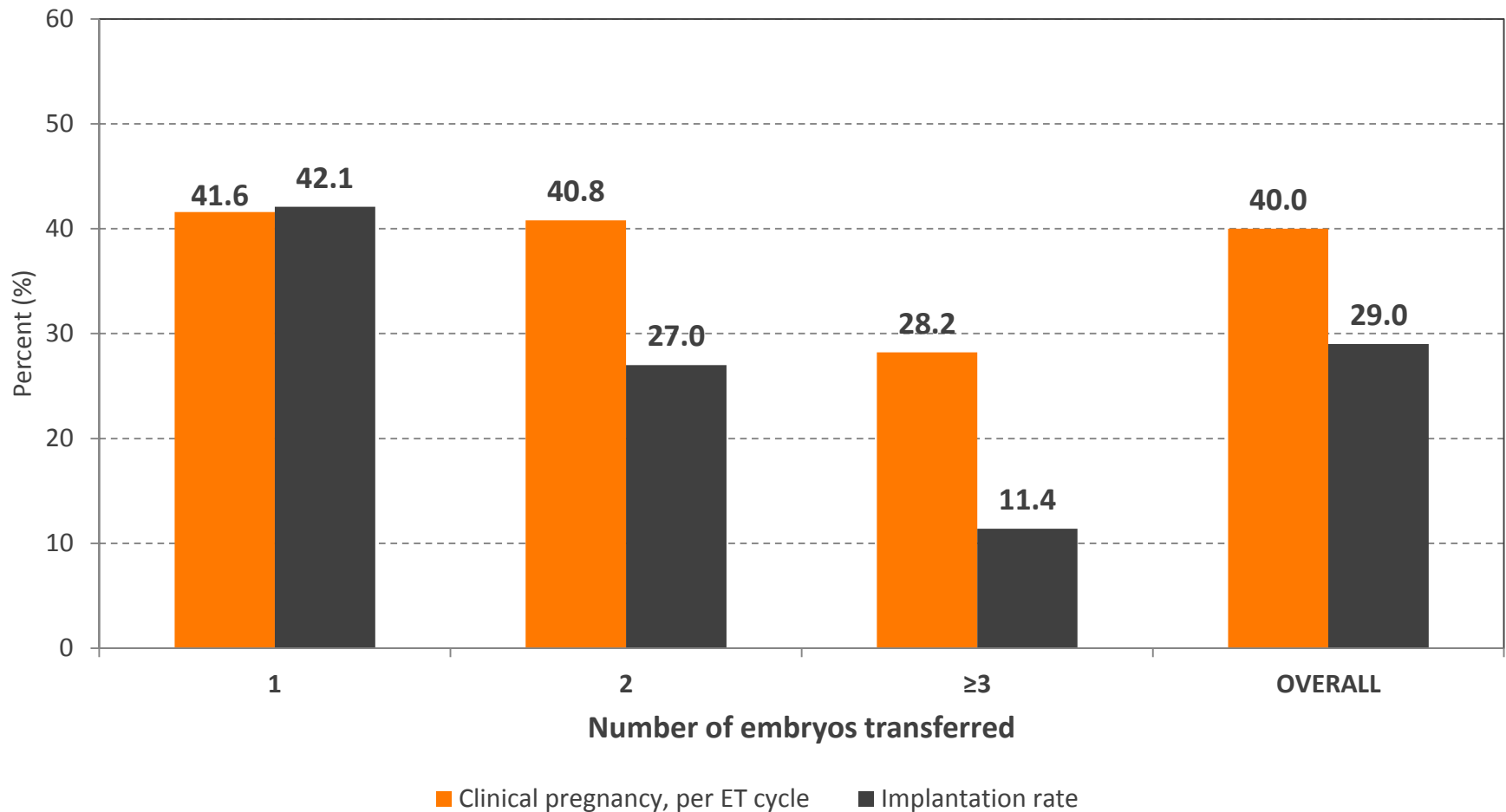


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Clinical pregnancy and implantation rate by number of embryos transferred

ART cycles using fresh IVF – own oocytes, 2014

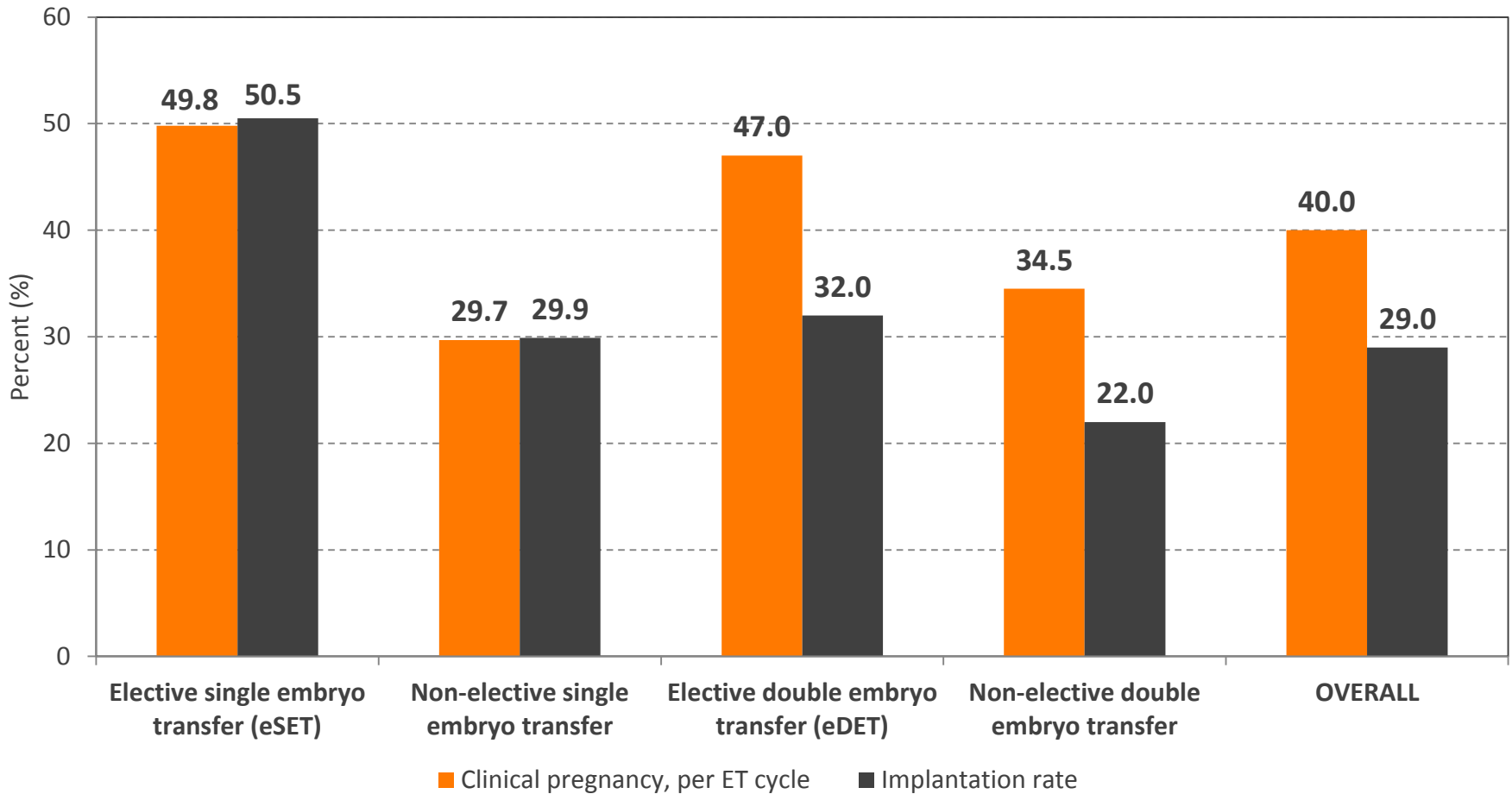


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Clinical pregnancy and implantation rate by eSET/eDET

ART cycles using fresh IVF – own oocytes, 2014



NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

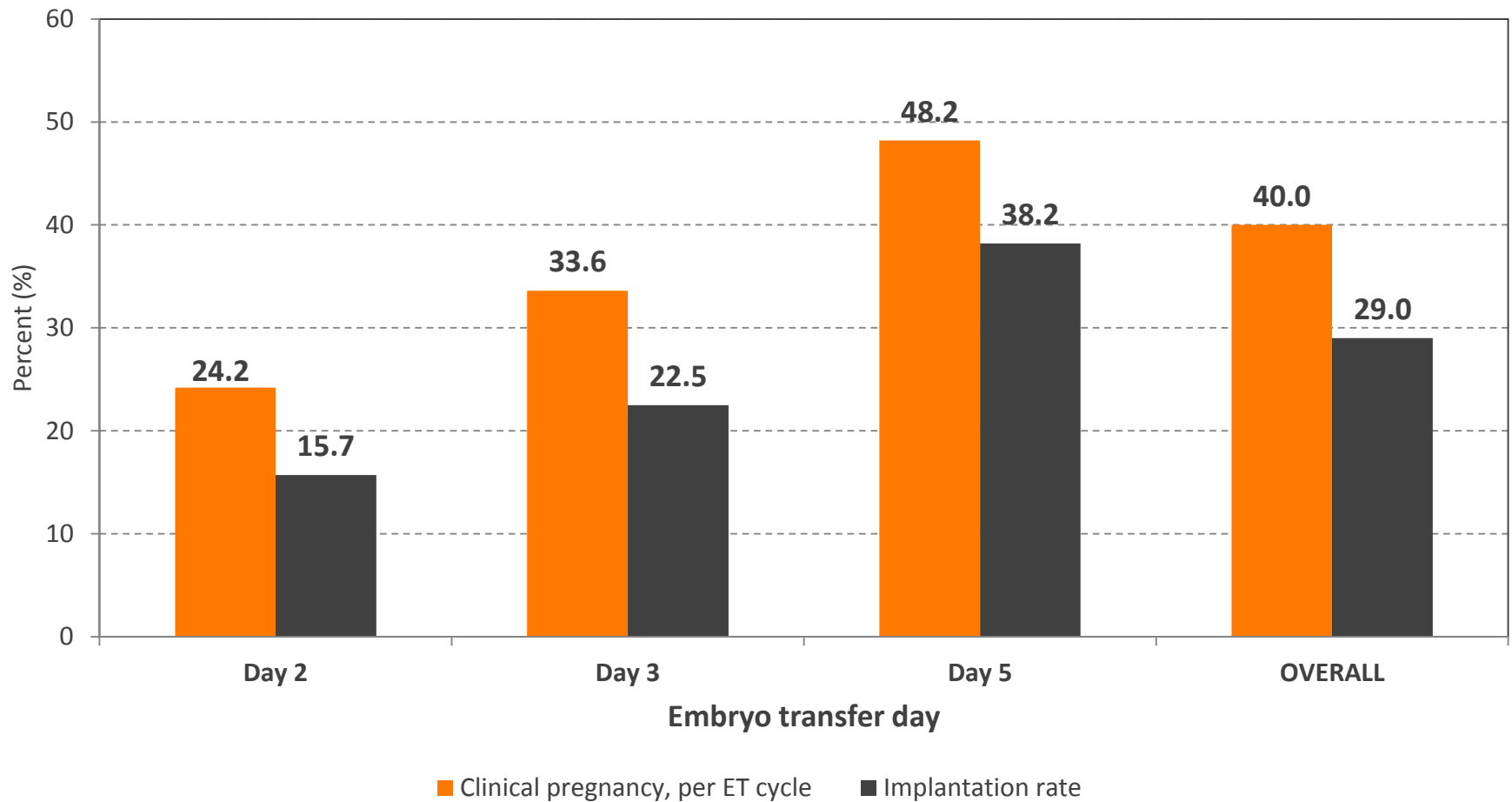
\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred



# Clinical pregnancy and implantation rate by embryo transfer day

ART cycles using fresh IVF – own oocytes, 2014

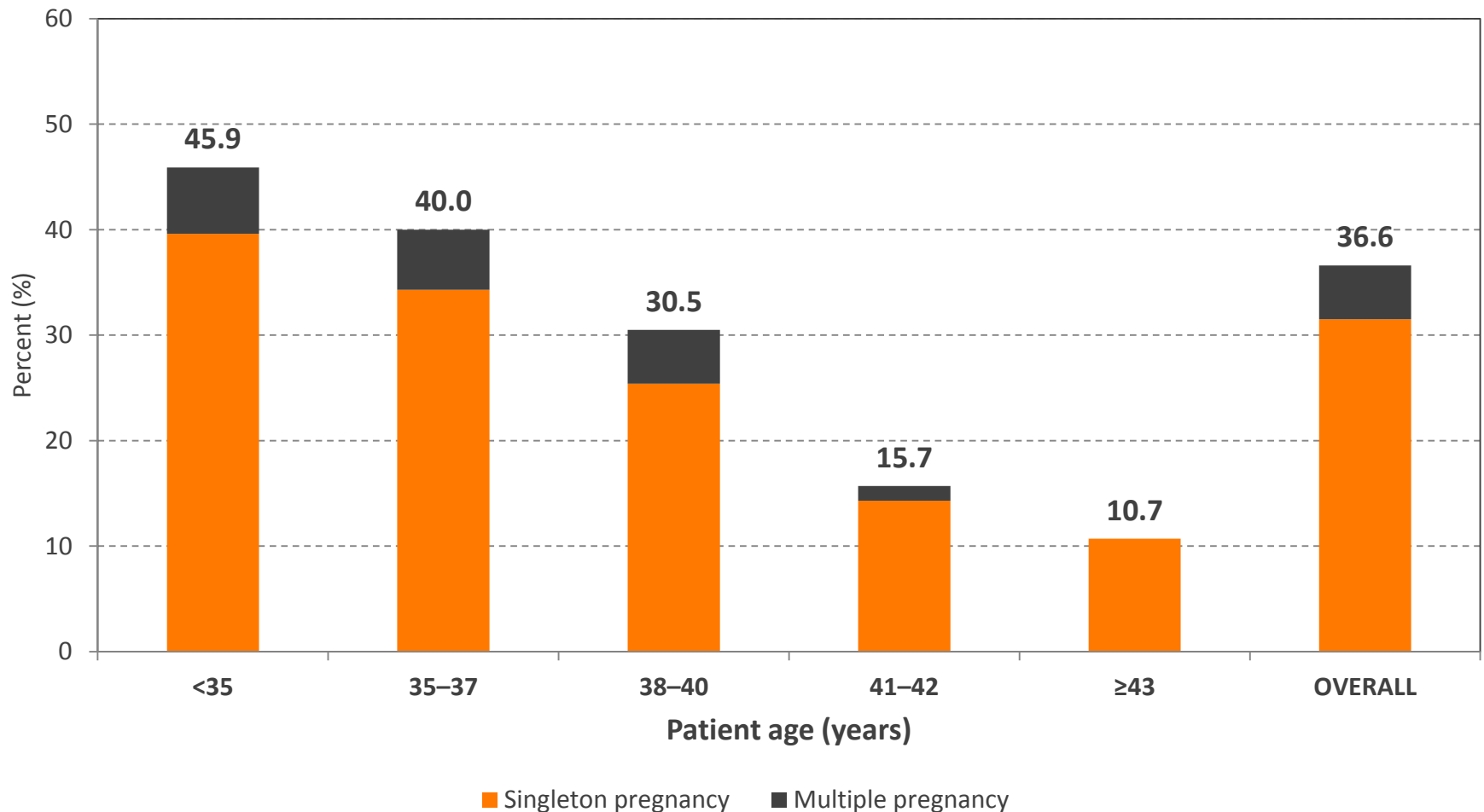


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and patient age, per ET cycle

ART cycles using fresh IVF – own oocytes, 2014

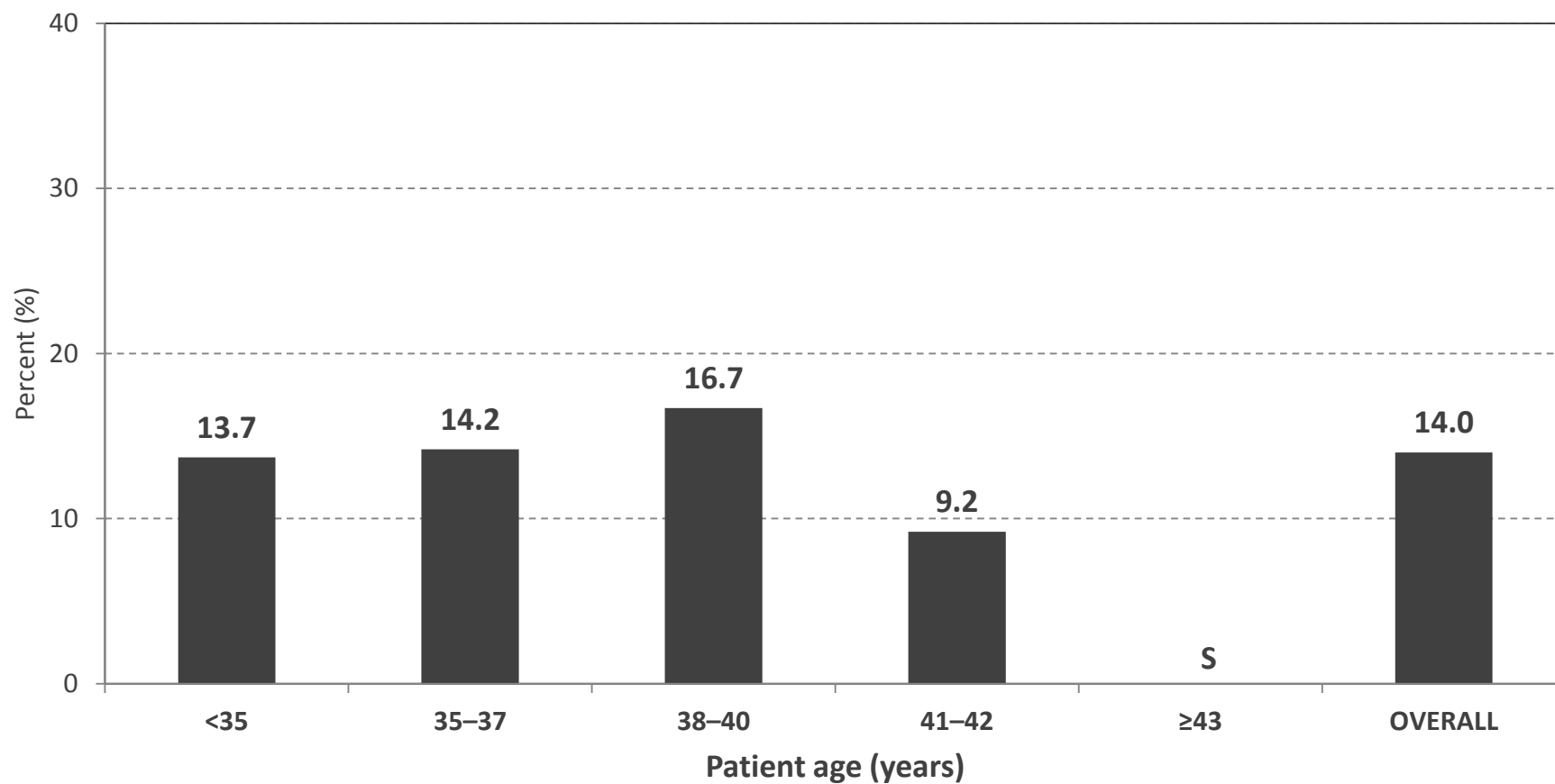


\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by patient age, per ongoing clinical pregnancy

ART cycles using fresh IVF – own oocytes, 2014



Multiple pregnancies

249

133

108

15

<6

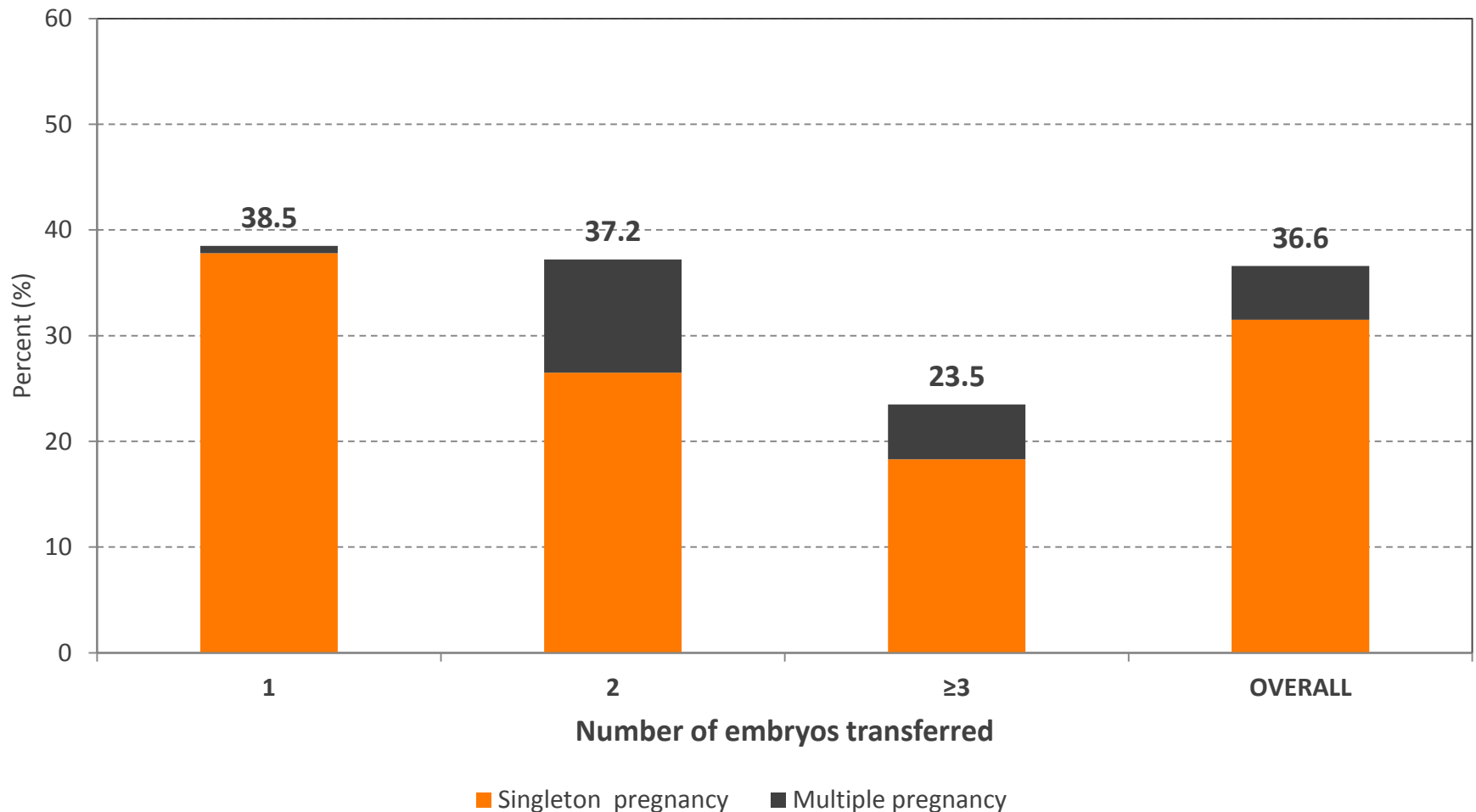
506

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $> 1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and number of embryos transferred, per ET cycle

ART cycles using fresh IVF – own oocytes, 2014



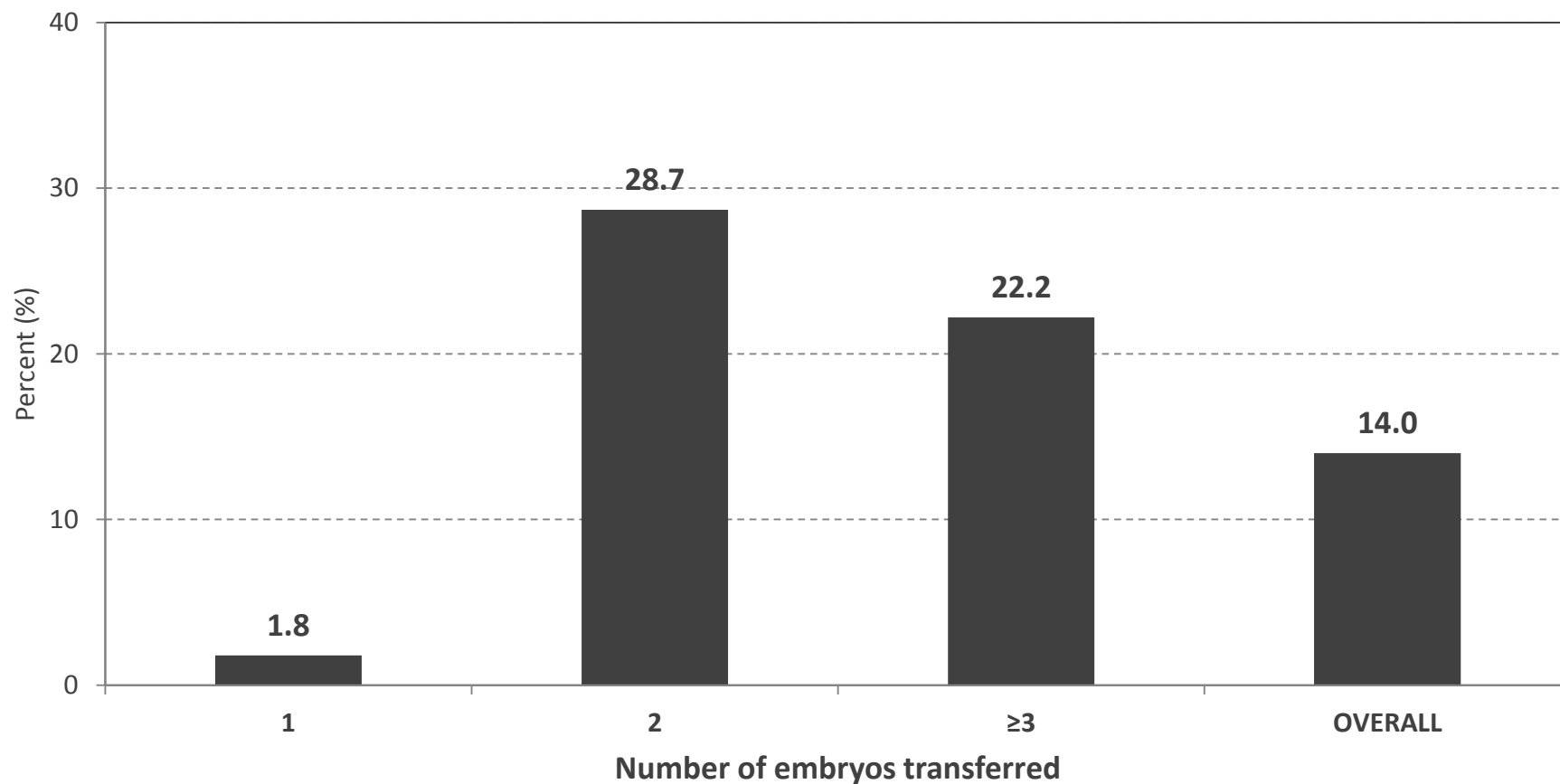
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by number of embryos transferred, per ongoing clinical pregnancy

ART cycles using fresh IVF – own oocytes, 2014



Multiple pregnancies

35

425

46

506

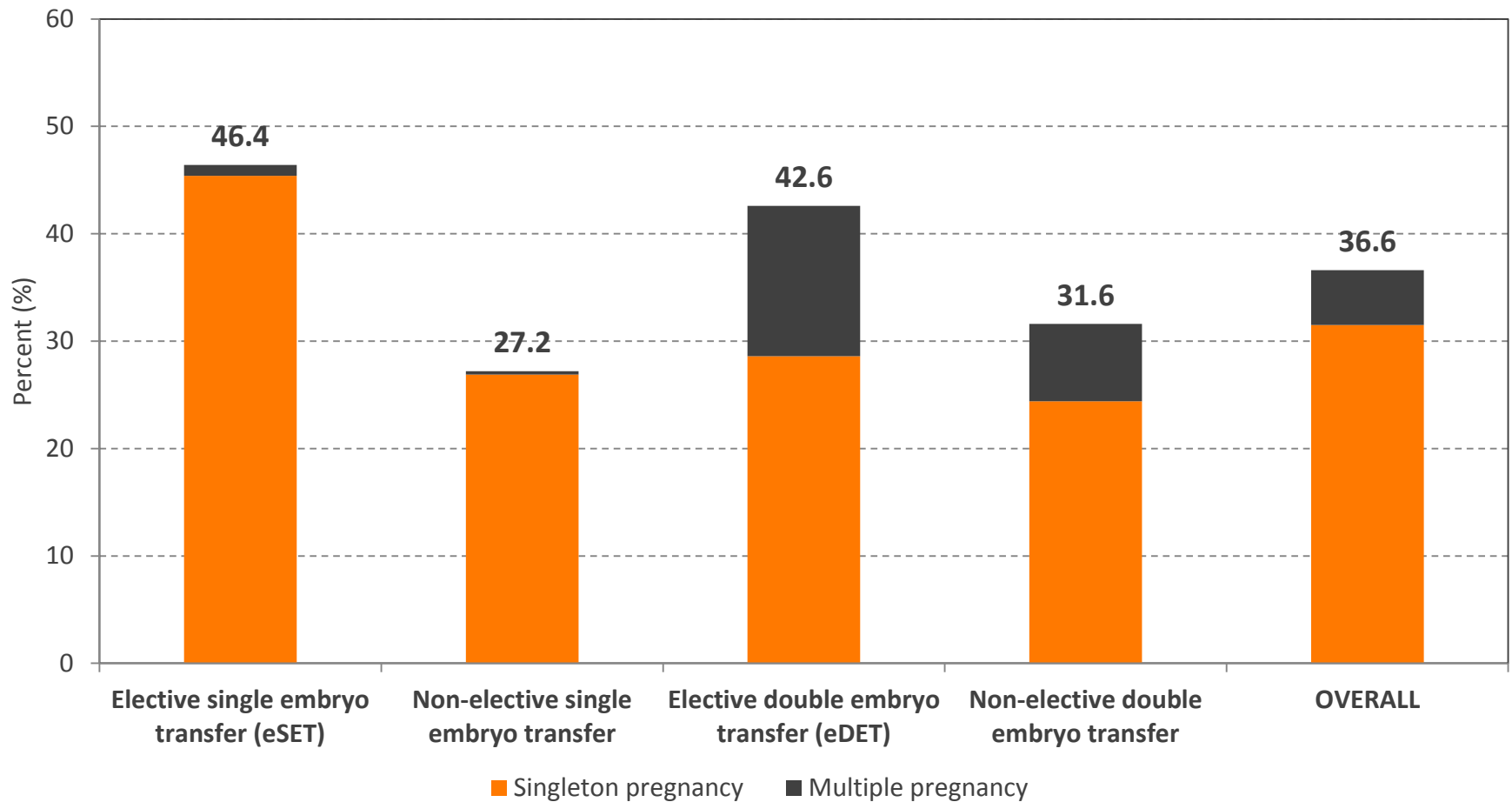
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and eSET/eDET, per ET cycle

ART cycles using fresh IVF – own oocytes, 2014



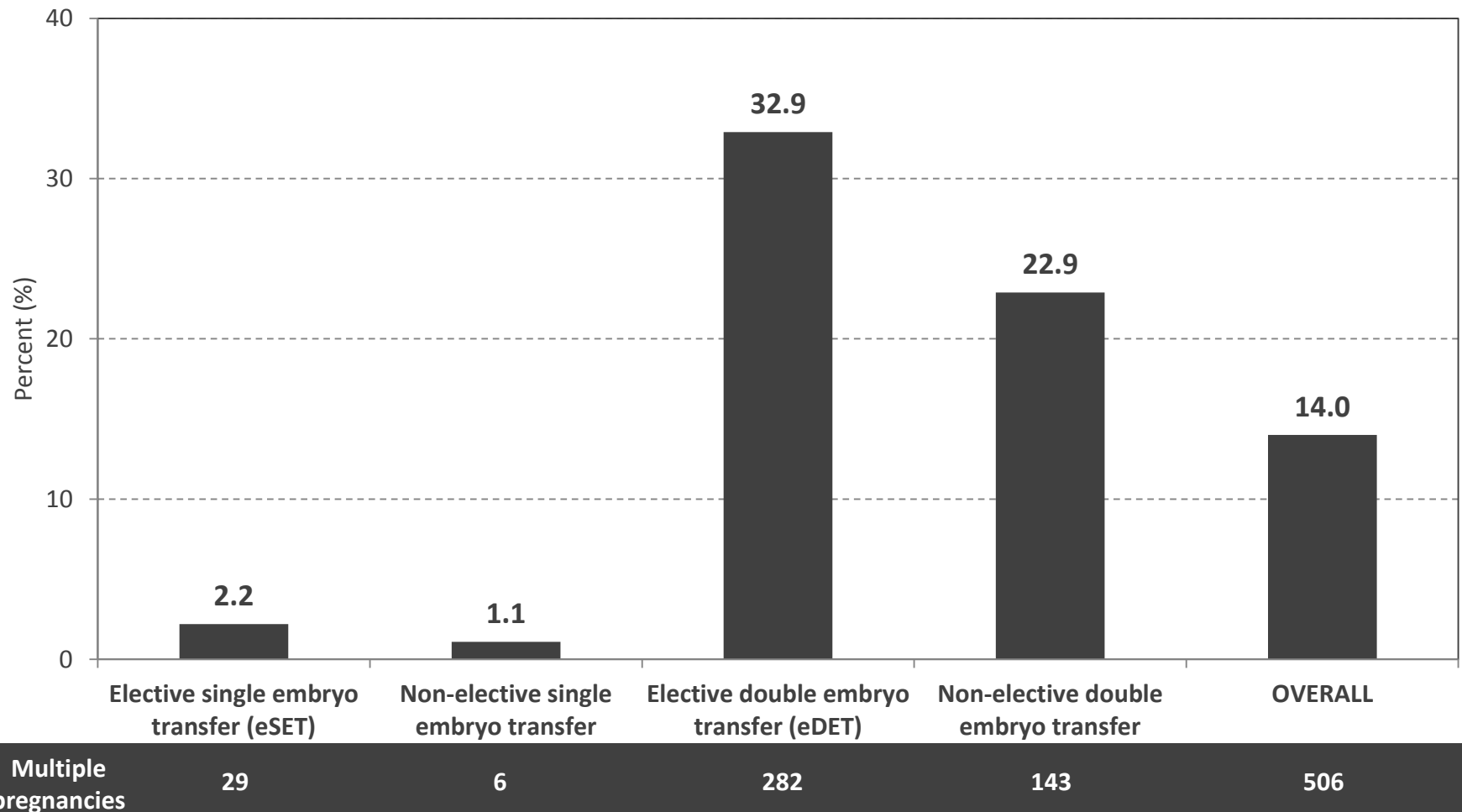
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by eSET/eDET, per ongoing clinical pregnancy

ART cycles using fresh IVF – own oocytes, 2014



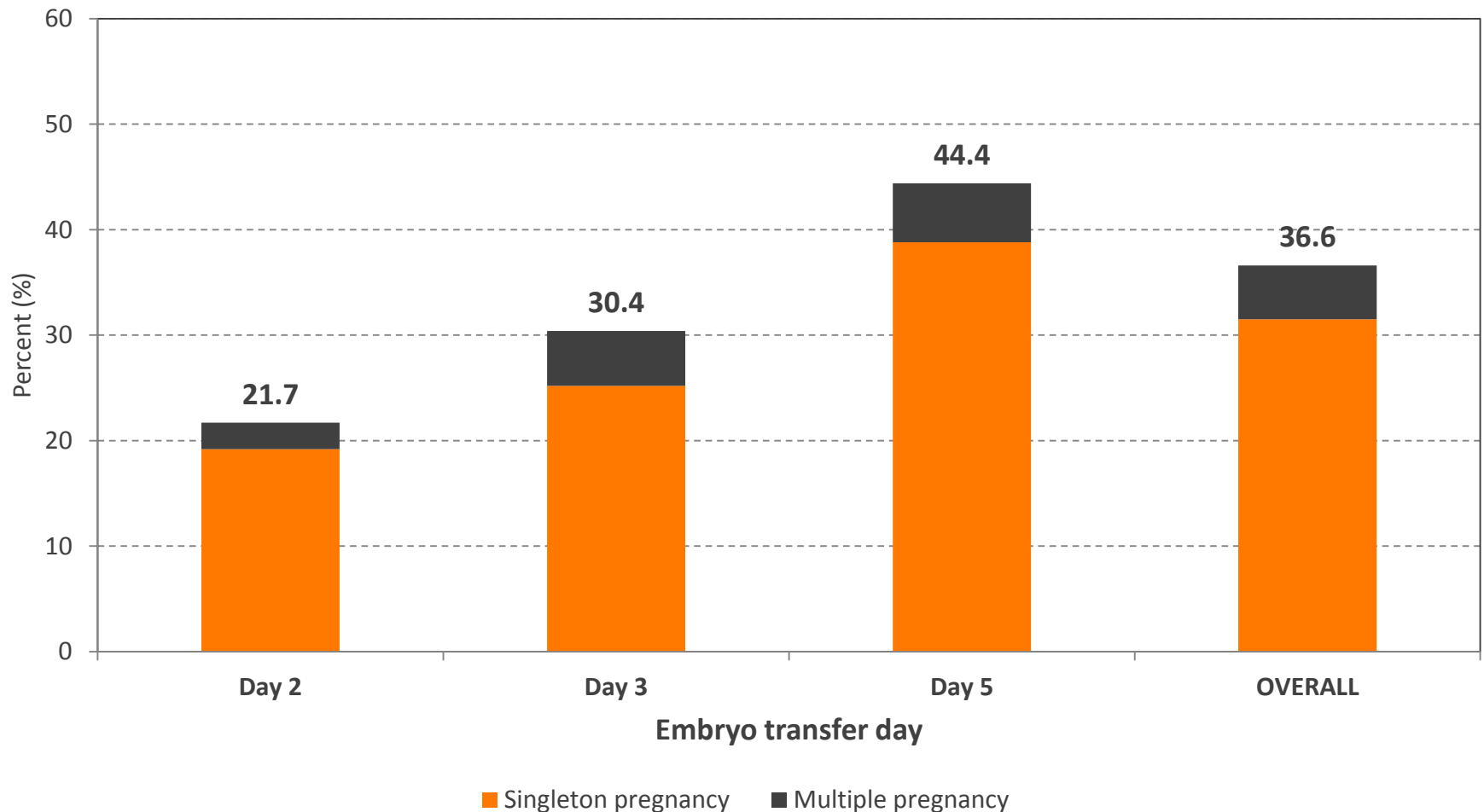
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and embryo transfer day, per ET cycle

*ART cycles using fresh IVF – own oocytes, 2014*



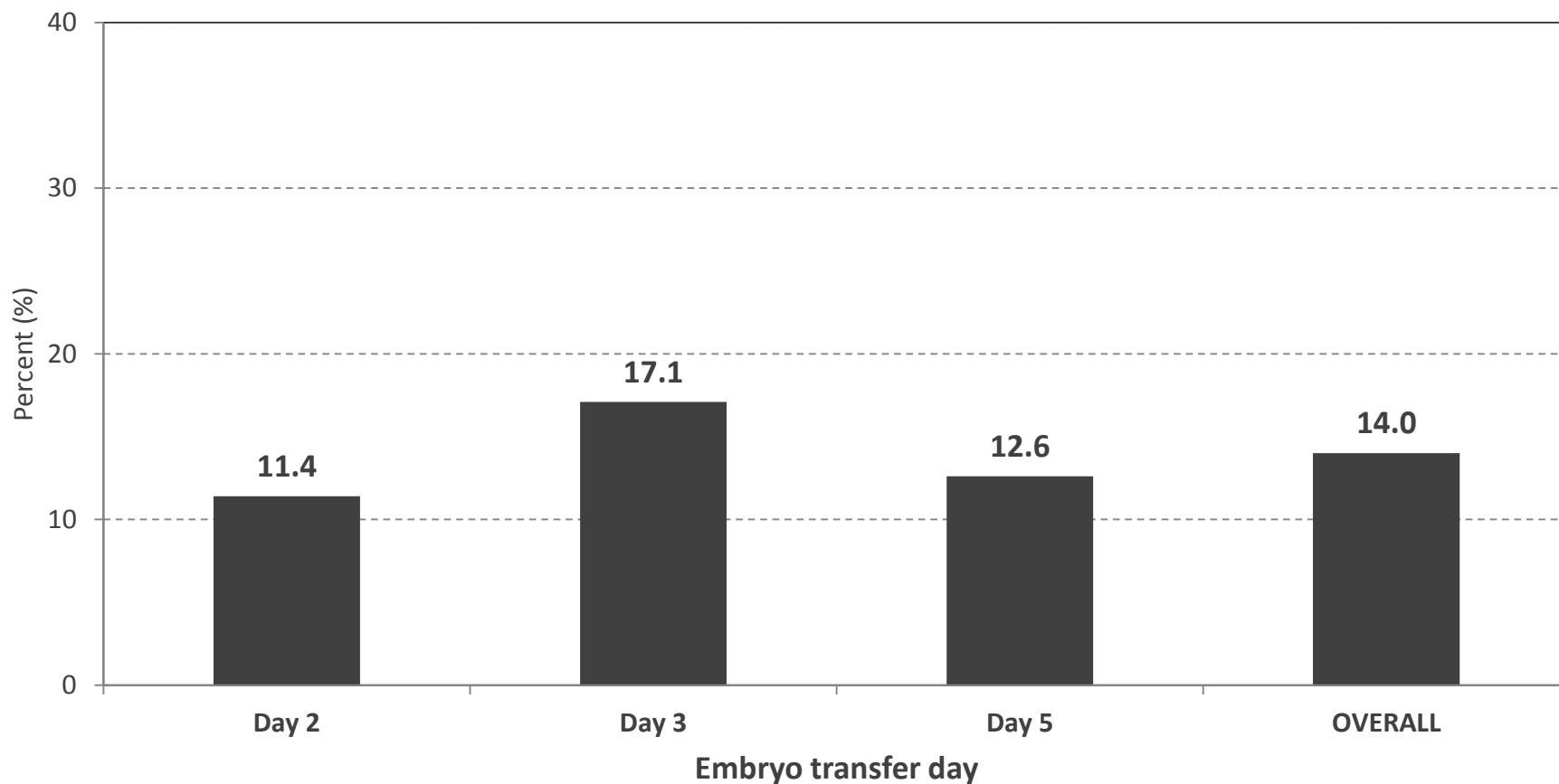
\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat



# Percentage of multiple pregnancies by embryo transfer day, per ongoing clinical pregnancy

ART cycles using fresh IVF – own oocytes, 2014



Multiple pregnancies

16

210

272

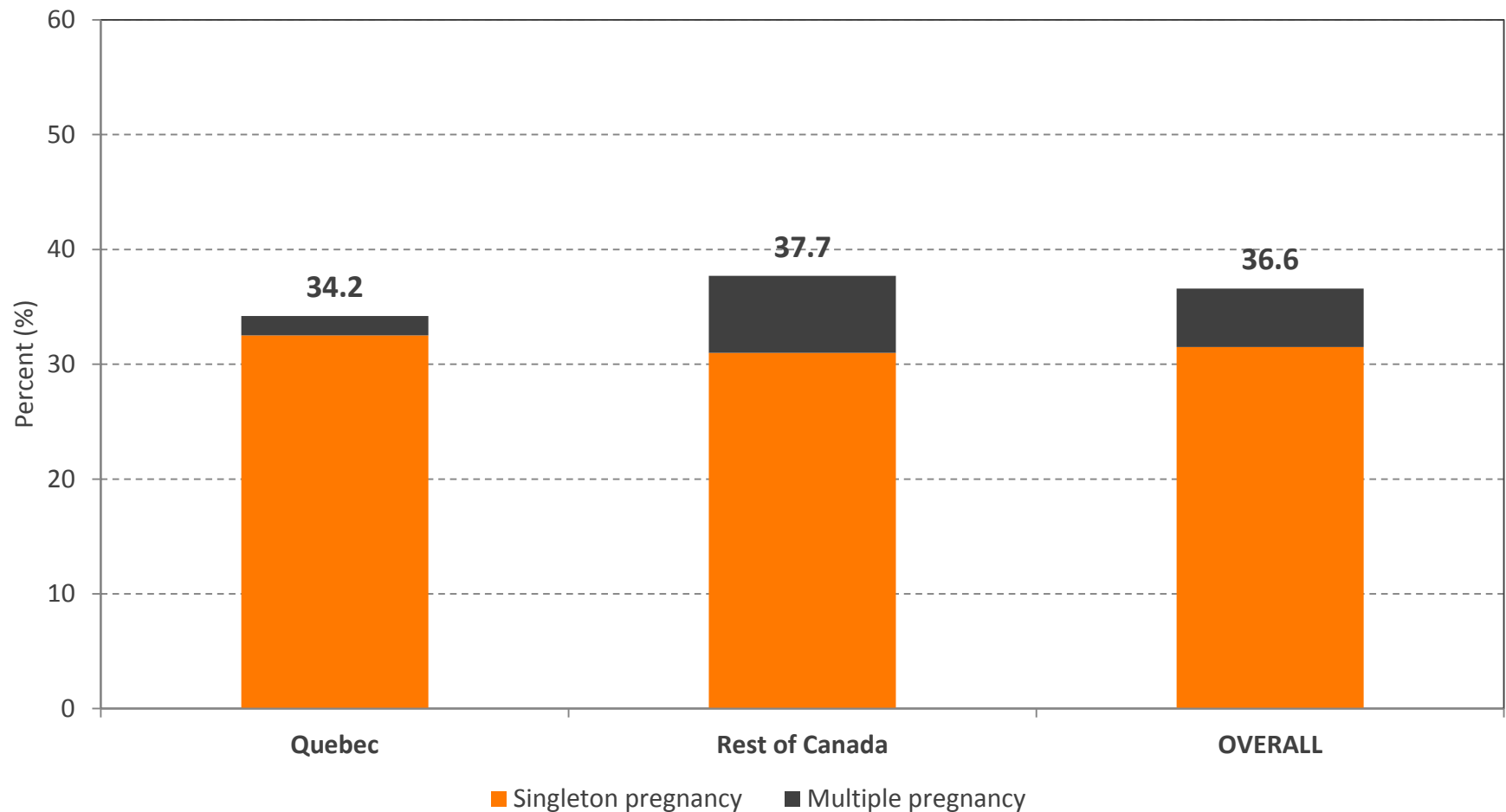
506

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and province, per ET cycle

*ART cycles using fresh IVF – own oocytes, 2014*

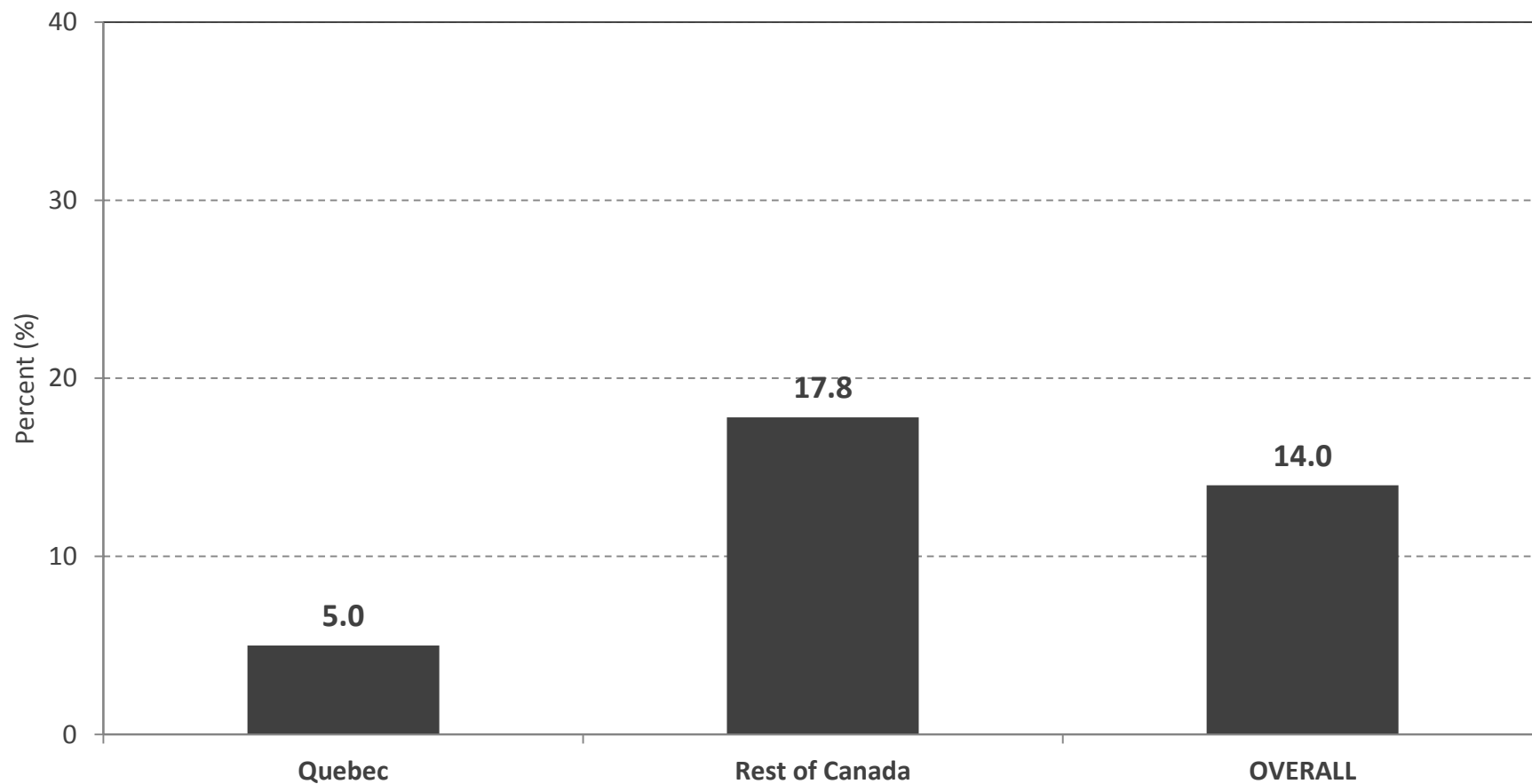


\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by province, per ongoing clinical pregnancy

*ART cycles using fresh IVF – own oocytes, 2014*



Multiple pregnancies

53

453

506

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Treatment outcomes

ART cycles using fresh IVF – own oocytes, 2014

Treatment outcome	Number	% per CS	% per ET	% per CP	% per OCP
<b>Clinical pregnancy (CP)*</b>	<b>3,949</b>	<b>26.4</b>	<b>40.3</b>		
<b>Ongoing clinical pregnancy (OCP)†</b>	<b>3609</b>	<b>24.1</b>	<b>36.8</b>	<b>91.4</b>	
Singleton‡	3,103	20.8	31.6	78.6	86.0
Multiple‡	506	3.4	5.2	12.8	14.0
<b>Multiple pregnancy‡</b>	<b>506</b>	<b>3.4</b>	<b>5.2</b>	<b>12.8</b>	<b>14.0</b>
Twins	487	<b>96.2% of multiple pregnancies were twin gestations</b>			
Triplet or higher	19				

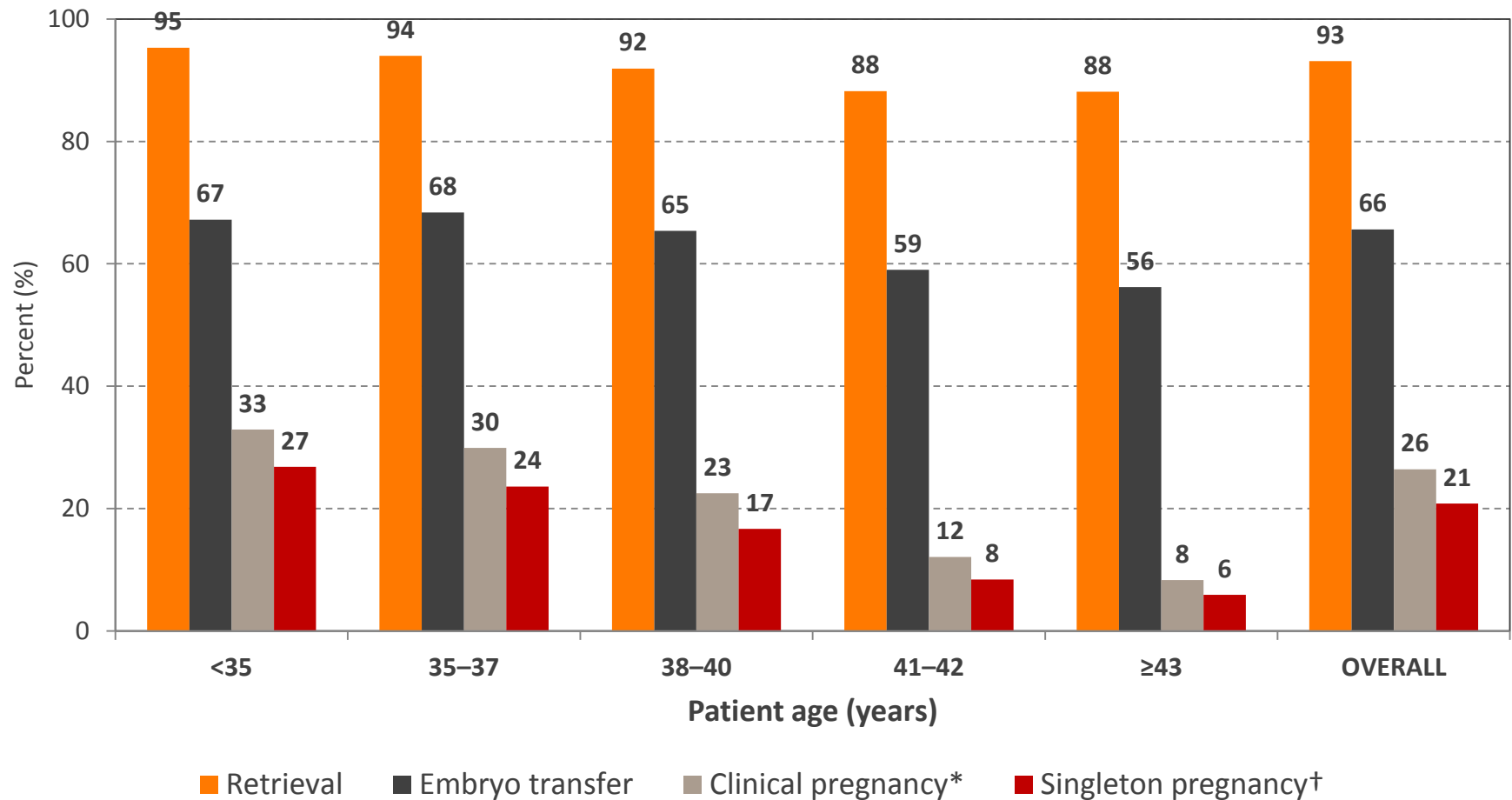
\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Ongoing clinical pregnancy: clinical pregnancy with ≥1 fetal heart beat on ultrasound

‡ Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with >1 fetal heart beat

# Oocyte retrieval, embryo transfer, clinical pregnancy and singleton pregnancy by patient age, per CS

ART cycles using fresh IVF – own oocytes, 2014



\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

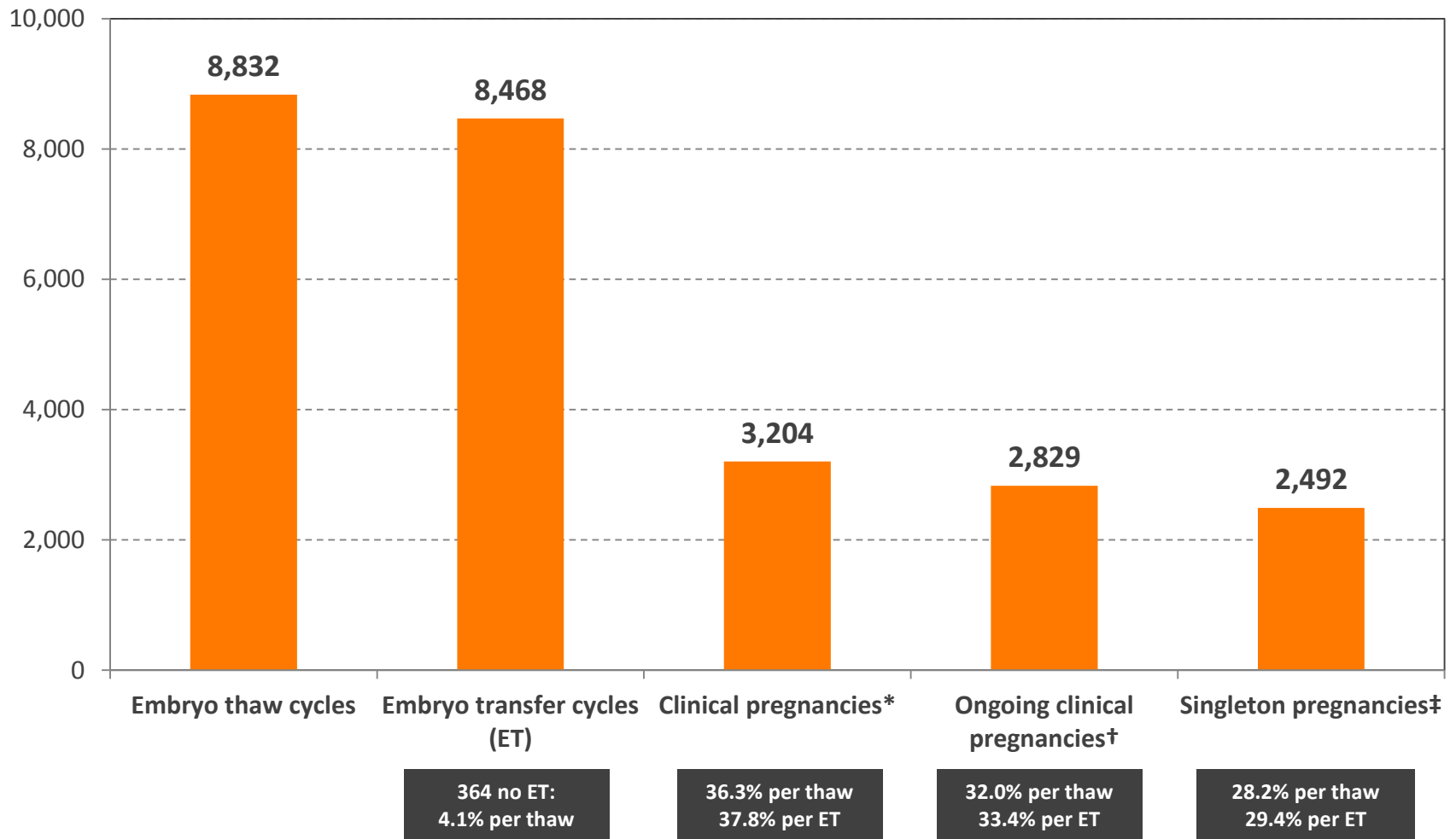
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*ART cycles using FET – own oocytes*

# TREATMENT CYCLES FOR 2014

# Stage of treatment and treatment outcomes

ART cycles using FET – own oocytes, 2014



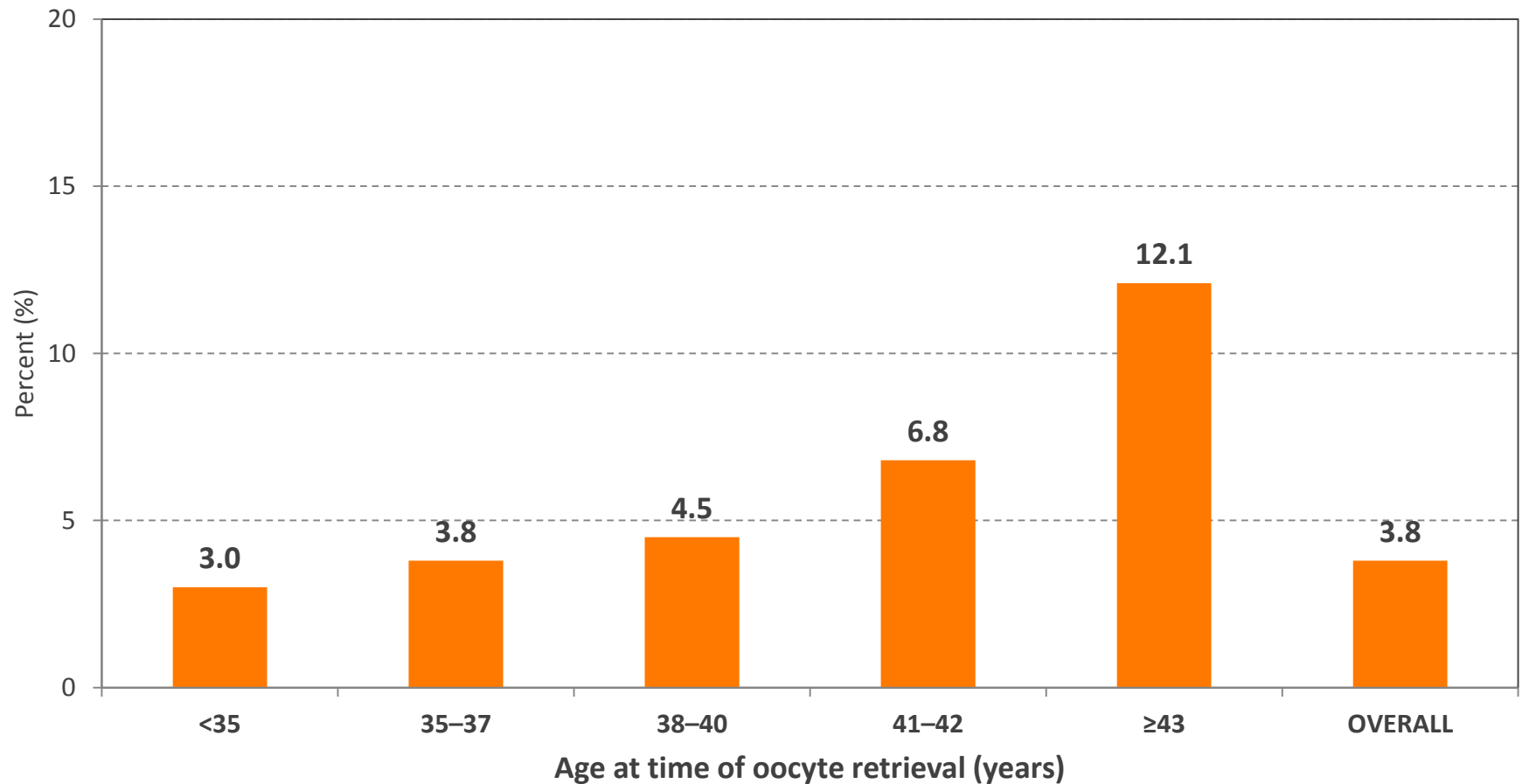
\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

‡ Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

# Percentage of no embryo transfer by age at time of oocyte retrieval, per embryo thaw cycle

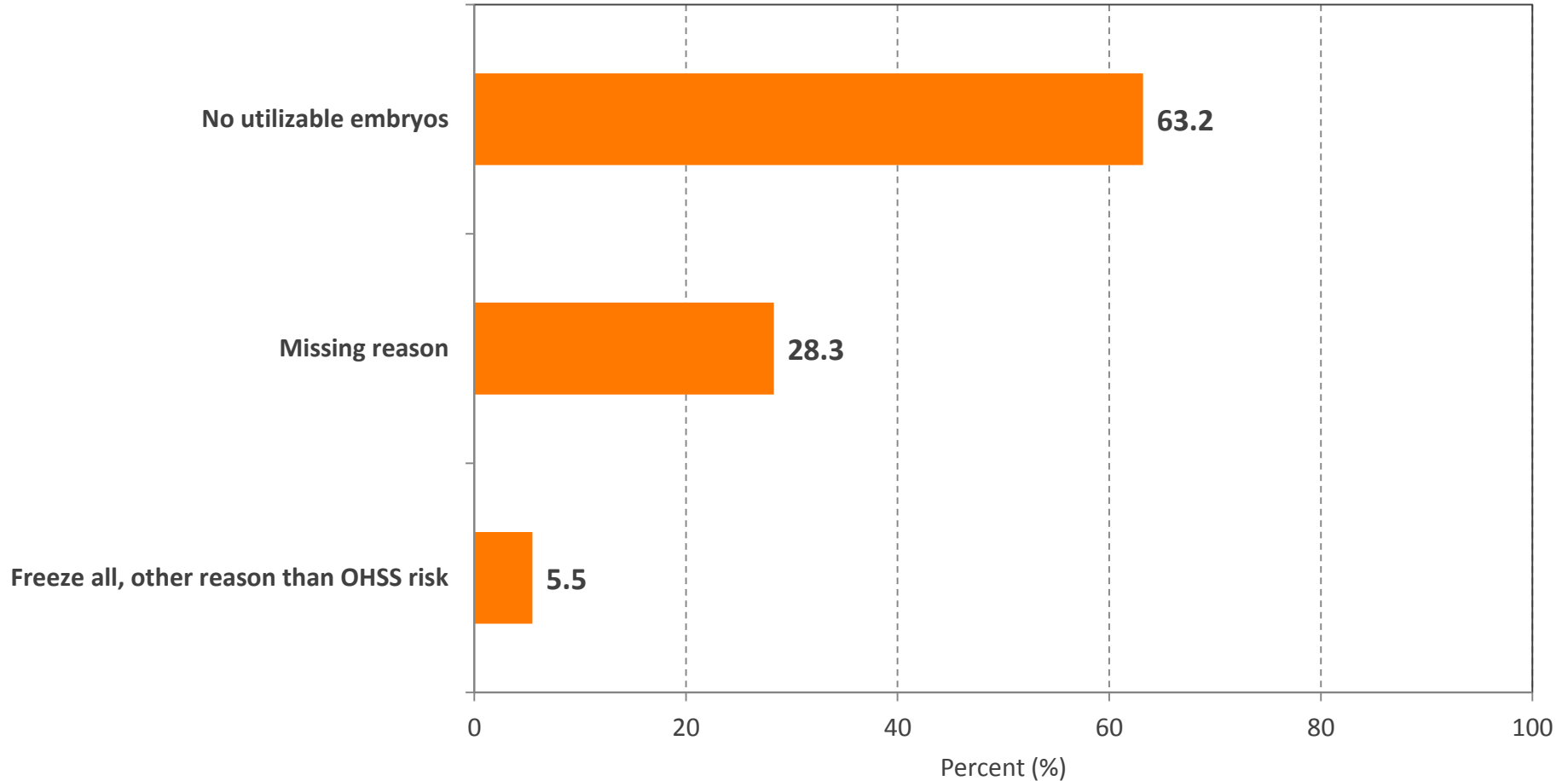
*ART cycles using FET – own oocytes, 2014*





# Reasons for no embryo transfer, per embryo thaw cycle with no embryo transfer

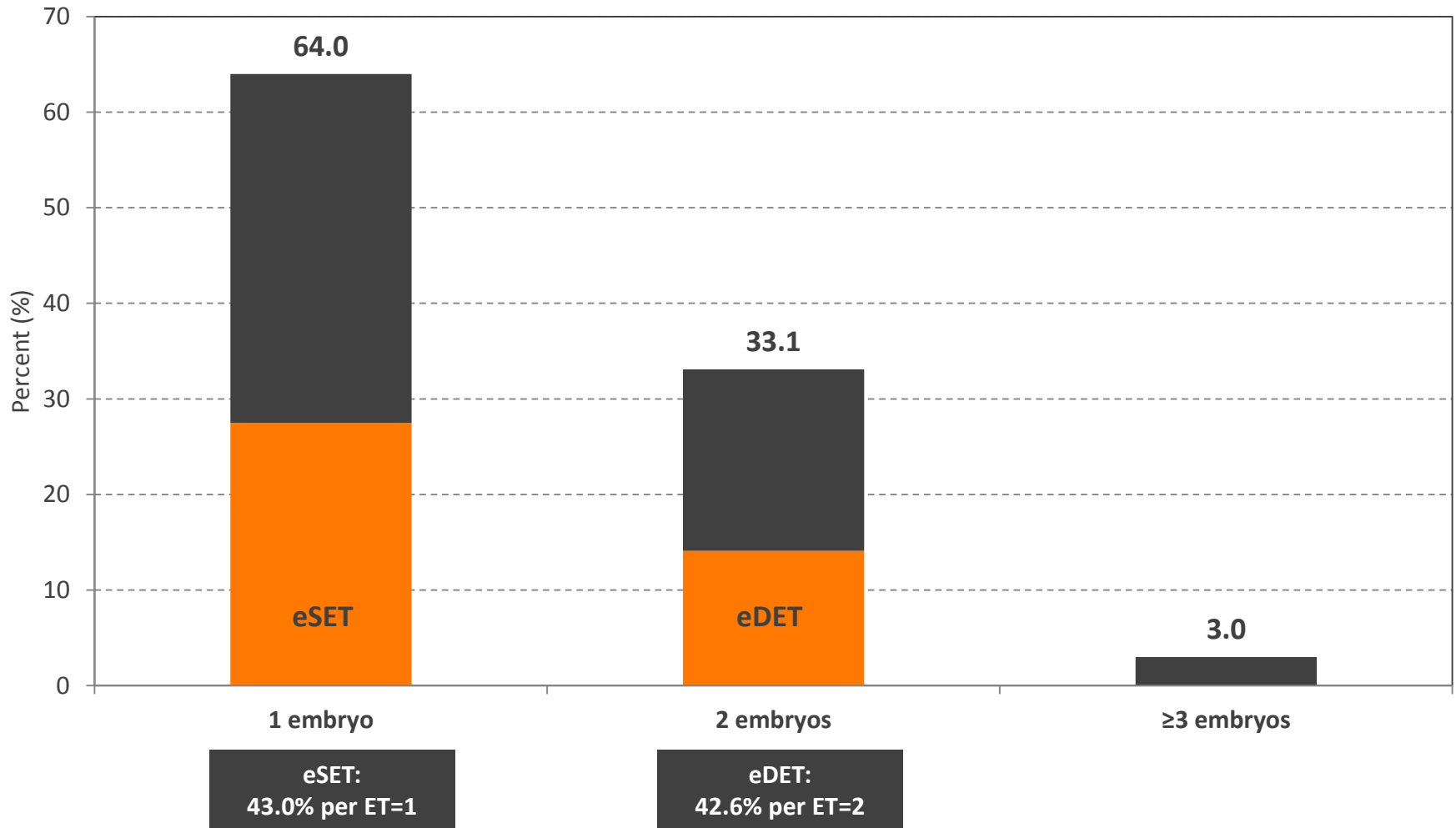
*ART cycles using FET – own oocytes, 2014*



\* Categories are mutually exclusive

# Number of embryos transferred, per ET cycle

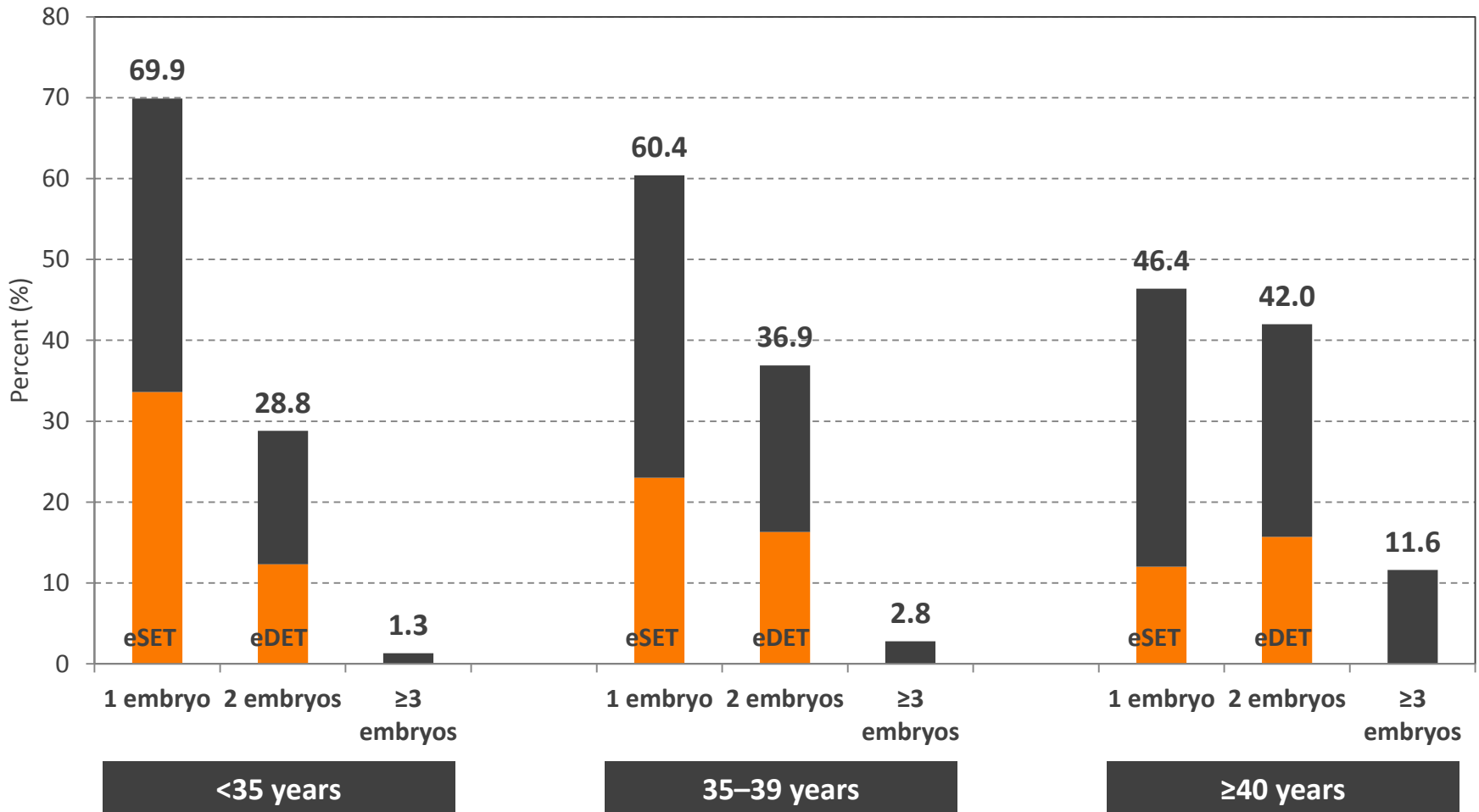
ART cycles using FET – own oocytes, 2014



\* Elective single (eSET) and double (eDET) embryo transfer: transfer of one embryo (eSET) or two embryos (eDET), selected from a larger cohort of available embryos

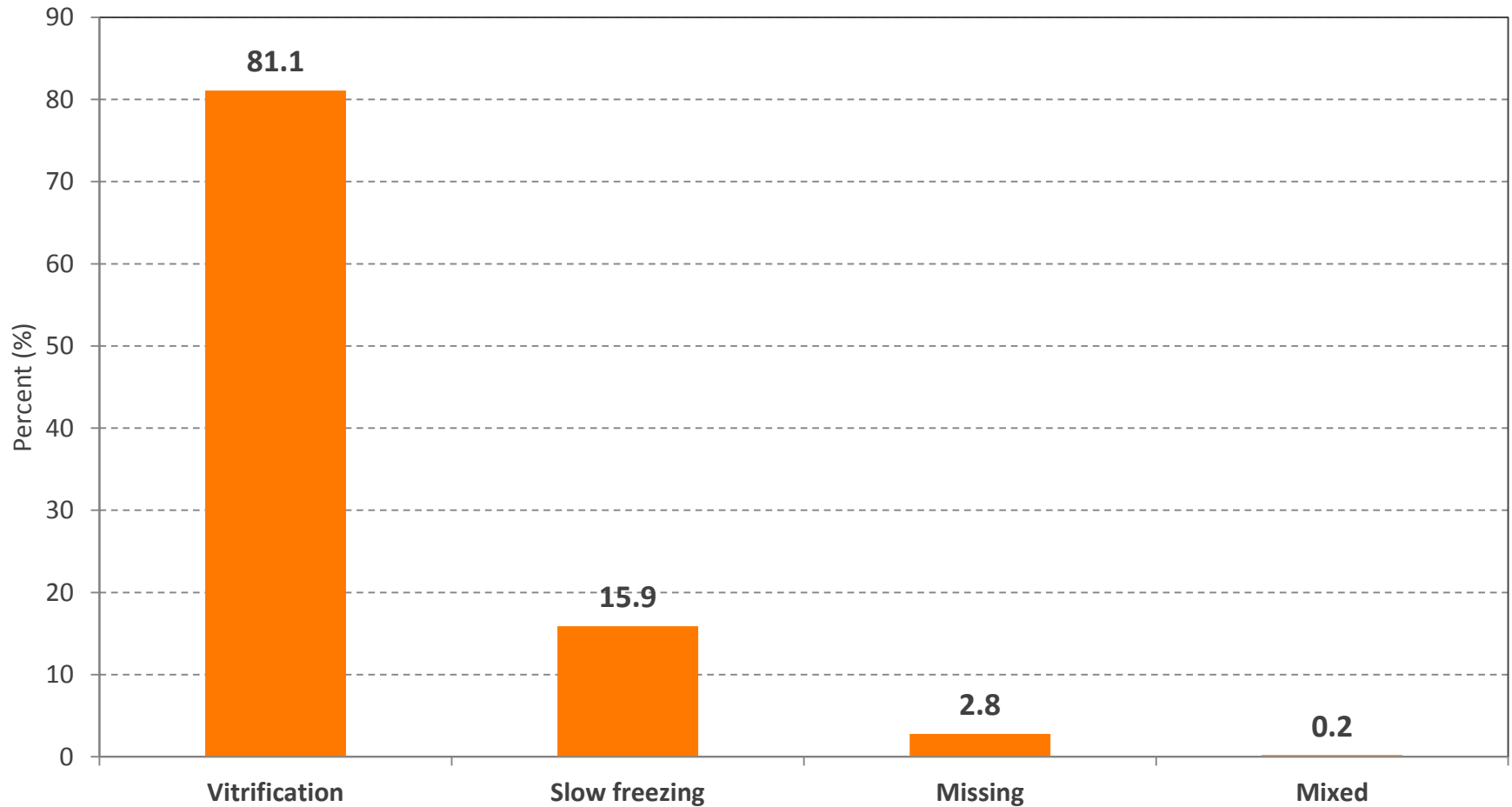
# Number of embryos transferred by age at time of oocyte retrieval, per ET cycle

*ART cycles using FET – own oocytes, 2014*



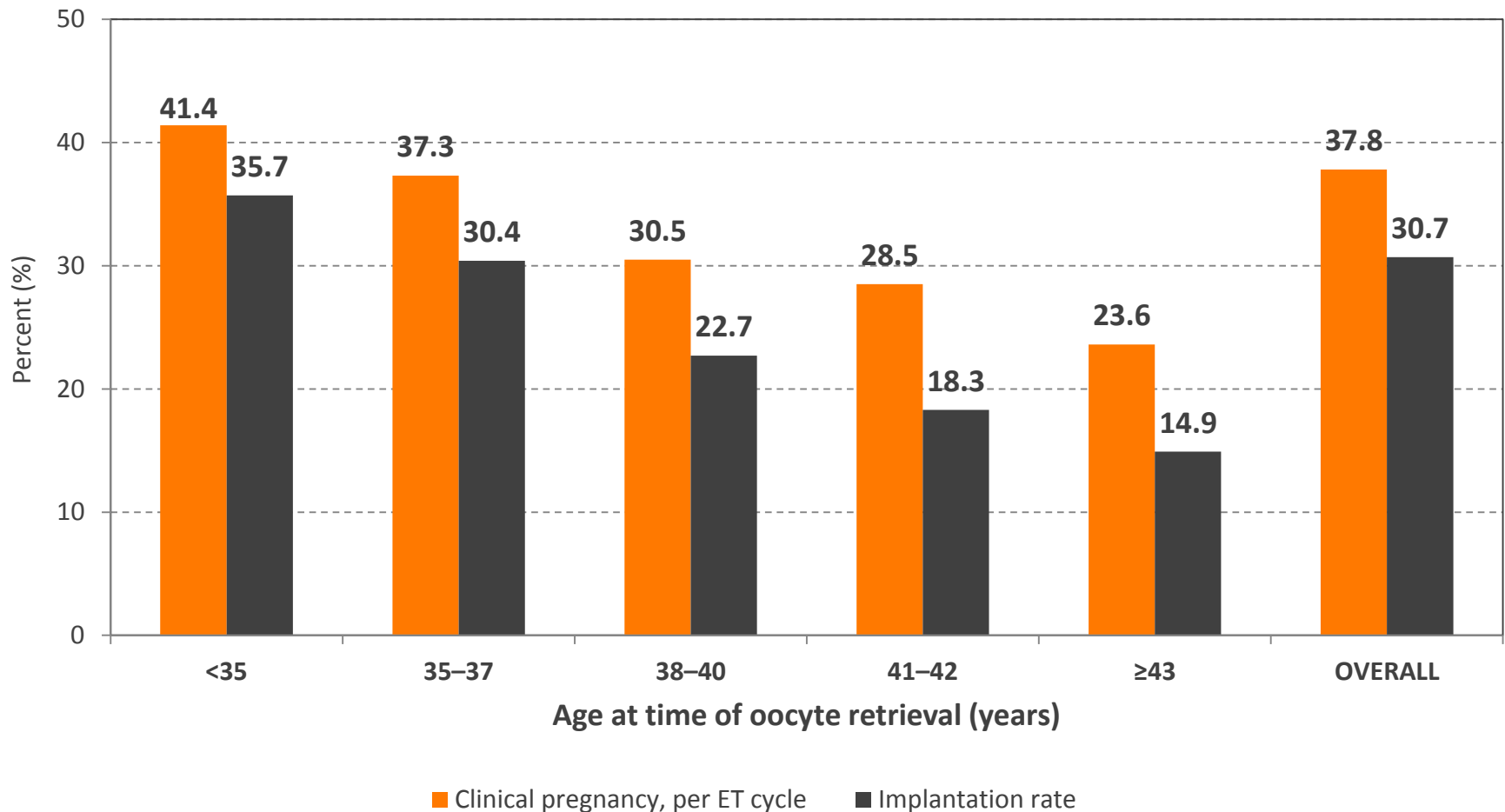
# Method of embryo cryopreservation, per embryo thaw cycle

*ART cycles using FET – own oocytes, 2014*



# Clinical pregnancy and implantation rate by age at time of oocyte retrieval

ART cycles using FET – own oocytes, 2014

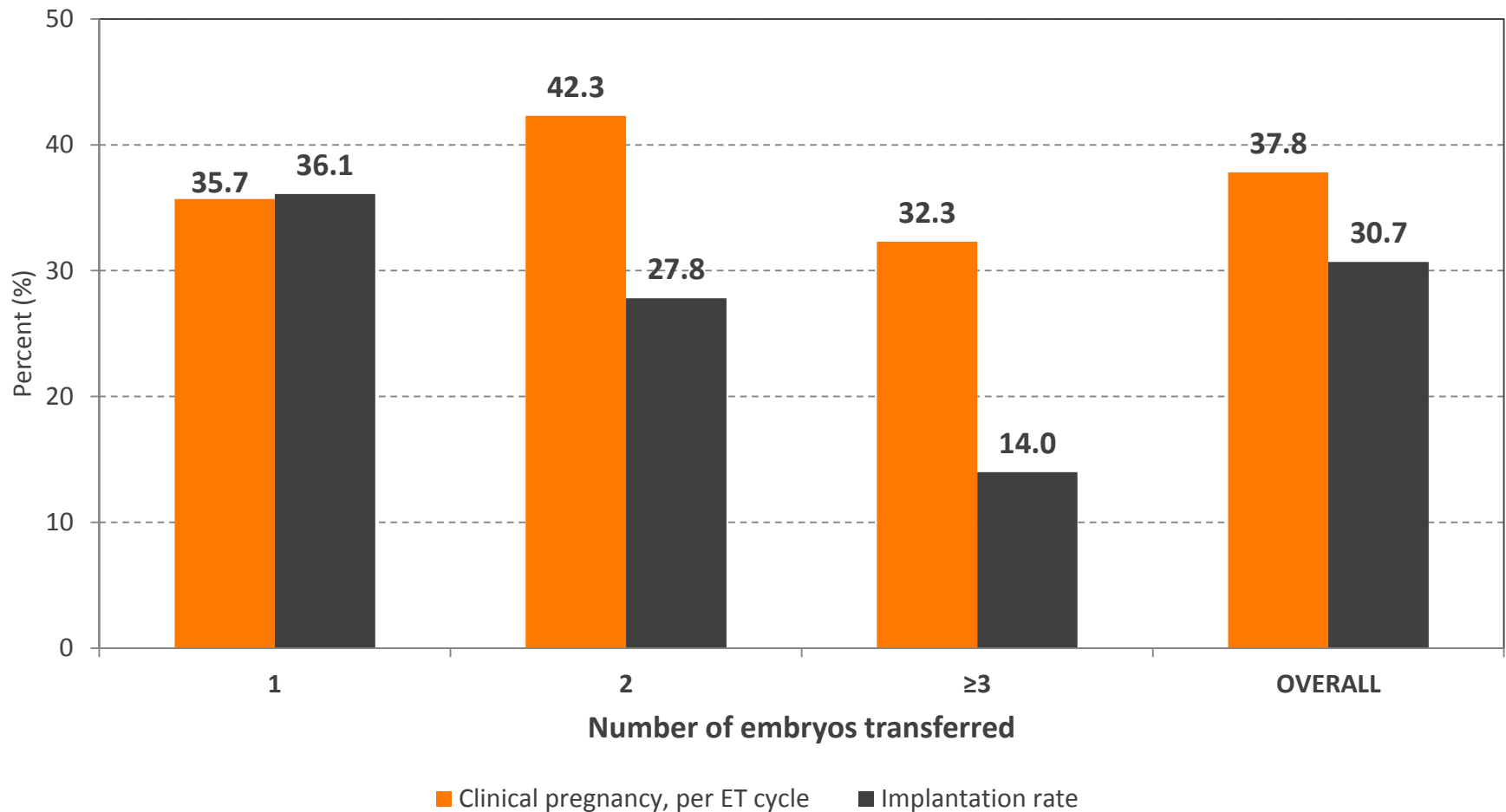


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Clinical pregnancy and implantation rate by number of embryos transferred

*ART cycles using FET – own oocytes, 2014*

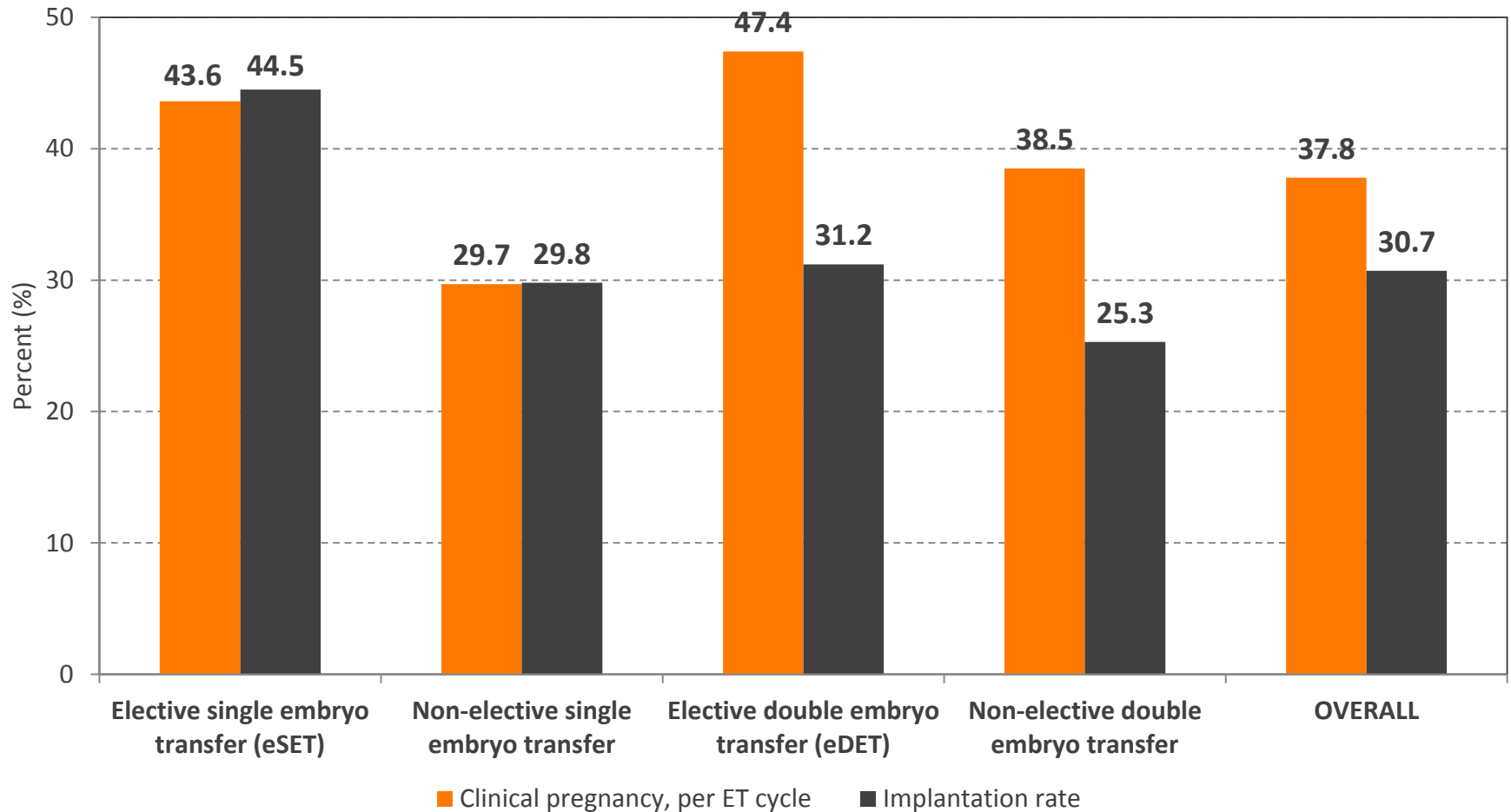


\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Clinical pregnancy and implantation rate by eSET/eDET

ART cycles using FET – own oocytes, 2014



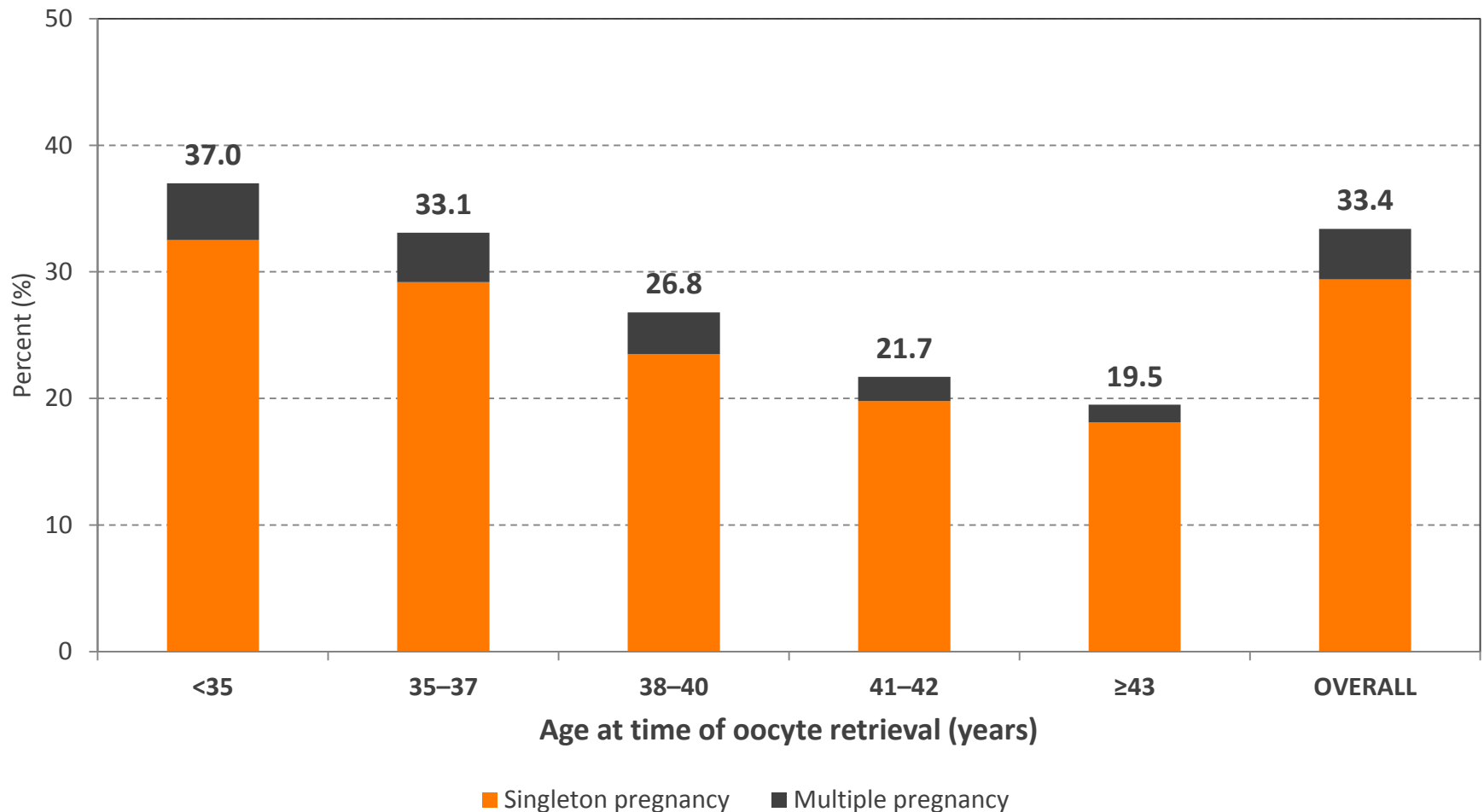
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and age at time of oocyte retrieval, per ET cycle

ART cycles using FET – own oocytes, 2014



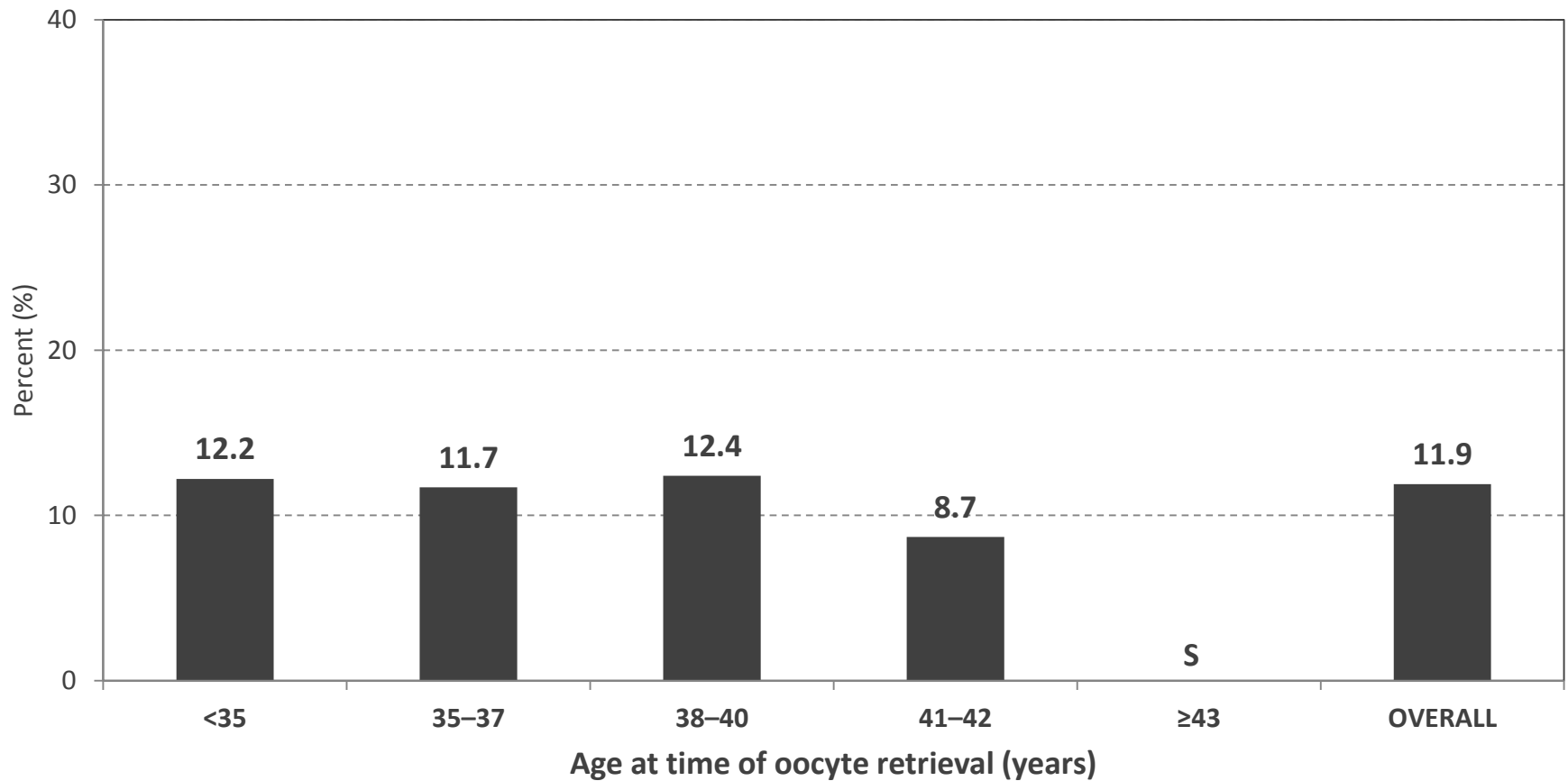
\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat



# Percentage of multiple pregnancies by age at time of oocyte retrieval, per ongoing clinical pregnancy

*ART cycles using FET – own oocytes, 2014*



Multiple pregnancies

207

77

42

9

<6

337

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $> 1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and number of embryos transferred, per ET cycle

ART cycles using FET – own oocytes, 2014



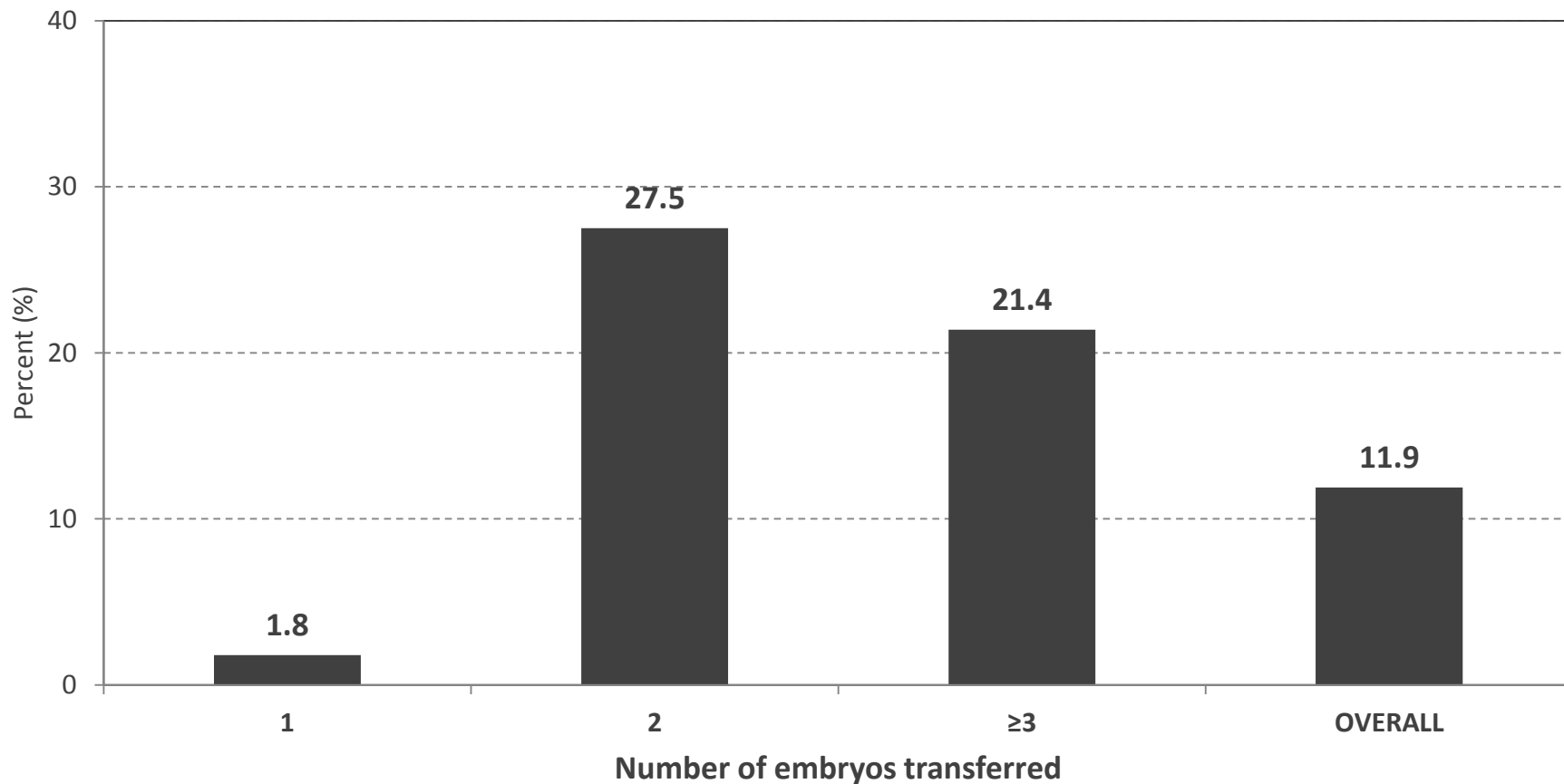
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by number of embryos transferred, per ongoing clinical pregnancy

ART cycles using FET – own oocytes, 2014



Multiple pregnancies

31

291

15

337

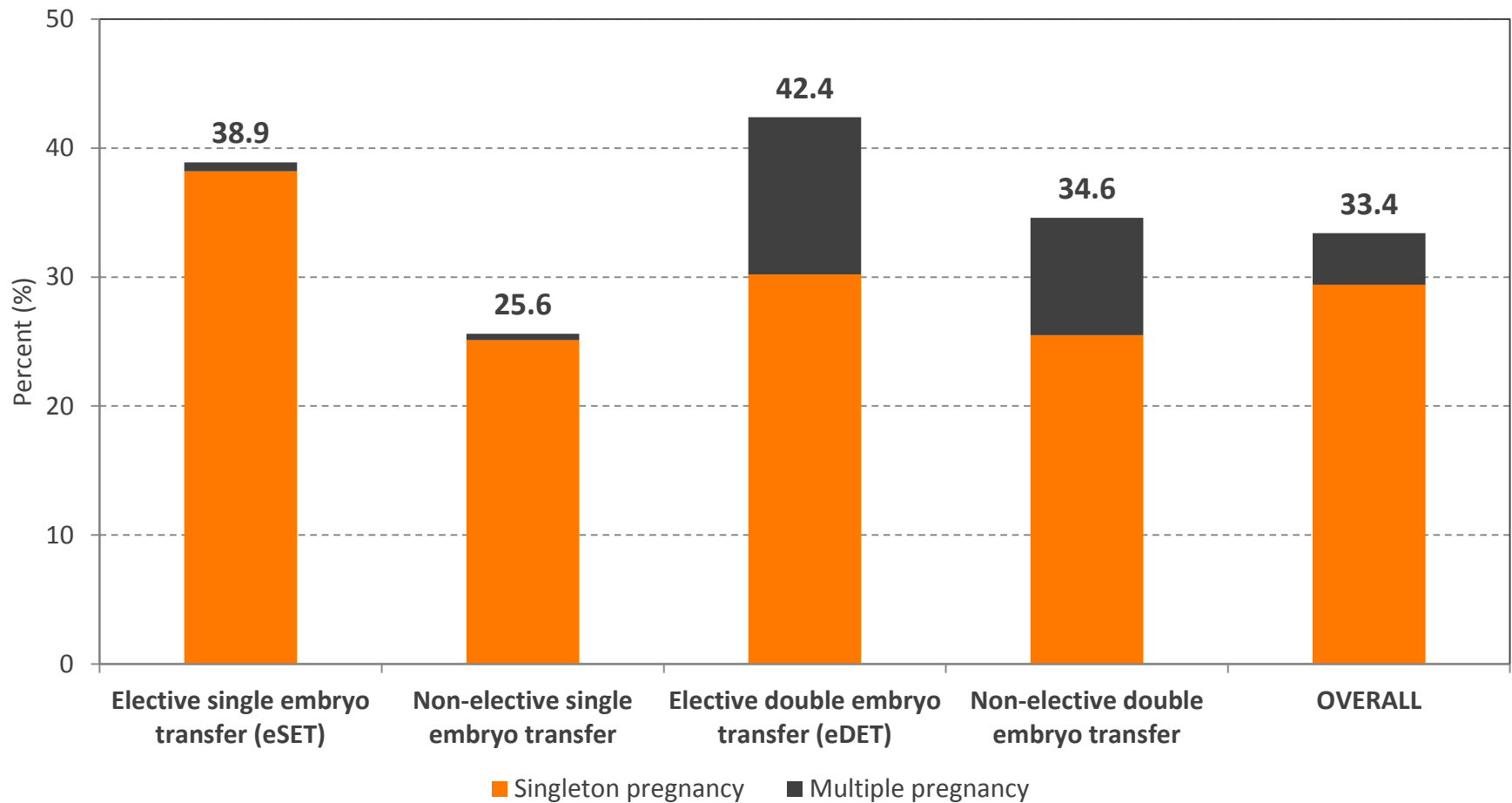
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and eSET/eDET, per ET cycle

ART cycles using FET – own oocytes, 2014



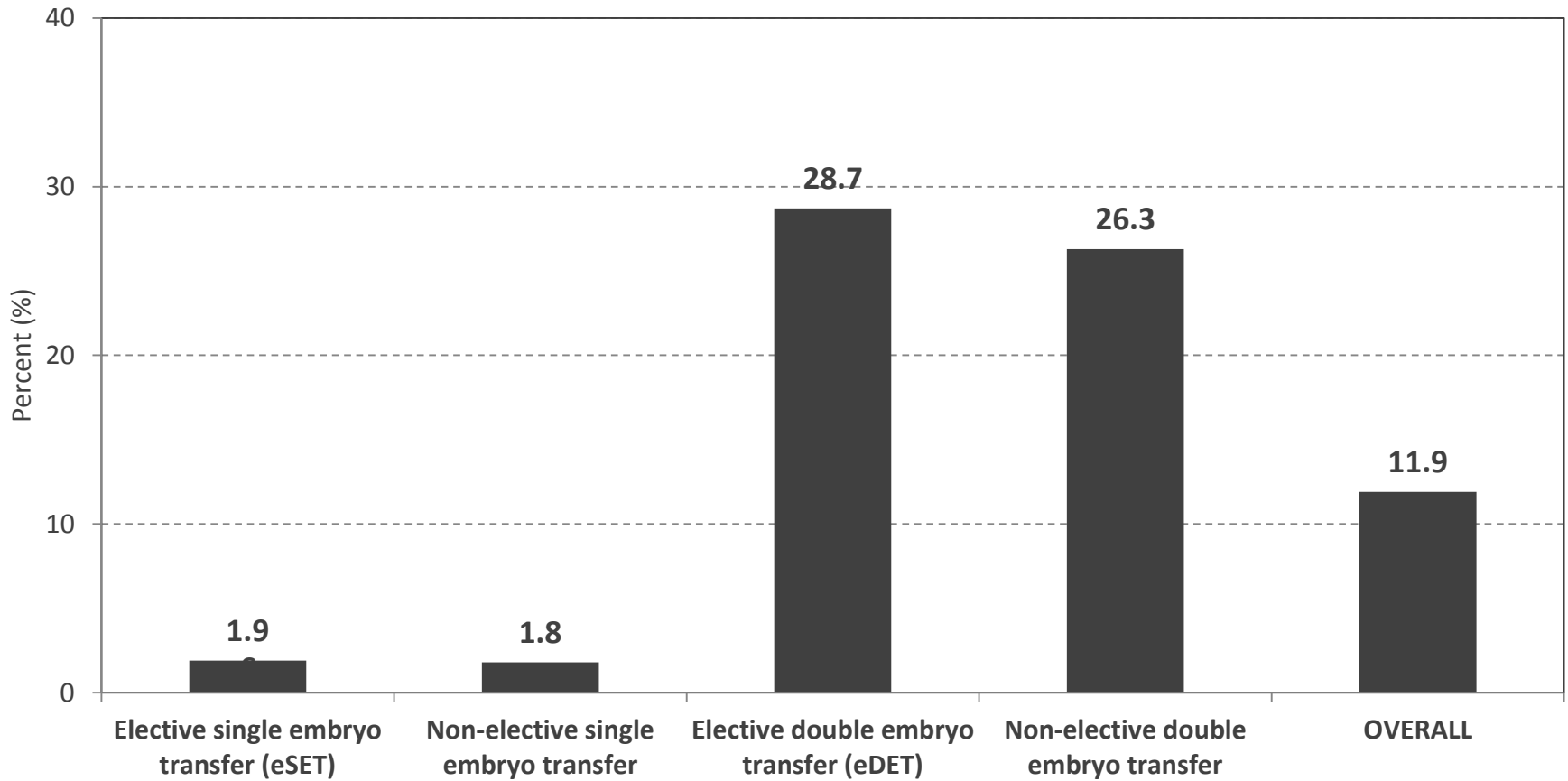
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by eSET/eDET, per ongoing clinical pregnancy

ART cycles using FET – own oocytes, 2014



Multiple pregnancies

17

14

145

146

337

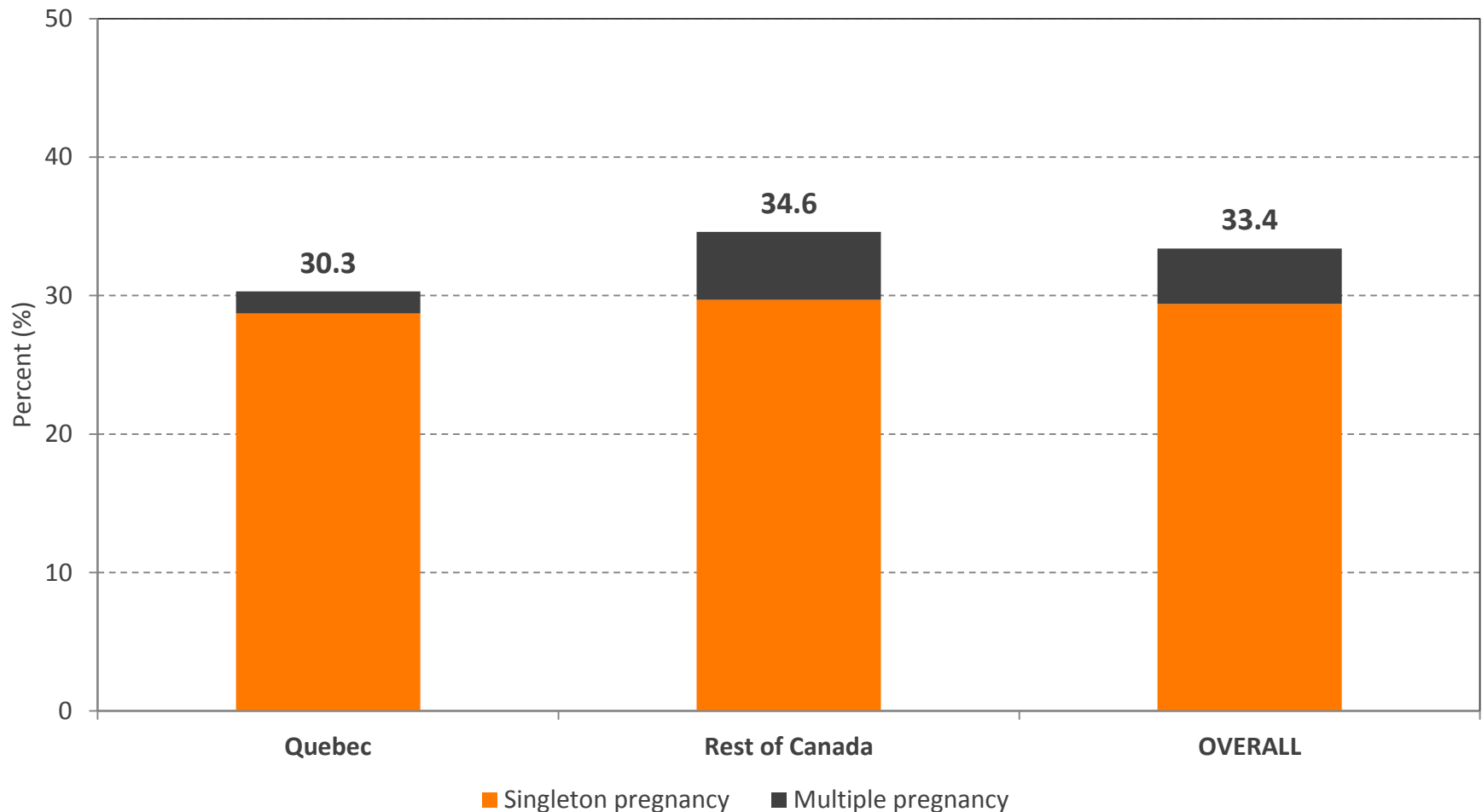
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Proportion of cycles resulting in an ongoing clinical pregnancy by plurality and province, per ET cycle

*ART cycles using FET – own oocytes, 2014*

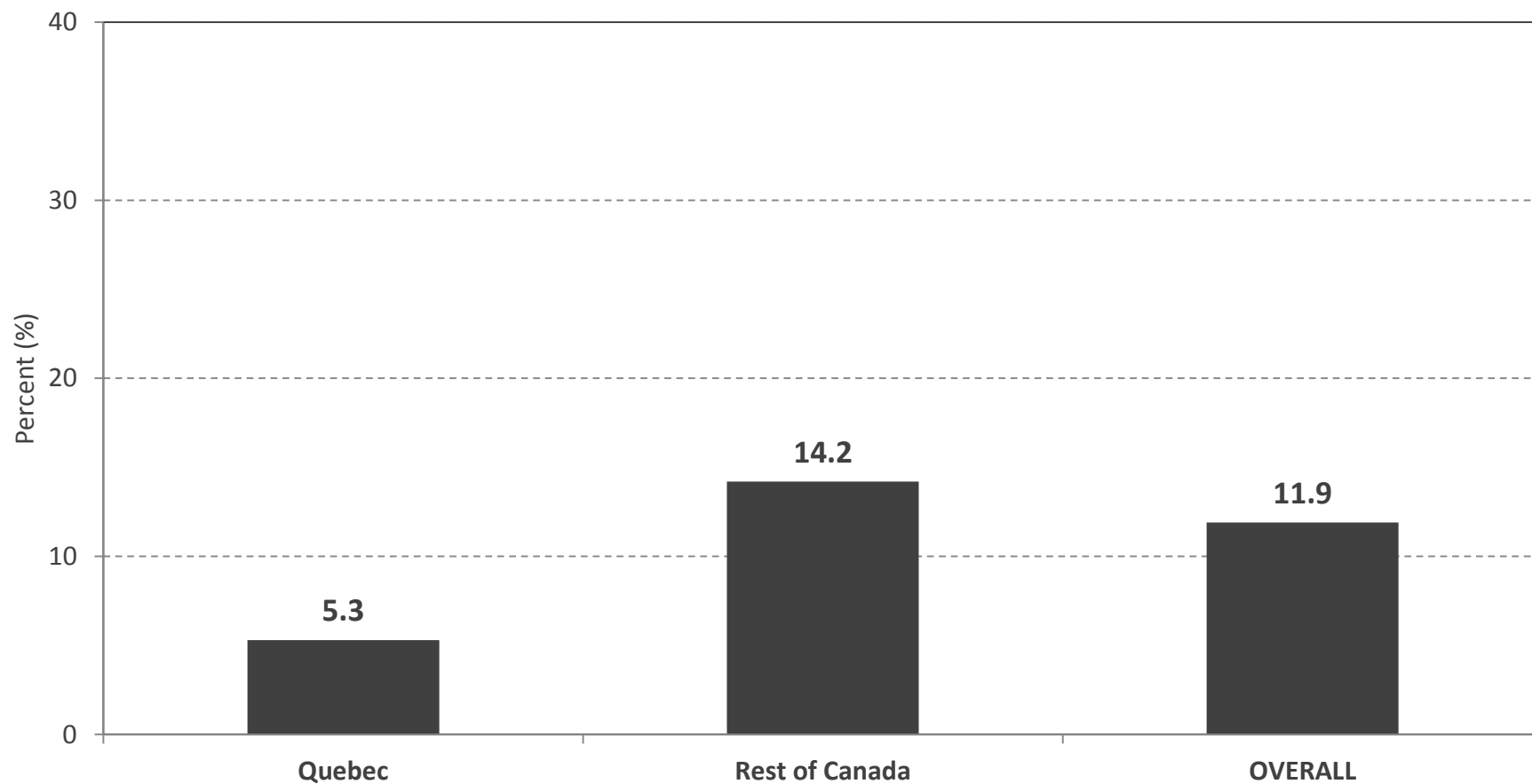


\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat

# Percentage of multiple pregnancies by province, per ongoing clinical pregnancy

*ART cycles using FET – own oocytes, 2014*



Multiple pregnancies

38

299

337

\* Ongoing clinical pregnancy: clinical pregnancy with  $\geq 1$  fetal heart beat on ultrasound

† Multiple pregnancy: ongoing clinical pregnancy with  $>1$  fetal heart beat on ultrasound

# Treatment outcomes

ART cycles using FET – own oocytes, 2014

Treatment outcome	Number	% per embryo thaw	% per ET	% per CP	% per OCP
<b>Clinical pregnancy (CP)*</b>	<b>3,204</b>	<b>36.3</b>	<b>37.8</b>		
<b>Ongoing clinical pregnancy (OCP)†</b>	<b>2829</b>	<b>32.0</b>	<b>33.4</b>	<b>88.3</b>	
Singleton‡	2492	28.2	29.4	77.8	88.1
Multiple‡	337	3.8	4.0	10.5	11.9
<b>Multiple pregnancy‡</b>	<b>337</b>	<b>3.8</b>	<b>4.0</b>	<b>10.5</b>	<b>11.9</b>
Twins	327	<b>97% of multiple pregnancies were twin gestations</b>			
Triplet or higher	10				

\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

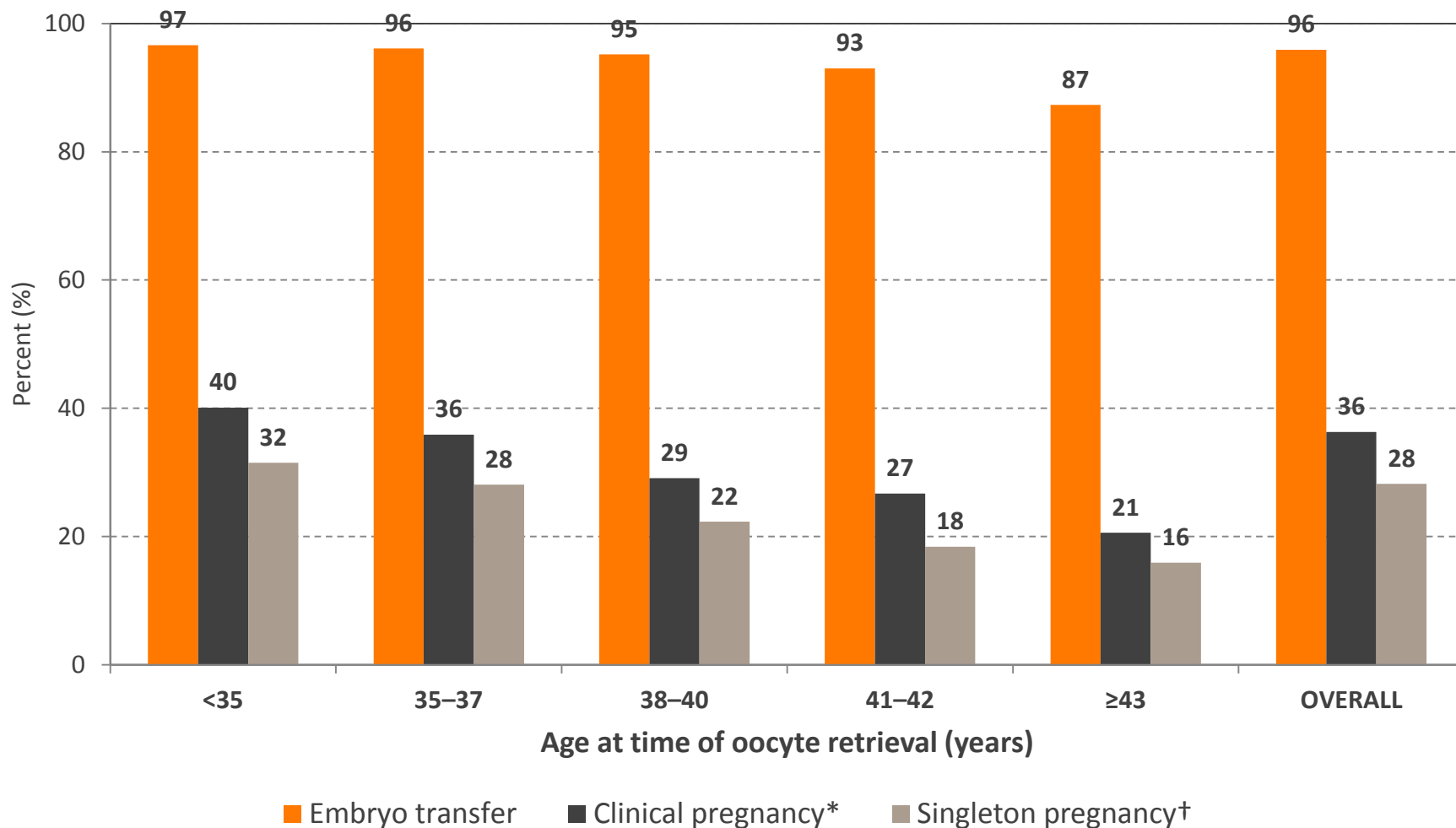
† Ongoing clinical pregnancy: clinical pregnancy with ≥1 fetal heart beat on ultrasound

‡ Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with >1 fetal heart beat



# Embryo transfer, clinical pregnancy and singleton clinical pregnancy by age at time of oocyte retrieval, per embryo thaw cycle

ART cycles using FET – own oocytes, 2014



\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

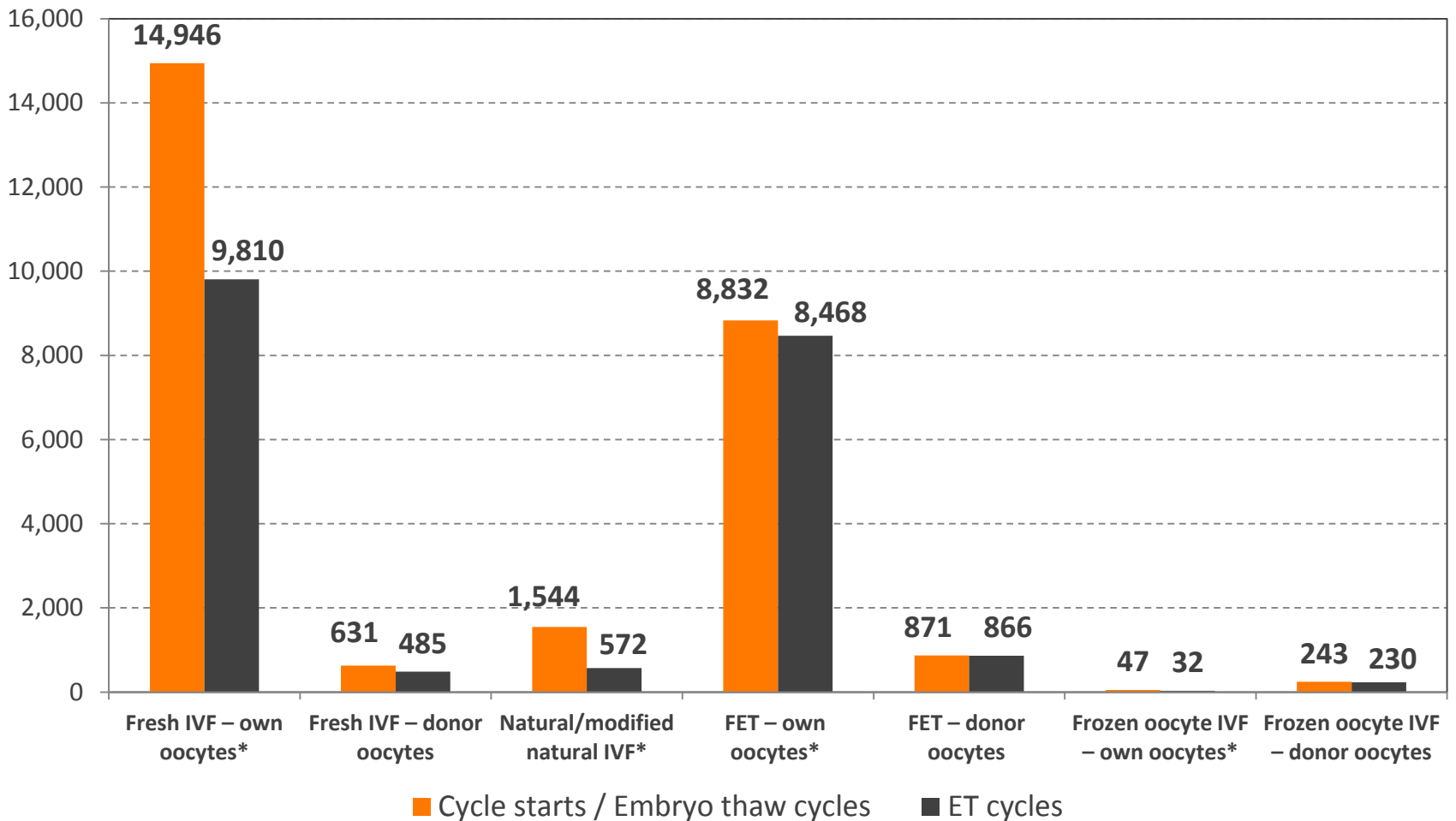
† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

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# OVERALL SUMMARY

# Number of treatment cycles

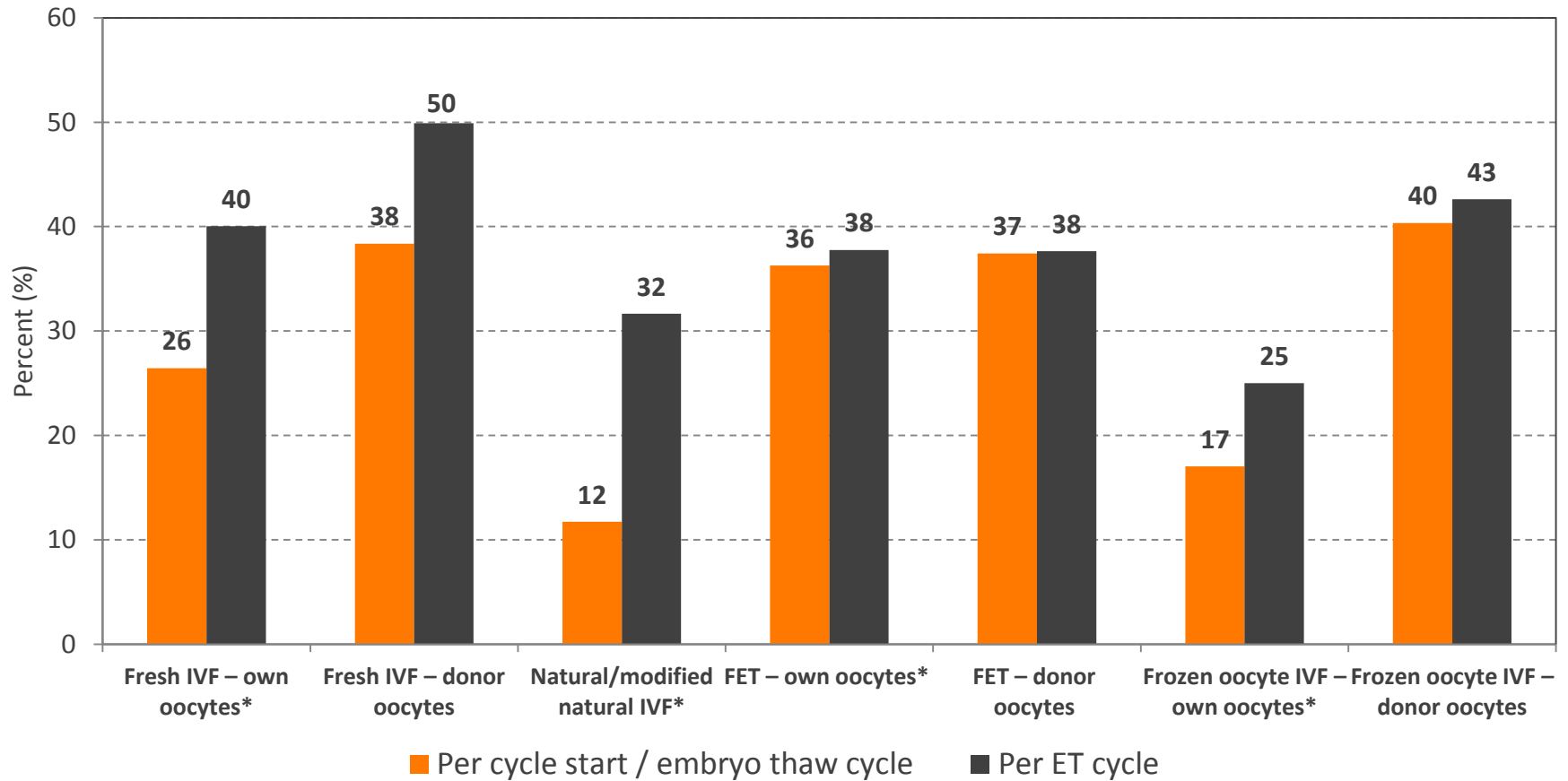
2014



\* Own oocytes exclusively

# Clinical pregnancy by type of treatment cycle

2014



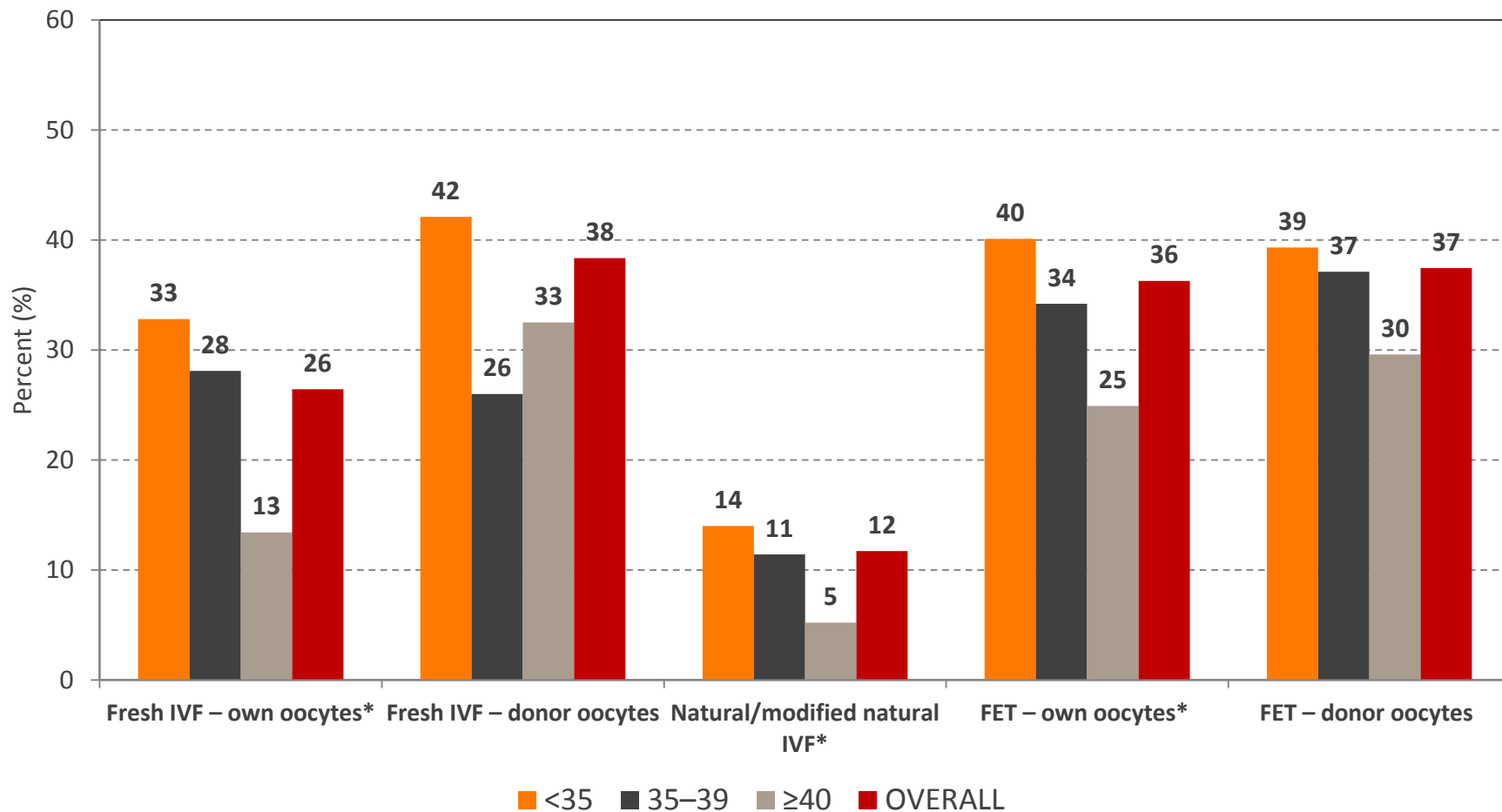
Treatment Cycle Type	Clinical pregnancies
Fresh IVF – own oocytes*	3,928
Fresh IVF – donor oocytes	242
Natural/modified natural IVF*	181
FET – own oocytes*	3,197
FET – donor oocytes	326
Frozen oocyte IVF – own oocytes*	8
Frozen oocyte IVF – donor oocytes	98

\* Own oocytes exclusively

† Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

# Clinical pregnancy by age at time of oocyte retrieval and type of treatment cycle, per CS/embryo thaw cycle

2014

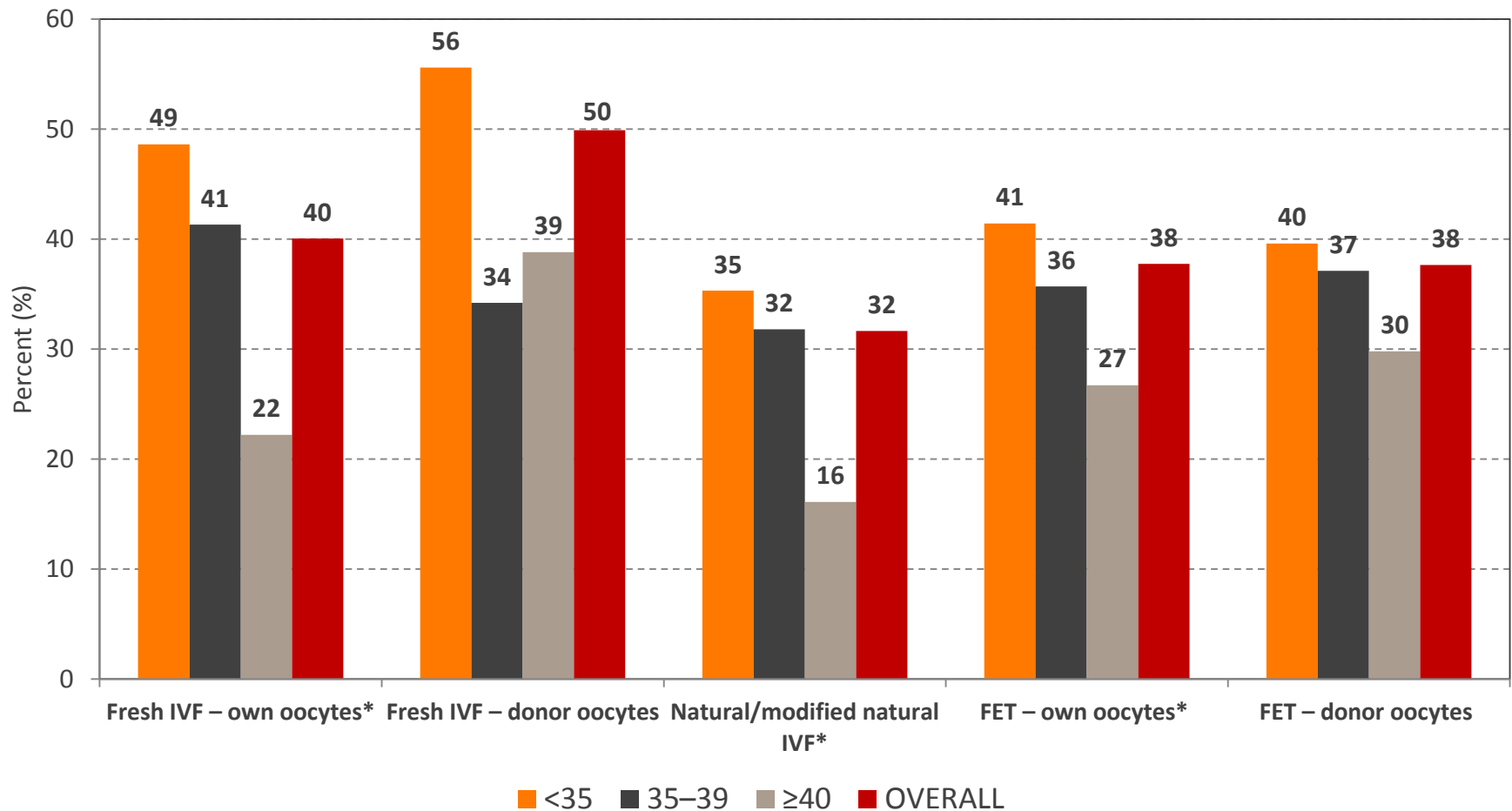


\* Own oocytes exclusively

† Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

# Clinical pregnancy by age at time of oocyte retrieval and type of treatment cycle, per ET cycle

2014

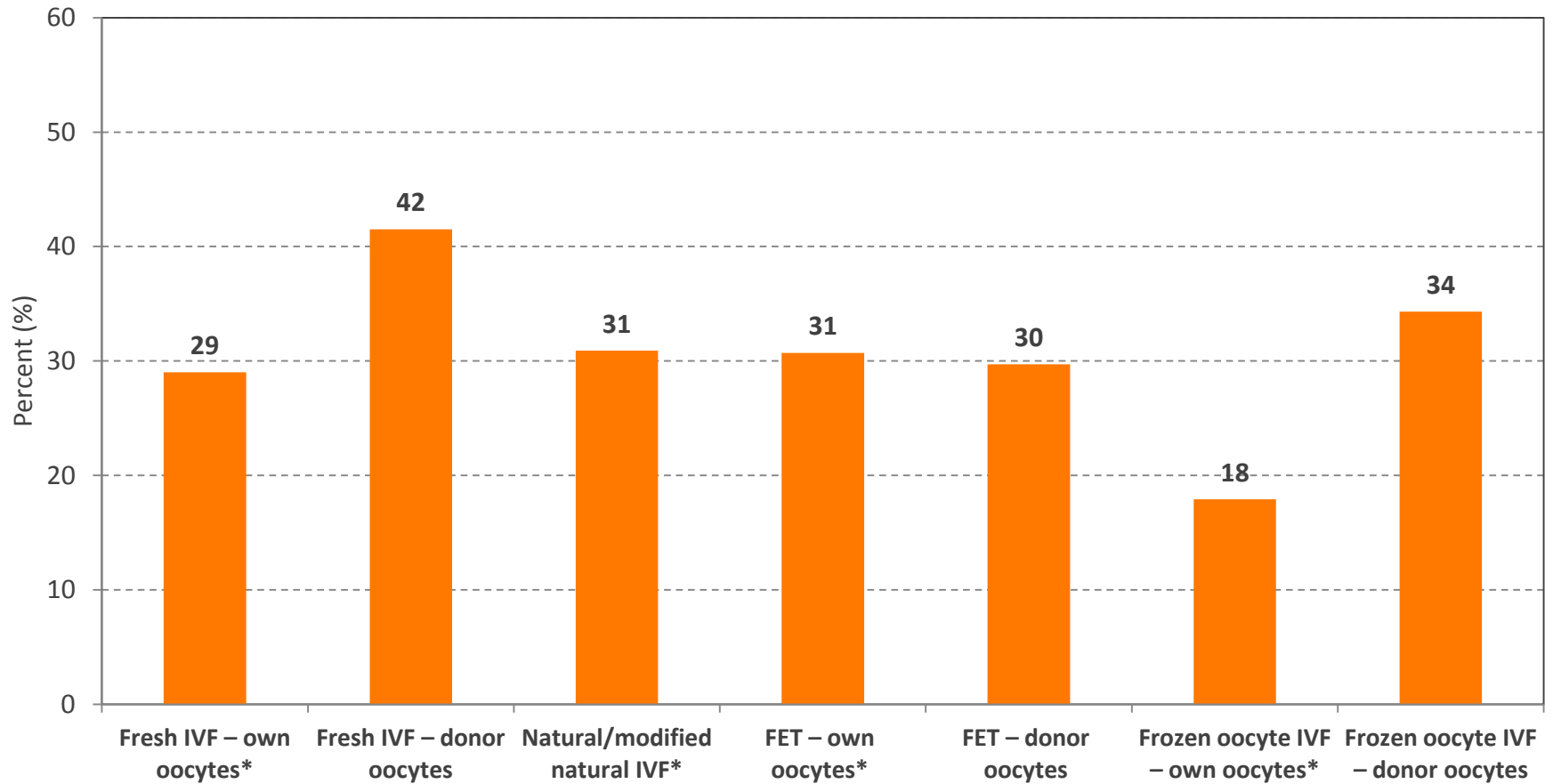


\* Own oocytes exclusively

† Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

# Implantation rate by type of treatment cycle

2014

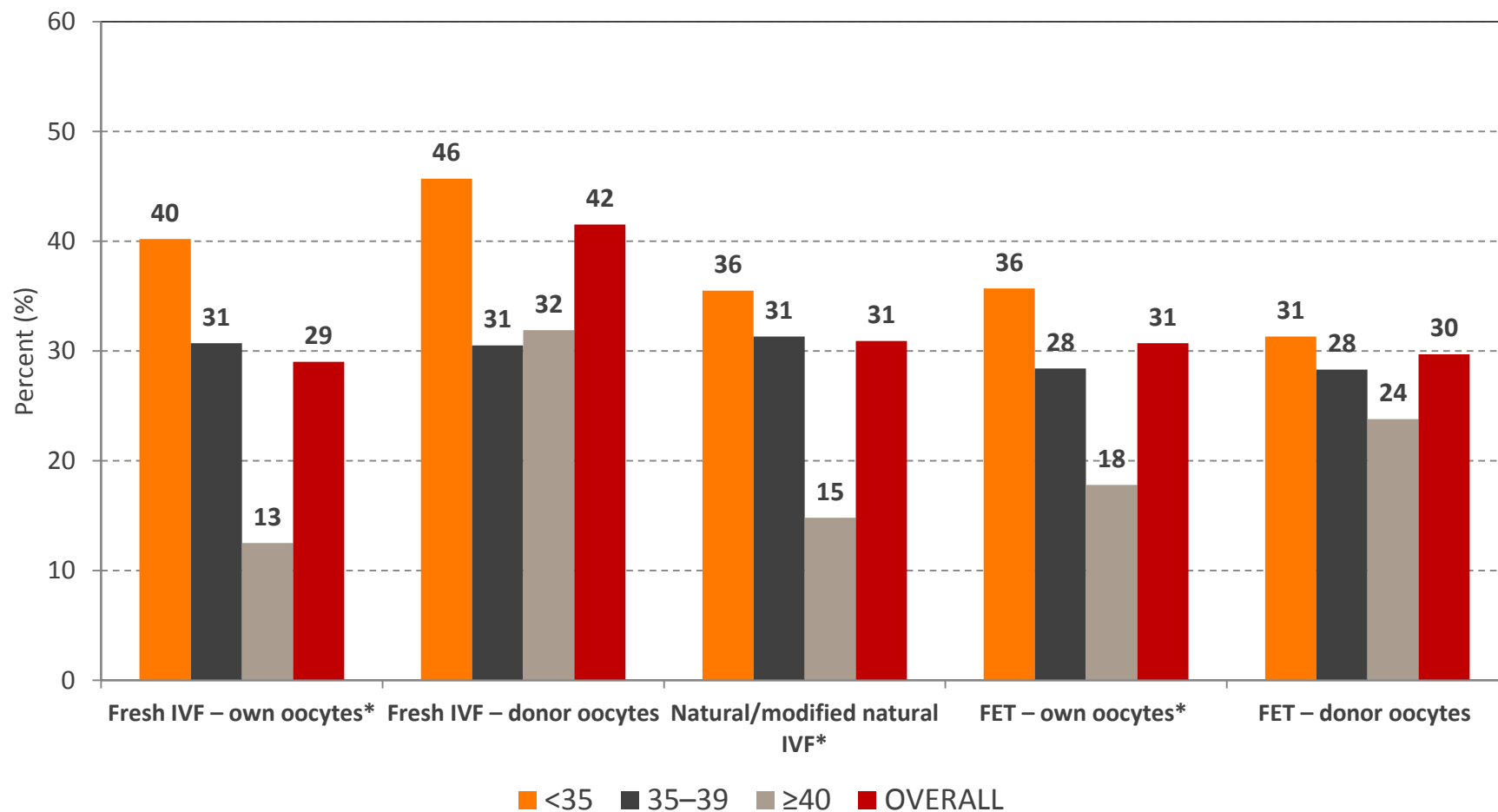


\* Own oocytes exclusively

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred

# Implantation rate by age at time of oocyte retrieval and type of treatment cycle

2014



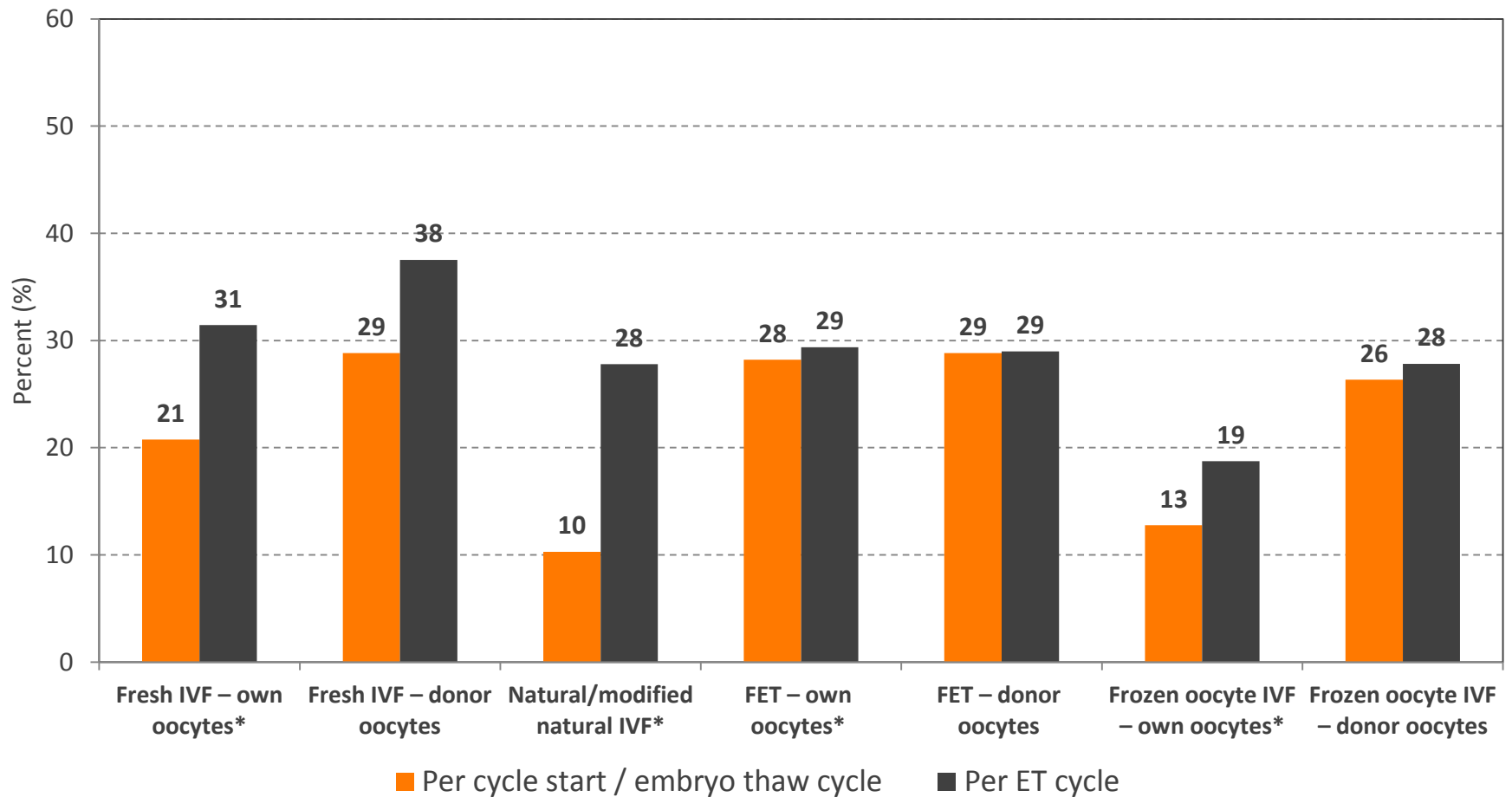
\* Own oocytes exclusively

† Implantation rate: number of gestational sacs observed on ultrasound, divided by the total number of embryos transferred



# Singleton ongoing clinical pregnancy by type of treatment cycle

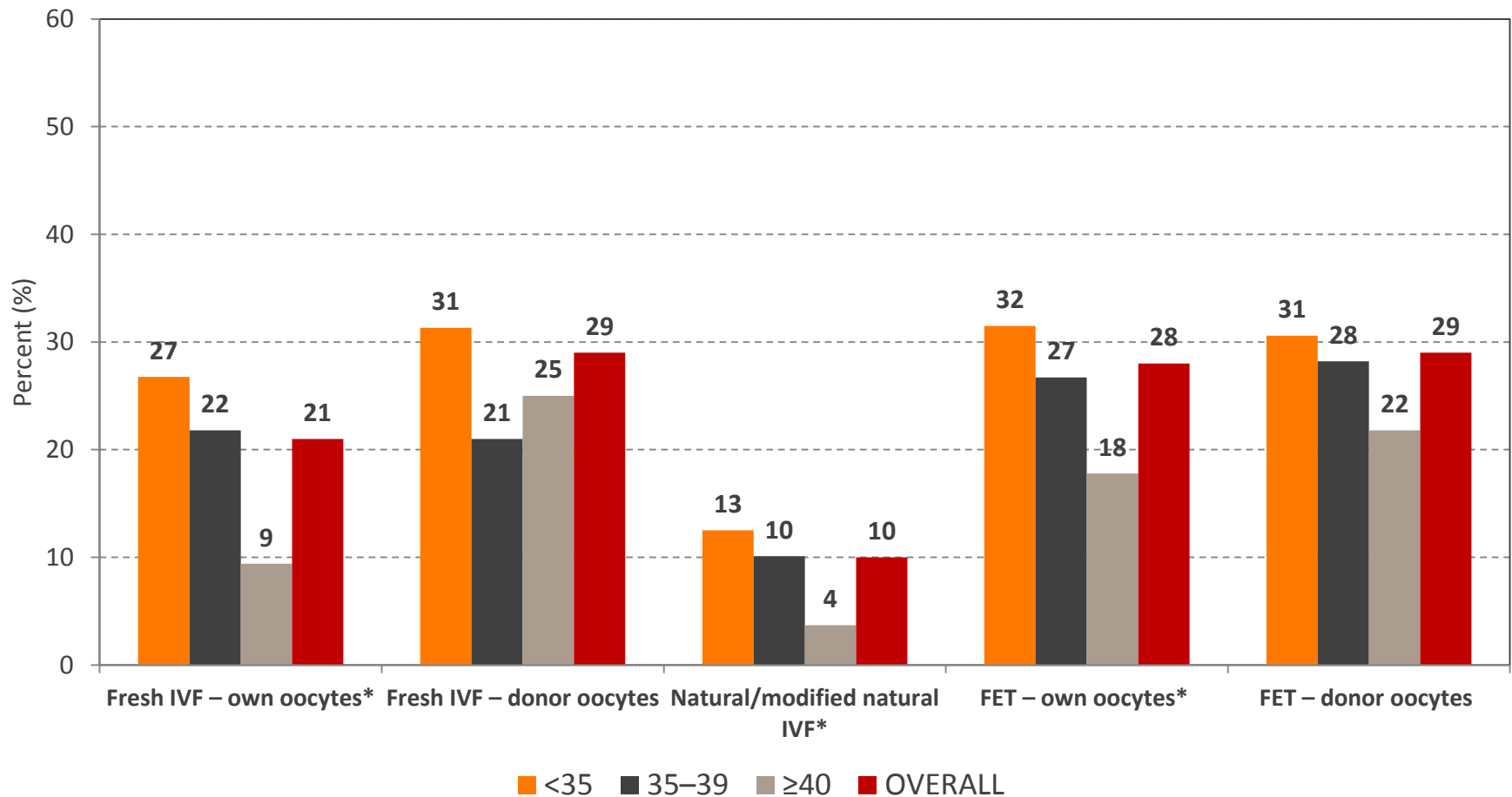
2014



\* Own oocytes exclusively

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

# Singleton ongoing clinical pregnancy by age at time of oocyte retrieval and type of treatment cycle, per CS/embryo thaw cycle 2014

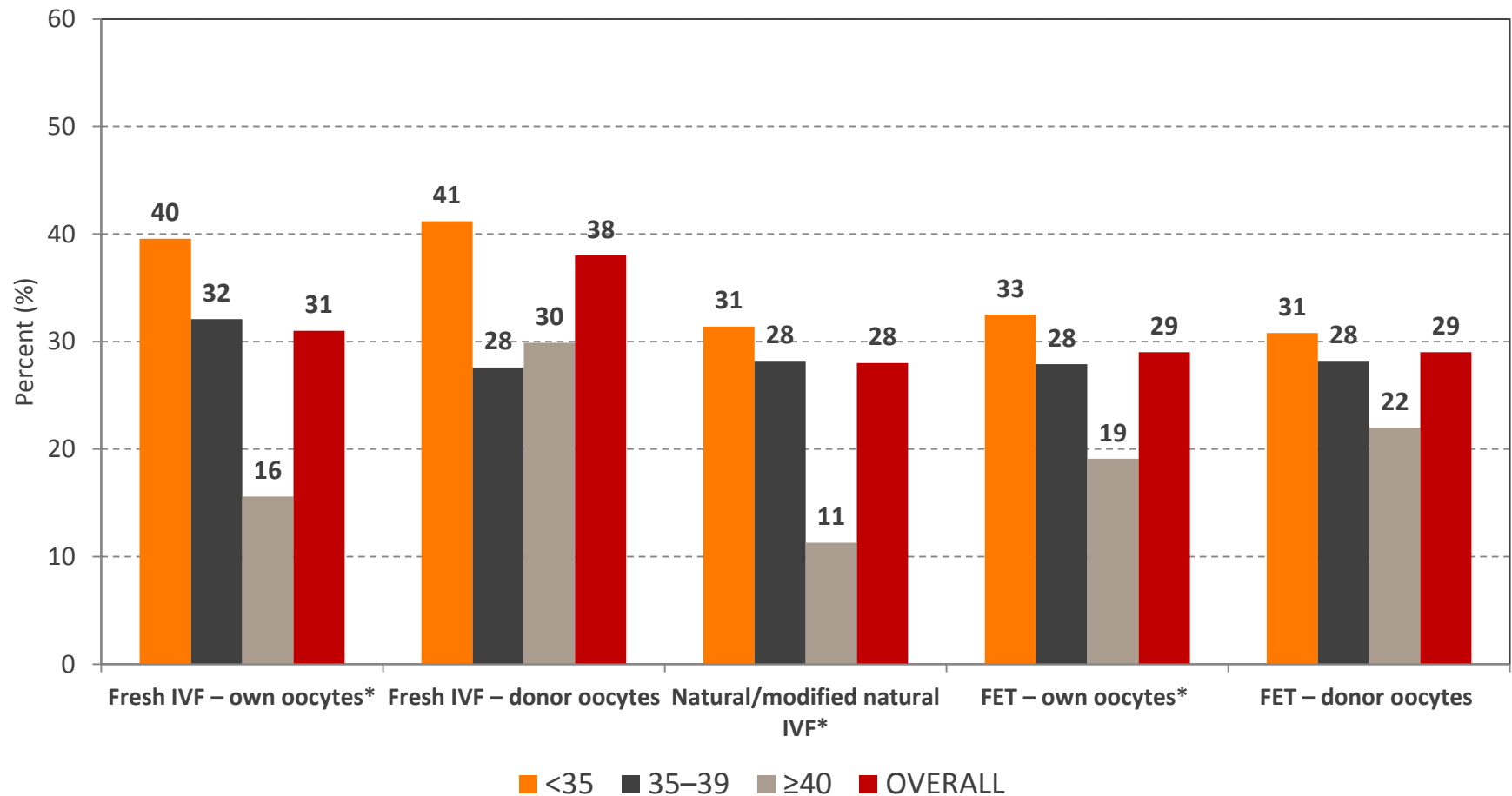


\* Own oocytes exclusively

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

# Singleton ongoing clinical pregnancy by age at time of oocyte retrieval and type of treatment cycle, per ET cycle

2014



\* Own oocytes exclusively

† Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound

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# PRIMARY TRANSFER RATE

# Primary transfer

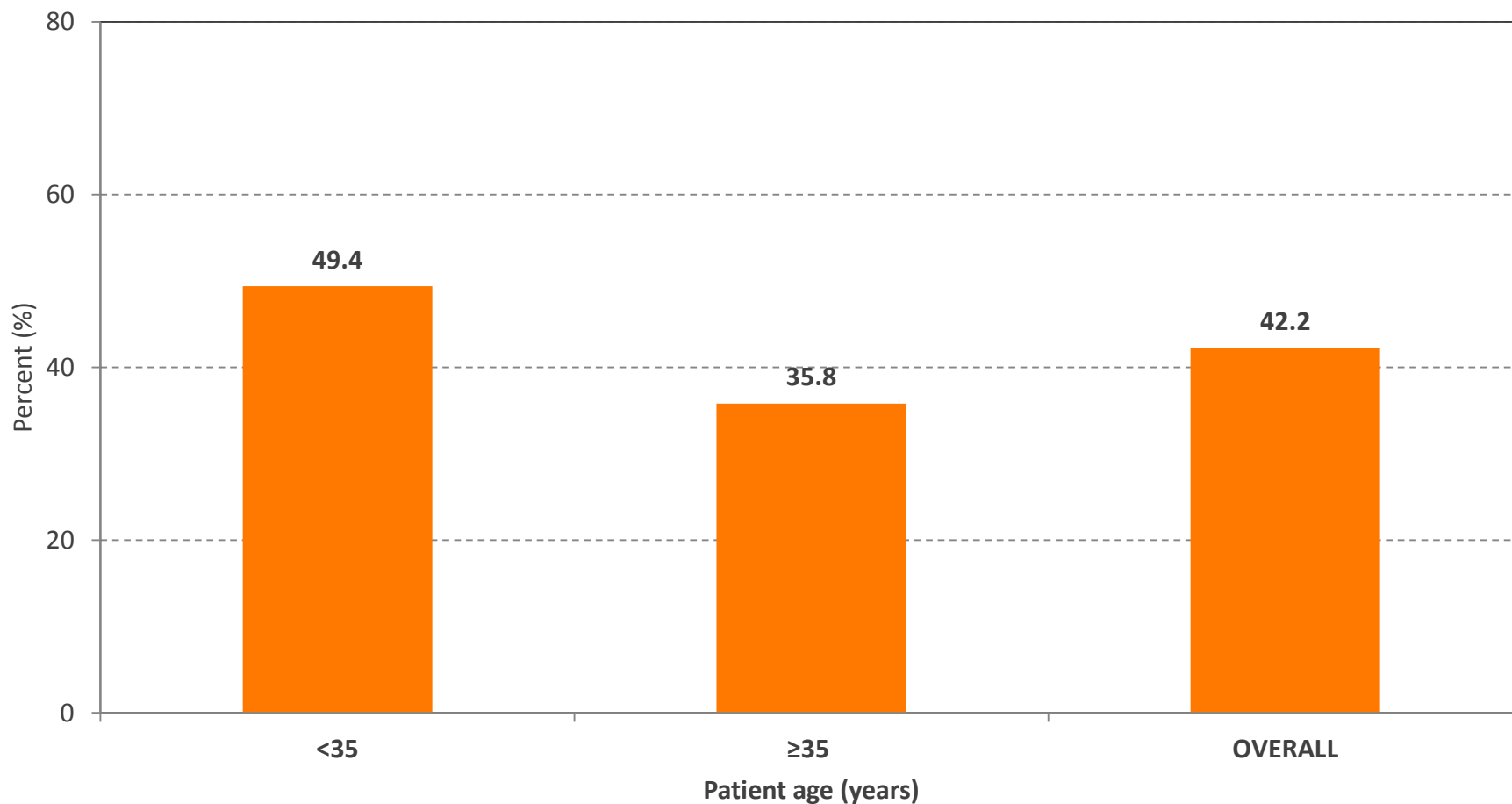
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- **Cohort:**

- Patients with first IVF cycle in CARTR Plus and no documented prior treatment cycle using own oocytes
- The first treatment cycle with an embryo transfer
  - Fresh IVF with own oocytes
  - FET with own oocytes

# Clinical pregnancy rate by patient age, per primary transfer

IVF and FET – using own oocytes, 2013 and 2014



Clinical pregnancy

3,624

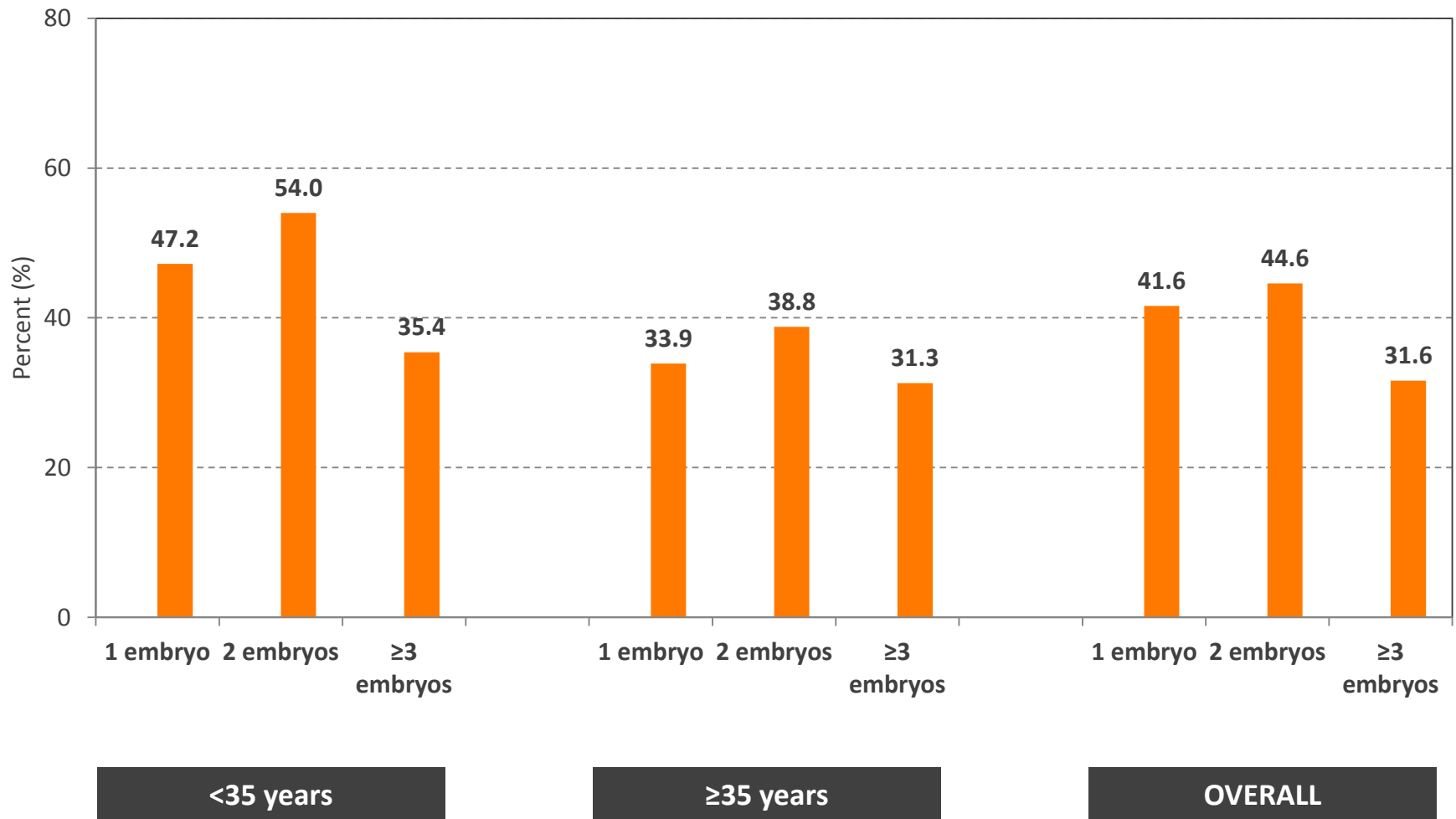
2,927

6,551

\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

# Clinical pregnancy rate by patient age and number of embryos transferred, per primary transfer

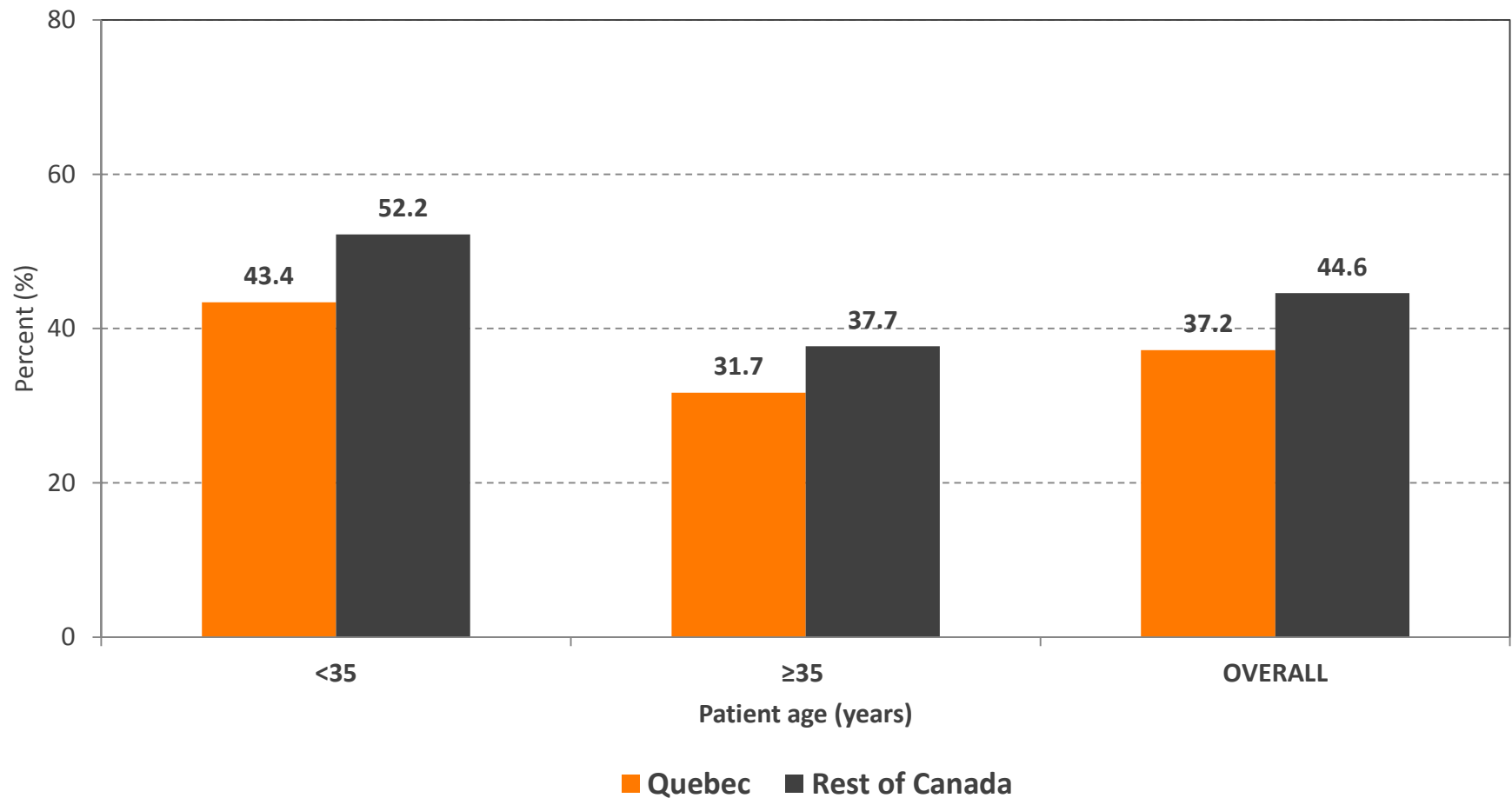
IVF and FET – using own oocytes, 2013 and 2014



\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

# Clinical pregnancy rate by patient age and province, per primary transfer

IVF and FET – using own oocytes, 2013 and 2014



\* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy



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# CUMULATIVE PREGNANCY RATE

# Cumulative pregnancy rate

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- **Definition:**

- The number of clinical pregnancies resulting from one or more ART cycles, including the cycle when fresh embryos are transferred and all related subsequent frozen/thawed embryo transfer cycles if the fresh embryo transfer did not result in a pregnancy

- **Rationale:**

- Estimates cumulative success with ongoing treatment, rather than success per individual stage of the treatment process

# Cumulative pregnancy rate

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- **Several options for calculation:**
  - **Per patient:** treatment cycle outcomes can be linked for a patient throughout the database
  - **Per batch of oocytes collected:** treatment cycles that used frozen oocytes or embryos can be linked to the fresh IVF cycle where the oocytes were collected

# Cumulative pregnancy rate

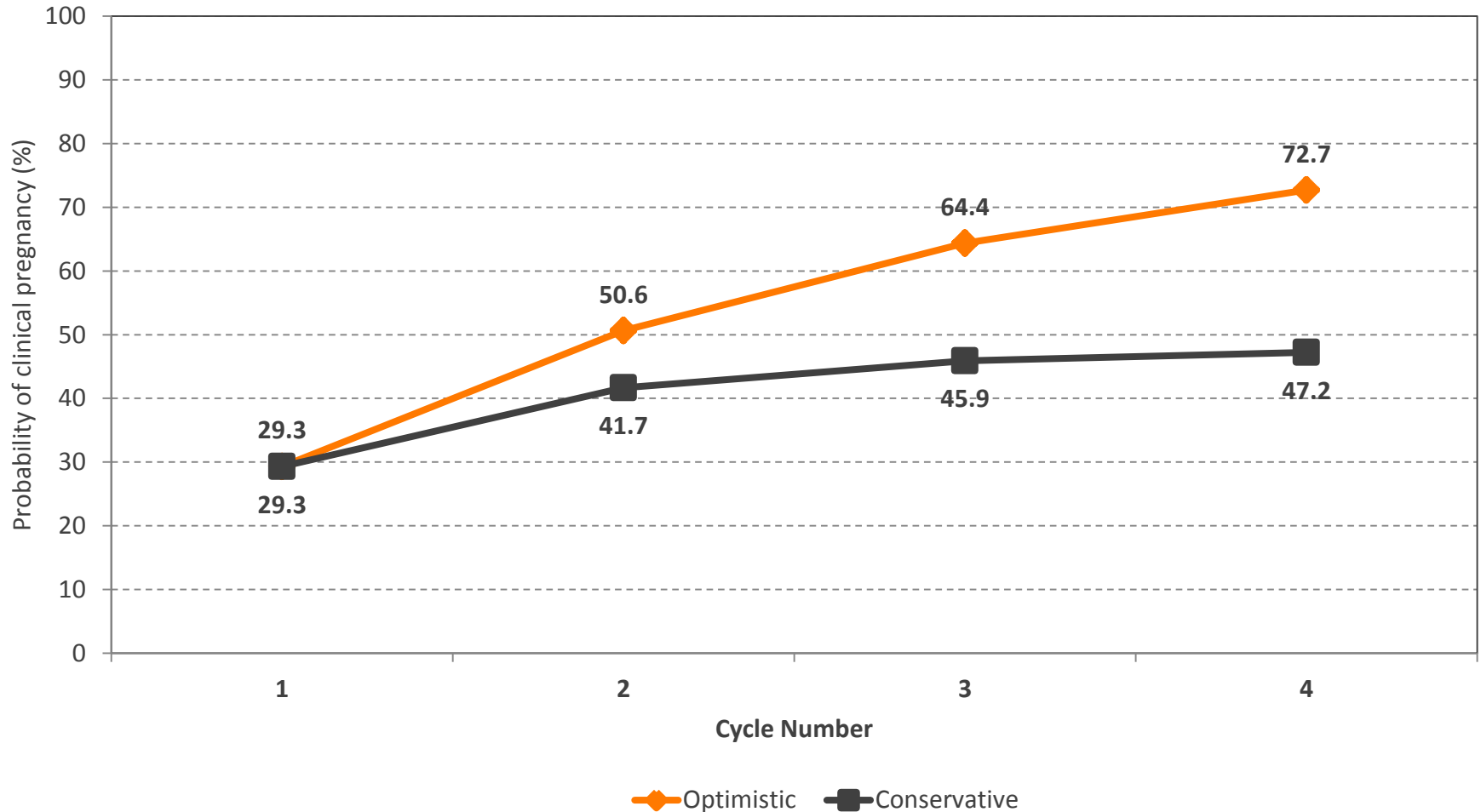
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- **Optimistic:**
  - Assumes that women who did not return for subsequent treatment cycles had the same chance of a clinical pregnancy as those who did return for treatment
- **Conservative:**
  - Assumes that women who did not return for subsequent treatment cycles did not have a clinical pregnancy

Malizia BA et al., NEJM 2009; 360: 236-243

# Cumulative pregnancy rate, per cycle start

All ART treatment cycles types (fresh and frozen), 2013 and 2014



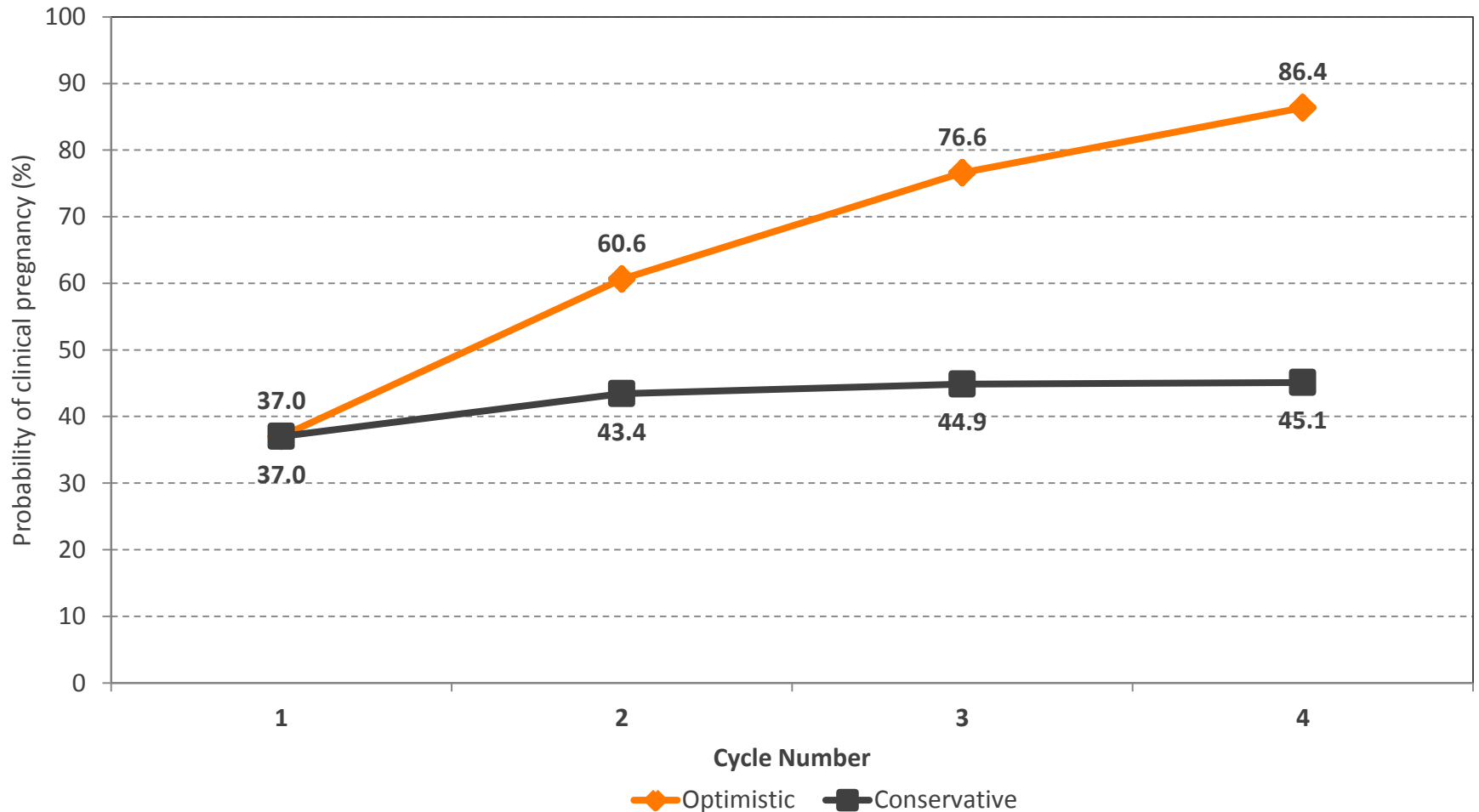
Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

Optimistic: Assumes that women who did not return for subsequent treatment cycles had the same chance of a clinical pregnancy as those who did return for treatment.

Conservative: Assumes that women who did not return for subsequent treatment cycles did not have a clinical pregnancy.

# Cumulative pregnancy rate, per batch of oocytes retrieved

IVF and FET – using own oocytes, 2013 and 2014



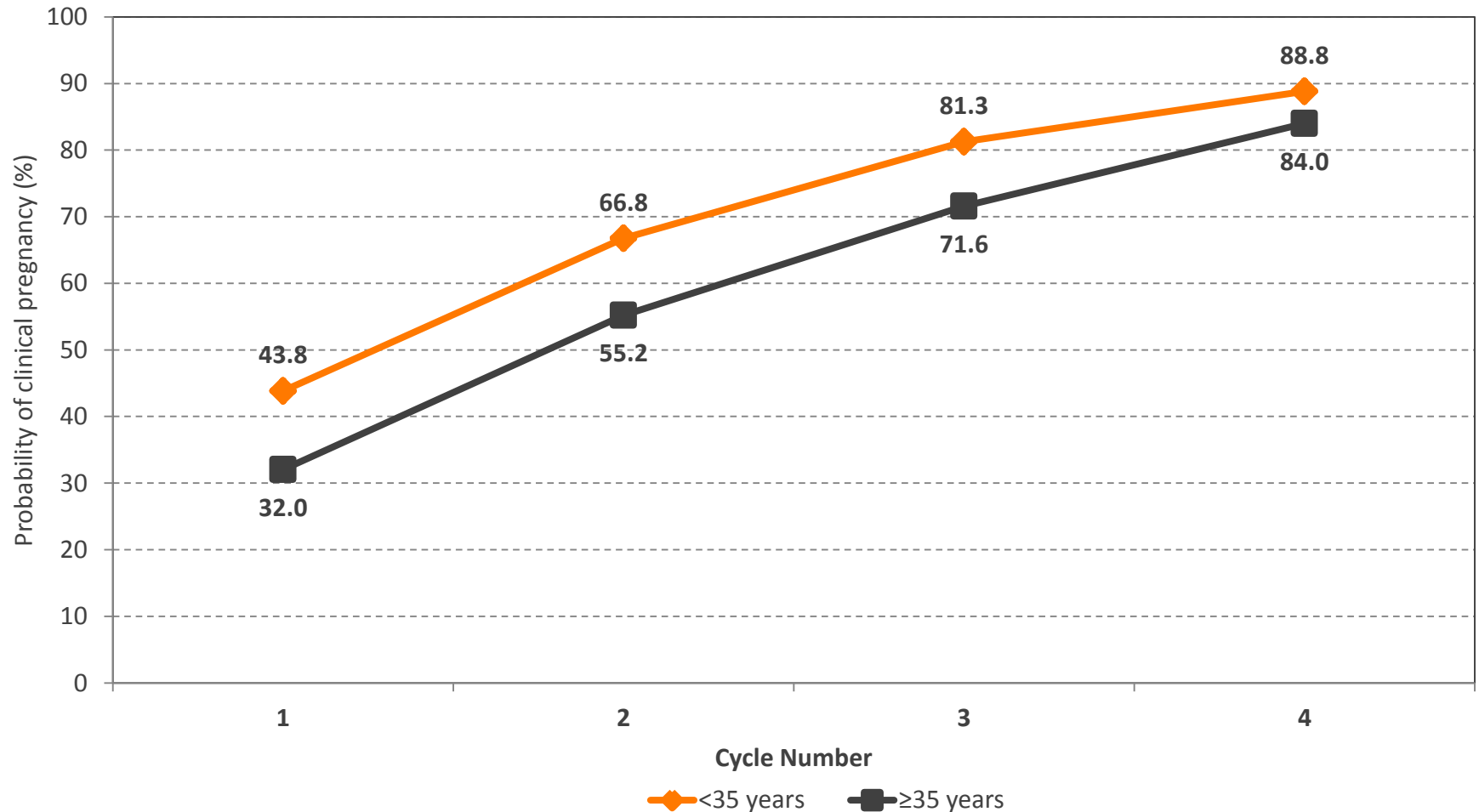
*Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy*

*Optimistic: Assumes that women who did not return for subsequent treatment cycles had the same chance of a clinical pregnancy as those who did return for treatment.*

*Conservative: Assumes that women who did not return for subsequent treatment cycles did not have a clinical pregnancy.*

# Optimistic cumulative pregnancy rate <35 years compared to ≥35 years, per batch of oocytes retrieved

IVF and FET – using own oocytes, 2013 and 2014

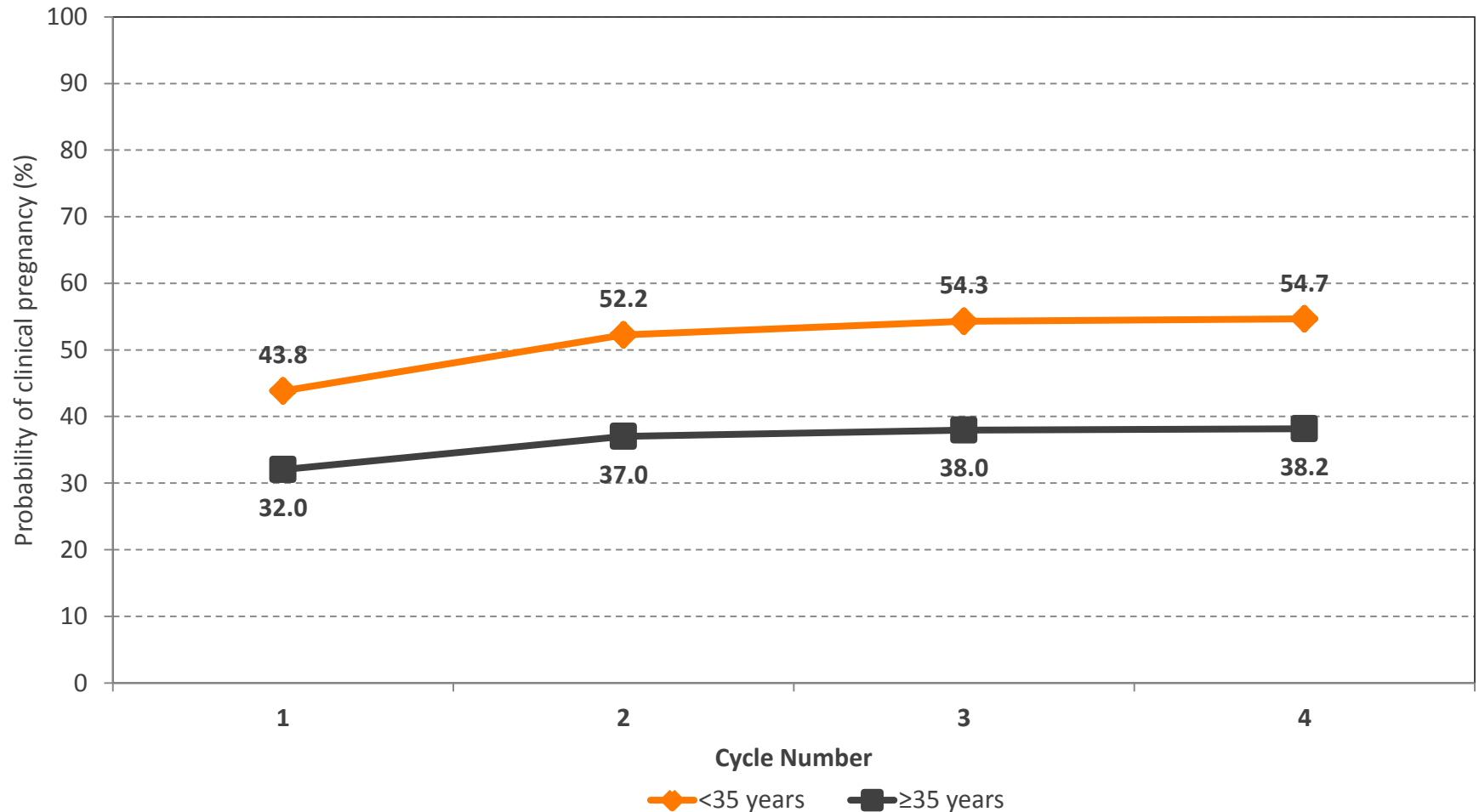


*Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy*

*Optimistic: Assumes that women who did not return for subsequent treatment cycles had the same chance of a clinical pregnancy as those who did return for treatment.*

# Conservative cumulative pregnancy rate <35 years compared to ≥35 years, per batch of oocytes retrieved

IVF and FET – using own oocytes, 2013 and 2014



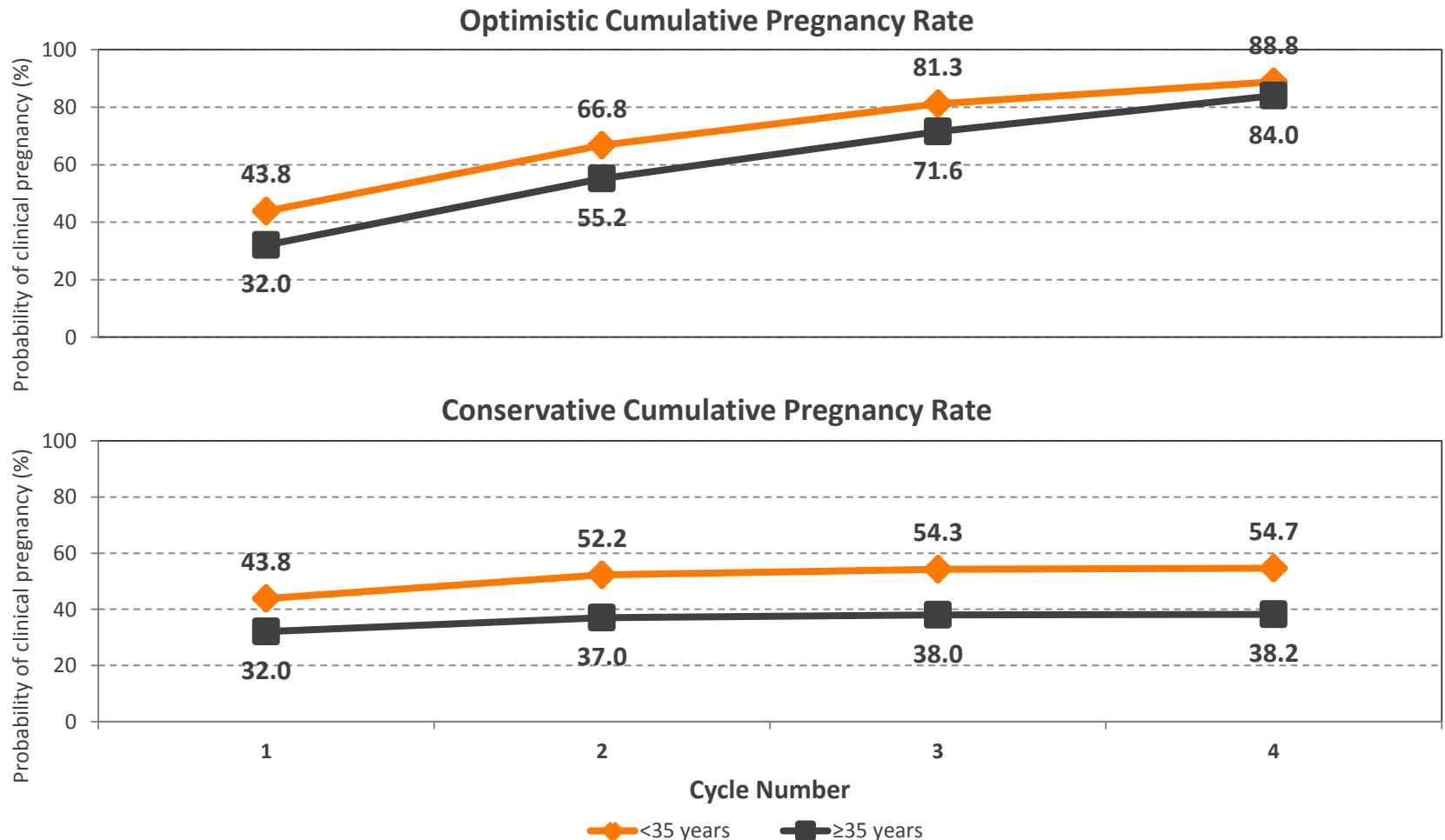
*Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy*

*Conservative: Assumes that women who did not return for subsequent treatment cycles did not have a clinical pregnancy.*



# Cumulative pregnancy rate <35 years compared to ≥35 years, per batch of oocytes retrieved

IVF and FET – using own oocytes, 2013 and 2014



Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

Optimistic: Assumes that women who did not return for subsequent treatment cycles had the same chance of a clinical pregnancy as those who did return for treatment.

Conservative: Assumes that women who did not return for subsequent treatment cycles did not have a clinical pregnancy.

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# CLOSING REMARKS

# Key messages

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## Ontario (linked birth registry)

- 96.0% capture of birth outcomes per ongoing clinical pregnancy

## Rest of Canada

- 93.8% capture of birth outcomes per ongoing clinical pregnancy

# Key messages

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- **Preterm birth among all live births:**
  - 7.7% in the general obstetrical population of Canada
  - 28.4% (95% CI: 26.7 to 30.1) among IVF with own oocytes
  - 23.7% (95% CI: 21.7 to 25.8) among FET with own oocytes
  
- **Preterm birth among singleton live births:**
  - 6.2% in the general obstetrical population of Canada
  - 14.5% (95% CI: 13.2 to 16.0) among IVF with own oocytes
  - 12.0% (95% CI: 10.4 to 13.7) among FET with own oocytes

# Key messages

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- Increased proportion:
  - freeze all cycles
  - PGS/PGD
  - single embryo transfers
- Cumulative pregnancy rates will stabilize as the database grows

# THANK YOU!



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