

Ultrasound of cervical length: why, when and how

Elizabeth Bonney

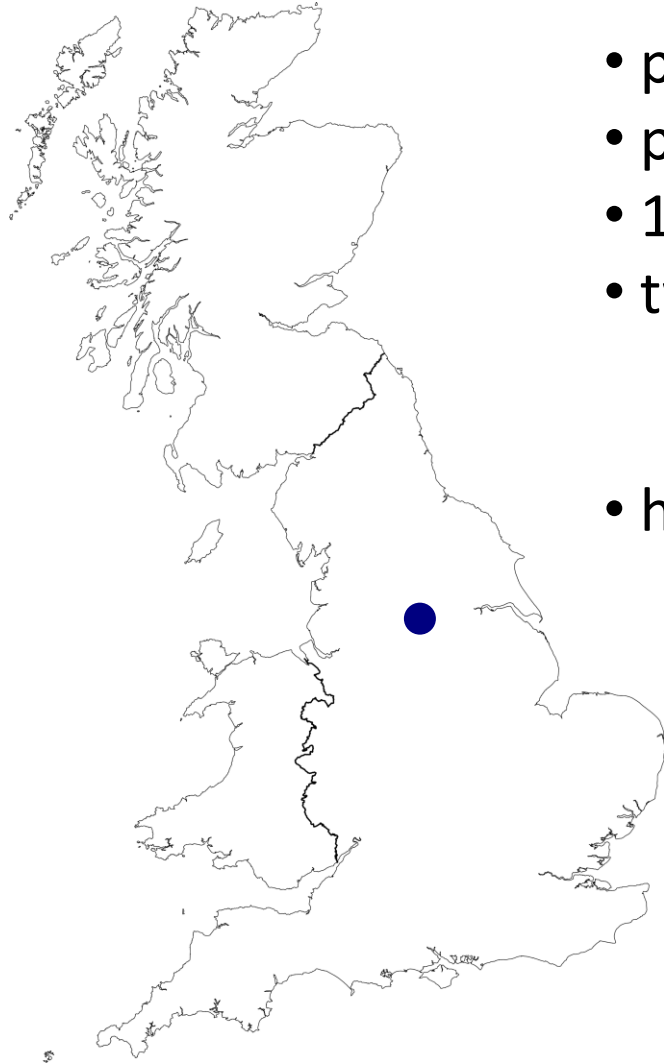
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Leeds

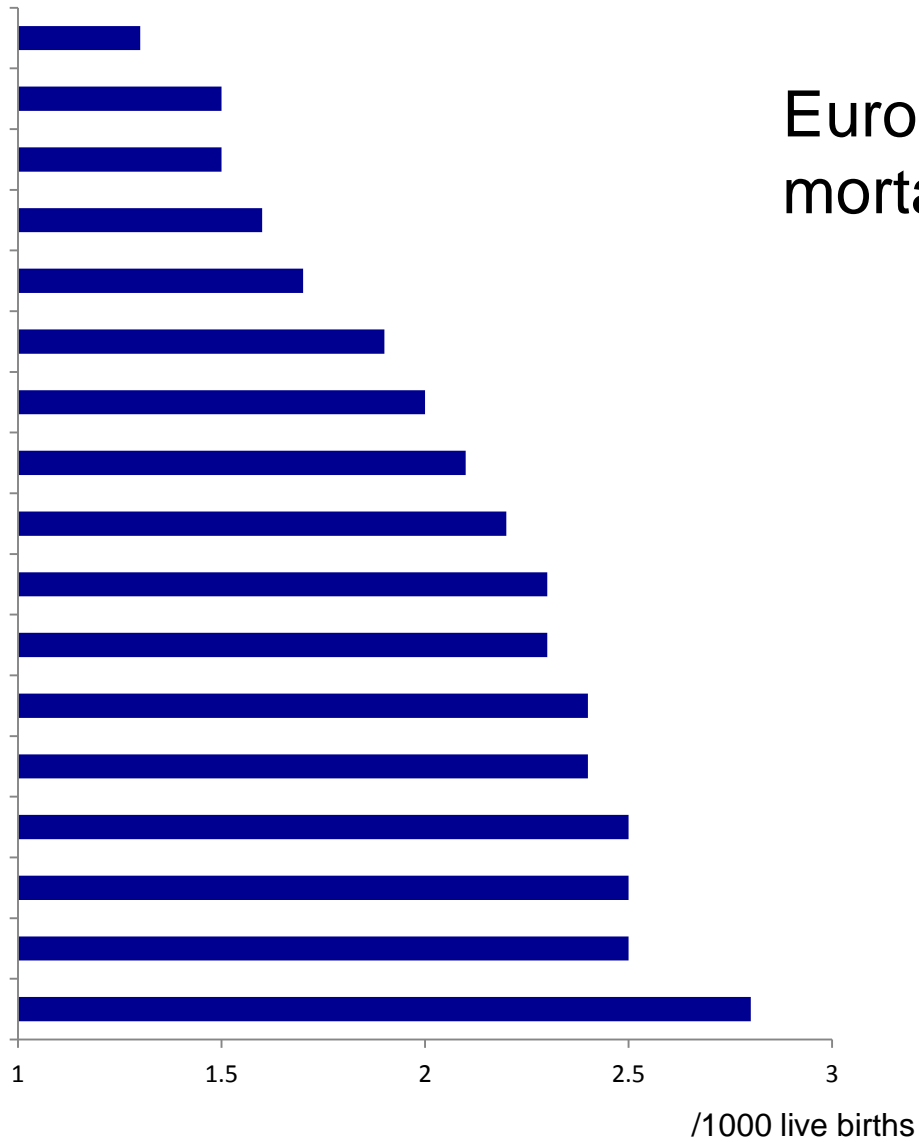


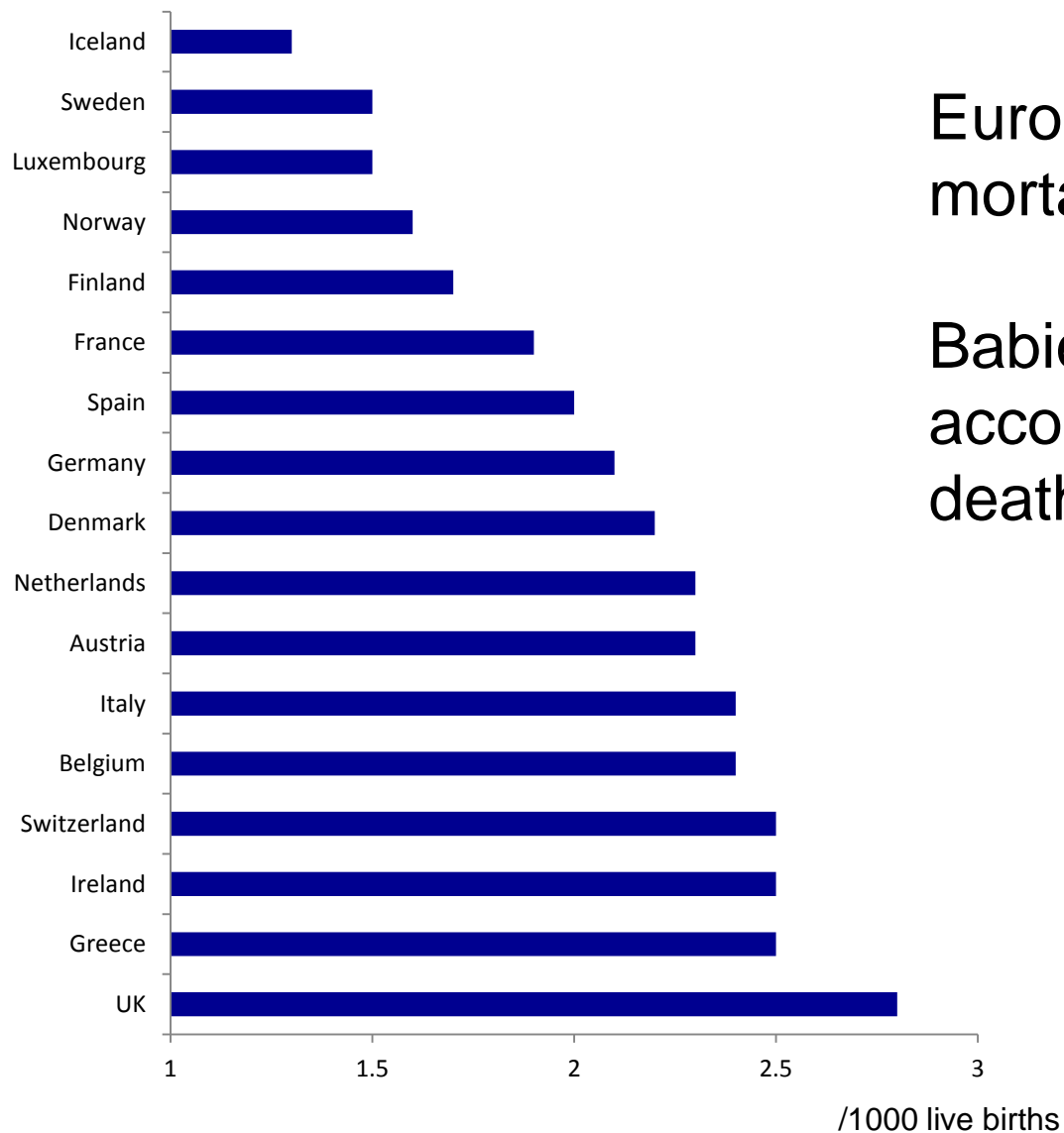
- population 750 000
- previously heavily industrialised
- 10000 deliveries/yr
- two maternity units
 - Leeds General Infirmary
 - St James's University Hospital
- higher than average deprivation

Leeds

- history
 - preterm birth rate 11% in 1999
 - prevention strategy
 - clinic started following year
- progress
 - 2 clinics/week, 2 consultants
 - 500 referrals/yr (20% regional)
 - >100 individual clinic episodes/month

European neonatal mortality rates 2013

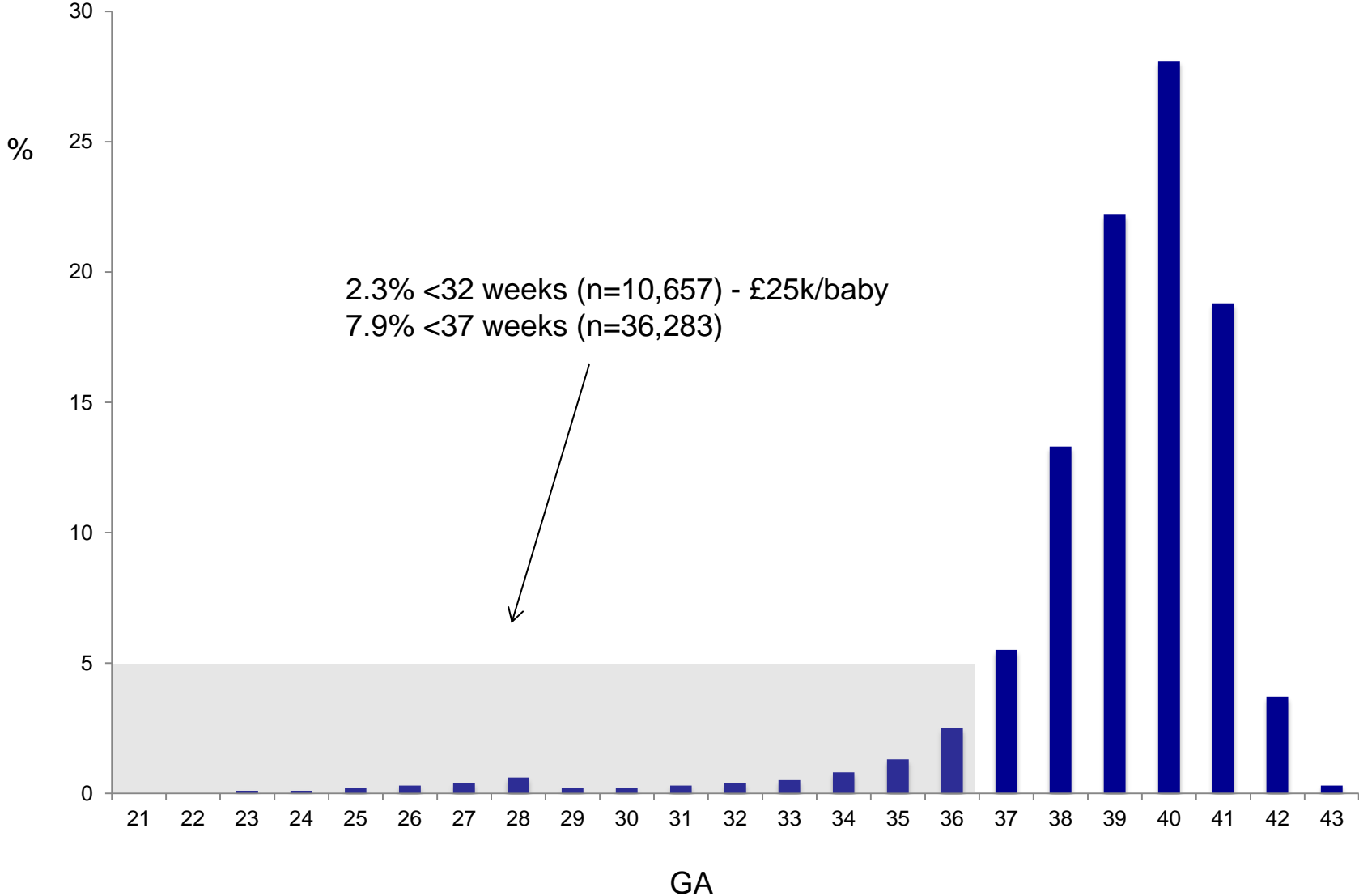




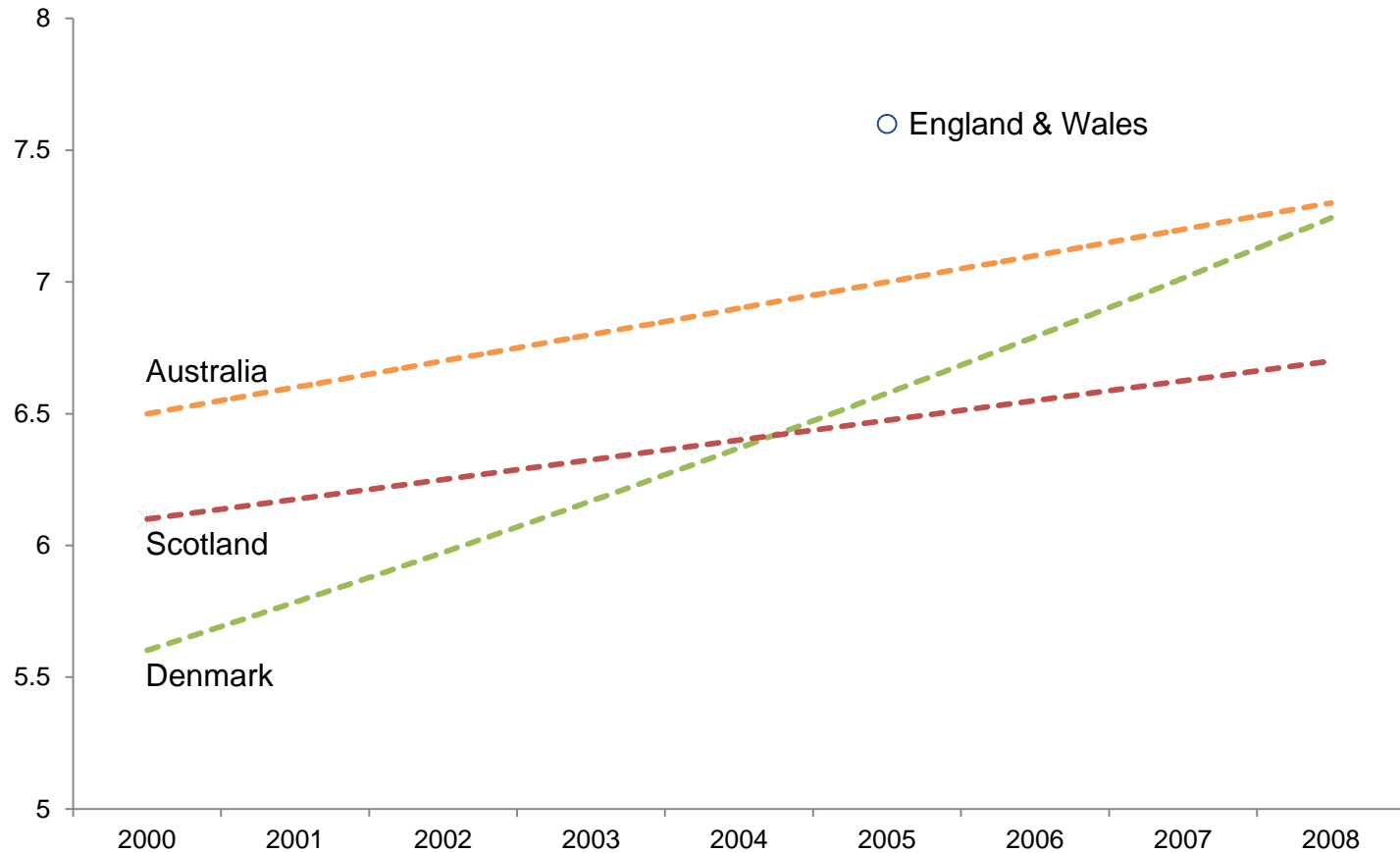
European neonatal mortality rates 2013

Babies less than 2500g account for 75% of deaths

Gestational age at delivery (UK, 2008-9)



Trends in preterm birth

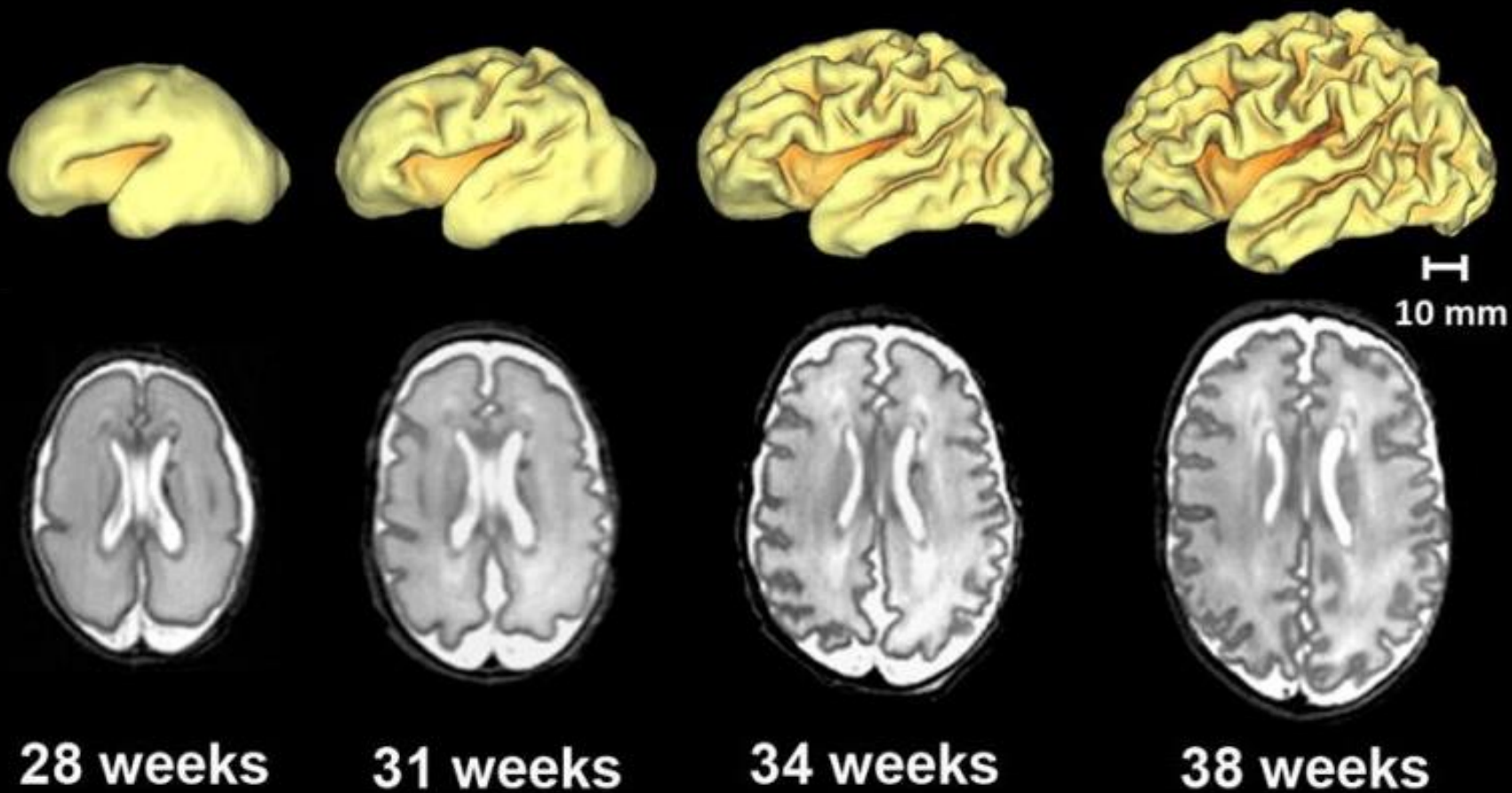


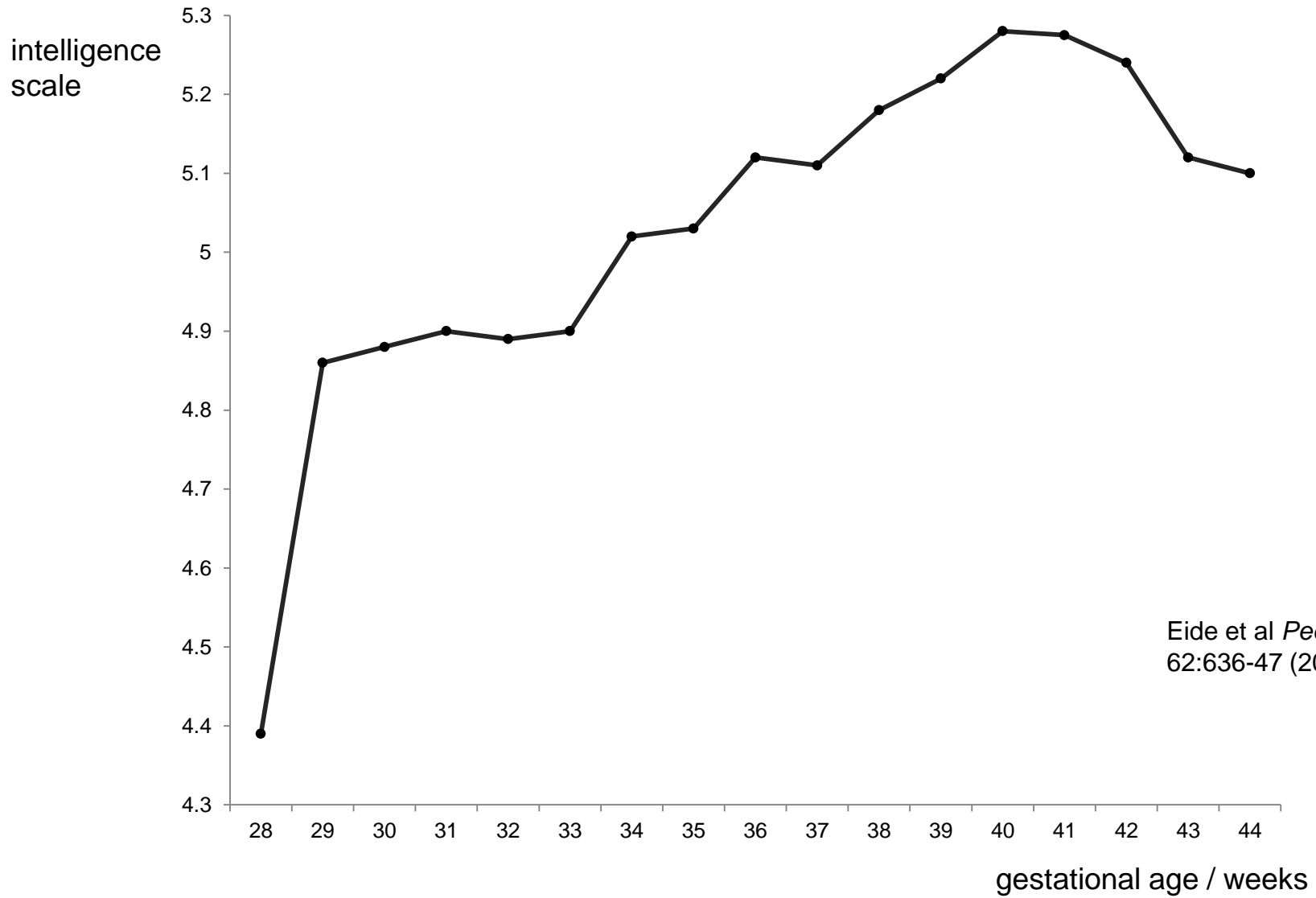
Norman J et al PLoS Medicine 6(9):e1000153 (2009)

Tracy SK et al BJOG 114:731-5 (2007)

Langhoff-Roos J et al BMJ 332:937-9 (2006)

ONS, 2007 (<http://www.statistics.gov.uk/Statbase/Product.asp?vlnk=14882>)





Eide et al *Pediatr Res*
62:636-47 (2007)

History

- general associations

bacterial vaginosis

pyelonephritis family history

domestic violence alcohol

psychosocial stress

teenage pregnancy

drug use

previous preterm birth

deprivation

gum disease

urine infection

cervical surgery

mullerian variants

chlamydia

bicornuate uterus

cone biopsy

gonorrhoea

smoking

uterine septum

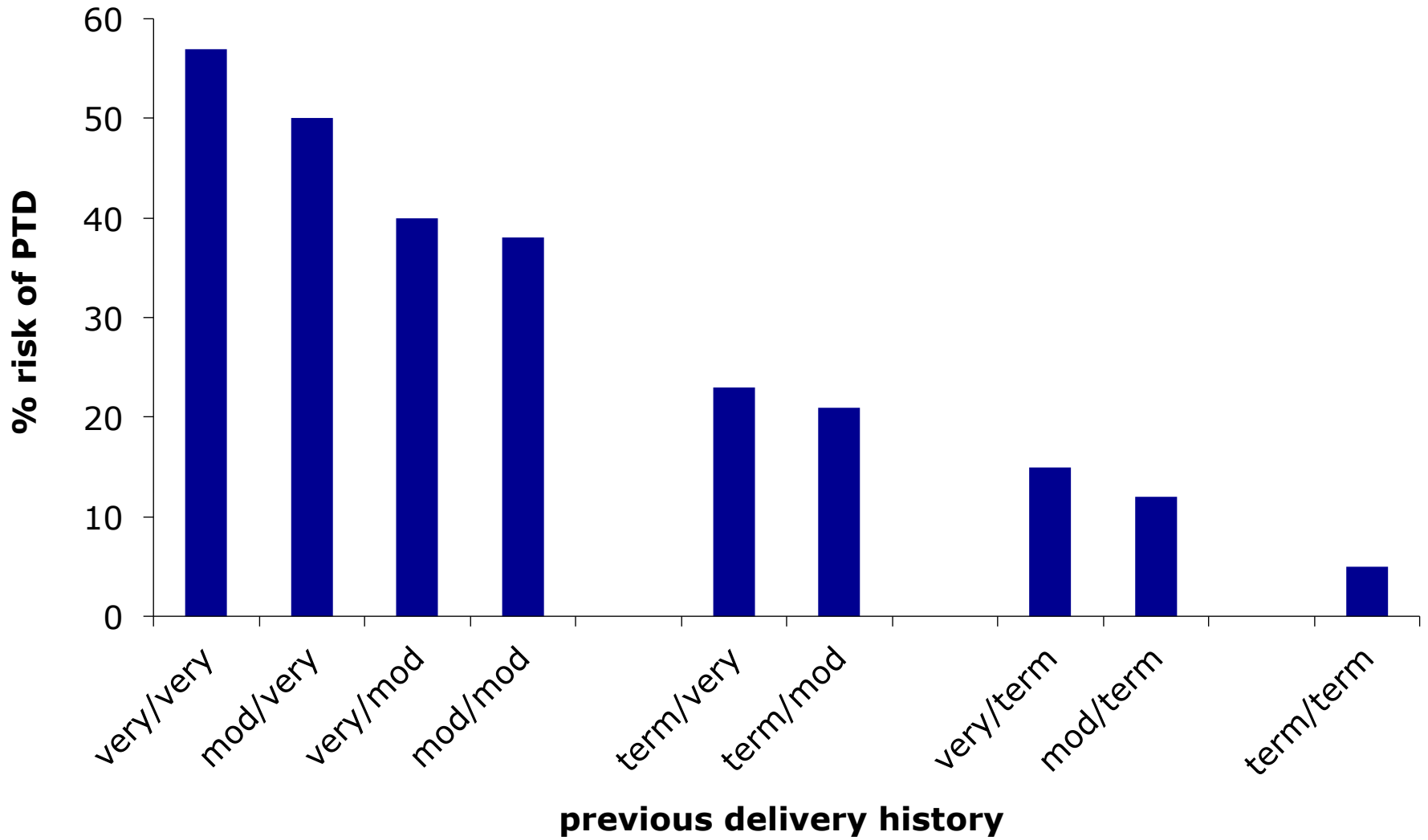
discrimination

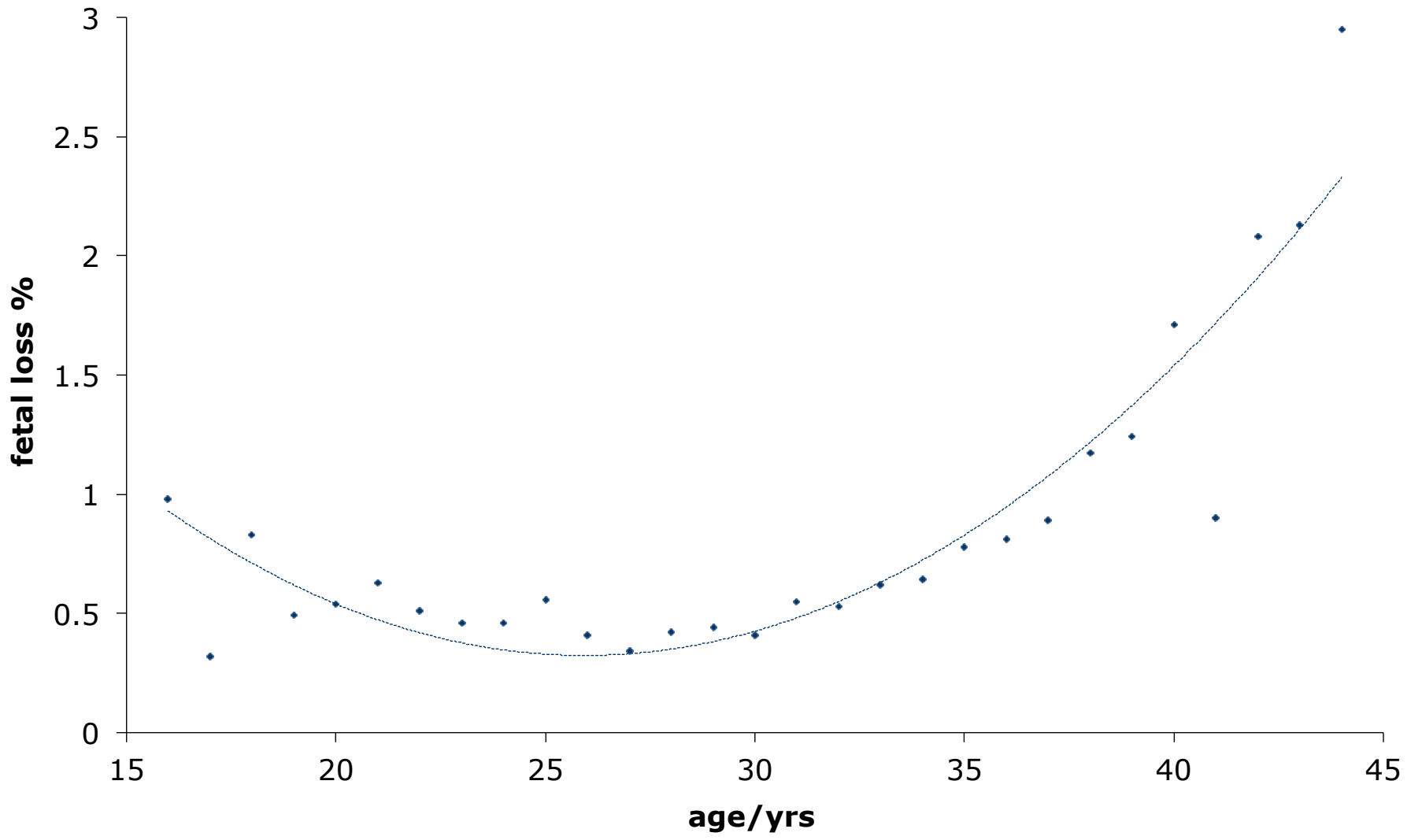
older mums

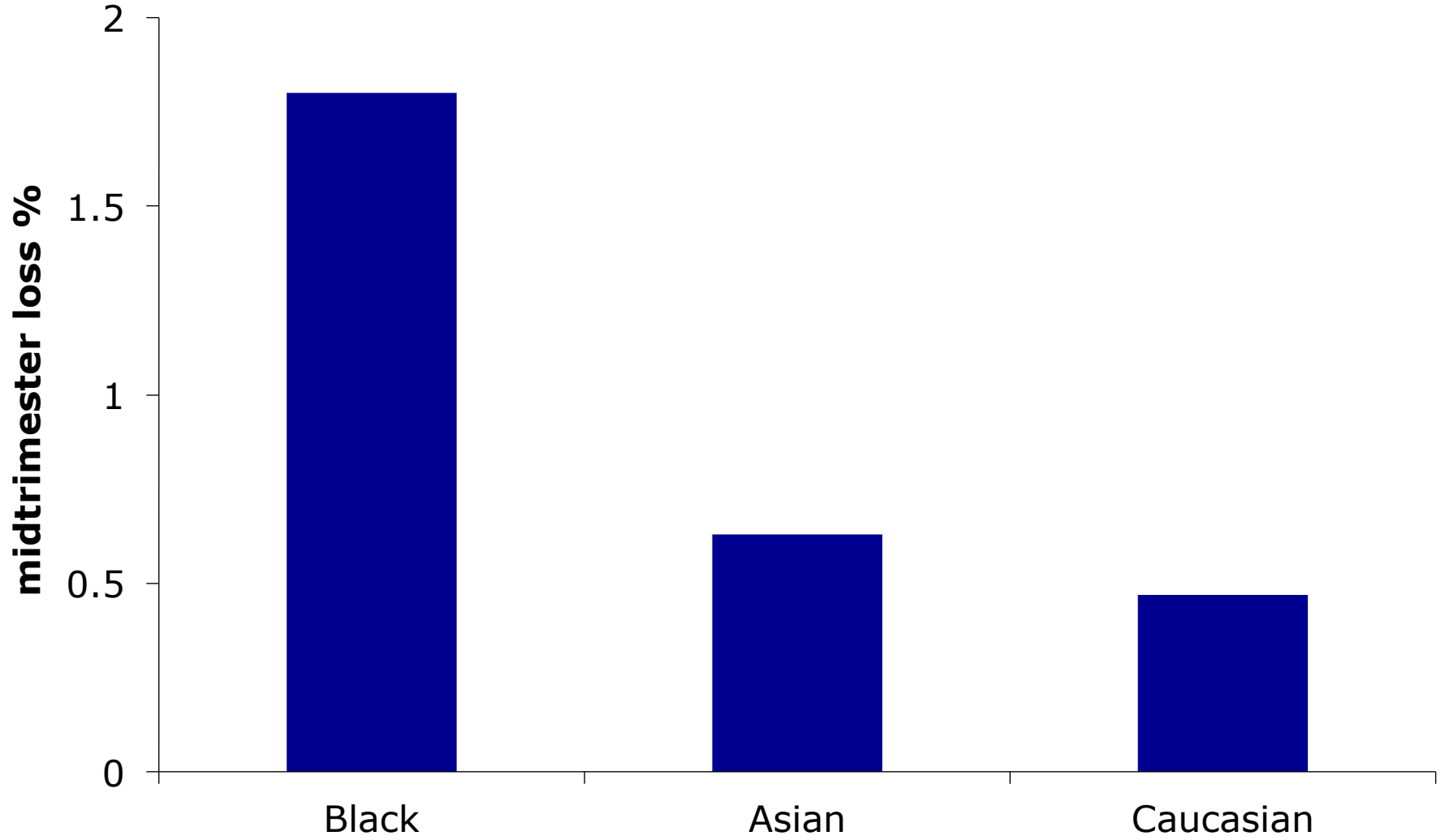
terminations

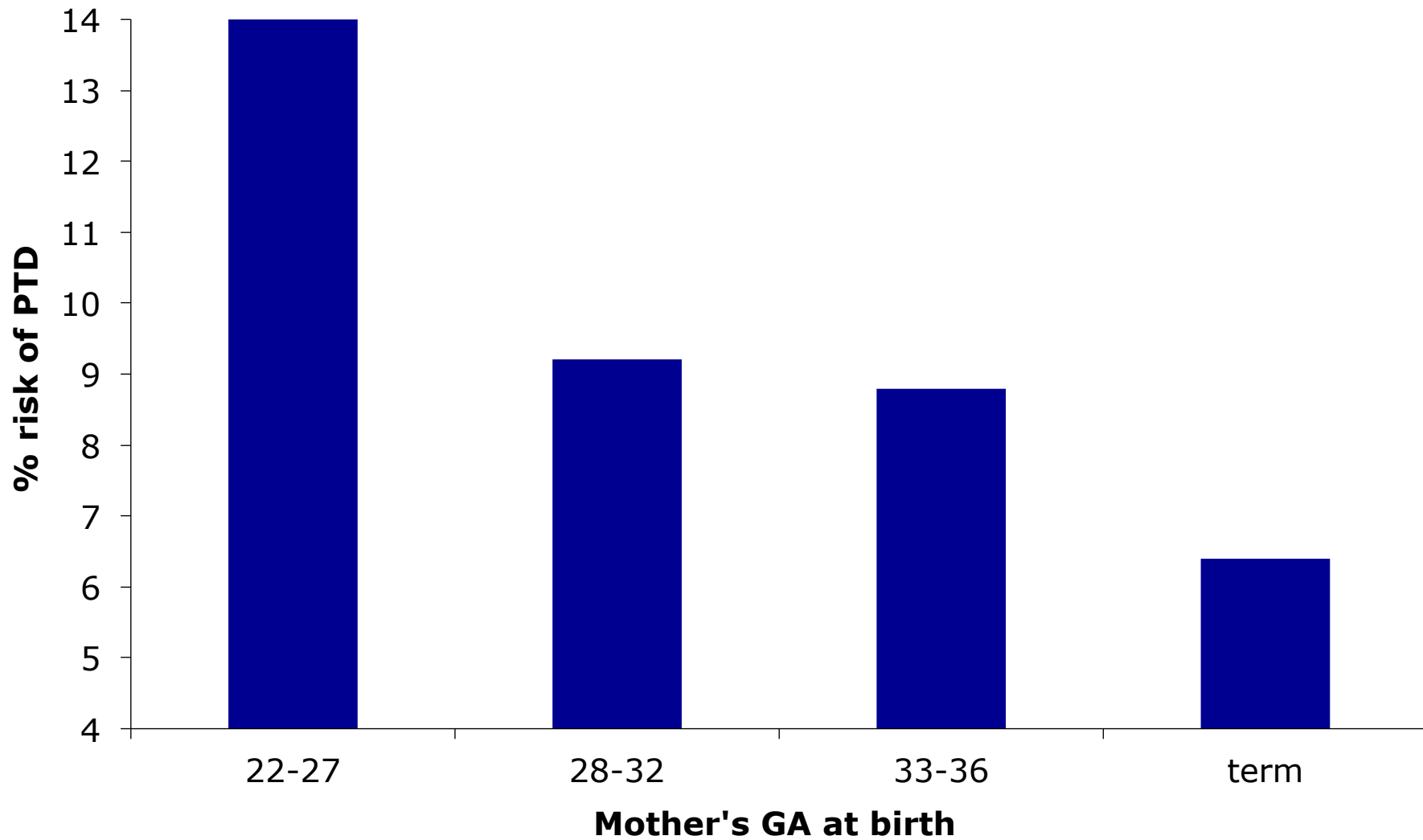
multiple

LEETZ







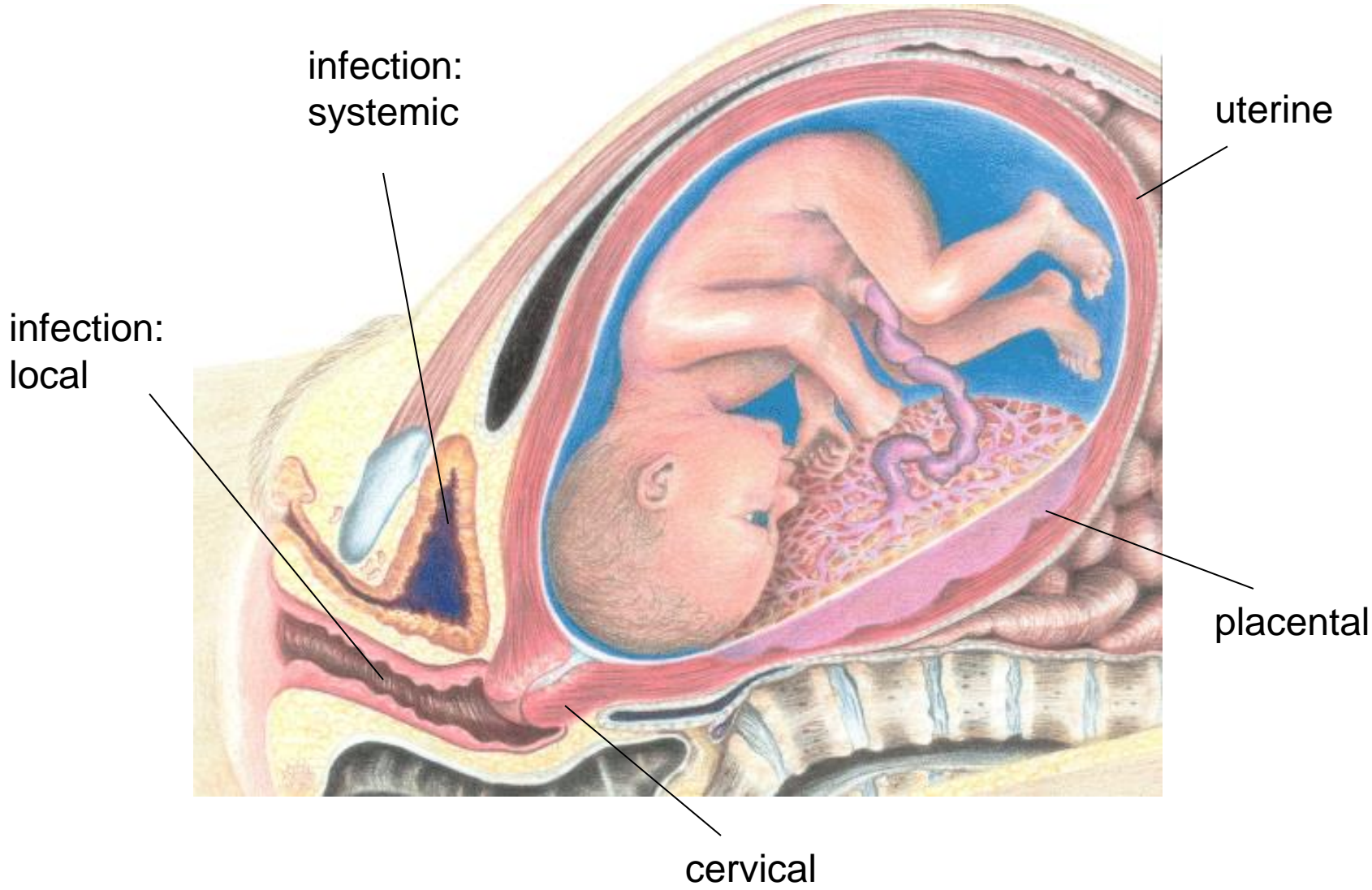


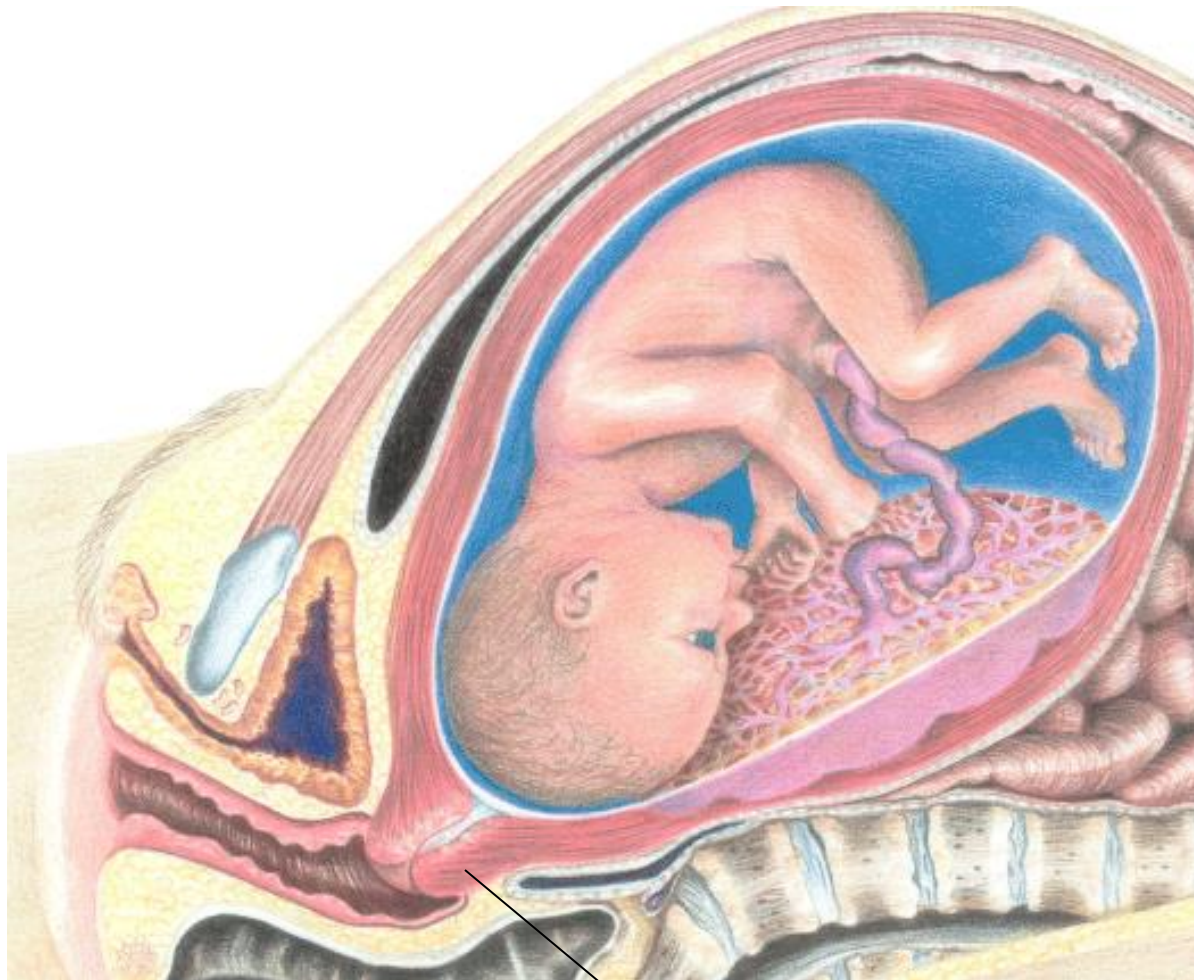
Swamy et al *JAMA* 299:1429-36 (2008)

Causes

- general associations
- specific causes

Preterm birth - causes

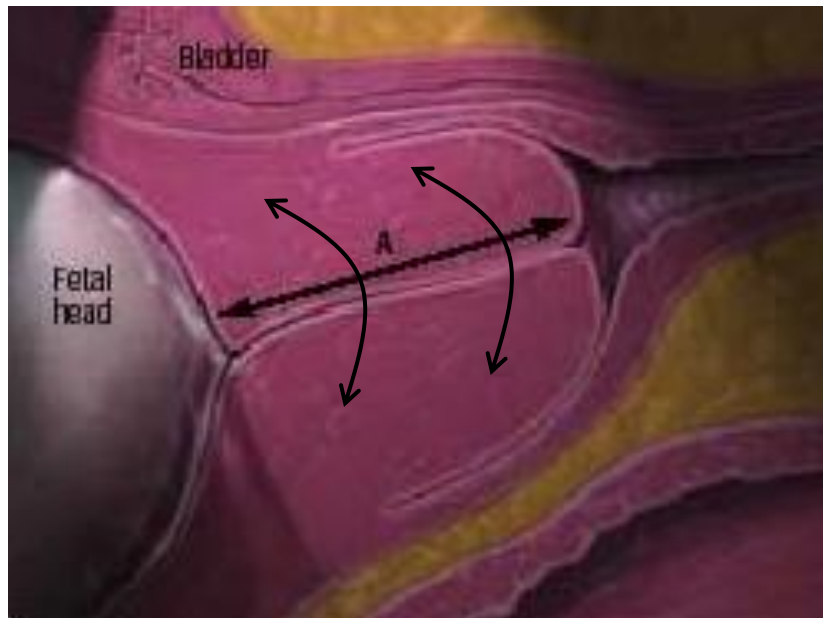




cervical

Cervical

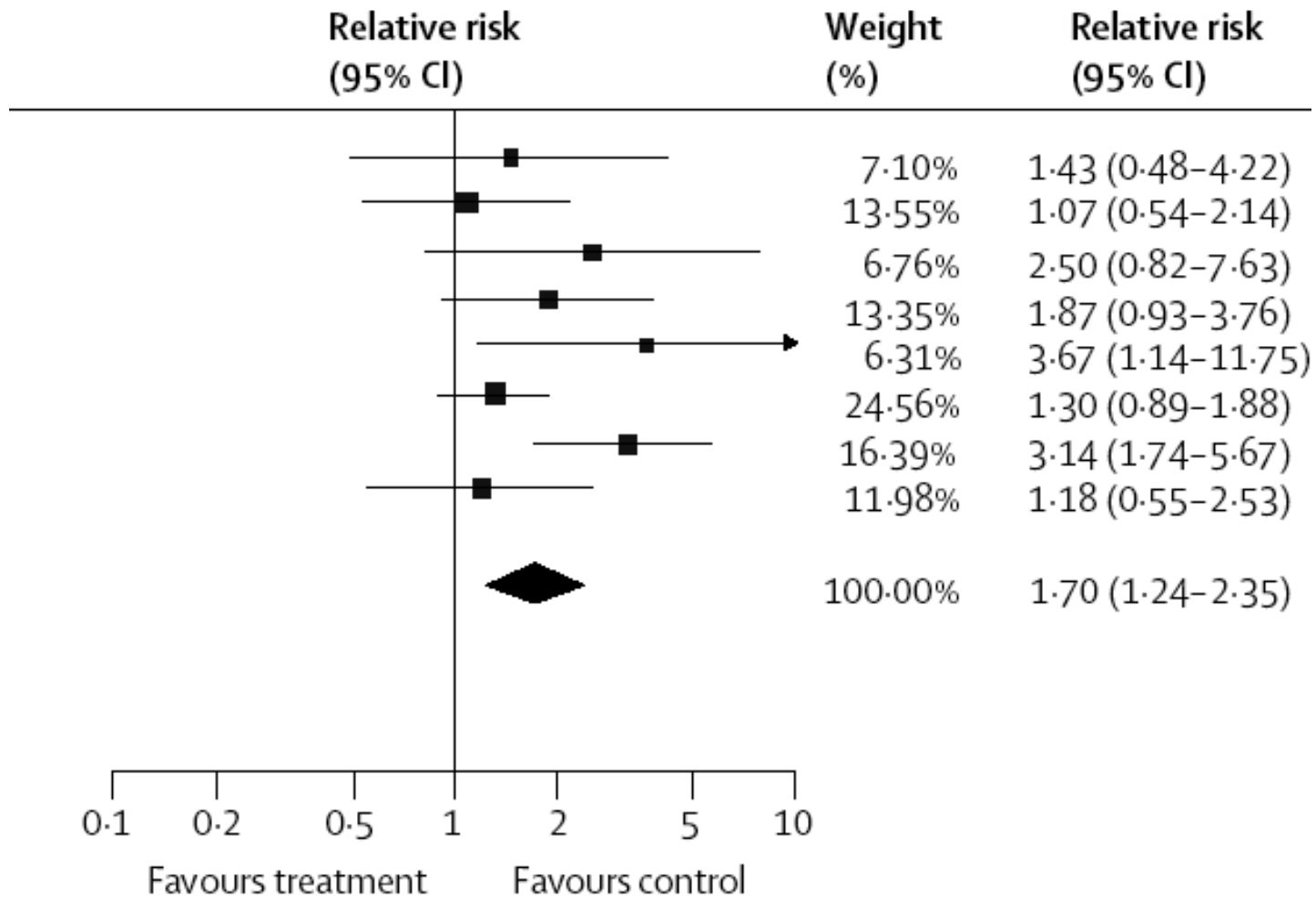
- length: prevent ascending infection
- strength: retain conceptus



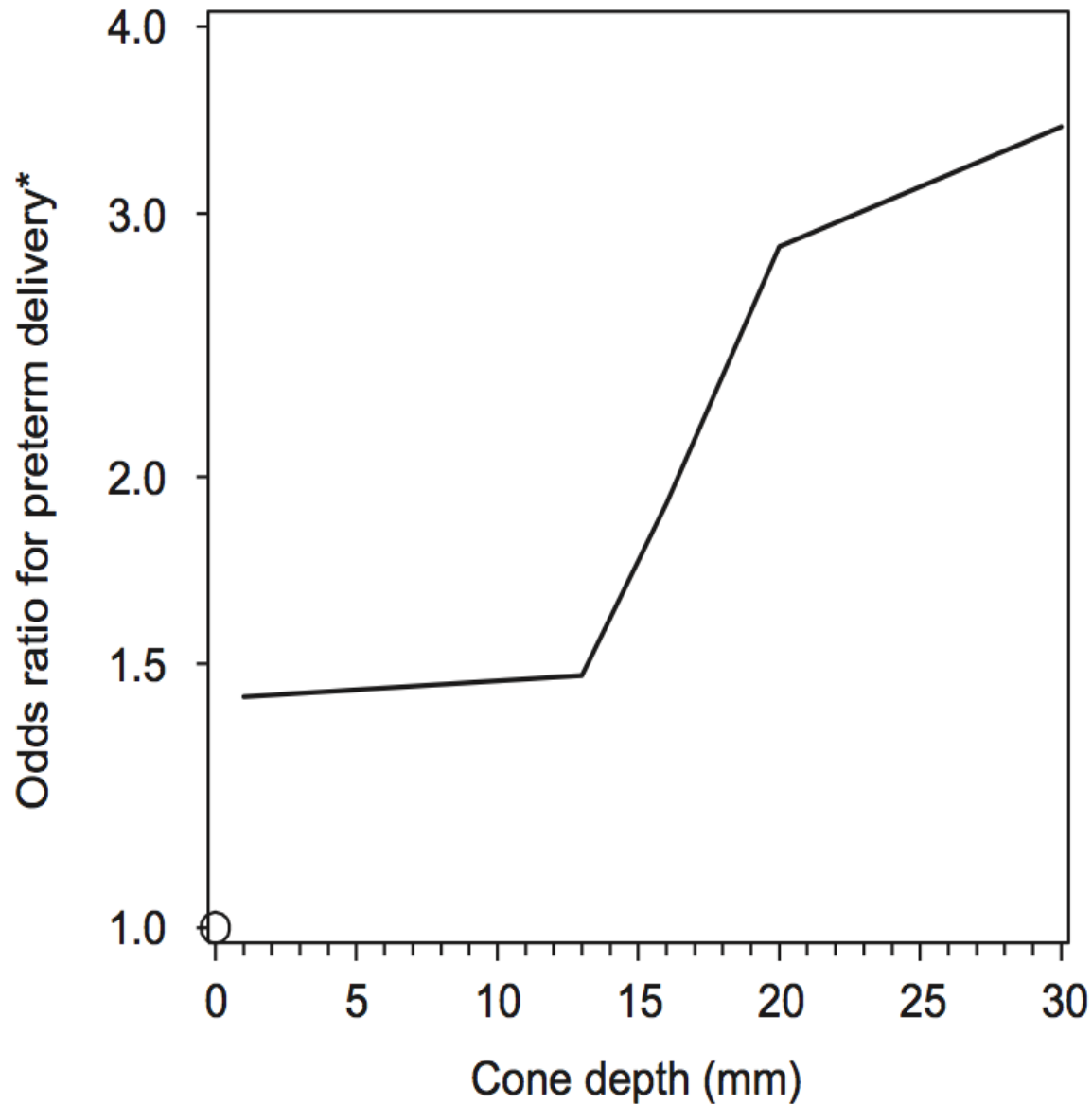
The role of the cervix

- shortening of cervix
 - caused by
 - cone biopsy, LLETZ
 - obstetric trauma (full dilatation CS/forceps)

LLETZ and risk of preterm birth

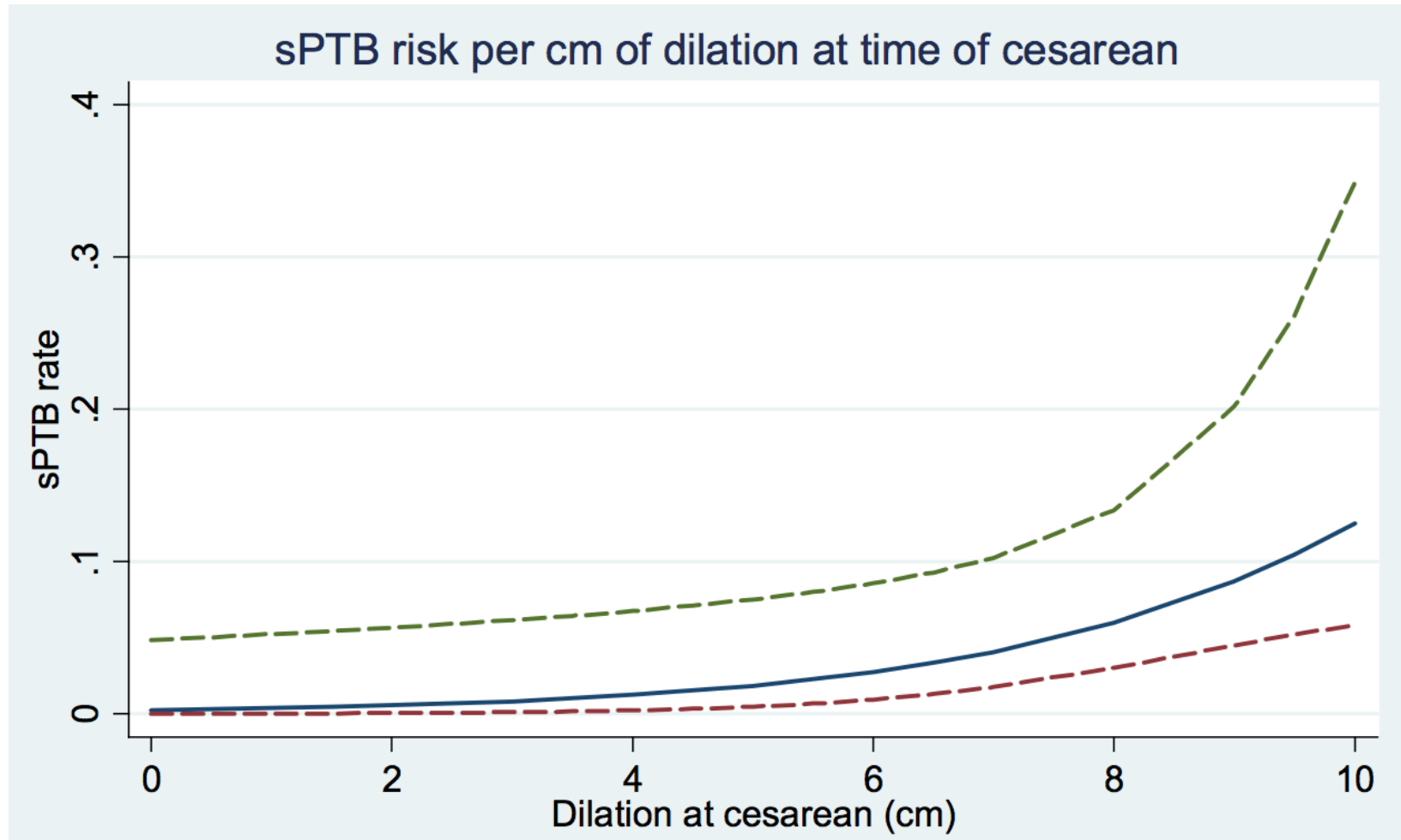


Depth of LLETZ



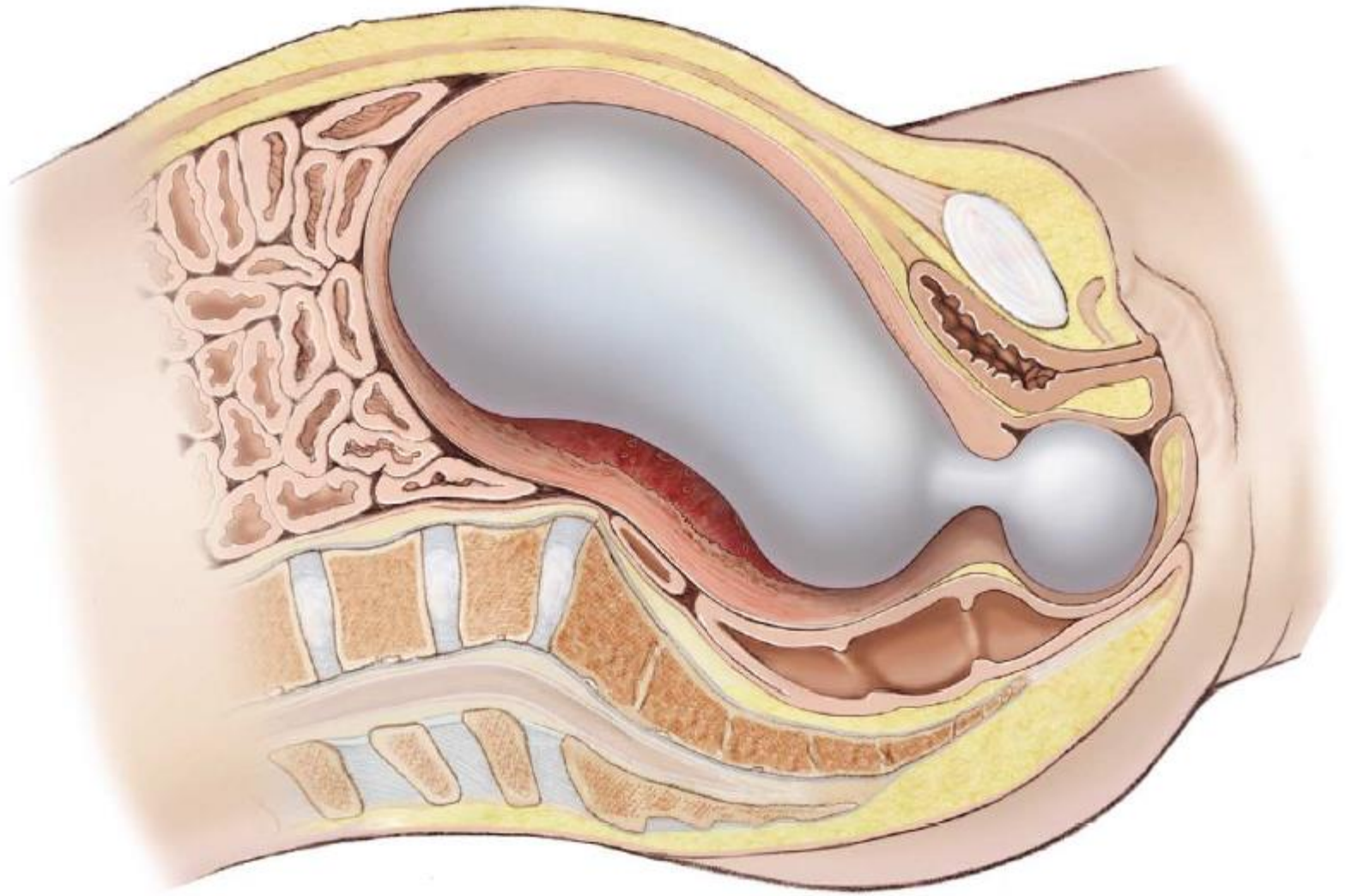
Noehr B et al
Obstet Gynecol
114:1232-8
(2009)

LSCS and risk of preterm birth



Cervical compromise

- consequences
 - ↓ barrier for ascending infection
 - ascending colonisation
 - spectrum of presentation
 - hourglass membranes
 - PTL
 - PPROM



Cervical assessment

- digital examination

Town Country	Liege Belgium	London 1 Great Britain	Luxembourg	Maastricht Netherlands	Madrid Spain	Strasbourg France	Tübingen Germany	Verona Italy
Weight	●	●	●	●	●	●	●	●
Blood pressure	●	●	●	●	●	●	●	●
Uterine height	●	●	●	●	●	●	●	●
Digital vaginal examination	●	○	●	○	○	●	●	●
Fetal heart sounds	●	●	●	●	●	●	●	●
Fetal presentation	●	●	●	●	●	●	●	●
Speculum examination	○	○	●	○	○	○	○	●
Physical examination	○	○	○	○	○	○	○	●

- Routinely done.
- Not routinely done.

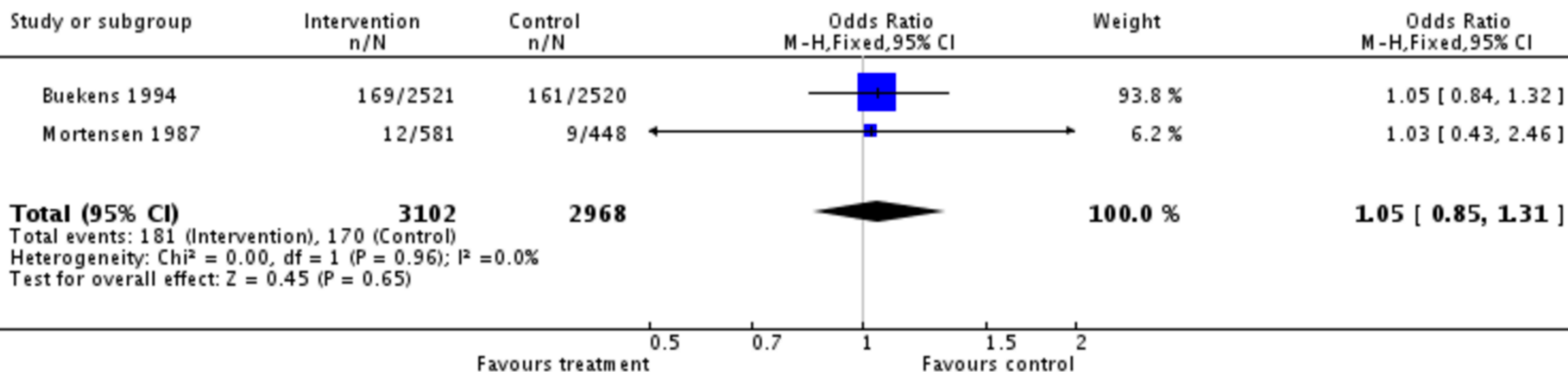
Cervical assessment

- digital examination

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Fetal heart sounds	●	●	●	●	●	●	●	●
Fetal presentation	●	●	●	●	●	●	●	●
Speculum examination	○	○	●	○	○	○	○	●
Physical examination	○	○	○	○	○	○	○	●

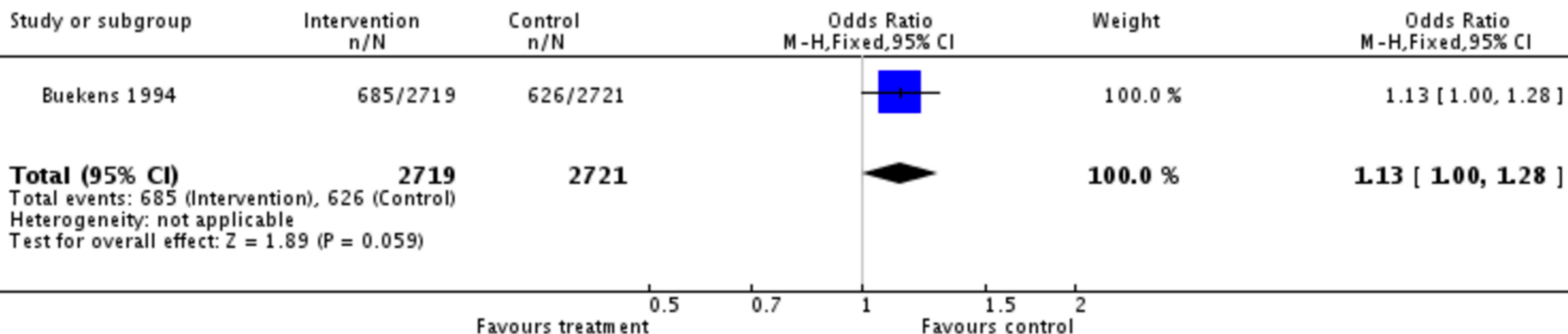
- Routinely done.
- Not routinely done.

Review: Repeat digital cervical assessment in pregnancy for identifying women at risk of preterm labour
 Comparison: 1 Systematic digital cervical examination versus no examination unless medically indicated
 Outcome: 1 Preterm birth < 37 weeks



No reduction in preterm birth...

Review: Repeat digital cervical assessment in pregnancy for identifying women at risk of preterm labour
 Comparison: 1 Systematic digital cervical examination versus no examination unless medically indicated
 Outcome: 7 Hospital admission before 37 weeks



...but increased likelihood of admission

Cervical assessment

- digital examination
- transvaginal ultrasound
 - 7.5 MHz
 - microcurved array probe

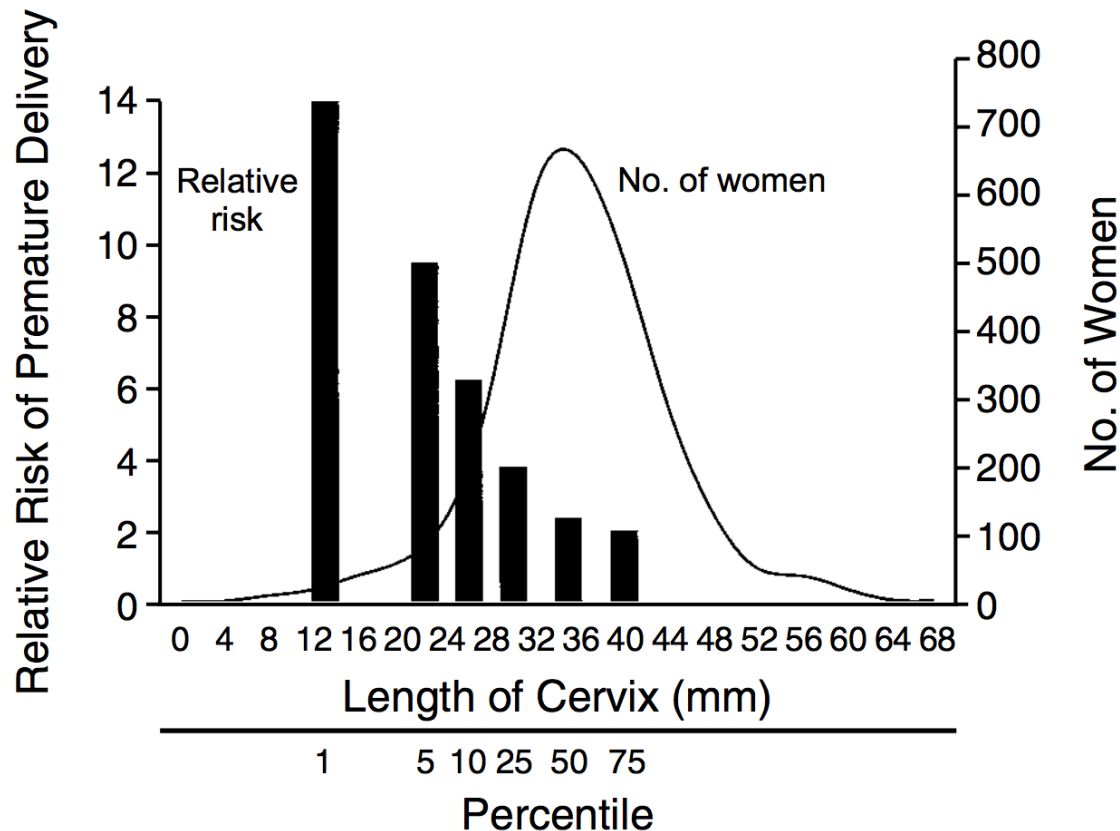


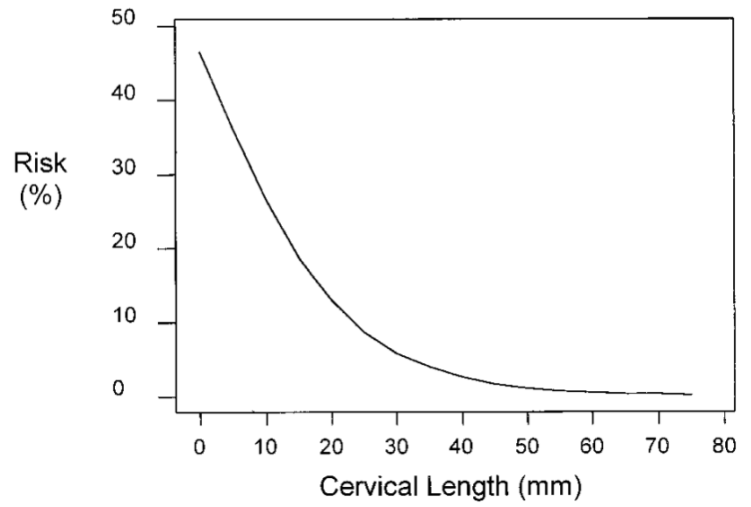
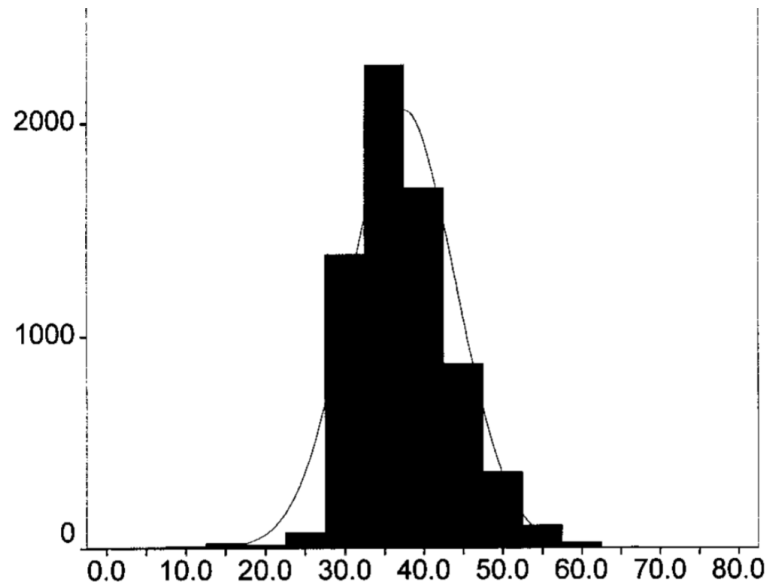
Measurement of Cervical Length in Pregnancy: Comparison Between Vaginal Ultrasonography and Digital Examination

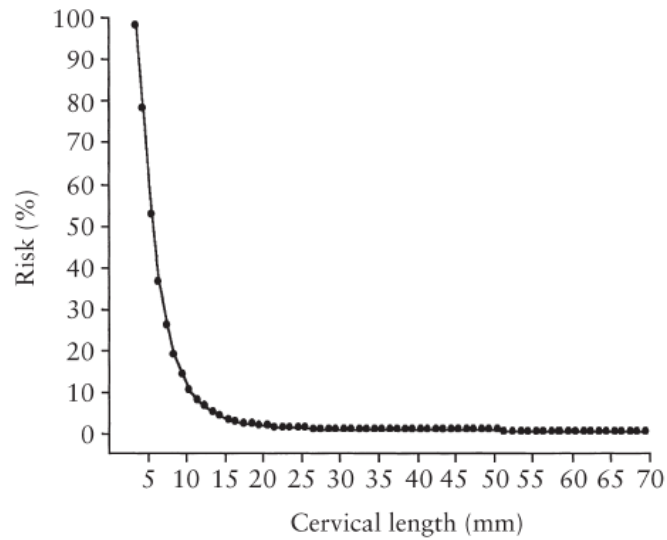
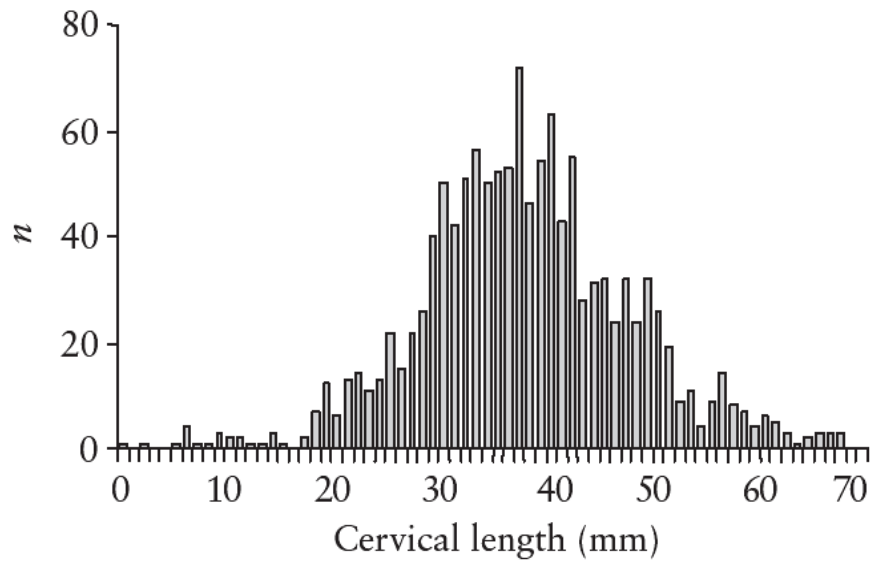
*JIRI D. SONEK, MD, J. D. IAMS, MD, M. BLUMENFELD, MD, F. JOHNSON, RN,
M. LANDON, MD, AND S. GABBE, MD*

THE LENGTH OF THE CERVIX AND THE RISK OF SPONTANEOUS PREMATURE DELIVERY

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ATEF MOAWAD, M.D., ANITA DAS, M.S., ELIZABETH THOM, PH.D., DONALD MCNELLIS, M.D.,
RACHEL L. COPPER, M.S.N., C.R.N.P., FRANCEE JOHNSON, R.N., B.S.N., JAMES M. ROBERTS, M.D.,
AND THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT MATERNAL FETAL
MEDICINE UNIT NETWORK*







Cervical length

- technique

Study	'failed' images
Preterm Prediction Study (MFMU Network)	20%
SCAN Trial (MFMU Network)	15%
NuMOM2b Network	30%
CerviLenz Study	11.5%
PREGNANT Trial	10%

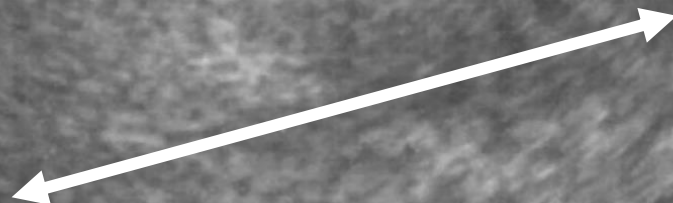
Cervical length

- technique
 - cervix occupies 75% of the image
 - anterior width = posterior width
 - maternal bladder empty
 - internal os seen
 - external os seen
 - cervical canal visible throughout
 - caliper placement correct

51/52
19Hz

R06 G76 C3 A1

51/52
19Hz



R06 G76 C3 A1

48/49
19Hz



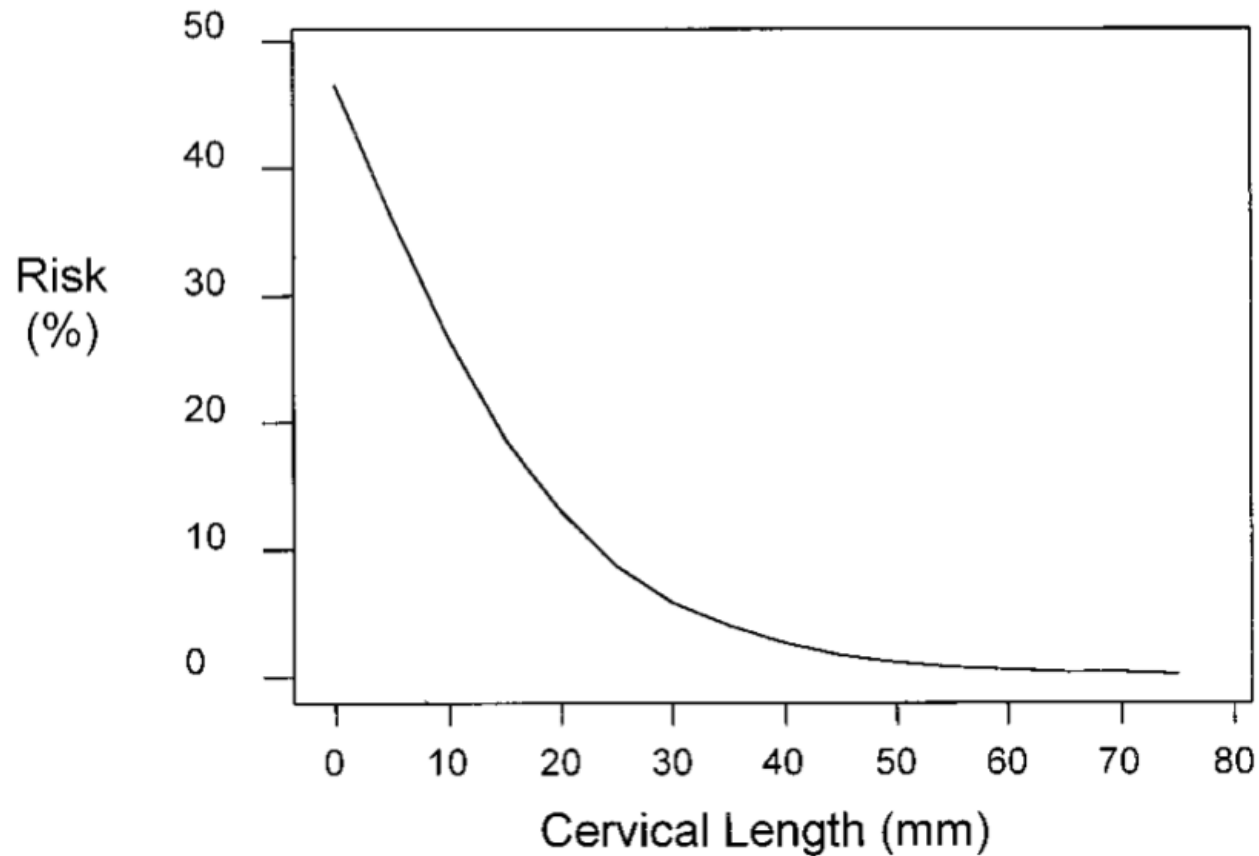
Cervical length

- indications

- asymptomatic: to assess need for preventive strategies (progesterone, cerclage, pessary)
- symptomatic: guide intervention (tocolysis, steroids, magnesium sulphate)

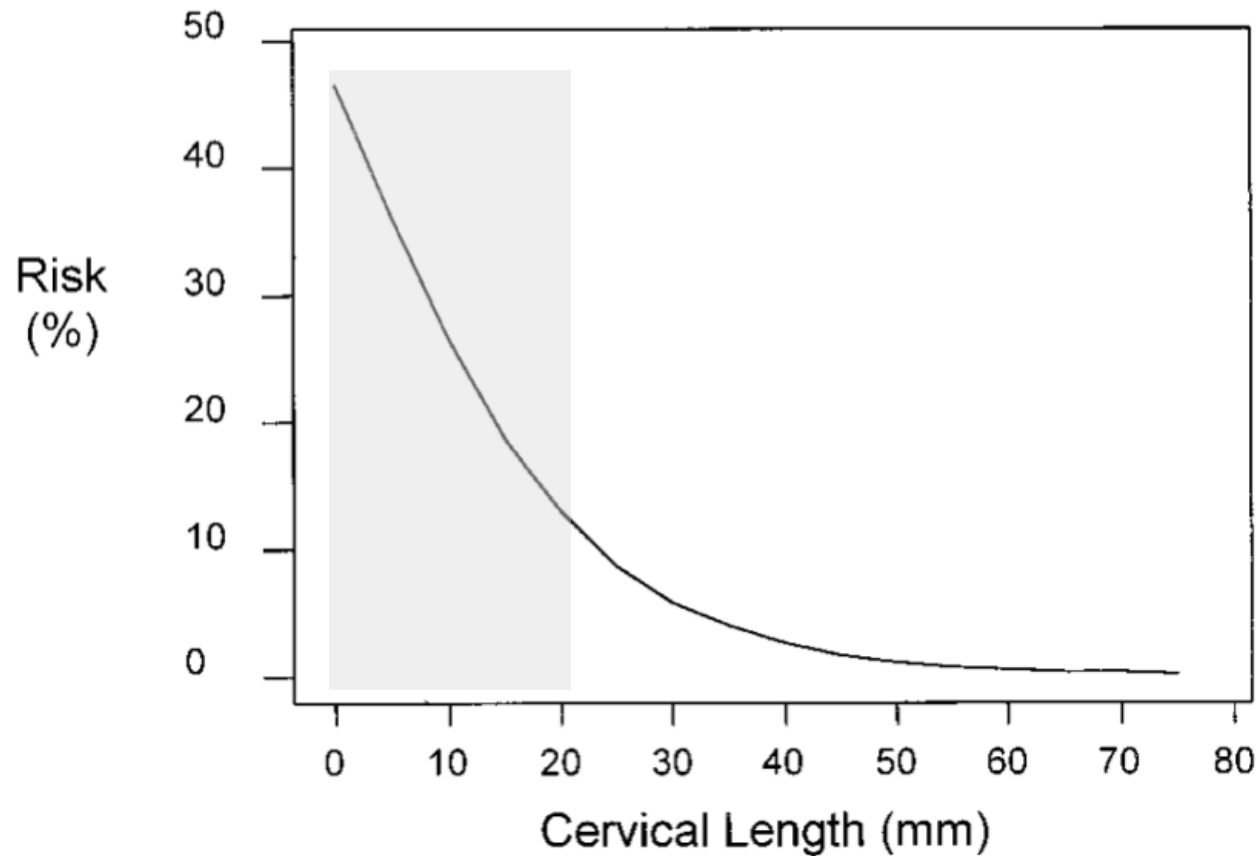
Cervical assessment

- implications of short cervix

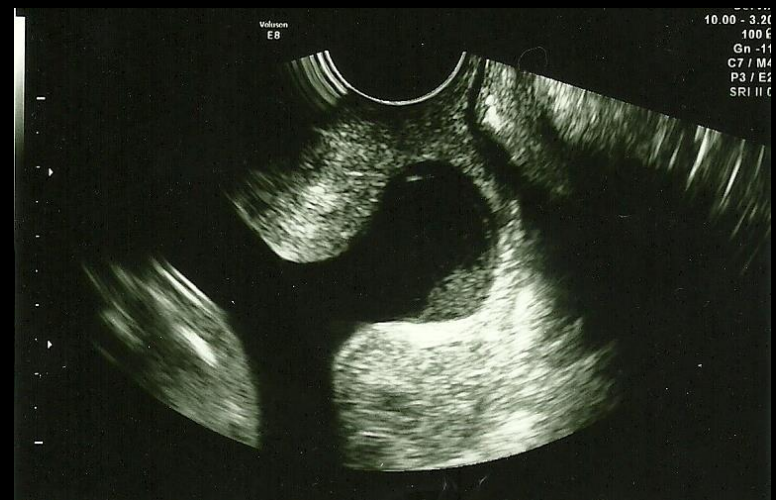


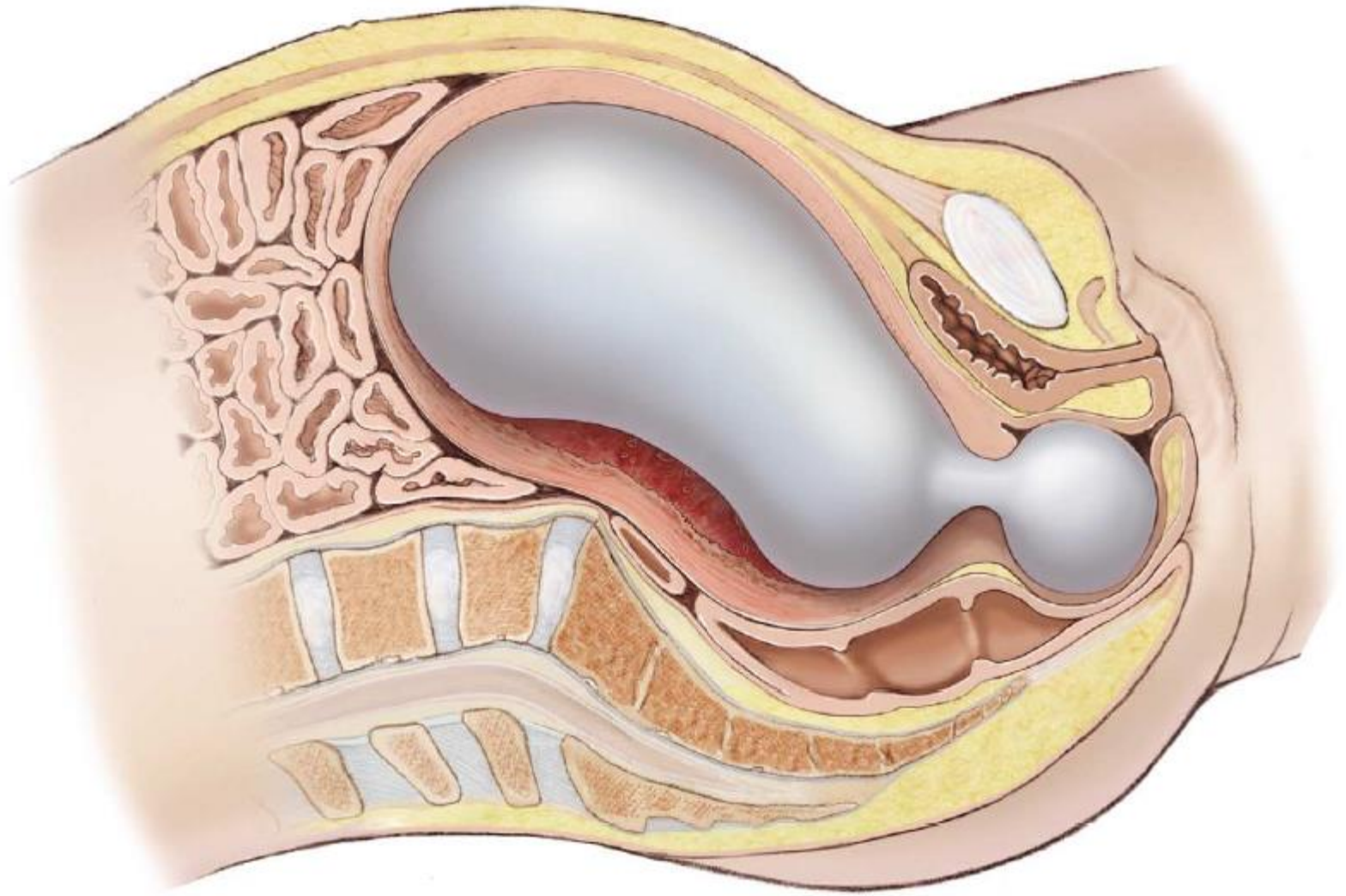
Cervical assessment

- implications of short cervix









FR 26HZ
RS

2D
54%
C 52
P Med
HRes

M3

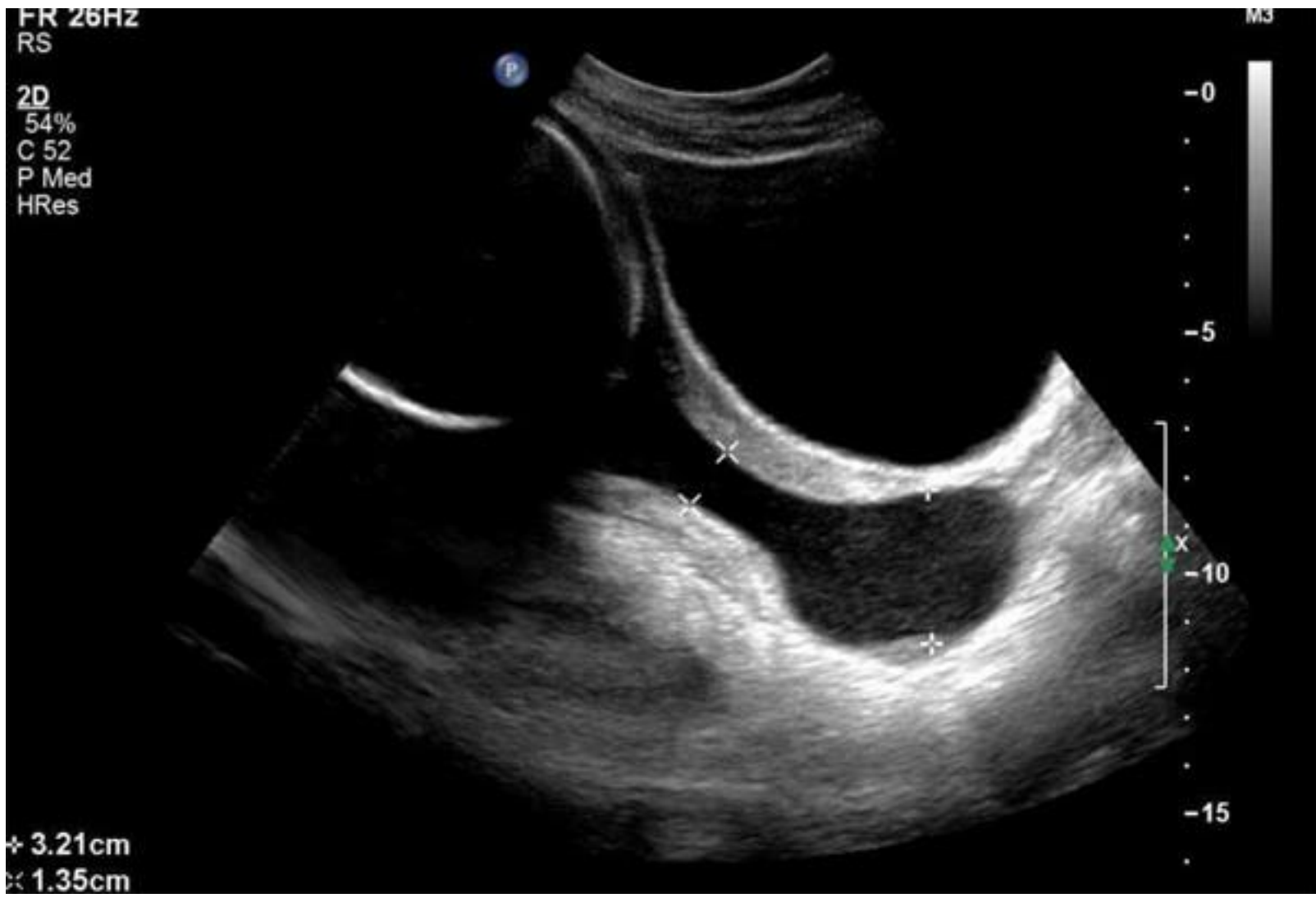
-0

-5

-10

-15

+ 3.21cm
x 1.35cm



Cervical assessment

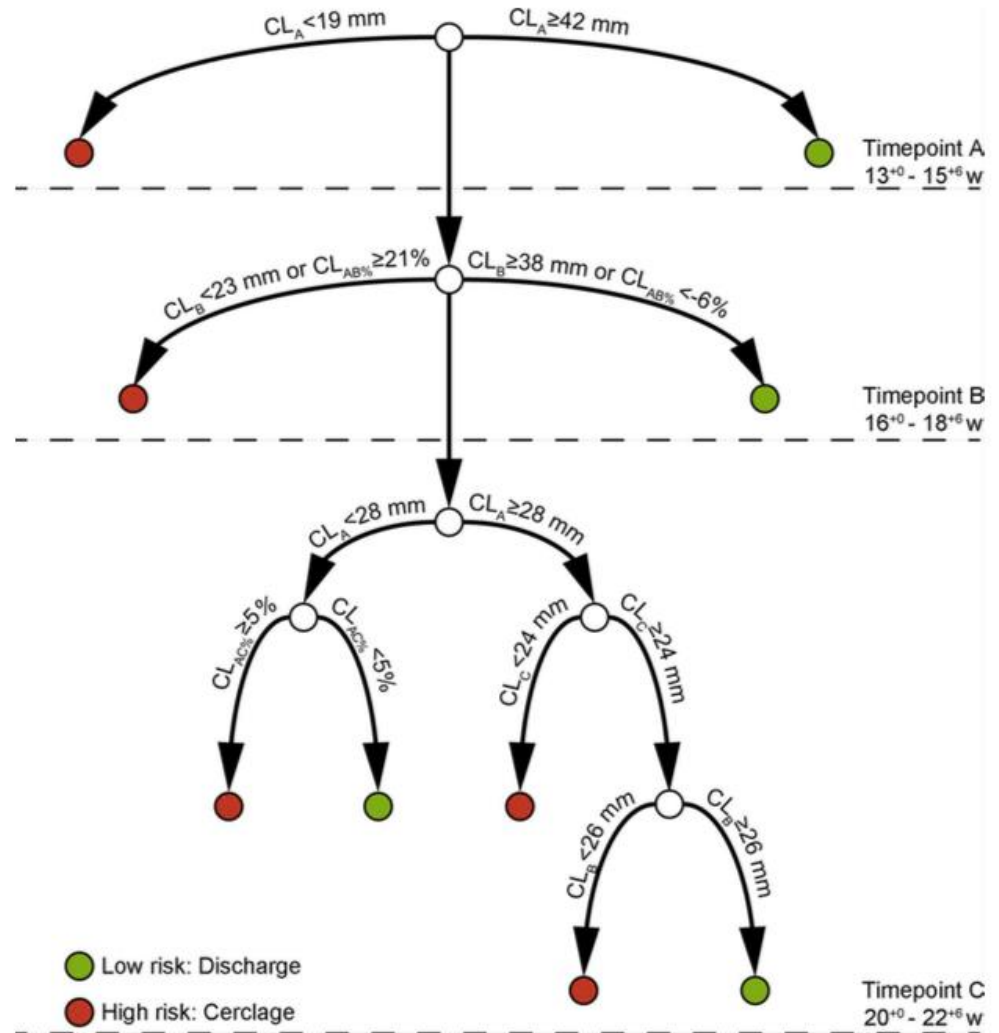
- implications of short cervix
- determine causation:
 - normal length for that woman?
 - previous excisional procedure?
 - structural weakness of internal os?
 - early parturition?
 - combination of any of these?

Cervical assessment

- sequential scans/critical length?
 - low risk population, serial scans, change 24-28wks
 - ‘among women with a short cervix [$<25\text{mm}$], for every 1 mm of cervical shortening between ultrasounds, there was a 3% increase in the odds of SPTB....[with] stable or increased CL, rate of SPTB was lower than for women with decreased CL between visits...no association for women with a CL $>25\text{ mm}$ ’

Cervical assessment

- sequential scans/LLETZ?



Cervical assessment

- start at 16 weeks for baseline measurement
- repeat scans according to POH
- assess internal os
- earlier collapse probably implies structural weakness

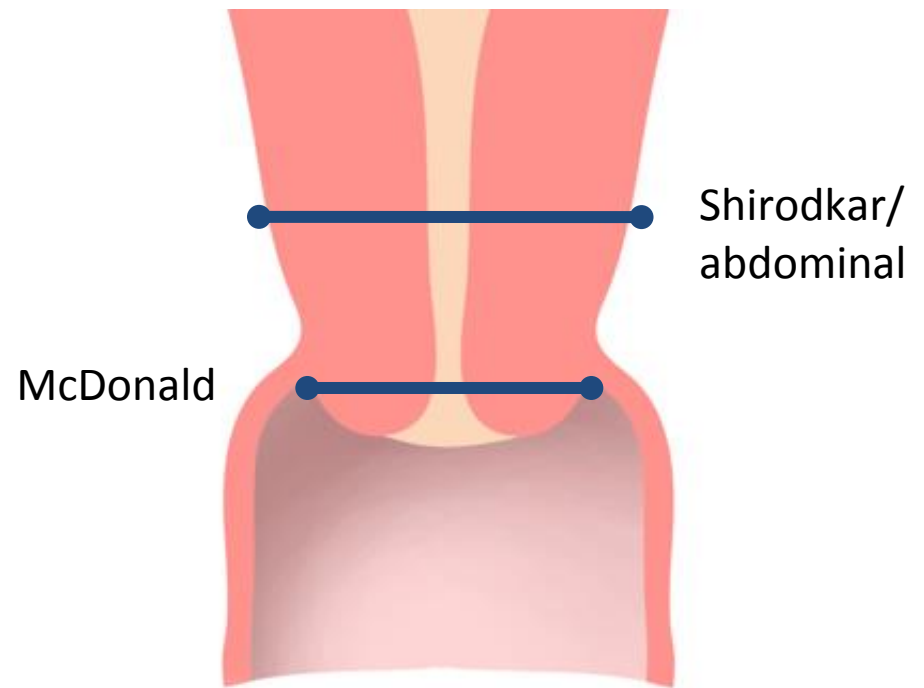
Cerclage

- types

- McDonald
- Shirodkar
- transabdominal

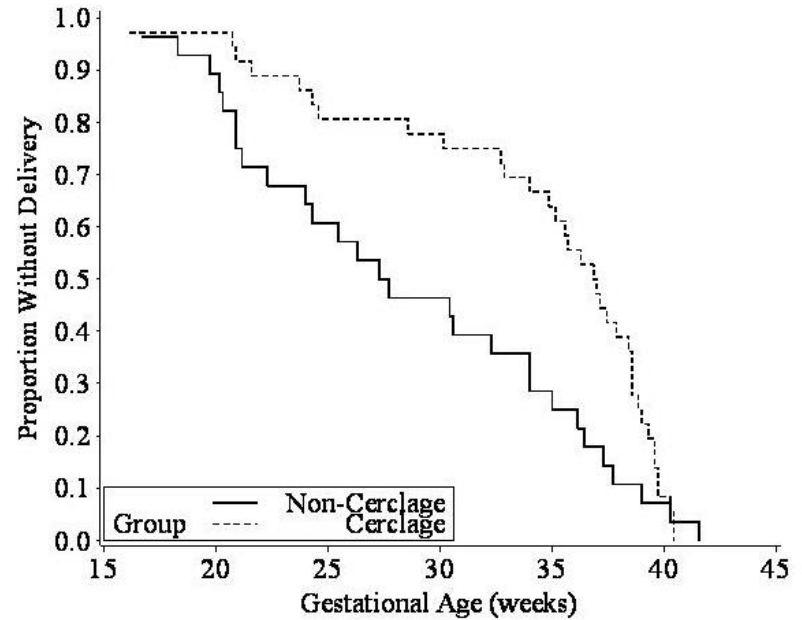
- timing

- elective
- ultrasound-indicated
- rescue



Cerclage

- cerclage reduces sPTB by 30% in women with a history of sPTB and a cervix <25mm before 24 weeks gestation



-5500 PHD

Y

, F 3 17-01-

16:27:

49/50
19Hz

9118 5
DVA: 49

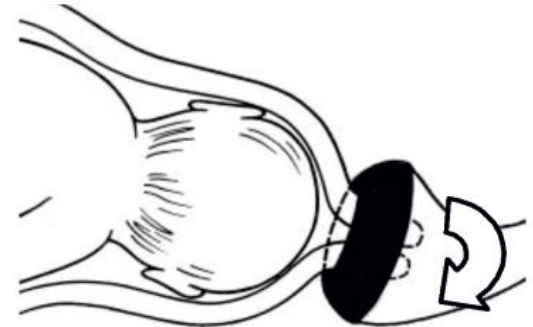
R08 G65 C3 A1

TV



Pessaries

- Arabin
 - silicone
 - easier insertion
 - ongoing trials v cerclage and progesterone



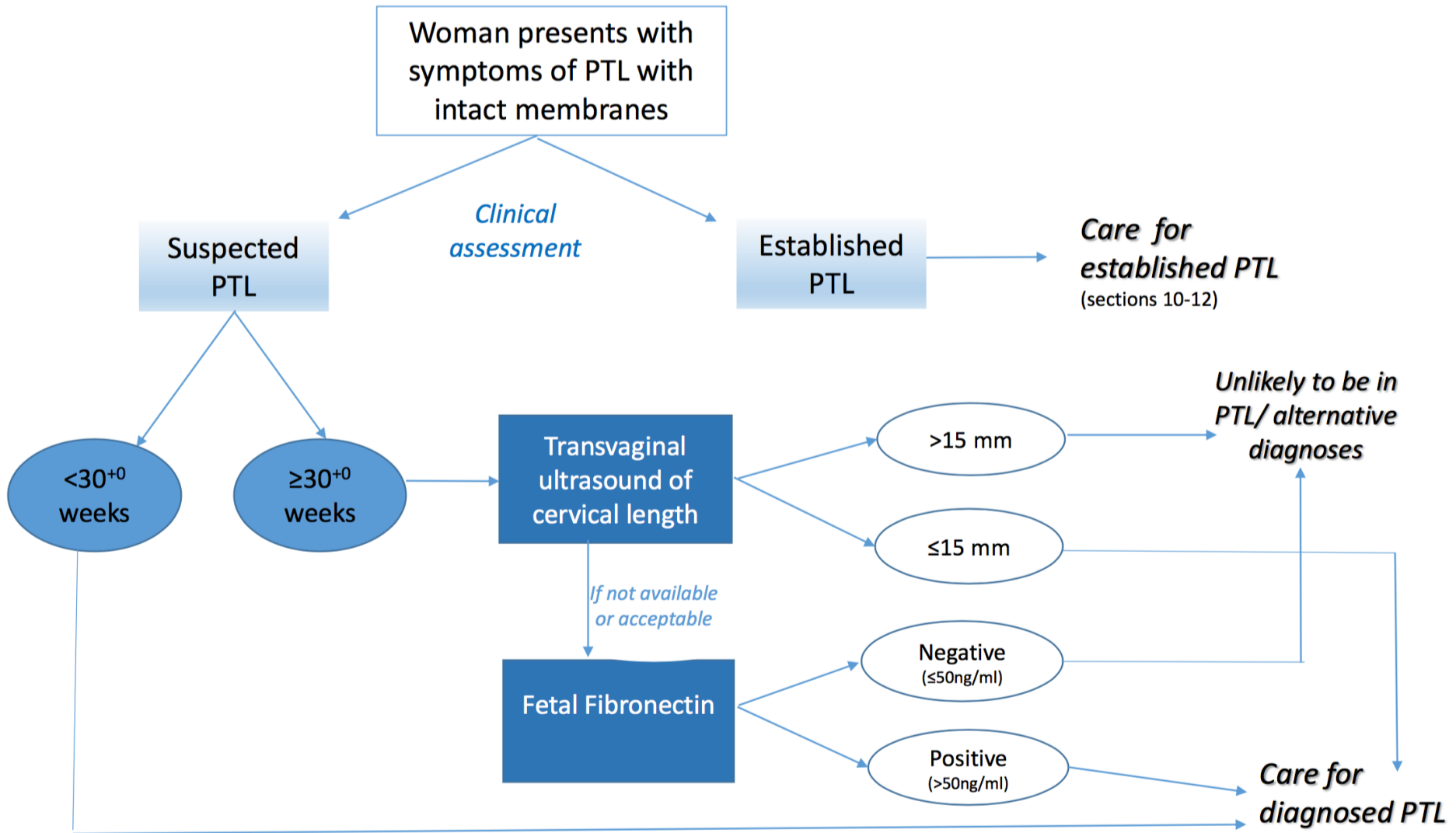
Cervical length

- **indications**

- asymptomatic: to assess need for preventive strategies (progesterone, cerclage, pessary)
- symptomatic: guide intervention (tocolysis, steroids, magnesium sulphate)

Cervical length

- 'If the clinical assessment suggests that the woman is in suspected preterm labour and she is 30+0 weeks pregnant or more, consider transvaginal ultrasound measurement of cervical length as a diagnostic test to determine likelihood of birth within 48 hours'



Summary

- TVS assessment of cervix is here to stay
- use in symptomatic and high-risk asymptomatic women
- current challenges
 - adjunctive tests
 - management strategies
 - training