Do international variations in the preterm birth rate reflect overall differences in the gestational age distribution?

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Inserm

UNIVERSITÉ PARIS DESCARTES

Background: Wide variations in preterm birth (PTB) rates and trends

BJOG An International Journal of Obstetrics and Gynaecology

Epidemiology

Preterm birth time trends in Europe: a study of 19 countries

OPEN

J Zeitlin[1,2,*], K Szamotulska[3], N Drewniak[1,2], AD Mohangoo[4], J Chalmers[5], L Sakkeus[6], L Irgens[7,8], M Gatt[9], M Gissler[10,11], B Blondel[1,2] and The Euro-Peristat Preterm Study Group[†]

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- From 5 to 10% among live births in Europe are preterm, defined as < 37 weeks GA
- Prevention policies have generally not been successful

REVIEW

OPEN

CURRENT OPINION

What contributes to disparities in the preterm birth rate in European countries?

Marie Delnord, Béatrice Blondel, and Jennifer Zeitlin

- What are the most likely current sources of variation that could explain PTB rate differences between countries?

- **Key message 1:**

Multiple risk factors impact on PTB rates and trends

- Modifiable population factors e.g. BMI, smoking, environmental exposures
- Health systems factors: practices related to subfertility treatments and indicated deliveries

- **Key message 2:**

Need more knowledge about how risk factors contribute to low and stable PTB rates in some countries versus others.

- Are these risk factors only for preterm birth or do they affect the whole GA distribution?

- Are we only concerned about the extremes (<37 weeks) or the entire distribution?

- **Do international variations in the preterm birth rate reflect overall differences in the gestational age distribution?**

Could this change the way that we think about prevention or evaluate policies?

Study Population: singleton live births

- 27 European countries in the Euro-Peristat project, the United States, Canada and Japan (PREBIC project)
- Years:

1996, N=16 countries

2000, N=20

2004, N=22

2008, N=21

2010, N=34

- By mode of onset (spontaneous versus provider-initiated) for 11 countries in 1996, 14 in 2000 , 16 in 2004 and 16 in 2008.

Analysis

Outcome measures:

Rates of moderate and late PTB (32-36 weeks)

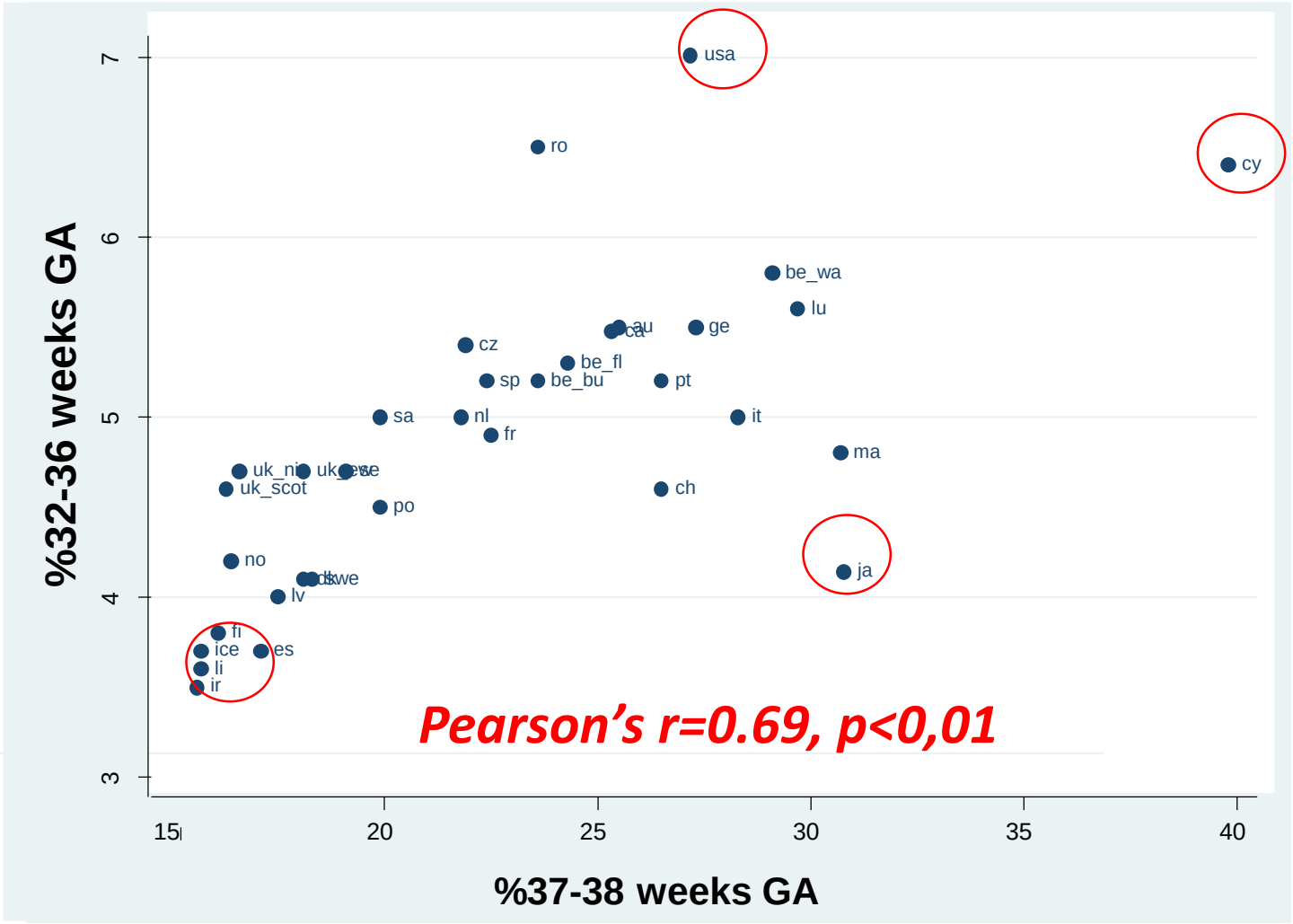
Rates early term births (37-38 weeks GA)

Mean GA at term (excluding preterm births and setting all postterm births to 41 GA)

- ✓Correlation between rates of PTB and ETB using Pearson's correlation in each time period
- ✓Correlation of change in rates of PTB and ETB, adjusted for clustering within countries

- ➢Results provided overall and by mode of onset

Results: In 2010, 34 countries/regions



Rates:

Early term births:

[15,6%-39,8%]

med: 22,2 %

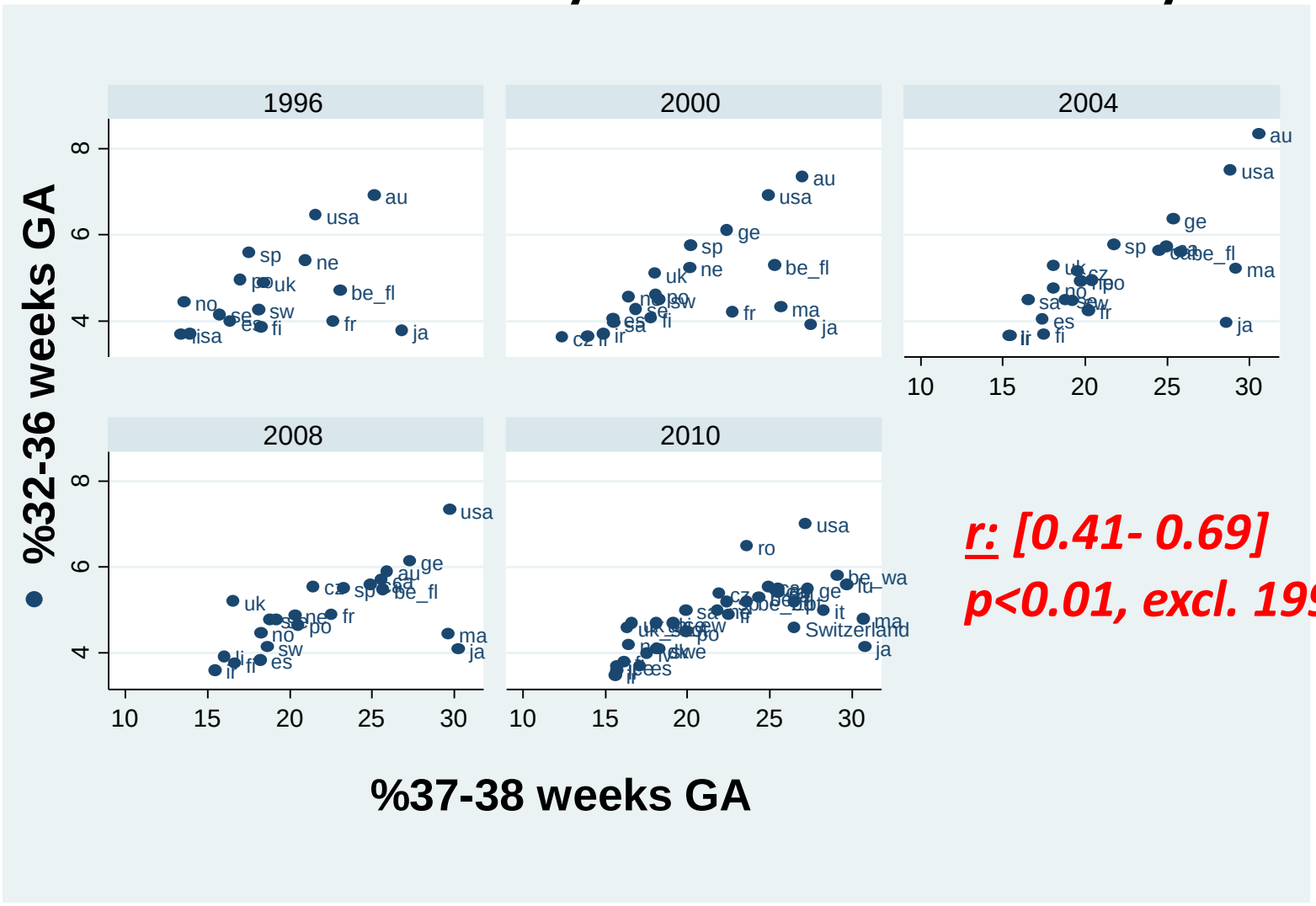
Late & mod. PTB:

[3,5%-7,0%]

med: 4,9%

In Europe: N= 248 752; US: N= 3 363 032; Japan: N= 1 080 089

Late and moderate PTB rates were positively correlated with early term births in all years

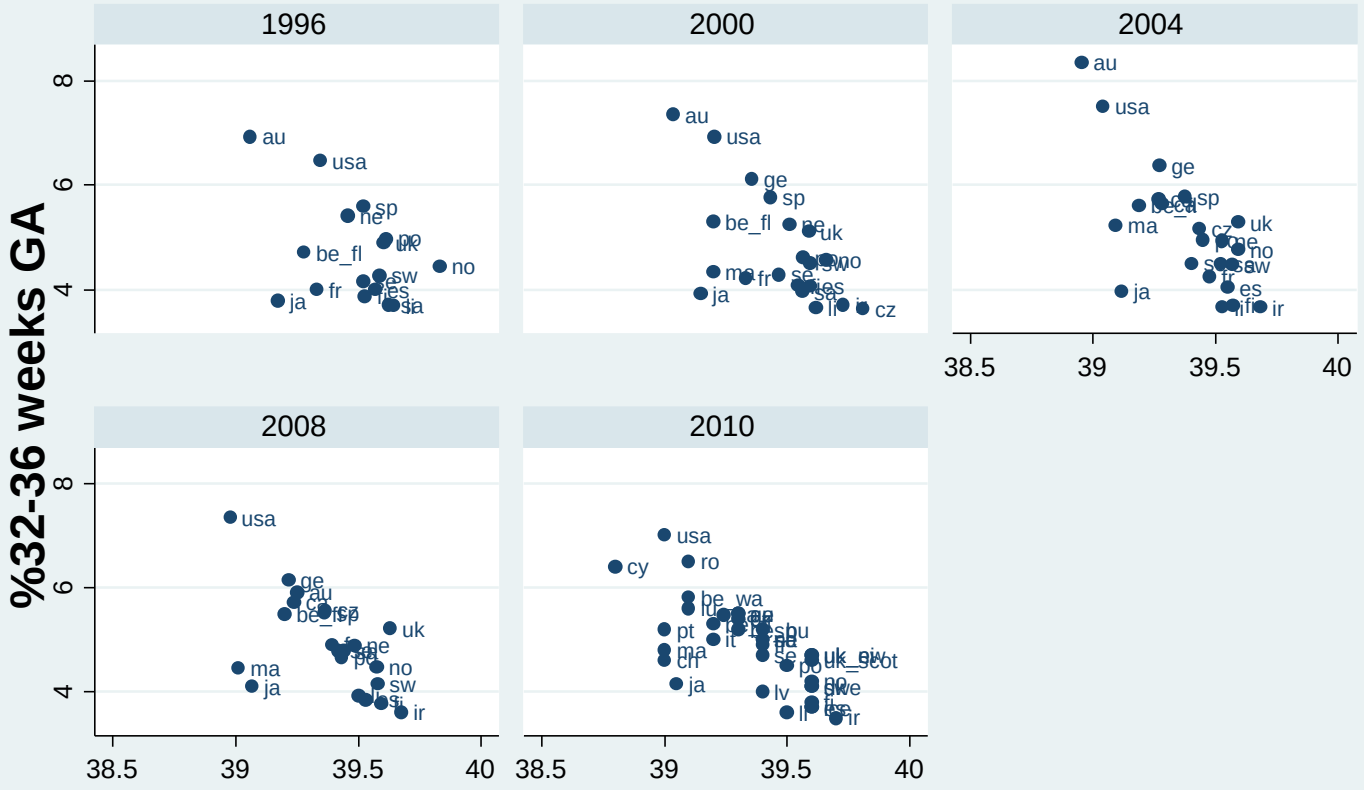


r: [0.41- 0.69]

p<0.01, excl. 1996

➢ **also true for spontaneous vs. indicated deliveries (excl.1996,2000)**

Moderate and late PTB rates were negatively correlated with mean GA at term



By year:

1996: r= -0.44, p= 0.10 N=16

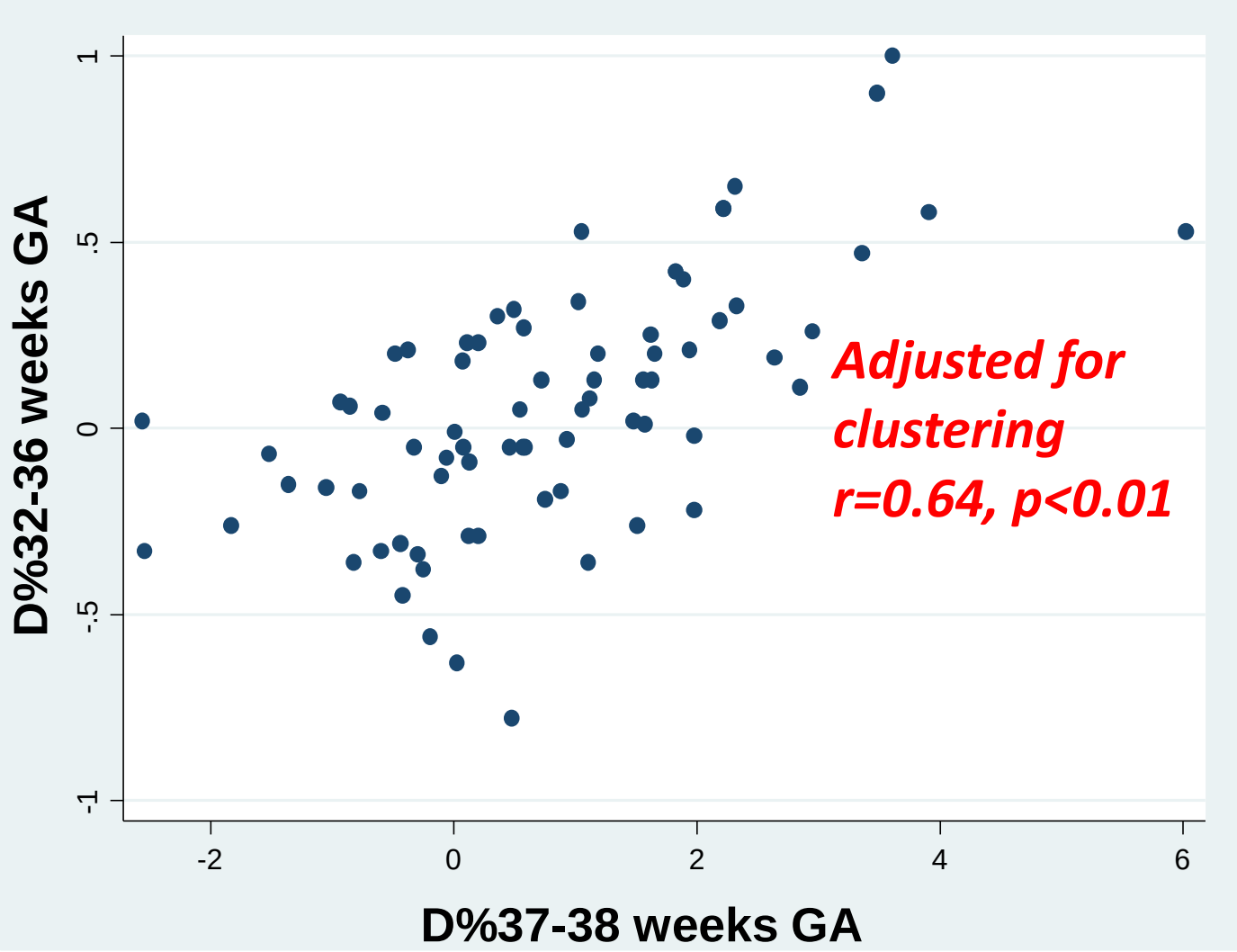
2000: r= -0.61, p<0.01 N=20

2004: r= -0.73, p<0.01 N=22

2008: r= -0.59, p<0.01 N=21

2010: r= -0.71, p<0.01 N=34

Times series analysis:
Rate changes 1996-2010 *(up to 4 data points/country N=76)*



By mode of onset:

Spontaneous:
r=0.37,p<0,01
w/o USA: r=0.37

Indicated:
r=0.69,p<0,01
w/o USA: r=0.65

Key results

1)Changes over time in the proportion of preterm births were strongly correlated with changes in the proportions of early term births

2)Negative association with mean GA at term

3) Cross-sectional and time series results were similar for spontaneous and provider indicated births.

Conclusion: Do international variations in the preterm birth rate reflect overall differences in the gestational age distribution?

- Factors affecting the PTB rate also affect early term births and the GA distribution.
- For both spontaneous and provider initiated deliveries
- Warrants the consideration of population-based approaches to PTB prevention.

Next steps

- We would like to look at whether principal risk factors have the same impact on PTB and early term births using individual-level data
  - BMI
  - maternal age
  - parity
  - fertility treatments
  - SES factors.

Please let us know if you can contribute data to these analyses: *marie.delnord@inserm.fr*

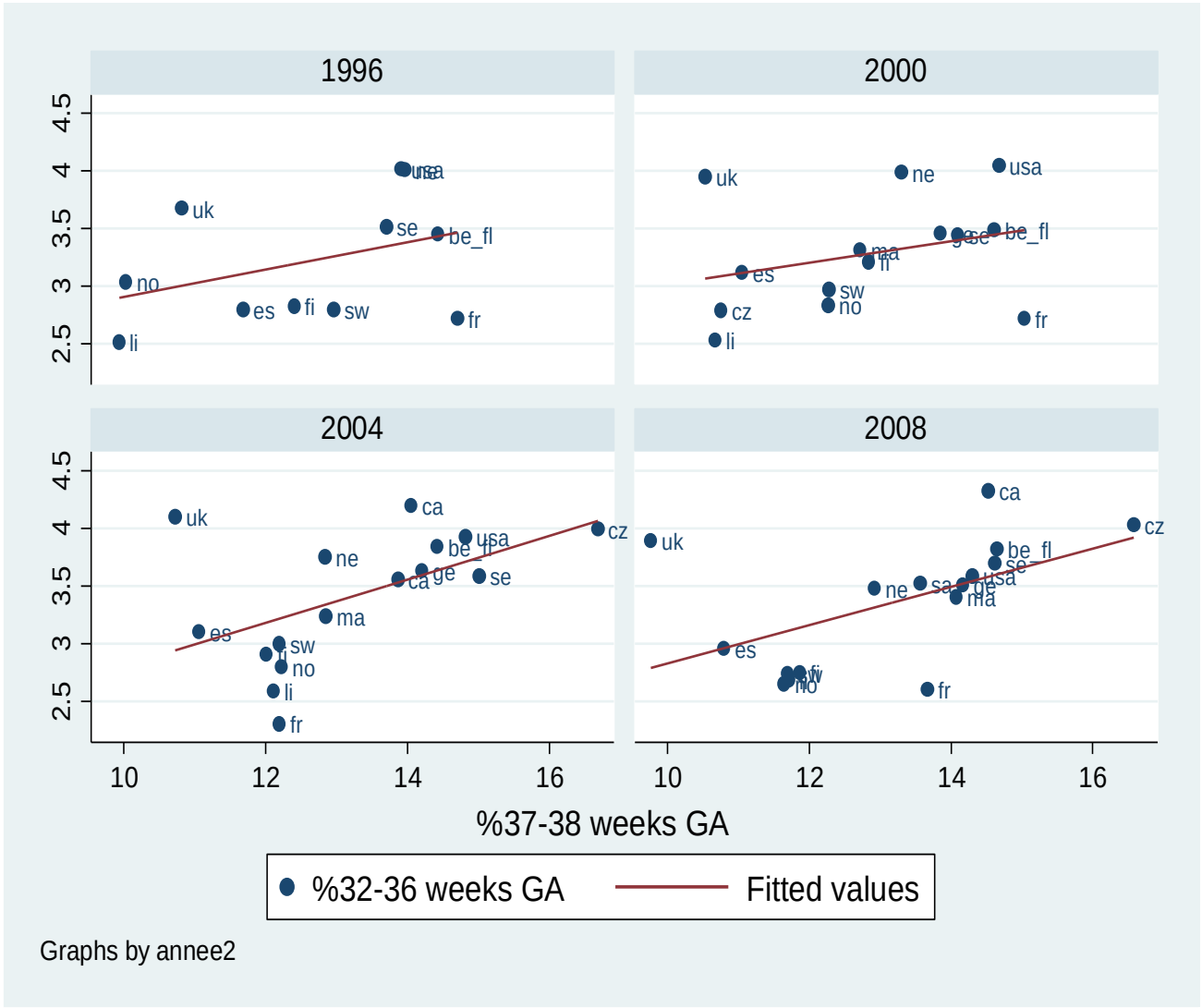
Thank you!

Supplementary slides

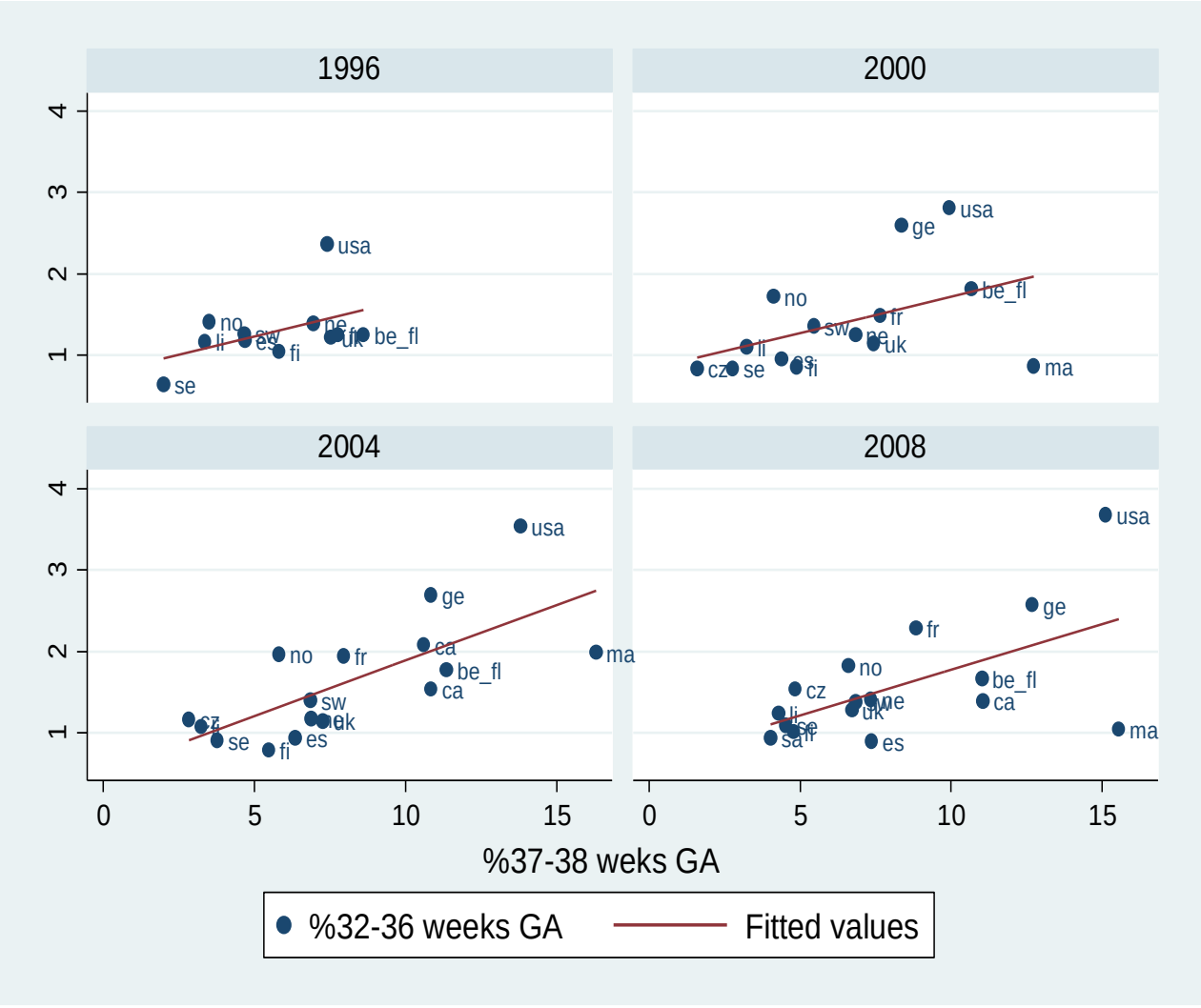
Variations in preterm and early term birth rates by mode of onset in 2008 in 16 countries

		Spontaneous deliveries		Indicated deliveries	
Country	N	%37-38 weeks	%32-36 weeks	%37-38 weeks	%32-36weeks
BE: Flanders	66 672	14,7	3,8	11,0	1,7
Canada	273 178	14,5	4,3	11,1	1,4
Czech Republic	114 722	16,6	4,0	4,8	1,5
Estonia	15 507	10,8	3,0	7,4	0,9
Finland	57 887	11,9	2,7	4,8	1,0
France	14 326	13,7	2,6	8,8	2,3
Germany	208 457	14,2	3,5	12,7	2,6
Lithuania	30 510	11,7	2,7	4,3	1,2
Malta	4020	14,1	3,4	15,5	1,0
Netherlands	170 255	12,9	3,5	7,4	1,4
Norway	59 075	11,6	2,7	6,6	1,8
Slovakia	52 520	13,6	3,5	4,0	0,9
Slovenia	21 050	14,6	3,7	4,5	1,1
Sweden	105 855	11,7	2,7	6,8	1,4
UK : Scotland	56 468	9,8	3,9	6,7	1,3
USA (without CA)	3 563 722	14,3	3.6	15,1	3,7

Spontaneous deliveries, NS in 1996 and 2000



Indicated deliveriesn NS 1996 and 2000



Adjusted Pearson's r, Lorenz et al. **Marginal association measures for clustered data, Stat Med 2011**

- Informative cluster size
- Based on within clusters resampling, WRC
- In WCR, a single observation is randomly selected from each cluster to form a resampled data set on which methods requiring independent observations are valid
- Population moments are replaced by the sample estimators
- Estimates allow to compute marginal correlations of individual pairs under the assumption of identical distribution of all pairs within a cluster.