

Are twins really different ?

Vincent Rigo

Introduction

Twins

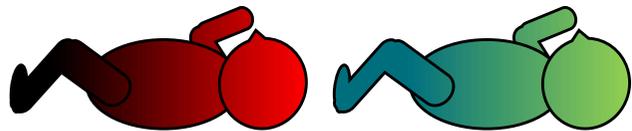
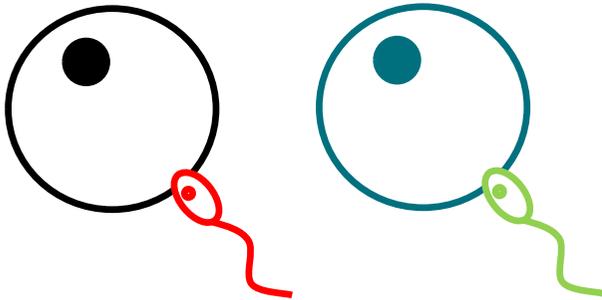
Since the dawn of time



- ▶ Monozygotic twins
- ▶ Krems-Wachtberg grave, Danube's left bank, currently Austria
- ▶ Upper Paleolithic (-31 000)

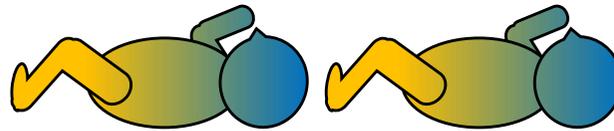
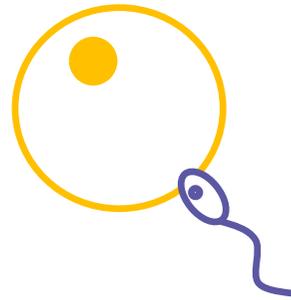
Twin types

Dizygotic



50% maternal
50% paternal

Monozygotic

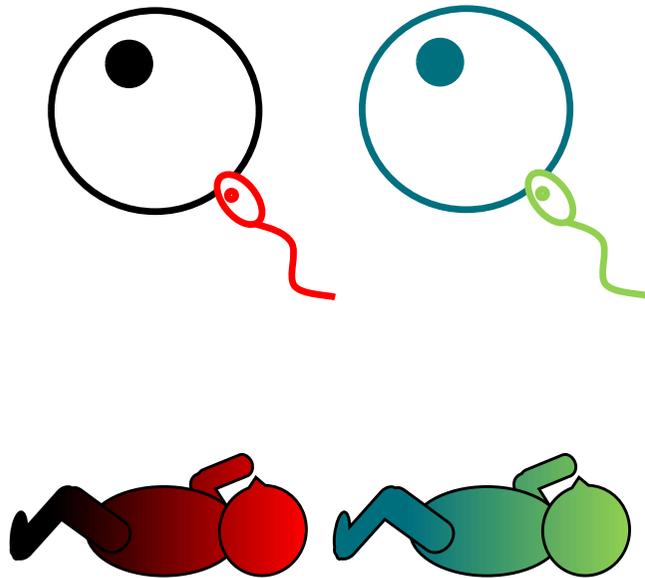


Shared DNA:

100% maternal
100% paternal

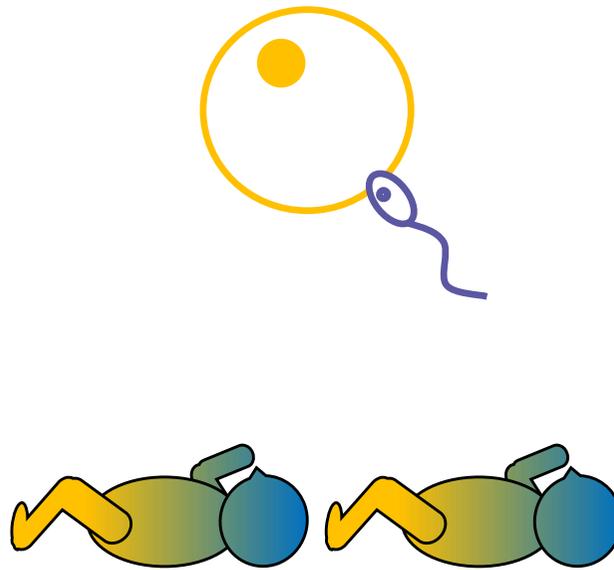
Twin types

Dizygotic



50% maternal
50% paternal

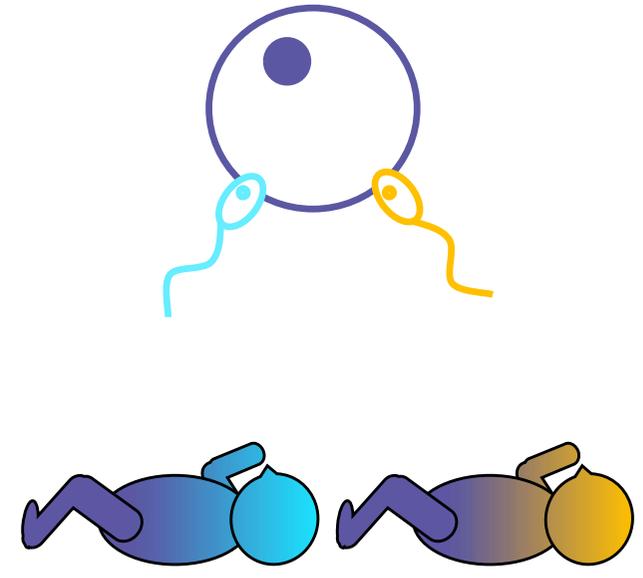
Monozygotic



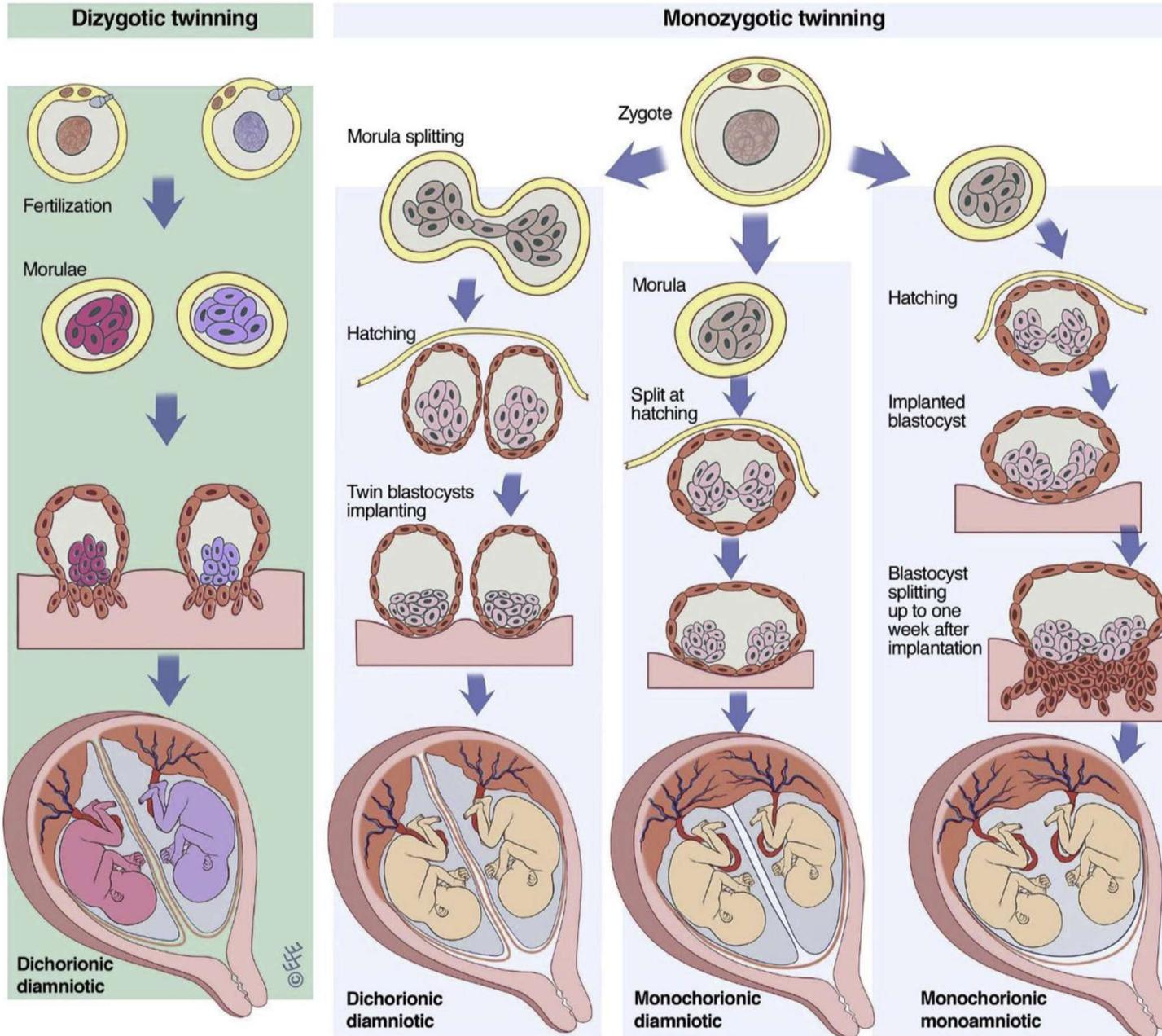
Shared DNA :

100% maternal
100% paternal

Sesquizygotic



100% maternal
50-78% paternal



1-3 days
32%

4-8 days
64%

8-13 days
4%

Epidemiology

Twins

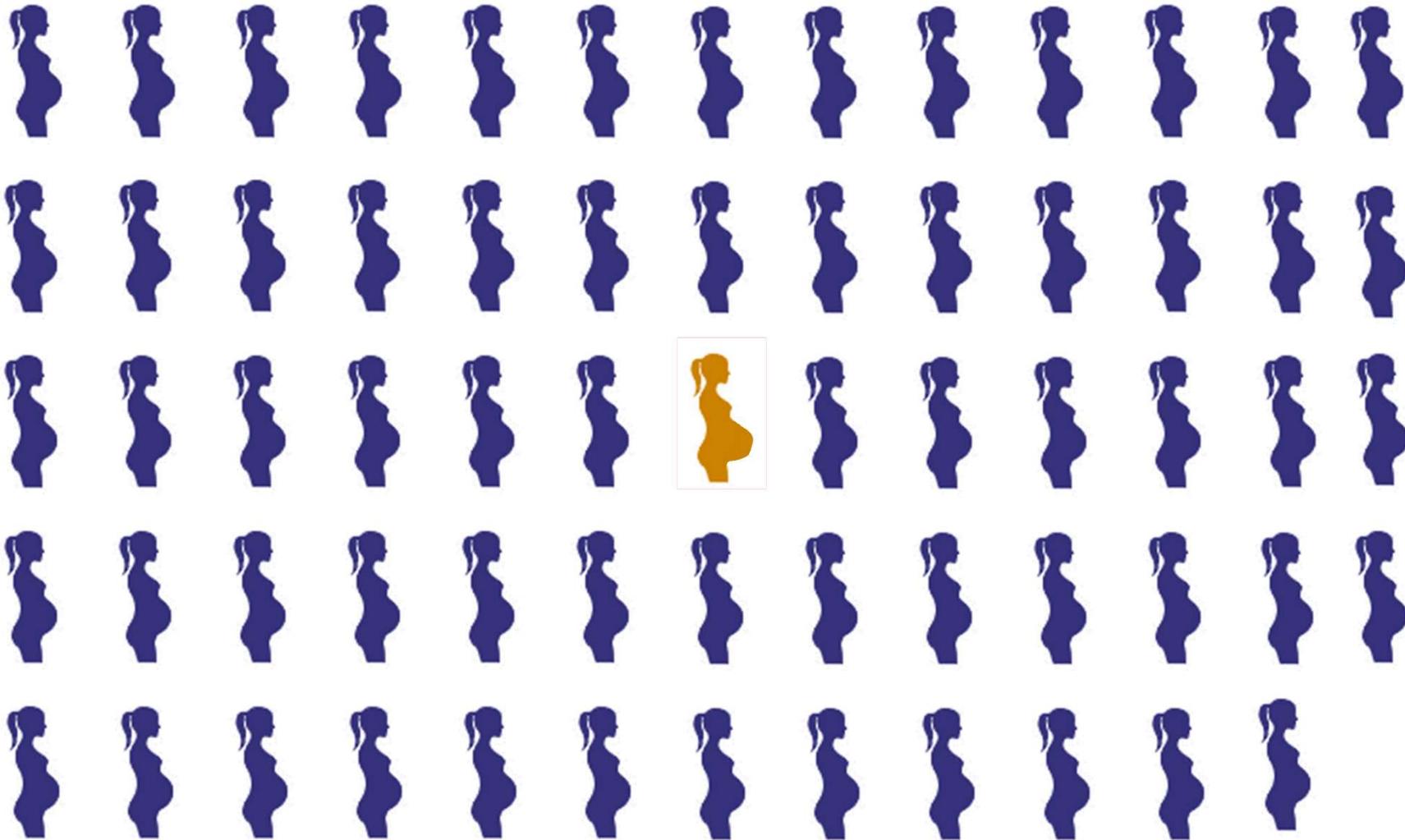
Leia and
Luc



A long time ago
in a galaxy far,
far away....

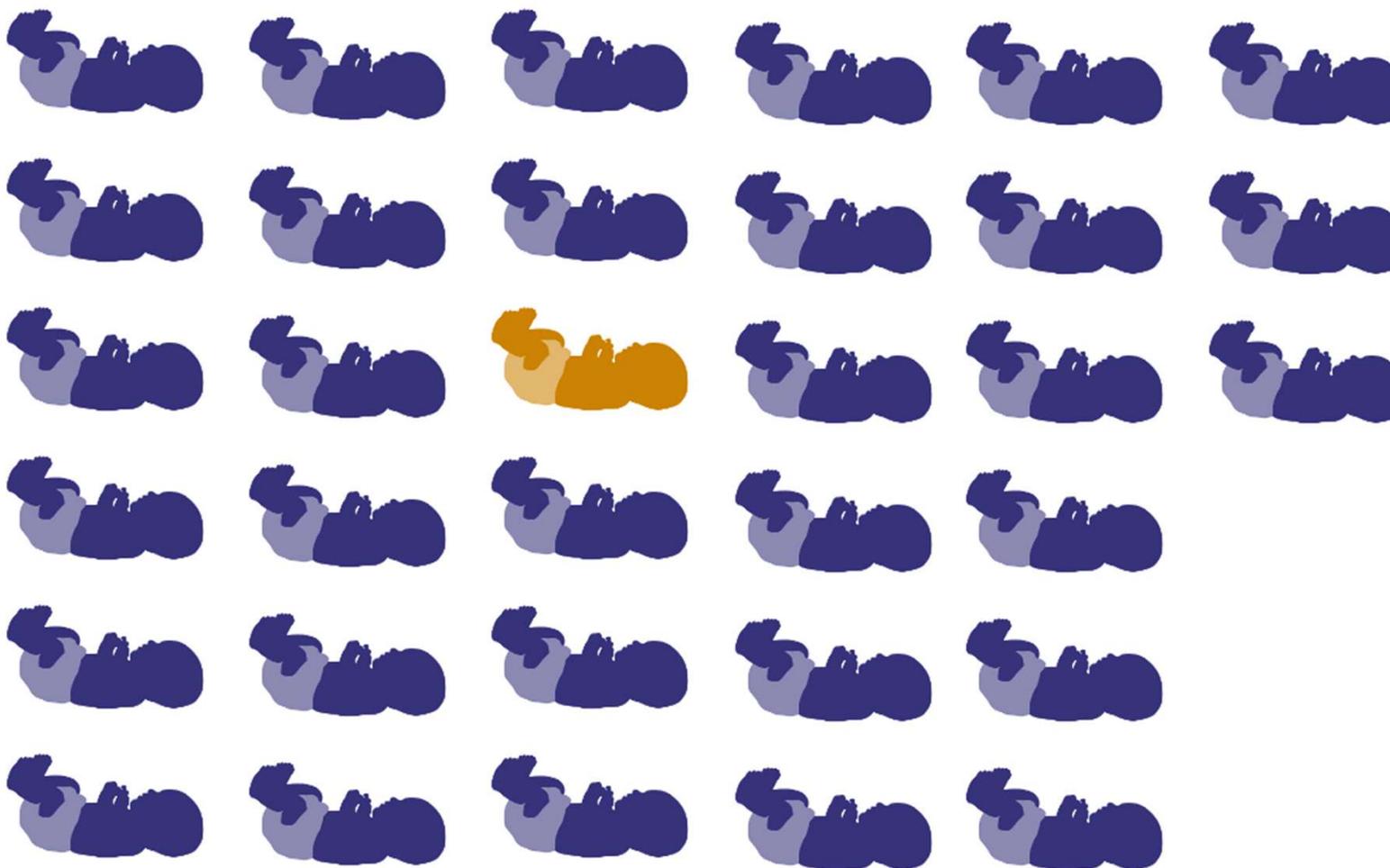
Incidence

1/ 64 pregnancies (Bel 2022-23)
15,6/1000



Incidence

1/33 newborns (Bel 2022-23)
30,4/1000





Twinning: risk factors

Dizygotic

Superovulation

- ▶ Origine
- ▶ Maternal age
- ▶ ART
- ▶ Familial
 - ▶ FSH
 - ▶ Ovarian function genes

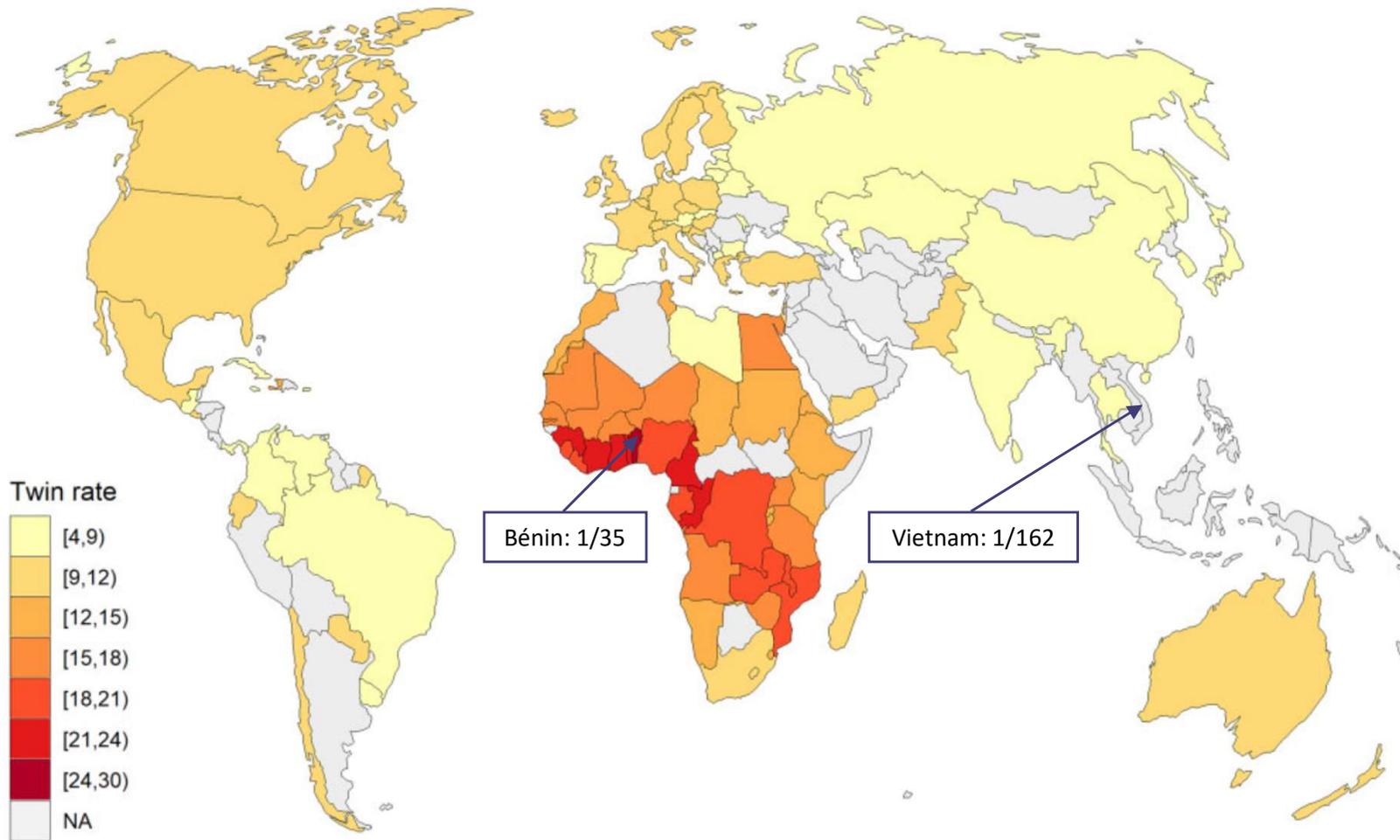
Monozygotic

Fragility of the ovule

- ▶ Maternal age
- ▶ ART
- ▶ (genetics)
 - ▶ AD, AR, X-linked

Twinning worldwide

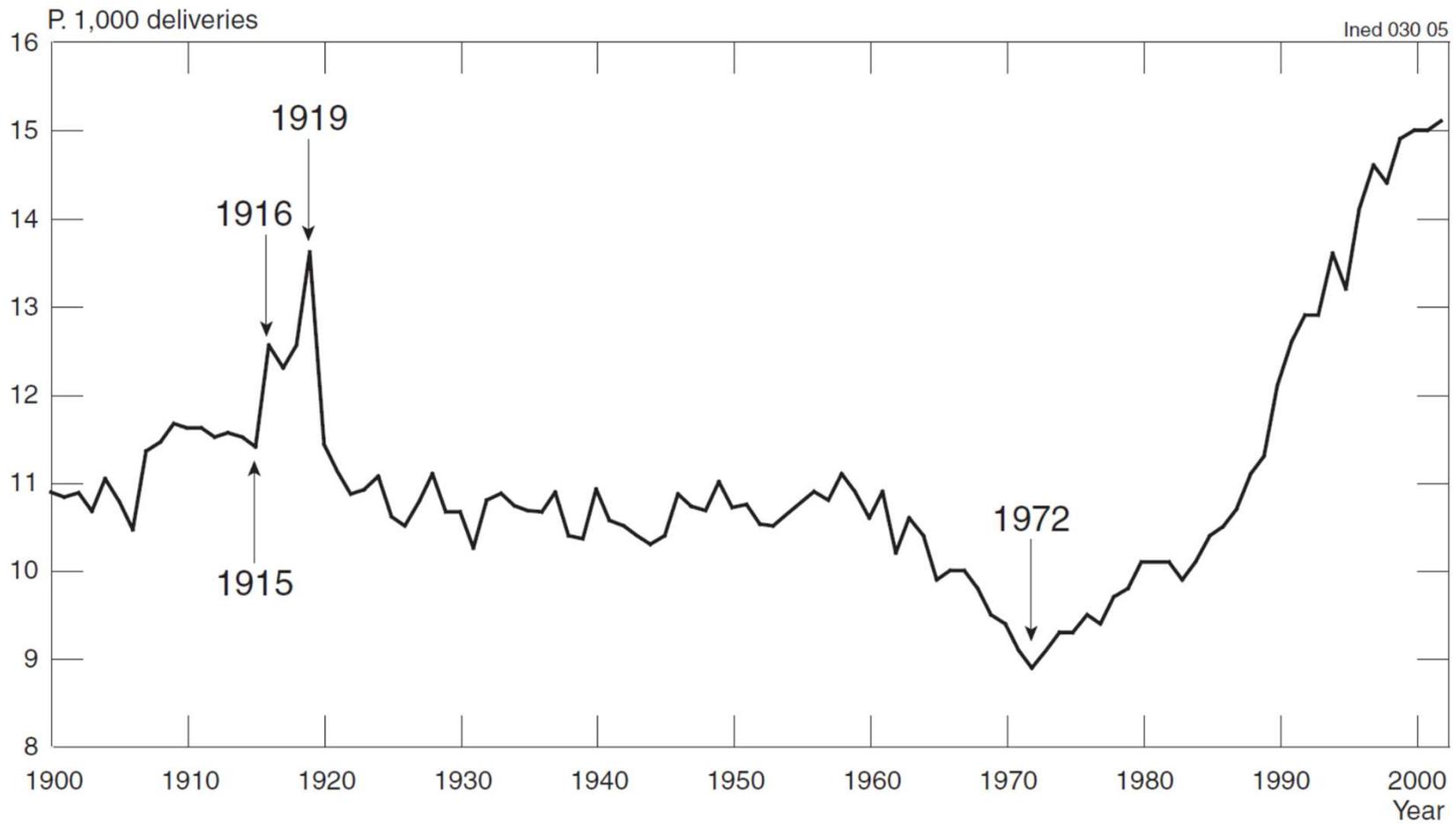
1980-1985



Supplementary Figure S1. Twin deliveries per 1000 total deliveries in 1980–1985.

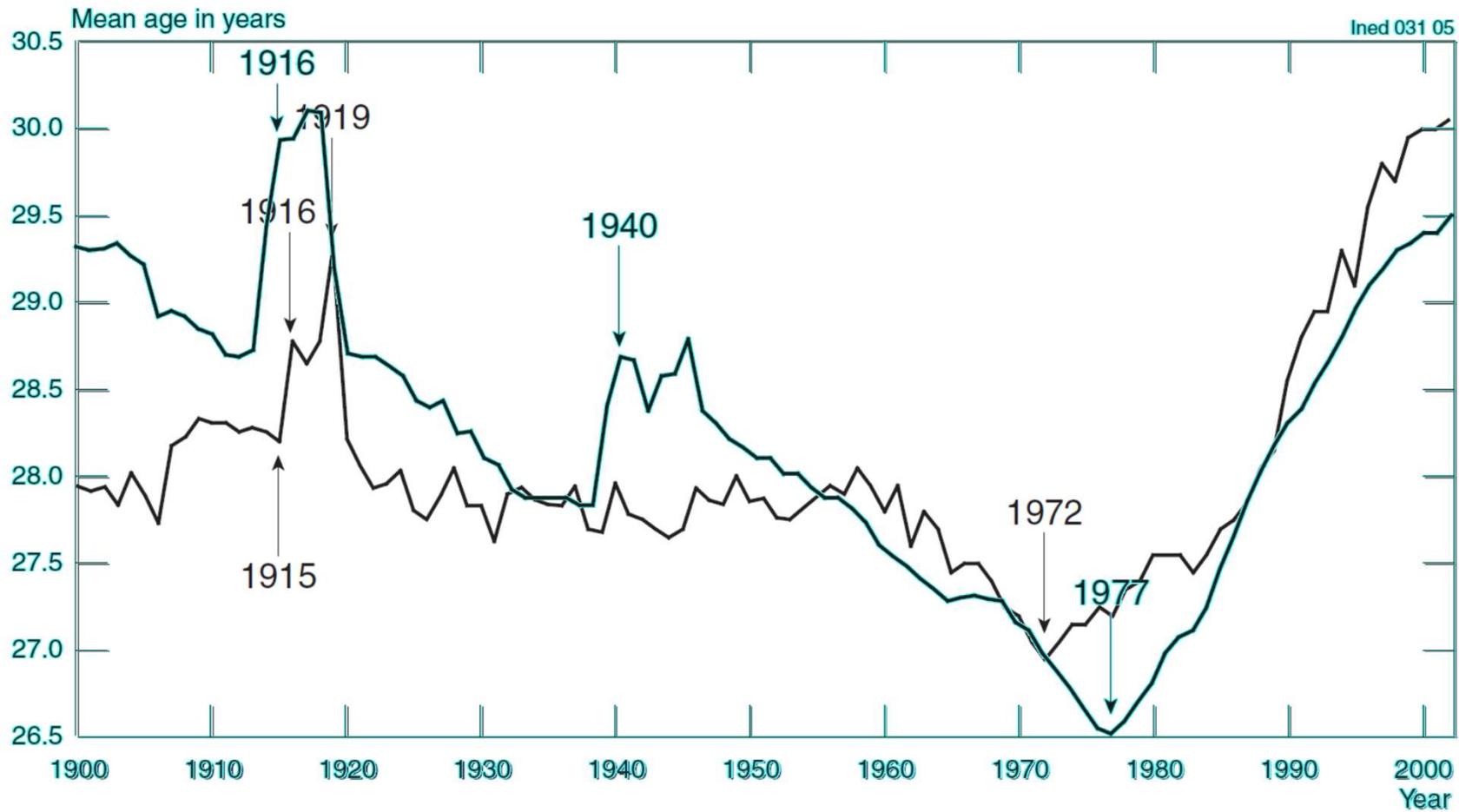


Twin pregnancy incidence in France



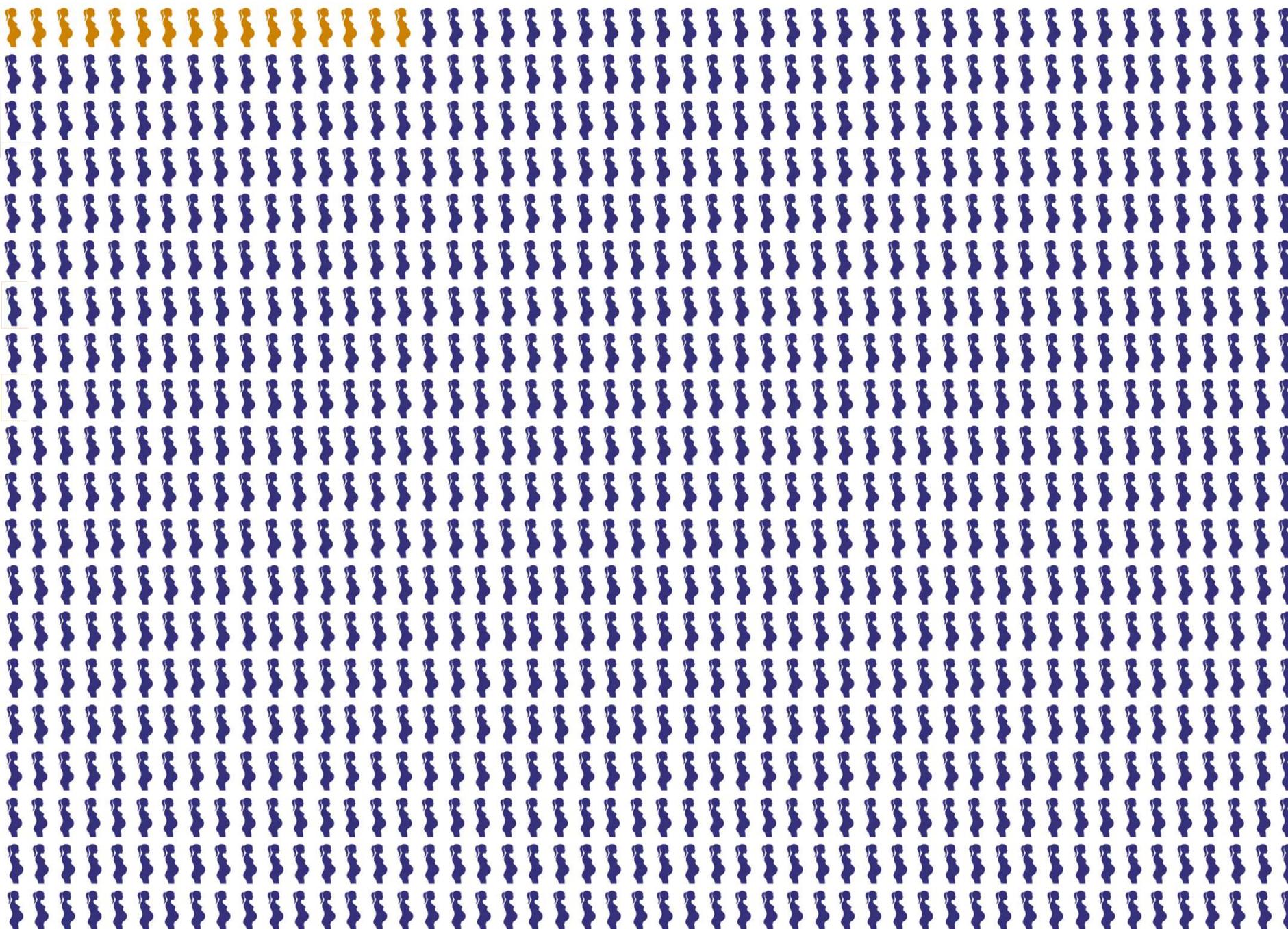


Twin pregnancy incidence in France related to maternal age



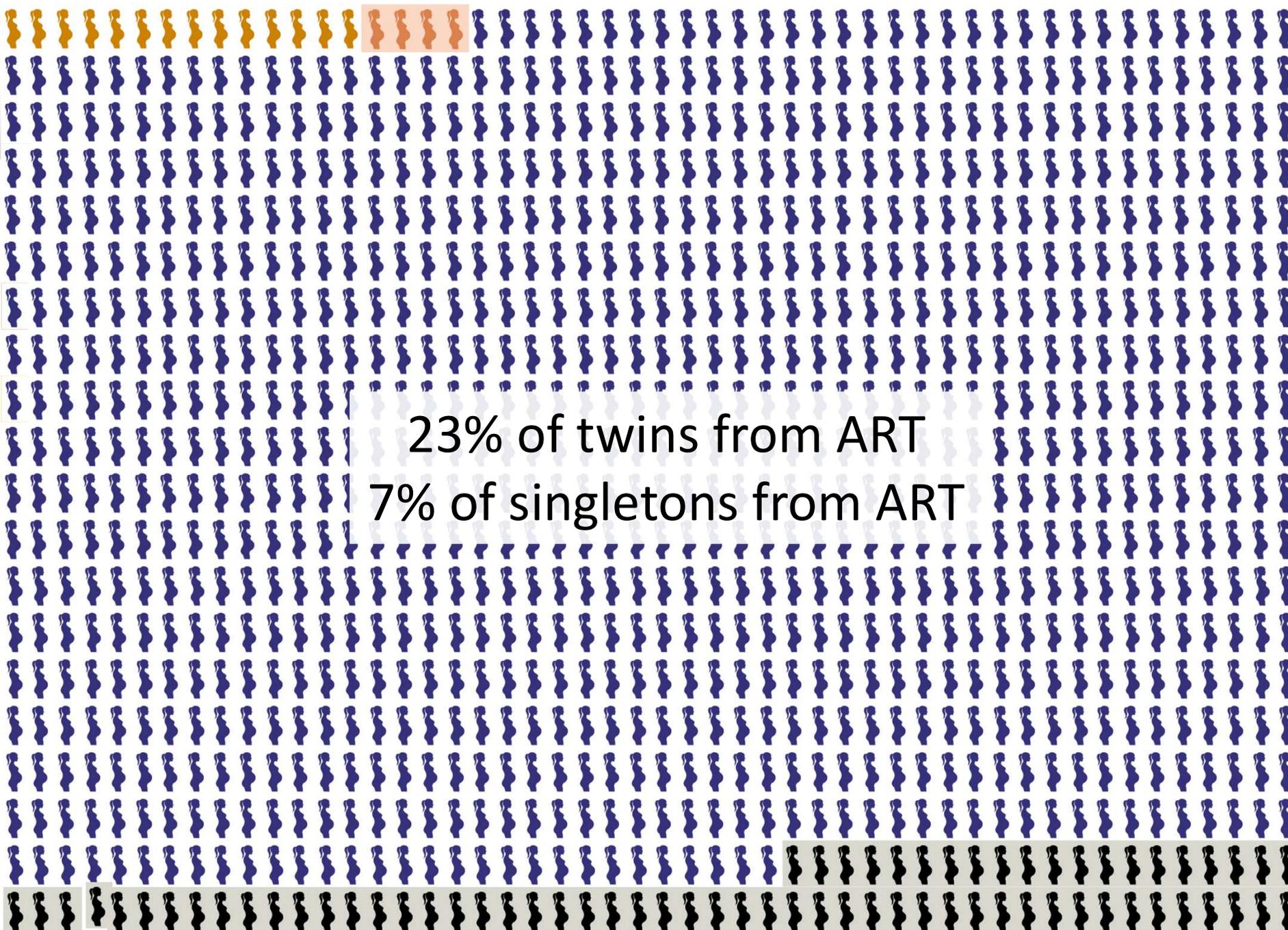


General incidence: 15,6%



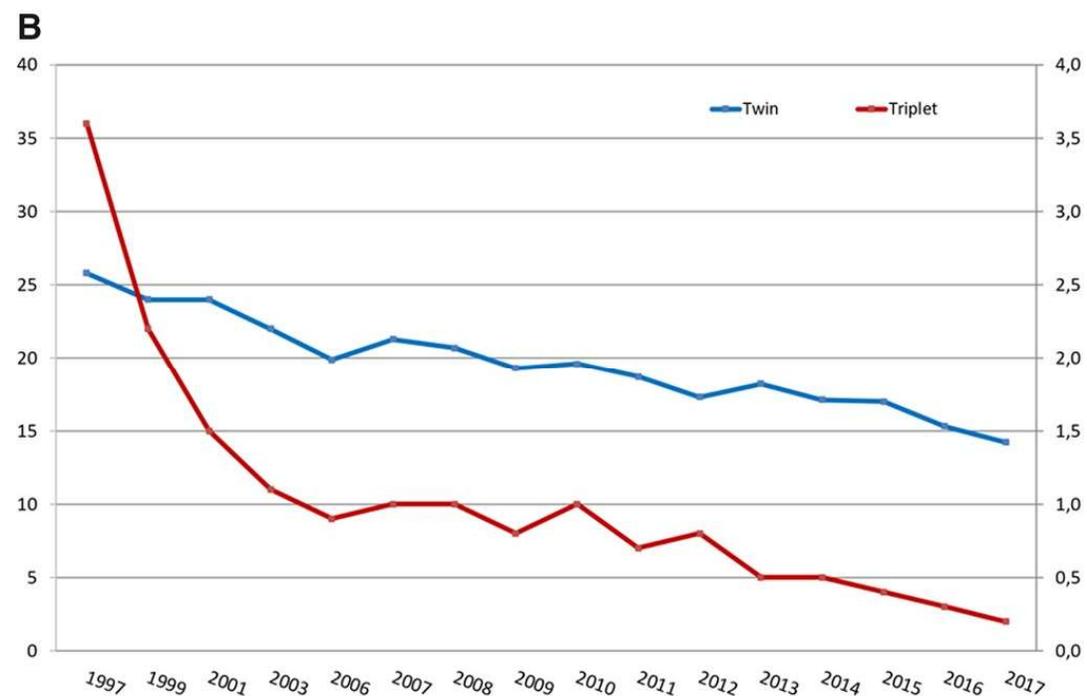
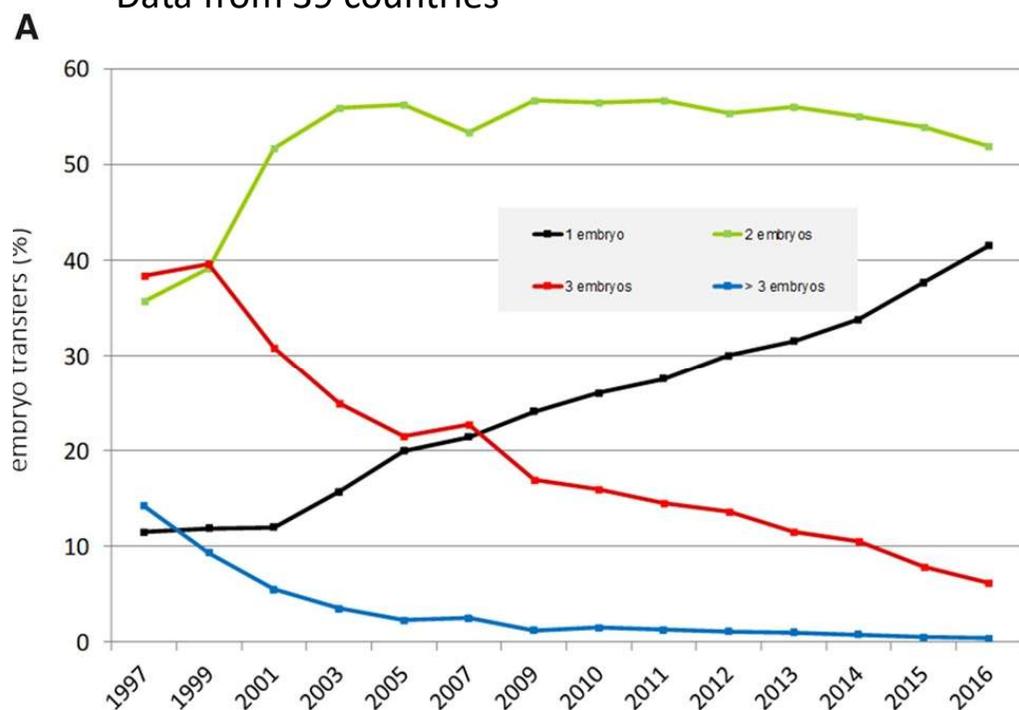


Incidence without ART: 13,4‰



Reimplantation and multiples

The European IVF-Monitoring Consortium (EIM)
for the European Society of Human Reproduction and Embryology (ESHRE):
Data from 39 countries



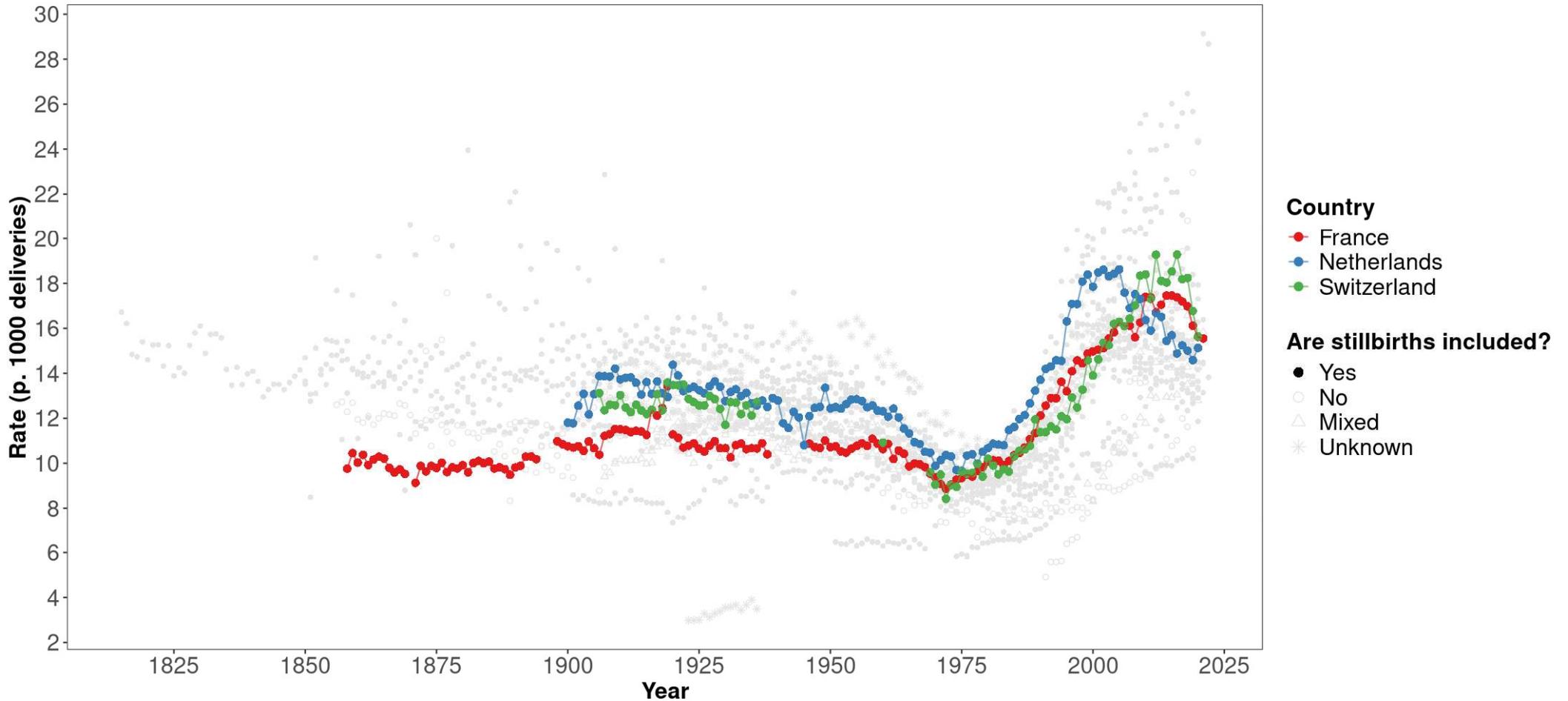
- 1 embryo
- 2 embryos
- 3 embryos
- >3 embryos

- Twins
- Triplets



Twin peaks ?

Twinning rate



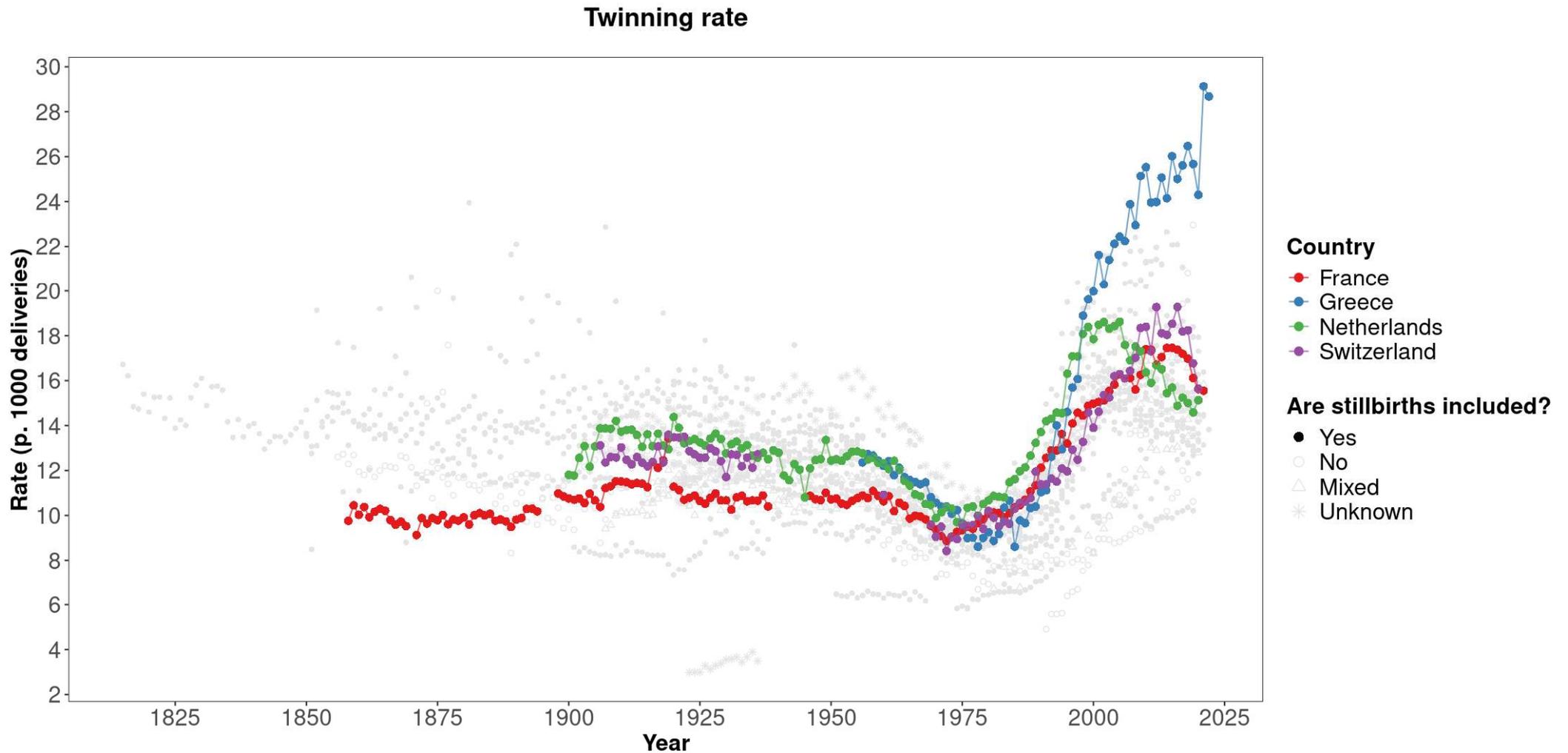
Source: Human Multiple Births Database (2024). French Institute for Demographic Studies - INED (distributor).

Notes: The grey dots illustrate all the values of the selected variable available in the HMBD (i.e., for all countries included in the database).

The different dot shapes indicate whether the stillbirths are included in the data for a given country.

Details on the treatment of stillbirths in the statistics are available in the country-specific metadata files (see link above).

Twin peaks ?



Source: Human Multiple Births Database (2024). French Institute for Demographic Studies - INED (distributor).

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Foetal growth

Twins

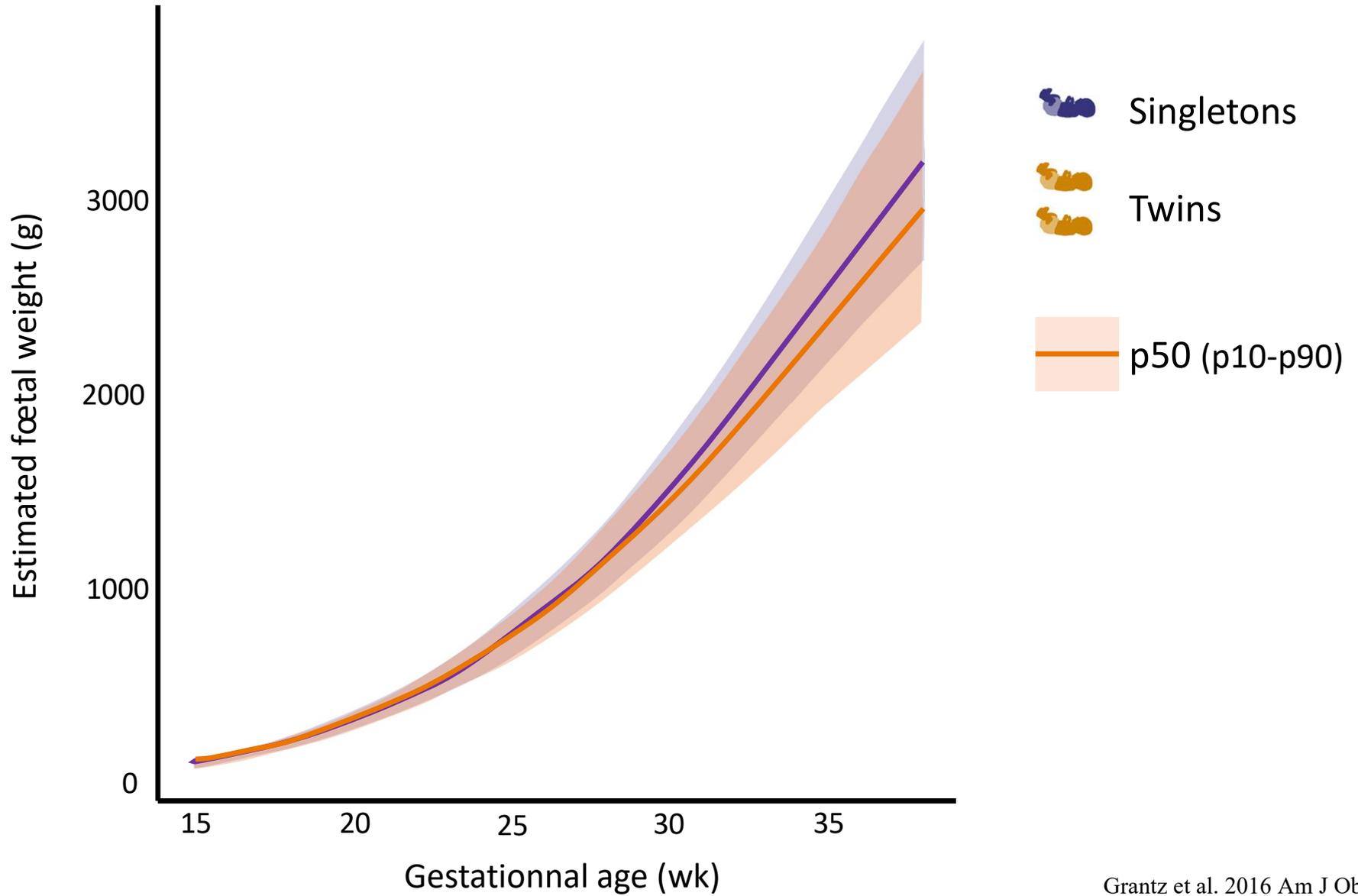
The Grady twins



1970's
Colorado



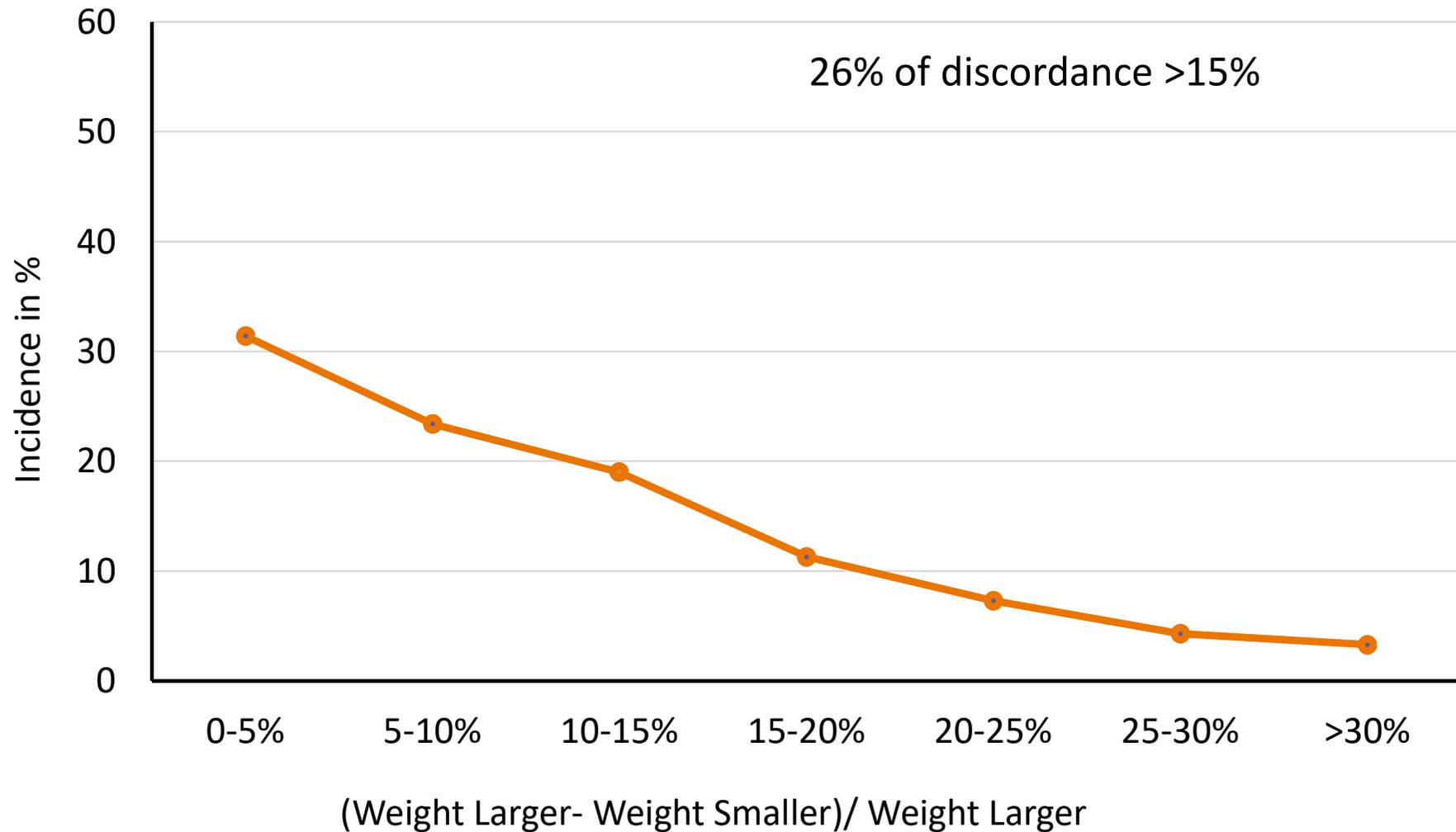
Foetal growth





Discordant growth

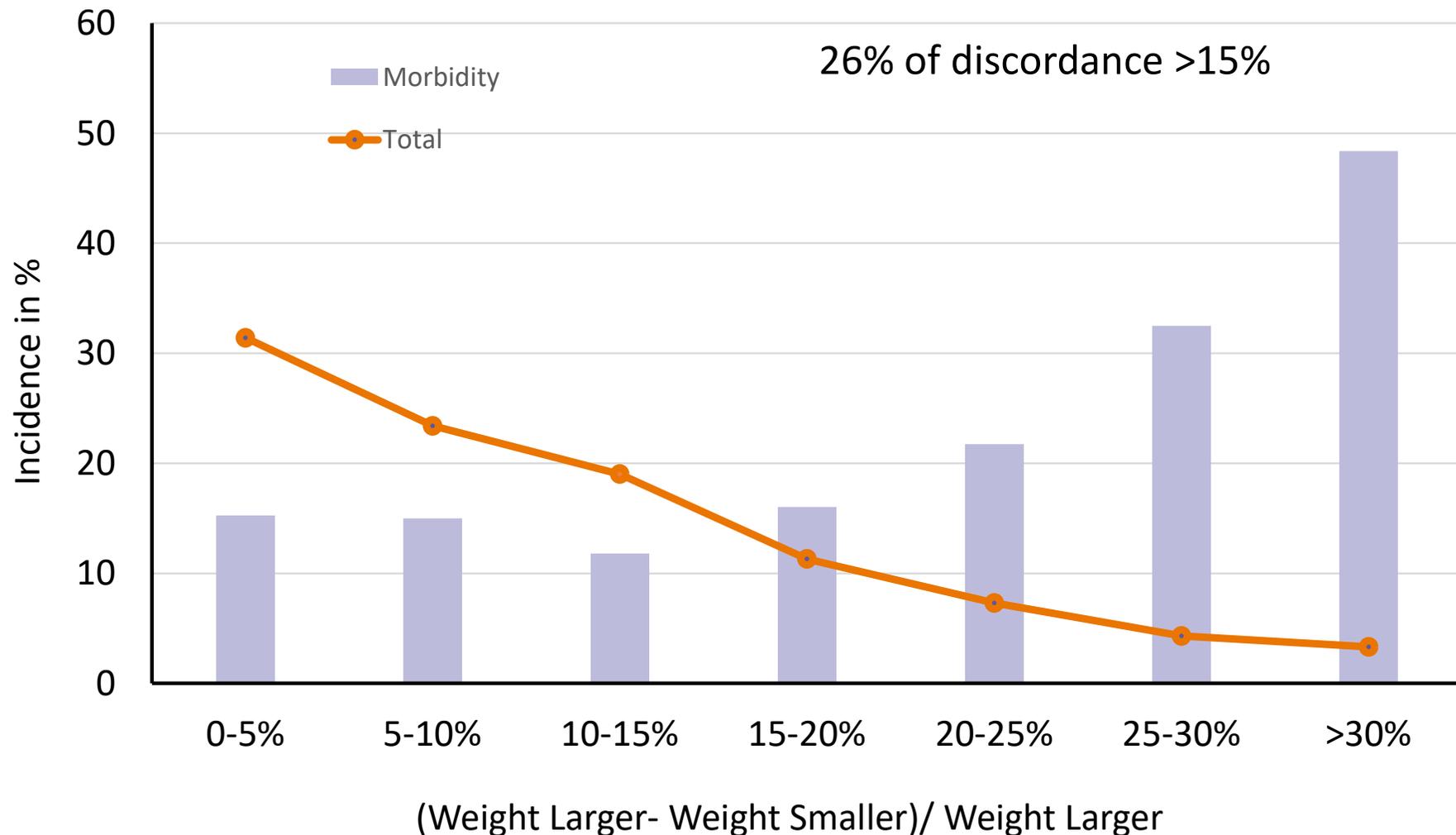
939 twin pairs >34 wk
« uncomplicated pregnancies »



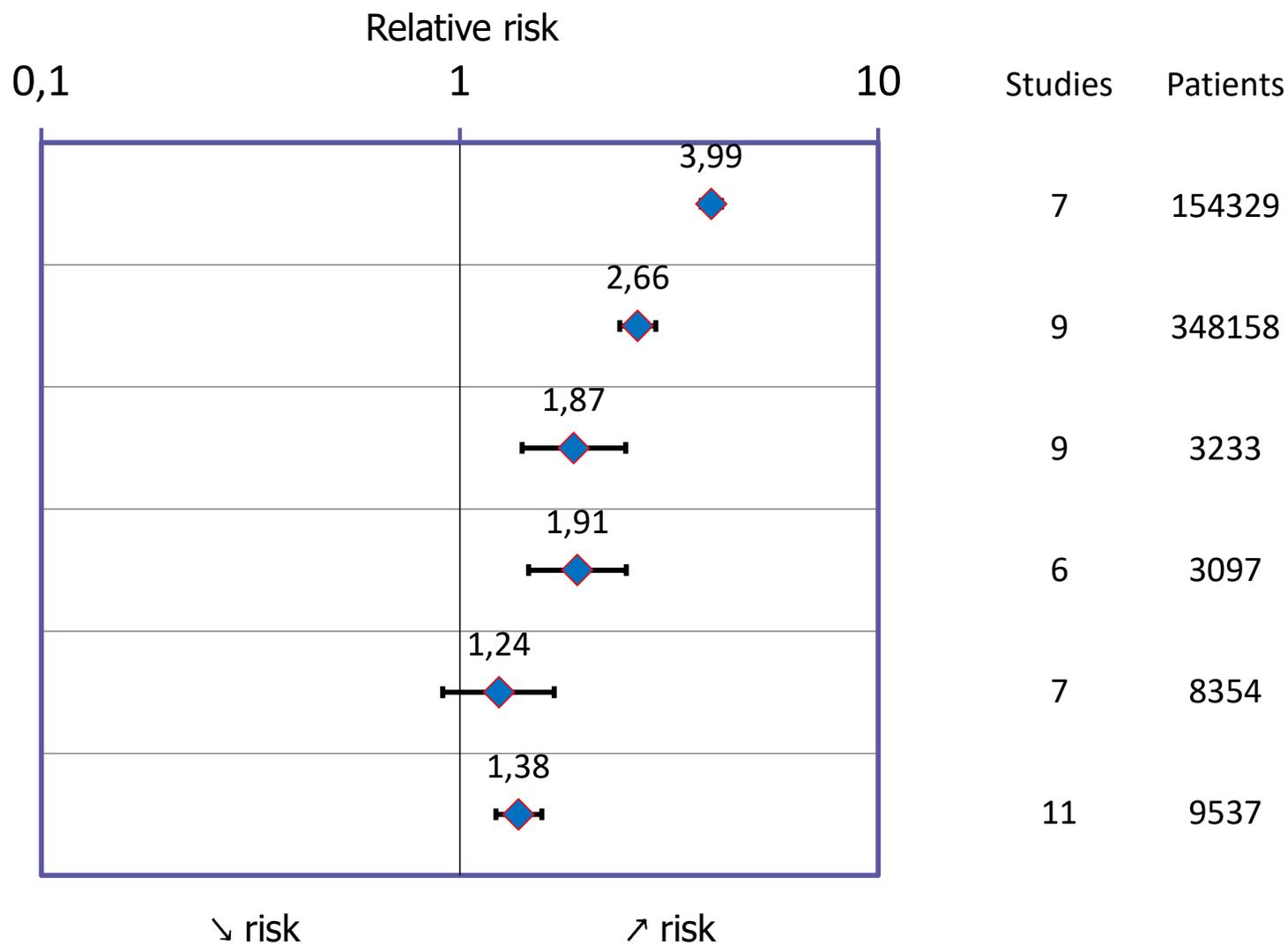


Discordant growth and morbidity

939 twin pairs >34 wk
« uncomplicated pregnancies »



Discordant growth : prognosis



Cut off mostly 20% (range 10-30%)

Preterm birth

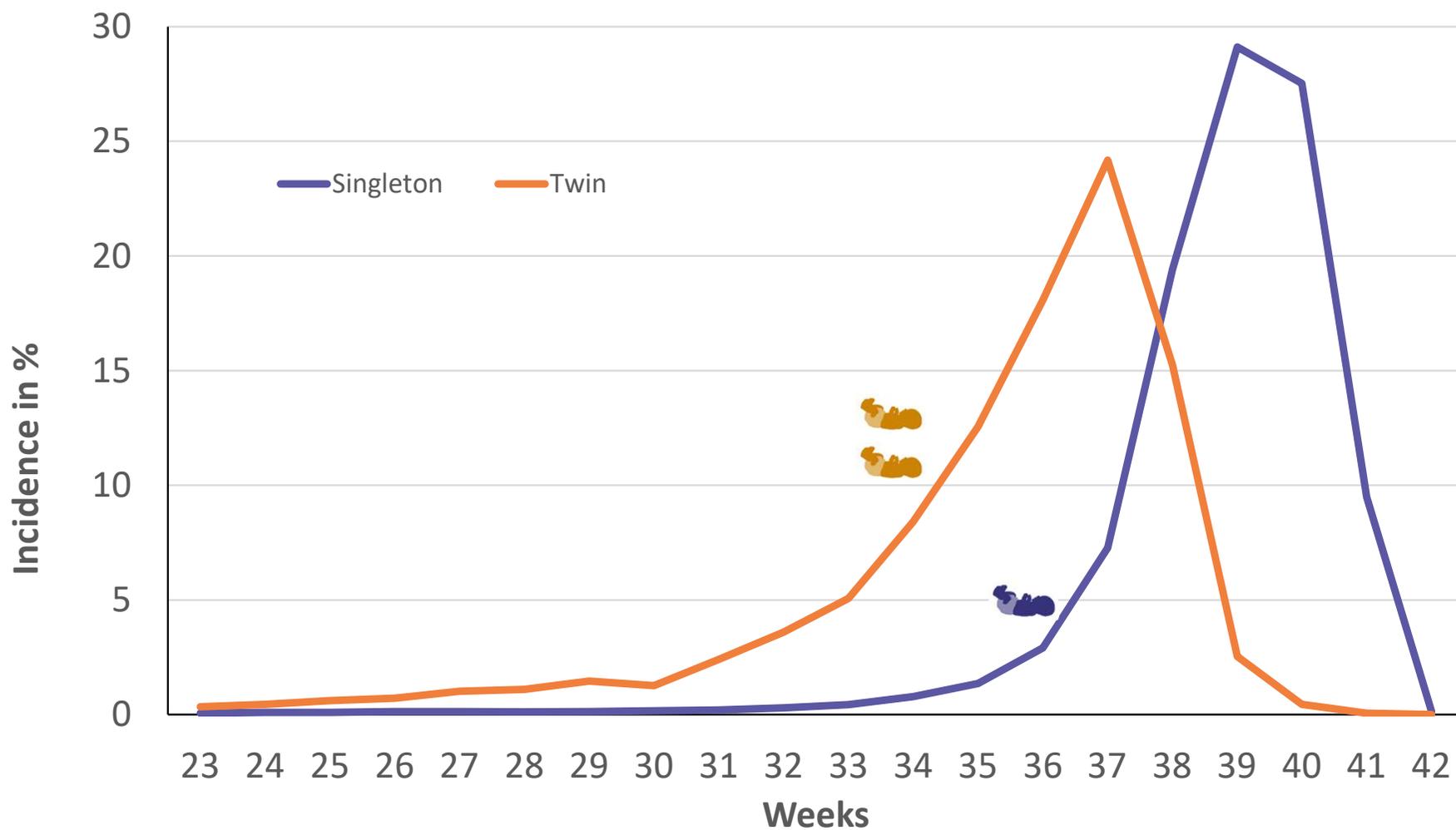
Twins

Romulus
and Remus

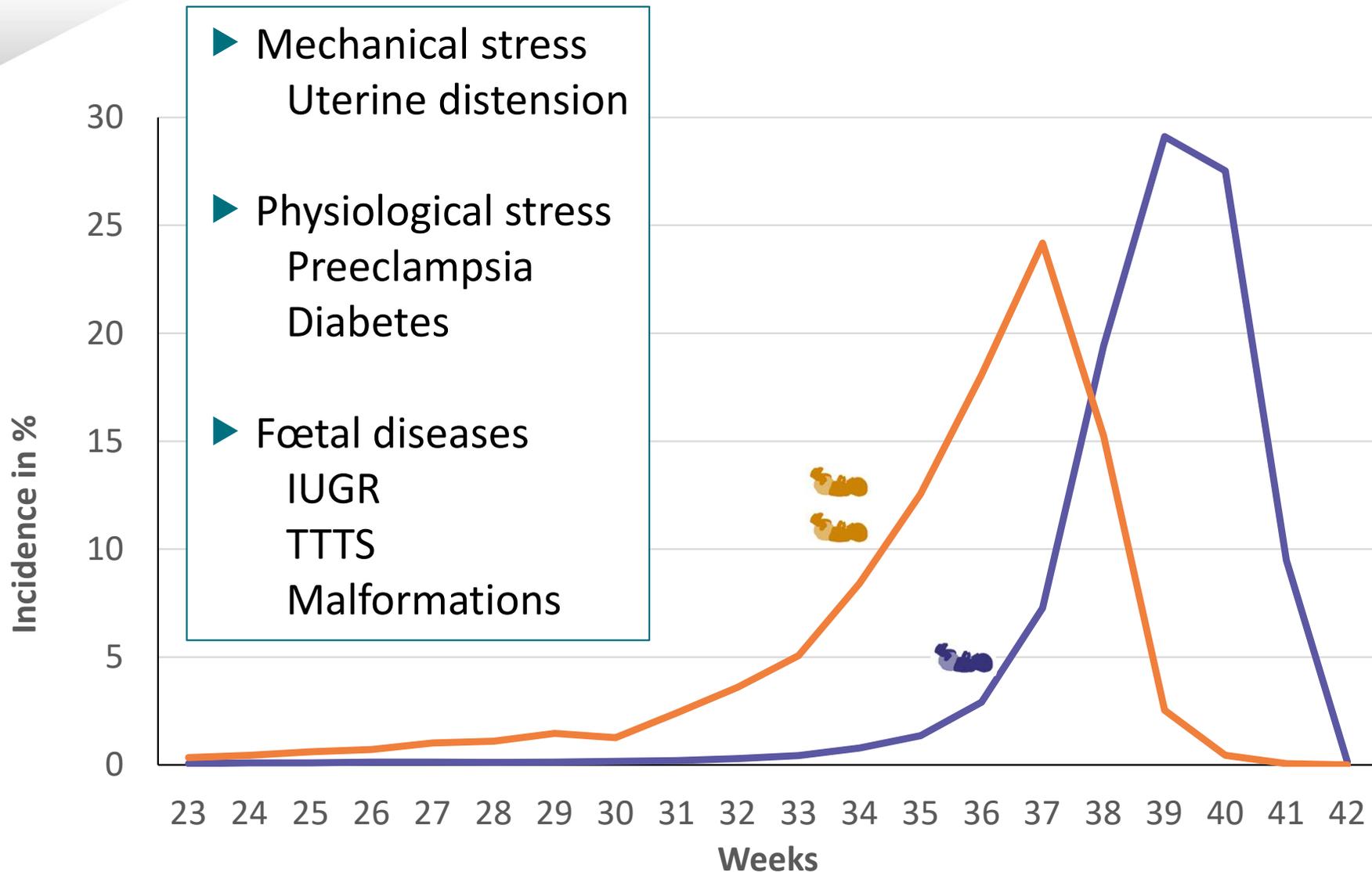


753 AD
Rome

Gestational age at delivery

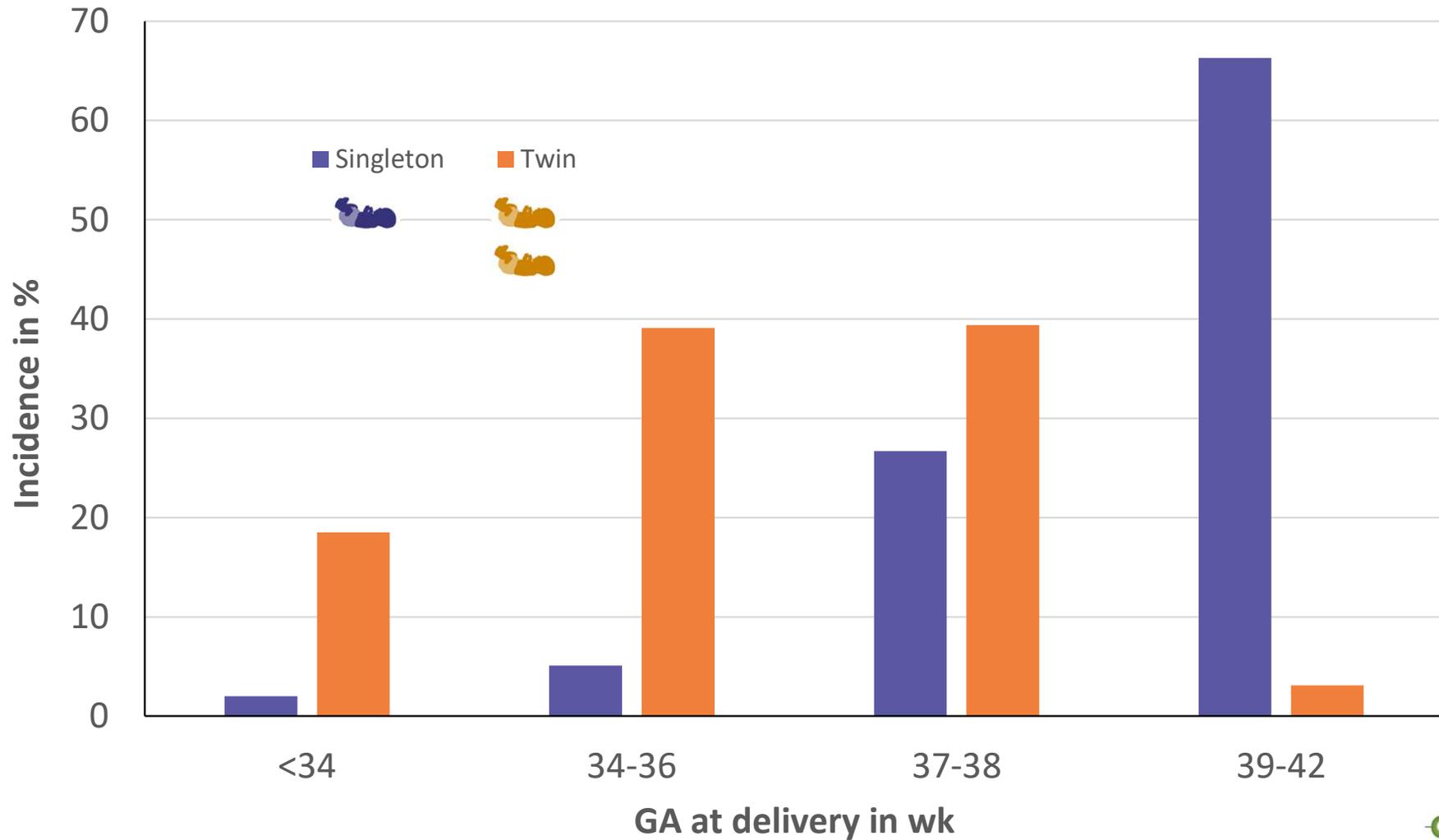


Gestational age at delivery

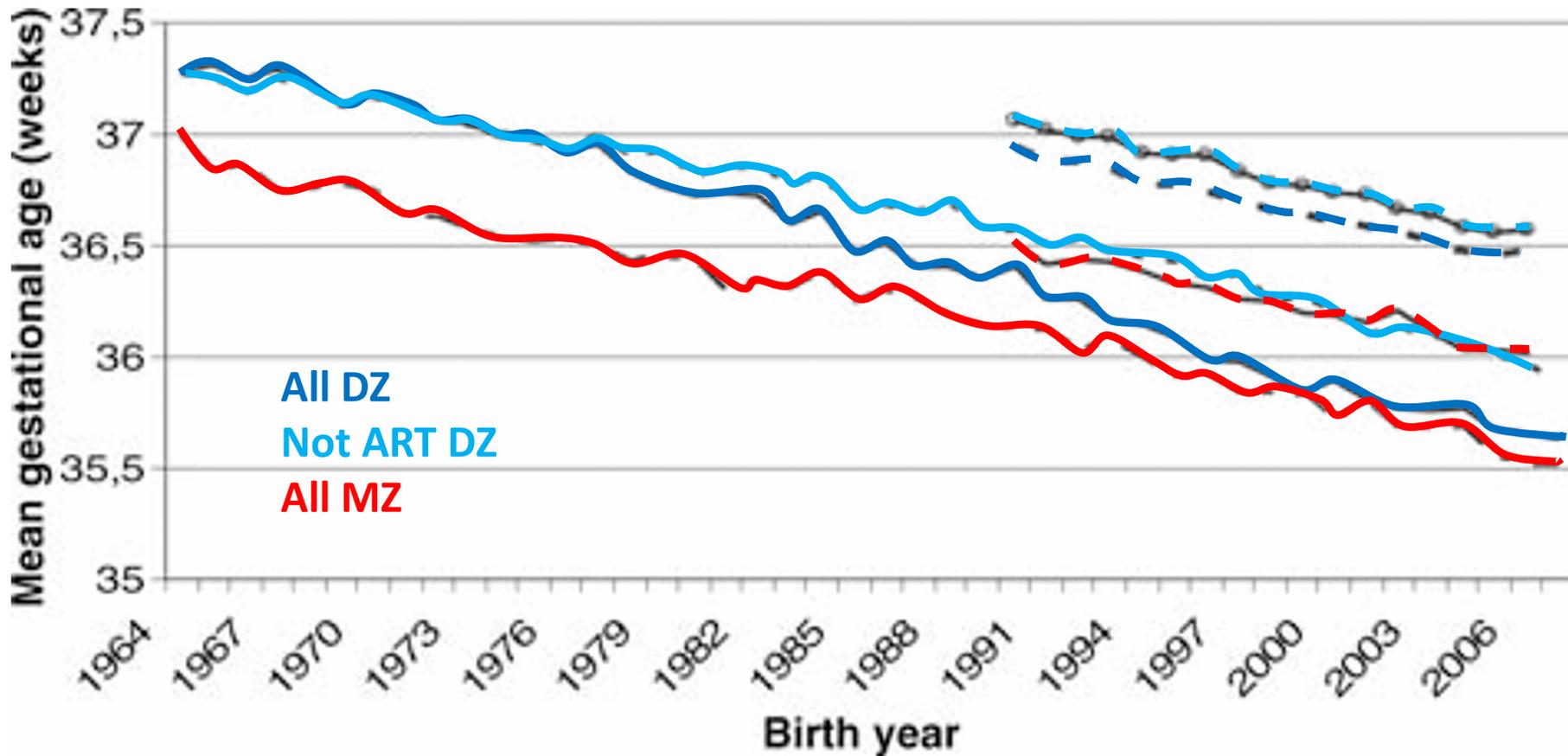




Gestational age at delivery



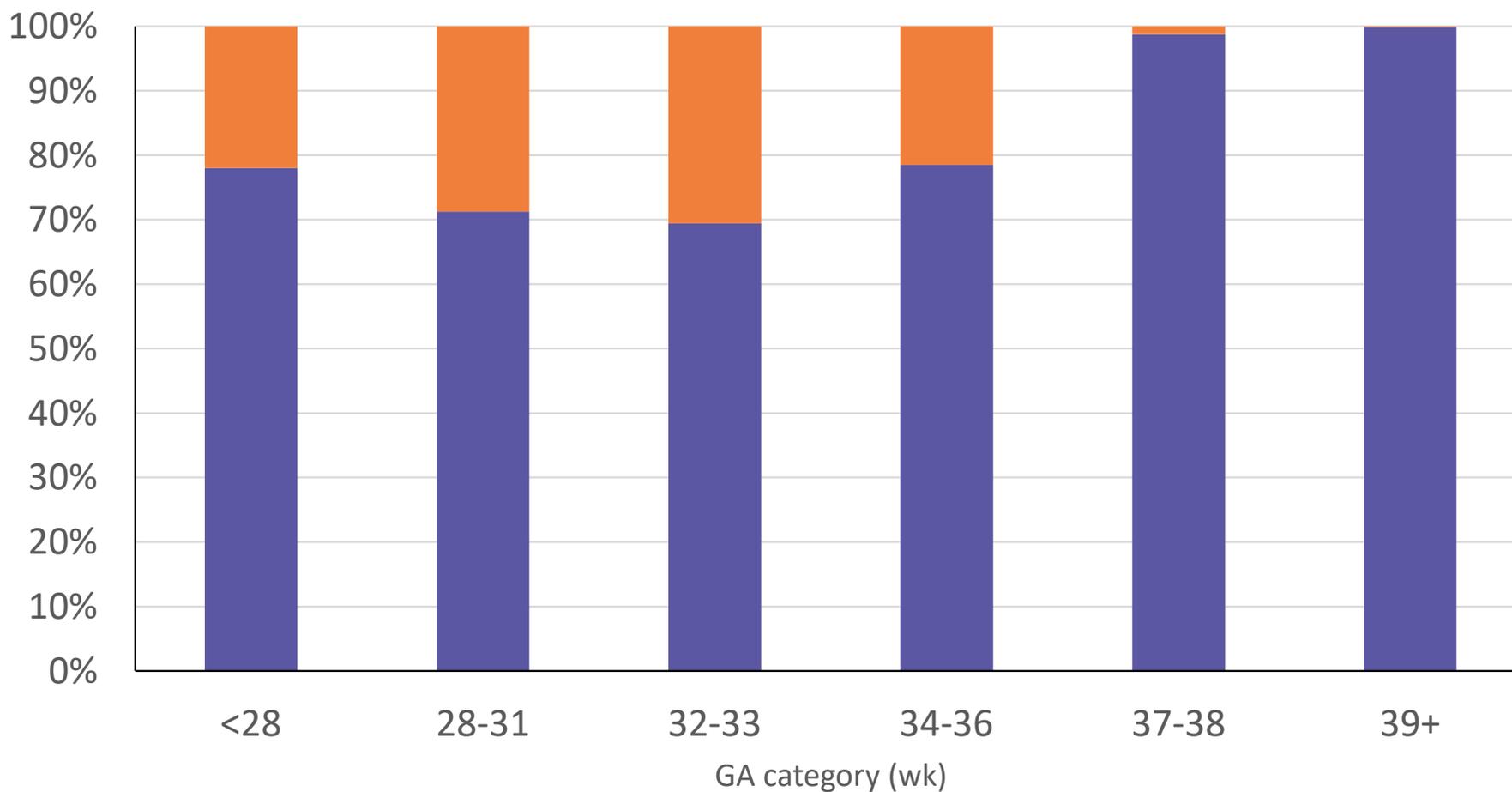
GA at birth: evolution



Nederlands Tweelingen Register
Oost-Vlaams Meerlingenregister

“Infertility treatment, C/S, primiparity and advanced maternal age \nearrow over the years, but none of these factors influenced the secular trends in gestational age and birthweight”.

Twins' proportions according to GA



Live births

Triplet and above not included

■ Singletons ■ Twins





Differed birth

↗ Survival ?

↘ morbidities

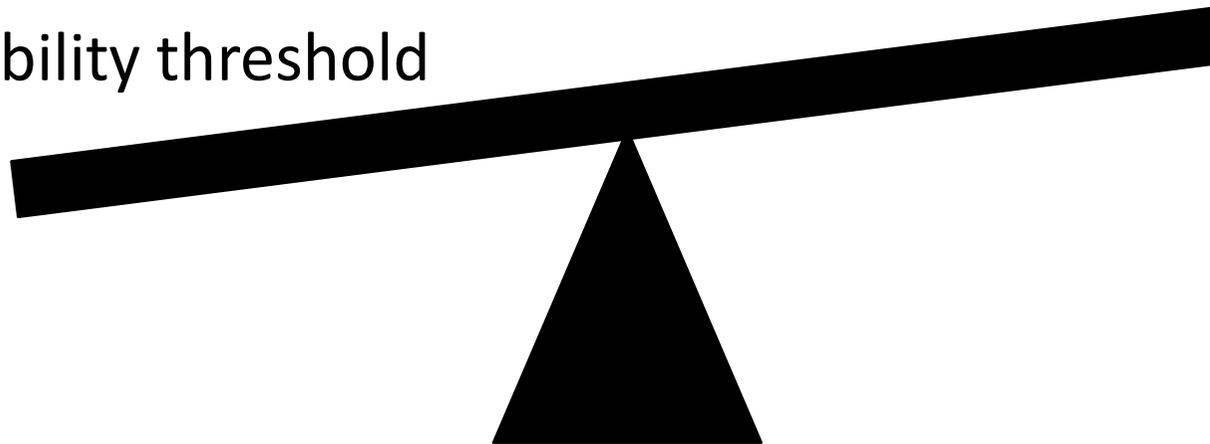
Steroids

Pass viability threshold

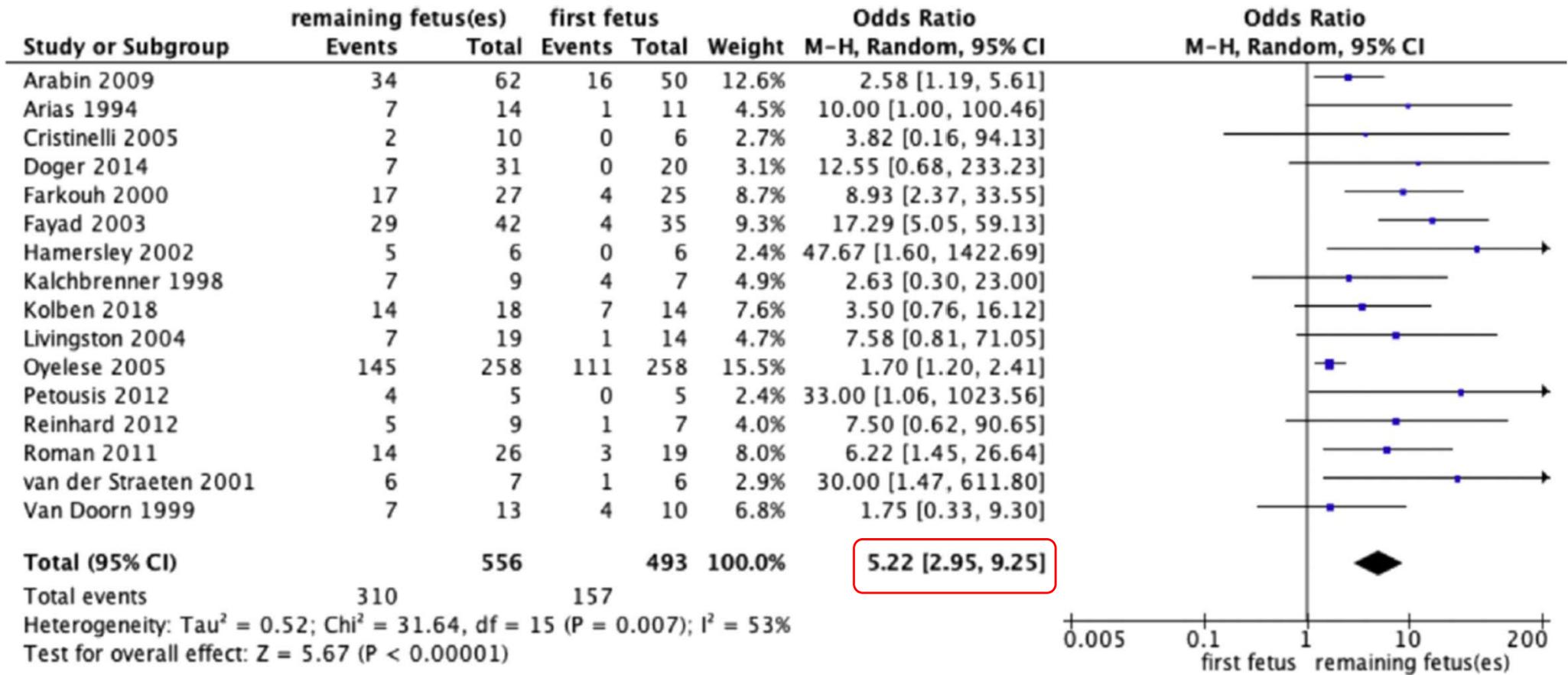
Maternal risk

Extreme preterm birth risk

Sepsis risk



Differed birth: Second twin survival



NNT: 4,2

Adaptation at birth

Twins

Thing 1 and Thing 2

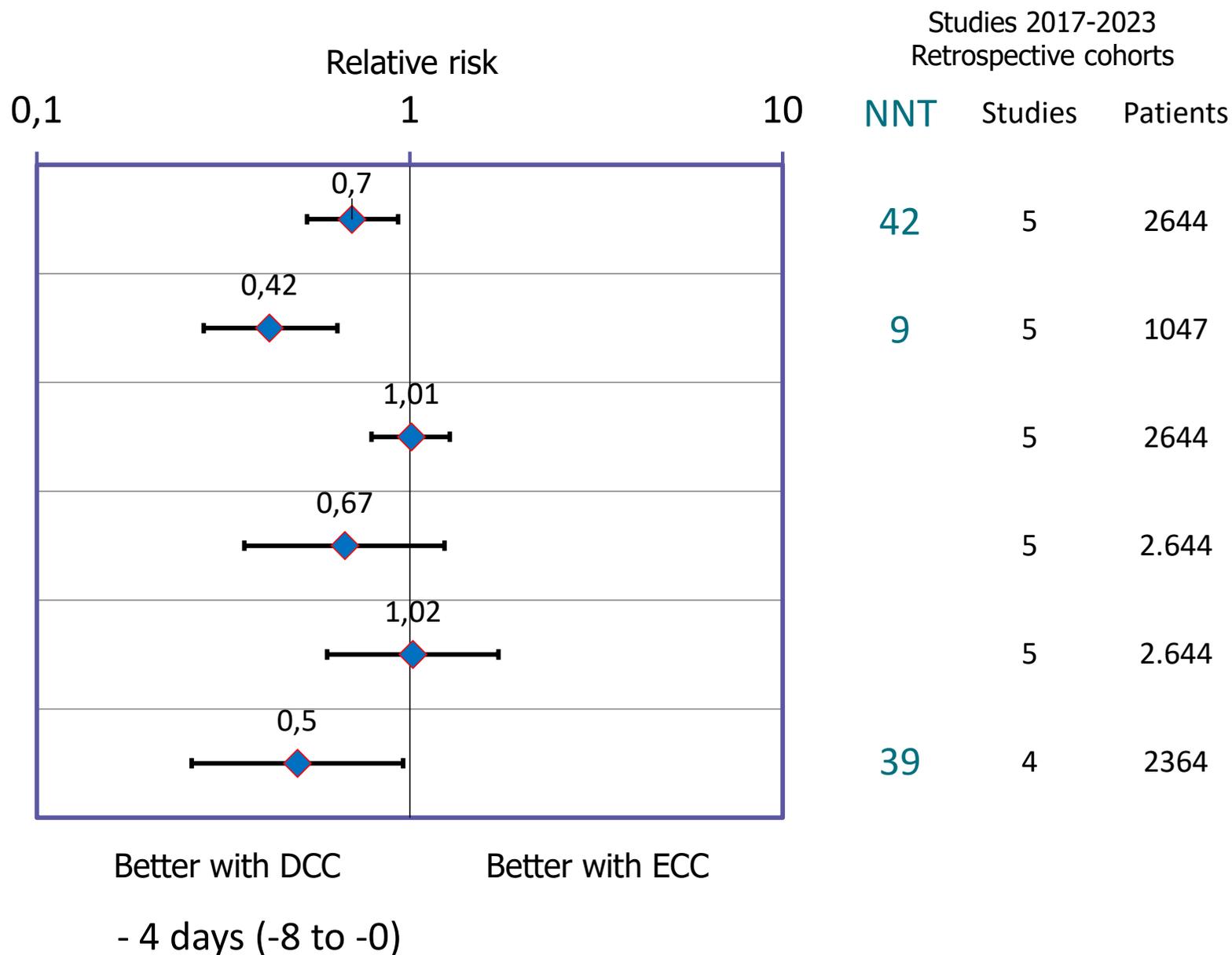


1957

Sally and her brother's house



Delayed cord clamping in preterm twins

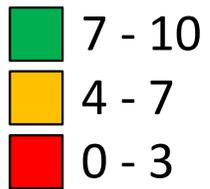
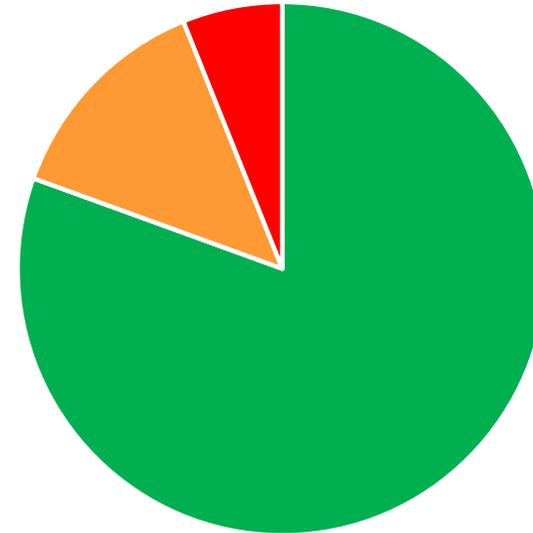
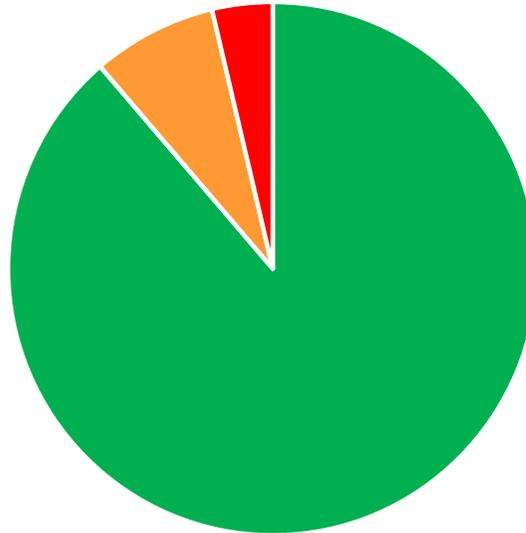


Apgar's scores

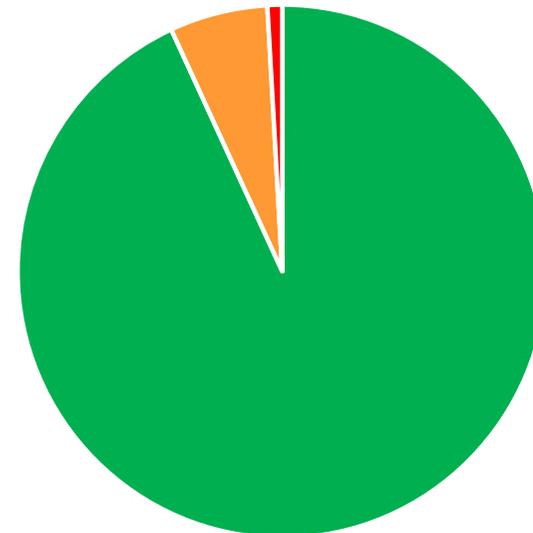
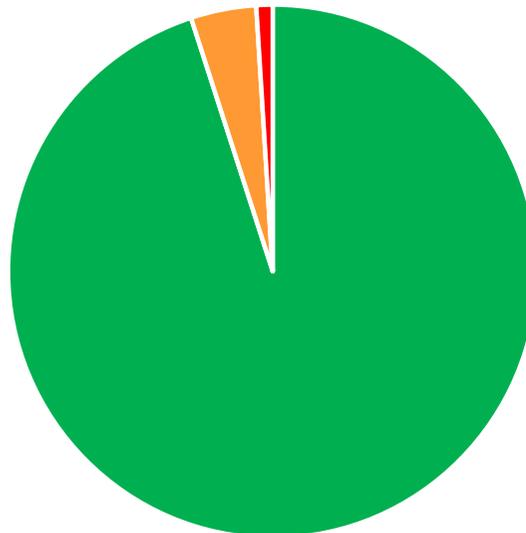
Twin 1

Twin 2

At one minute

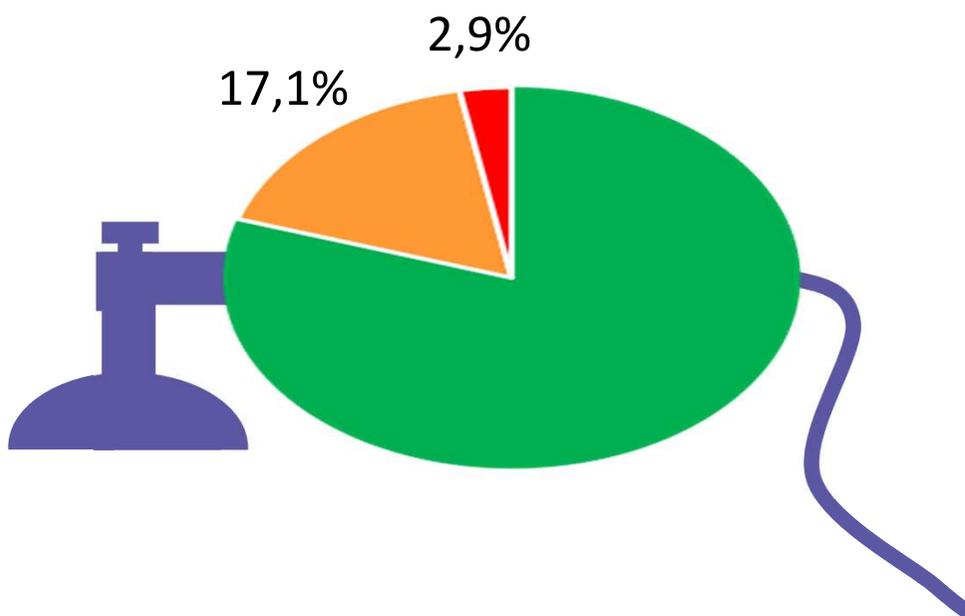


At 5 minutes

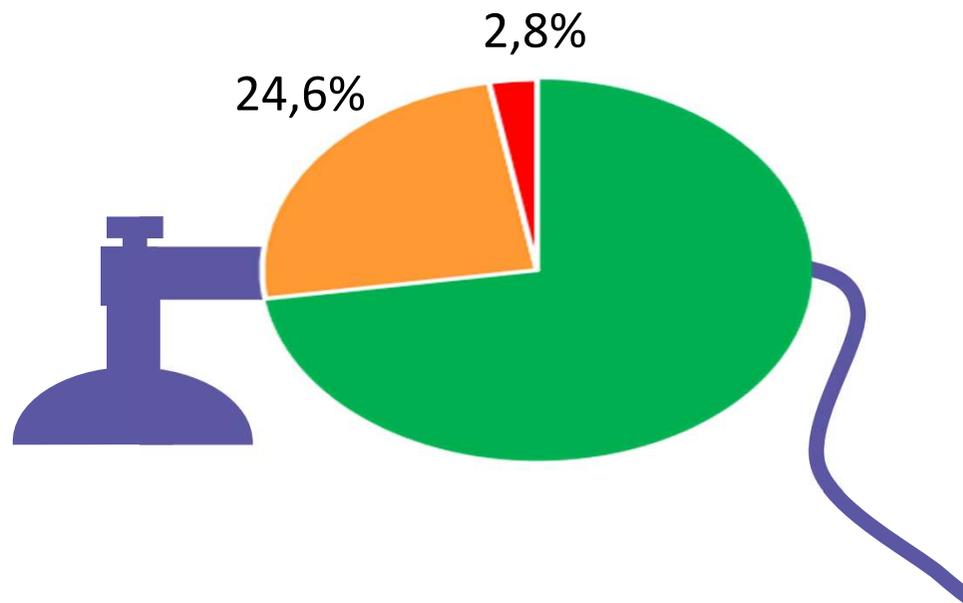


Ventilation at birth

Twin 1



Twin 2

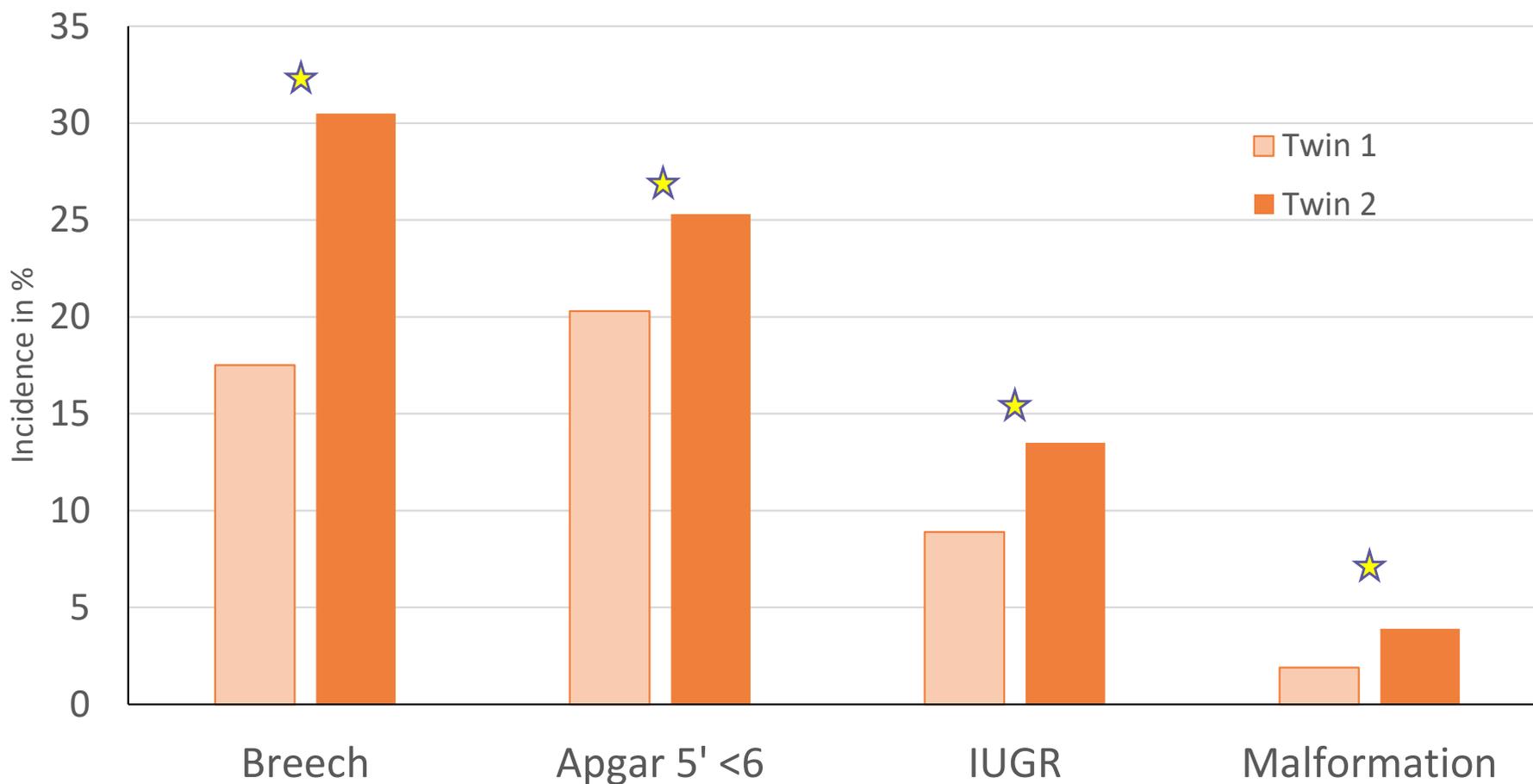


- No
- Mask
- Intubation



The second twin

1062 dichorionic pregnancies (Île de la Réunion-sud)



Mortality

Twins

Xololt and
Tlahuizcalpantecuhtli

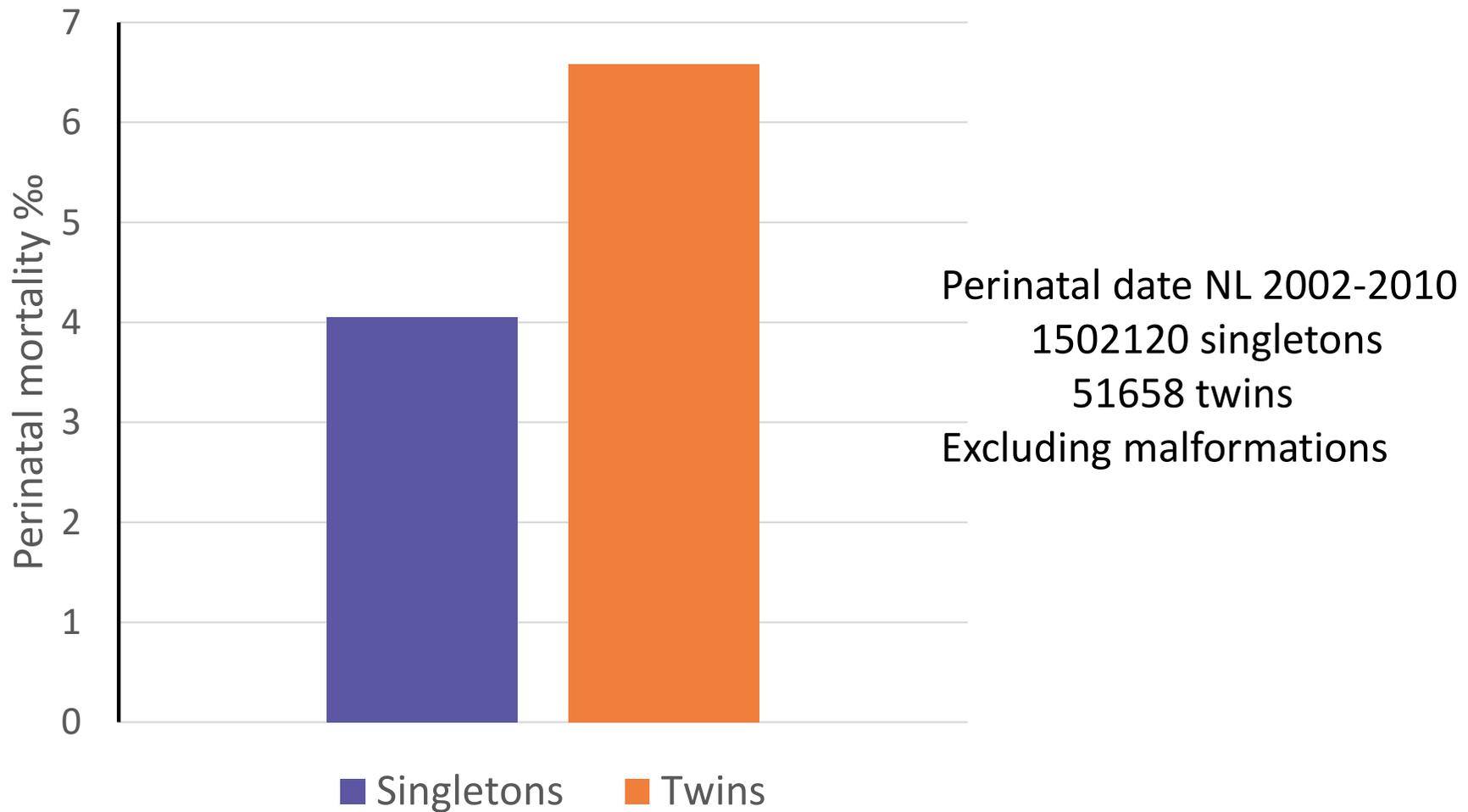


1200-1521

Aztec
Empire

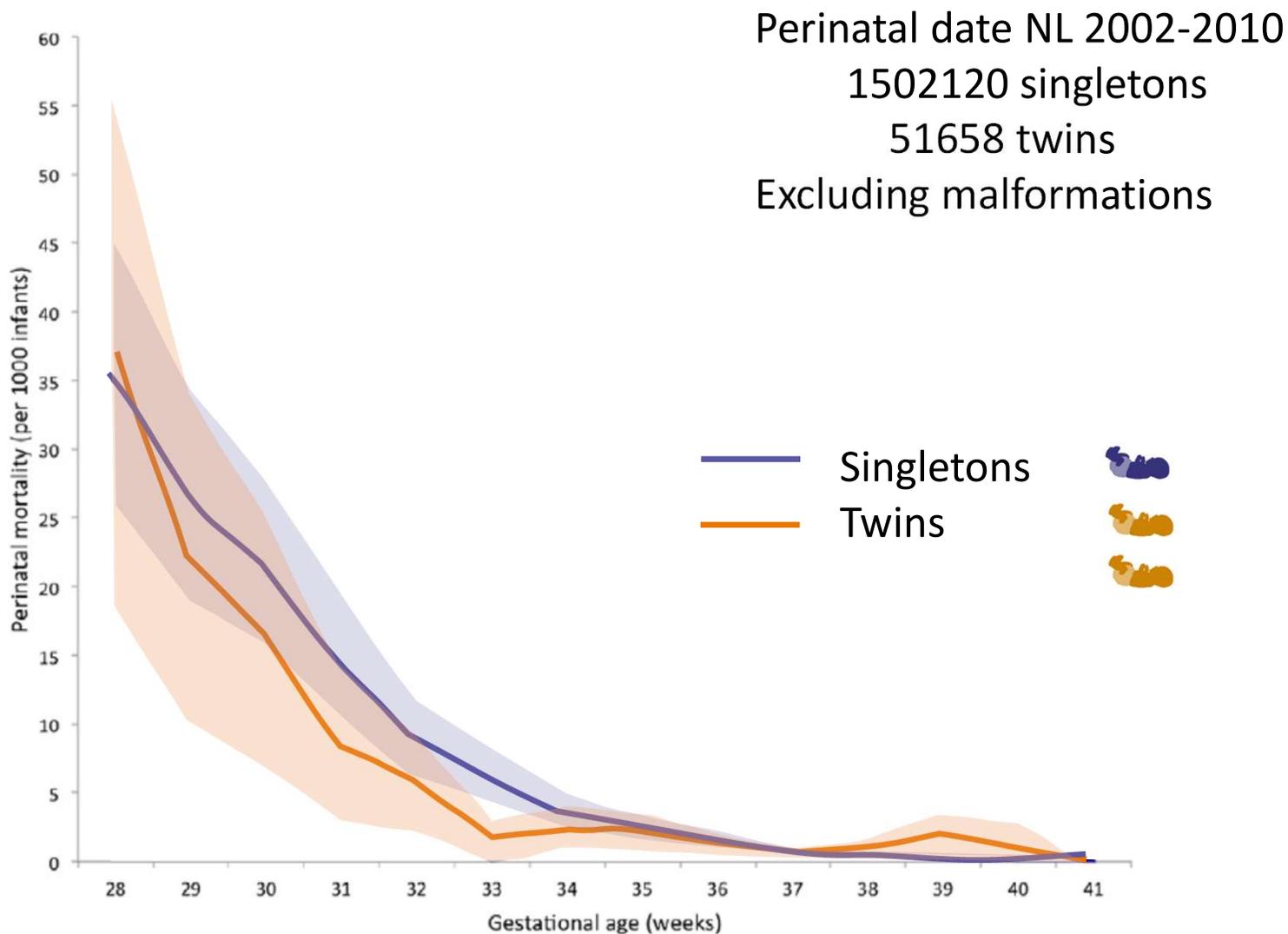


Prognosis: perinatal mortality



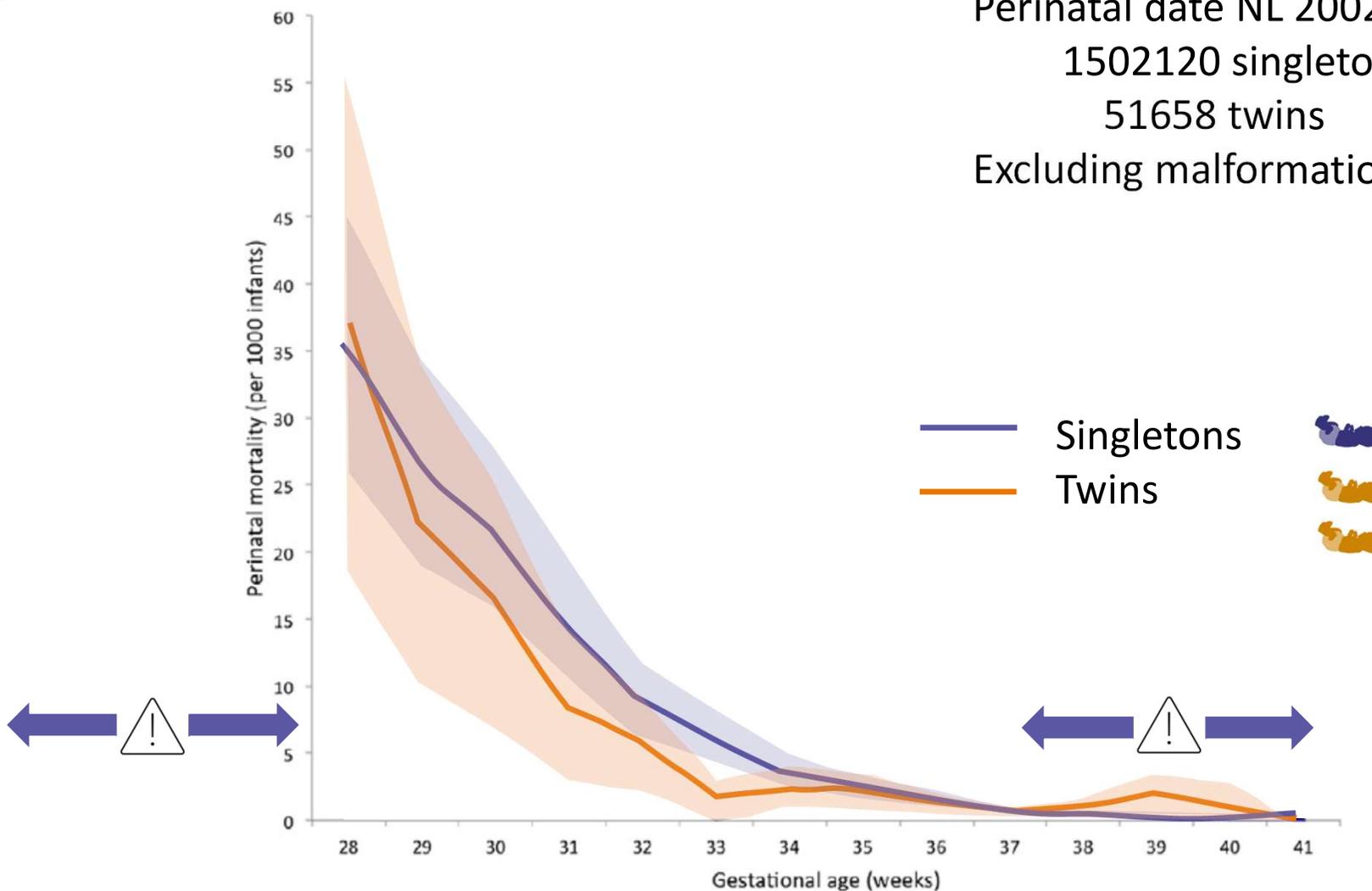


Early neonatal mortality



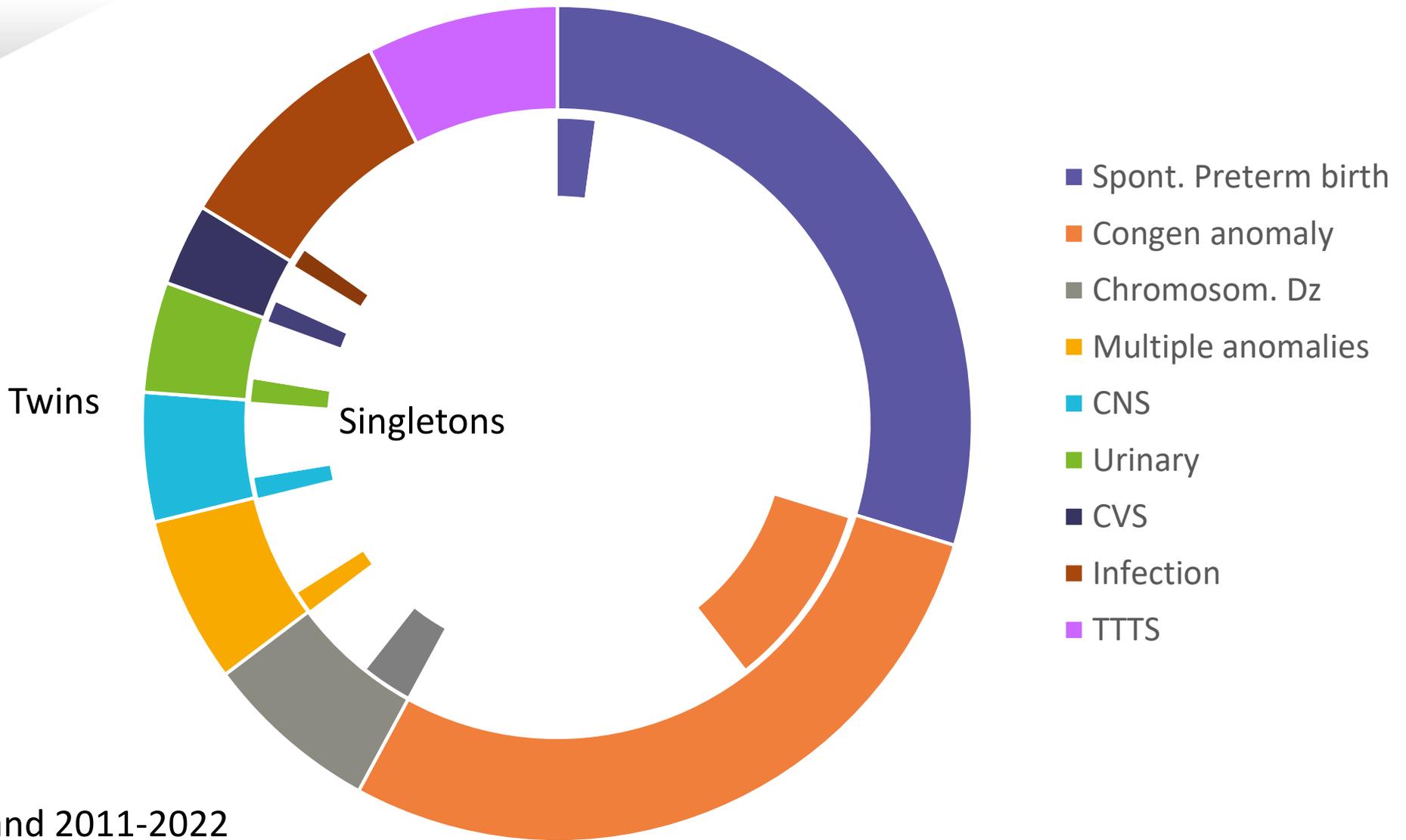
Early neonatal mortality

Perinatal date NL 2002-2010
 1502120 singletons
 51658 twins
 Excluding malformations





Early neonatal death causes



Ireland 2011-2022

1127 singletons deaths (1.7 ‰)

226 twins deaths (9.2 ‰)

Morbidity

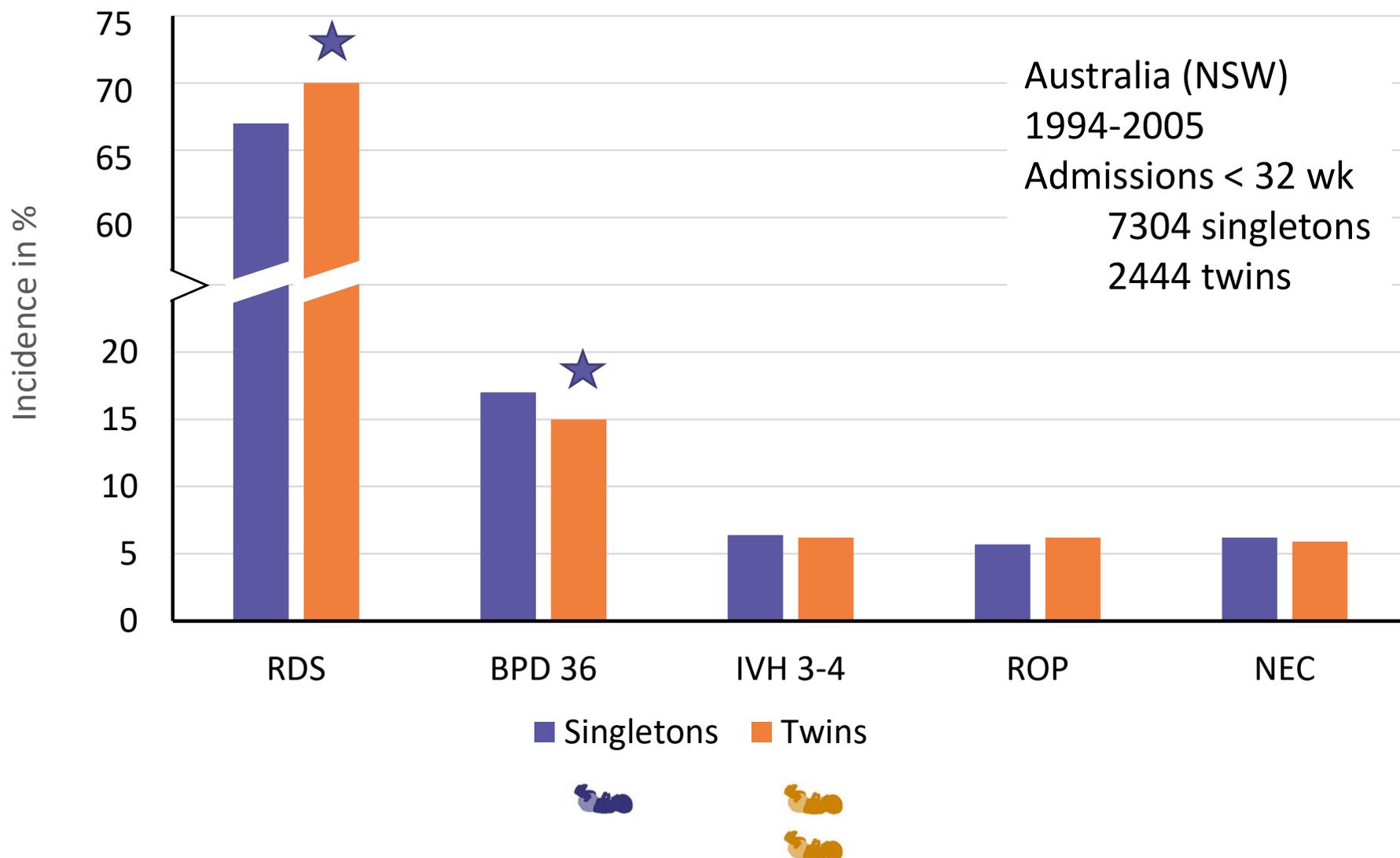
Twins

Fred and
George



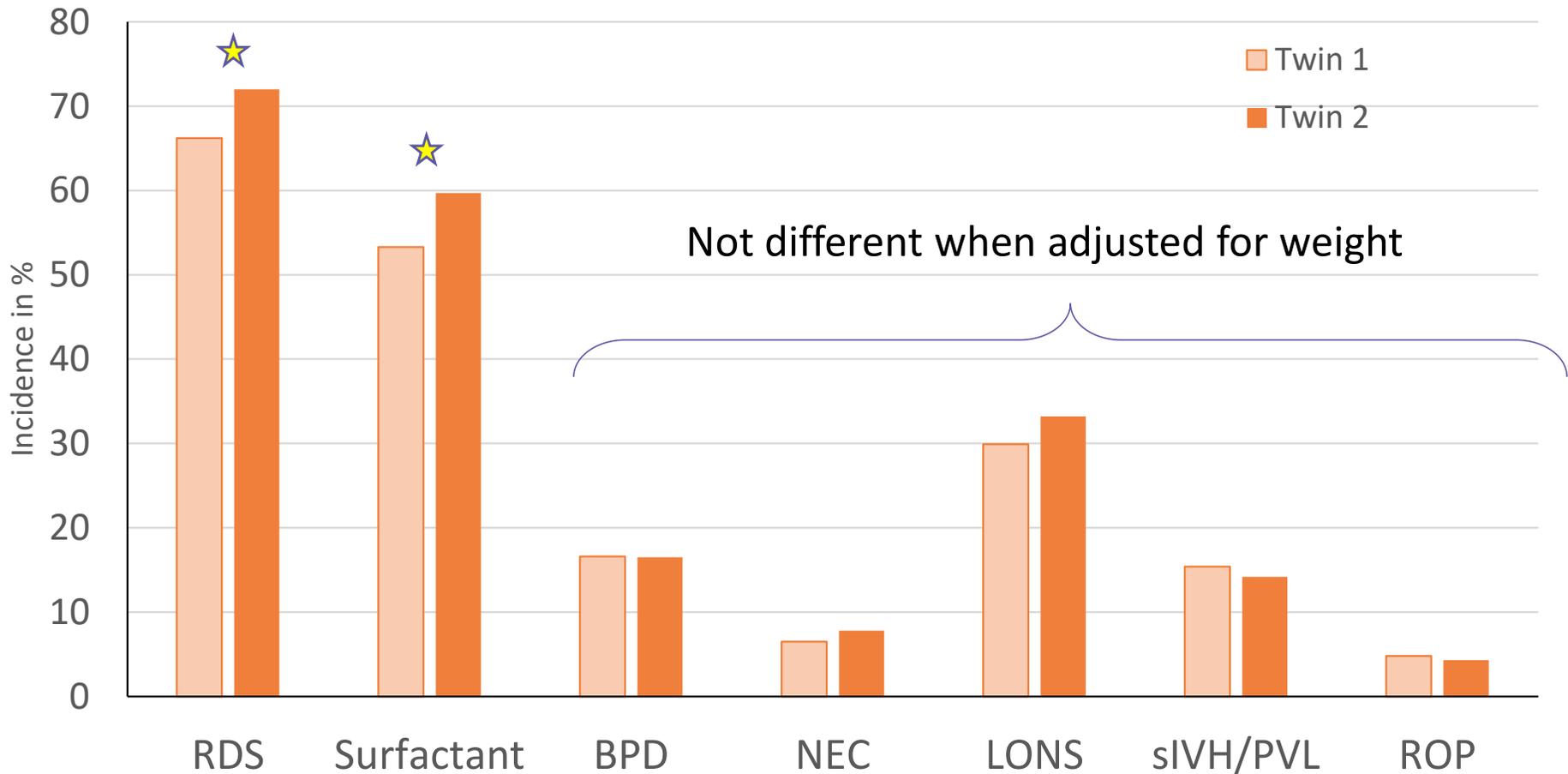
1994
London

VPTi morbidity



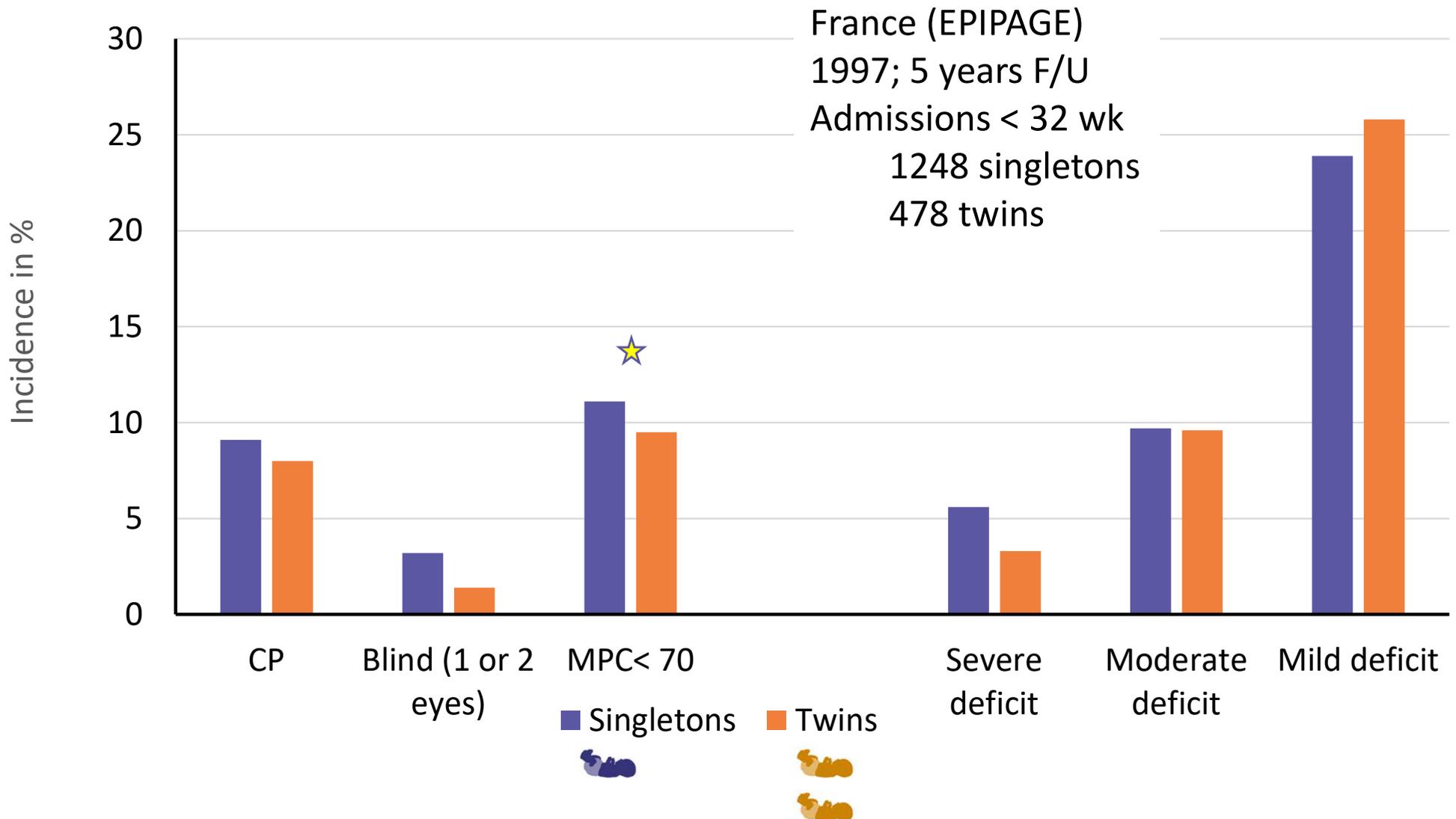
The second VPT/VLBW twin

Spanish SEN1500 neonatal network, 2011-2020



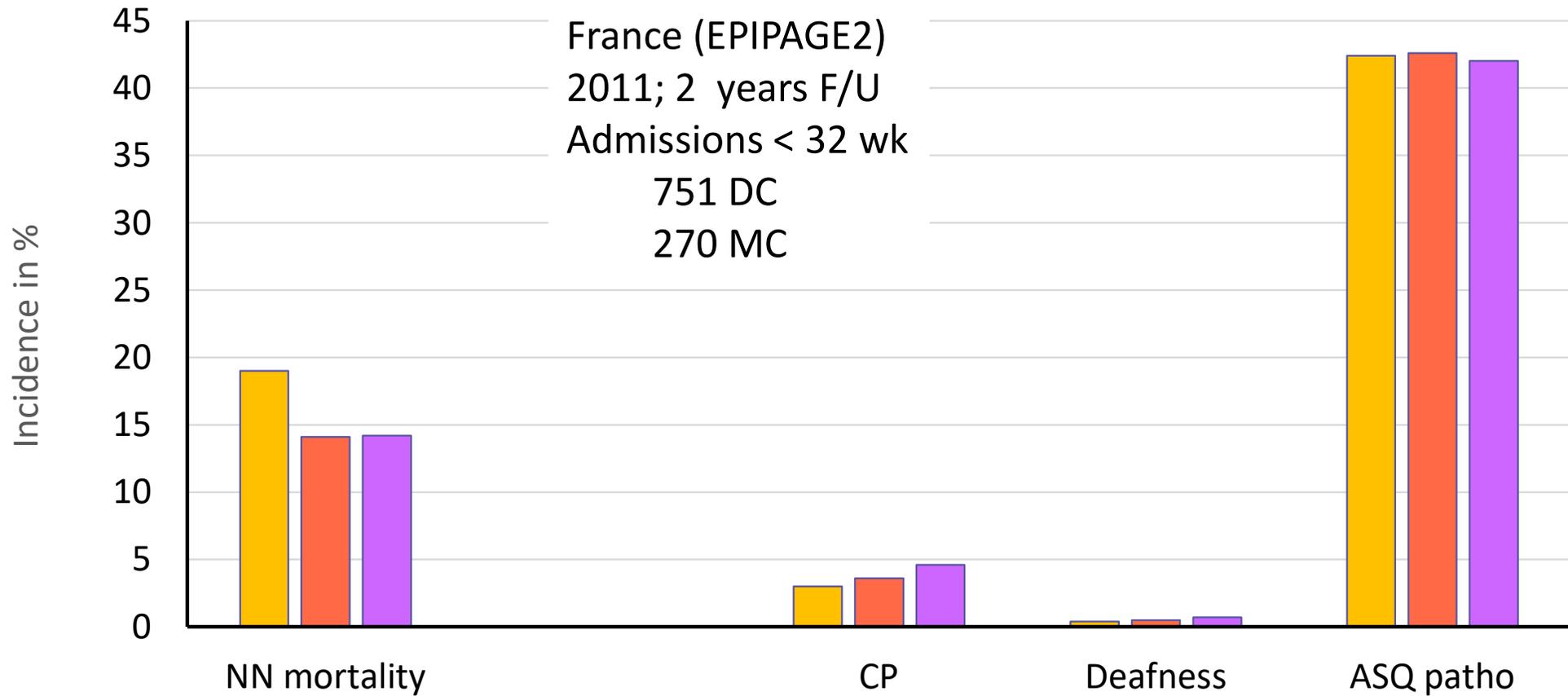


VPTi: 5 years follow-up





VPTi: chorionicity impact



* Outside delivery room

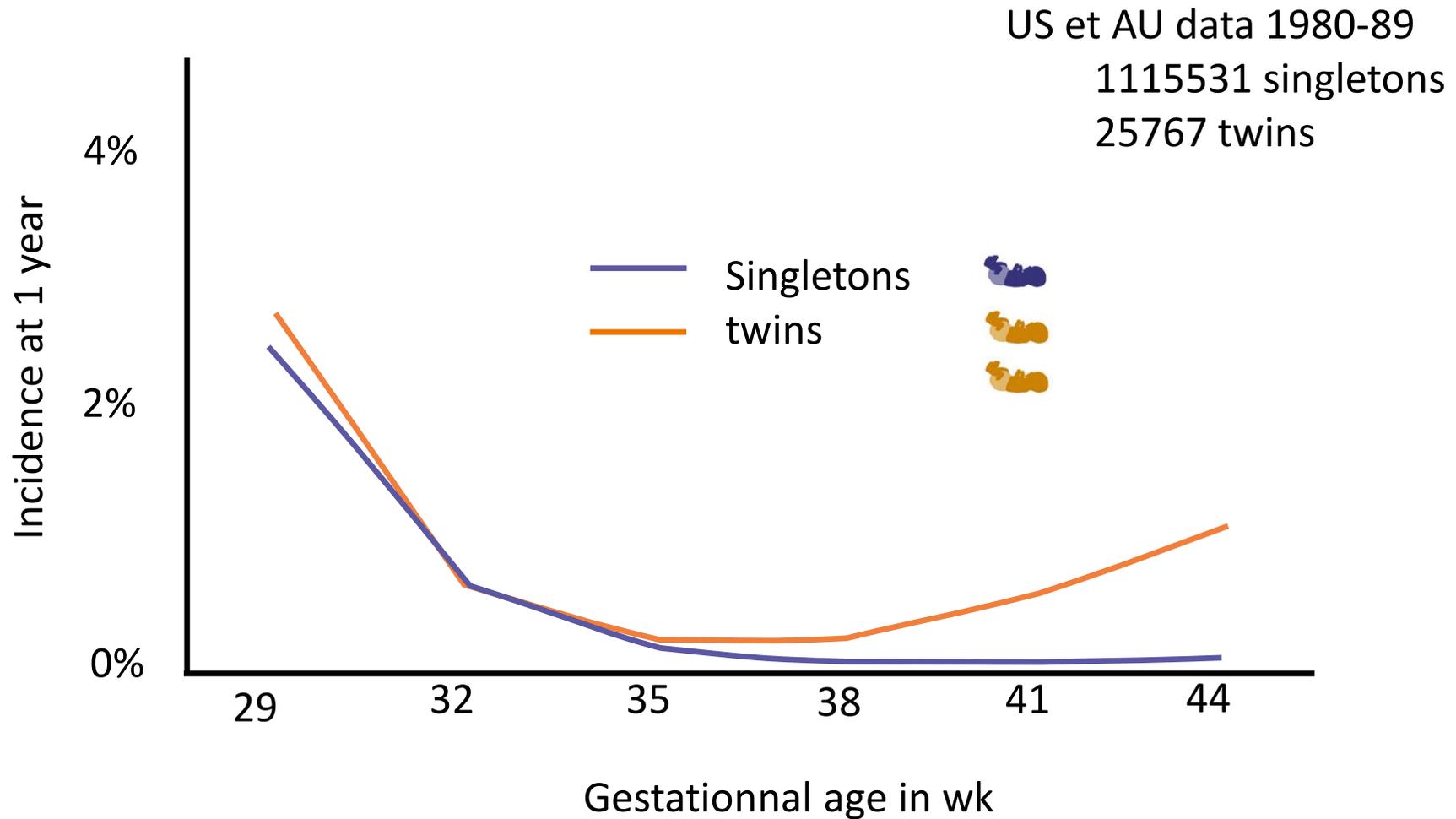
≥1 domain/ 5

■ DC ■ MC ■ Epipage 2

Tosello et al 2021 BJOG 128(2):281–91
 Ancel et al. 2015 JAMA Pediatr. 169(3):230-238
 Pierrat 2017 BMJ 358:j3448

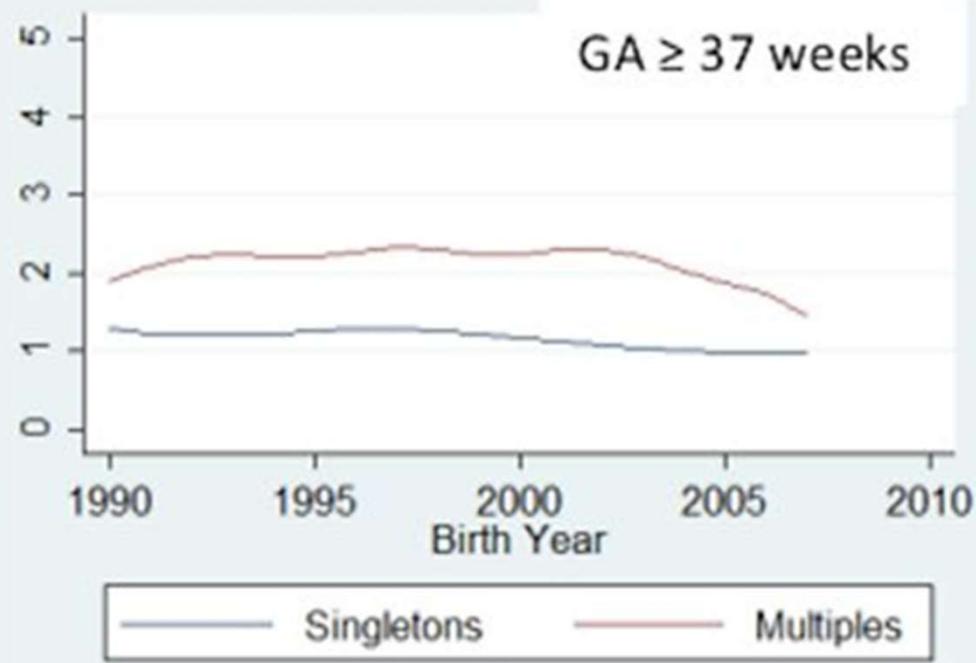
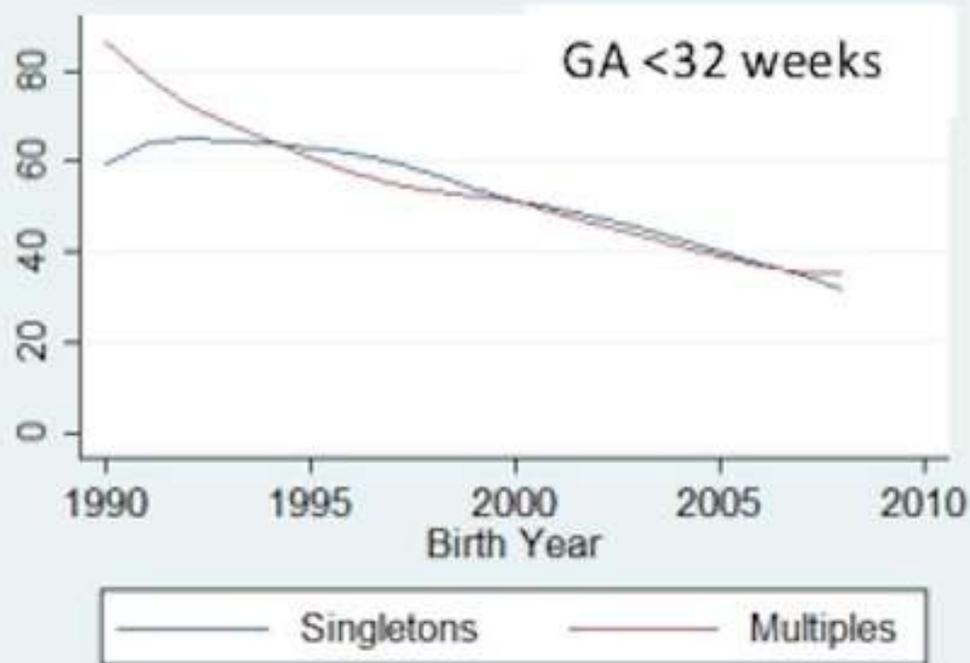


Cerebral palsy risk



Cerebral palsy risk

! Different scales



12 European CP registries

4 446 125 childs, 8416 (0.19%) with pre- or perinatal CP

Isolette sharing?

- ▶ Limited data: small samples
- ▶ Unconfirmed theoretical risks
 - ▶ Thermoregulation
 - ▶ Infection
 - ▶ Identity vigilance
- ▶ Potentially
 - ▶ ↘ apnoea
 - ▶ ↘ length of stay

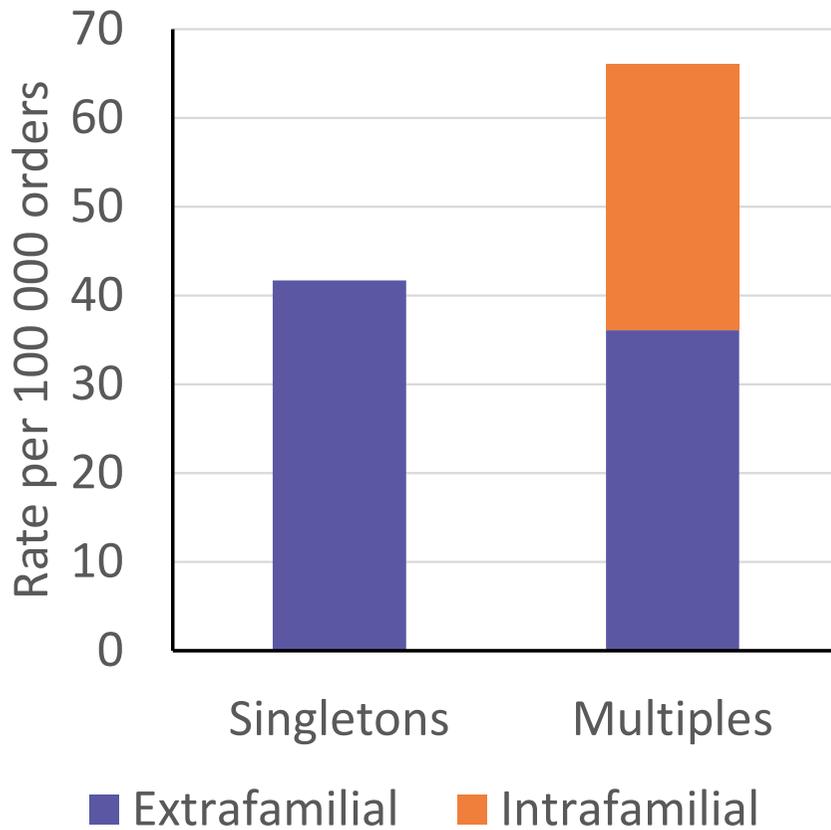


Photographe Red Méthot, Quebec



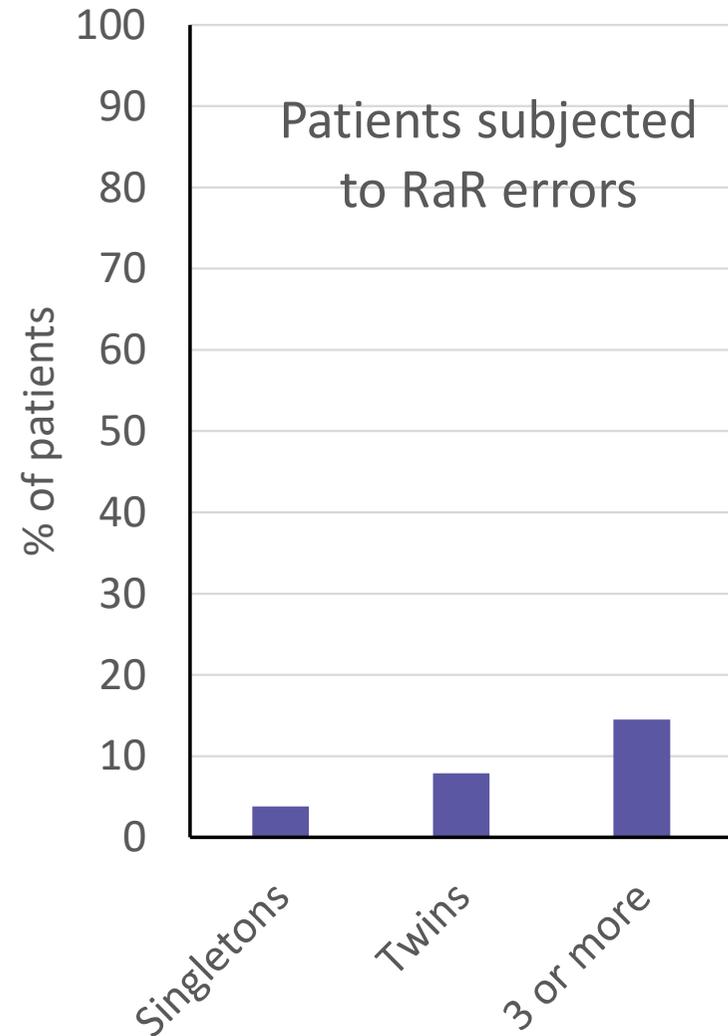
Risk of Wrong-Patient Orders

Retract and Reorder errors



Does not include:

- Missed errors
- Wrong patient administration errors





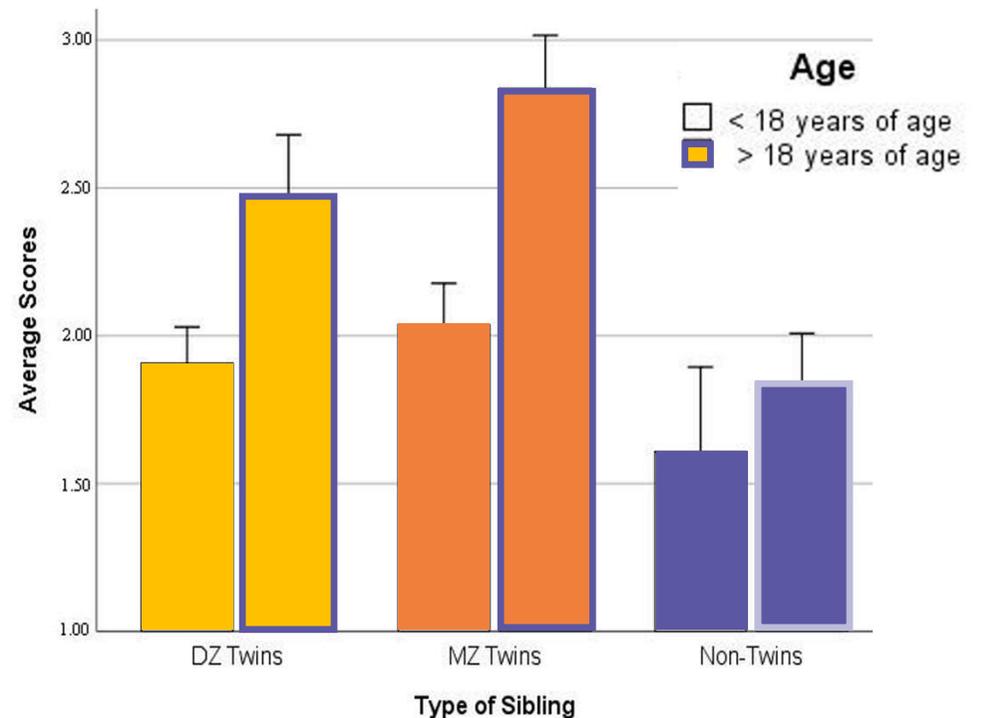
Twins' first names do sound alike



Similarity score based on:

- ▶ Begin with same letter/sound/syllab
- ▶ Ends with same letter/sound/syllabe
- ▶ Doubles names (both twins, one same name)
- ▶ Tonic vowel
- ▶ One letter difference
- ▶ Number of syllables/letters

Score Max 12



Brazil, same sex siblings

1019 x2 MZ

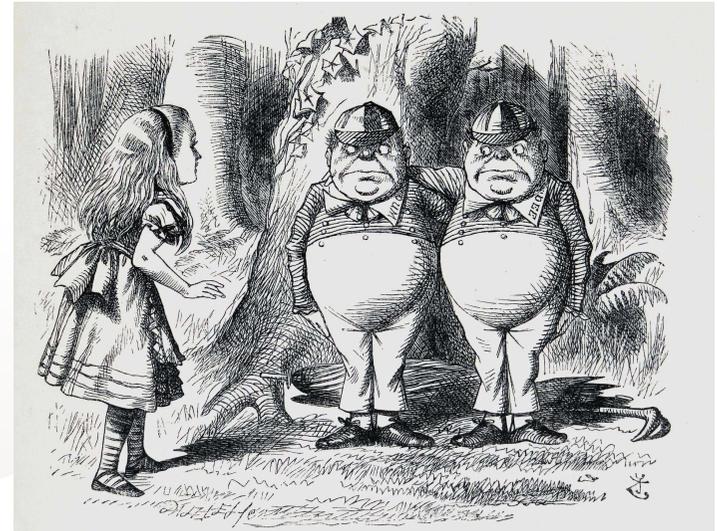
953 x2 DZ

415 x2 non twins

Congenital anomalies

Twins

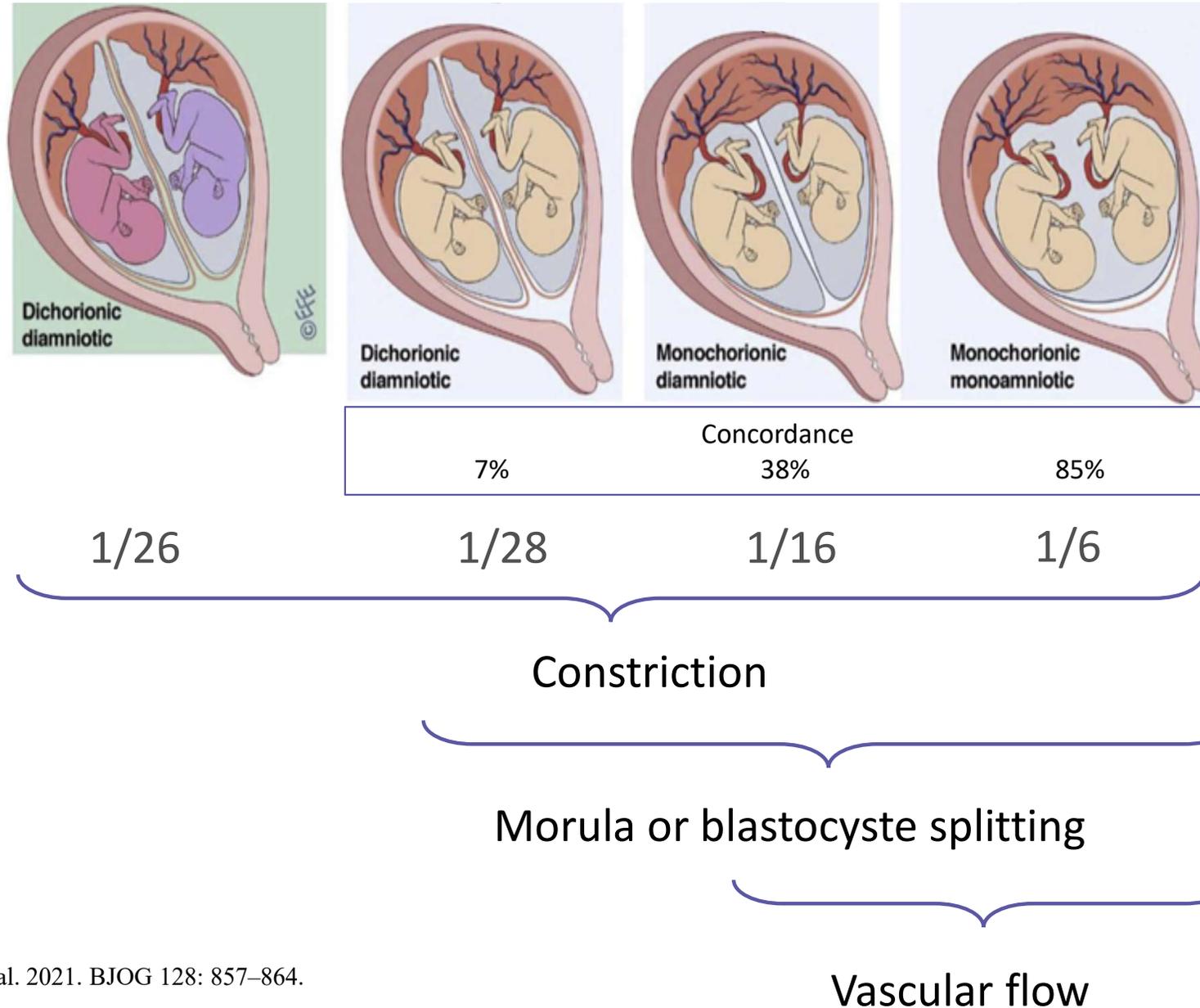
Tweedledum and Tweedledee



1871

Through the Looking-Glass

Structural congenital anomalies





Structural congenital anomalies

Deformations

- Clubfeet
- Torticollis

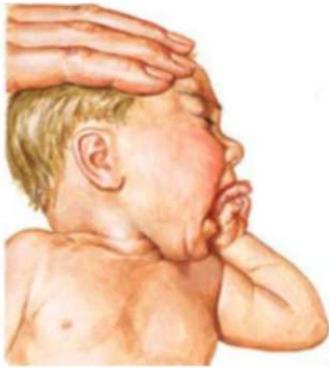
Early Malformations

- Midline
 - CNS
- Conjoined

Vascular flow

- CHD
- CNS

Deformations



Torticollis



Positionnal
plagiocéphaly



Craniostenosis



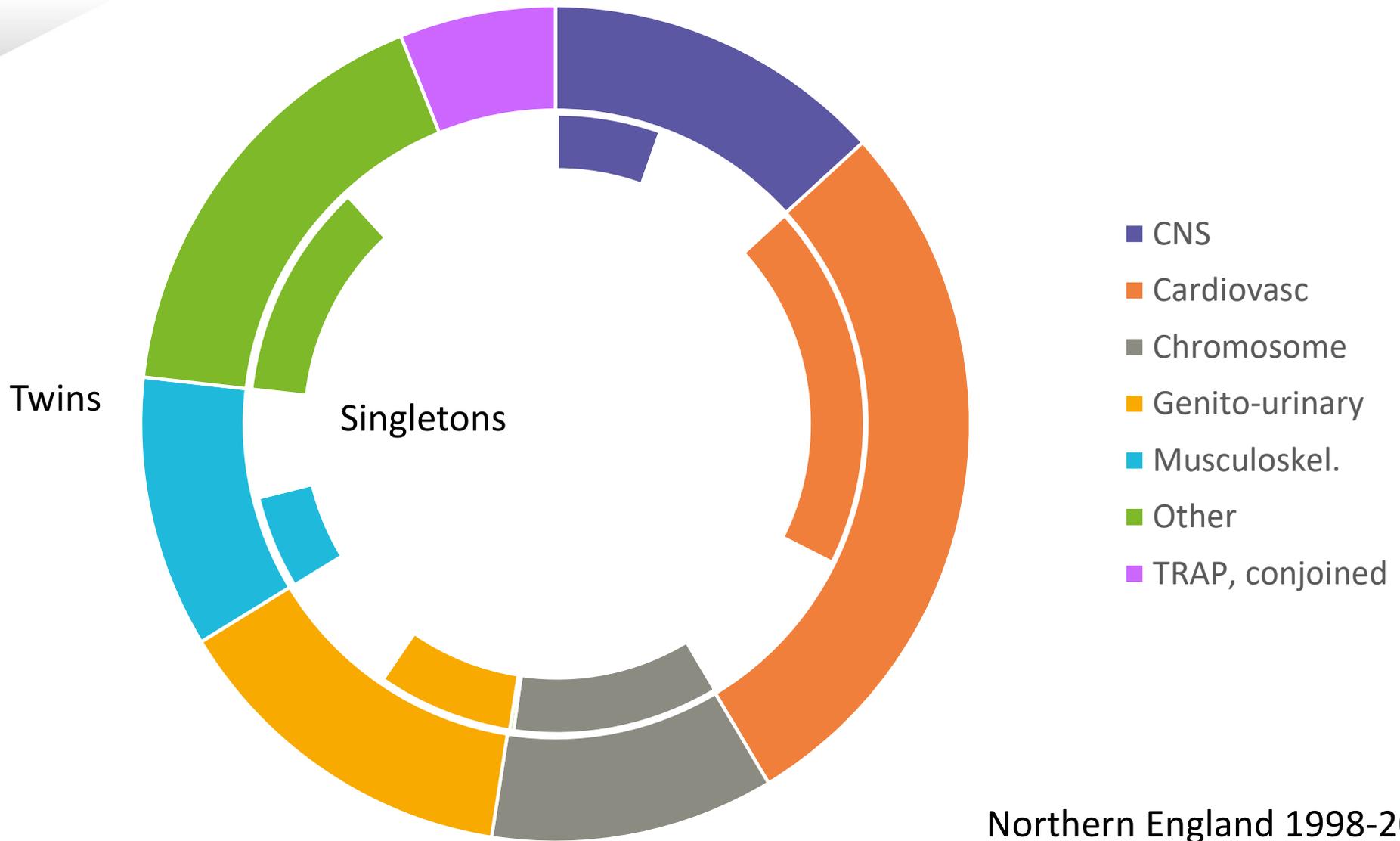
Metatarsus
adductus



Clubfeet

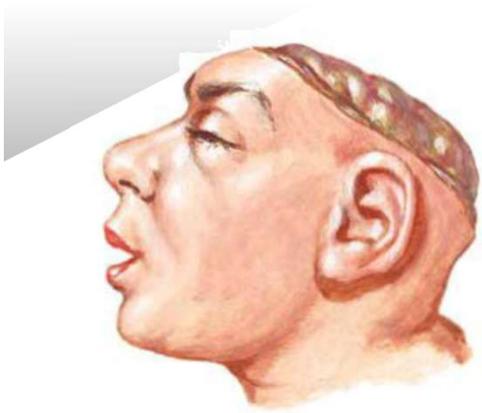


Congenital malformations

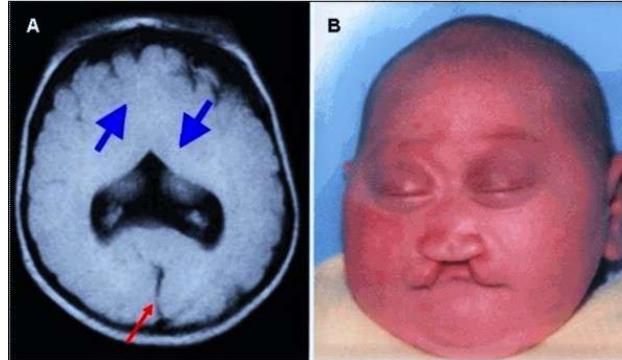


Northern England 1998-2002
 4658 twins; malformations 406/10000
 147 655 singletons; malformations 238/10000

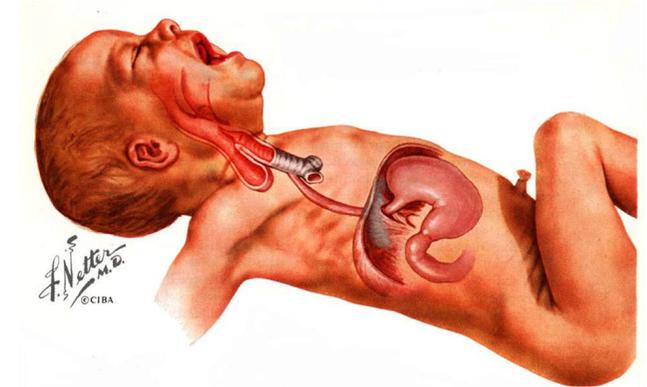
Malformations



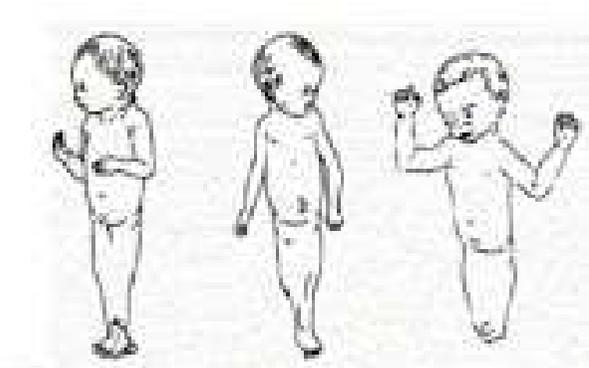
Anencephale
RR x 2,2



Holoprosencephaly
RR x 2,7



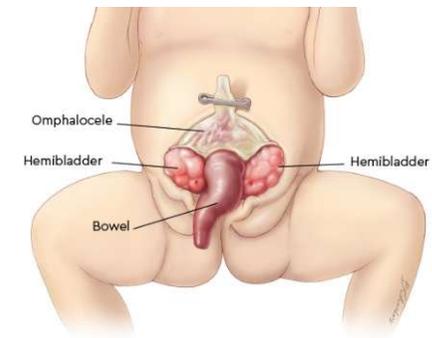
Oesophageal atresia
RR x 3,6



Sirenomelia



Sacrococcygeal teratoma

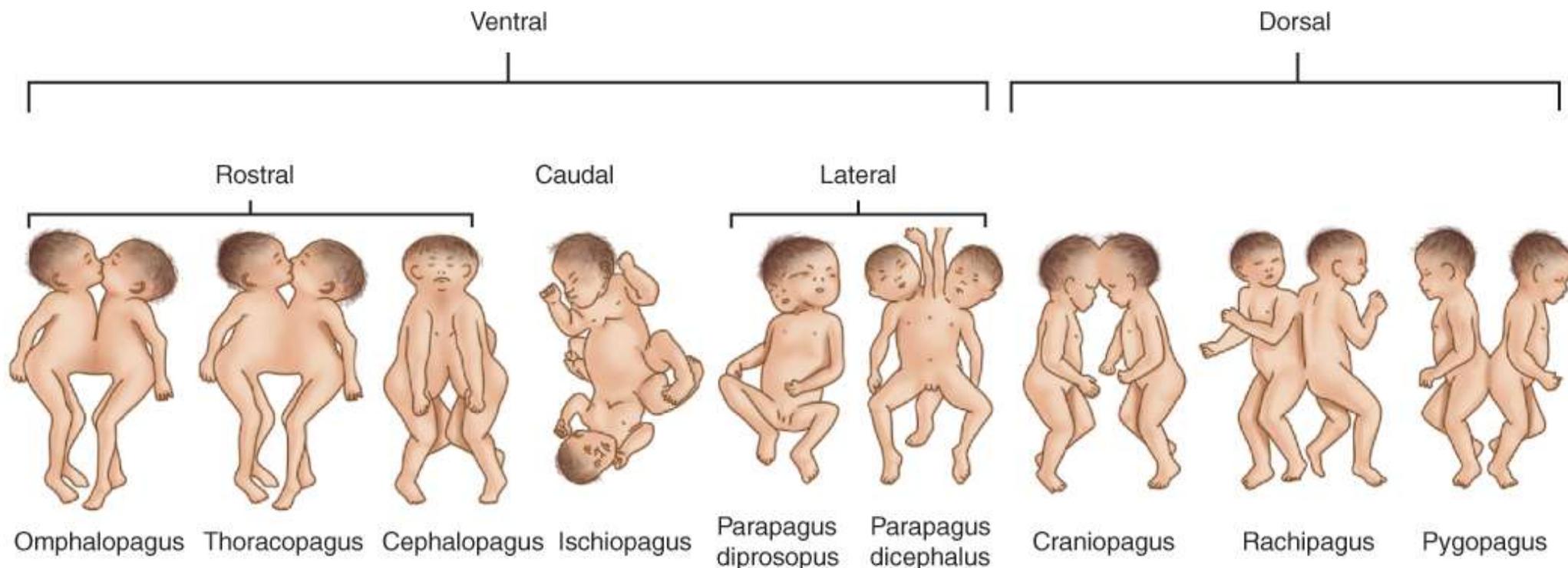


Cloacal extrophy
RR x 4,9

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Conjoined twins

1/50 000-200 000



Source: F. Gary Cunningham, Kenneth J. Leveno, Steven L. Bloom, Catherine Y. Spong, Jodi S. Dashe, Barbara L. Hoffman, Brian M. Casey, Jeanne S. Sheffield: *Williams Obstetrics*, 25th Edition
 Copyright © McGraw-Hill Education. All rights reserved.

Infants and toddlers

Twins

Gru and Dru



2017

Freedonia and Hollywood



Breastfeeding twins' challenges

- ▶ Prematurity
- ▶ Number of feeds
- ▶ Synchronisation (or not 😊)
 - ▶ Simultaneous
 - ▶ Demand x2
 - ▶ Demand x1 then the other
- ▶ Milk production ↗ x2 !

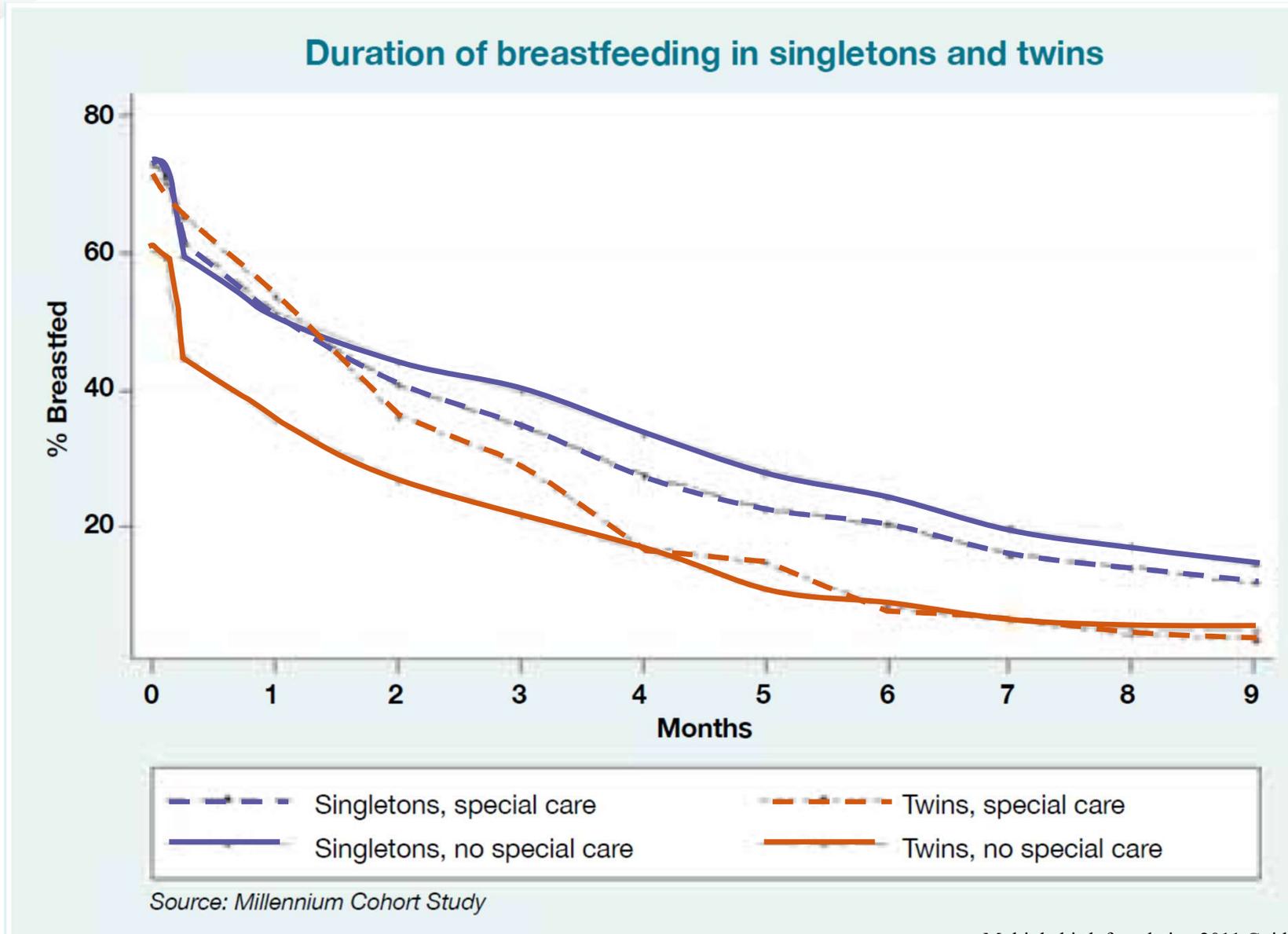
Double breastfeeding



Illustration: Jumeauxandco.com Papa Cube

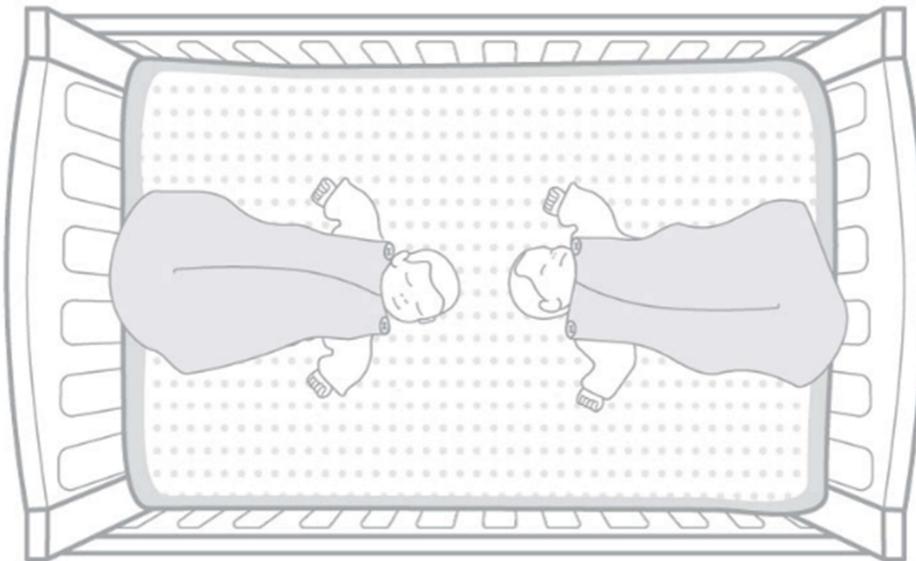


Breastfeeding duration



Cobedding

- ▶ Frequent
 - ▶ 50% at 6 weeks
 - ▶ 30% at 4 months
- ▶ Synchronous sleep
- ▶ Stop when moving
- ▶ Risks
 - ▶ Heat
 - ▶ Suffocation





Developmental stages

Age	Stade	
0 to 2 years	Fusion	Parental workload Mirror stage completely (6-8 months in singletons)



Cryptophasia

- ▶ « Common language »: also toward others but not understandable (30-40%)
- ▶ « Private language » : between them (10%)

- ▶ Lasting for ~ 1 year
 - ▶ Start 20 months (IQR 13-24)
 - ▶ Stop 30 months (IQR 24-36)

- ▶ Prédictive factors
 - ▶ Monozygotic twins ($\sigma > \text{♀}$)
 - ▶ No older sibling
 - ▶ Non verbal play



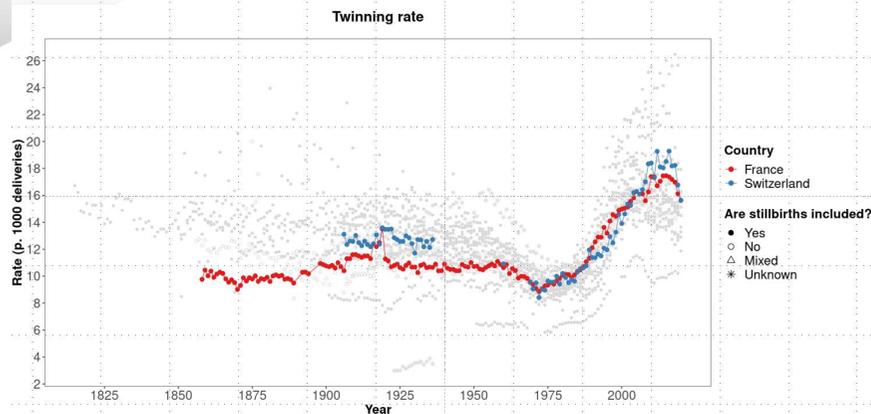
Developmental stages

Âge	Stade	
0 to 2 years	Fusion	Parental workload Mirror stage completely (6-8 months in singletons)
Small child	Complementarity	Construction relative to each other Ascendance (variable) Contrasting caricatural characteristics
Older child	Individualisation	Emerging from fusion and rivalry
Adolescent	Autonomisation	Redefining relationships with parents Redefining relationships with twin



Conclusions

Twin peaks ?

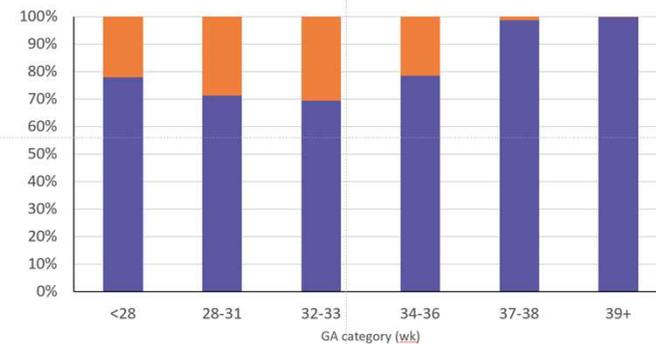


Source: Human Multiple Births Database (2021). French Institute for Demographic Studies - INED (distributor).
 Notes: The grey dots illustrate all the values of the selected variable available in the HMDB (i.e. for all countries included in the database).
 The different dot shapes indicate whether the stillbirths are included in the data for a given country.
 The coloured lines join the data points for the selected countries if the time lag between years with available data does not exceed 5 years or if the data source between consecutive years (time lag < 5 years) is the same.

Monden et al 2021 Human Reproduction, Vol.36, No.6, pp. 1666–1673

Human Multiple Births Database (2022). French Institute for Demographic Studies - INED (distributor). Extracted from: <https://www.twinbirths.org> (12/01/2022).

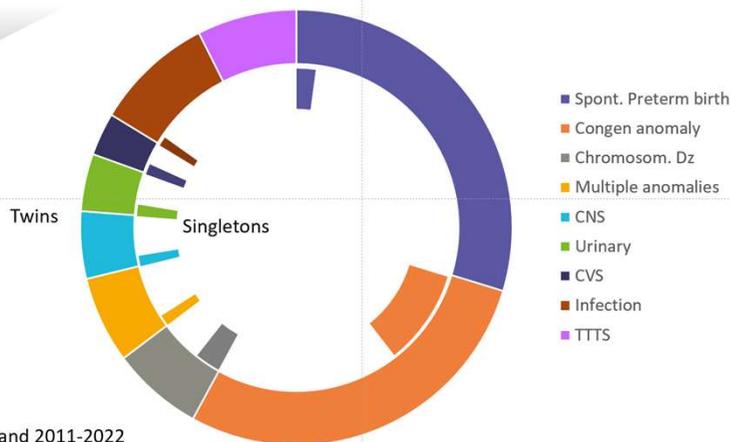
Twins' proportions according to GA



Live births
 Triplet and above not included

Données 2015-17

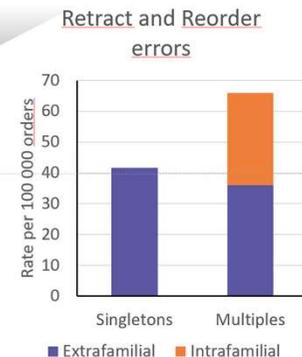
Early neonatal death causes



Ireland 2011-2022
 1127 singletons deaths (1.7 ‰)
 226 twins deaths (9.2 ‰)

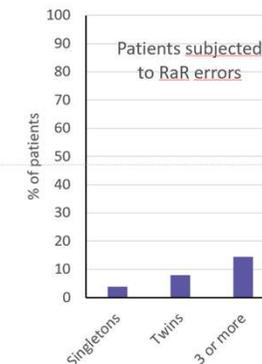
O'Connor 2025 Irish J Med Sc 194:167-180

Risk of Wrong-Patient Orders



Does not include:

- Missed errors
- Wrong patient administration errors



Adelman et al 2019 JAMA Ped 173(10):979-985.