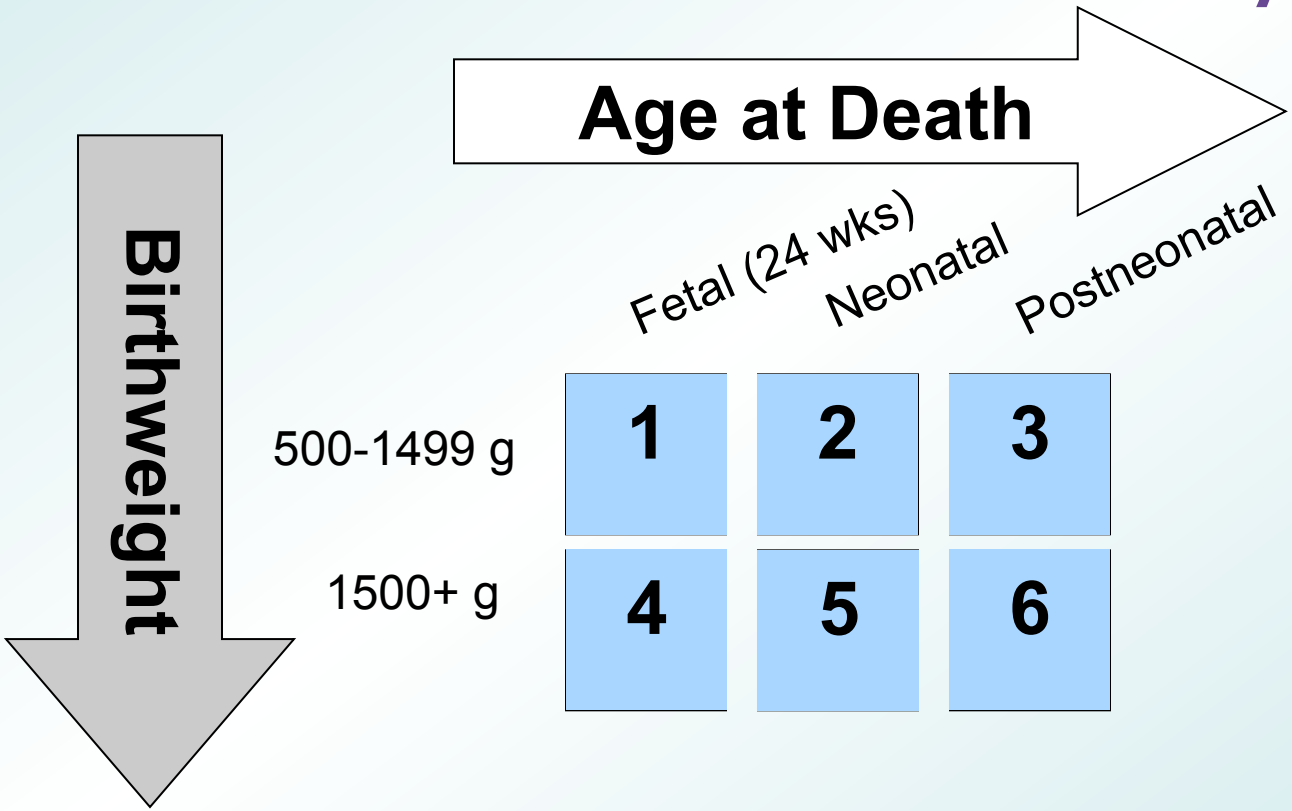
The 2000-2002 National Reference Group

- Problems due to missing data
- Proposed solution

PPOR "Map" of Feto-infant Mortality

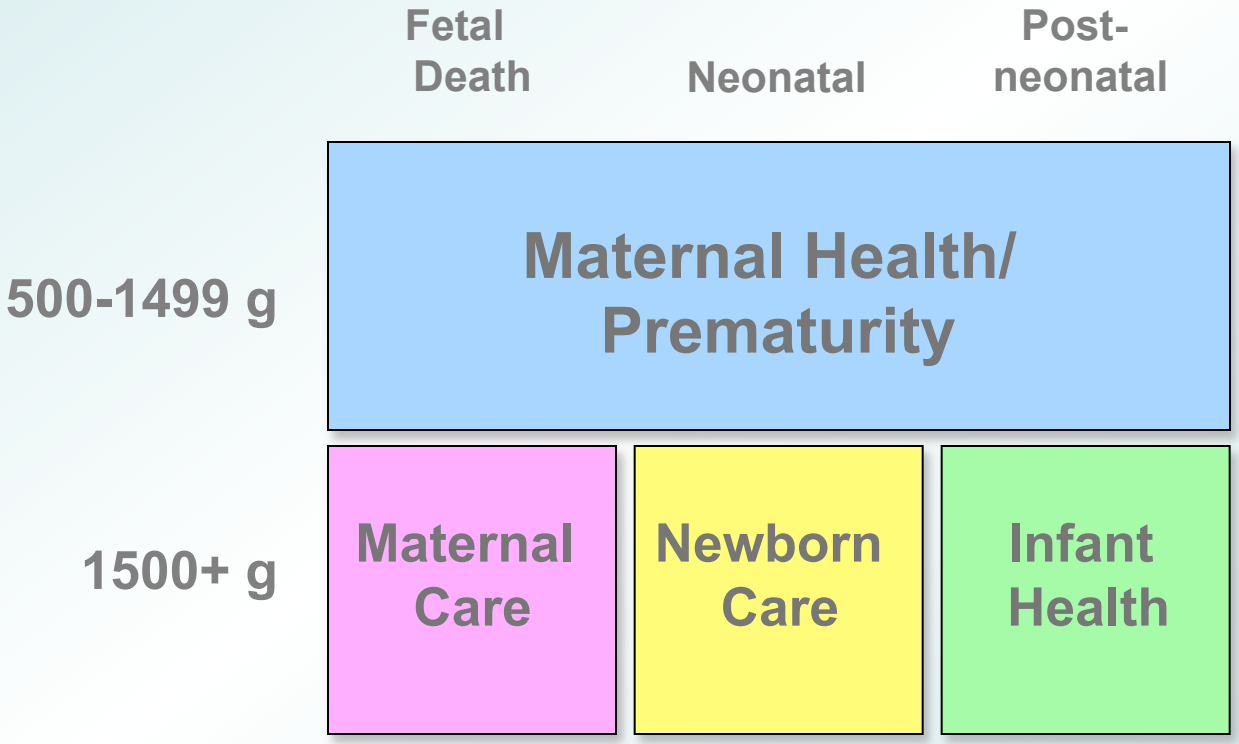


PPOR Map of Fetal-Infant Mortality:

What events are not included?

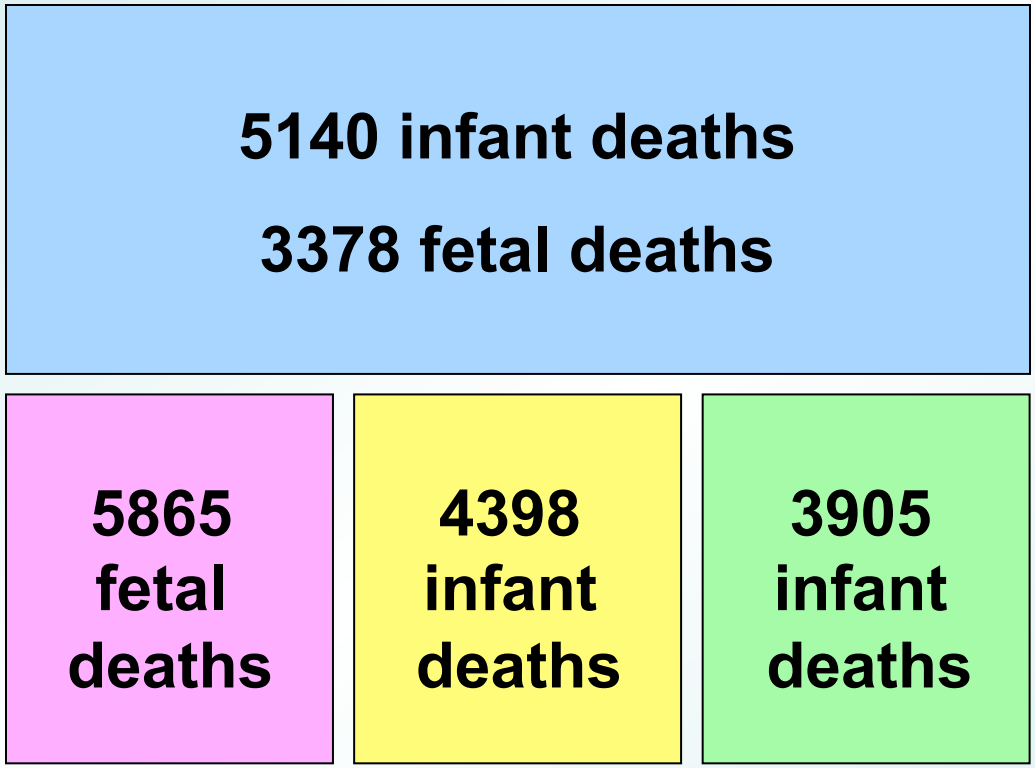
- Fetal deaths that occur before 24 wks
- Fetal deaths weighing under 500 grams
- Live births and infant deaths weighing less than 500 grams
- Spontaneous and induced abortions (events that are not reported)

The Periods of Risk



These four groups are given labels that suggest the primary preventive direction for the deaths in that group.

USA 2000-2002 Reference Group Excluding Cases With Missing Maternal Education

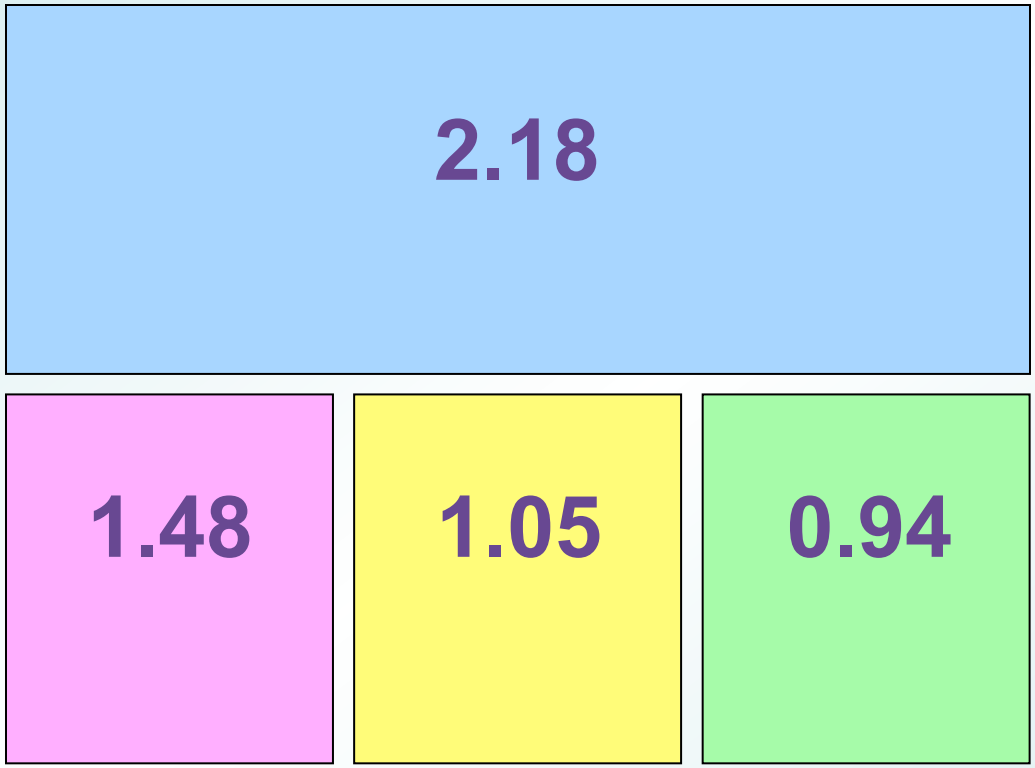


22,378 Fetal-Infant Deaths

3,960,512 live births and fetal deaths

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

USA 2000-2002 Reference Group Excluding Cases With Missing Maternal Education



5.65 Fetal-Infant Deaths per thousand

live births and fetal deaths

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

USA 2000-2002 Reference Group

Excluding Cases With Missing Maternal Education is equivalent to assuming they all had less than 13 years of education

This is a *bias*, because chances are that some of those with no education level recorded, did actually have more than 13 years of education and should have been in the reference group.

USA 2000-2002 Reference Group

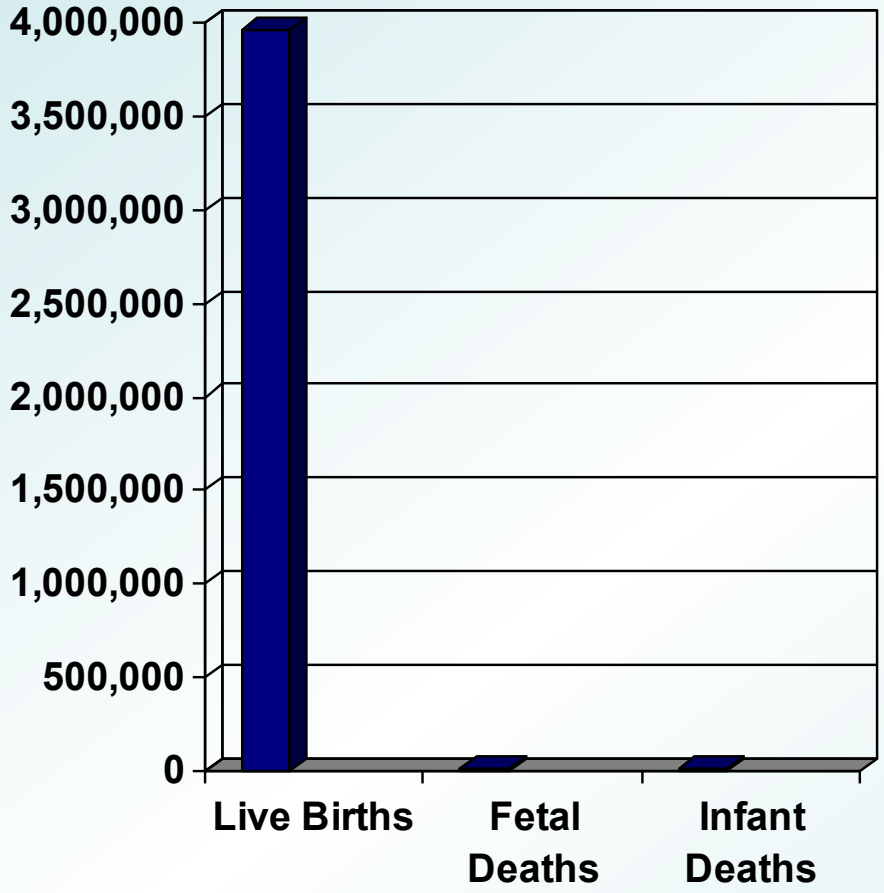
Q: What's the problem with leaving some deaths out?

A: This UNDER-REPORTS deaths for the reference group, making it look *better* than it is.

USA 2000-2002 Reference Group

Q: Aren't they left out of the denominator too, so, won't it "all come out in the wash?"

USA 2000-2002 Reference Group

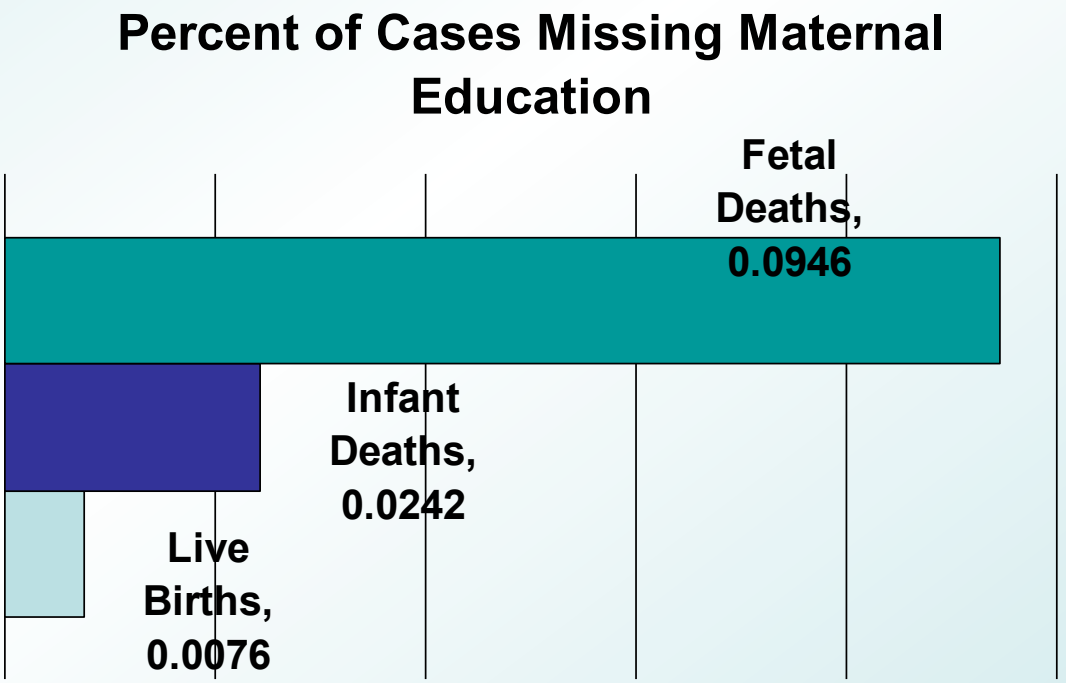


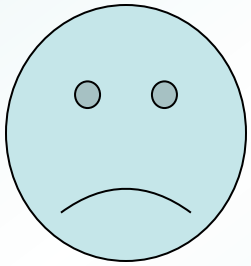
Since feto-infant death is a rare event, the numerator is much, much smaller than the denominator. Each missing case in the numerator has a large impact.

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

USA 2000-2002 Reference Group

The numerator is missing a significantly larger proportion of cases than the denominator is missing.





Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

USA 2000-2002 Reference Group

How many of the cases with unknown maternal education do *you* think should actually have been in the Reference Group?

Imputing
is an organized way to guess.

Our original guess was *NONE*.

We could be *fair* and guess *HALF.*

Or we could use the information we have about the cases that *did* have maternal education reported, to make a *better* guess.

	Ref. Group (Maternal Education >=13)	Maternal Education <13	Proportion >=13 (of those reported)
Fetal Deaths >20 years, White N-H	**9,195**	**8,402**	**52.3%**

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

Quick and Dirty Estimate of additional fetal deaths

- There are 1839 fetal deaths with missing maternal education, who would otherwise qualify for the reference group.

- If 52.2% of them (961) were added to the group, this would increase the overall rate from 22378/390512=5.65 deaths per 1,000 to (22378+961)/ (3960512+961)=5.89

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

Refinement of Imputation: Include infant deaths and live births

2000-2002	All levels of meduc included	Maternal Education Missing / imputed	Non-missing, Qualifies for Reference Group	Percent of non-missings IN reference group	Estimated number of missings IN reference group
infant deaths	27,700	672	13,183	48.8%	328
fetal deaths	19,436	1,839	9,195	52.3%	961
numerator	47,136	2,511	22,378	50.1%	1,259
live births	6,396,784	48,871	3,951,317	62.2%	30,420
denominator	6,416,220	50,710	3,960,512	62.2%	31,551

Data Source: NCHS Perinatal Files 2000-2002, March of Dimes; Calculations: CityMatCH

Original Reference Group

	MH/P	MC	NC	IH
Infants	5294		4168	3721
Fetal Deaths	3342	5853		
Feto-Infant	8636	5853	4168	3721
Rates	**2.18**	**1.48**	**1.05**	**0.94**
Denominator	**3,960,512**			

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes

Estimated Additional Cases

Fetal Deaths	**349**	**612**			**961**
Infant Deaths	**132**		**104**	**93**	**328**
Live Births					**30,420**
Added to Numerator	**481**	**612**	**104**	**93**	**1,289**
Added to Denominator					**31,381**

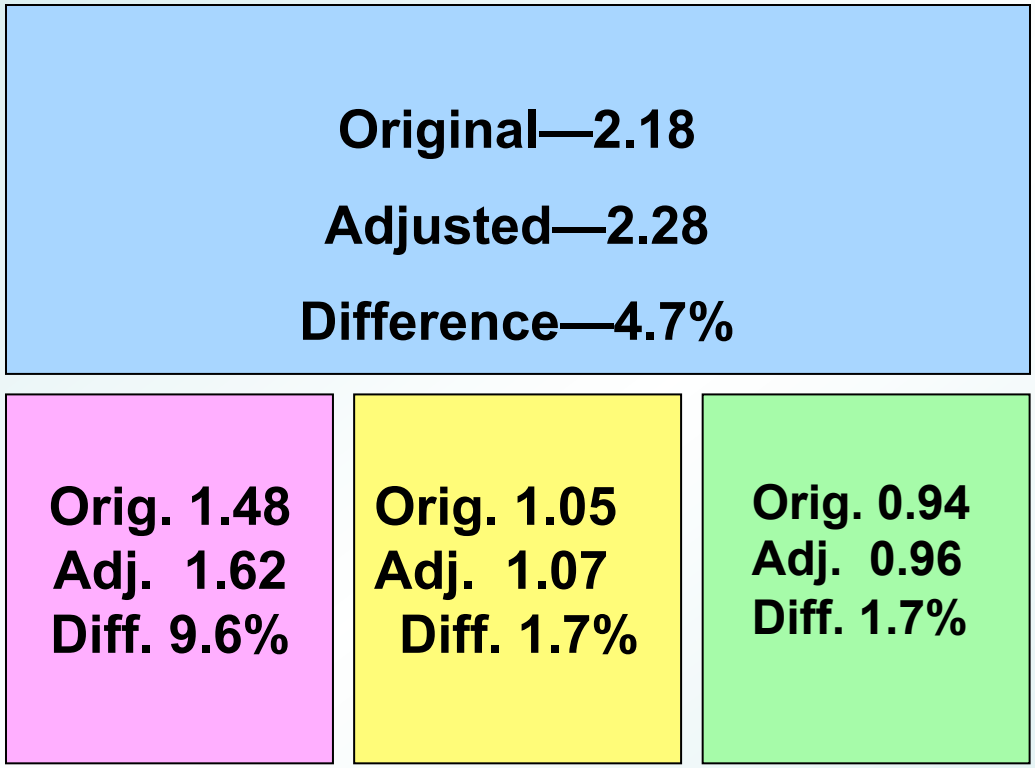
Data Source: NCHS Perinatal Files 2000-2002; Calculations: CityMatCH

Adjusted Reference Group

	MH/P	MC	NC	IH
Infants	5426		4272	3814
Fetal Deaths	3691	6465		
Feto-Infant	9117	6465	4272	3814
	2.28	**1.62**	**1.07**	**0.96**
Denom.	**3,991,893**			

Data Source: NCHS Perinatal Files 2000-2002; Calculations: CityMatCH

USA 2000-2002 Reference Group Excluding Cases With Missing Maternal Education



Overall Feto-Infant Mortality Rate

Original—5.65

Adjusted—5.93

Difference—4.9%

Deaths per thousand live births and fetal deaths

Data Source: NCHS Perinatal Files 2000-2002; Calculations: March of Dimes and CityMatCH

Where do we go from here?

- There are other ways to impute, and more possibilities for “refinement” of estimates. We have asked the NCHS for assistance.
- A technical advisory committee is being reconvened to address imputation issues and other PPOR data implications.