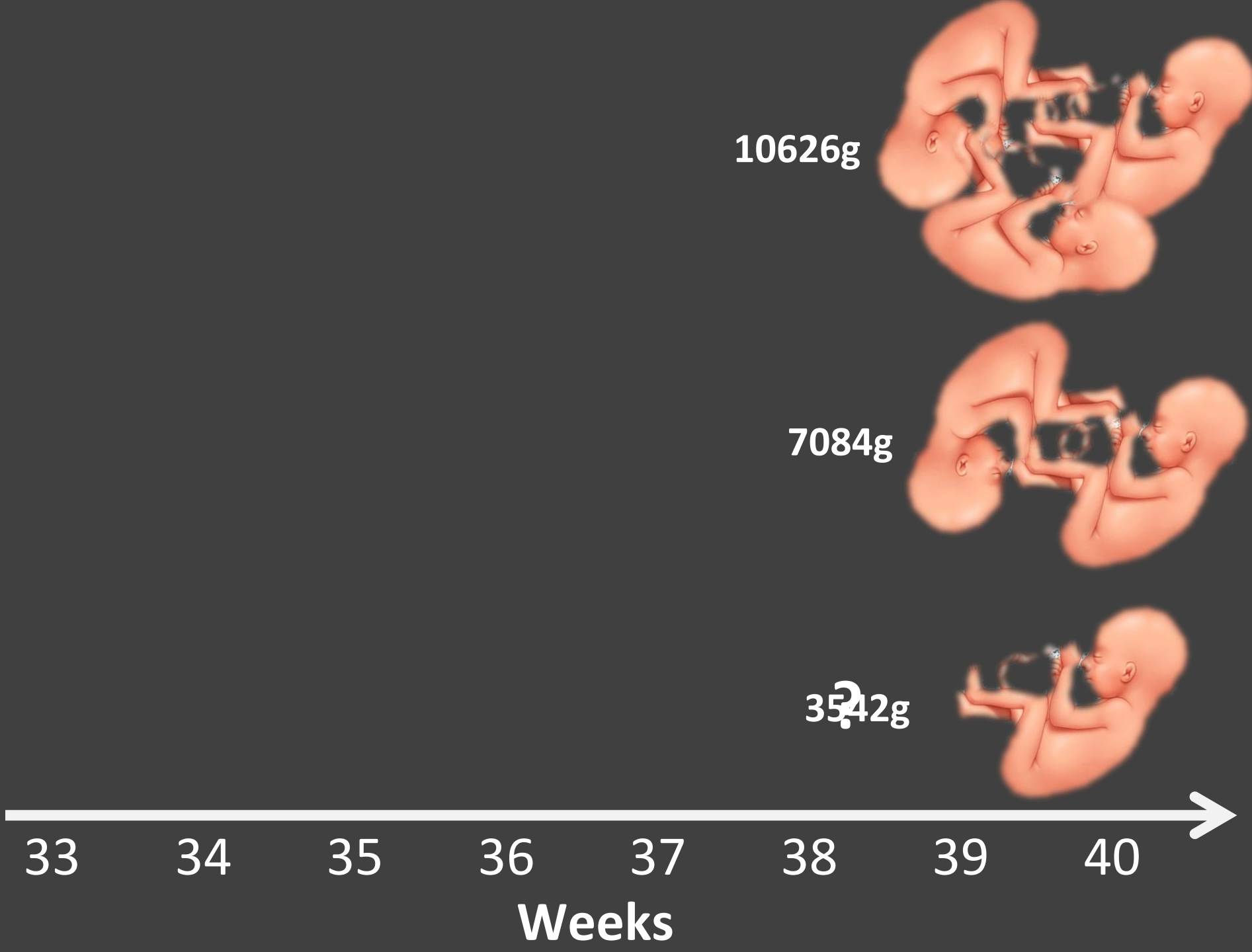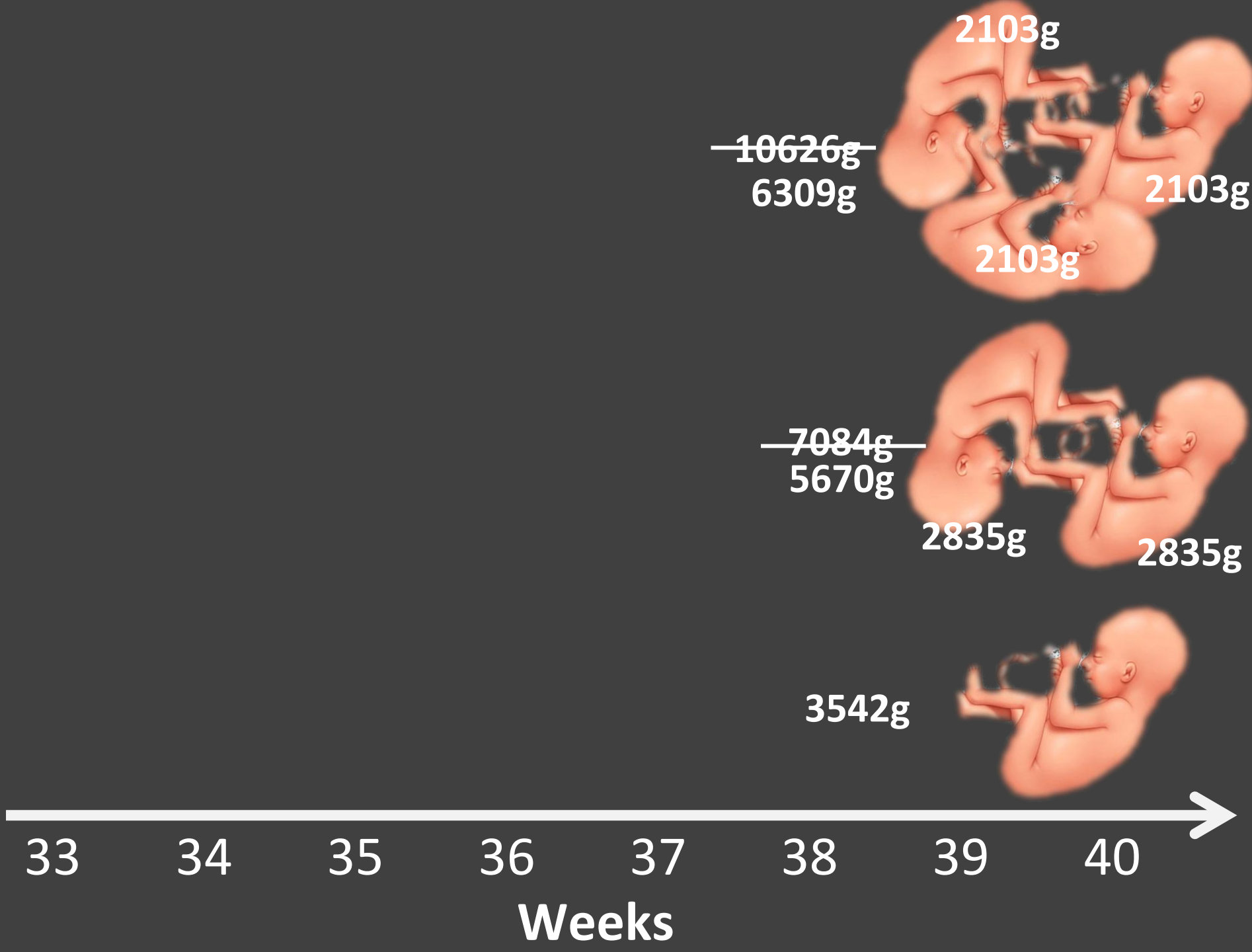# Fetal Growth in Twins

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OB Ultrasound , Feb-22, 2019

UNIVERSITY OF
TORONTO

Sunnybrook

Twins ≠ 2 Singletons

10626g

7084g

3542g **?**

33 34 35 36 37 38 39 40

Weeks

2103g

~~10626g~~
6309g

2103g

2103g

~~7084g~~
5670g

2835g

2835g

3542g

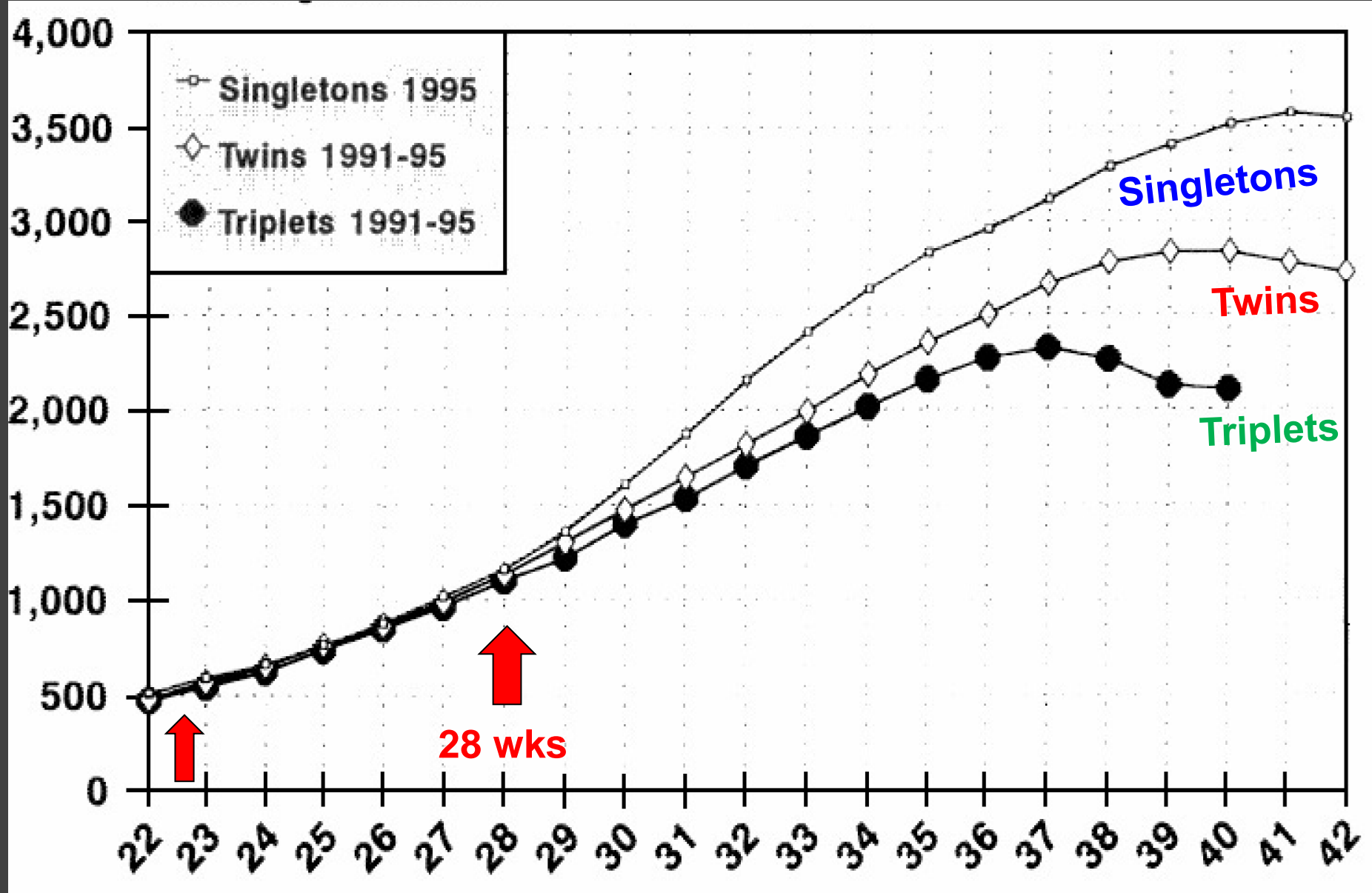| 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |

Weeks

Objectives

1. What is the **normal growth pattern** of twins?

2. Why are twins smaller – **pathology** vs. **physiology**?

3. Should we use **twins-based** or **singletons-based** reference to monitor growth of twins?

4. How should we **monitor growth**?

1. What is the normal growth pattern of twins?
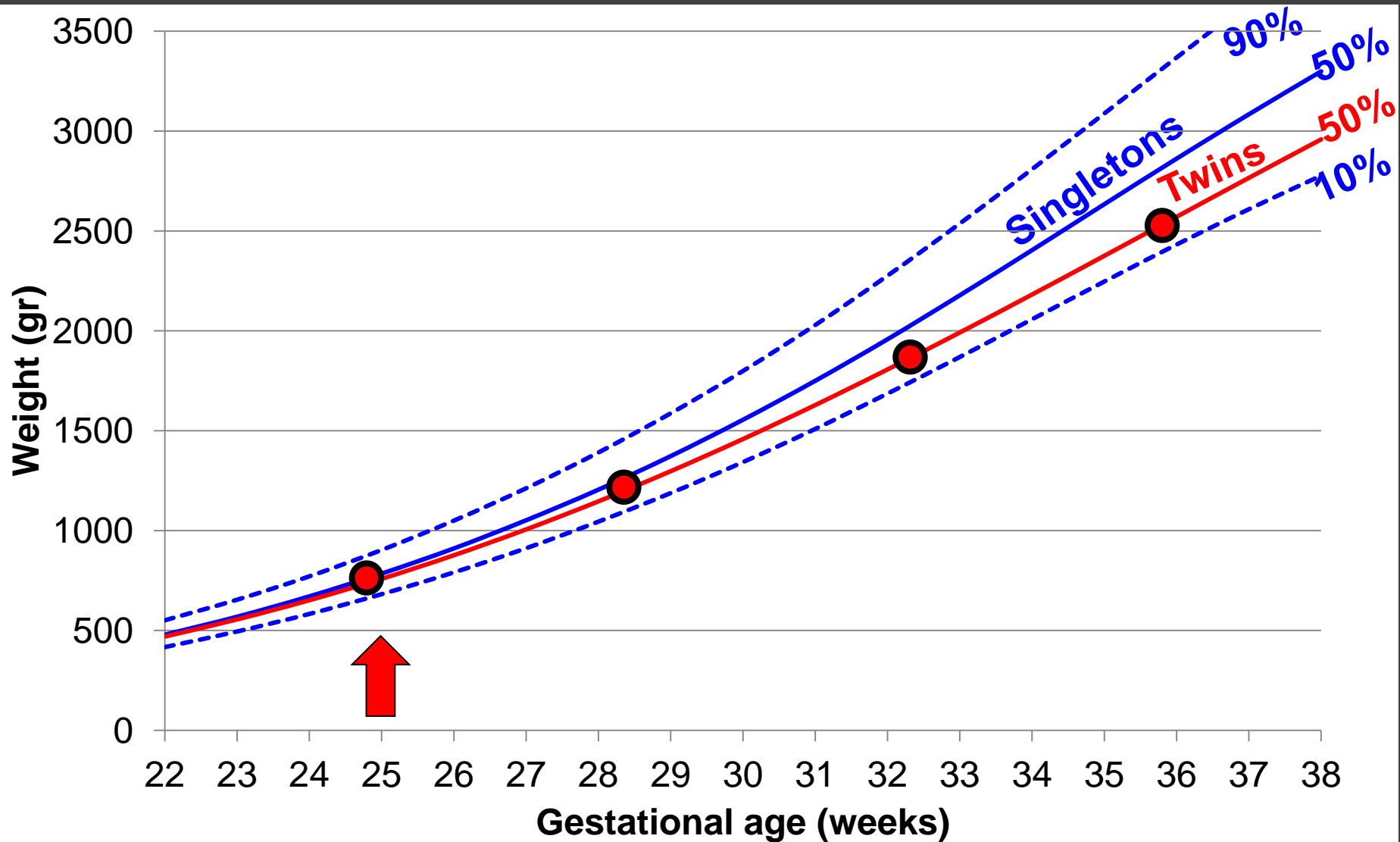
Birthweight (U.S.)

Alexander et al. Clin Ob Gyn 1998

Sonographic estimated fetal weight (Canada)
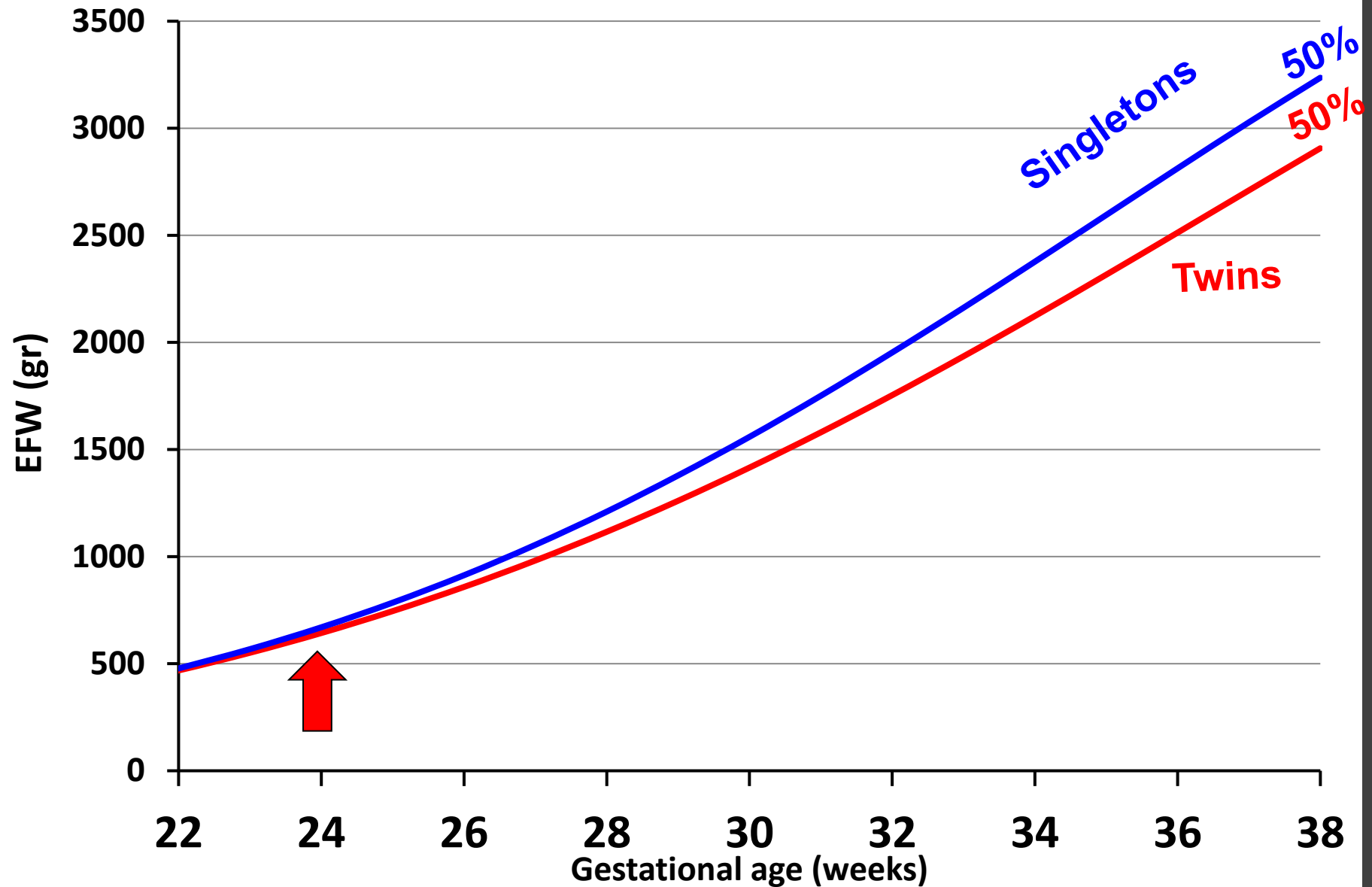
Sonographic estimated fetal weight (U.S.)
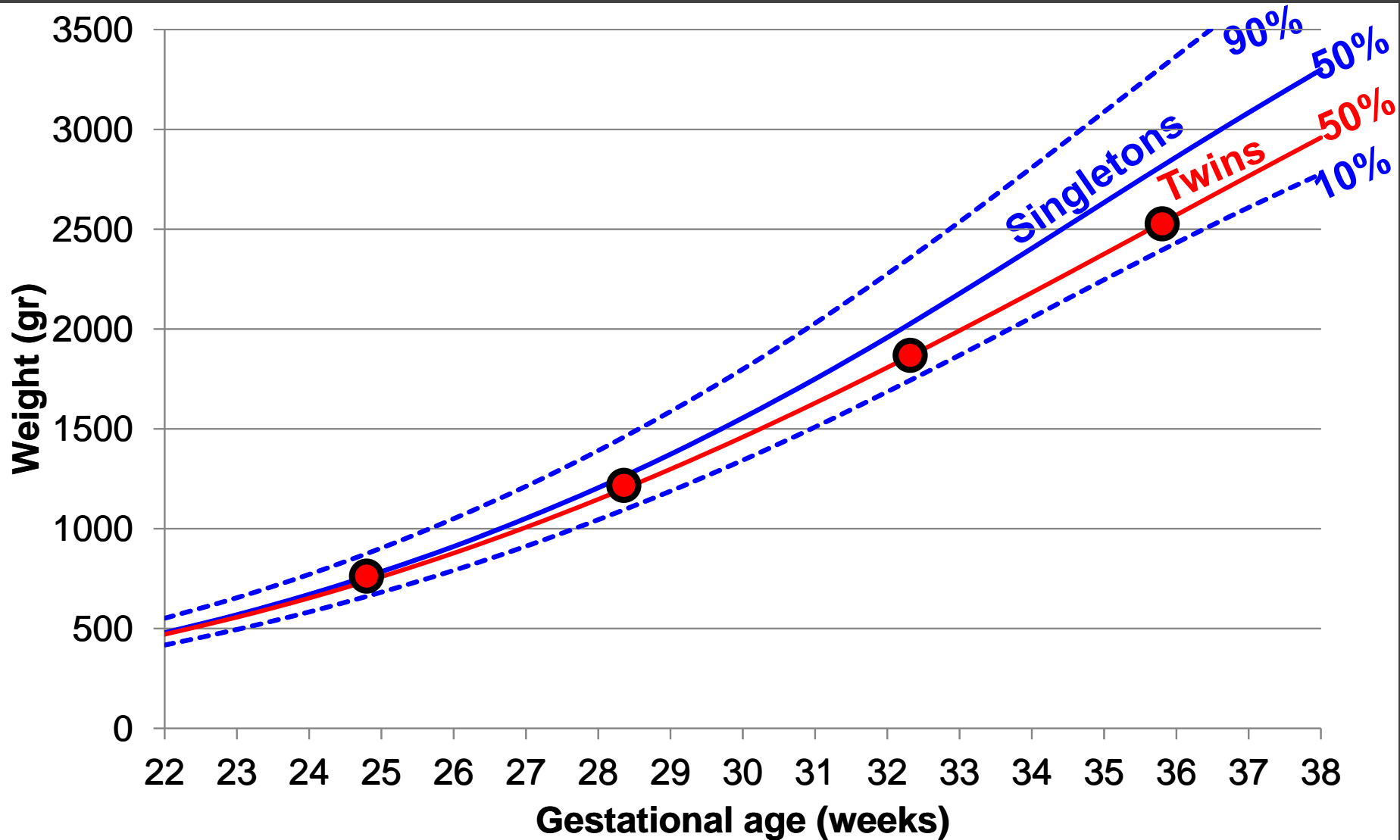## NICHD Fetal Growth Studies

Grantz et al, AJOG 2016   *Grantz et al, AJOG 2015*
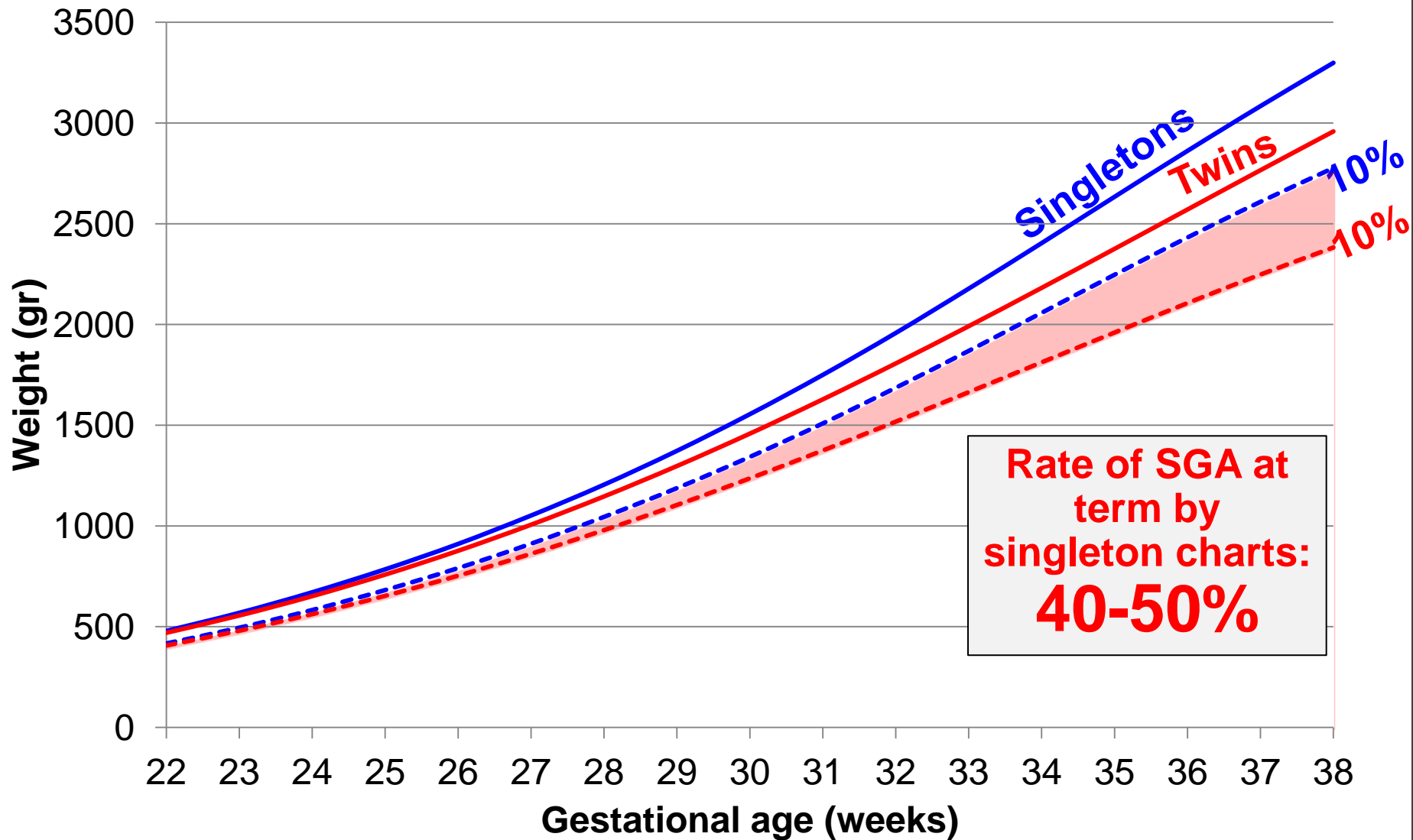
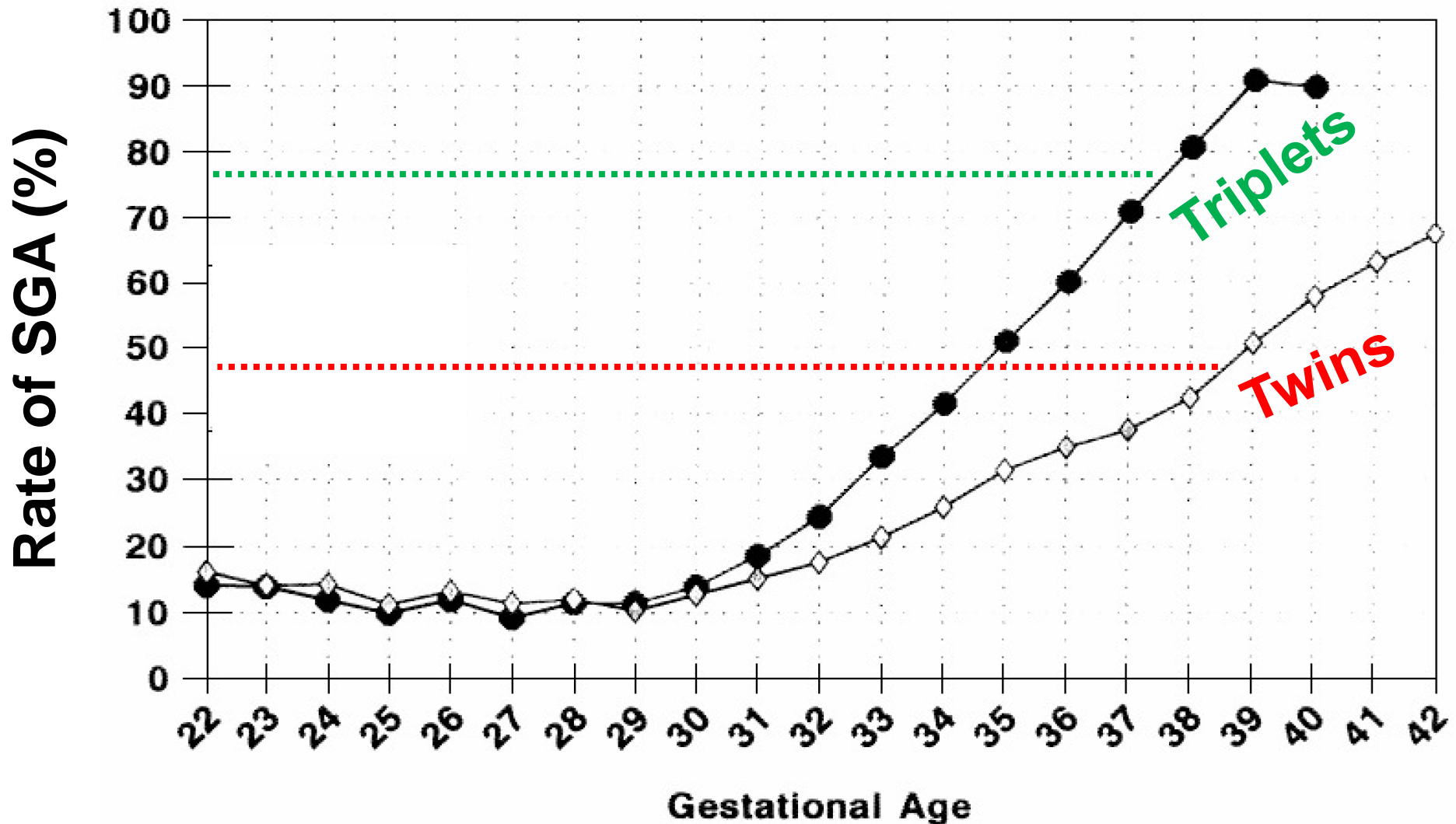# Sonographic estimated fetal weight (U.S.)
NICHD Fetal Growth Studies

Grantz et al, AJOG 2016   *Grantz et al, AJOG 2015*

High rate of SGA twins when using singleton charts

Rate of SGA at term by singleton charts: **40-50%**

High rate of SGA twins when using singleton charts

2. Why are twins smaller – pathology vs. physiology?

PUBMED: studies on "*Twins*" & "*Growth*"

Why are twins smaller?

Constraint by uterine size?

Early programming
- **Sacrify size for maturation?**
- **epigenetics?**
- **Hormonal?**

Inability to meet nutritional needs of 2 fetuses?

Weight (gr) vs. Weeks

Growth restricted vs. **Normal physiologic adaptation?**
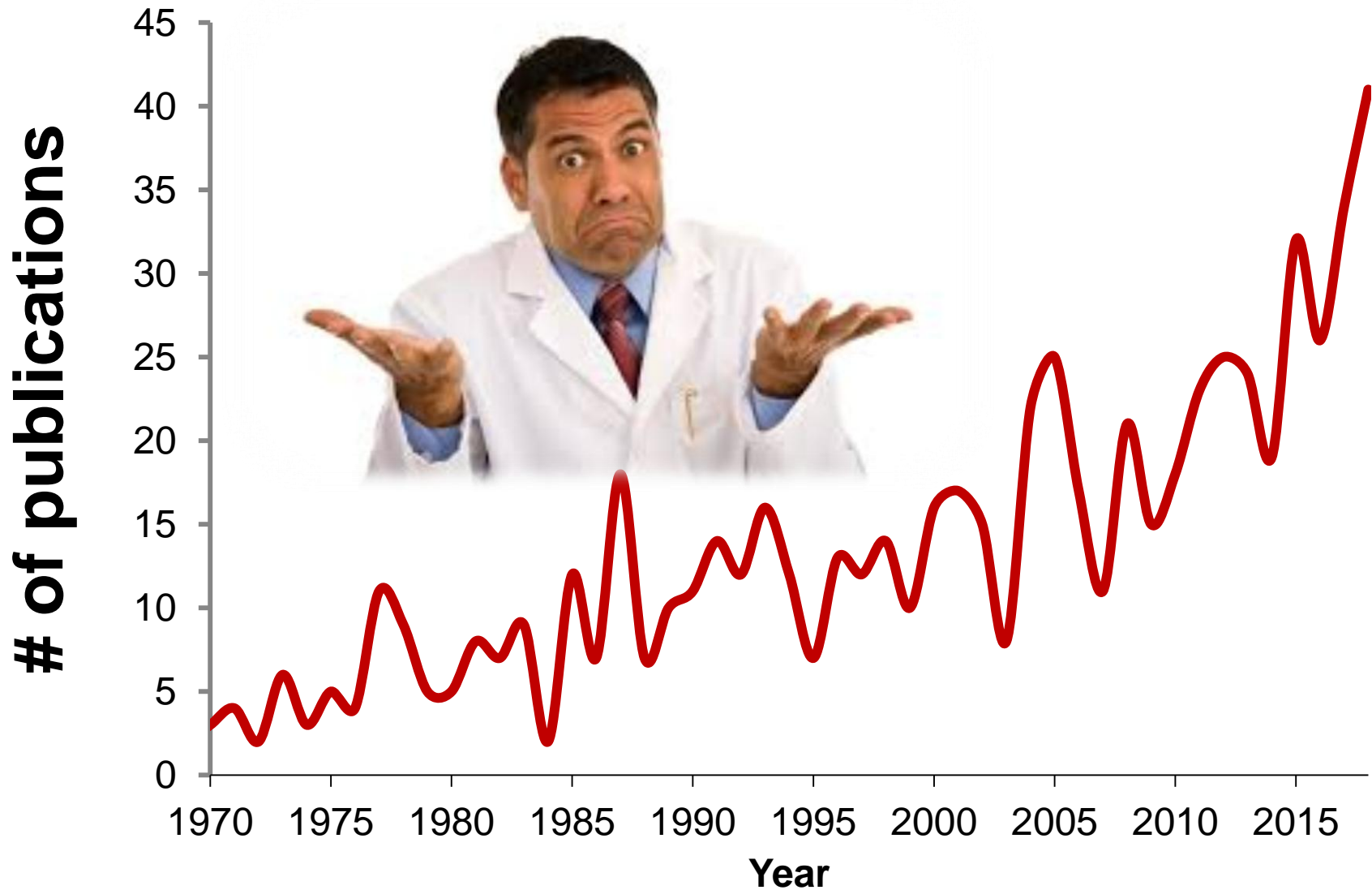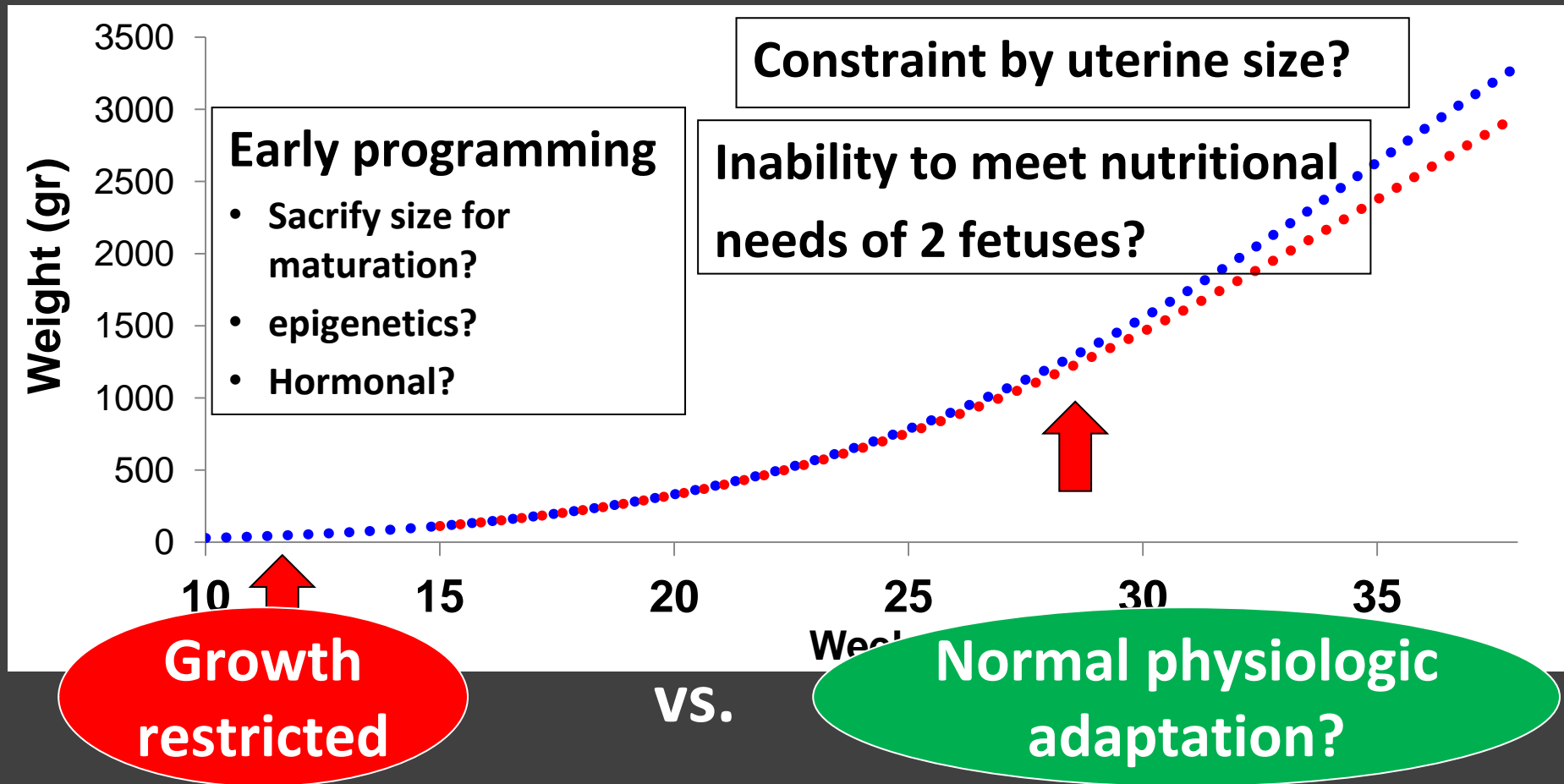
Use **SINGLETON charts** to identify **all small twins**

Use **TWINS-specific charts** to avoid over diagnosis of 'IUGR'

Depp, AJOG 1996;   Pinborq, Hum Reprod 2005

3. Should we use **twins-based** or **singletons-based** charts to monitor growth of twins?

What's good about using twins-charts?

Benefits of using Twins-charts

1. **Avoid over diagnosis of SGA** **(40-50% -> ~10%)**

   - Resources

   - Cost

   - Interventions → prematurity

   - Anxiety

2. **Diagnosis of SGA that is more clinically relevant**

Twins versus singleton pregnancies: outcomes in small for gestational age late preterm deliveries

(JMFM 2018)

Allison R. Walker iD, Bethany T. Waites and Aaron B. Caughey

- **SGA late preterm twins** (using SINGLETON charts)   (n=3,363)

  vs.

  SGA late preterm singletons   (n=7,283)

	Singletons, n (%)	Twins, n (%)	p-value	Odds Ratio	95% CI
SGA 10 percentile					
Cesarean section	2618 (53.7)	1863 (80.0)	<0.001	3.40	3.01–3.90
Preeclampsia	2072 (42.5)	615 (26.4)	<0.001	0.56	0.50–0.63
Placental abruption	313 (6.4)	50 (2.2)	<0.001	0.29	0.21–0.40
Neonatal death	32 (0.7)	2 (0.1)	0.001	0.14	0.03–0.63
IUFD	256 (5.3)	14 (0.6)	<0.001	0.16	0.08–0.31

Dx of SGA in twins using <u>SINGLETON charts</u> – less clinically relevant than SGA in singletons

Placental abnormalities differ between small for gestational age fetuses in dichorionic twin and singleton pregnancies

Mia Kibel [a], Michael Kahn [a], Christopher Sherman [b], John Kingdom [c], Arthur Zaltz [a], Jon Barrett [a], Nir Melamed [a, *]

- Compared the rate of placental abnormalities between:
  - **SGA-singletons** (n=954) – birth weight <10th%
  - **SGA twins** (n=532)– birth weight <10th% (<u>SINGLETON charts</u>)

Horizontal bar chart comparing Twins (red) and Singletons (blue). Categories: Placental weight <10th% (*), Any pathology (*), Maternal vascular… (*), Fetal vascular malperfusion (*). X-axis: Rate (%), 0 to 100.
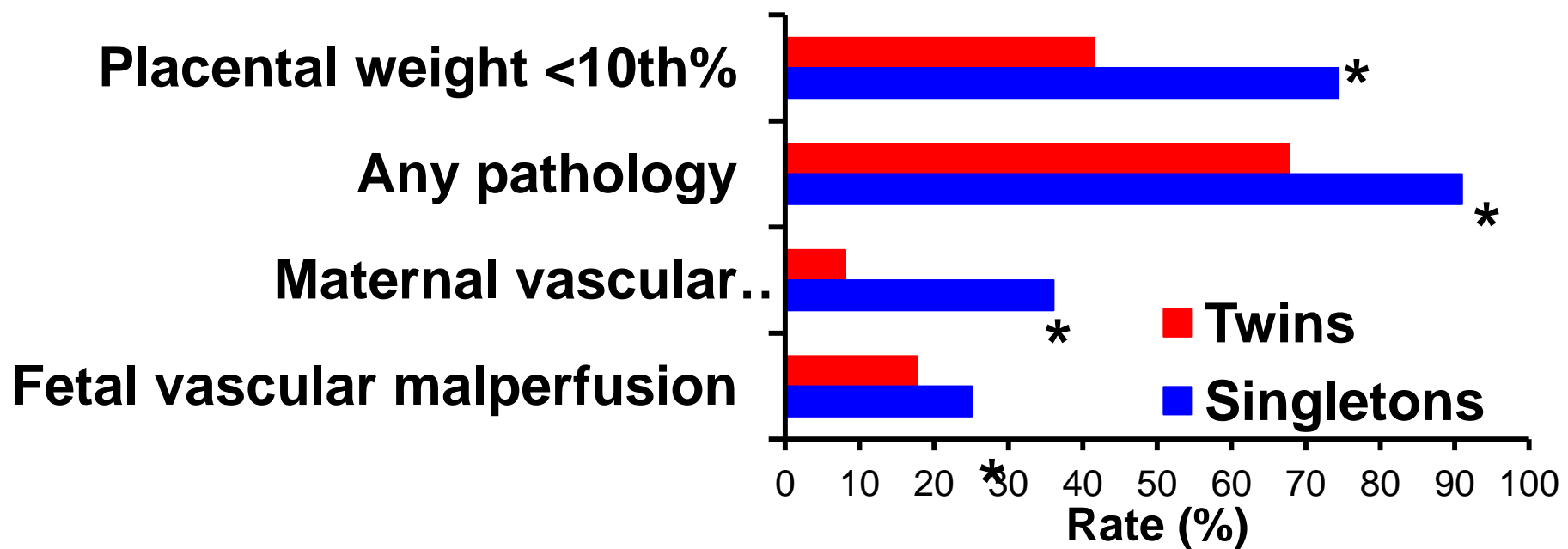
Dx of SGA in twins using <u>SINGLETON charts</u> – less clinically relevant than SGA in singletons

Growth among Twins: Use of Singleton versus Twin-Specific Growth Nomograms

AJP, 2018

Hector Mendez-Figueroa, MD[1]   Van Thi Thanh Truong, MS[2]   Claudia Pedroza, PhD[2]
Suneet P. Chauhan, MD[3]

- Association of **SGA** using **Singletons-Charts** vs. **Twins-Charts** with **perinatal M&M**

- Data for 7 MFMu studies

- The use of **Twins charts**:

  - **Lower rate of SGA** (4% vs. 33%)

  - **Greater association with perinatal M&M**

	Singleton nomogram[23]			Twin nomogram[13]		
	SGA (N = 2,518)	AGA (N = 5,136)	aOR[a] (95% CI)	SGA (N = 306)	AGA (N = 7,218)	aOR[c] (95% CI)
Composite neonatal morbidity	974/1,678 (58.1)	2,427/3,721 (65.2)	1.19 (1.08–1.32)	152/170 (89.4)	3,228/5,182 (62.3)	1.68 (1.23–2.29)
Apgar score < 4 at 5 min	55/2,508 (2.2)	101/5,123 (2.0)	1.35 (0.96–1.92)	22/305 (7.2)	133/7,196 (1.9)	4.66 (2.76–7.88)
Confirmed seizures	9/2,371 (0.4)	51/4,948 (1.0)	0.46 (0.25–0.85)	8/287 (2.8)	52/6,903 (0.8)	5.49 (2.46–12.23)
Stillbirth	47/2,518 (1.9)	31/5,136 (0.6)	3.57 (2.16–5.90)	18/306 (5.9)	60/7,218 (0.8)	7.54 (4.17–13.64)
Neonatal death	39/2,006 (1.9)	109/4,266 (2.6)	1.09 (0.74–1.60)	22/265 (8.3)	125/5,878 (2.1)	4.59 (2.76–7.63)

Association between Hypertensive Disorders and Fetal Growth Restriction in Twin Compared with Singleton Gestations
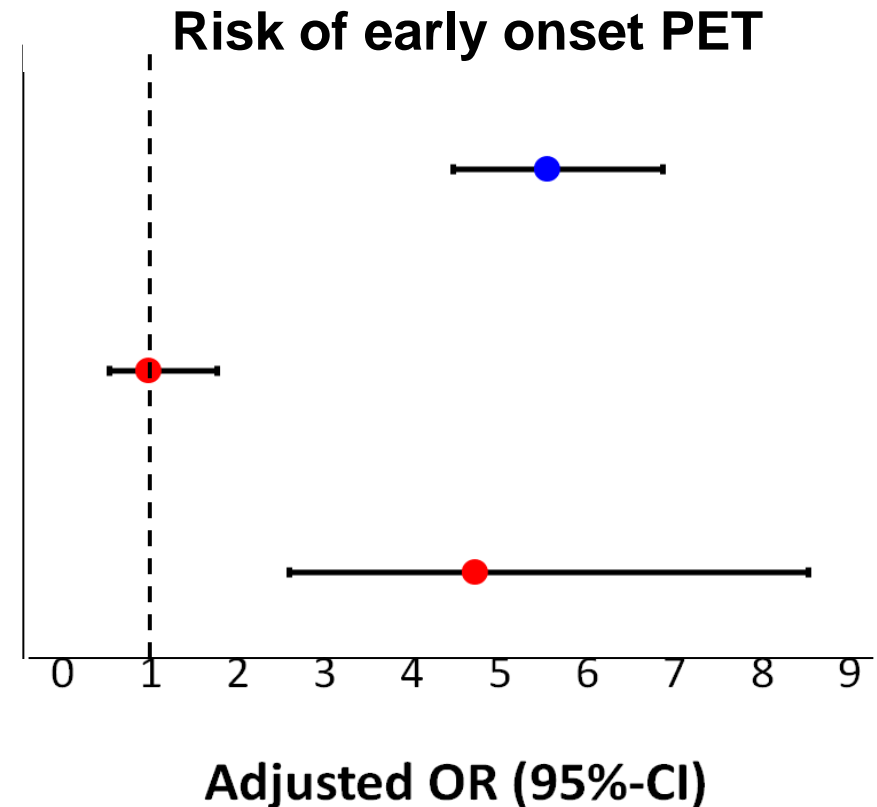
Leslie Proctor, Julia Kfouri, Liran Hiersch, Amir Aviram, Arthur Zaltz, John Kingdom, Jon Barrett, Nir Melamed

- 2,189 twins &48,943 singletons (Sunnybrook, 2003-2015)

Risk of early onset PET

Singleton pregnancies with SGA

Twin pregnancies with SGA (using SINGLETON charts)

Twin pregnancies with SGA (using TWINS charts)

Adjusted OR (95%-CI)

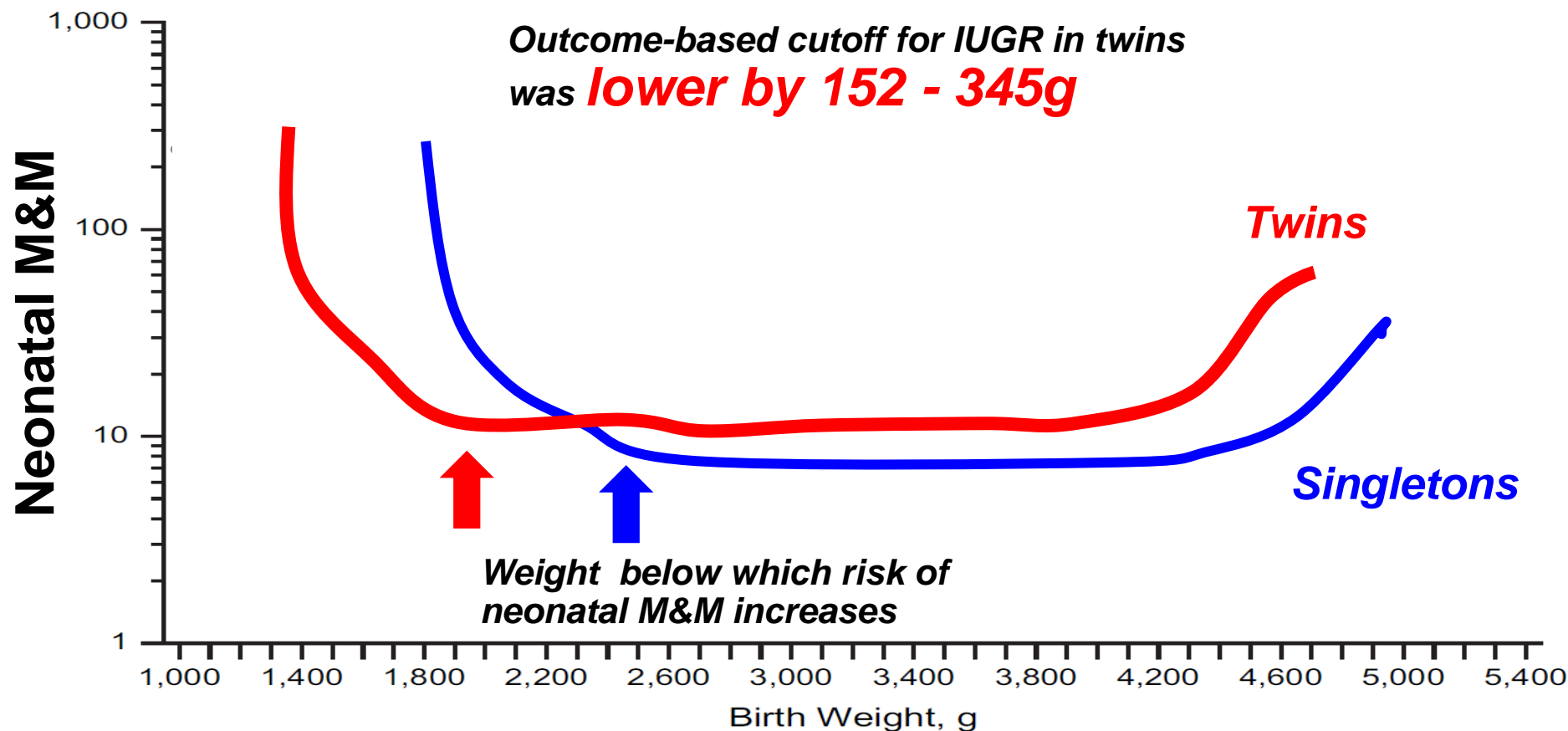**The dx of SGA in twins using TWINS charts is more clinically relevant and equivalent to dx of SGA in singletons**

Are twin-charts safe?

An Outcome-based Approach for the Creation of Fetal Growth Standards: Do Singletons and Twins Need Separate Standards?

K. S. Joseph, John Fahey, Robert W. Platt, Robert M. Liston, Shoo K. Lee, Reg Sauve, Shiliang Liu, Alexander C. Allen, and Michael S. Kramer

- Singleton and twin infants born at 36-42 weeks (U.S., 1995-2002, n=17,811,922)
- Identified the **birthweight cutoff** at each week below which **neonatal M&M** ↑

Outcome-based cutoff for IUGR in twins was **lower by 152 - 345g**

Weight below which risk of neonatal M&M increases

Twins

Singletons

Support the use of twins-charts in twins

Predictive accuracy of Southwest Thames Obstetric Research Collaborative (STORK) chorionicity-specific twin growth charts for stillbirth: a validation study

E. KALAFAT[1,2,3], M. SEBGHATI[1], B. THILAGANATHAN[1,4] and A. KHALIL[1,4], on behalf of the Southwest Thames Obstetric Research Collaborative (STORK)#

- Compared the detection rate of **SGA** using **Singletons-Charts** vs. **Twins-Charts** for **stillbirth**

- STORK cohort (2000-2009) - **1850 DC**, **300 MC**

	Singleton charts	Twin Charts	P-value
SGA <10%			
rate of SGA	**14.2%**	11.6% *	<0.0001
Detection rate for stillbirth	47.9%	43.8%	0.5
AUC	0.64	0.68	0.1

Using TWINS-Charts is safe and has a similar detection rate for SB

True IUGR – drop in percentiles
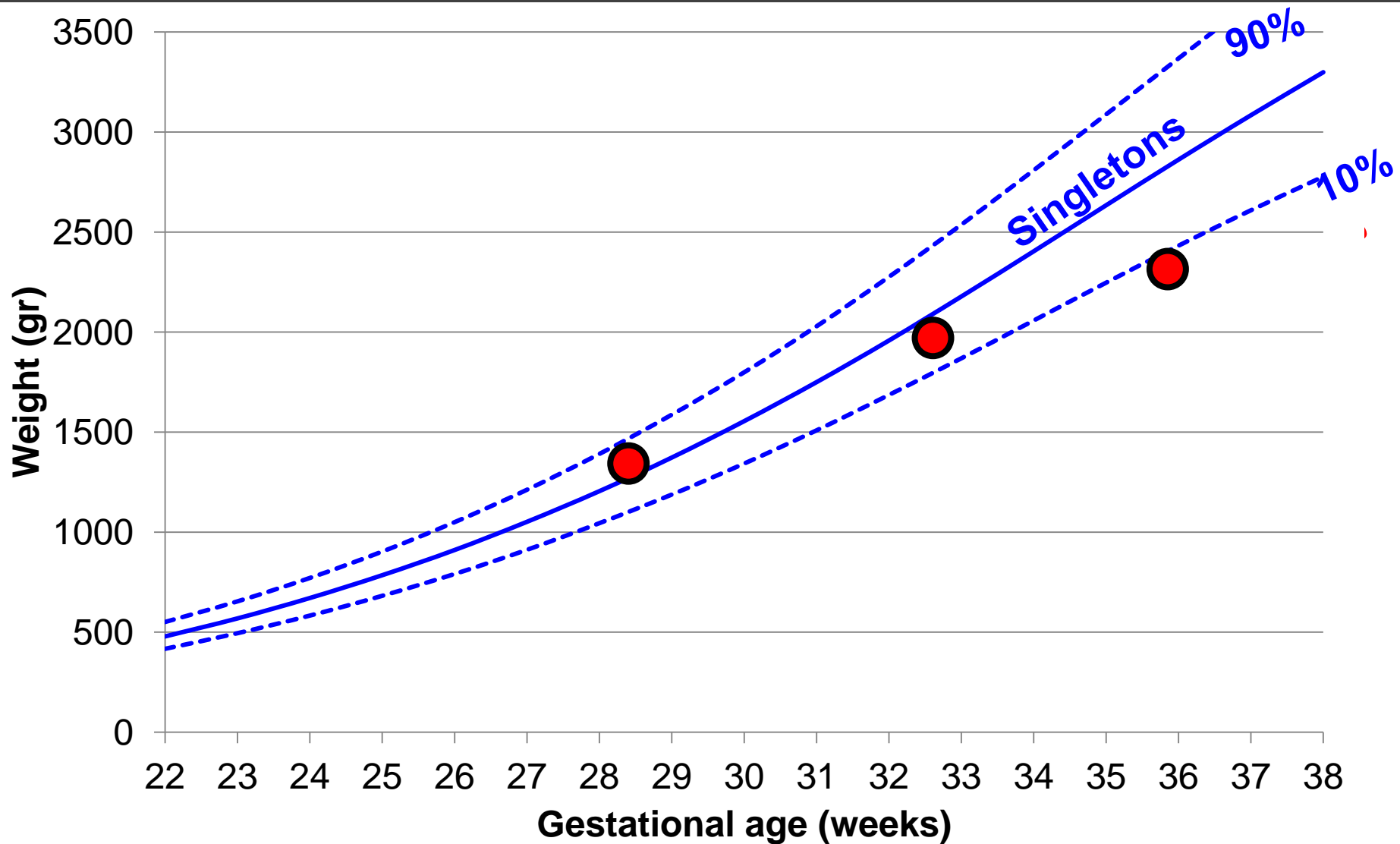
What are the current recommendations?

SOGC	**2000:** Either twins or singletons charts **2011:** Singletons, but further research is needed
ACOG (2013, 2016)	?
NICE (UK) (2011)	?
ISUOG (2016)	Twin charts should be used, but controversial

4. How should we **monitor growth**?

- **Single small study**

	DC twins	MC twins
SOGC	q3-4w From 18-20w	q2-3w From 16w
ACOG	q4-6w	
NICE (UK)	q4w from 20w	q2w from 16w
ISUOG	q4w from 20w	q2w from 16w

Sunnybrook Twins Clinic protocol for U/S schedule:

- q2 weeks from 16w (MC) or 18-20w (DC)

- q1 week from 30w (MC) or 32w (DC)

Summary

Summary

- Twins grow slower starting at 24-28 weeks
  - **Etiology unclear** – programming in early pregnancy?
  - **Pathology** vs. **physiology**?

- Which charts to use?
  - **Reasonable to use twins charts** – especially if serial U/S
    - Can decrease SGA from 40-50% → ~10%
    - More clinically relevant diagnosis of SGA

- How to monitor?
  - **MC**: q2w from 16w → weekly from 30w
  - **DC:** q2-4w from 18-20w → weekly from 32w

Good practice points

- **Twin labeling:**
  - Use as many features as possible (not only A/B, presentation)
    - Position (left/right)
    - Sex
    - Placental position & cord insertion
    - Unique features (e.g., anomaly):

      " Twin B (male) is on the maternal left, posterior placenta, marginal cord insertion, with the pelviectasis"

- **Report discordance** (ΔEFW/[EFW larger])) starting at 20w
    - Alert if >20-25%

Thank you !

Nir.Melamed@Sunnybrook.ca

OB Ultrasound , Feb-22, 2019