

# Infant Mortality in Cuba: Myth and Reality

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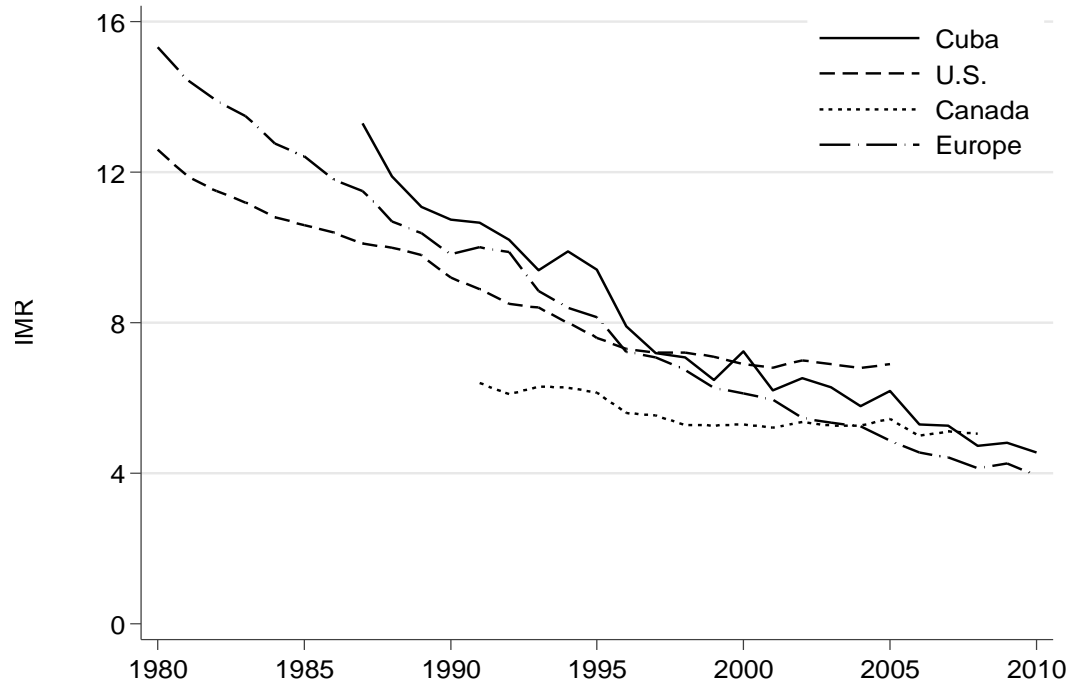
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# Overview of the Paper

**Myth:** Cuba's IMR is comparable that of the most developed countries.



- Using the IMR reported by Cuba, the myth seems to be valid.

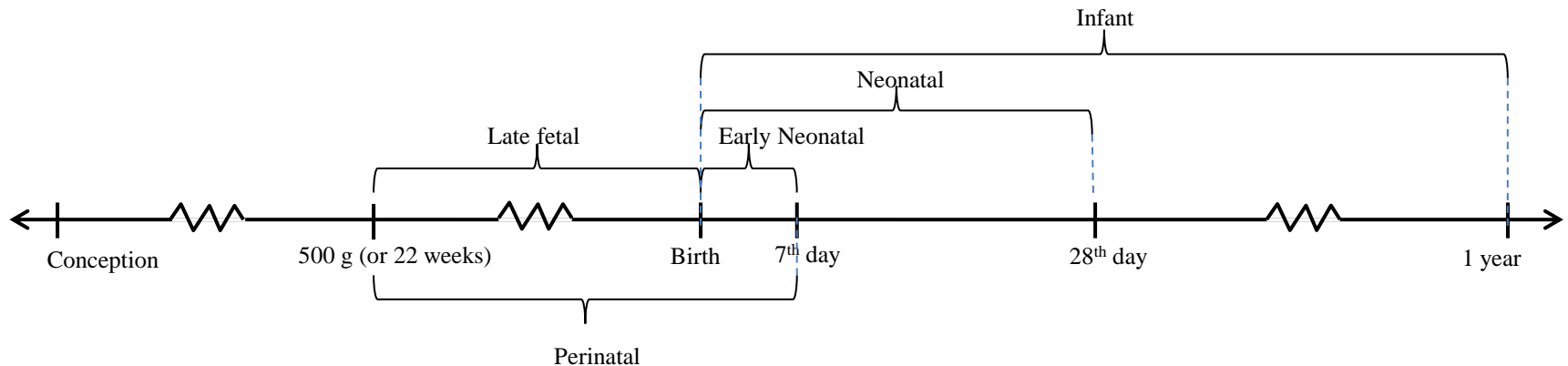
# Overview of the Paper (Cont'd)

- **Reality (based on the paper's findings):**
  - Cuba's IMR might be as much as twice the IMR reported by official authorities.
  - Relative to Latin American and middle-income countries, Cuba's corrected IMR is still low (although not the lowest as previously perceived)
  - Relative to developed countries, Cuba's corrected IMR is, by no means, comparable.

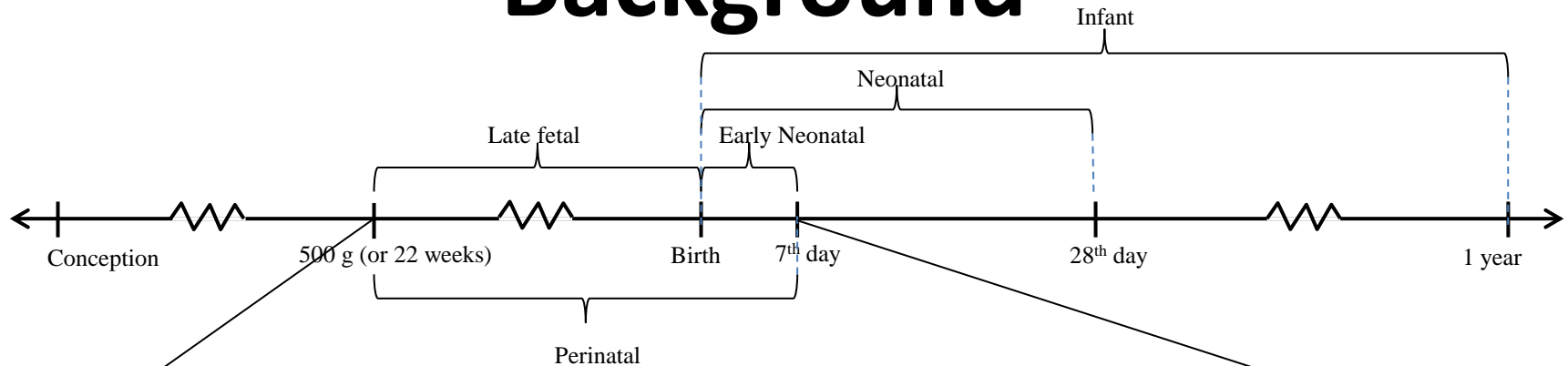
# Background

## Some definitions:

- **Infant deaths:** deaths occurring within the first year of life
- **Early Neonatal deaths:** deaths occurring during the first week of life
- **Late Fetal deaths:** deaths of fetuses weighing at least 500g.



# Background



*“Although the relative contributions of late fetal and early neonatal deaths might be expected to vary somewhat across time and location, we would expect the absolute level of the two components to be fairly consistent within a given republic”*

Source: Velkoff, Victoria A. and Jane E. Miller. 1995. “Trends and Differentials in Infant Mortality in the Soviet Union, 1970-90: How Much Is Due to Misreporting?” *Population Studies* Vol. 49, No. 2, 241-258.

*“Stillbirths should equal, or more likely exceed, early neonatal deaths, as shown by data from developed countries, historical datasets and hospital data”*

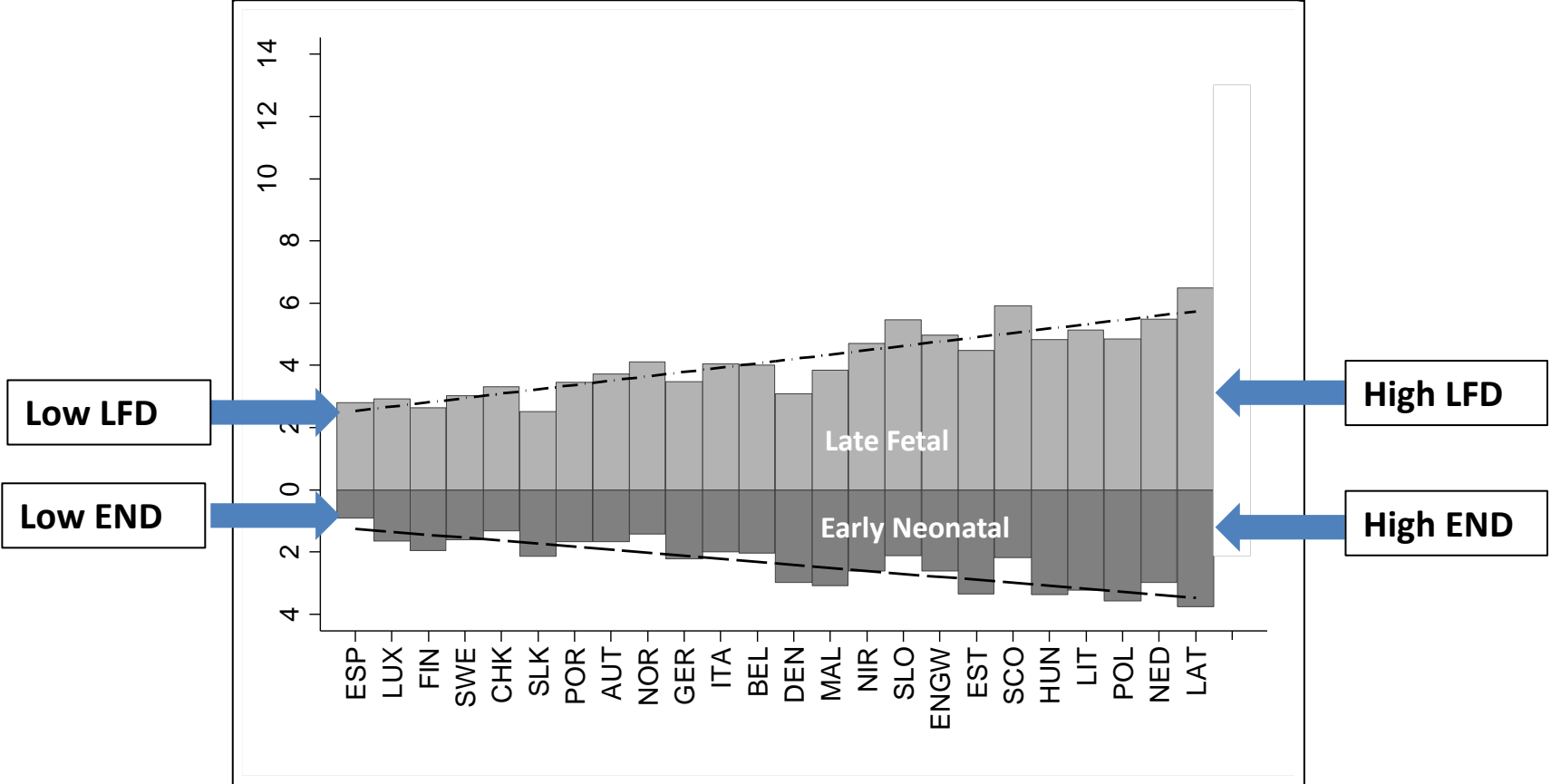
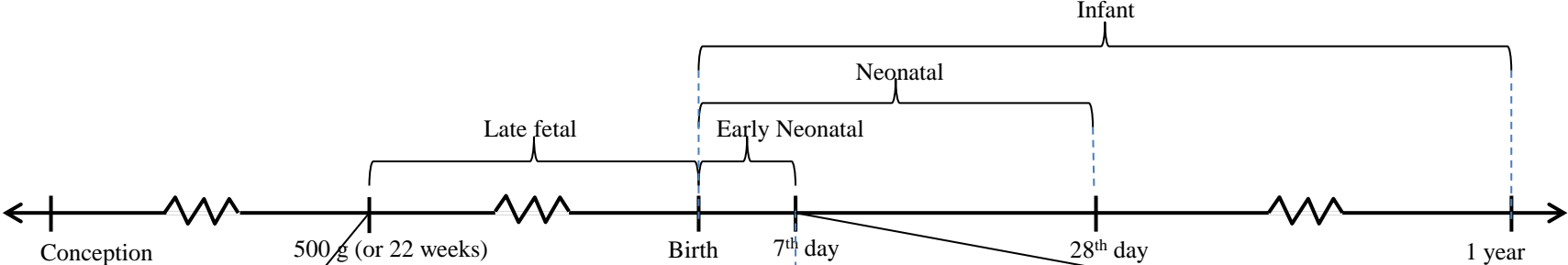
Source: Neonatal and Perinatal Mortality: Country, Regional and Global Estimates. World Health Organization, 2006.

ISBN:9789241563208

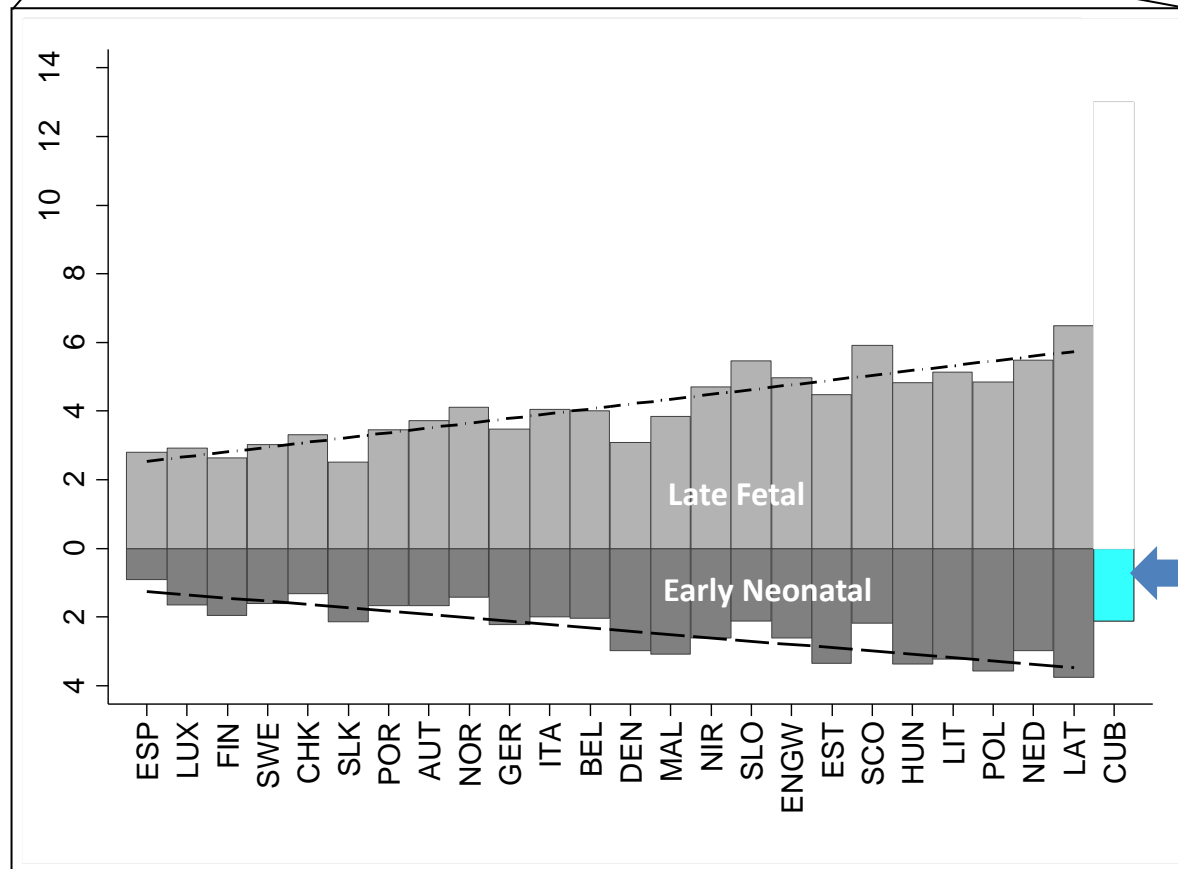
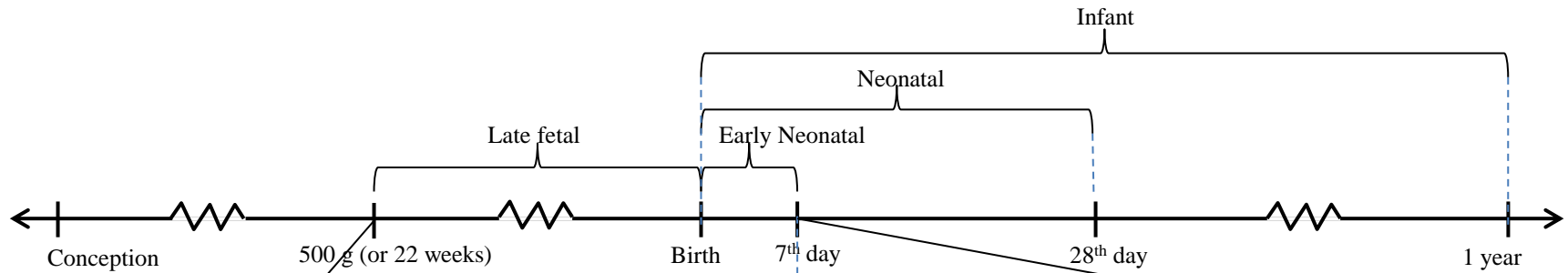
# Some Challenges

- **Bottom line:** Late Fetal and Early Neonatal deaths are closely related.
  - (i.e.: high LFD  $\leftrightarrow$  high END, low LFD  $\leftrightarrow$  low END)
- **Problem:** Simple comparisons of LFD and END across countries are not very valid.
  - Countries use varying definitions of LFD and END.
- **Solution:** PERISTAT provides comparable data for a sample of 25 European countries.

# LFD and END in PERISTAT sample



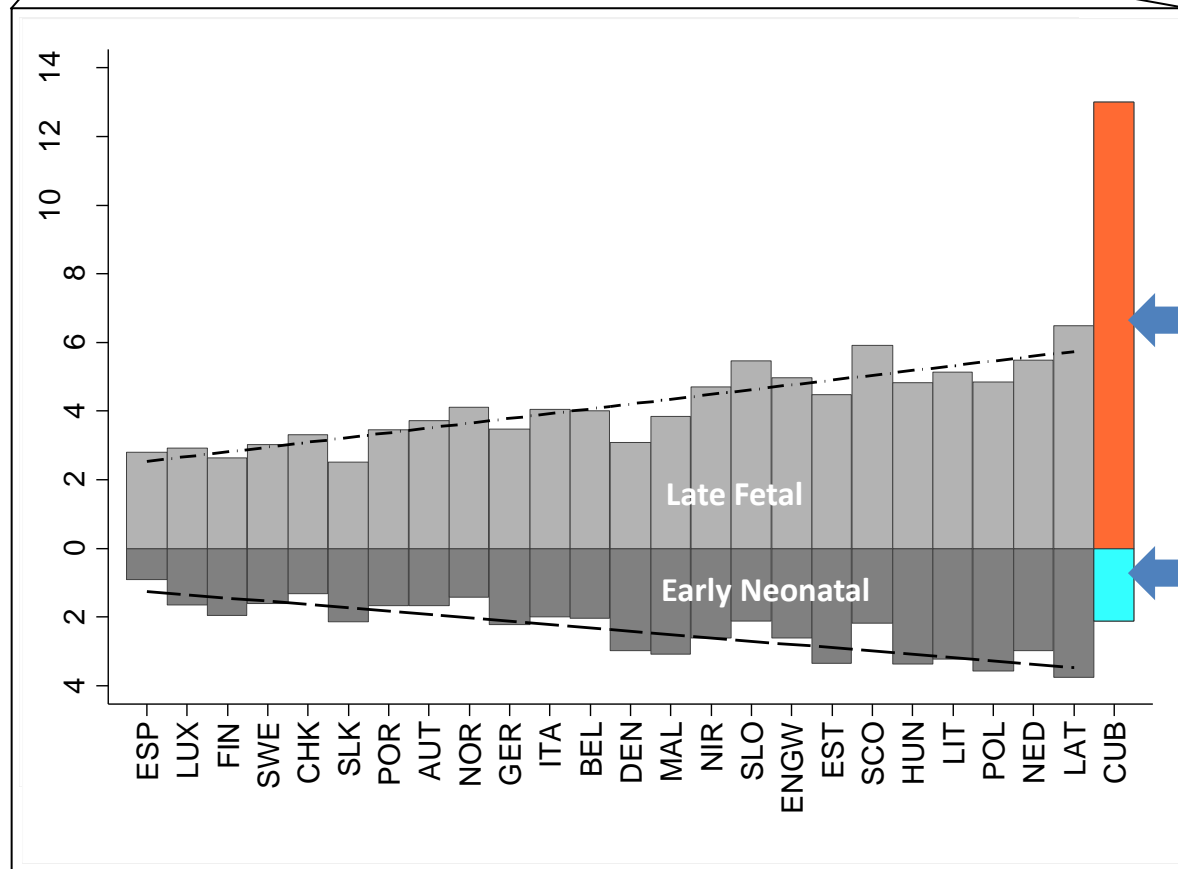
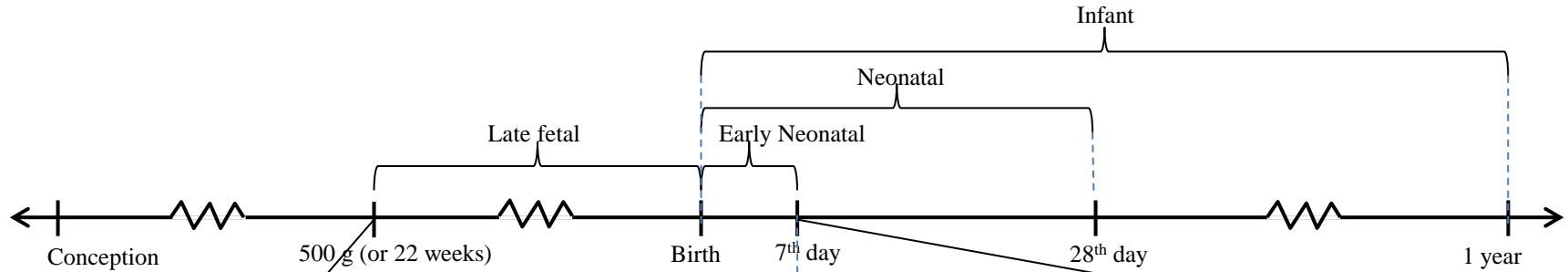
# How does Cuba compare? END?



Low END



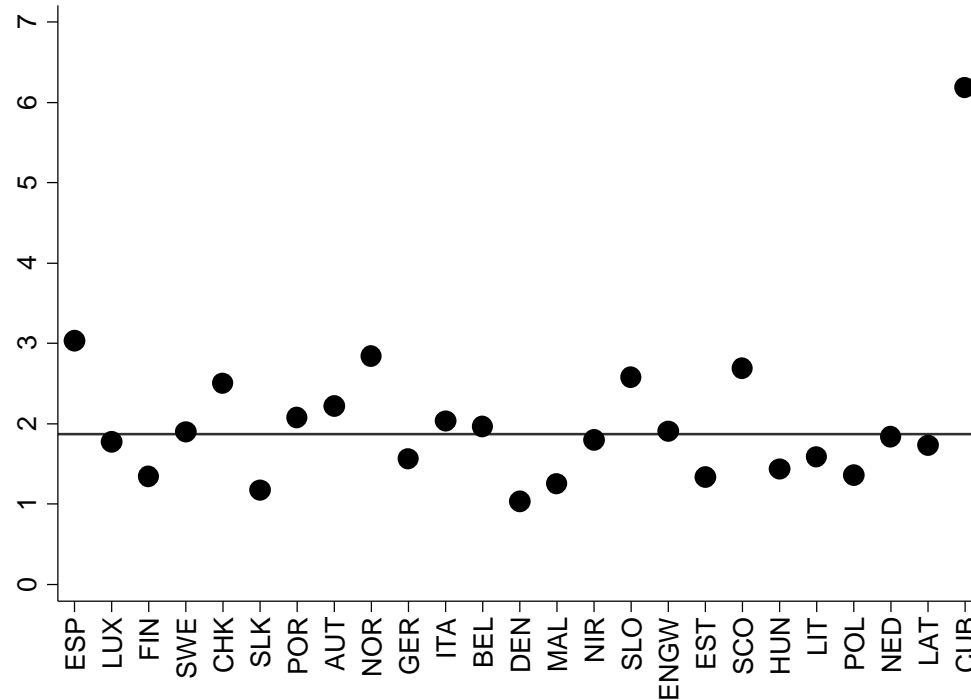
# How does Cuba compare? LFD?



Very high LFD

Low END

# Ratio of LFD to END



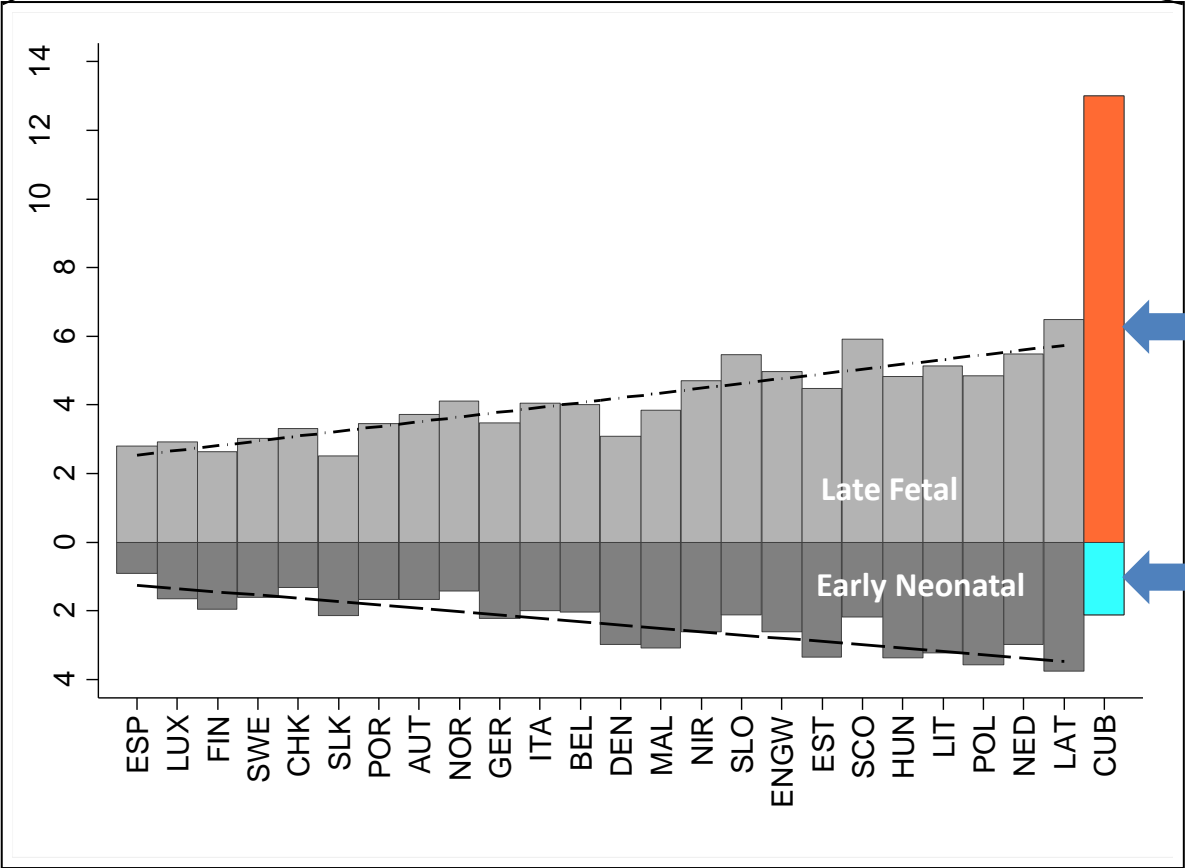
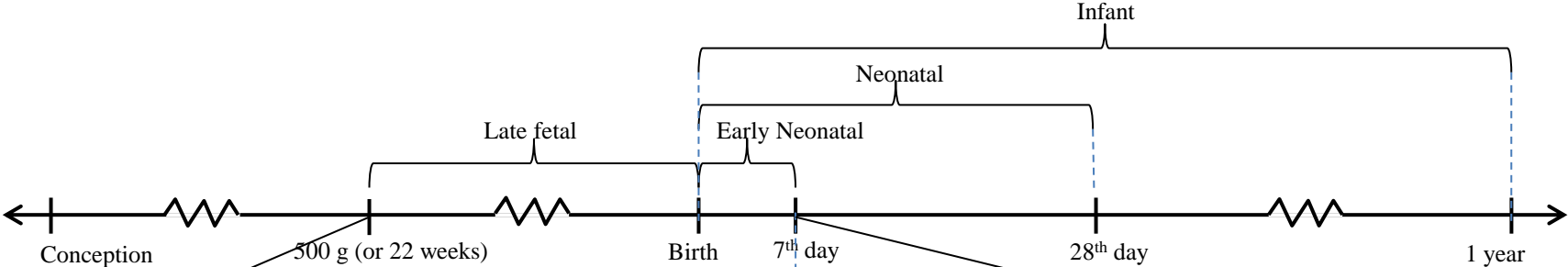
*“If early neonatal deaths are being systematically misclassified as late fetal deaths, then the ratio of late fetal to early neonatal mortality will be high compared to its expected value”*

Velkoff and Miller (1995)

# Why this disparity?

- **Coding error in 2004?**
  - LFMR to ENMR ratio has been above 4 for the past 14 years
- **Misclassification by health professionals?**
  - More typical of countries where health professionals are not properly trained.
- **Misreporting on purpose?**
  - Might be more reasonable as there is a clear incentive for this

# What's the incentive?



Not part of IMR

Part of IMR

# Corrected LFD and END

- I estimate lower and upper bounds for the LFMR and ENMR by estimating the following sets of equations.

$$1 \left\{ \begin{array}{l} \frac{LFD_{min}^*}{END_{min}^*} = r_{min} \\ PD = LFD_{min}^* + END_{min}^* \end{array} \right.$$



$$END_{min}^* = \frac{1}{1 + r_{min}} PD$$

$$LFD_{min}^* = \frac{r_{min}}{1 + r_{min}} PD$$

$$2 \left\{ \begin{array}{l} \frac{LFD_{max}^*}{END_{max}^*} = r_{max} \\ PD = LFD_{max}^* + END_{max}^* \end{array} \right.$$



$$END_{max}^* = \frac{1}{1 + r_{max}} PD$$

$$LFD_{max}^* = \frac{r_{max}}{1 + r_{max}} PD$$

# Corrected IMR

- Using the expressions for END and LFD one can obtain an expression for the number of infant deaths as a function of observable parameters:

$$ID_{min}^* = (ID^R - END^R) + END_{min}^*$$

$$ID_{max}^* = (ID^R - END^R) + END_{max}^*$$



$$ID_{min}^* = (ID^R - END^R) + \frac{1}{1 + r_{min}} PD$$

$$ID_{max}^* = (ID^R - END^R) + \frac{1}{1 + r_{max}} PD$$

# Results

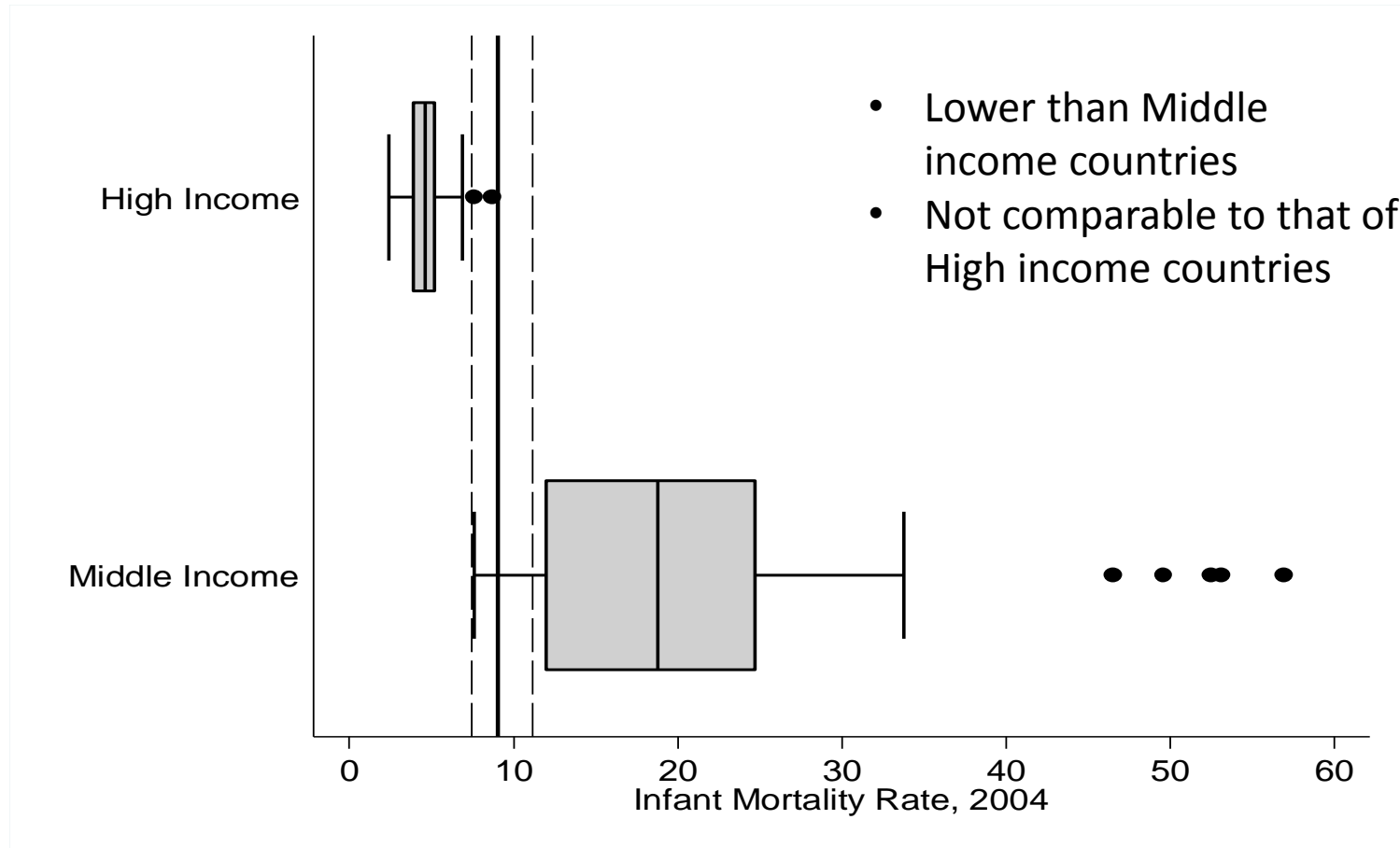
**Table 1.** Reported and Estimated Late Fetal, Early Neonatal, and Infant Deaths and Mortality Rates for Cuba, 2004

<b>Panel A. Total Deaths</b>				
	Reported	$r_{min}$	Estimated	$r_{max}$
			$r_{median}$	
Late Fetal Deaths	1,675	990	1,261	1,463
Early Neonatal Deaths	271	955	685	483
Infant Deaths	736	1,420	1,150	948

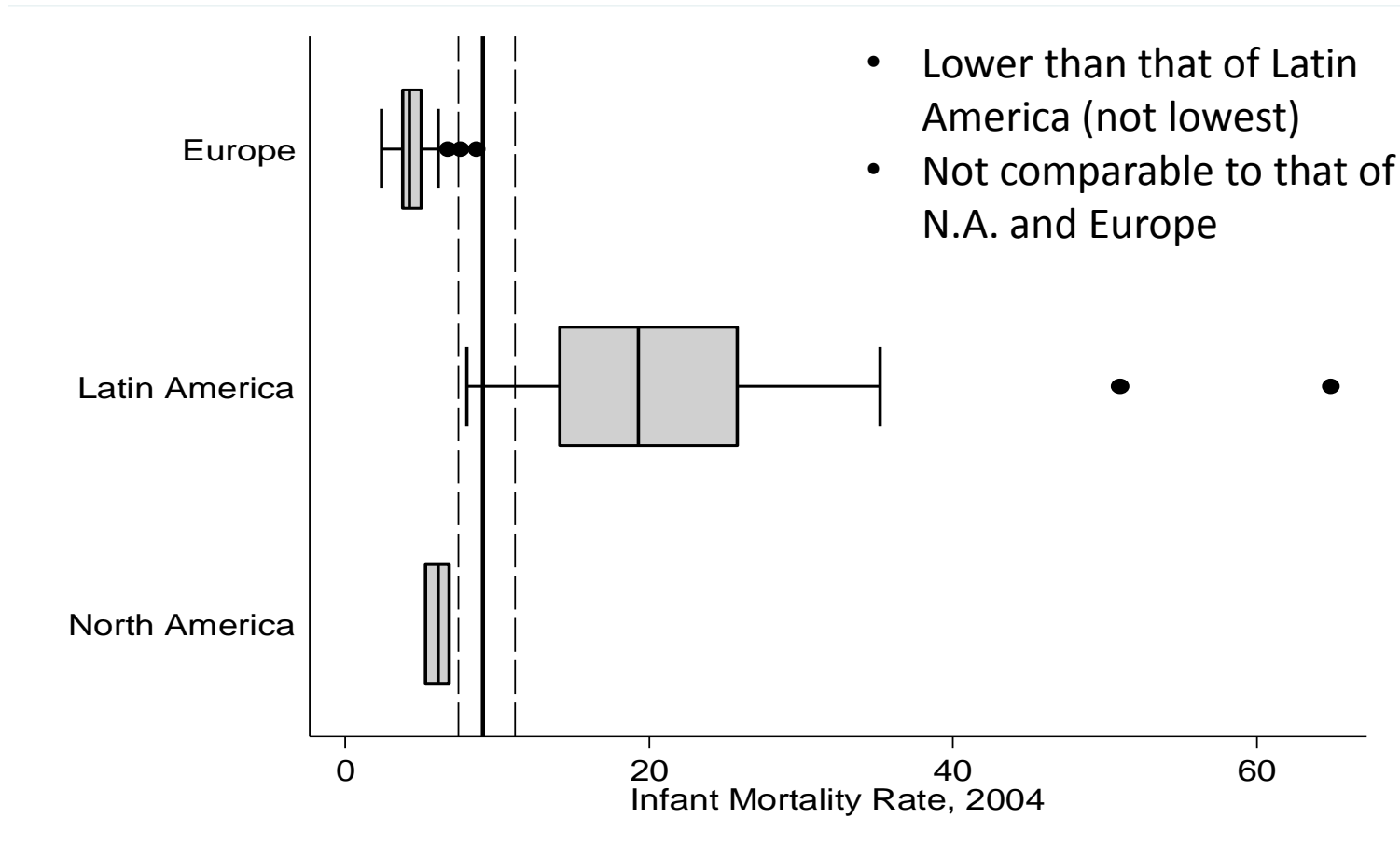
<b>Panel B. Mortality Rates</b>				
	Reported	$r_{min}$	Estimated	$r_{max}$
			$r_{median}$	
Late Fetal Mortality Rate	13.00	7.68	9.79	11.35
Early Neonatal Mortality Rate	2.13	7.51	5.39	3.80
Infant Mortality Rate	5.79	11.16	9.04	7.45

# Results (Cont'd)





# Results (Cont'd)



# Conclusions

- Cuba's corrected IMR,
  1. could be almost twice the IMR officially reported (11.16 vs 5.79)
  2. is lower than the IMR of most middle-income countries but not comparable to that of high-income countries.
  3. is lower than the IMR of most Latin American countries but might not be the lowest (Costa Rica and Chile might have lower IMR's)