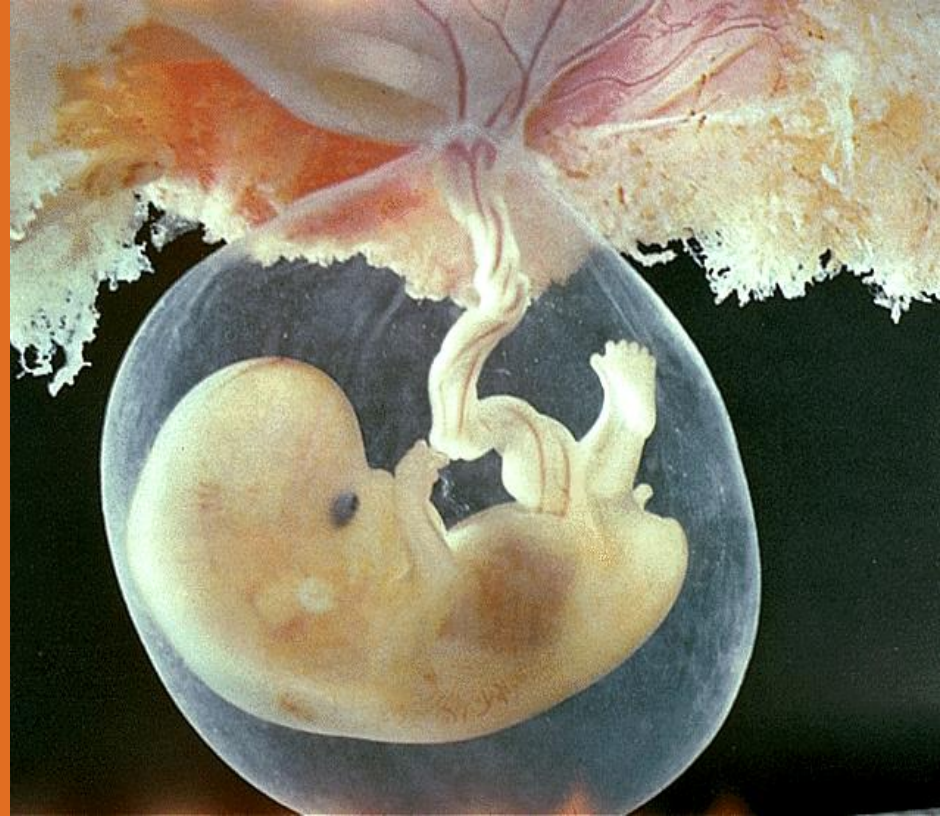


**Canadian Assisted
Reproductive
Technologies Register Plus
(CARTR Plus)**



**Canadian Fertility and Andrology Society
68th Annual Meeting - Halifax
September 22 – 24, 2022**

List of abbreviations

CS	Cycle start
RET	Oocyte retrieval
ET	Embryo transfer
IVF	In vitro fertilization
FET	Frozen embryo transfer
PGT-A/PGT-M	Preimplantation Genetic Testing for Aneuploidy/Monogenic (Single Gene) Diseases
IVM	In vitro maturation
OHSS	Ovarian hyperstimulation syndrome
eSET	Elective single embryo transfer
neSET	Non-elective single embryo transfer
eDET	Elective double embryo transfer
neDET	Non-elective double embryo transfer

Disclaimer

- 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.
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Suggested citations

Canadian Assisted Reproductive Technologies Registry (CARTR) Plus. Final treatment cycle and pregnancy outcome data for 2020. Better Outcomes Registry & Network Ontario. Ottawa ON, September 2022.

Canadian Assisted Reproductive Technologies Registry (CARTR) Plus. Preliminary treatment cycle data for 2021. Better Outcomes Registry & Network Ontario. Ottawa ON, September 2022.

Notes

- **Ontario data current as of March 2021; Rest of Canada data current as of June 2022**
- **Treatment cycle outcomes for 2021 cycle starts**
 - Based on 35 clinics
- **Birth outcomes for 2020 cycle starts**
 - Based on 35 clinics

Notes

- 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

Summary of CARTR Plus records extracted June 2022



Total IVF treatment records entered into CARTR Plus with a cycle start date between Jan 1, 2013 and Dec 31, 2021:
 Fresh cycles = 158,256
 Frozen cycles = 133,430

34 clinics

33 clinics

35 clinics

36 clinics

36 clinics

36 clinics

36 clinics

35 clinics

2014 cycles
 Fresh:
 n = 17,958
 Frozen:
 n = 10,208

2015 cycles
 Fresh:
 n = 17,862
 Frozen:
 n = 11,676

2016 cycles
 Fresh:
 n = 16,911
 Frozen:
 n = 14,361

2017 cycles
 Fresh:
 n = 17,618
 Frozen:
 n = 16,508

2018 cycles
 Fresh:
 n = 18,066
 Frozen:
 n = 18,013

2019 cycles
 Fresh:
 n = 17,750
 Frozen:
 n = 18,146

2020 cycles
 Fresh:
 n = 15,858
 Frozen:
 n = 16,177

2021 cycles
 Fresh:
 n = 19,436
 Frozen:
 n = 19,789

Birth outcomes

91.1% complete
 (7822/8587)
 per ongoing clinical
 pregnancy

35 clinics

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

† Fresh cycles include: Fresh IVF cycles, oocyte banking cycles, and IVM cycles

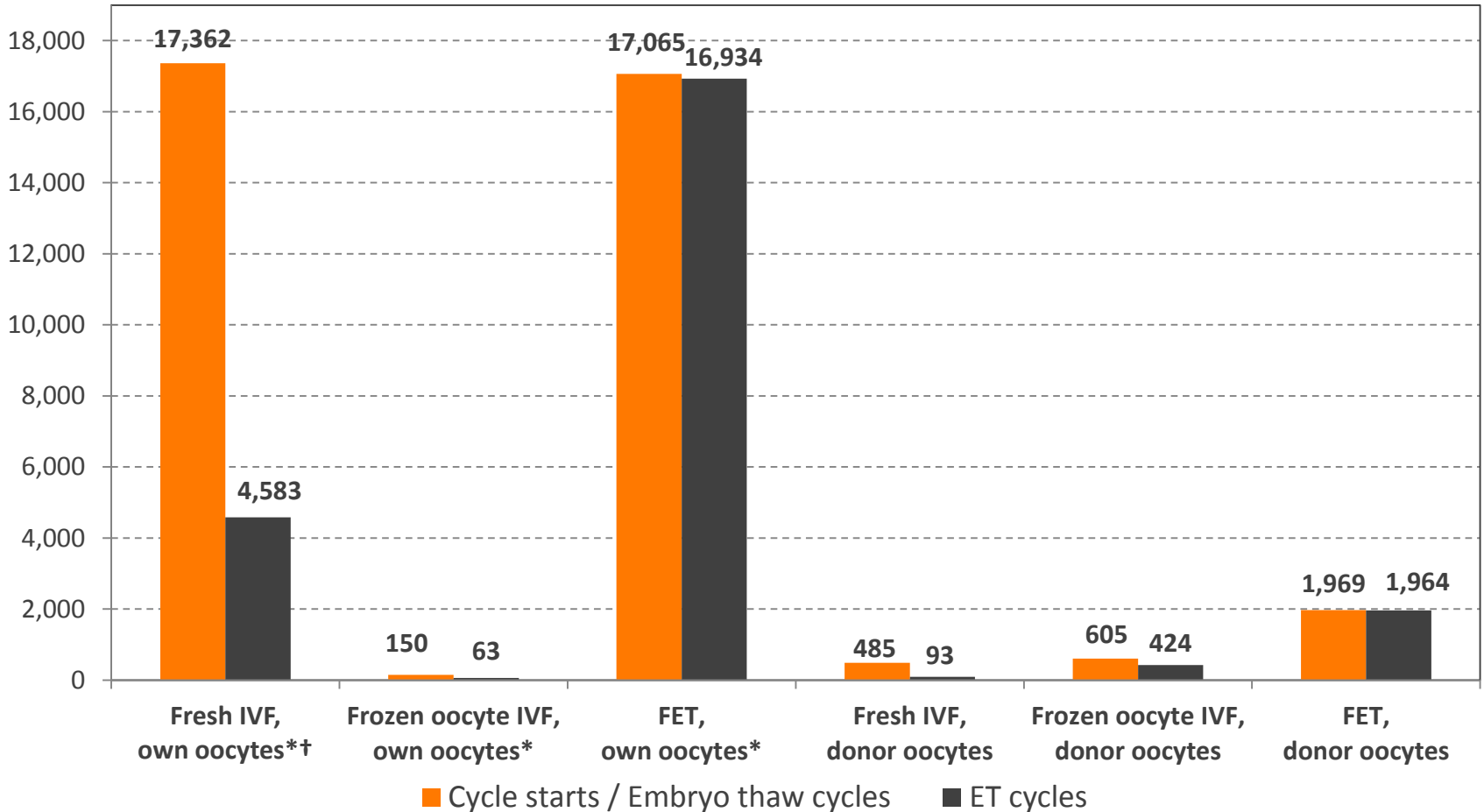
‡ Frozen cycles include: FET cycles, and frozen oocyte IVF cycles

TREATMENT CYCLES FOR 2021

All ART treatment cycles (fresh and frozen)

Number of treatment cycles by type

2021

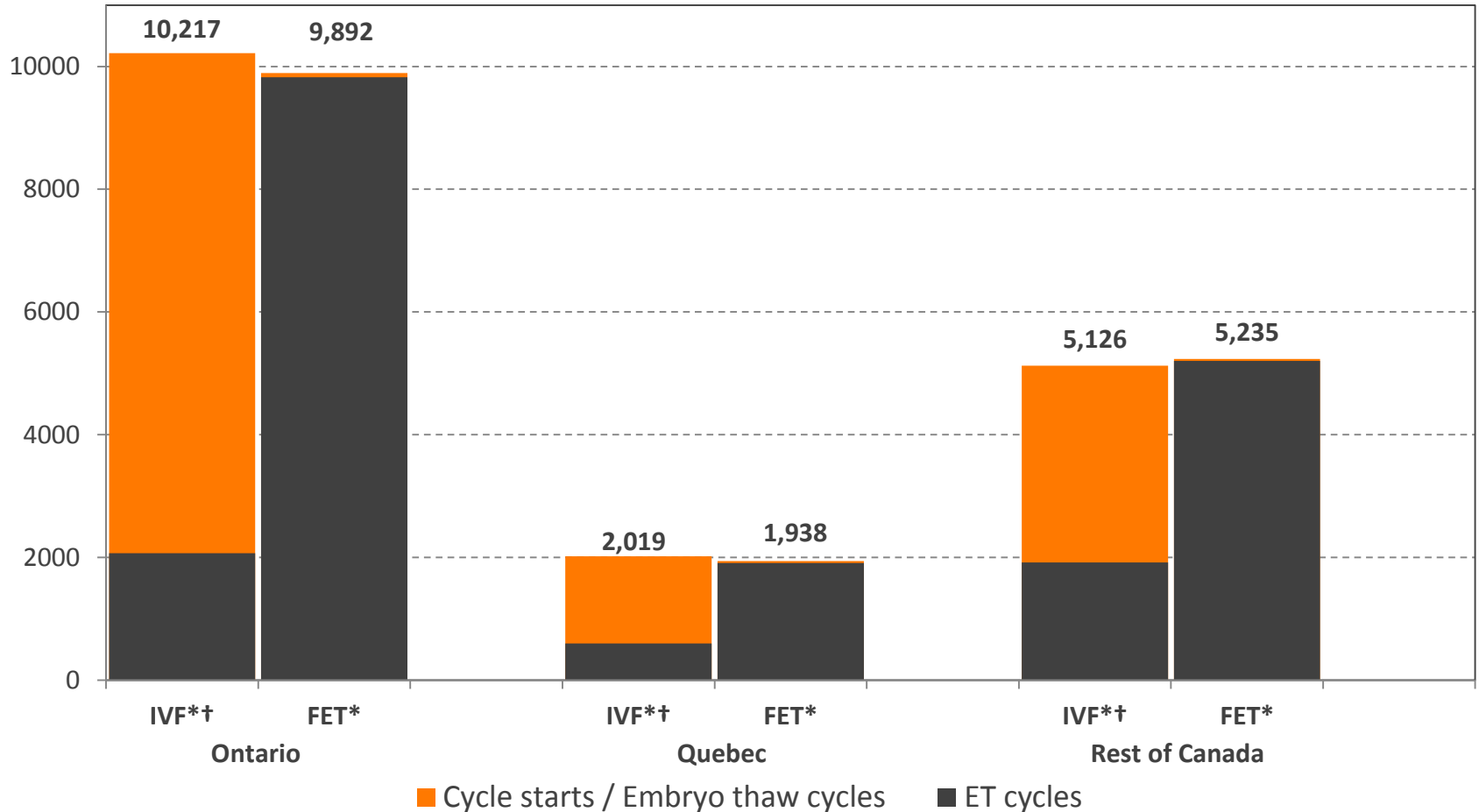


* Own oocytes exclusively

† Includes Natural & Modified Natural IVF, own oocytes

Number of treatment cycles by province

IVF and FET – own oocytes, 2021

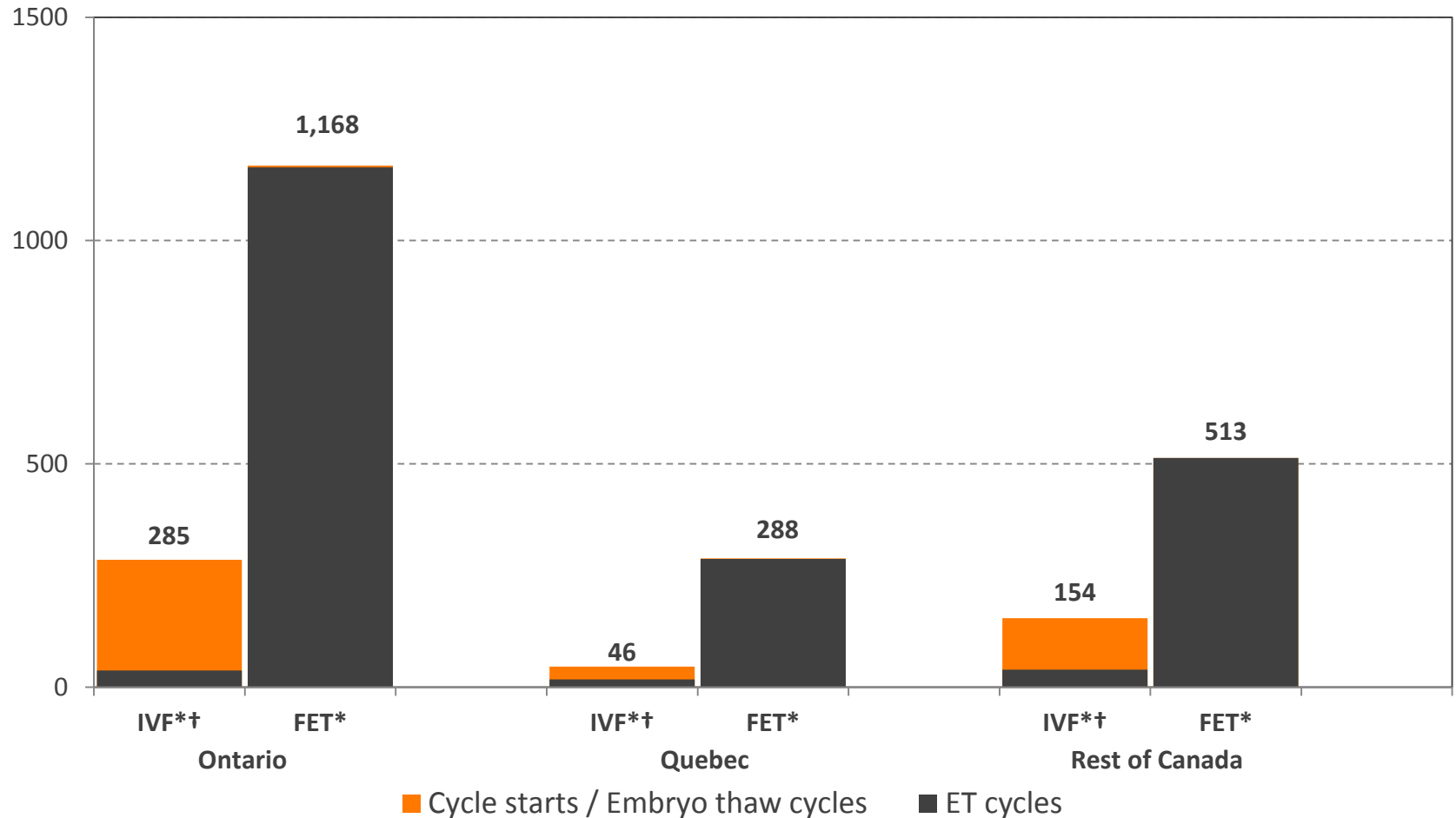


* Own oocytes exclusively

† Includes Natural & Modified Natural IVF, own oocytes

Number of treatment cycles by province

IVF and FET – donor oocytes, 2021



* Own oocytes exclusively

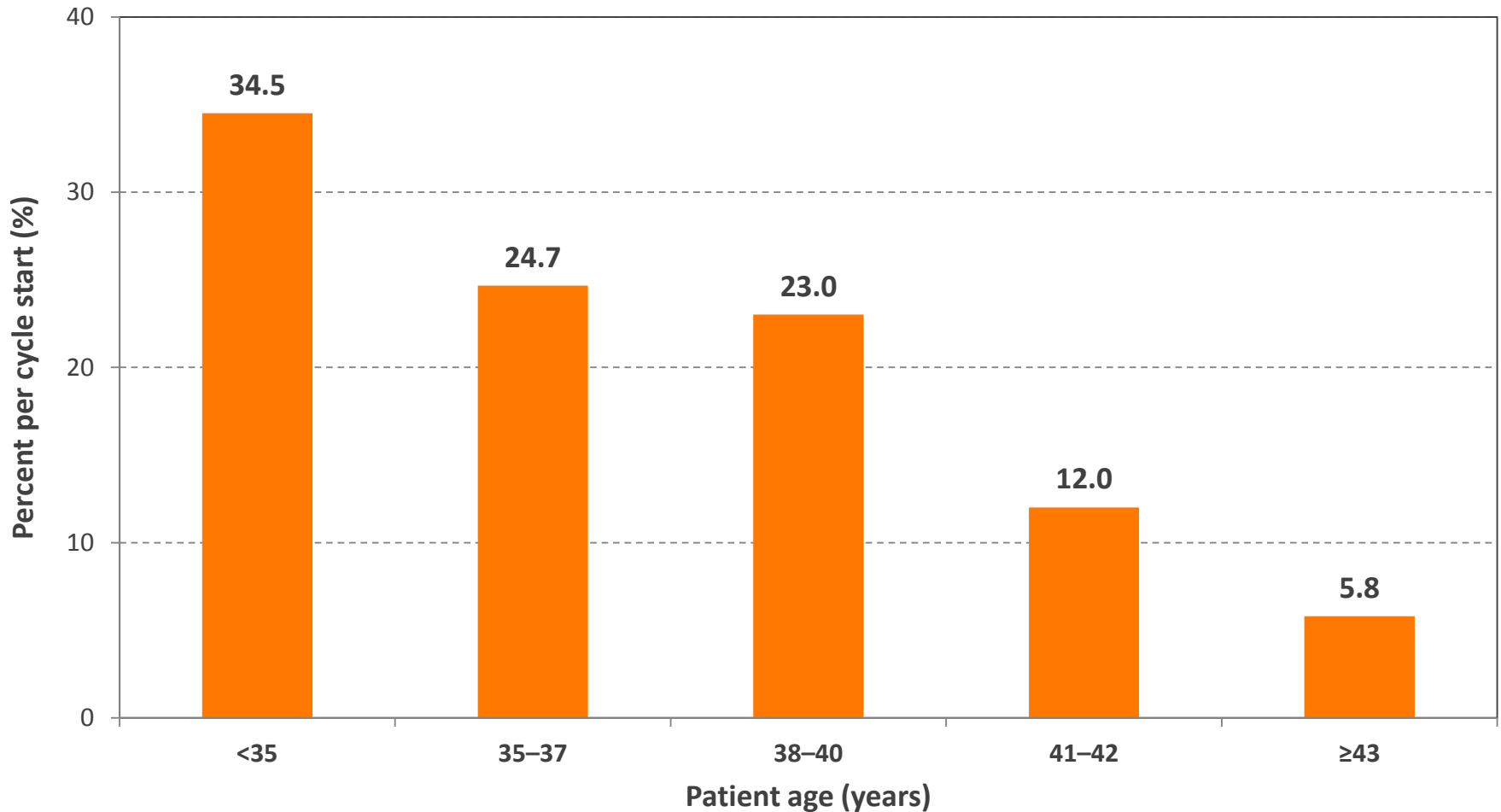
† Includes Natural & Modified Natural IVF, own oocytes

TREATMENT CYCLES FOR 2021

ART cycles using IVF – own oocytes

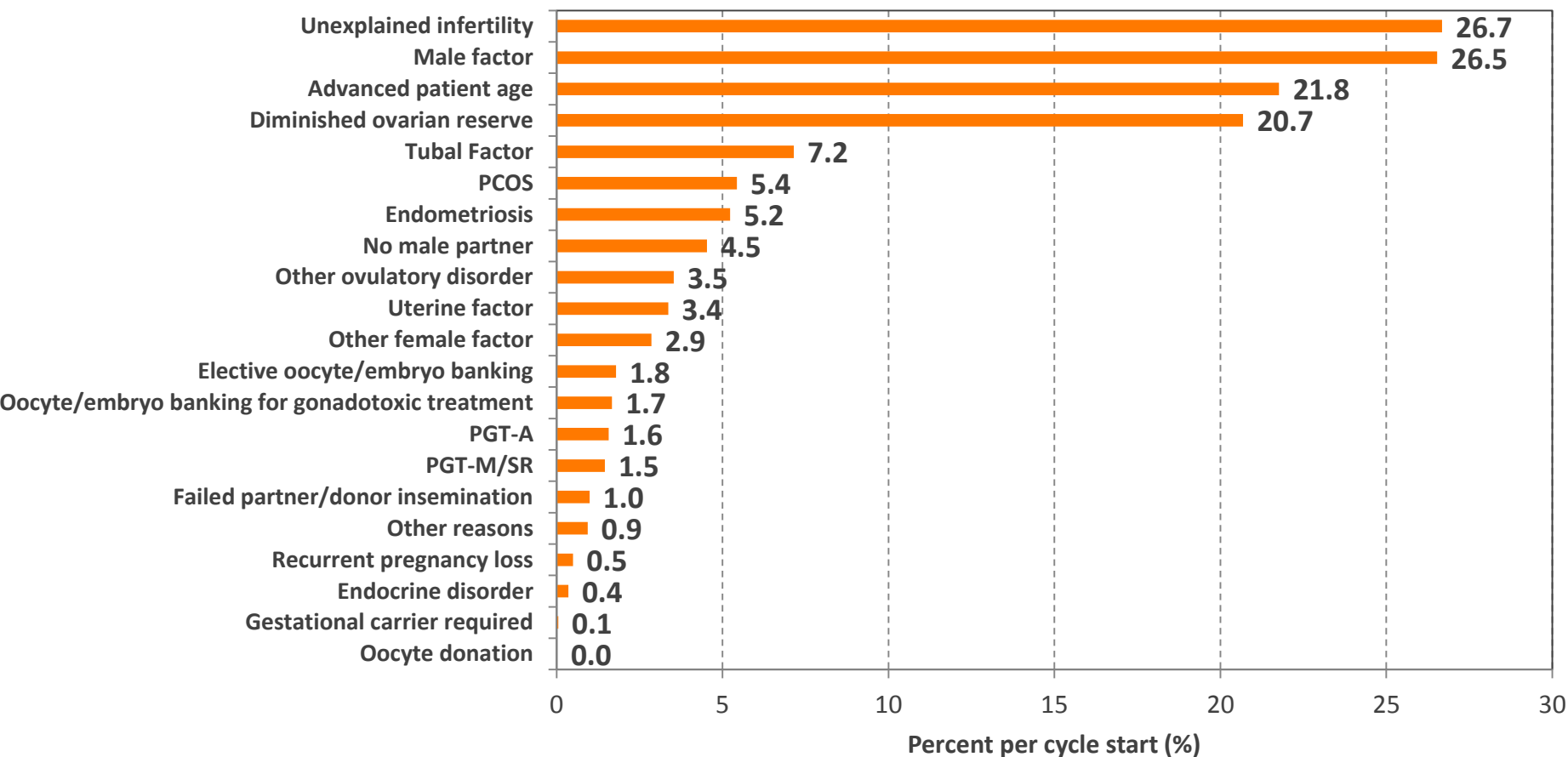
Patient age

ART cycles using IVF – own oocytes, 2021



Reasons for treatment

ART cycles using IVF, 2021



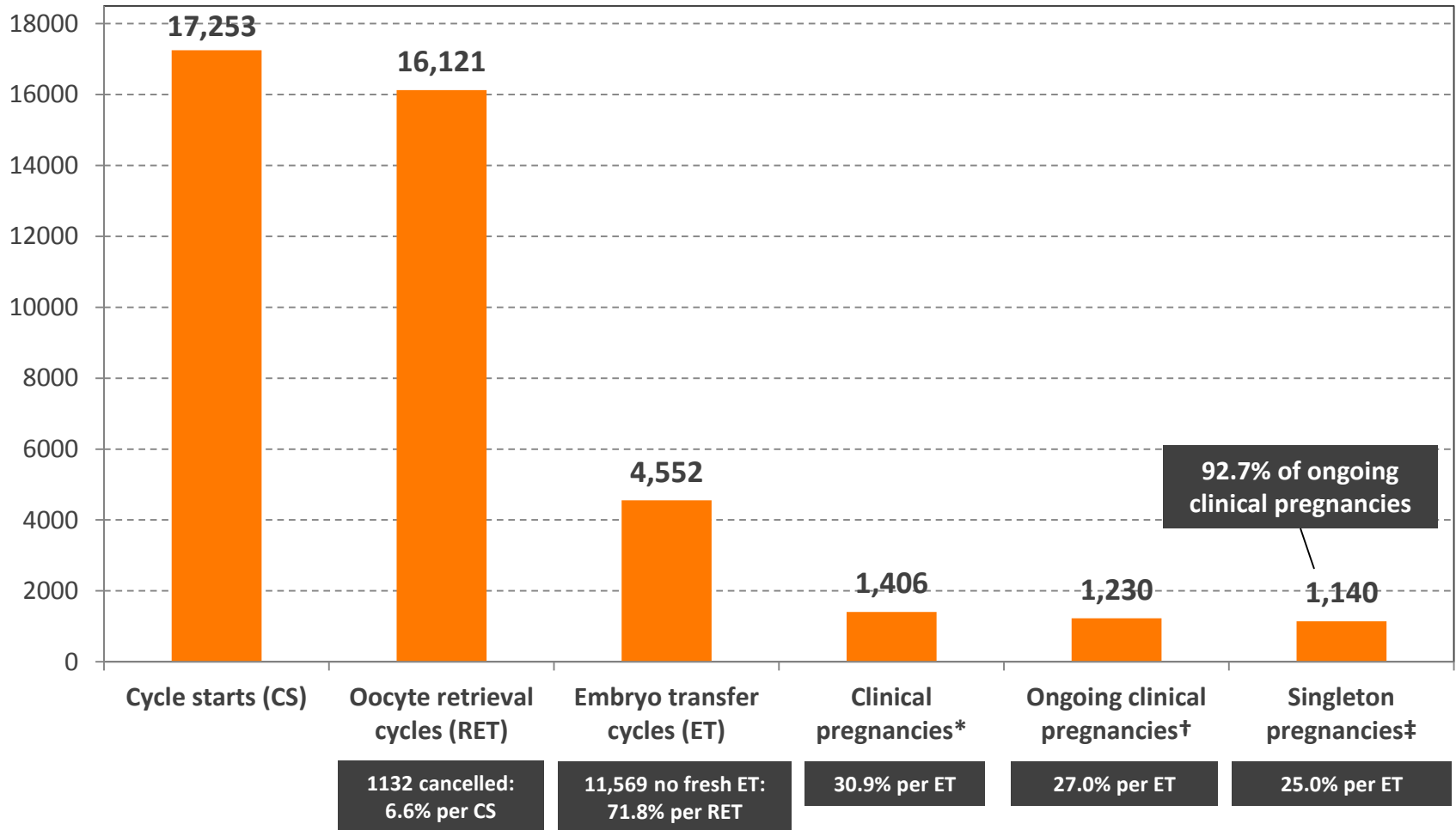
* Categories are not mutually exclusive

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

‡ The following categories were removed as part of the 2022 CARTR Plus Enhancements: No male partner; Other female factor; PGT-A; Endocrine disorder; Gonadotoxic therapy, No female partner; and Peritoneal factor or severe adhesions. As a result, the proportions may not represent a full year of data

Stage of treatment and treatment outcomes

ART cycles using IVF – own oocytes, 2021



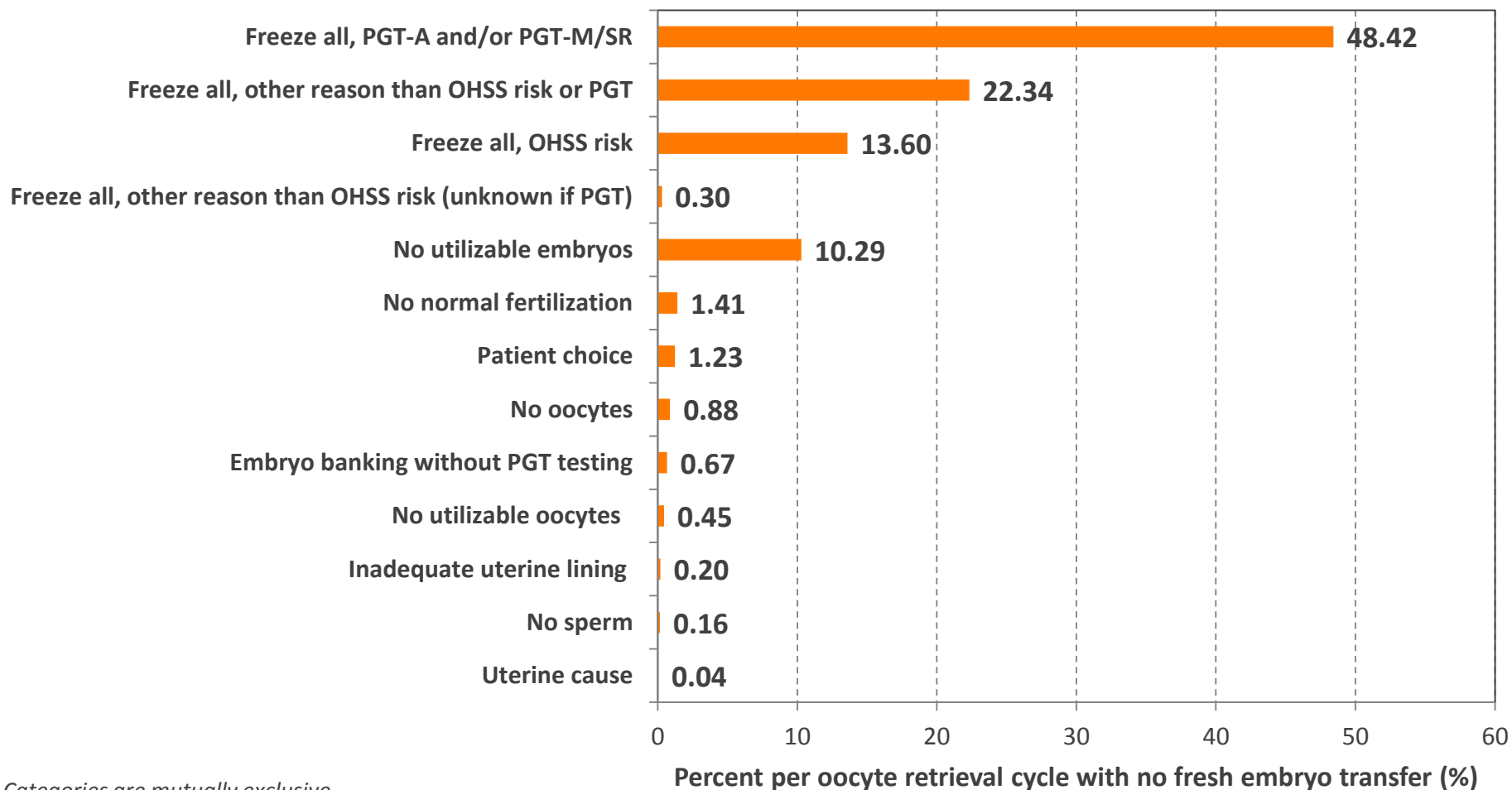
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† 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

Reasons for no fresh embryo transfer

ART cycles using IVF – own oocytes, 2021

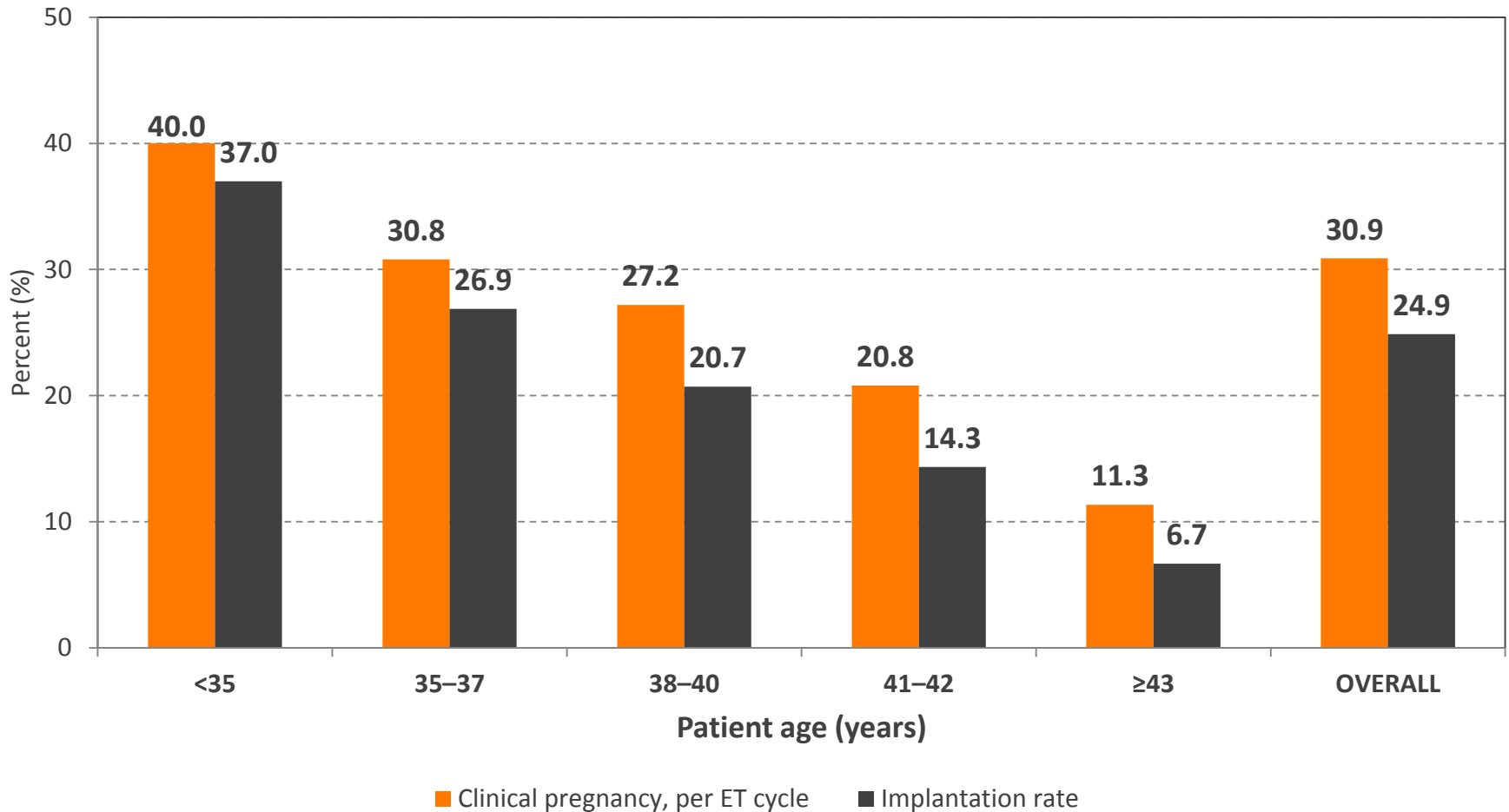


* Categories are mutually exclusive

† The following categories were removed as part of the 2022 CARTR Plus Enhancements: Inadequate uterine lining, no oocytes, no sperm, no utilizable oocytes, no normal fertilization, and freeze all, other reason than OHSS risk (unknown if PGT). As a result, the proportions may not represent a full year of data

Clinical pregnancy and implantation rate

ART cycles using IVF – own oocytes, 2021

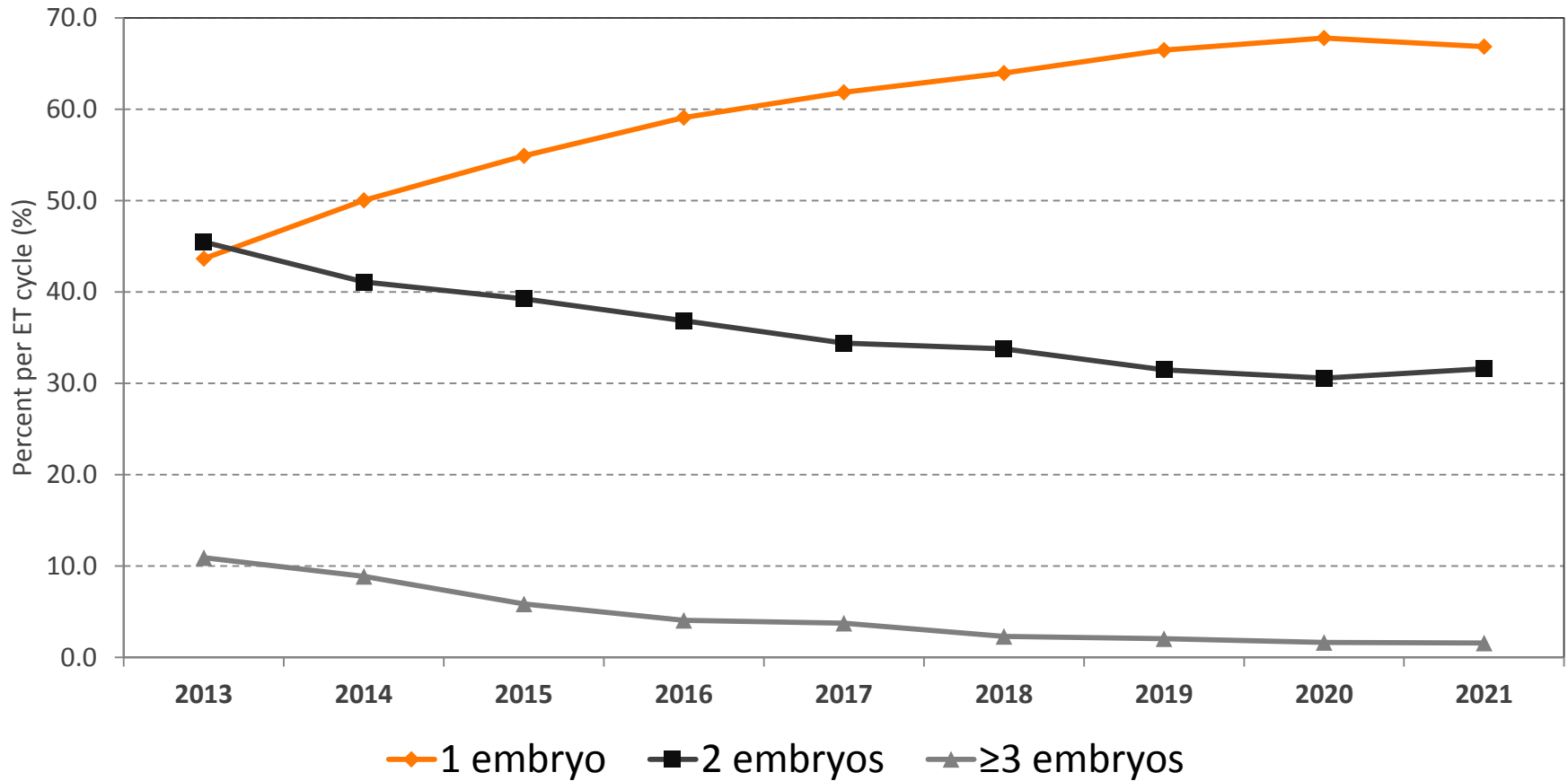


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

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

Number of embryos transferred, by year

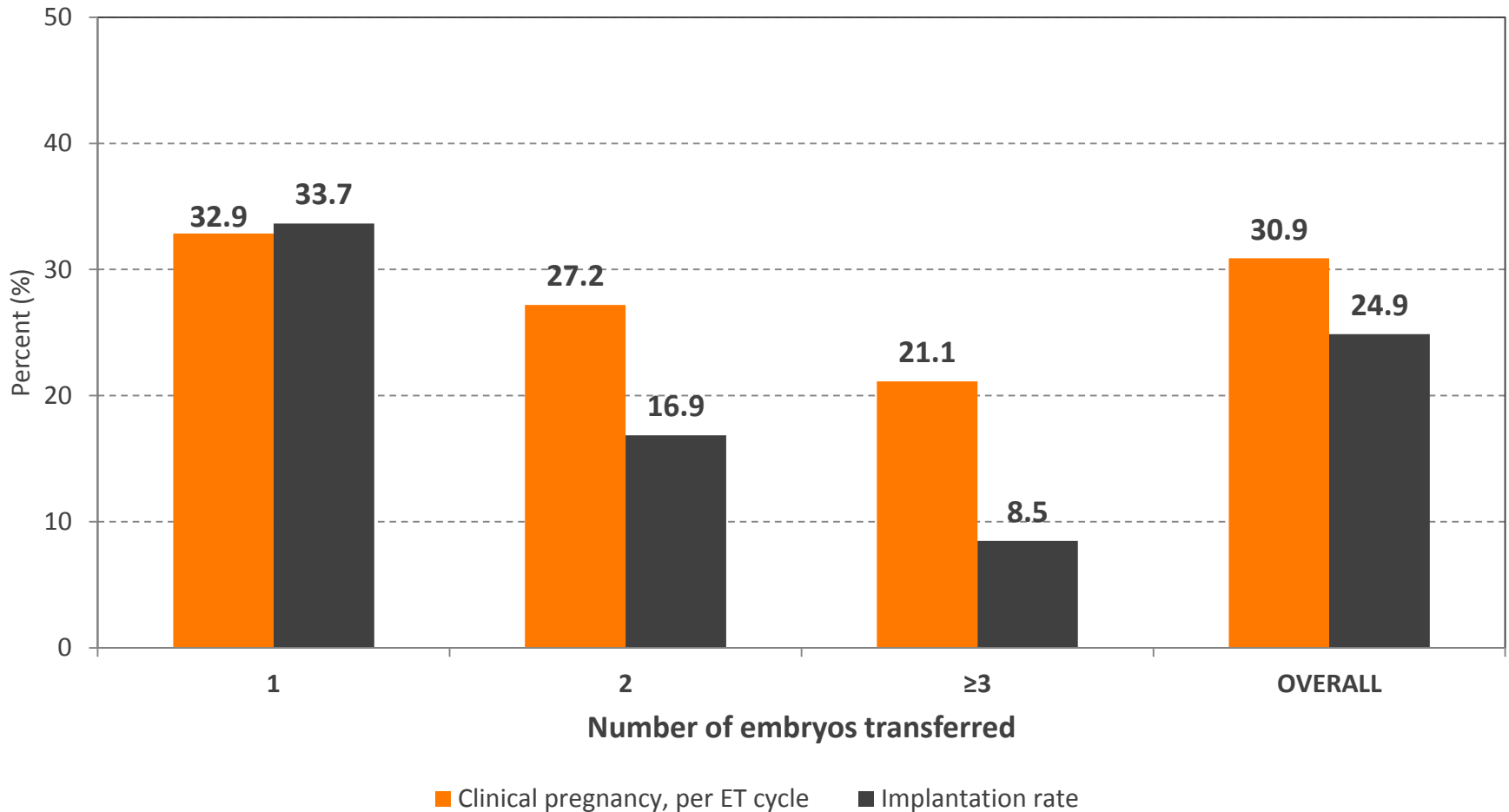
ART cycles using IVF – own oocytes, 2013 – 2021



* Excludes records with missing number of embryos transferred

Clinical pregnancy and implantation rate

ART cycles using IVF – own oocytes, 2021

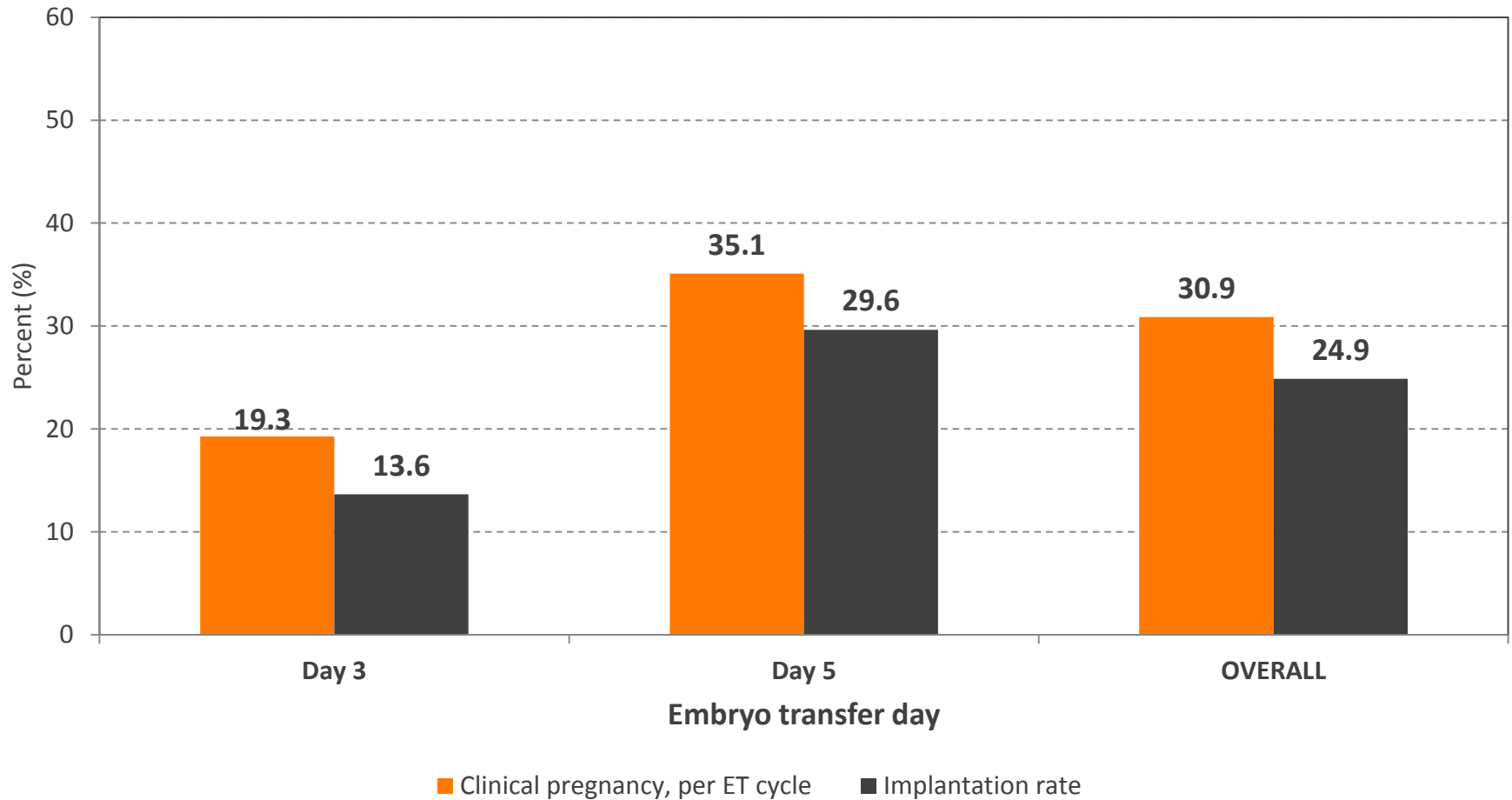


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

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

Clinical pregnancy and implantation rate

ART cycles using IVF – own oocytes, 2021



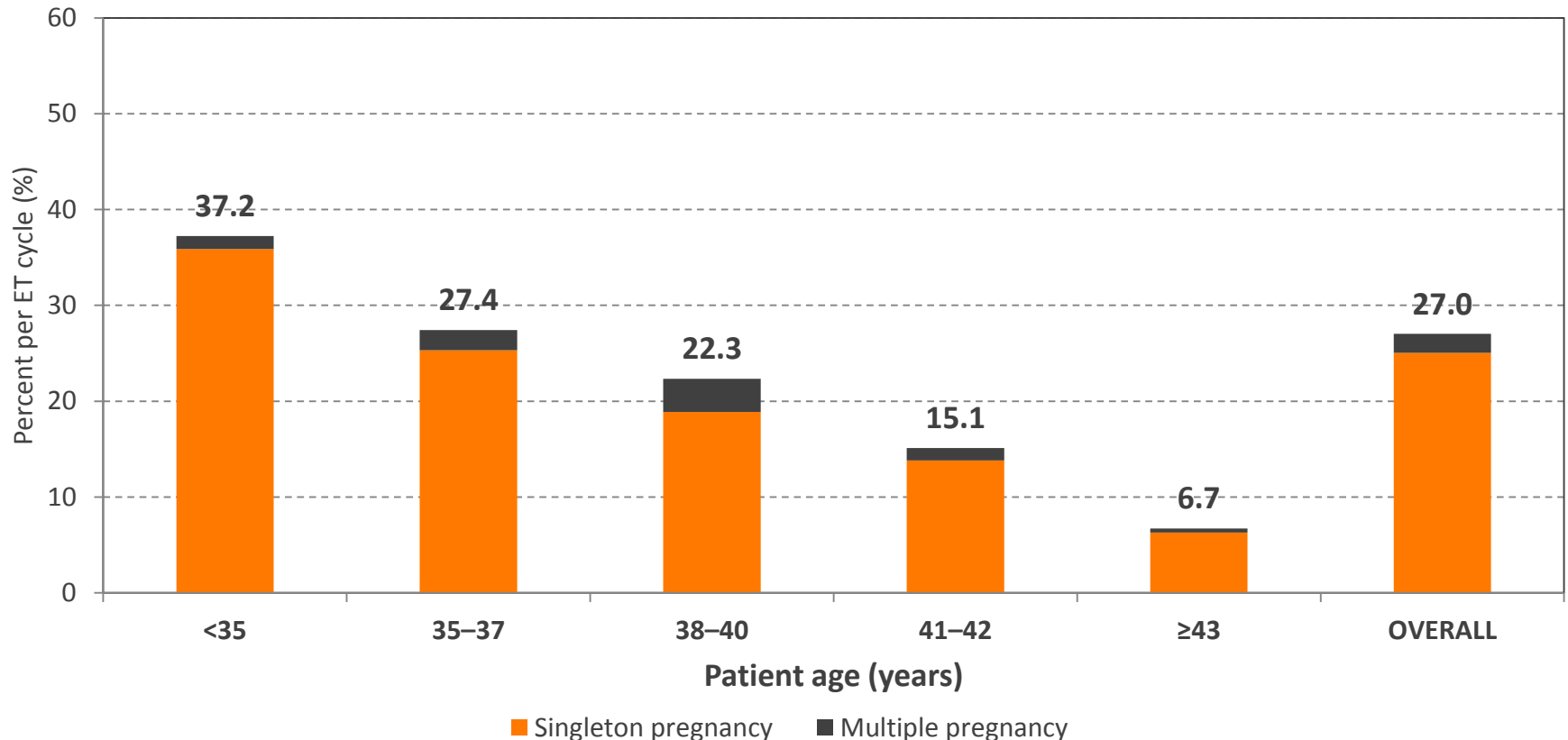
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† 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



ART cycles using IVF – own oocytes, 2021

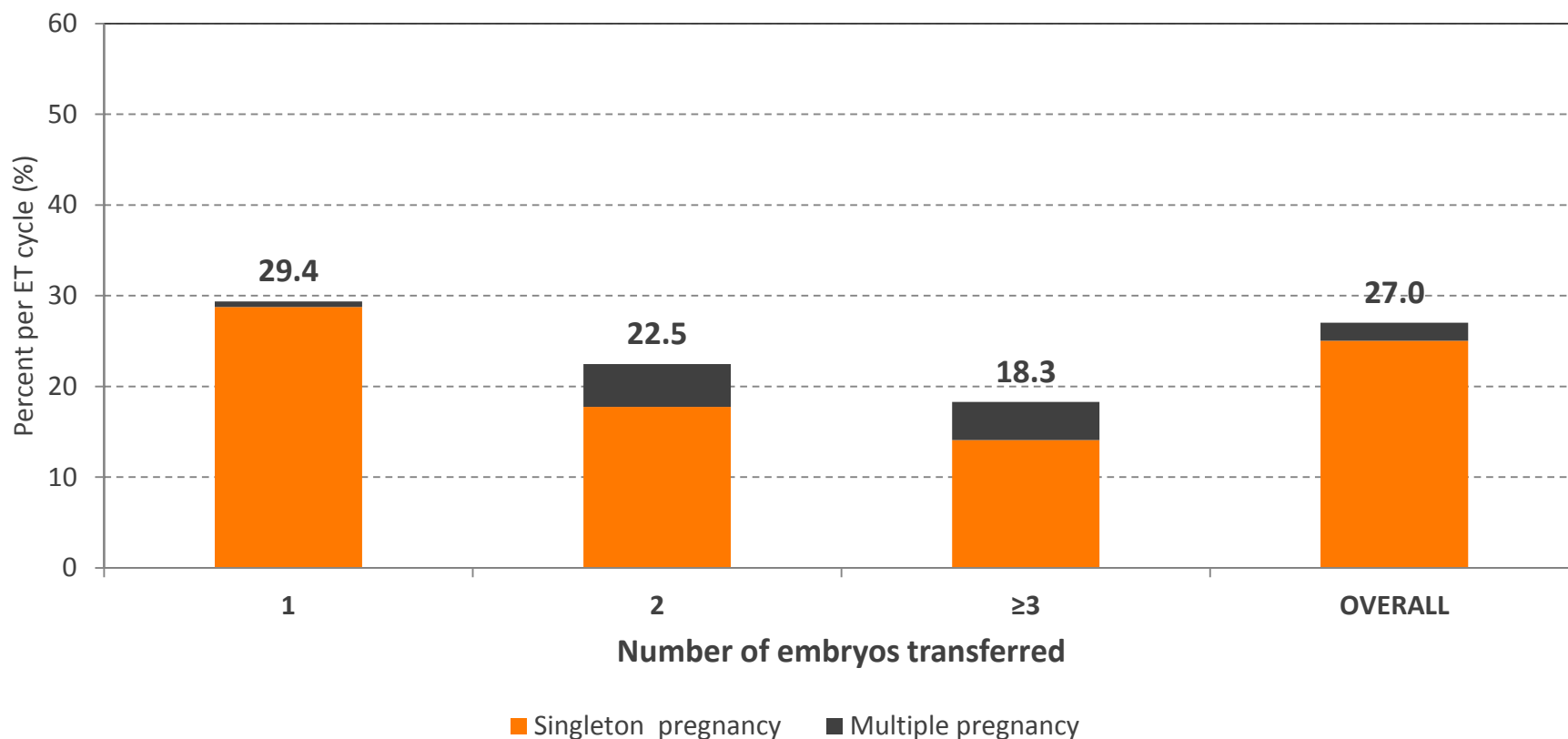


	<35	35-37	38-40	41-42	≥43	OVERALL
Singleton	557 (35.9%)	291 (25.3%)	202 (18.9%)	75 (13.8%)	15 (6.3%)	1,140 (25.0%)
Multiple	21 (1.3%)	24 (2.1%)	37 (3.5%)	7 (1.3%)	1 (0.4%)	90 (2.0%)

* 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

Proportion of cycles resulting in an ongoing clinical pregnancy

ART cycles using IVF – own oocytes, 2021



Singleton	875 (28.8%)	255 (17.7%)	10 (14.1%)	1,140 (25.0%)
Multiple	19 (0.6%)	68 (4.7%)	3 (4.2%)	90 (2.0%)

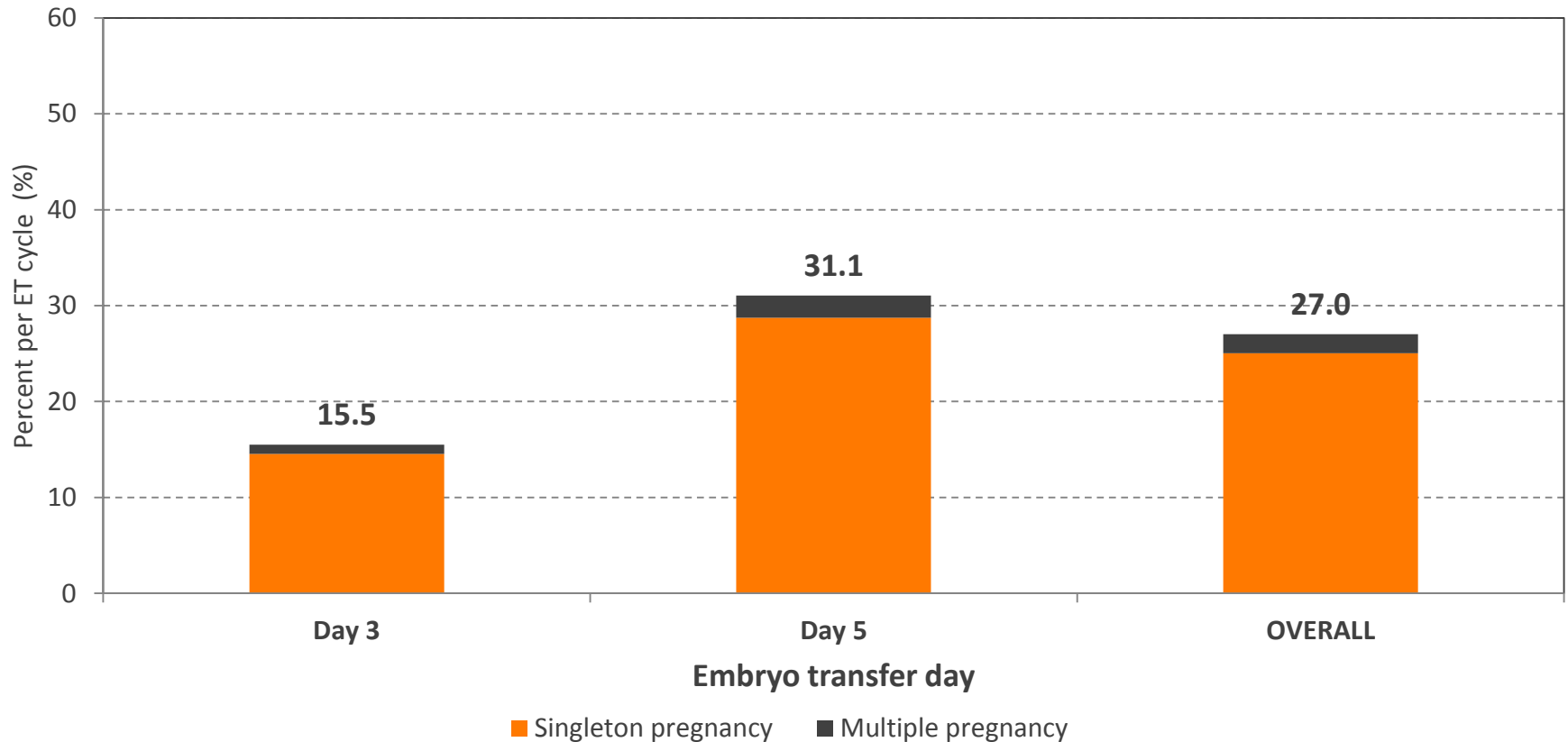
NOTE: In rare cases, a single embryo may divide and produce twins or triplets. For this reason, a small percentage of multiple pregnancies can result from a single embryo transfer

* Ongoing clinical pregnancy: clinical pregnancy with ≥ 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

Proportion of cycles resulting in an ongoing clinical pregnancy

ART cycles using IVF – own oocytes, 2021



	Day 3	Day 5	OVERALL
Singleton	135 (14.5%)	975 (28.7%)	1,140 (25.0%)
Multiple	9 (1.0%)	79 (2.3%)	90 (2.0%)

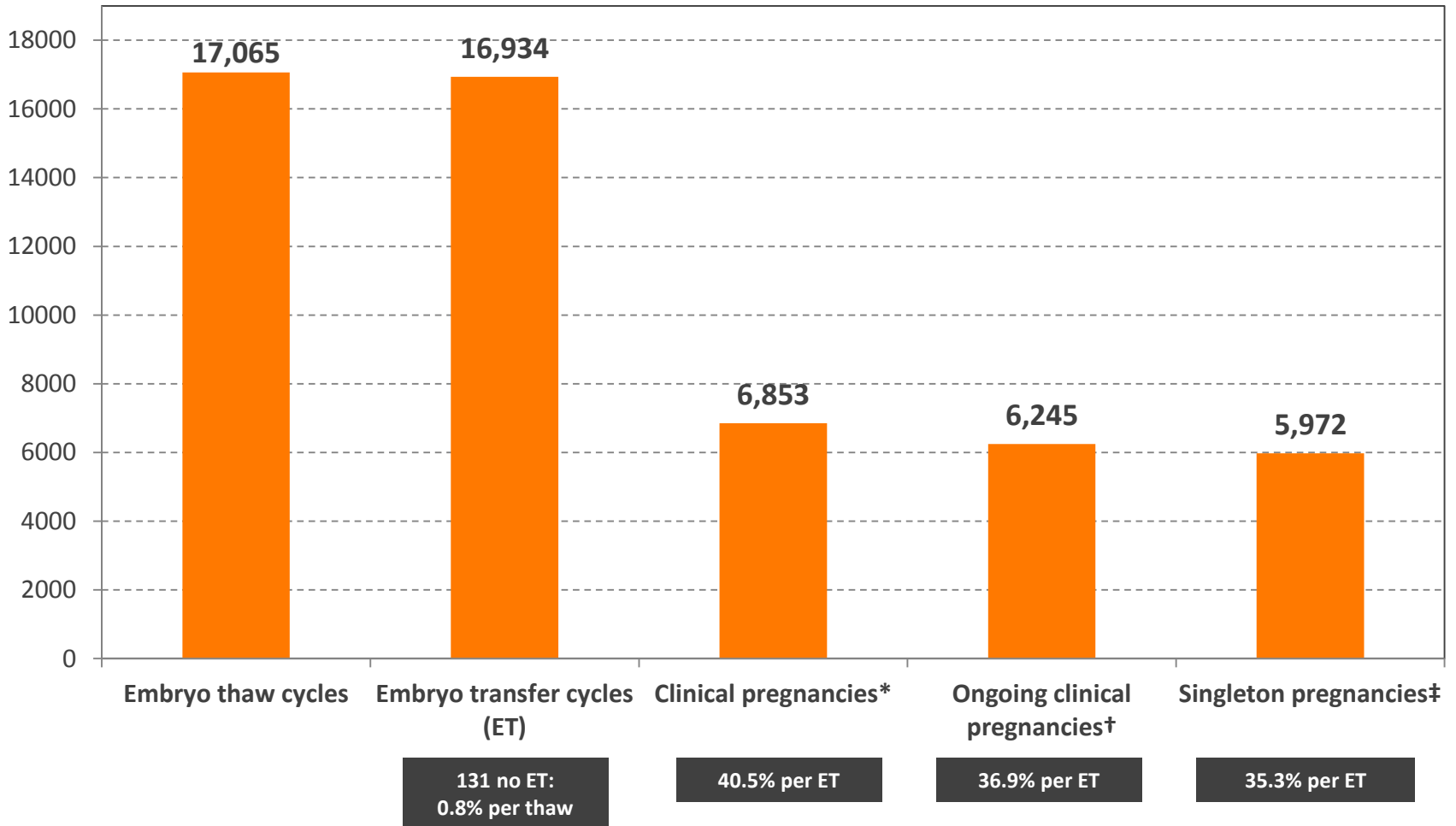
* Ongoing clinical pregnancy: clinical pregnancy with ≥ 1 fetal heart beat on ultrasound
 † Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with >1 fetal heart beat

TREATMENT CYCLES FOR 2021

ART cycles using FET – own oocytes

Stage of treatment and treatment outcomes

ART cycles using FET – own oocytes, 2021



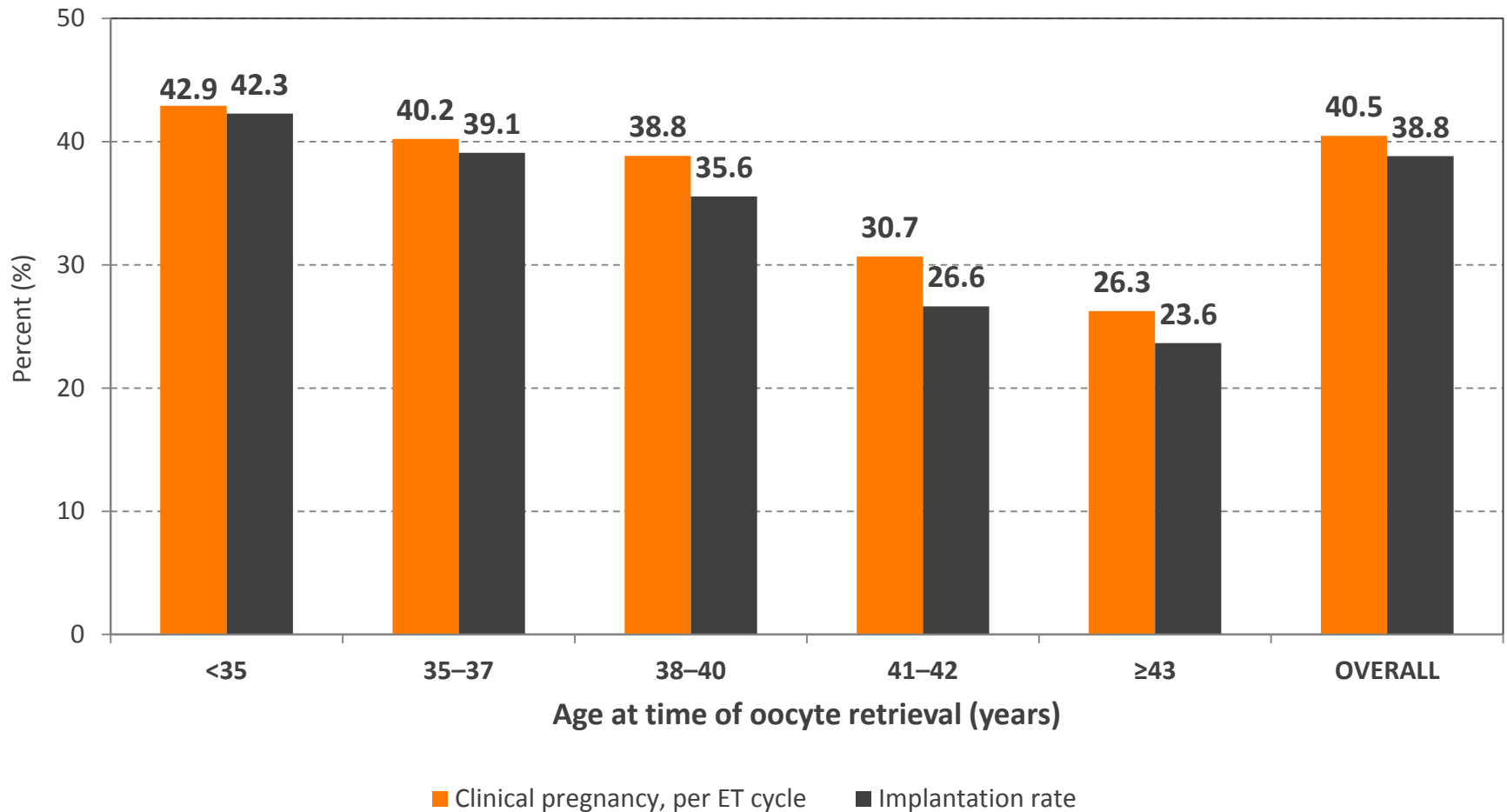
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† 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

Clinical pregnancy and implantation rate

ART cycles using FET – own oocytes, 2021

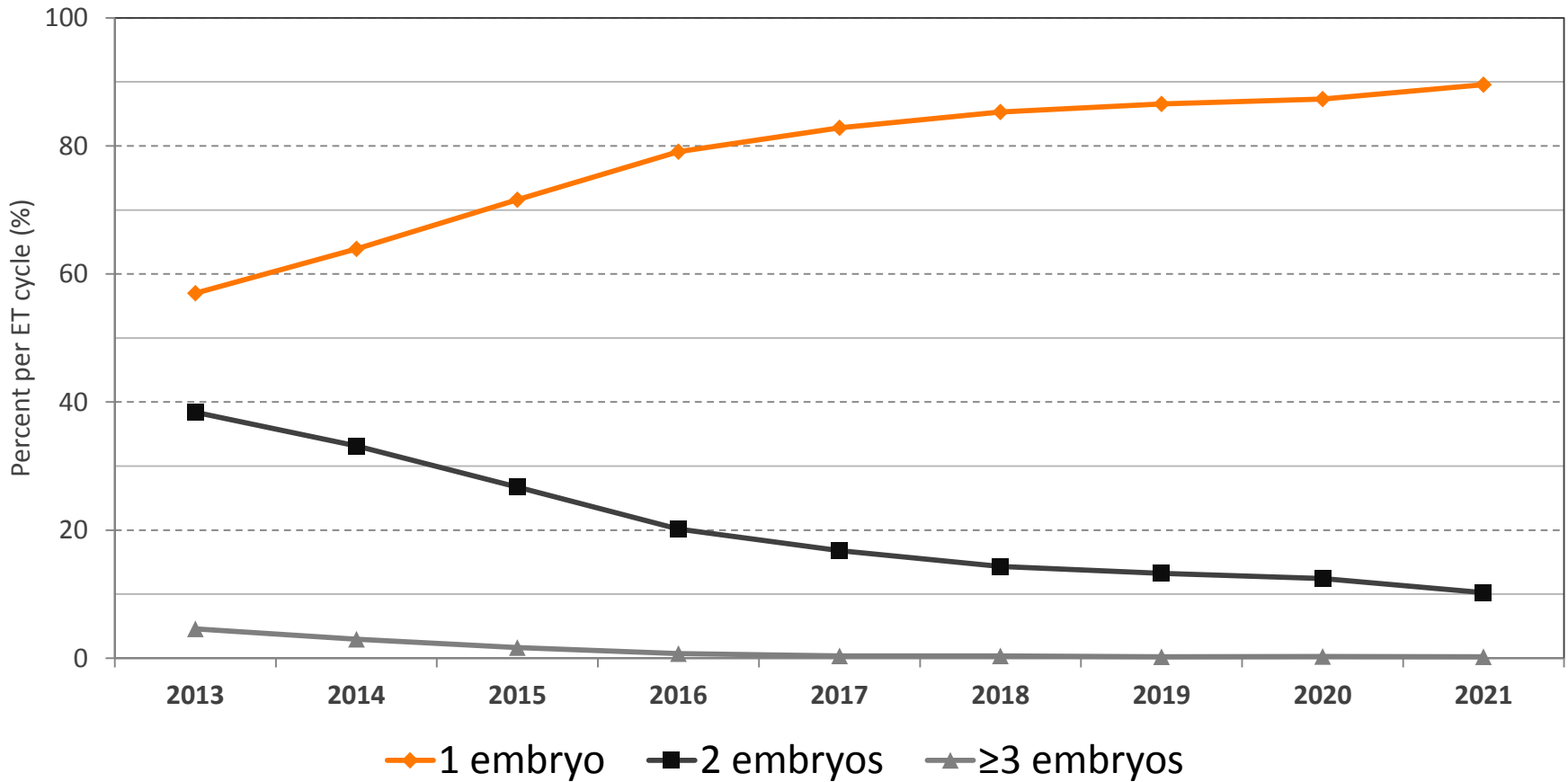


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

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

Number of embryos transferred, by year

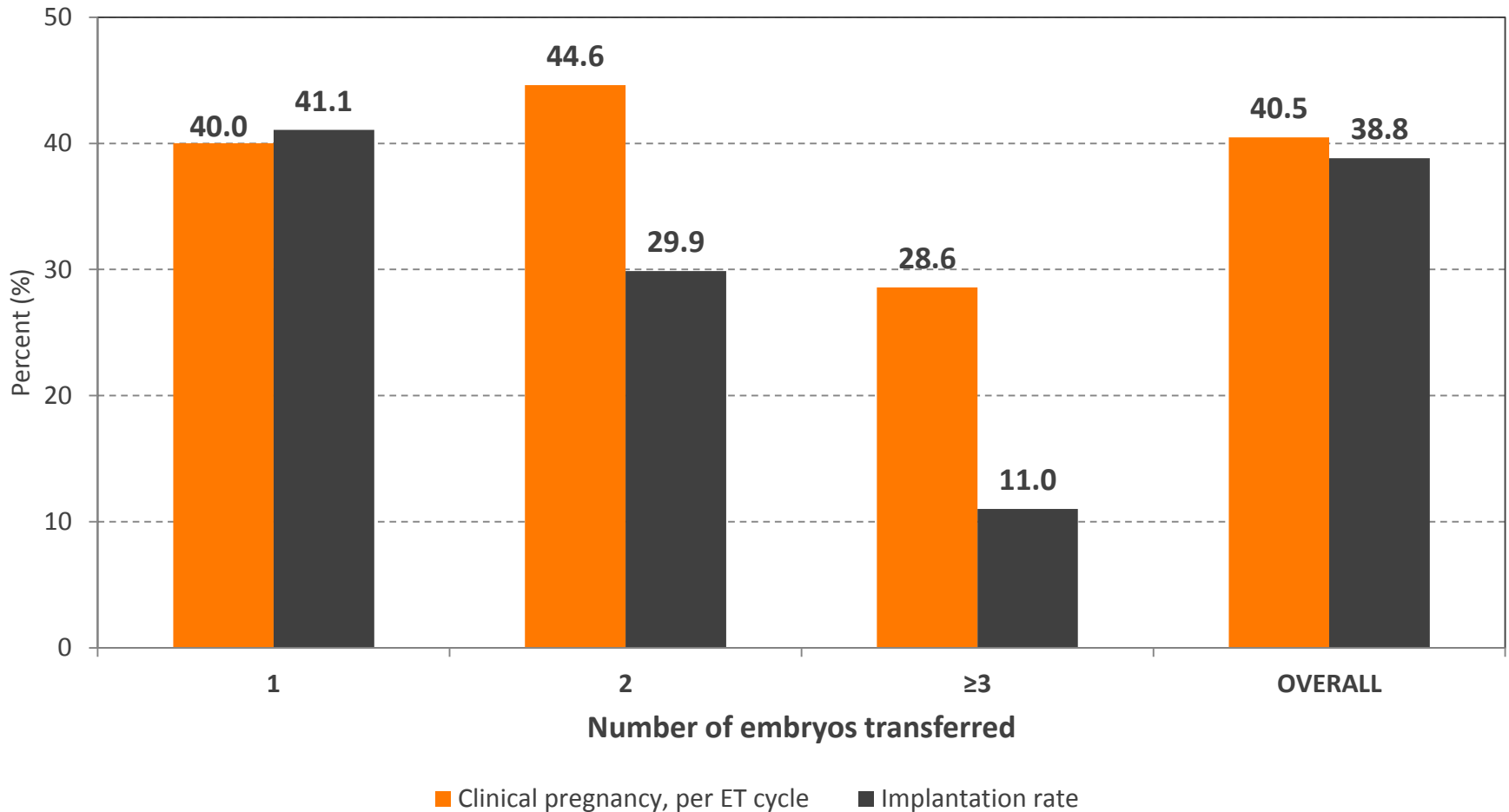
ART cycles using FET – own oocytes, 2021



* Excludes records with missing number of embryos transferred

Clinical pregnancy and implantation rate

ART cycles using FET – own oocytes, 2021

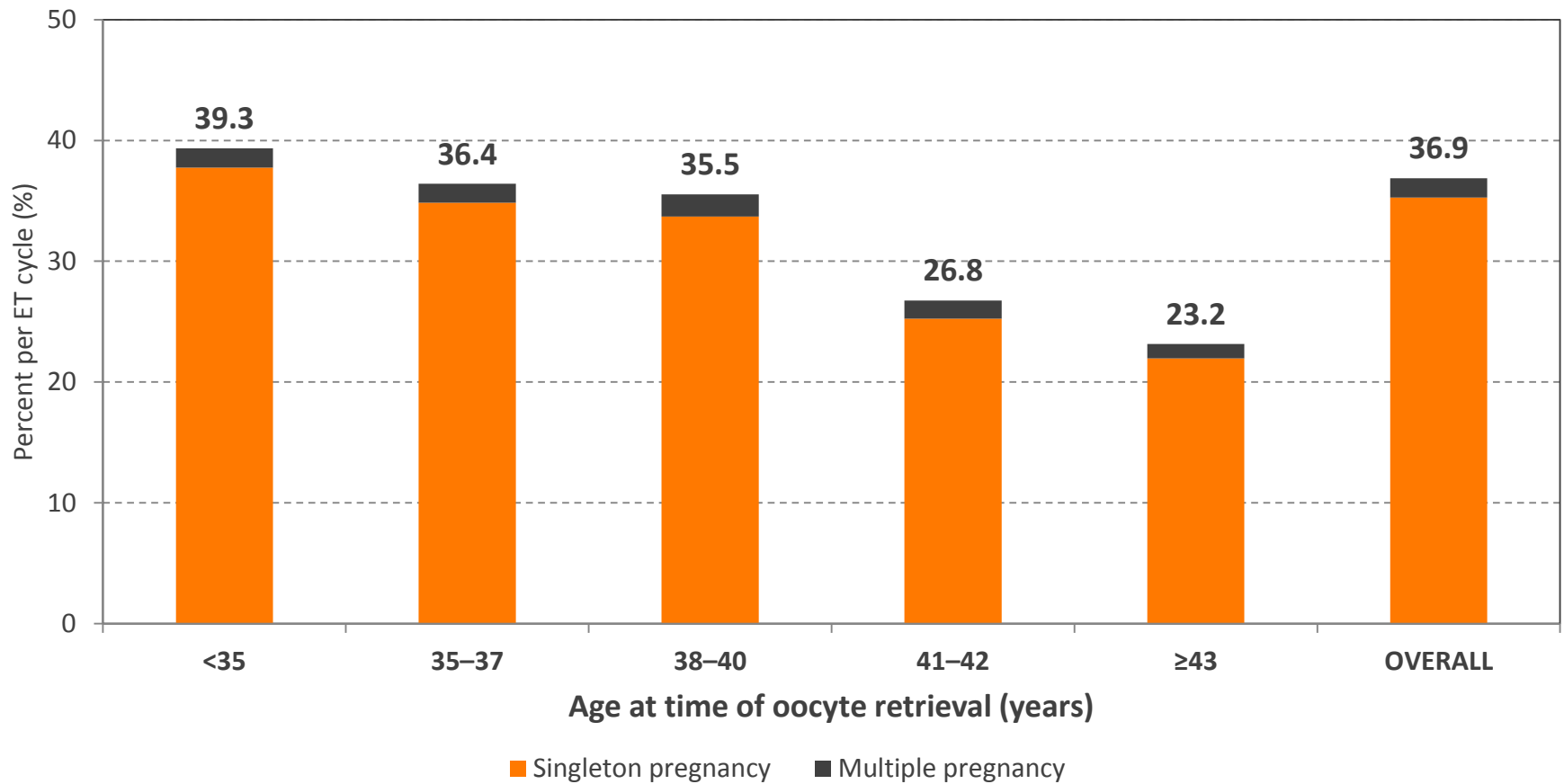


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† 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

ART cycles using FET – own oocytes, 2021



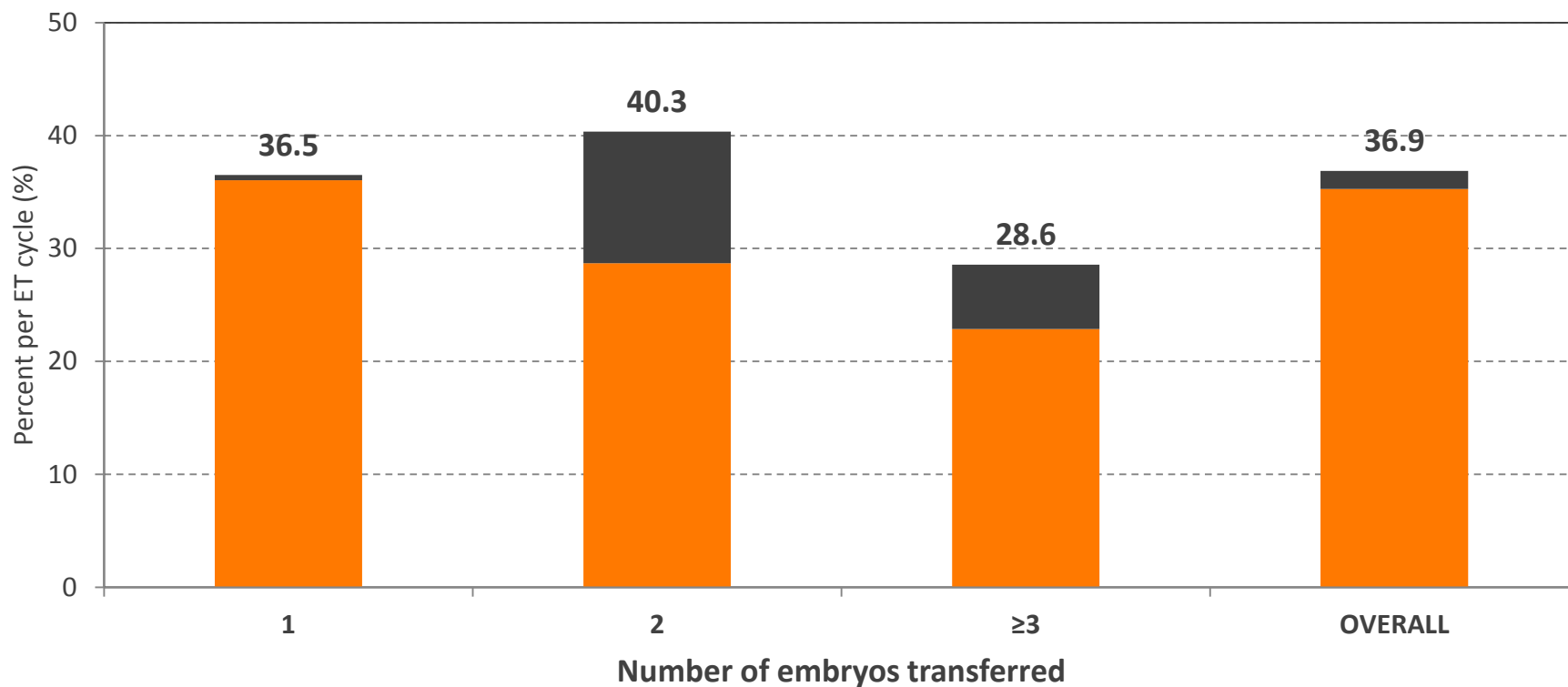
Singleton	3,184 (37.8%)	1,546 (34.8%)	917 (33.7%)	233 (25.2%)	92 (22.0%)	5,972 (35.3%)
Multiple	134 (1.6%)	70 (1.6%)	50 (1.8%)	14 (1.5%)	5 (1.2%)	273 (1.6%)

* 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

Proportion of cycles resulting in an ongoing clinical pregnancy

ART cycles using FET – own oocytes, 2021



■ Singleton pregnancy ■ Multiple pregnancy

Singleton	5,466 (36.0%)	498 (28.7%)	8 (22.9%)	5,972 (35.3%) [‡]
Multiple	69 (0.46%)	202 (11.6%)	2 (5.7%)	273 (1.6%)

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 ≥1 fetal heart beat on ultrasound

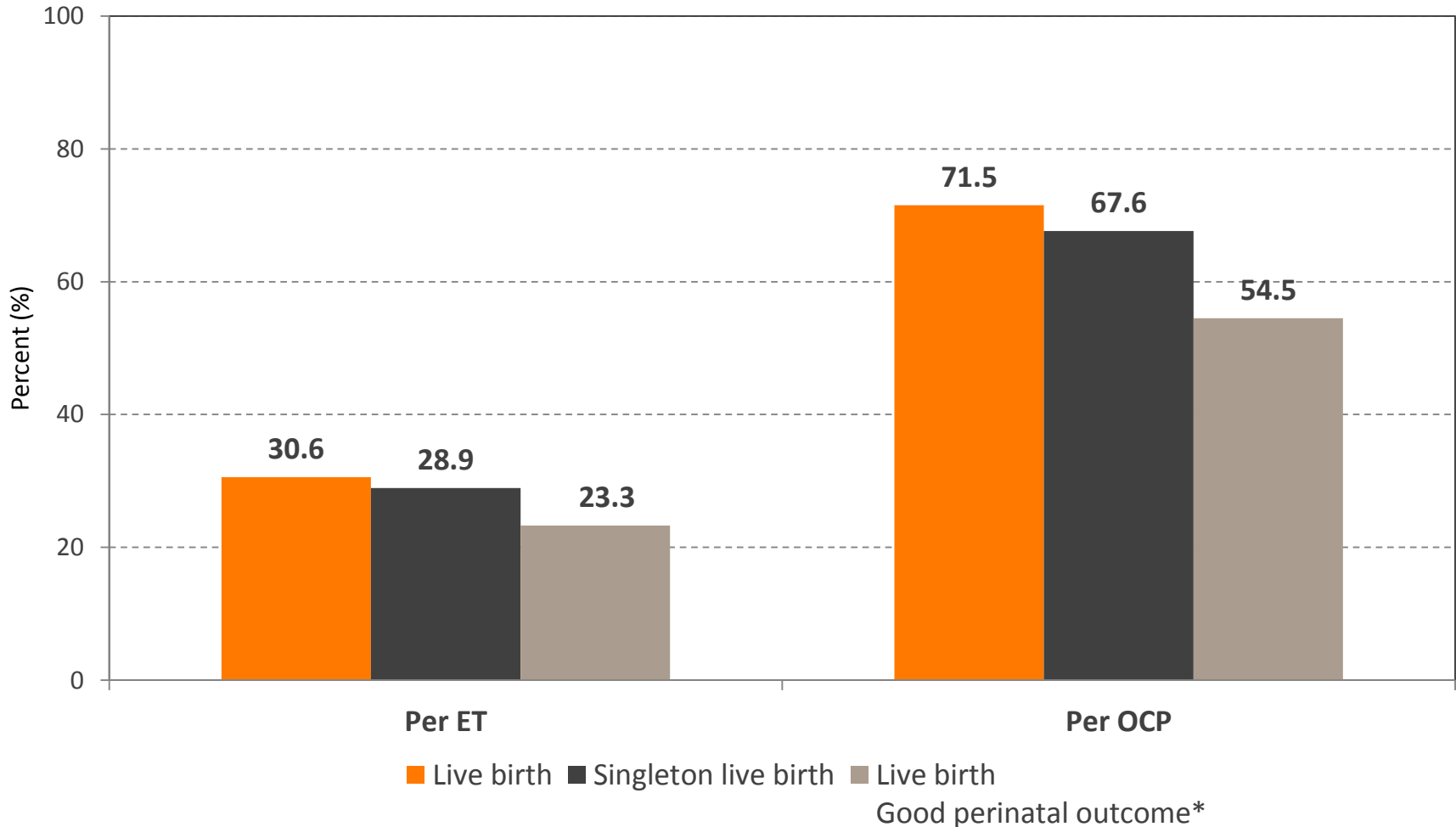
[‡] Singleton pregnancy: ongoing clinical pregnancy with only one fetal heart beat on ultrasound; multiple pregnancy: ongoing clinical pregnancy with >1 fetal heart beat

BIRTH OUTCOMES FOR 2020

All ART treatment cycles (fresh and frozen)

Birth outcome rates

All ART treatment cycles (fresh and frozen), 2020



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

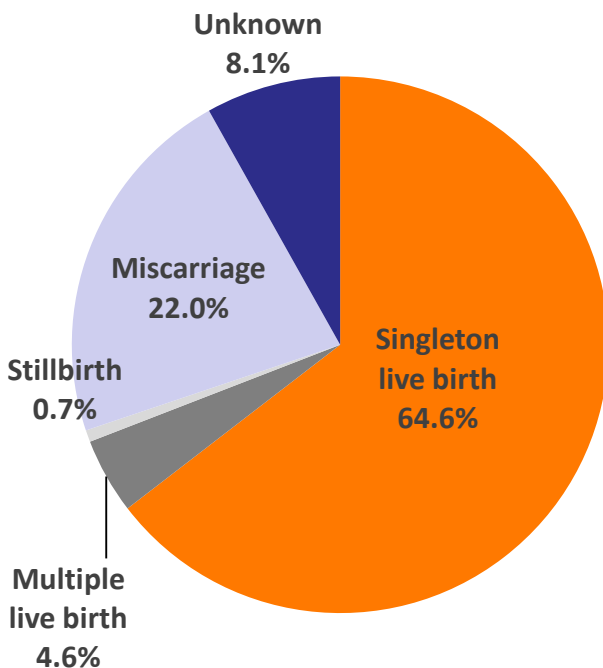
† OCP - Ongoing clinical pregnancy: a clinical pregnancy with documentation of at least one fetal heart beat on ultrasound

‡ Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=839)

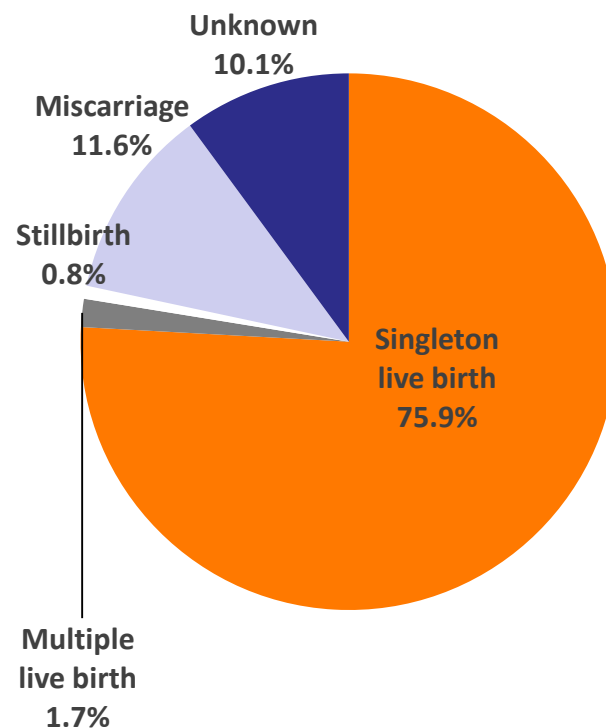
Distribution of birth outcomes among ongoing clinical pregnancies

ART cycles using IVF and FET – own oocytes, 2020

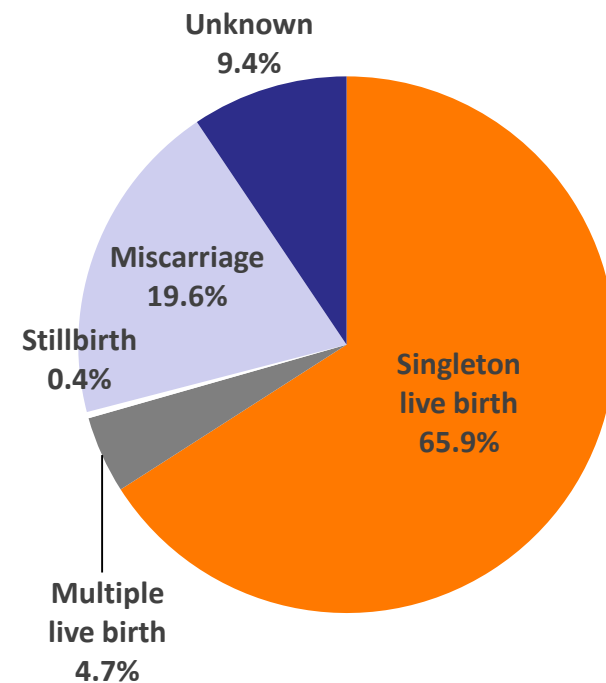
IVF – own oocytes
n= 1,402



FET – own oocytes, PGT-A
n= 1,774

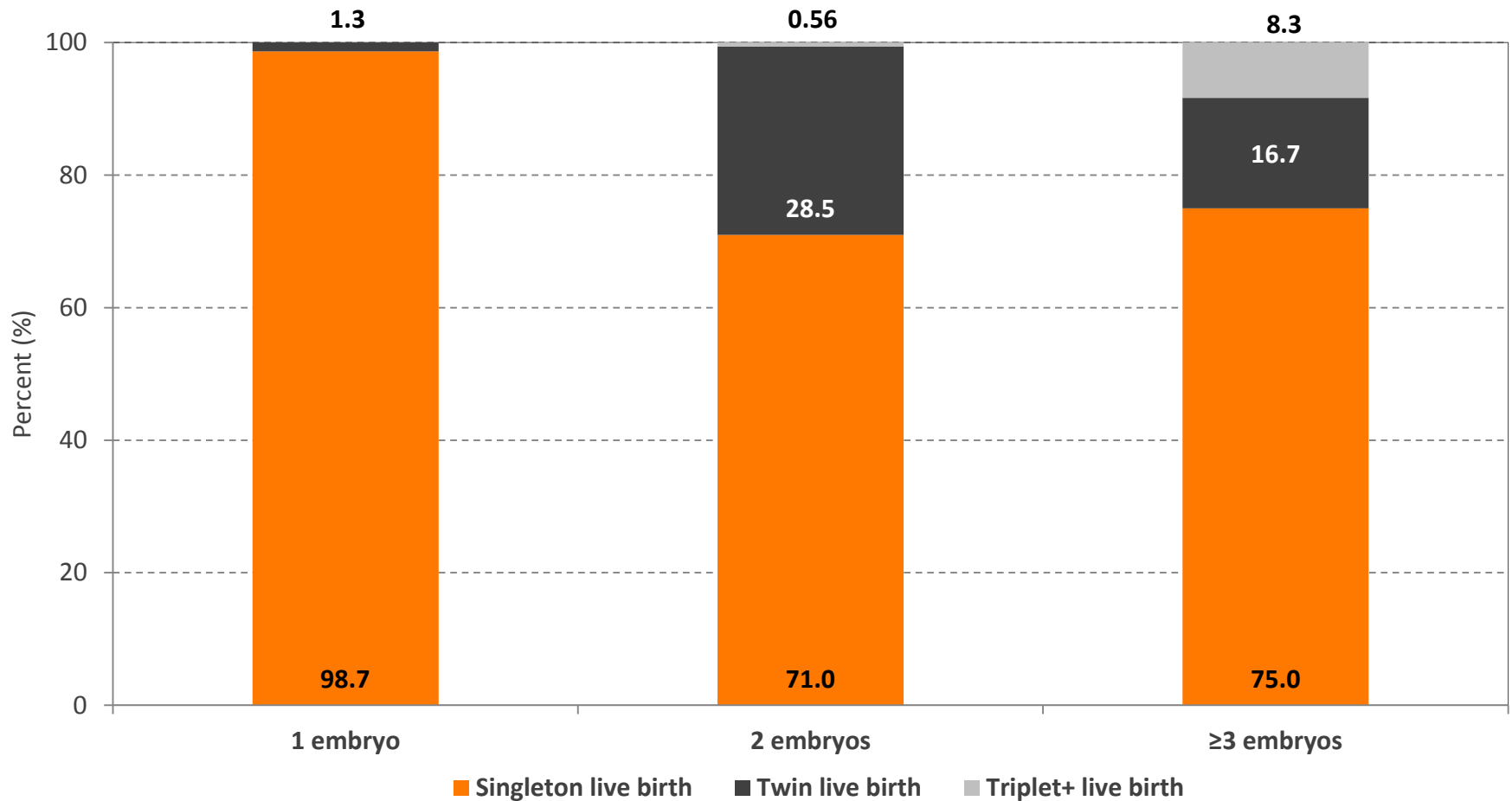


FET – own oocytes, no PGT-A
n= 4,491



Proportion of singleton and multiple live births

All ART treatment cycles (fresh and frozen), 2020



Live births

5,231

899

12

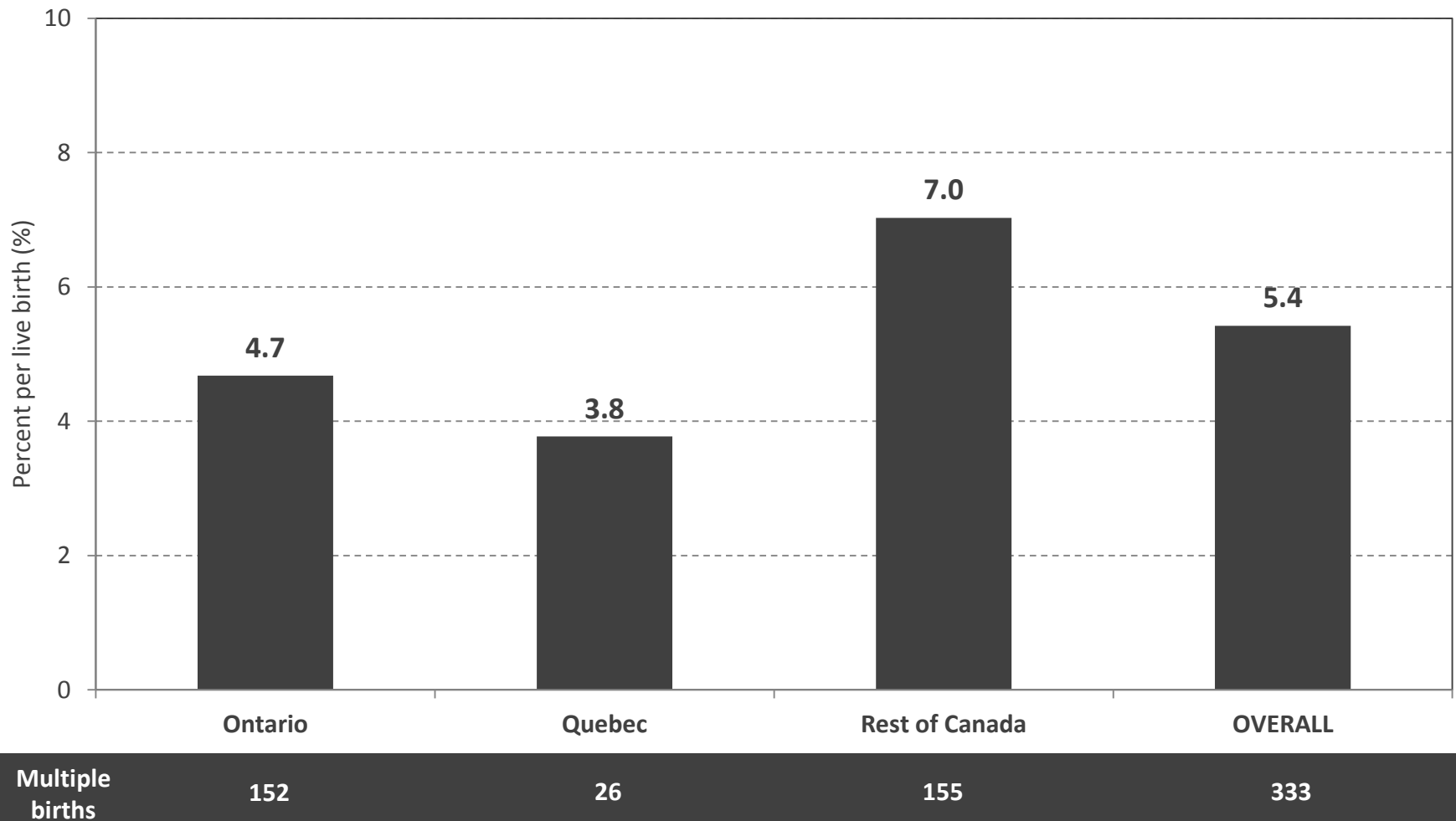
* Singleton live birth: one live birth

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

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

Multiple live birth rate per live birth, by province

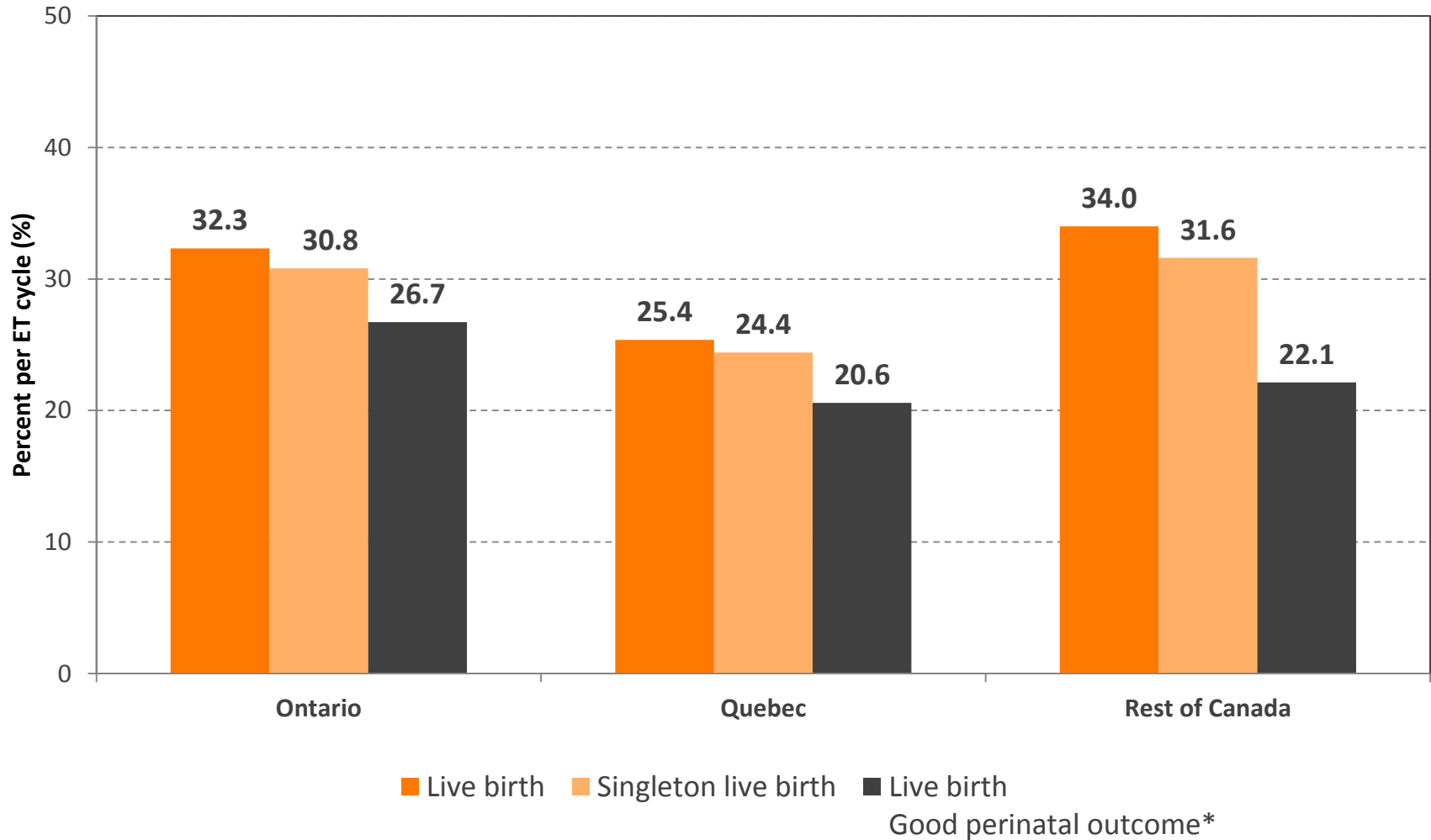
All ART treatment cycles (fresh and frozen), 2020



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

Birth outcomes by province

All ART treatment cycles (fresh and frozen), 2020



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

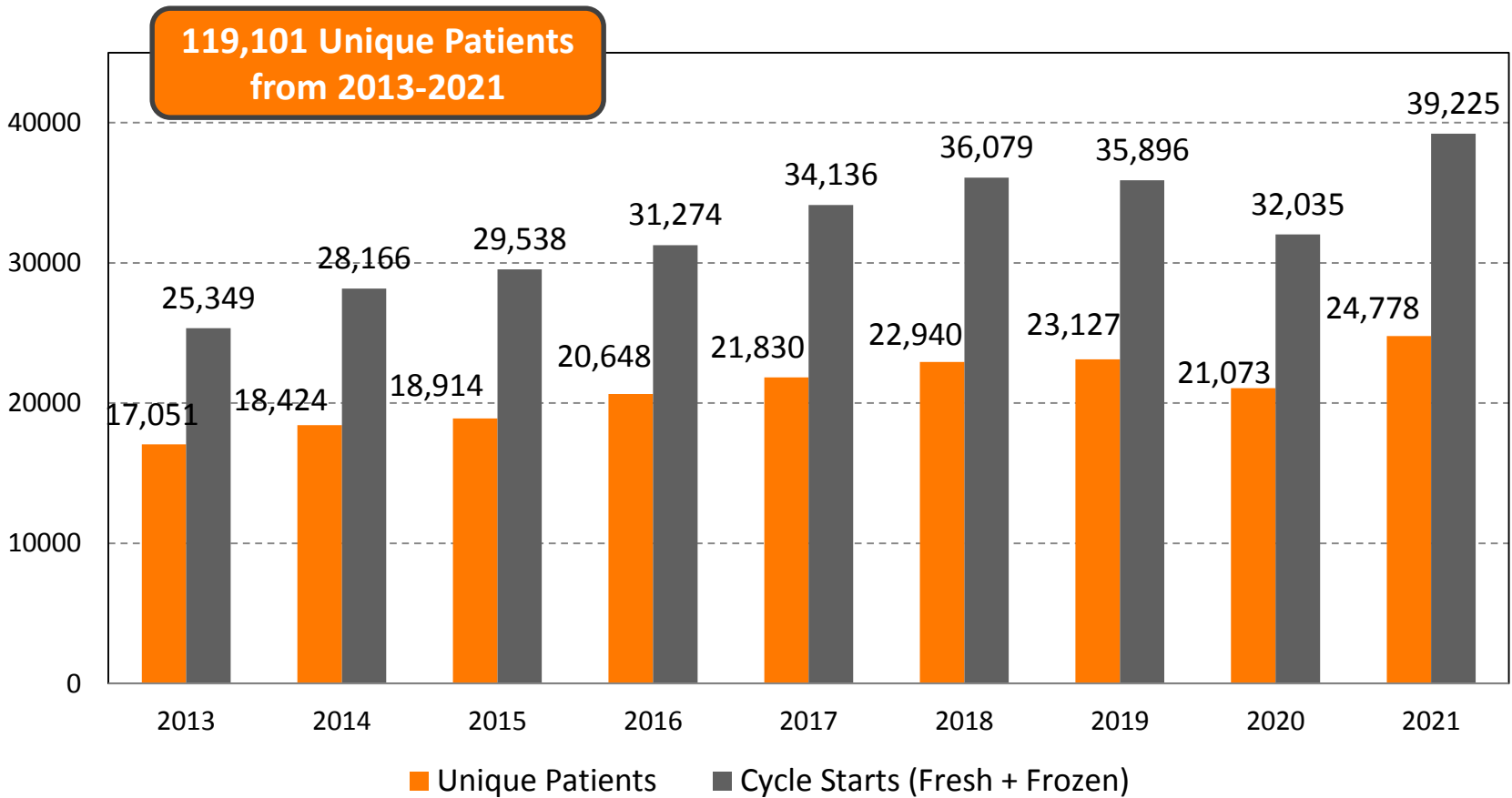
† Cycle starts, and embryo transfers with an unknown birth outcome were removed from the denominator (n=839)

TRENDING DATA OVER TIME

All ART treatment cycles (fresh and frozen)

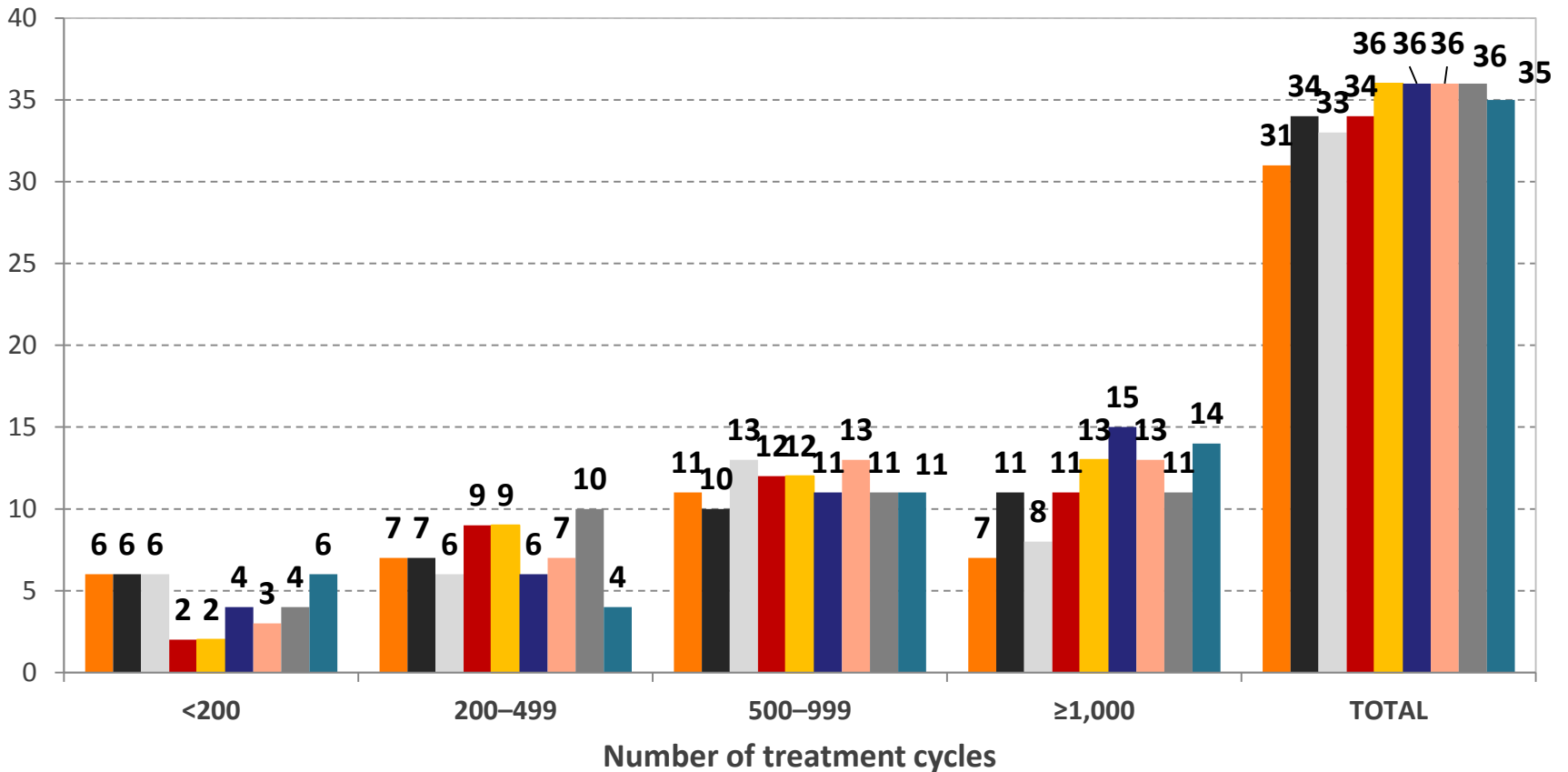
Number of unique patients over time

All ART treatment cycles



Number of clinics by the number of treatment cycles

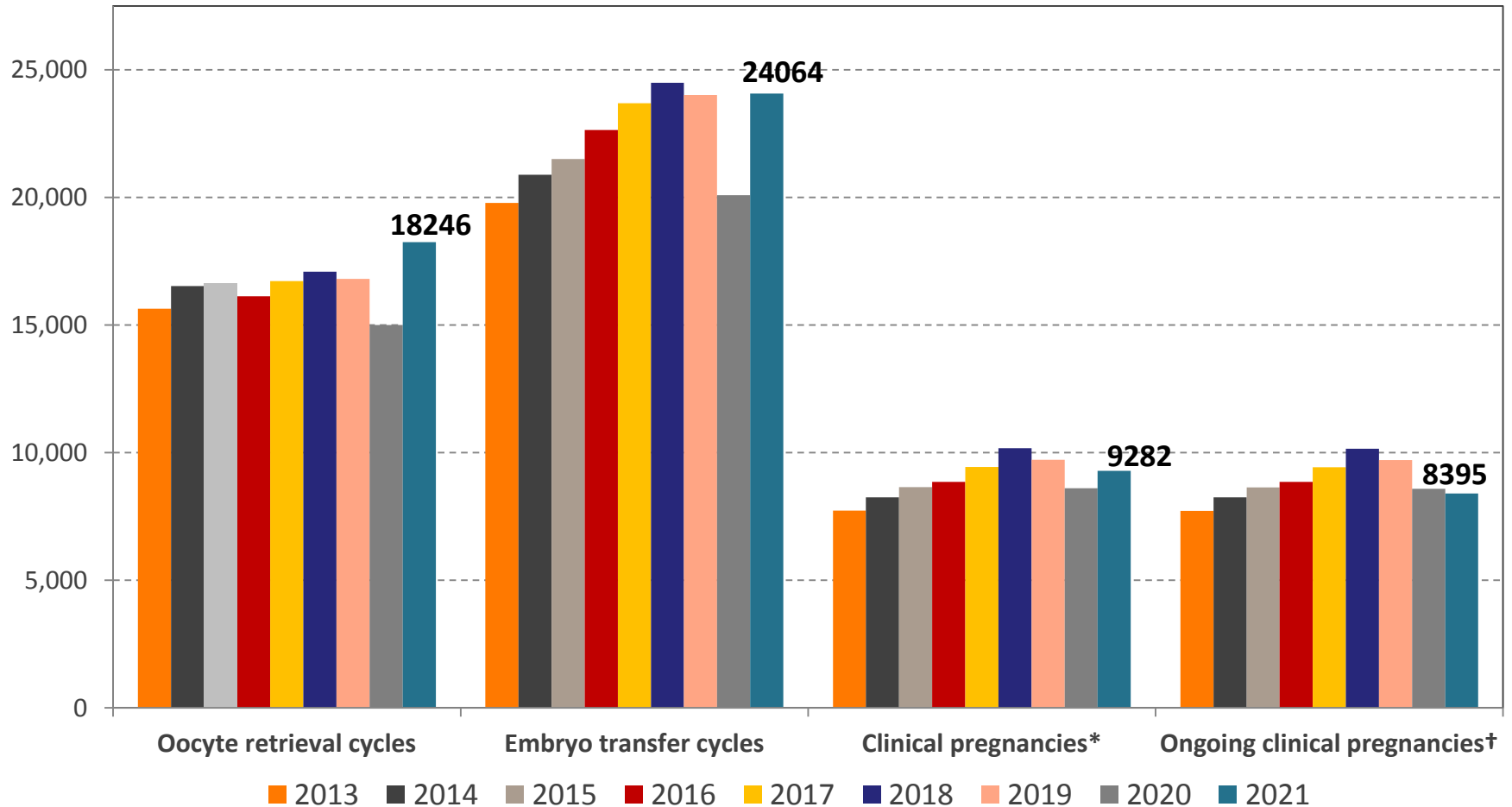
All ART treatment cycles



■ 2013
 ■ 2014
 ■ 2015
 ■ 2016
 ■ 2017
 ■ 2018
 ■ 2019
 ■ 2020
 ■ 2021

Number of cycles and clinical pregnancies over time

All ART treatment cycles

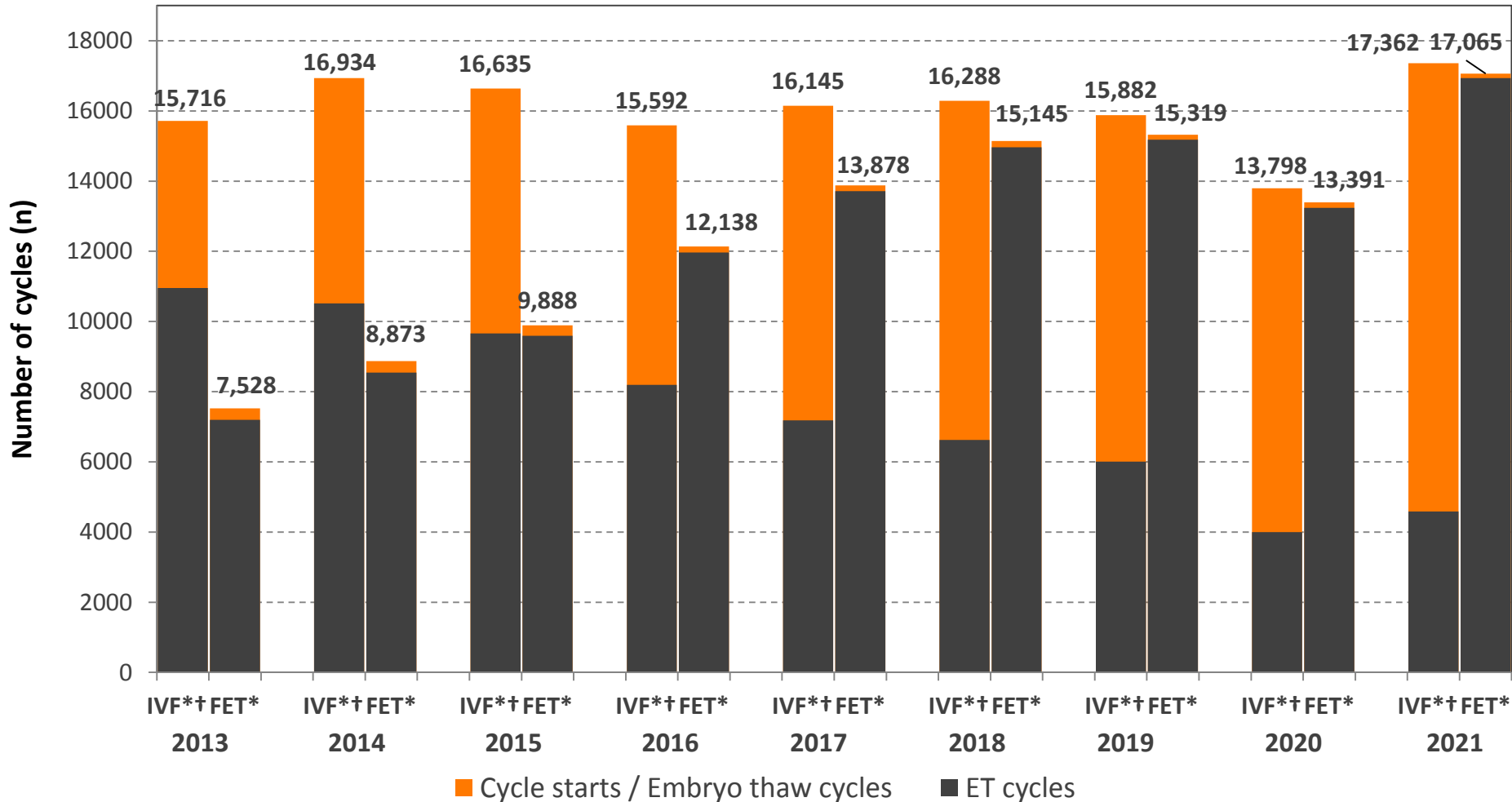


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

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

Number of treatment cycles by year

IVF and FET – own oocytes, 2013 – 2021

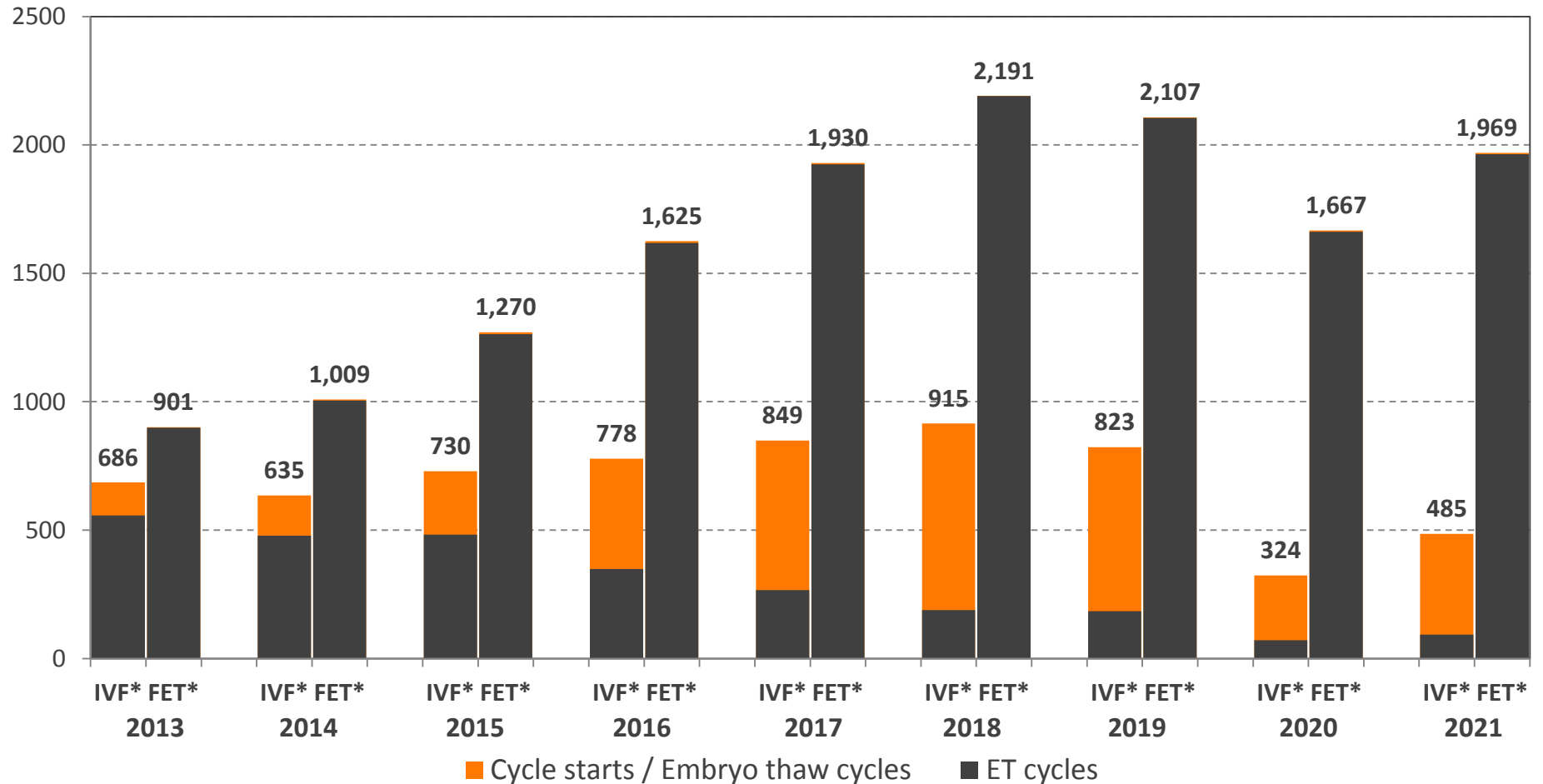


* Own oocytes exclusively

† Includes Natural & Modified Natural IVF, own oocytes

Number of treatment cycles by year

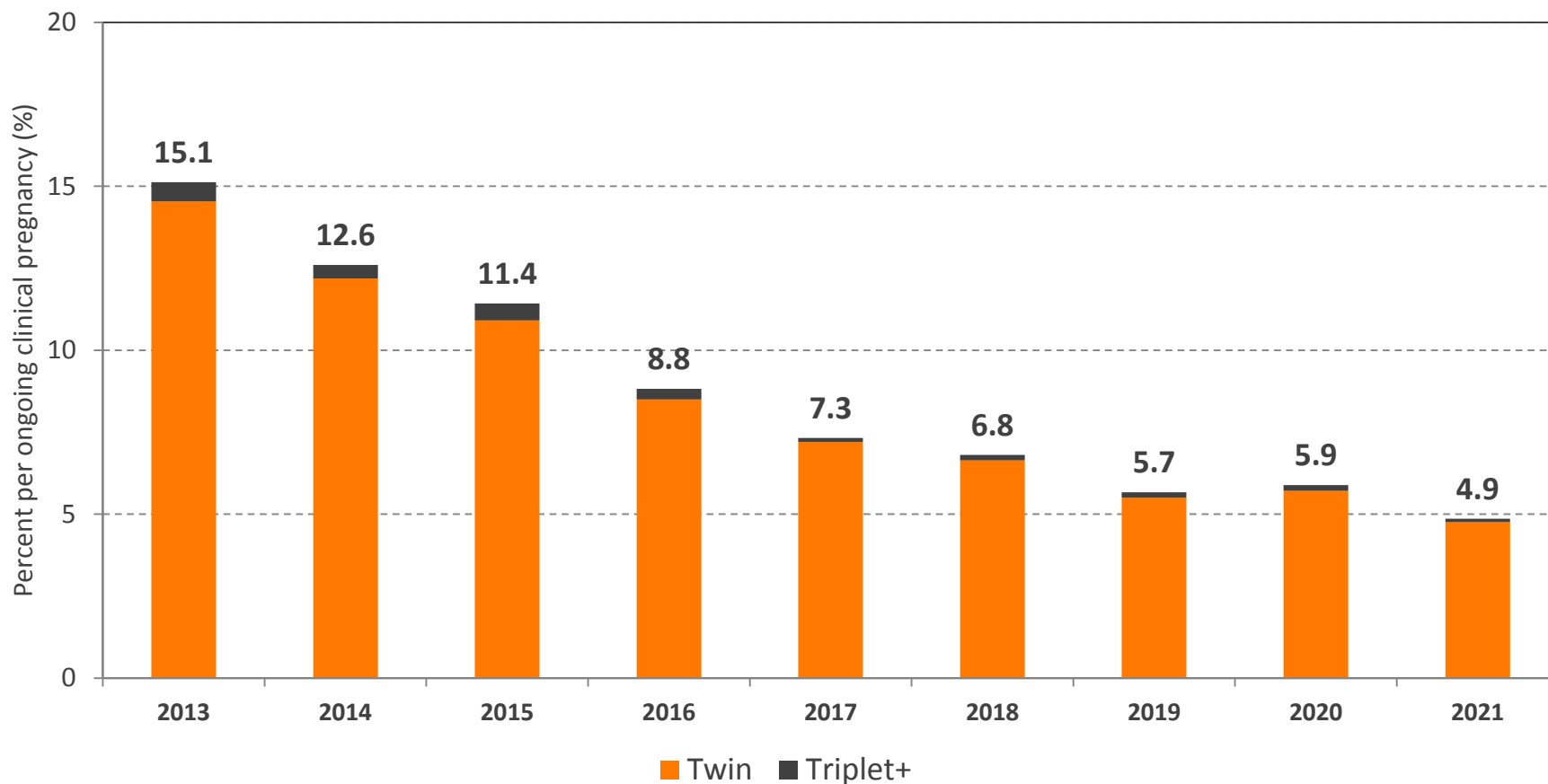
IVF and FET – donor oocytes, 2013 – 2021



* Any donor oocytes

Percentage of multiple pregnancies by year

All ART treatment cycles



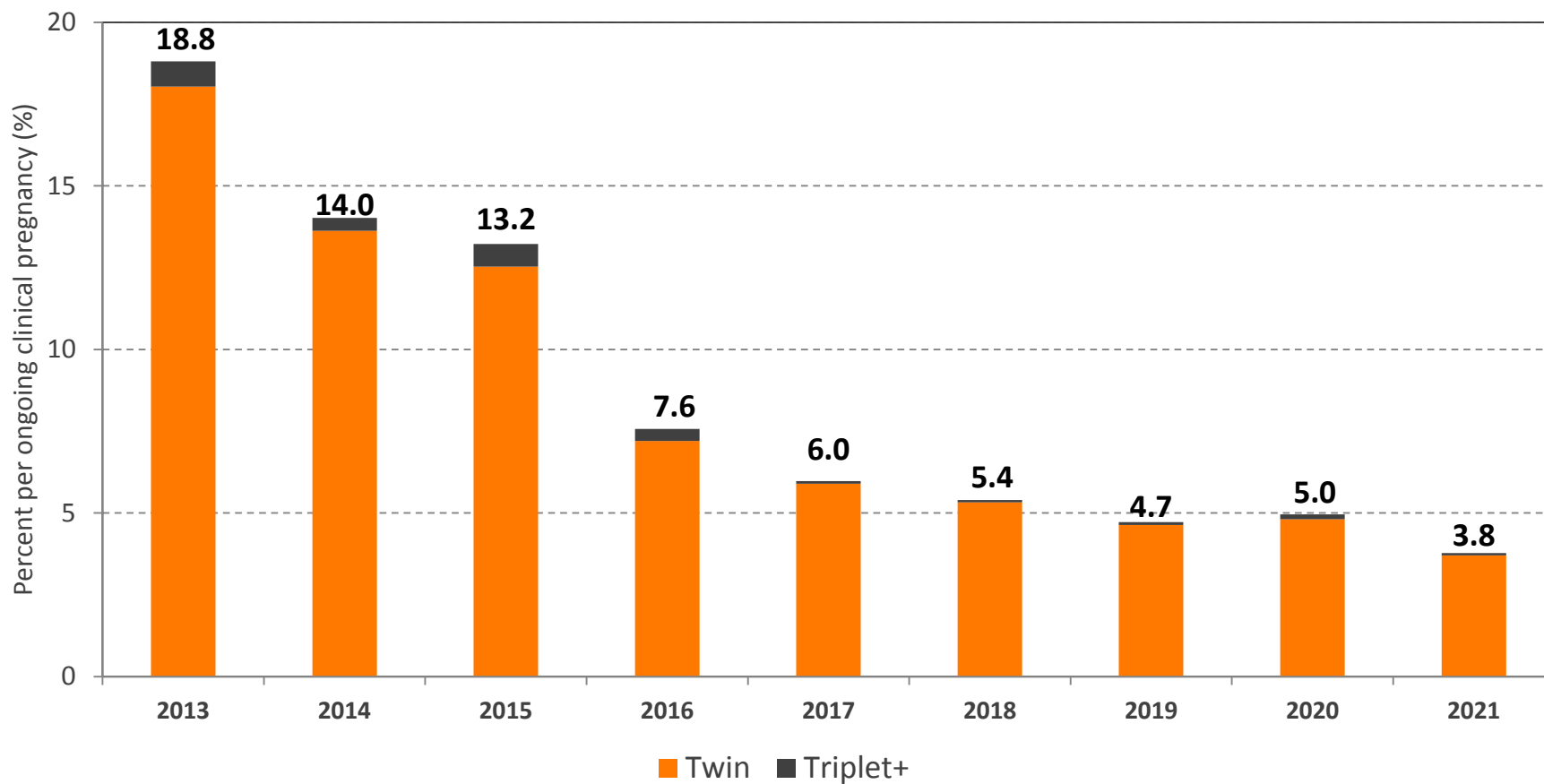
	2013	2014	2015	2016	2017	2018	2019	2020	2021
Twin	1,122	1,005	943	752	679	674	534	389	399
Triplet +	45	34	44	29	12	17	16	12	9

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

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

Percentage of multiple pregnancies in Ontario by year

All ART treatment cycles



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Twin	585	449	398	307	292	283	223	158	163
Triplet +	25	13	22	16	4	4	4	5	3

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

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

Specialized services

All ART treatment cycles (fresh and frozen), 2021

Description	Number of cycles
Gestational carrier	563
Intent for PGT-A/M/SR	11,029
Oocyte or embryo banking for gonadotoxic treatment	396
Elective oocyte or embryo banking	1,269
Any use of donor oocytes or embryos	3,067
Frozen oocyte IVF	755

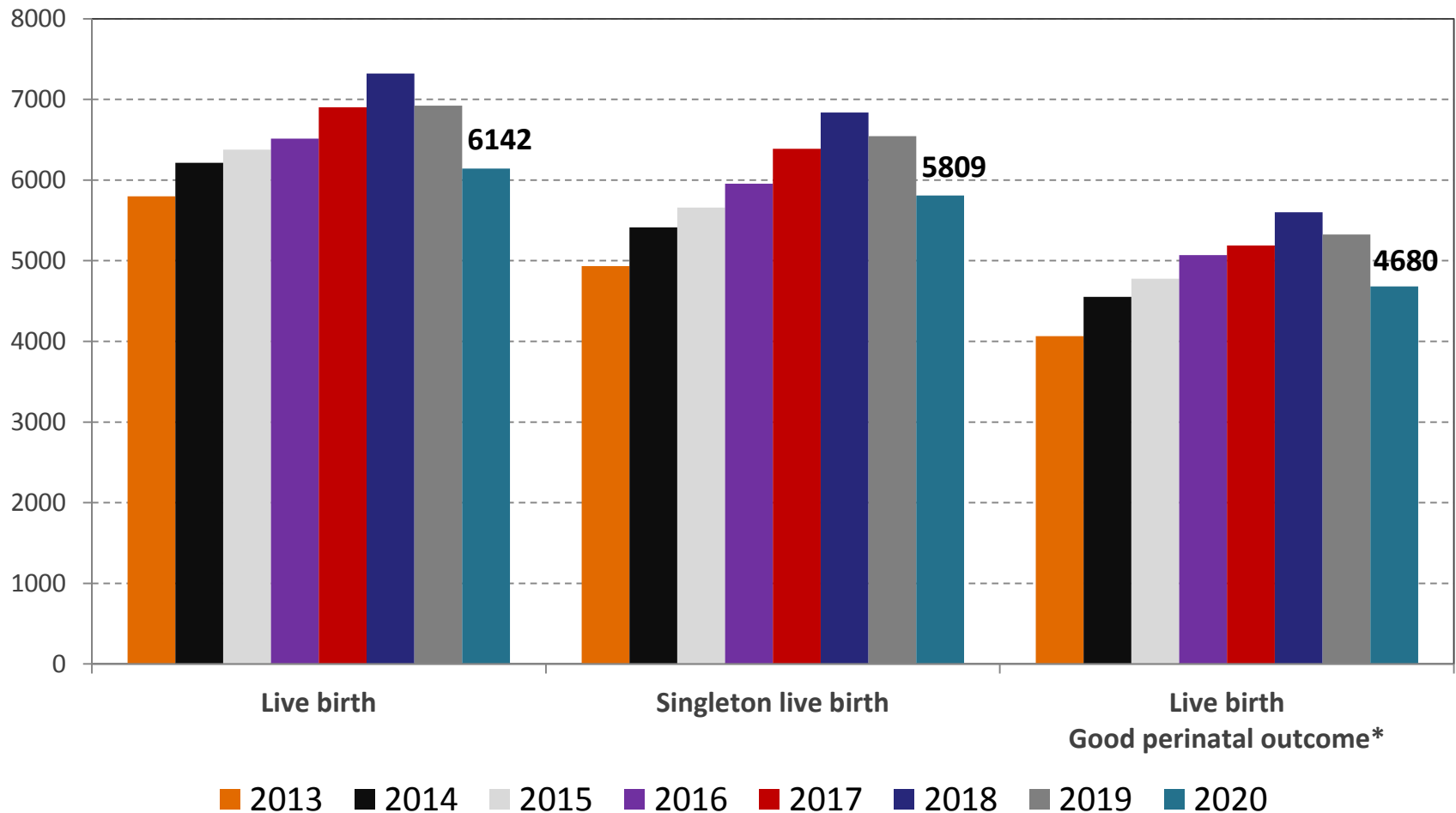
Elective oocyte or embryo freezing

2013 – 2021

Year	Oocyte Freezing n (% RET)	Embryo Freezing n (% RET)
2013	94 (0.39%)	40 (0.17%)
2014	135 (0.51%)	40 (0.15%)
2015	204 (0.72%)	80 (0.28%)
2016	280 (0.92%)	52 (0.17%)
2017	357 (1.07%)	64 (0.19%)
2018	548 (1.56%)	111 (0.32%)
2019	642 (1.84%)	109 (0.31%)
2020	627 (2.23%)	217 (0.73%)
2021	1,116 (2.93%)	164 (0.43%)
Overall	4,003 (1.44%)	877 (0.31%)

Birth outcomes

All ART treatment cycles (fresh and frozen), 2013-2020

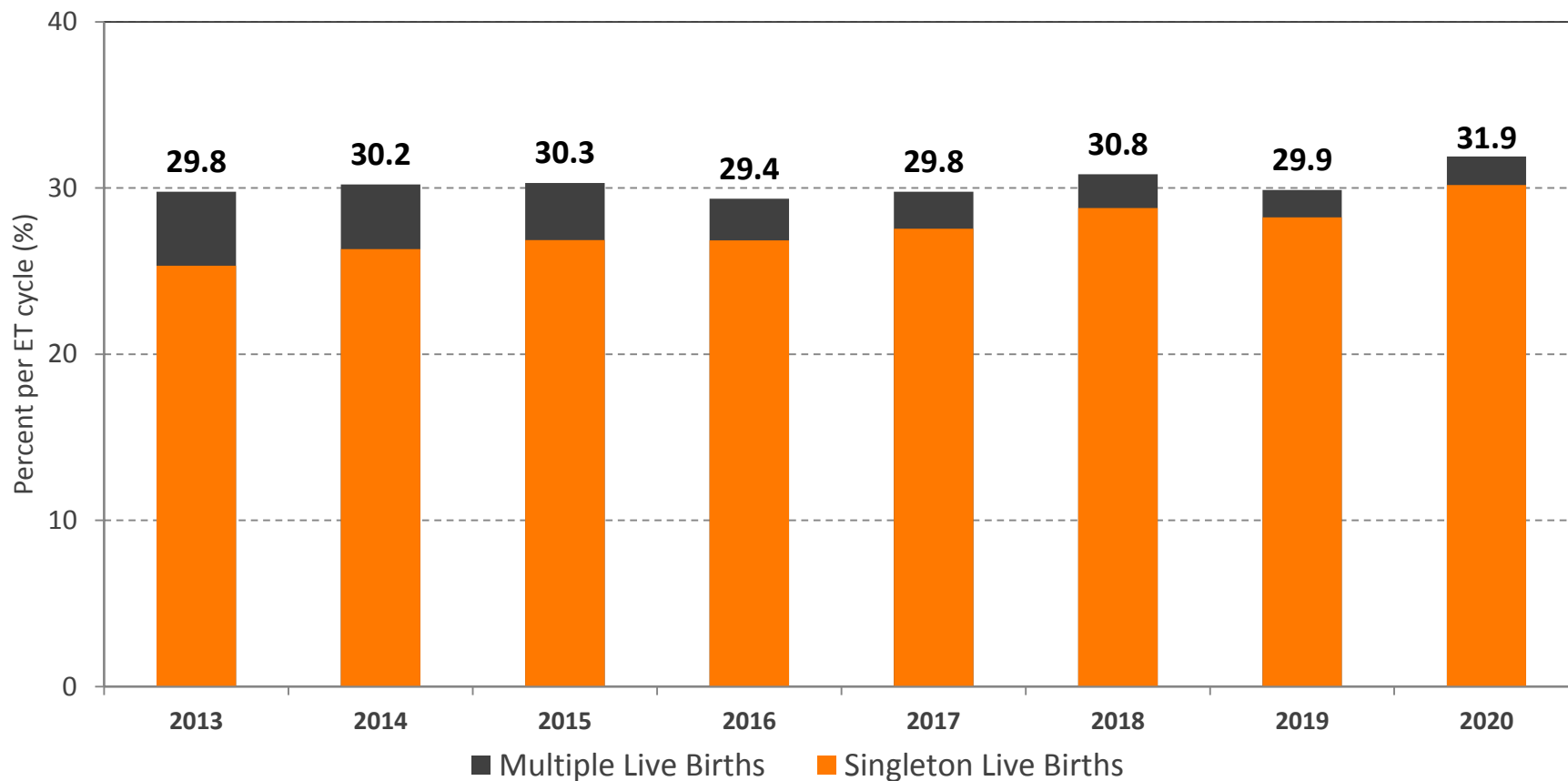


* Good perinatal outcome: singleton live birth at ≥ 37 weeks' gestation and a birth weight $\geq 2,500$ grams

† Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=4,448)

Proportion of singleton and multiple live births

All ART treatment cycles, 2013 – 2020

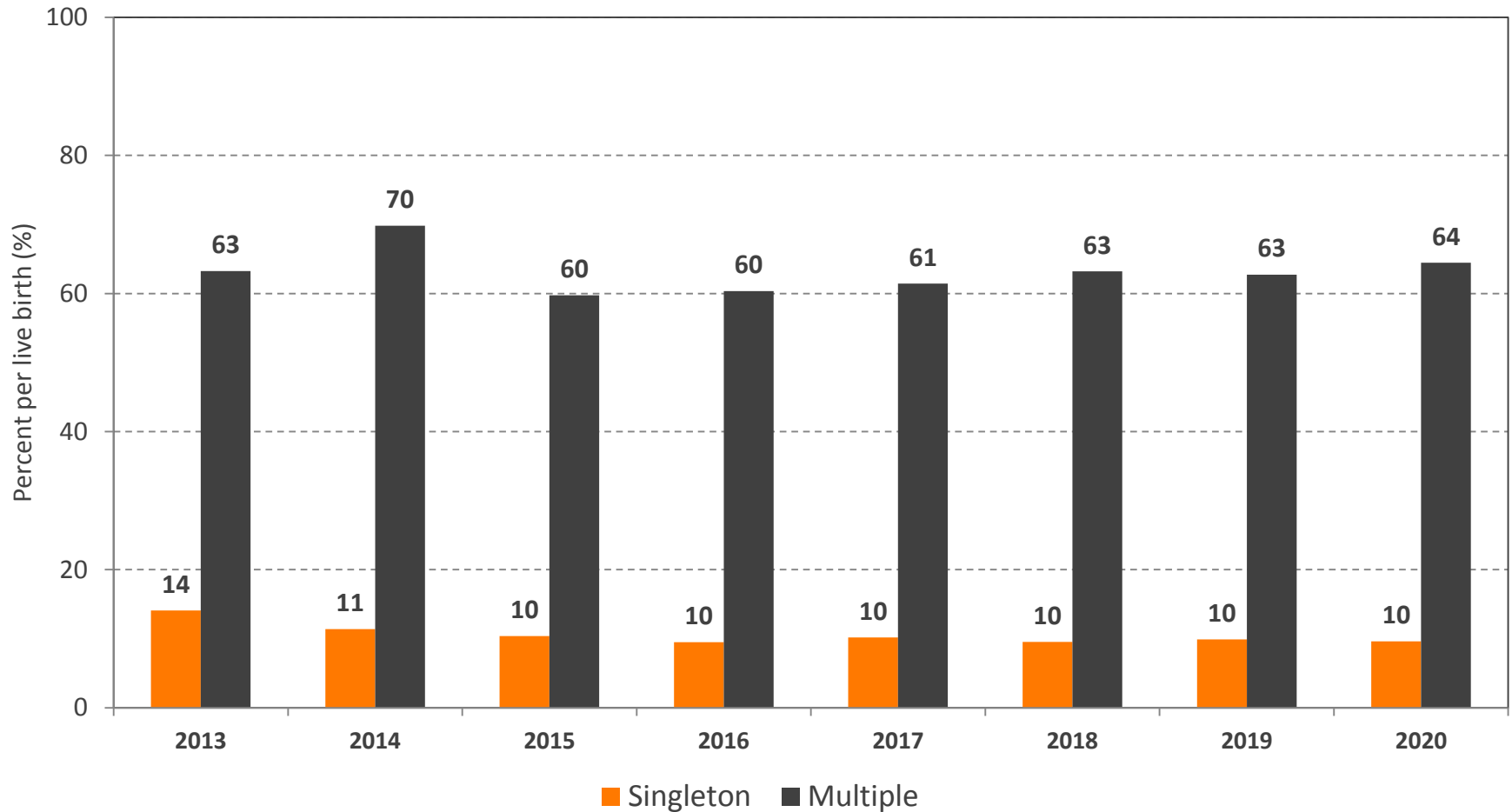


Live Births	5,800	6,215	6,379	6,514	6,903	7,320	6,922	6,142
Singletons	4,932	5,413	5,658	5,957	6,389	6,836	6,543	5,809
Multiples	868	802	721	557	514	484	379	333

* Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=4,448)

Proportion of preterm births, by plurality

All ART treatment cycles (fresh and frozen), 2013-2020

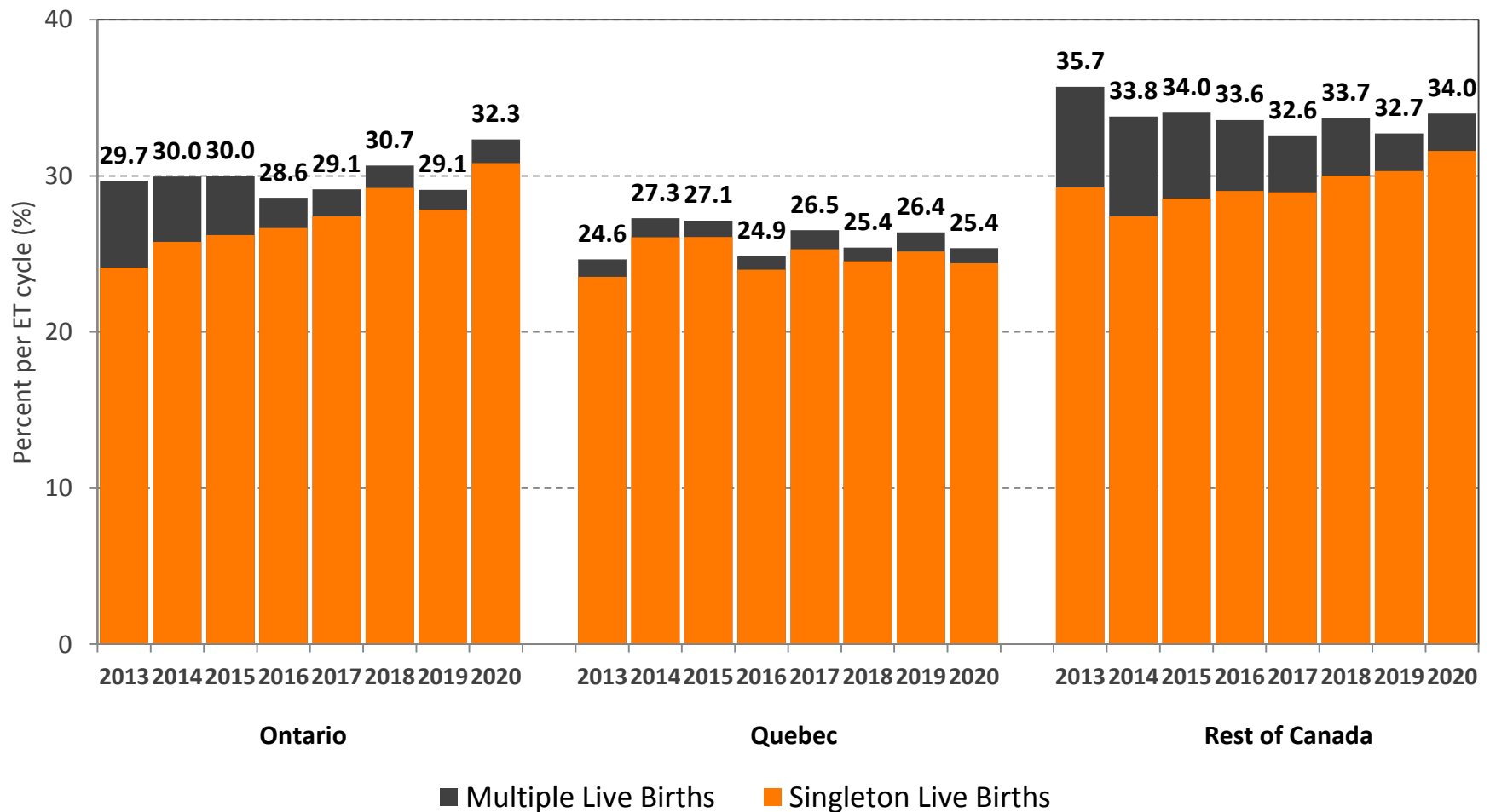


Preterm birth <37 weeks' gestation.

Proportion of singleton and multiple live births by province



All ART treatment cycles, 2013 – 2020



* Cycle starts, oocyte retrievals/thaws and embryo transfers with an unknown birth outcome were removed from the denominator (n=4,448)

PRIMARY TRANSFER PREGNANCY RATE

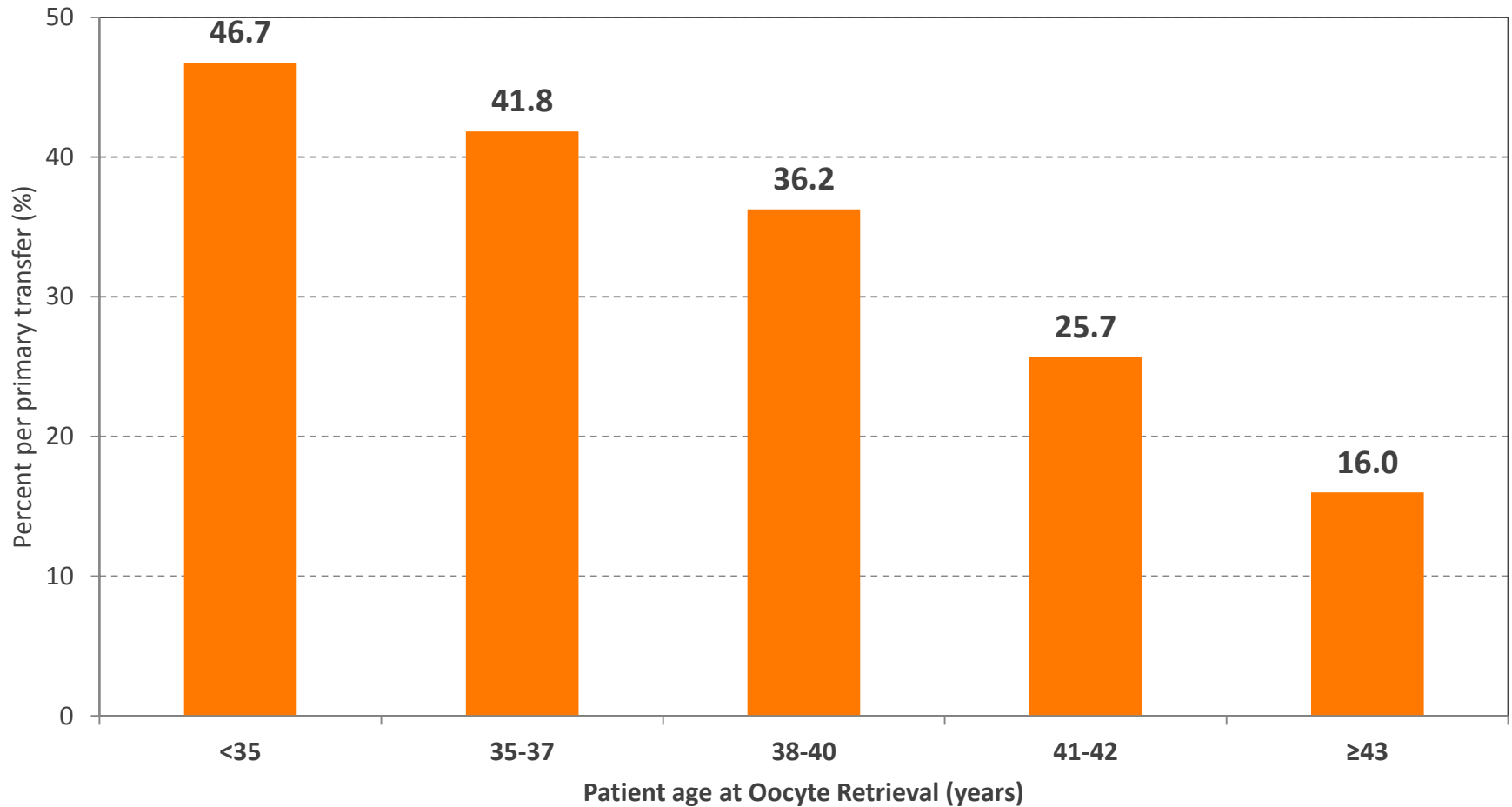
Primary transfer rate

- **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
 - IVF with own oocytes
 - FET with own oocytes
- **Rate per patient:** treatment cycle outcomes can be linked for a patient throughout the database

Primary transfer clinical pregnancy rate per patient

IVF and FET – own oocytes, 2013 – 2021



* Own oocytes exclusively

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

PREIMPLANTATION GENETIC TESTING

PGT-A results for the transferred embryo

ART cycles using FET – own and donor oocytes, 2021

27.4% (5,177/18,898) of
FET cycles used PGT

Characteristic of transferred embryo	# FET cycles	Percent*
Euploid after PGT-A testing	4,782	96.0
Mosaic after PGT-A testing	187	3.8
Aneuploid after PGT-A testing	11	0.2
TOTAL after PGT-A testing	4,980	100.0

* A total of 5,177 FET cycles were tested for PGT-A or PGT-M/SR. Of these cycles, 122 (2.4%) had an unknown result.

PGT-M/SR results for the transferred embryo

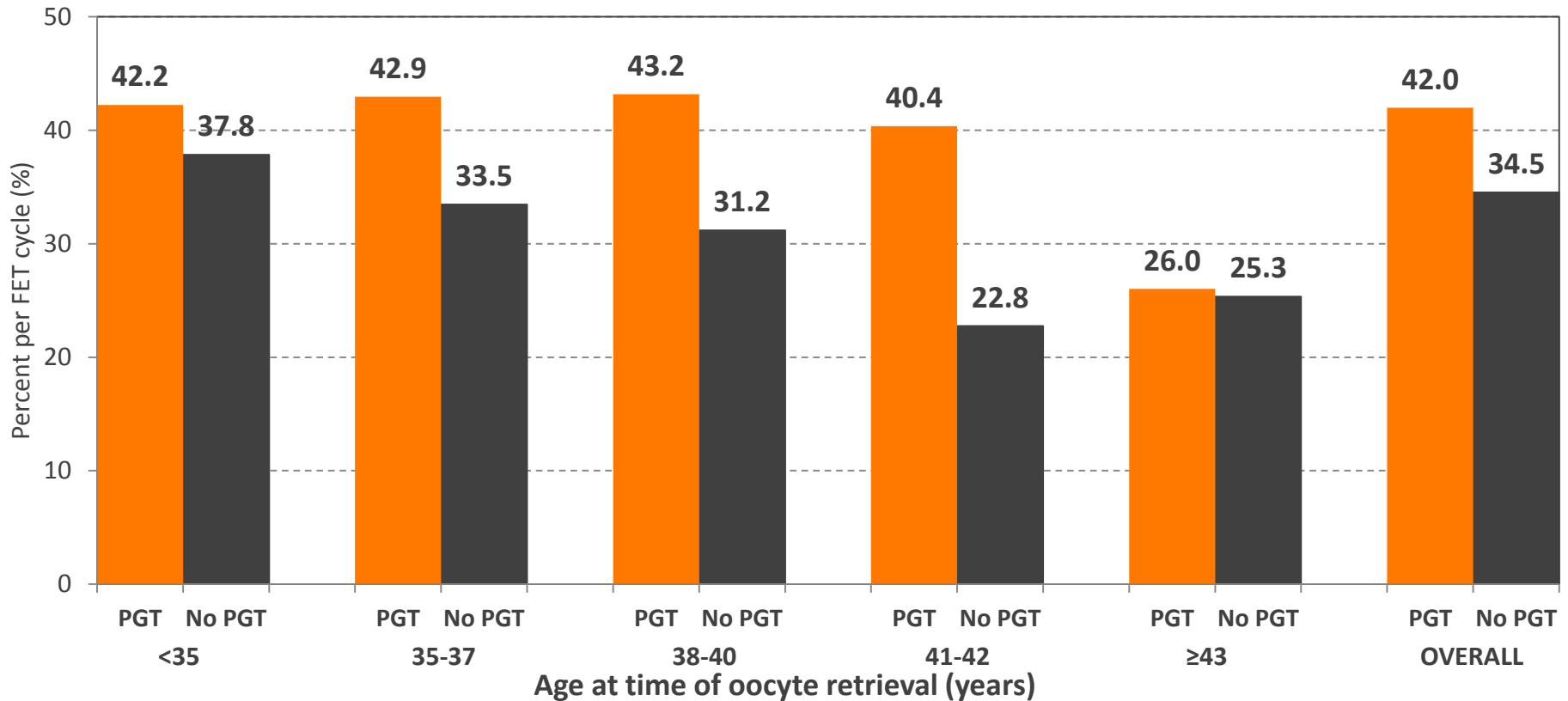
ART cycles using FET – own and donor oocytes, 2021

Characteristic of transferred embryo	# FET cycles	Percent
Free of genetic disease after PGT-M/SR testing	77	80.2
Carrier after PGT-M/SR testing	19	19.8
TOTAL after PGT-M/SR testing	96	100.0

** A total of 5,177 FET cycles were tested for PGT-A or PGT-M/SR. Of these cycles, 122 (2.4%) had an unknown result.*

Ongoing clinical pregnancy rates by age among FET cycles with vs without PGT

ART cycles using FET – own and donor oocytes, 2021



	PGT	No PGT	PGT	No PGT	PGT	No PGT	PGT	No PGT	PGT	No PGT	PGT	No PGT
OCP	894	2,784	627	1,060	475	554	132	172	45	168	2,173	4,738
FET	2,117	7,358	1,460	3,167	1,100	1,777	327	756	173	663	5,177	13,721

* Ongoing clinical pregnancy (OCP): clinical pregnancy with ≥1 fetal heart beat on ultrasound

EMBRYO TRANSFER-SPECIFIC RATES

All ART treatment cycles (fresh and frozen) – own oocytes

n^{th} ET-specific rate

- **Cohort:**
 - Include all oocyte retrieval cycles from 2013 to 2021
 - Include any FET cycle(s) with an embryo transfer date within one year of their respective oocyte retrieval date
 - Exclude any oocyte retrieval cycles that did not have an embryo transfer cycle documented within one year of oocyte retrieval date

n^{th} ET-specific rate

- **Definition:**
 - n^{th} ET cycle
 - Defined as the embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date. Only ET cycles within 1 year of their respective retrieval cycle are included
 - n^{th} ET-specific clinical pregnancy rate
 - The number of clinical pregnancies resulting from the n^{th} embryo transfer cycle within one year of retrieval. Expressed as a percentage of the total number of n^{th} ET cycles within one year of retrieval.
 - n^{th} ET-specific live birth rate
 - The number of live births resulting from the n^{th} embryo transfer cycle within one year of retrieval. Expressed as a percentage of the total number of n^{th} ET cycles within one year of retrieval.

Reasons for no fresh ET among retrievals with no ET within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2021

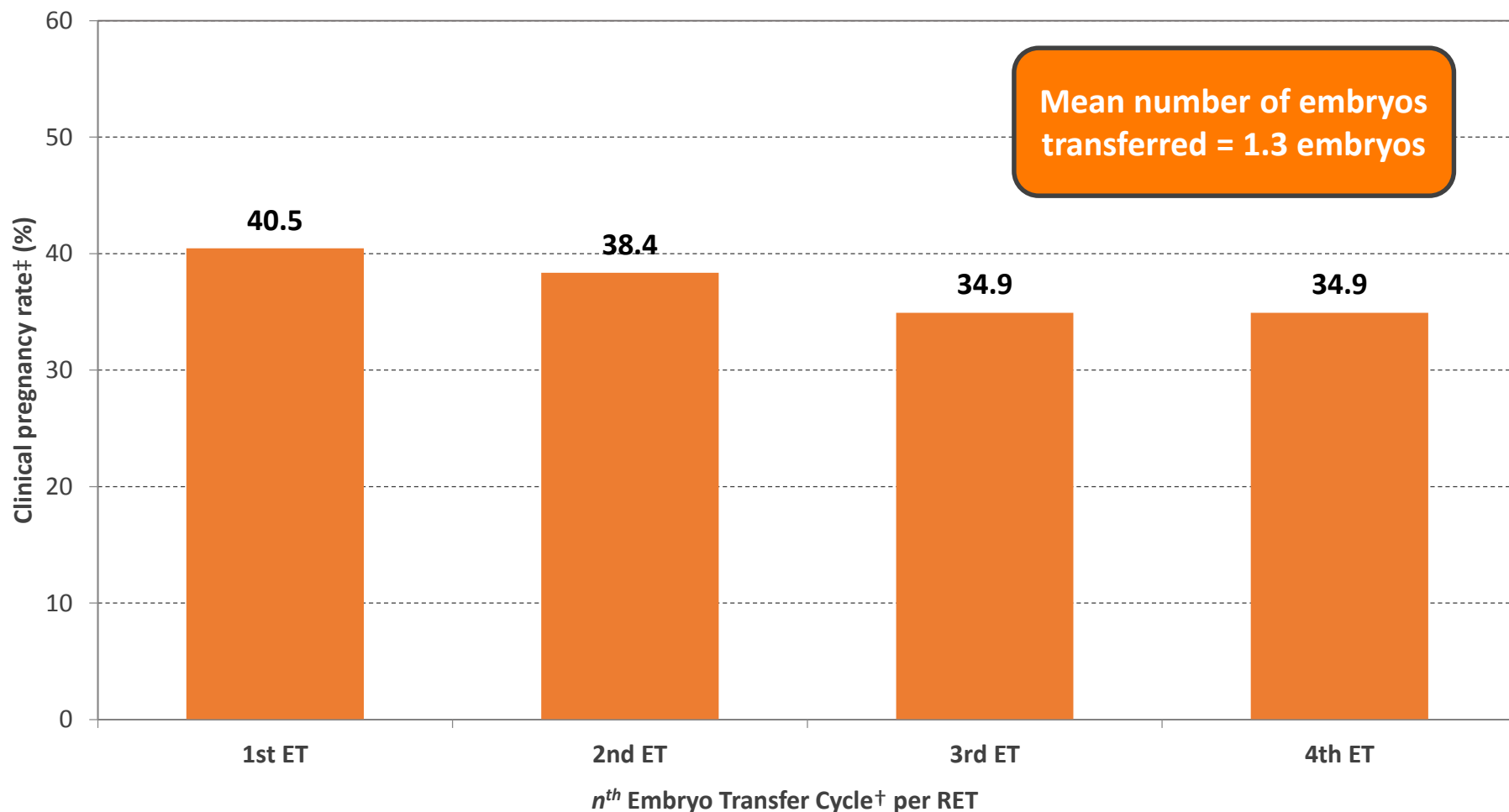


Reason for No ET	N	% RET with no fresh ET	% All RET
All RET	139,133	-----	100%
Total no fresh ET	34,759	100%	25.0%
No oocytes	1,893	5.4%	1.4%
No utilizable oocytes	956	2.8%	0.7%
No sperm	201	0.6%	0.1%
No normal fertilization	4,162	12.0%	3.0%
No utilizable embryos	8,419	24.2%	6.1%
Unknown reason*	19,128	55.0%	13.7%

*Unknown reason: includes unknown reason, Freeze all, Inadequate uterine lining, and Patient choice

ET-specific clinical pregnancy rates per retrieval, within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2021



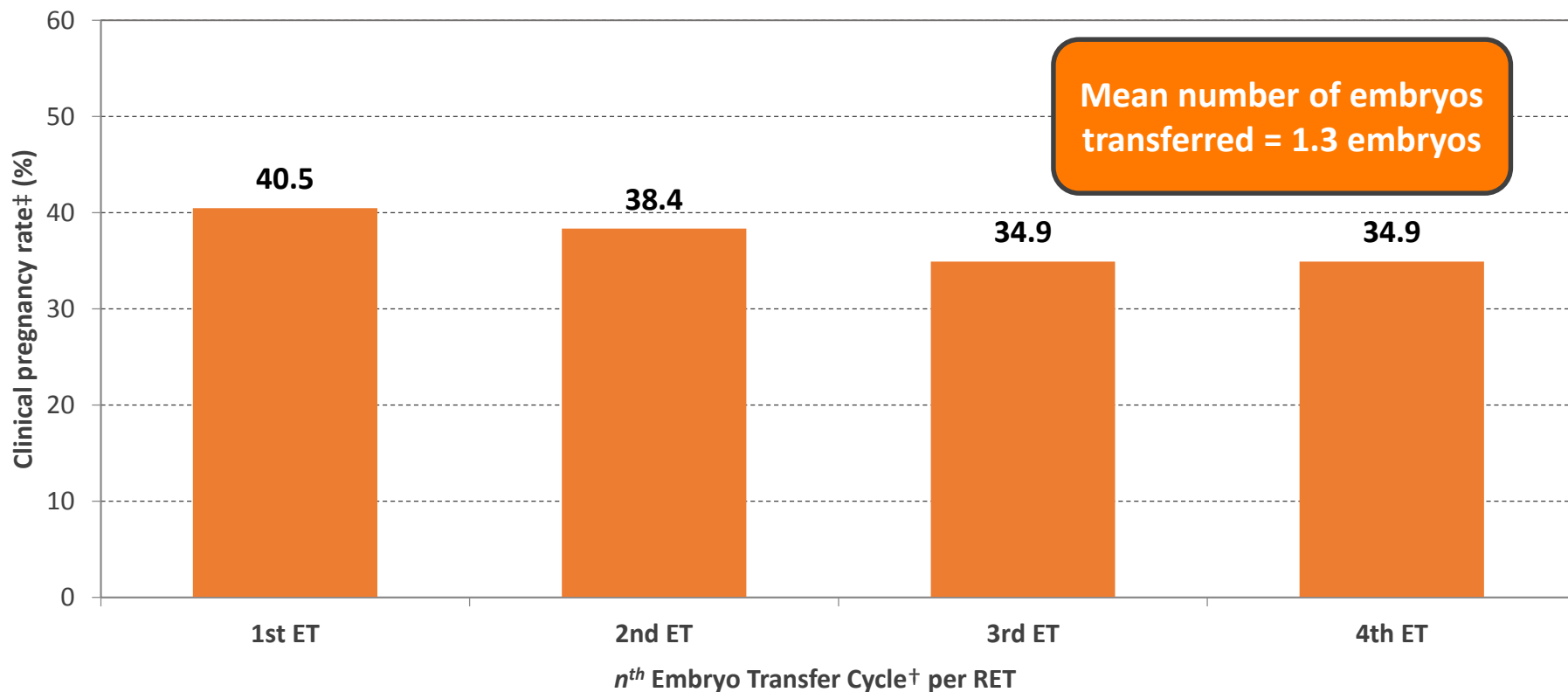
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

[†] n^{th} ET cycle: Embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date; only ET cycles within 1 year of their respective retrieval cycle are included

[‡] Clinical pregnancy rate at each n^{th} ET: the # of clinical pregnancies resulting from the n^{th} ET cycle per retrieval divided by the number of n^{th} ET cycles

ET-specific clinical pregnancy rates per retrieval, within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2021



# CP @ <i>n</i> th ET	42,238	9,898	2,219	408
# of <i>n</i> th ETs	104,374	25,809	6,352	1,168

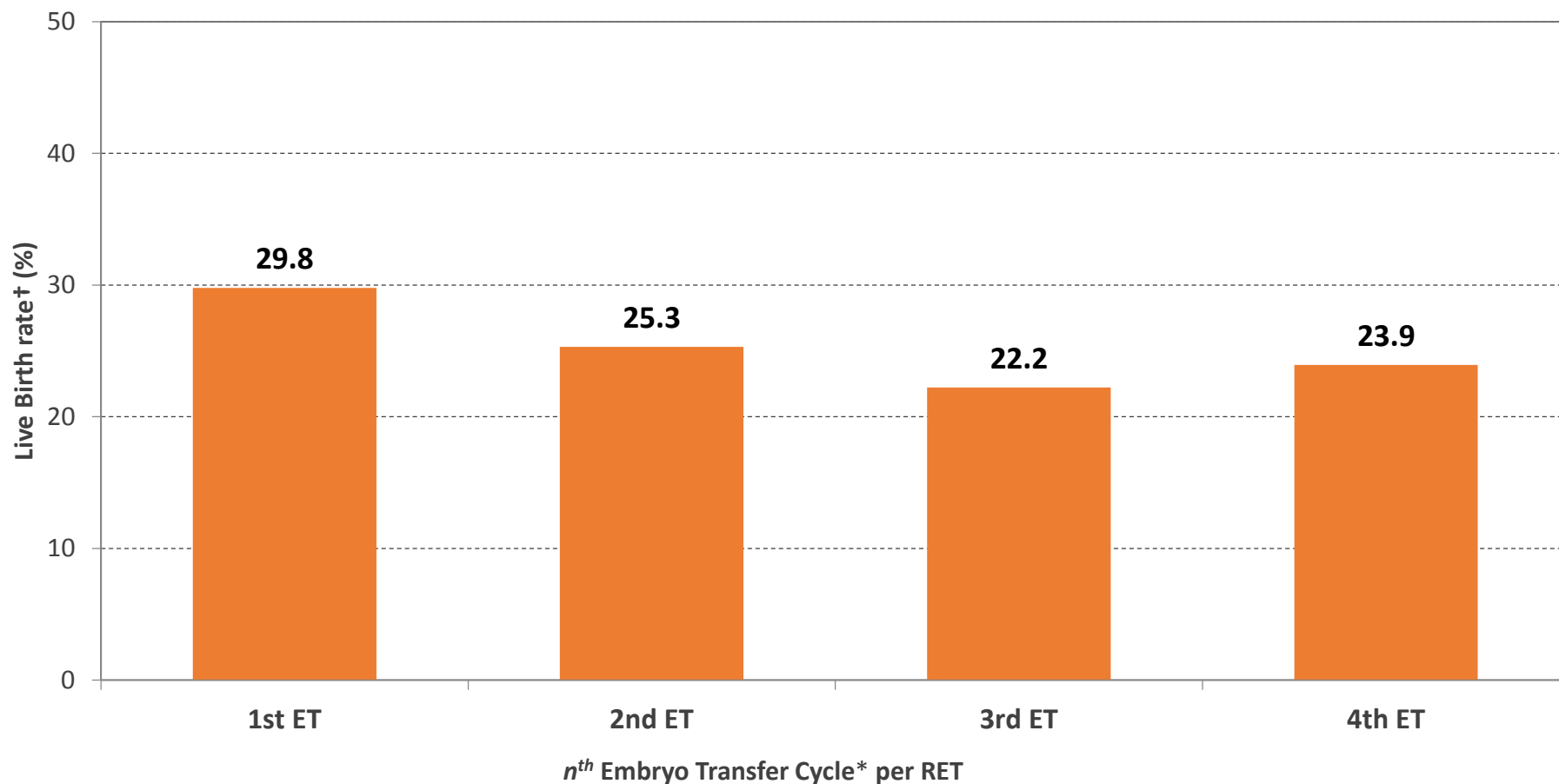
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† *n*th ET cycle: Embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date; only ET cycles within 1 year of their respective retrieval cycle are included

‡ Clinical pregnancy rate at each *n*th ET: the # of clinical pregnancies resulting from the *n*th ET cycle per retrieval divided by the number of *n*th ET cycles

ET-specific live birth rates per retrieval, within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2020

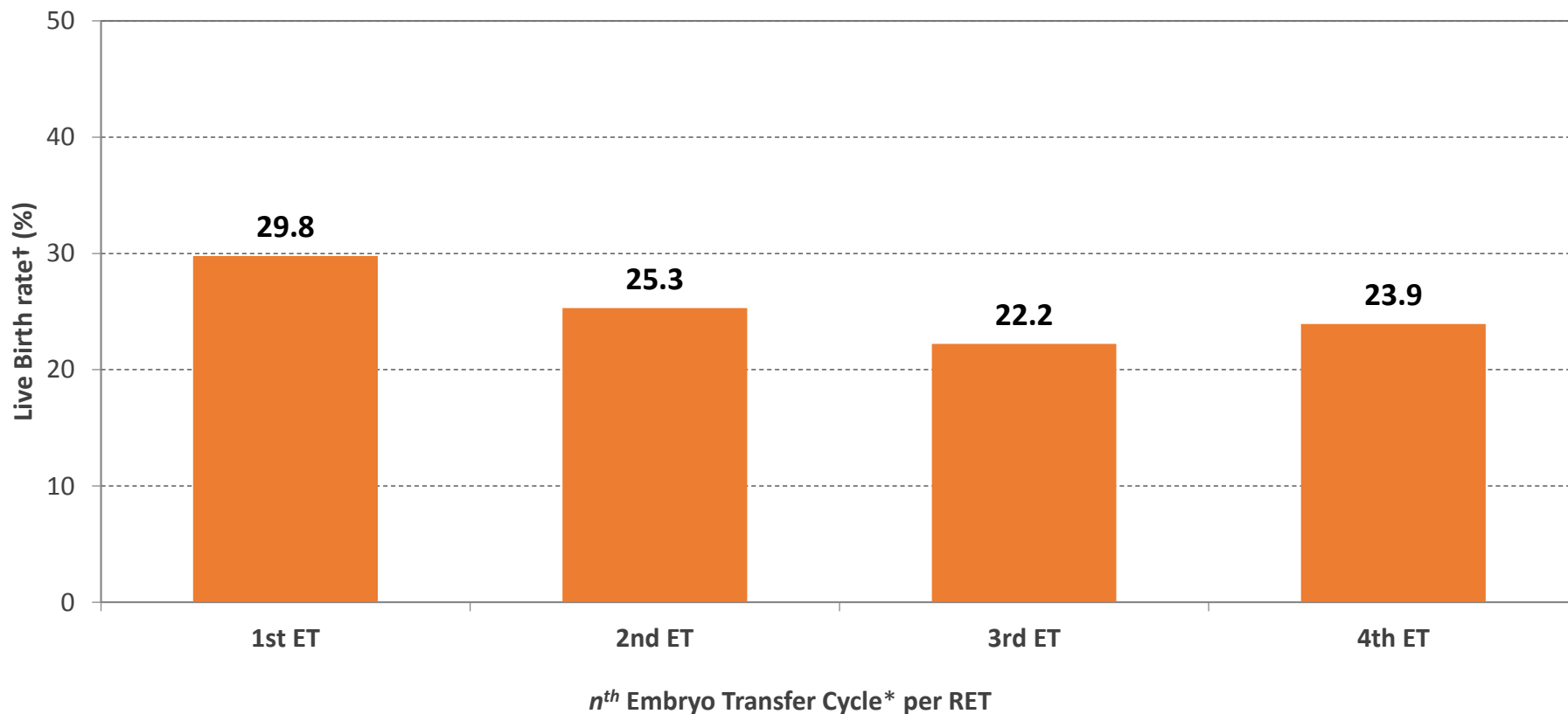


* n^{th} ET cycle: Embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date; only ET cycles within 1 year of their respective retrieval cycle are included

† Live Birth rate at each n^{th} ET: the # of live births resulting from the n^{th} ET cycle per retrieval divided by the number of n^{th} ET cycles

ET-specific live birth rates per retrieval, within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2020



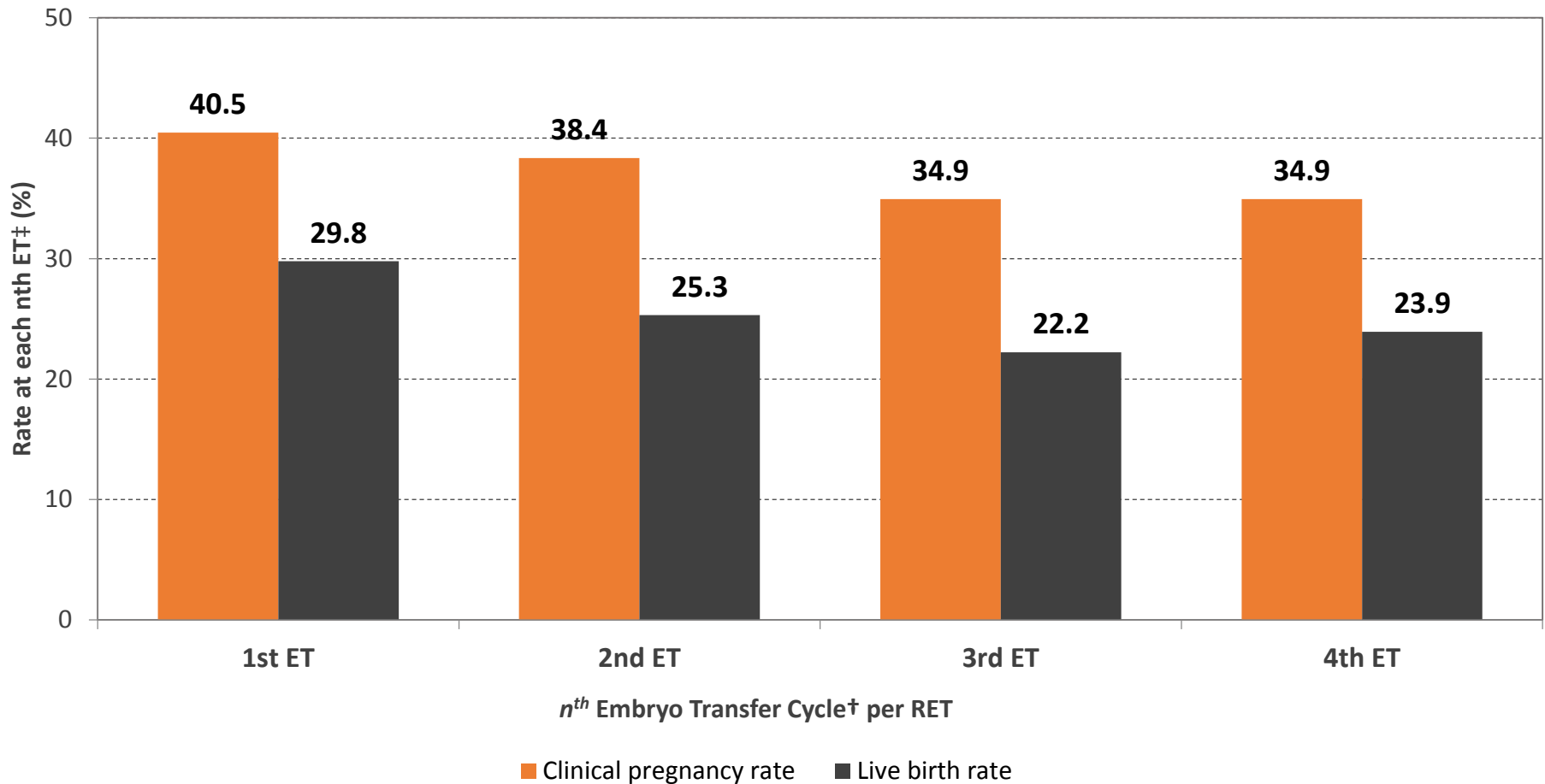
# LB @ n^{th} ET	28,214	6,033	1,338	269
# of n^{th} ETs	94,747	23,844	6,021	1,124

* n^{th} ET cycle: Embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date; only ET cycles within 1 year of their respective retrieval cycle are included

† Live Birth rate at each n^{th} ET: the # of live births resulting from the n^{th} ET cycle per retrieval divided by the number of n^{th} ET cycles

ET-specific clinical pregnancy and live birth rates per retrieval, within 1 year of retrieval

IVF and FET cycles – own oocytes exclusively, 2013 – 2020 (live birth rate) & 2021 (clinical pregnancy rate)



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

† n^{th} ET cycle: Embryos created from a unique retrieval cycle, where each succeeding ET cycle within a single retrieval are counted according to their transfer cycle start date; only ET cycles within 1 year of their respective retrieval cycle are included

‡ Rate at each n^{th} ET: For Clinical pregnancy - # of clinical pregnancies resulting from the n^{th} ET cycle per retrieval divided by the number of n^{th} ET cycles; For Live Birth rate - the # of live births resulting from the n^{th} ET cycle per retrieval divided by the number of n^{th} ET cycles

CUMULATIVE PREGNANCY AND LIVE BIRTH RATES

All ART treatment cycles (fresh and frozen) – own oocytes

Cumulative rate

- **Cohort:**
 - Include all oocyte retrieval cycles from 2013 to 2021
 - Include any FET cycle(s) with an embryo transfer date within one year of their respective oocyte retrieval date
 - Exclude any oocyte retrieval cycles that did not have an embryo transfer cycle documented within one year of oocyte retrieval date

Cumulative rate

- **Definition:**

- Cumulative clinical pregnancy rate

- The number of oocyte retrievals resulting in at least one clinical pregnancy within one year of the retrieval. Expressed as a percentage of all oocyte retrieval cycles that had at least one fresh or frozen/thawed embryo transfer cycle within one year of the retrieval date.

- Cumulative live birth rate

- The number of oocyte retrievals resulting in at least one live birth within one year of the retrieval. Expressed as a percentage of all oocyte retrieval cycles that had at least one fresh or frozen/thawed embryo transfer cycle within one year of the retrieval date.

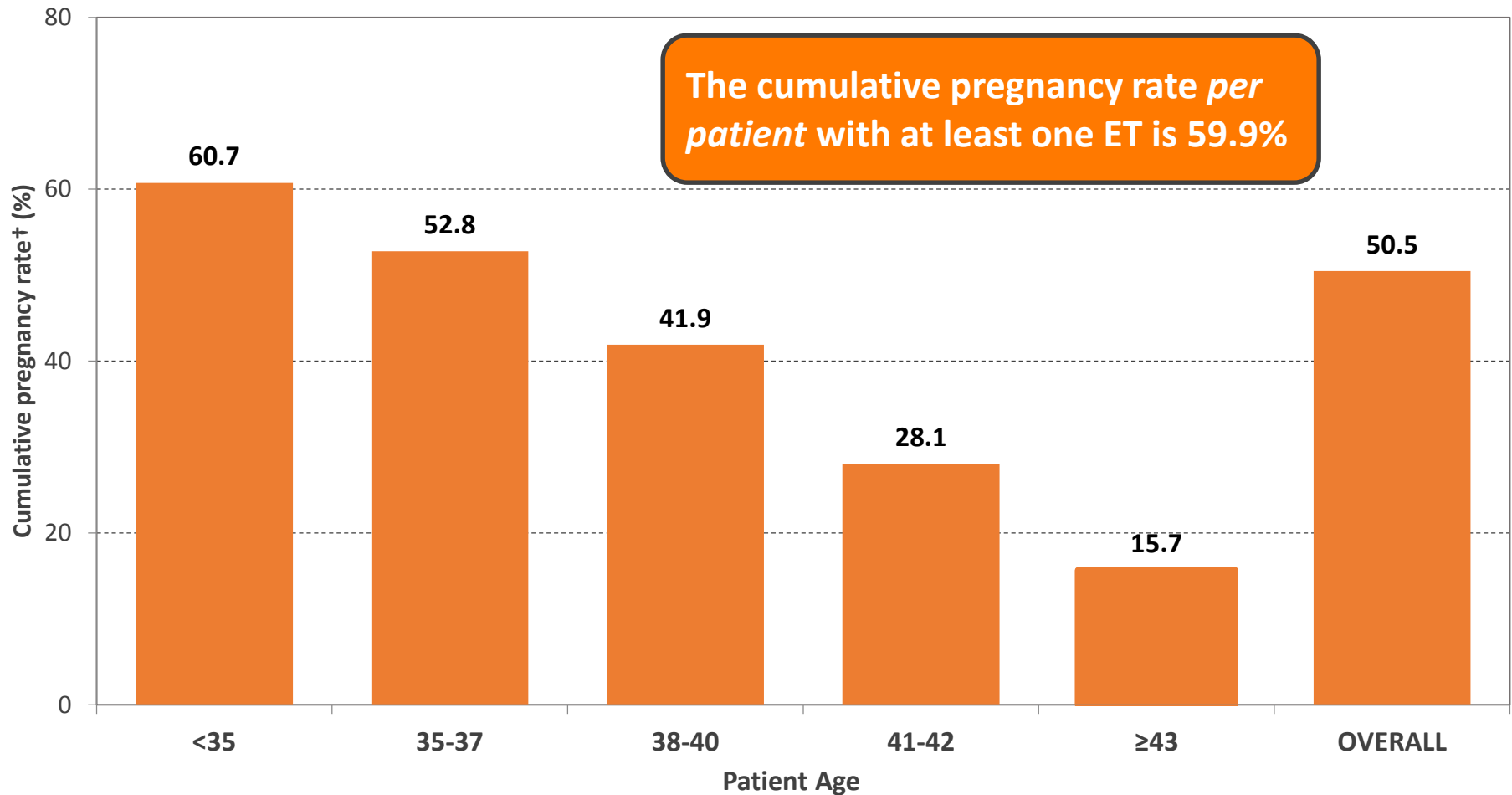
Cumulative rates

- **Options for calculation:**

- **per patient:** treatment cycle outcomes can be linked for a patient throughout the database
- **per oocyte retrieval (RET):** treatment cycles that used frozen oocytes or embryos can be linked to the IVF cycle where the oocytes were collected

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by patient age

IVF and FET cycles – own oocytes exclusively, 2013 – 2021



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

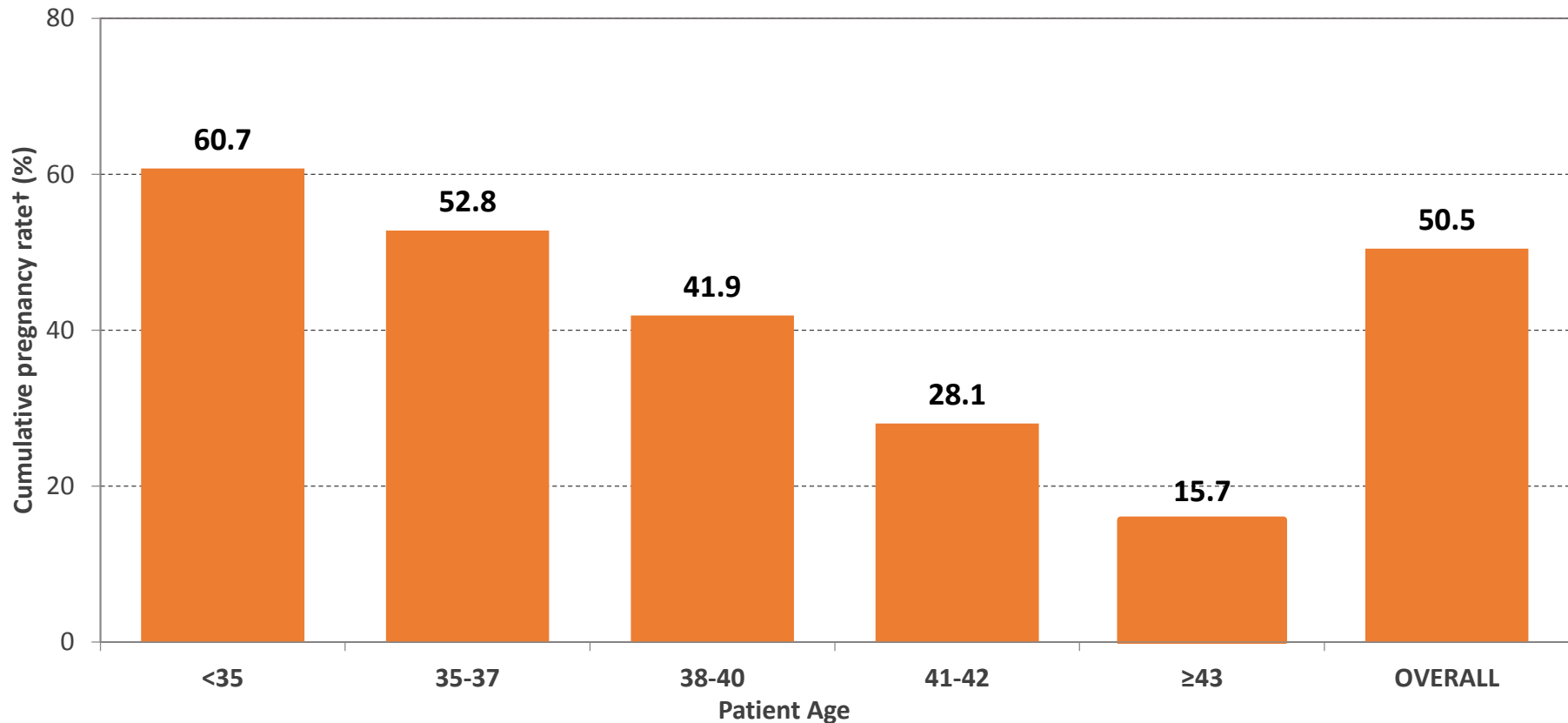
† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

‡ Patient Age: Age of patient at time oocyte retrieval

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by patient age



IVF and FET cycles – own oocytes exclusively, 2013 – 2021



CP*	26,984	13,410	9,044	2,741	499	52,678
RET cycles	44,422	25,408	21,587	9,769	3,188	104,374

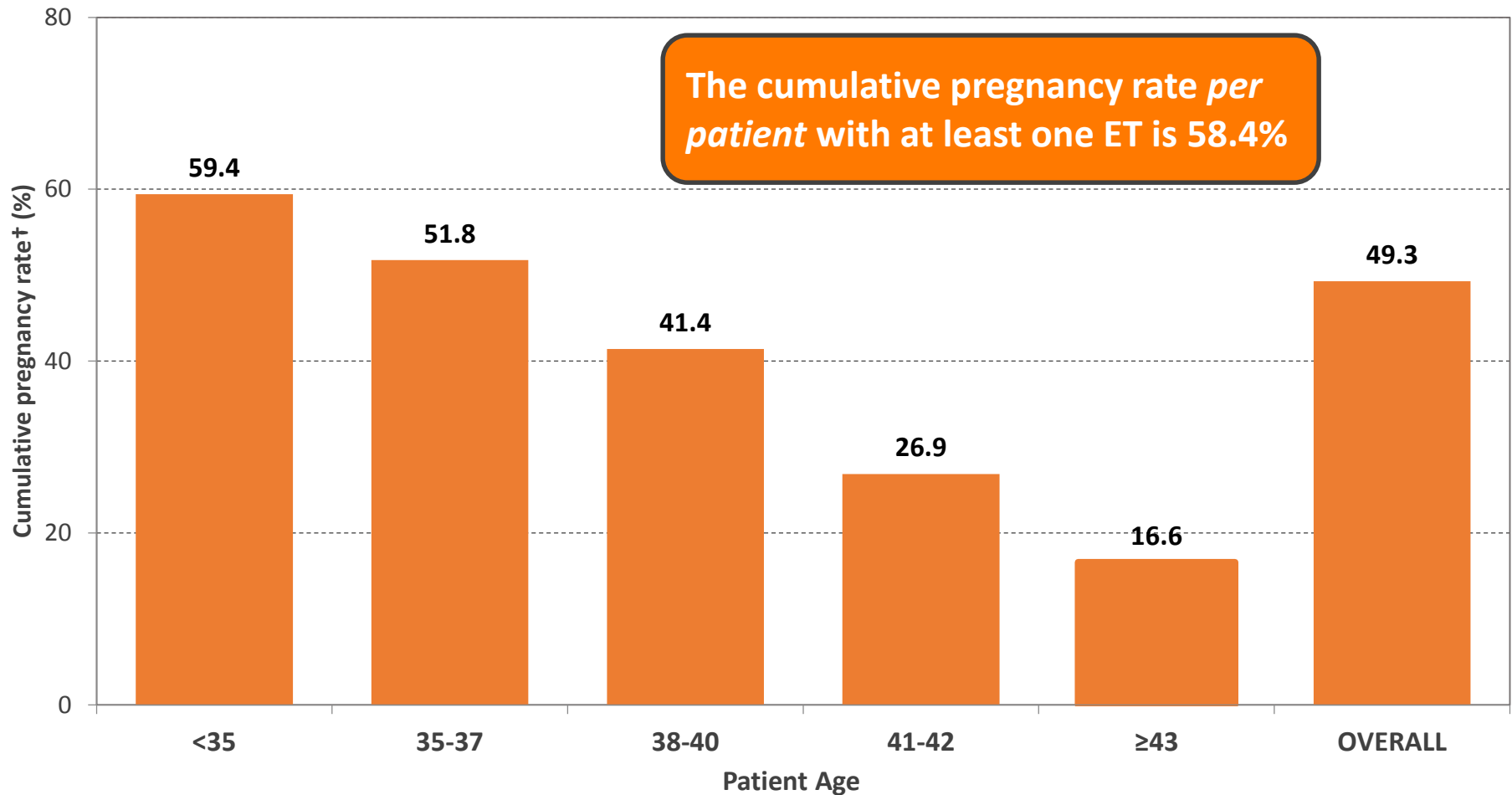
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer

‡ Patient Age: Age of patient at time oocyte retrieval

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by patient age (Ontario)

IVF and FET cycles – own oocytes exclusively, 2013 – 2021



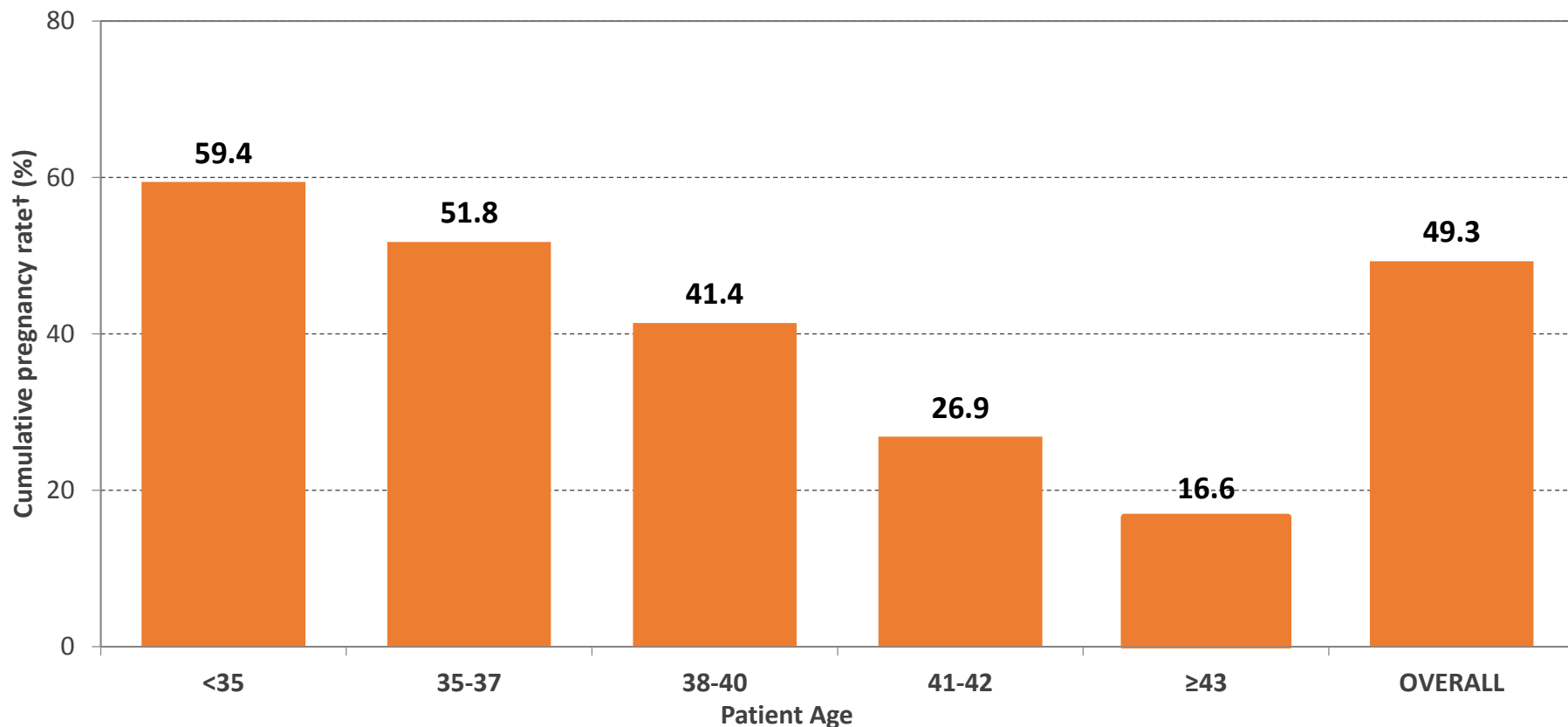
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

‡ Patient Age: Age of patient at time oocyte retrieval

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by patient age (Ontario)

IVF and FET cycles – own oocytes exclusively, 2013 – 2021



CP*	11,878	6,179	4,208	1,235	248	23,748
RET cycles	19,987	11,939	10,163	4,599	1,496	48,184

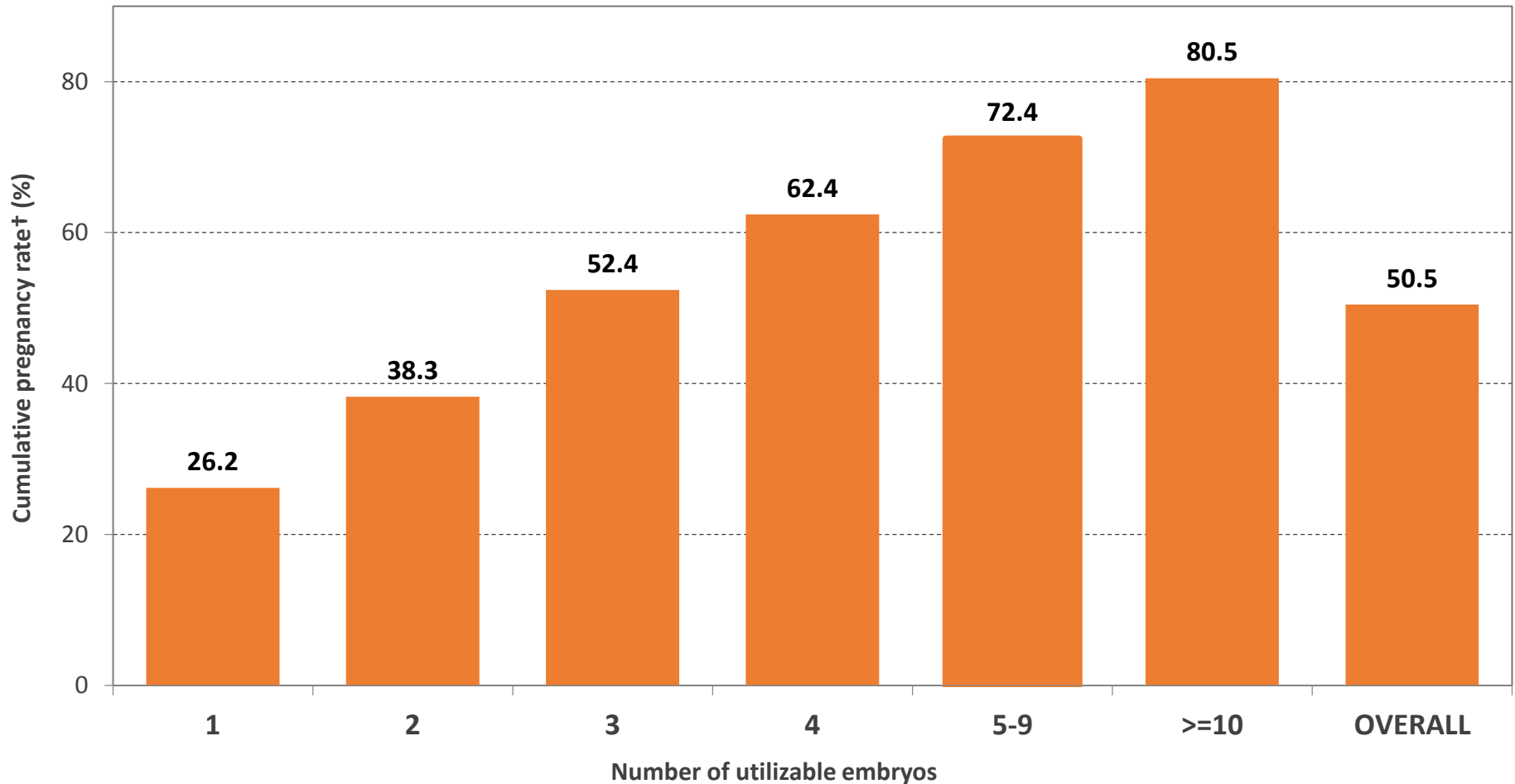
* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer

‡ Patient Age: Age of patient at time oocyte retrieval

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by number of utilizable embryos

IVF and FET cycles – own oocytes exclusively, 2013 – 2021

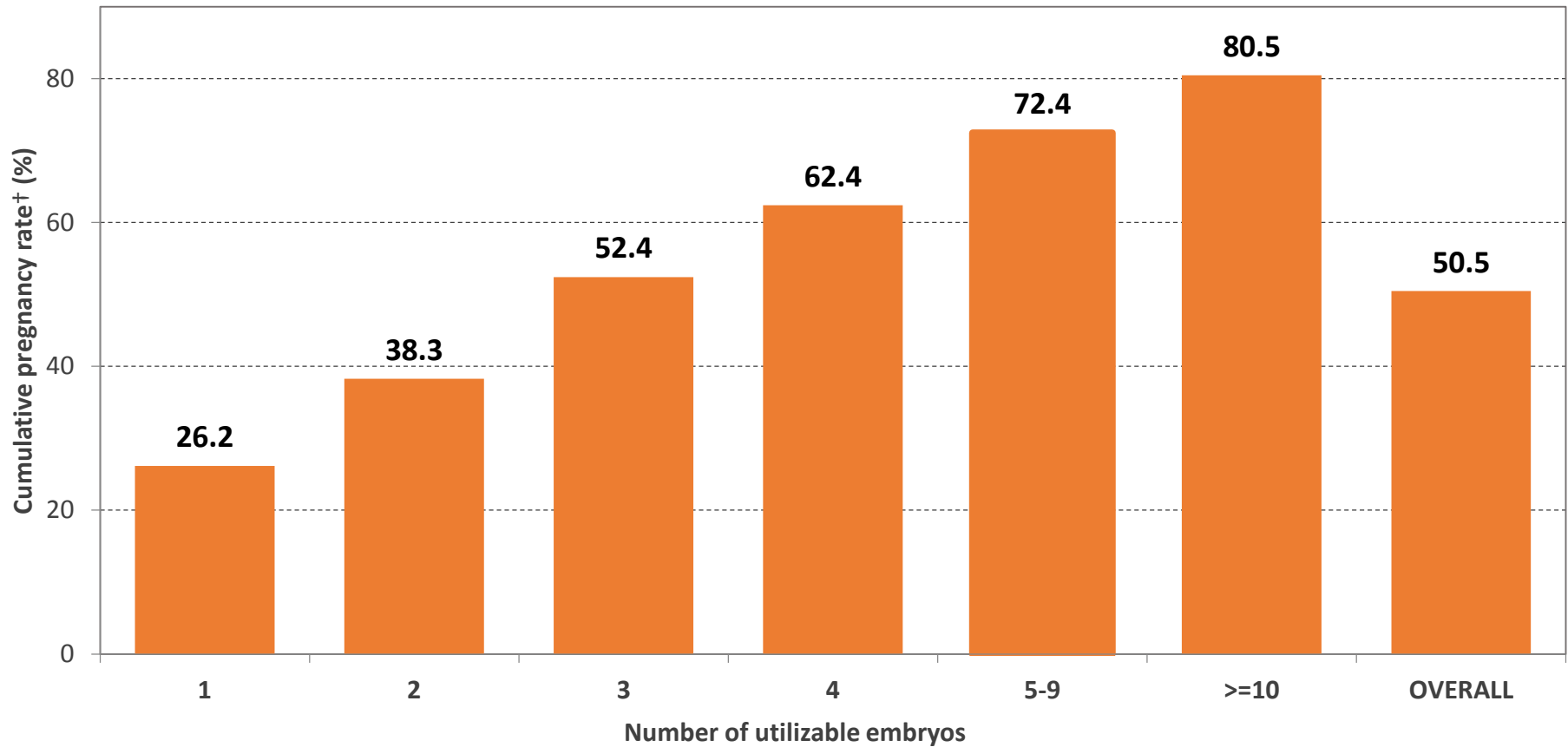


* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy

† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative clinical pregnancy rate per retrievals with an ET, within 1 year of retrieval, by number of utilizable embryos

IVF and FET cycles – own oocytes exclusively, 2013 – 2021

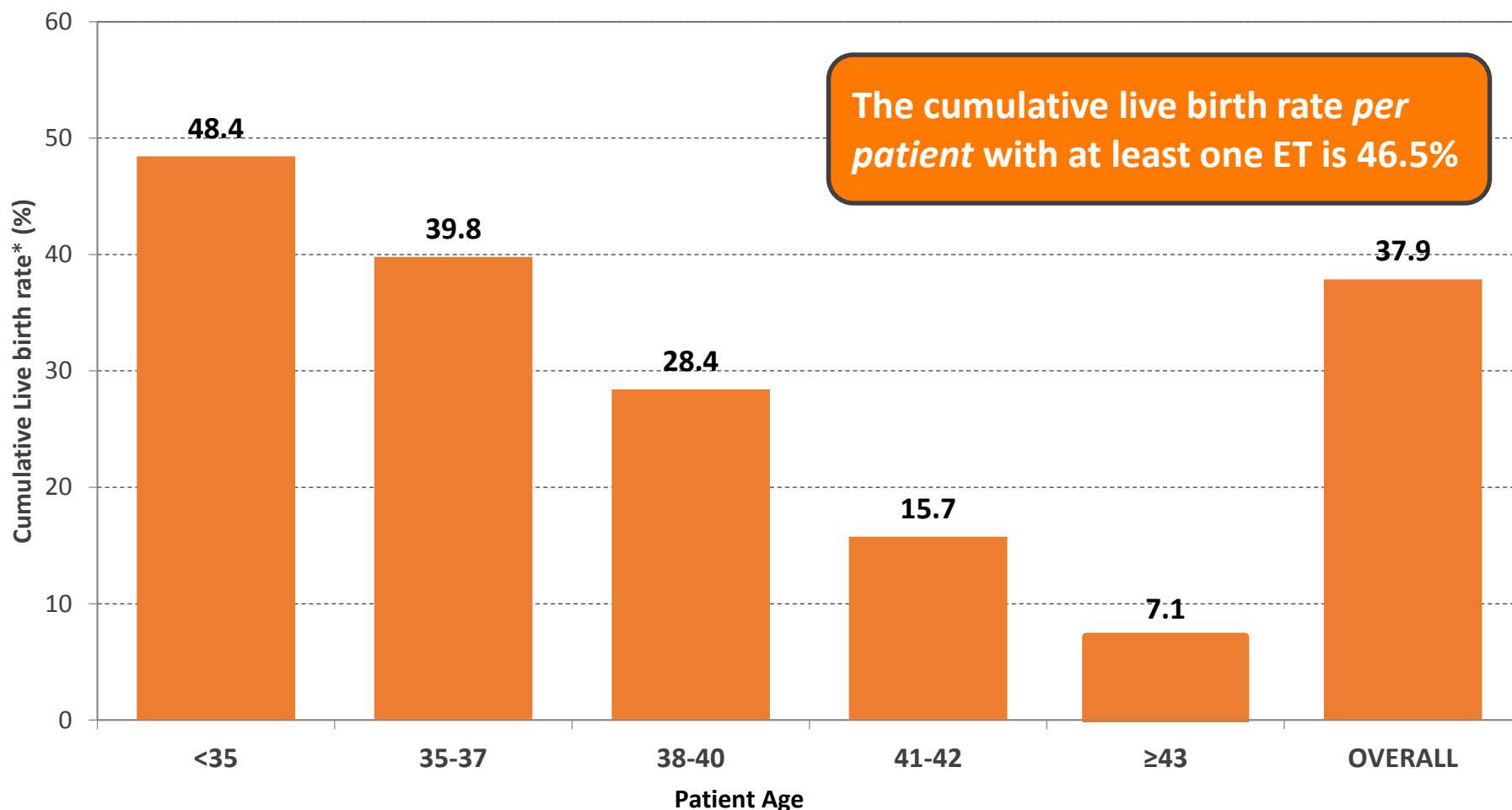


CP*	5,334	10,373	8,831	7,282	16,424	4,116	52,678
RET Cycles	20,382	27,112	16,849	11,671	22,674	5,116	104,374

* Clinical pregnancy: clinical intrauterine, heterotopic, or ectopic pregnancy
 † Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval, by patient age

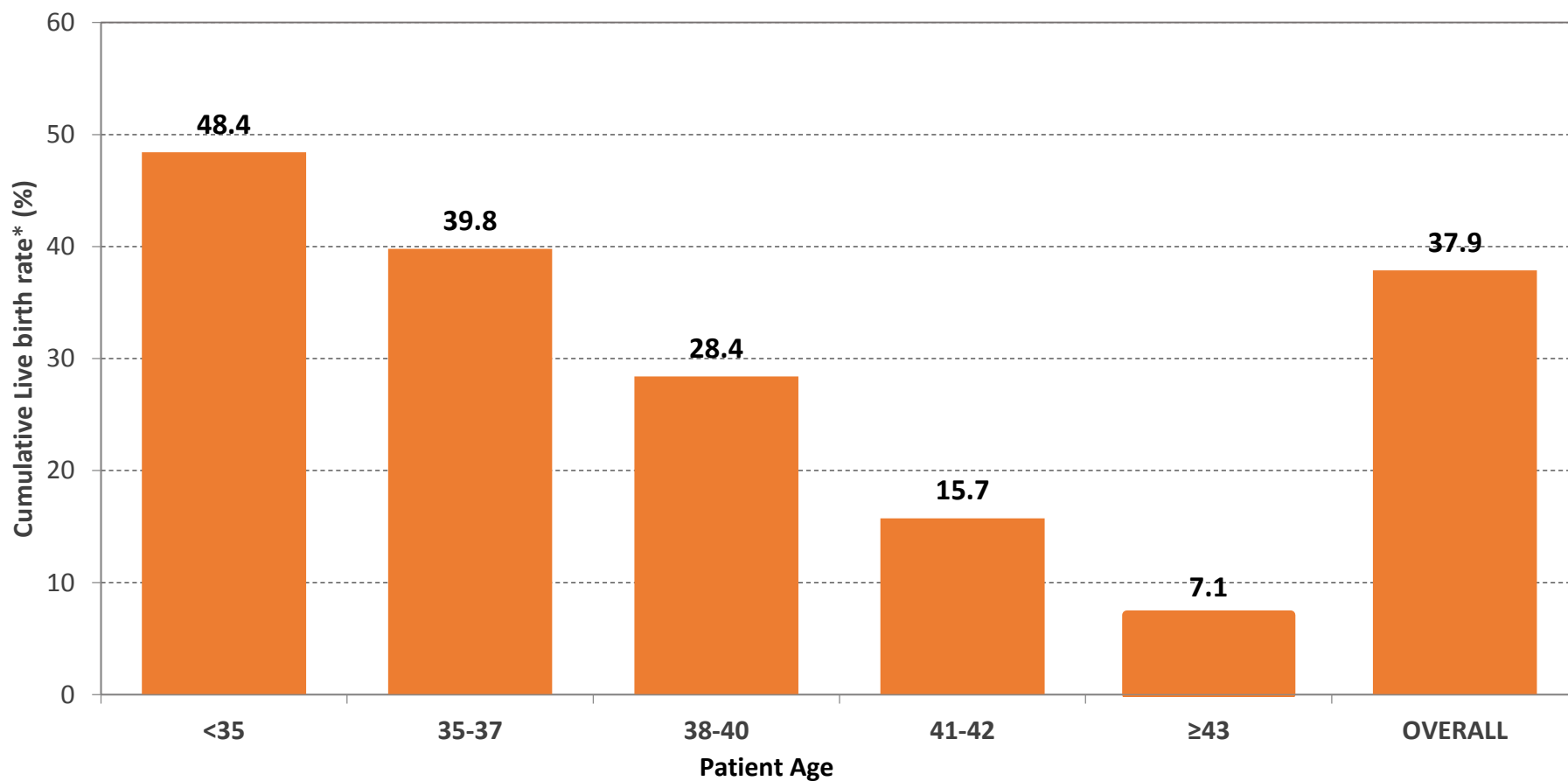
IVF and FET cycles – own oocytes exclusively, 2013 – 2020



* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval, by patient age

IVF and FET cycles – own oocytes exclusively, 2013 – 2020

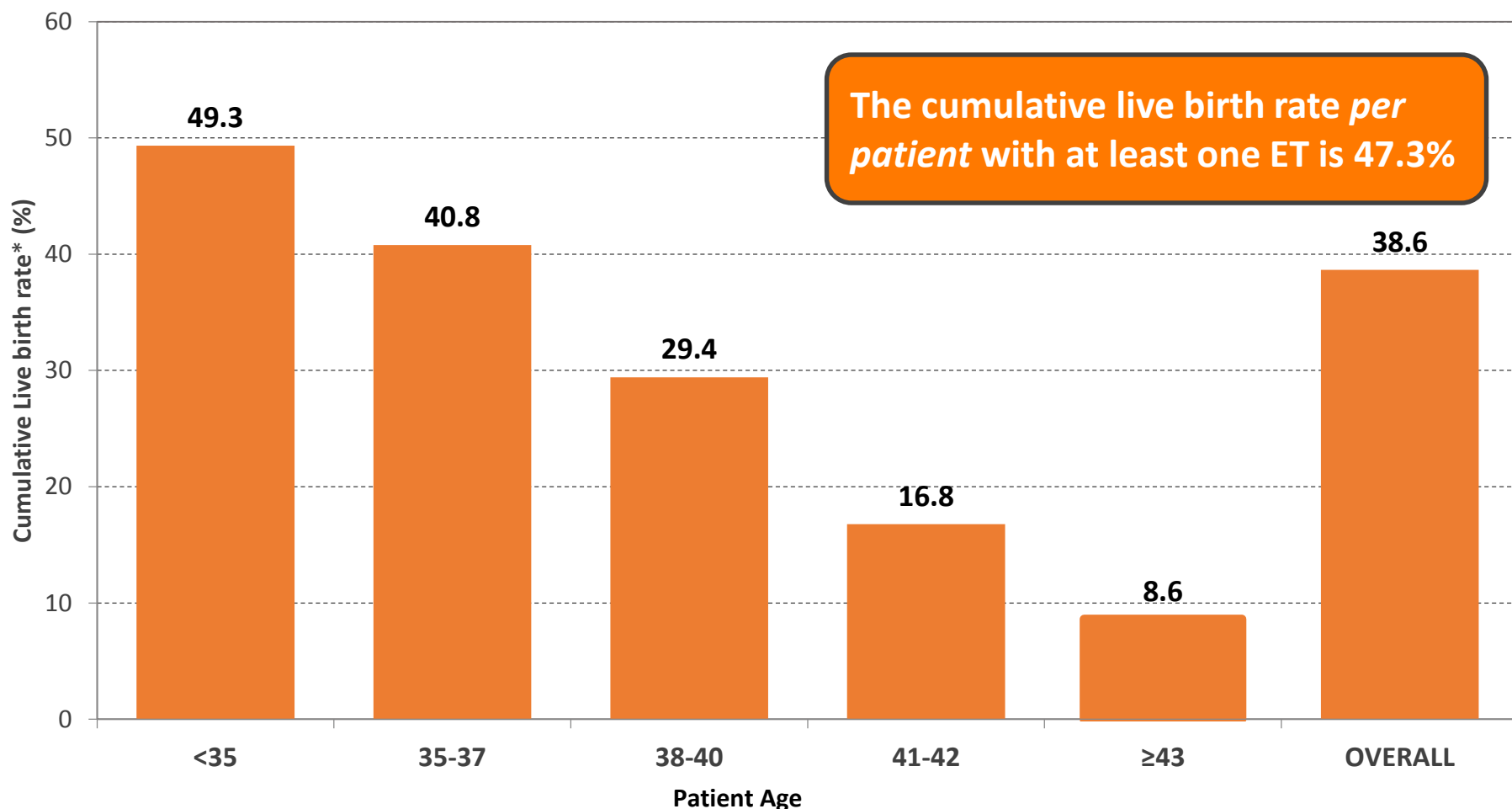


LB	19,608	9,108	5,559	1,404	205	35,884
RET Cycles	40,491	22,893	19,567	8,915	2,881	94,747

* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval, by patient age (Ontario)

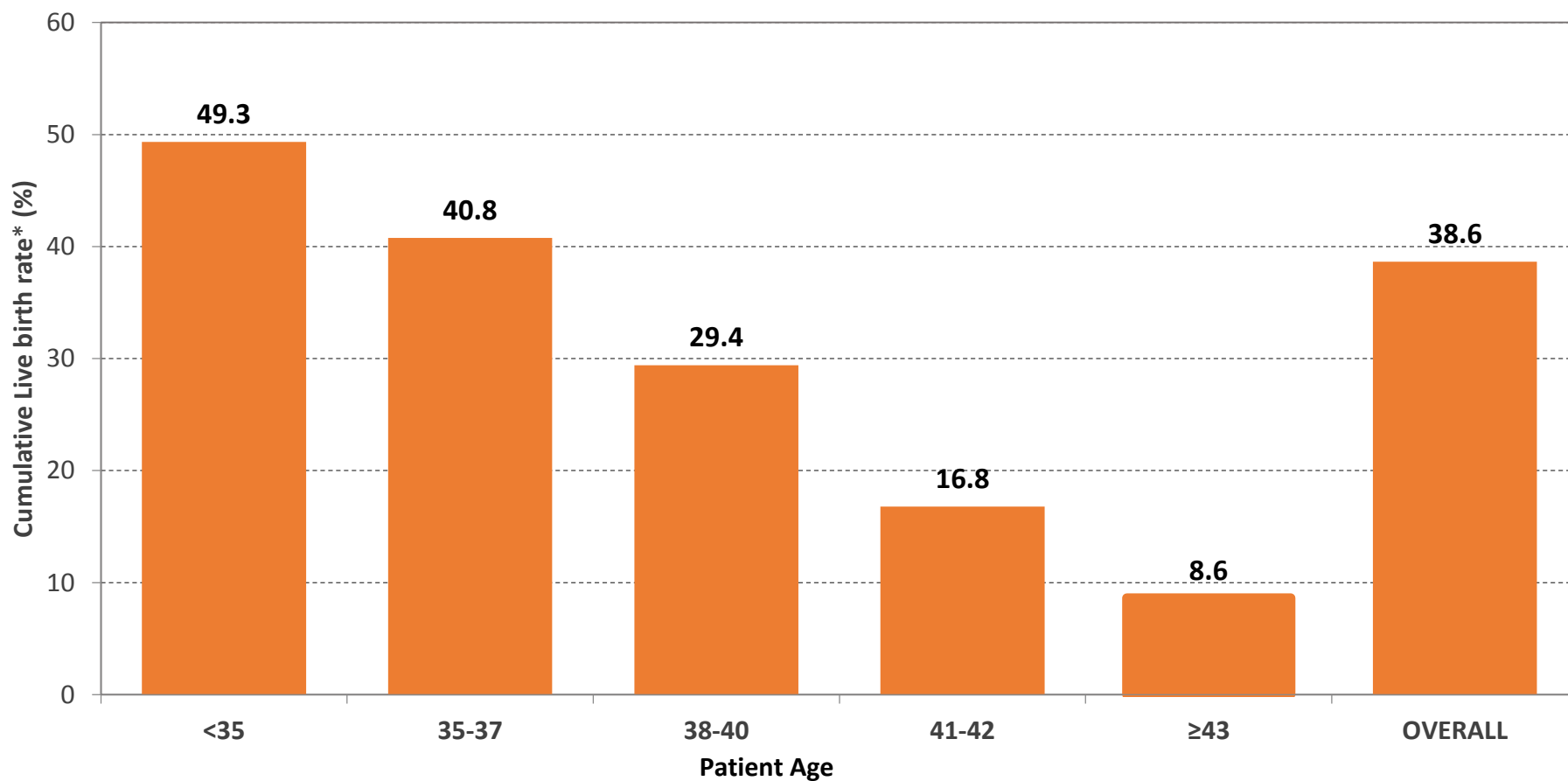
IVF and FET cycles – own oocytes exclusively, 2013 – 2020



* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval, by patient age (Ontario)

IVF and FET cycles – own oocytes exclusively, 2013 – 2020

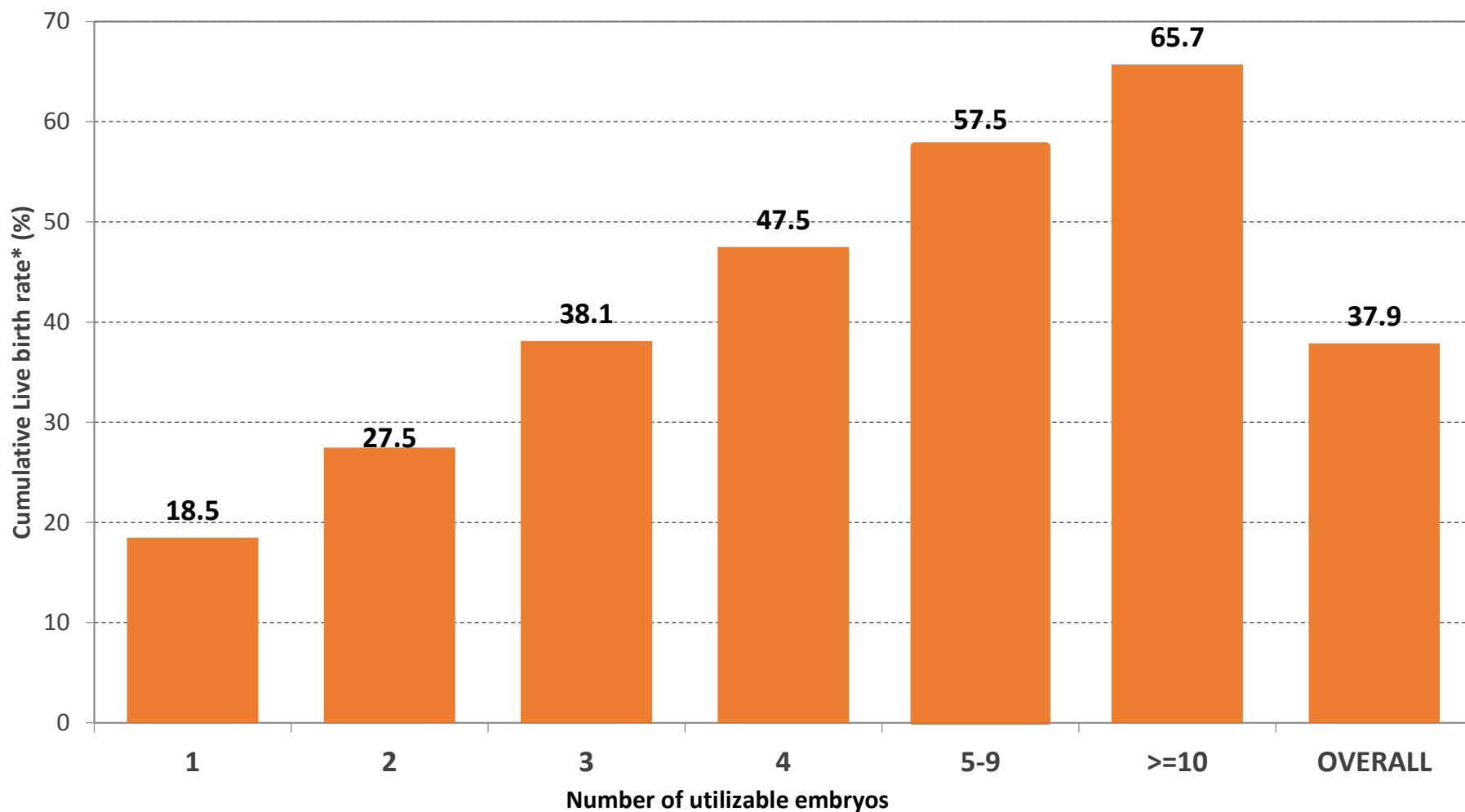


LB	8,831	4,295	2,664	691	115	16,596
RET Cycles	17,899	10,532	9,058	4,119	1,334	42,942

* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval by number of utilizable embryos

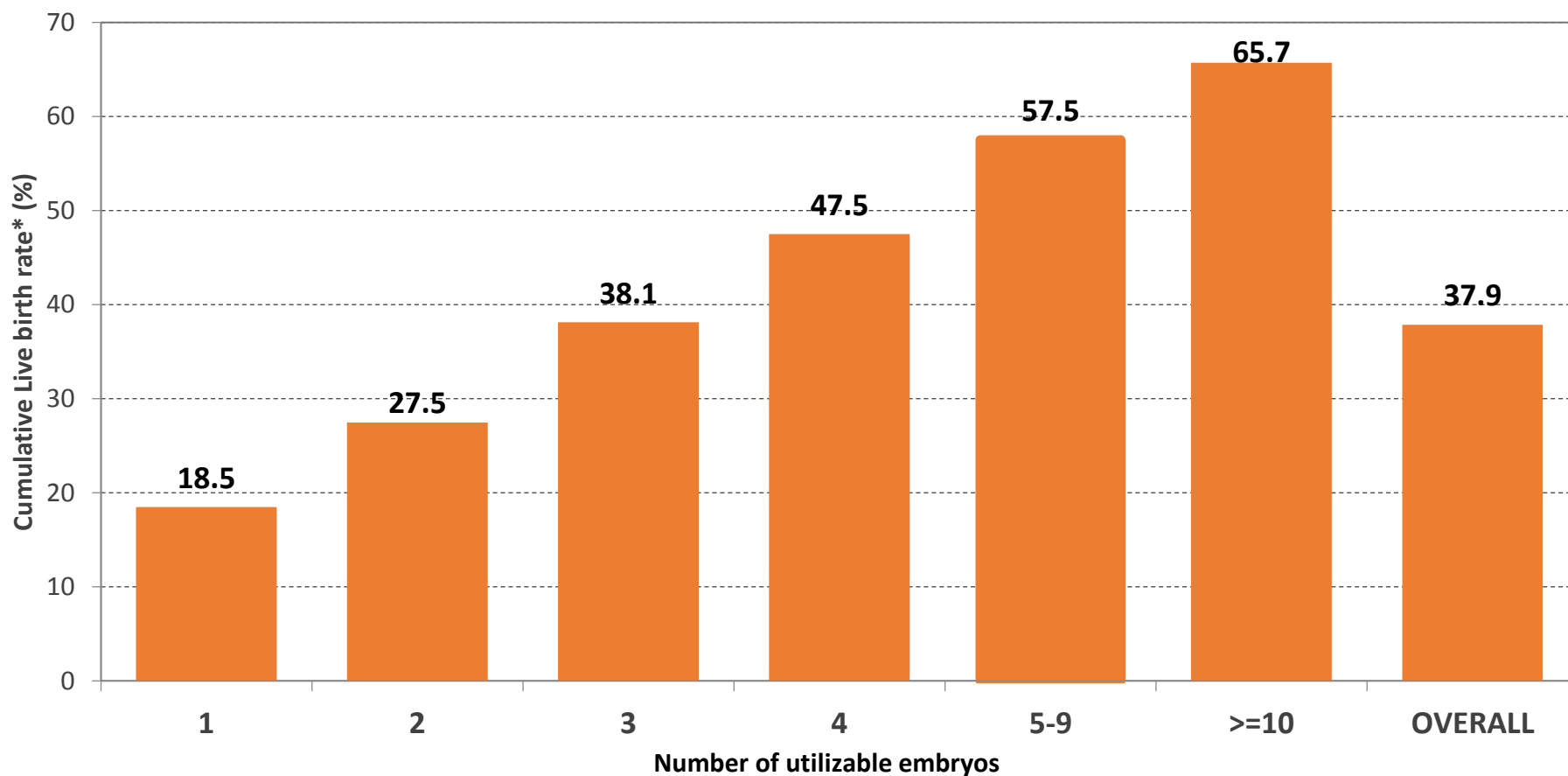
IVF and FET cycles – own oocytes exclusively, 2013 – 2020



* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative live birth rates per retrieval with an ET, within 1 year of retrieval by number of utilizable embryos

IVF and FET cycles – own oocytes exclusively, 2013 – 2020

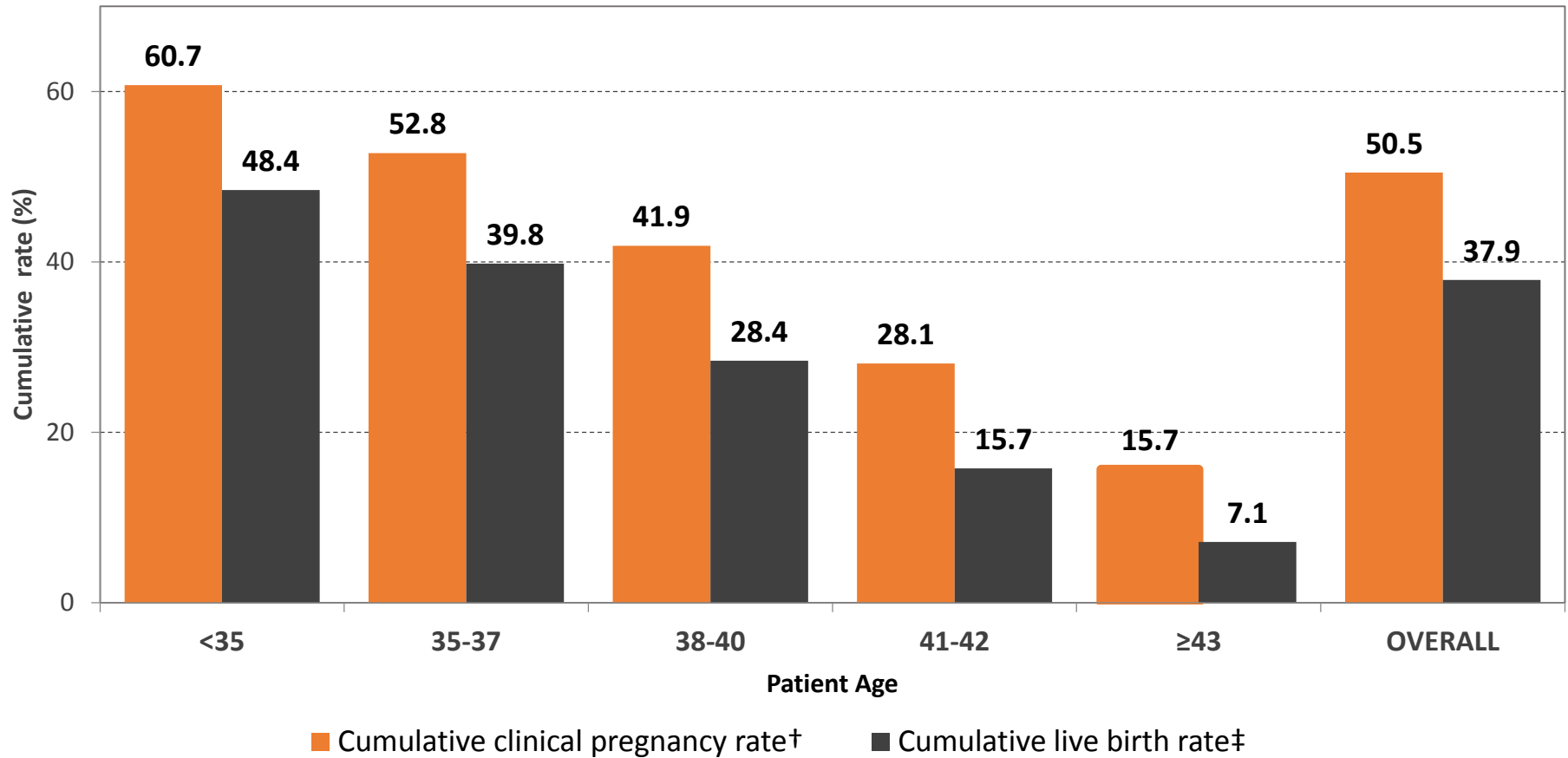


LB	3,473	6,858	5,867	5,003	11,586	2,890	35,884
RET Cycles	18,784	24,955	15,390	10,534	20,144	4,397	94,747

* Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

Cumulative clinical pregnancy and live birth rates per retrievals with an ET, within 1 year of retrieval, by patient age

IVF and FET cycles – own oocytes exclusively, 2013 – 2020 (live birth rate) & 2021 (clinical pregnancy rate)



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

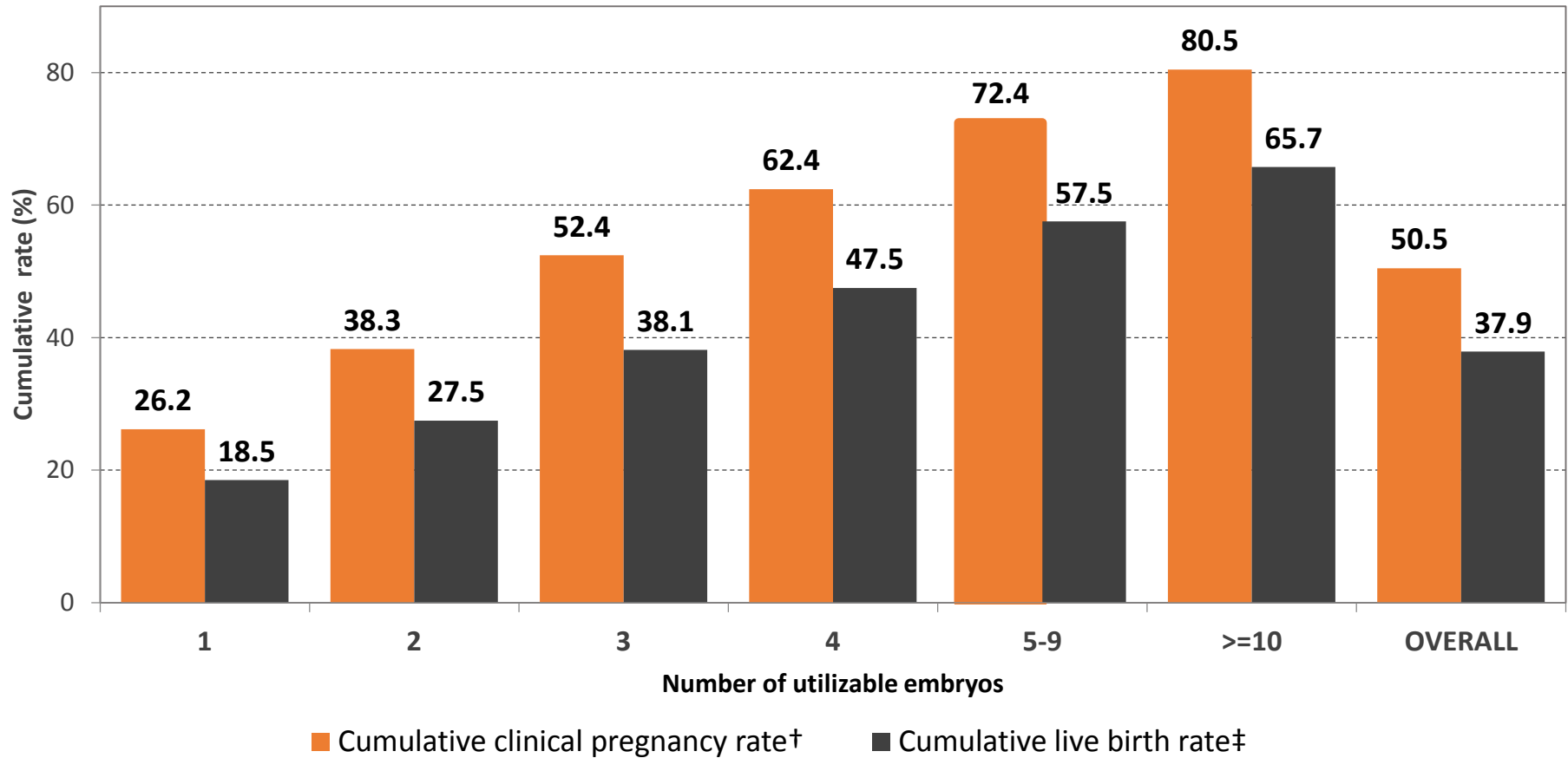
† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

‡ Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

§ Patient Age: Age of patient at time oocyte retrieval

Cumulative clinical pregnancy and live birth rates per retrievals with an ET, within 1 year of retrieval, by number of utilizable embryos

IVF and FET cycles – own oocytes exclusively, 2013 – 2020 (live birth rate) & 2021 (clinical pregnancy rate)



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

† Cumulative pregnancy rate: the number of retrievals resulting in at least 1 clinical pregnancies within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

‡ Cumulative Live Birth rate: the number of retrievals resulting in at least 1 live birth within 1 year of the retrieval divided by the total number of retrieval cycles that had at least 1 fresh or frozen embryo transfer.

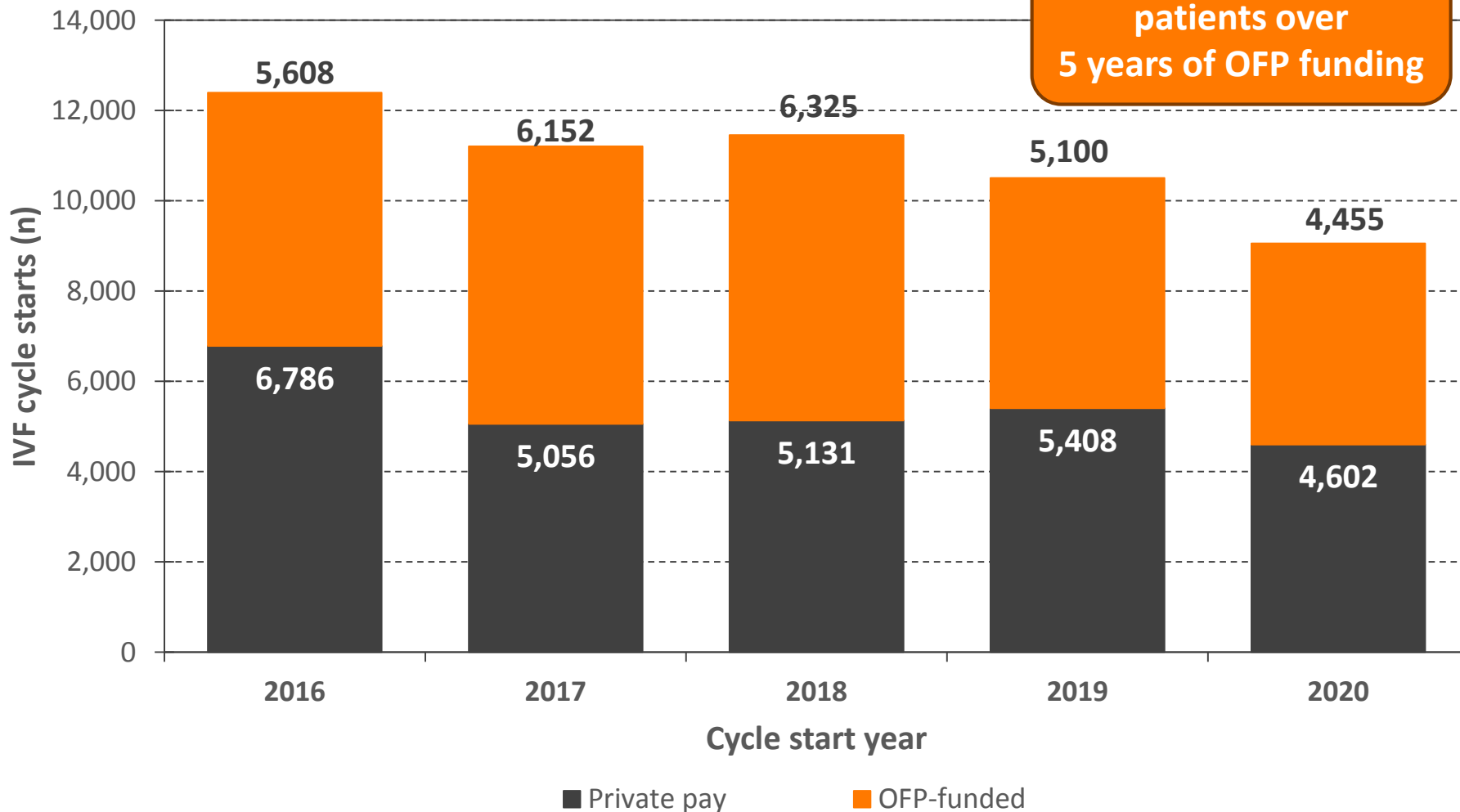
§ Patient Age: Age of patient at time oocyte retrieval

ONTARIO FERTILITY PROGRAM

Number of IVF cycle starts over time by OFP vs Private pay

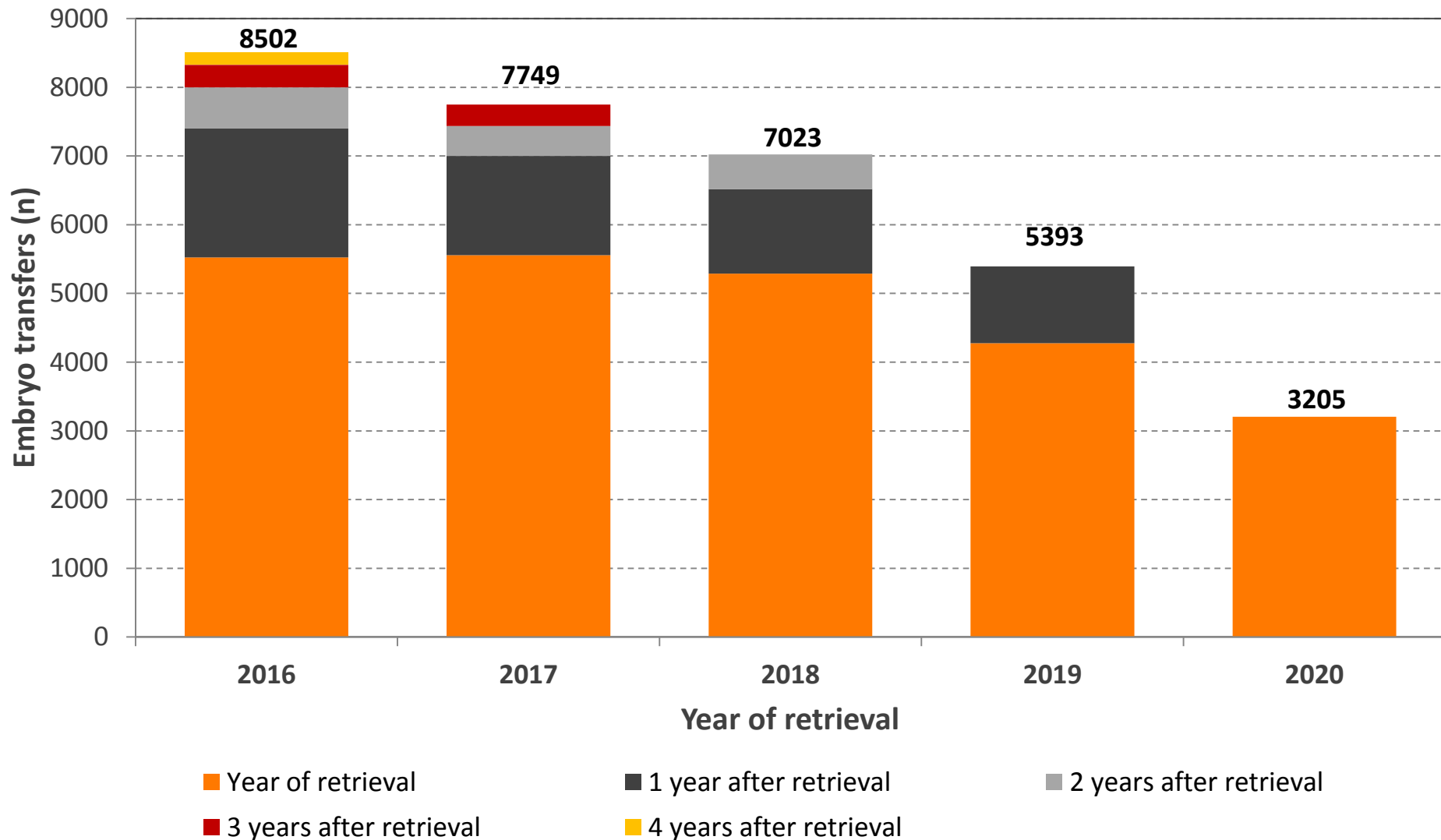
IVF cycles, 2016-2020

26,305 unique patients over 5 years of OFP funding



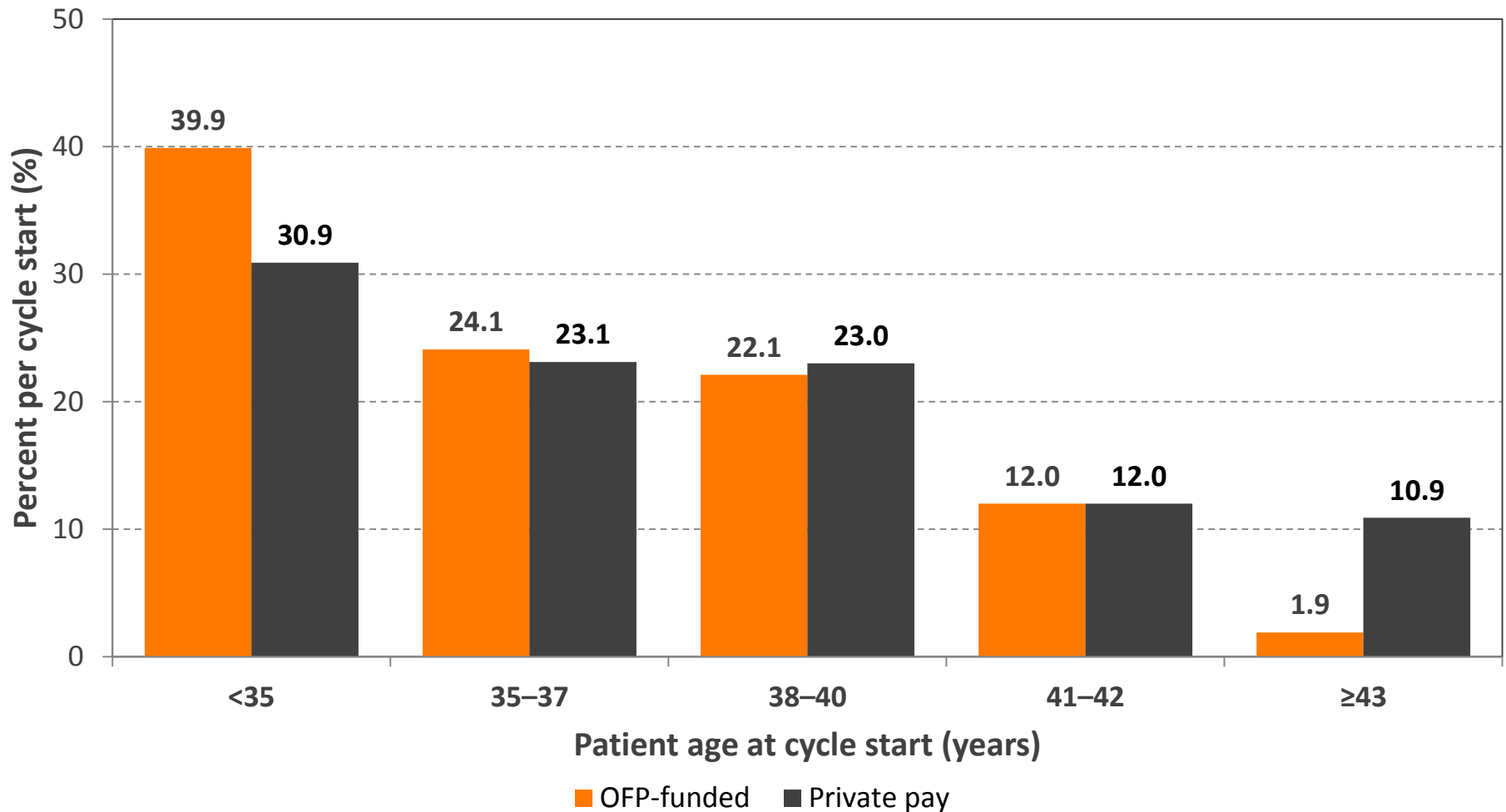
OFP-funded embryo transfers by retrieval year

IVF cycles, 2016-2020



Patient age by OFP vs Private pay

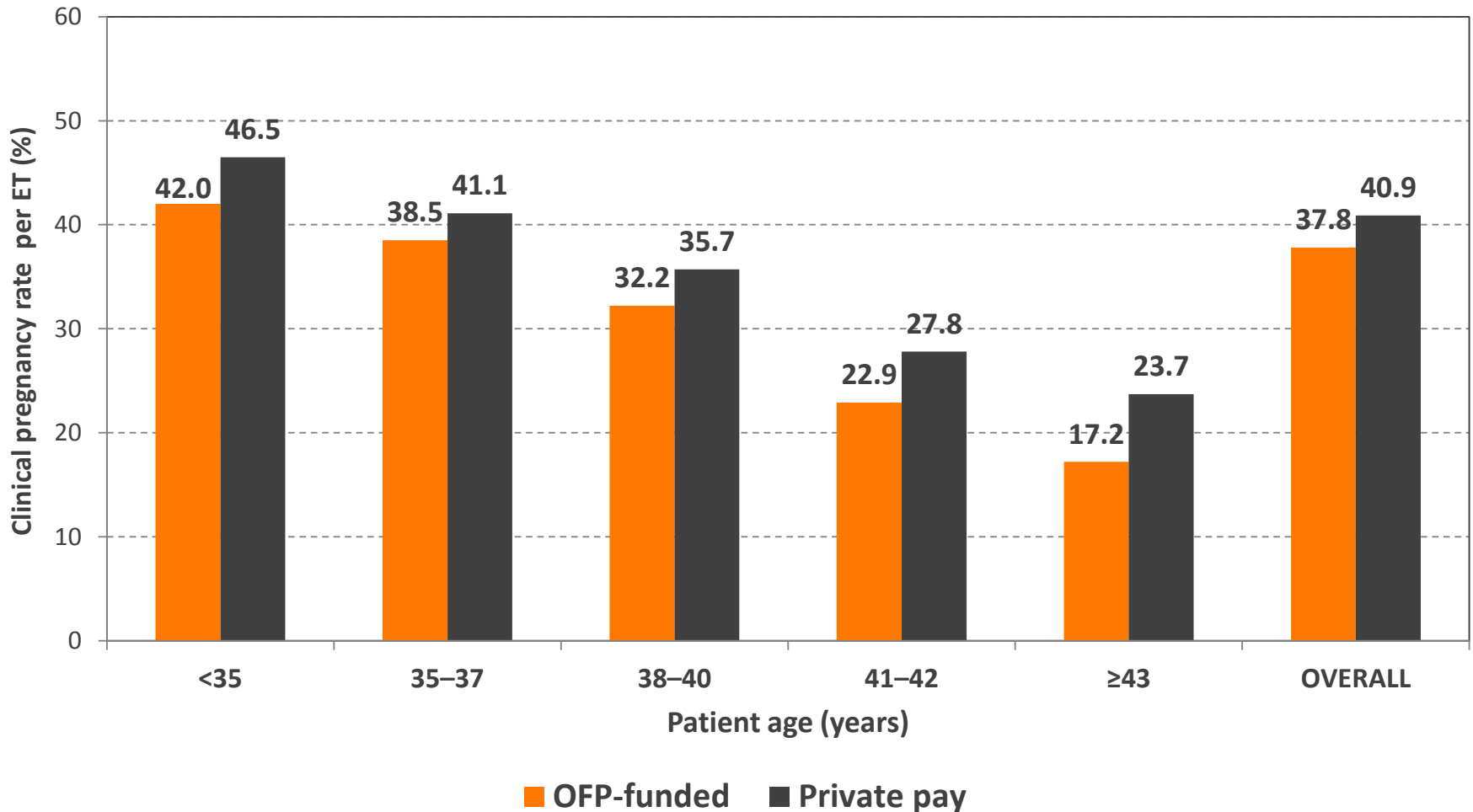
IVF cycles, 2016-2020



Clinical pregnancy rate per ET, by patient age and OFP vs Private pay in Ontario



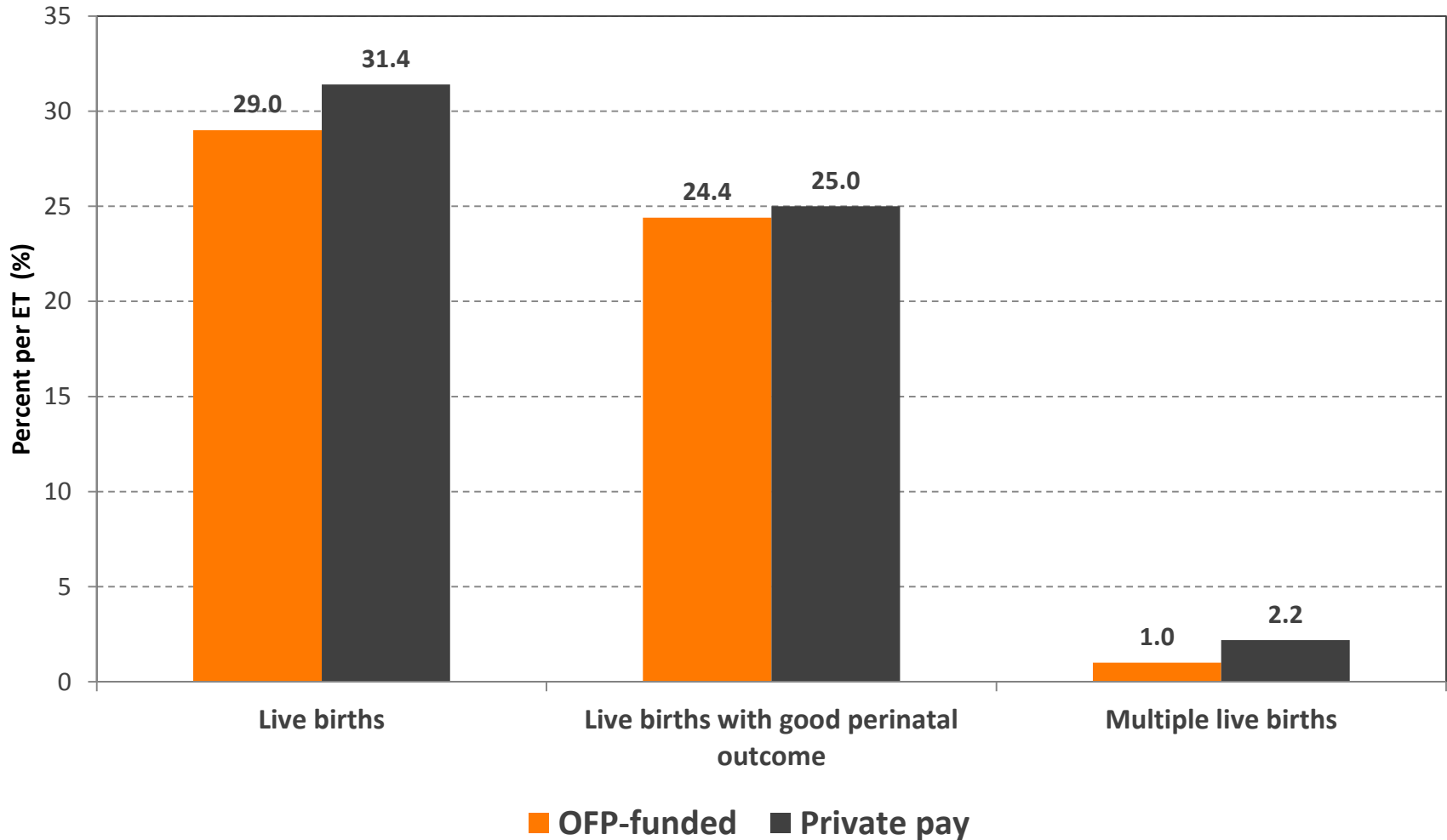
All ART treatment cycles (fresh and frozen), 2016-2020



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

Birth outcome rates per ET by OFP vs Private pay in Ontario

All ART treatment cycles (fresh and frozen), 2016-2020



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

GESTATIONAL AGE AT TIME OF DELIVERY

Ontario births: IVF conceptions compared to spontaneous conceptions

Preterm birth

ART vs. Non-ART Ontario – 2013 – 2020

- **Preterm birth:**
 - <37 weeks' gestation
 - RR = 1.93 [95% CI: 1.87–2.00]
 - adjusted RR = 1.85 [95% CI: 1.79–1.91]
 - ART risk: 0.144, Non-ART risk: 0.074

- **Singleton preterm births:**
 - <37 weeks' gestation
 - RR = 1.46 [95% CI: 1.41–1.52]
 - adjusted RR = 1.42 [95% CI: 1.36–1.48]
 - ART risk: 0.096, Non-ART risk: 0.066

** Adjusted risk ratios were adjusted for maternal age at delivery.*

Preterm birth

ART vs. Non-ART Ontario – 2013 – 2015

- **Preterm birth:**
 - <37 weeks' gestation
 - RR = 2.63 [95% CI: 2.48–2.78]
 - adjusted RR = 2.50 [95% CI: 2.36–2.65]
 - ART risk: 0.19, Non-ART risk: 0.07

- **Singleton preterm births:**
 - <37 weeks' gestation
 - RR = 1.48 [95% CI: 1.36–1.61]
 - adjusted RR = 1.43 [95% CI: 1.31–1.61]
 - ART risk: 0.09, Non-ART risk: 0.06

** Adjusted risk ratios were adjusted for maternal age at delivery.*

Preterm birth

ART vs. Non-ART Ontario – 2016 – 2020

- **Preterm birth:**
 - <37 weeks' gestation
 - RR = 1.71 [95% CI: 1.65–1.79]
 - adjusted RR = 1.65 [95% CI: 1.58–1.72]
 - ART risk: 0.13, Non-ART risk: 0.08

- **Singleton preterm births:**
 - <37 weeks' gestation
 - RR = 1.42 [95% CI: 1.35–1.49]
 - adjusted RR = 1.38 [95% CI: 1.31–1.45]
 - ART risk: 0.09, Non-ART risk: 0.07

** Adjusted risk ratios were adjusted for maternal age at delivery.*

Gestational age at time of delivery

ART vs. Non-ART Ontario – 2013 – 2020



Gestational age at delivery	Total births	ART		Non-ART		RR (95% CI)	Adj. RR (95%CI)
		n	%	n	%		
<32 weeks	17,936	769	3.17	17,167	1.45	2.19 (2.04, 2.35)	2.05 (1.90, 2.20)
32 weeks	3,773	163	0.67	3,610	0.30	2.21 (1.89, 2.58)	2.11 (1.80, 2.47)
33 weeks	5,731	283	1.17	5,448	0.46	2.54 (2.25, 2.86)	2.40 (2.12, 2.71)
34 weeks	9,928	408	1.68	9,520	0.80	2.09 (1.90, 2.31)	2.03 (1.83, 2.24)
35 weeks	17,601	654	2.70	16,947	1.43	1.88 (1.74, 2.04)	1.82 (1.68, 1.97)
36 weeks	36,475	1,206	4.97	35,269	2.98	1.67 (1.58, 1.77)	1.61 (1.52, 1.71)
≥37 weeks	1,117,002	20,765	85.64	1,096,237	92.57	0.93 (0.92, 0.93)	0.93 (0.92, 0.93)

* Adjusted for maternal age at delivery.

Gestational age at time of delivery for singleton pregnancies



ART vs. Non-ART Ontario – 2013 – 2020

Gestational age at delivery	Total births	ART		Non-ART		RR (95% CI)	Adj. RR (95%CI)
		n	%	n	%		
<32 weeks	16,012	552	2.47	15,460	1.33	1.87 (1.72, 2.03)	1.74 (1.60, 1.89)
32 weeks	3,161	98	0.44	3,063	0.26	1.67 (1.37, 2.04)	1.60 (1.30, 1.96)
33 weeks	4,771	174	0.78	4,597	0.39	1.98 (1.70, 2.30)	1.87 (1.60, 2.18)
34 weeks	8,509	232	1.04	8,277	0.71	1.46 (1.29, 1.67)	1.43 (1.26, 1.64)
35 weeks	15,374	438	1.96	14,936	1.28	1.53 (1.39, 1.68)	1.50 (1.36, 1.65)
36 weeks	32,485	842	3.77	31,643	2.71	1.39 (1.30, 1.49)	1.36 (1.27, 1.46)
≥37 weeks	1,108,525	19,997	89.54	1,088,528	93.31	0.96 (0.96, 0.96)	0.96 (0.96, 0.97)

* Adjusted for maternal age at delivery.

THANK YOU!

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