Using population-based data and PPOR with FIMR

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Objectives

- What is population-based data
- Perspectives & limitations of
  - FIMR
  - Population-based data
- Perinatal Periods of Risk
  - Brief overview
  - Examples of using PPOR with FIMR

Q: What is population-based data?

A: Data that includes or represents everyone

What data sources include everyone?

Decennial Census, Vital Records

What data sources represent everyone?

Sample surveys like BRFSS, ACS, PRAMS

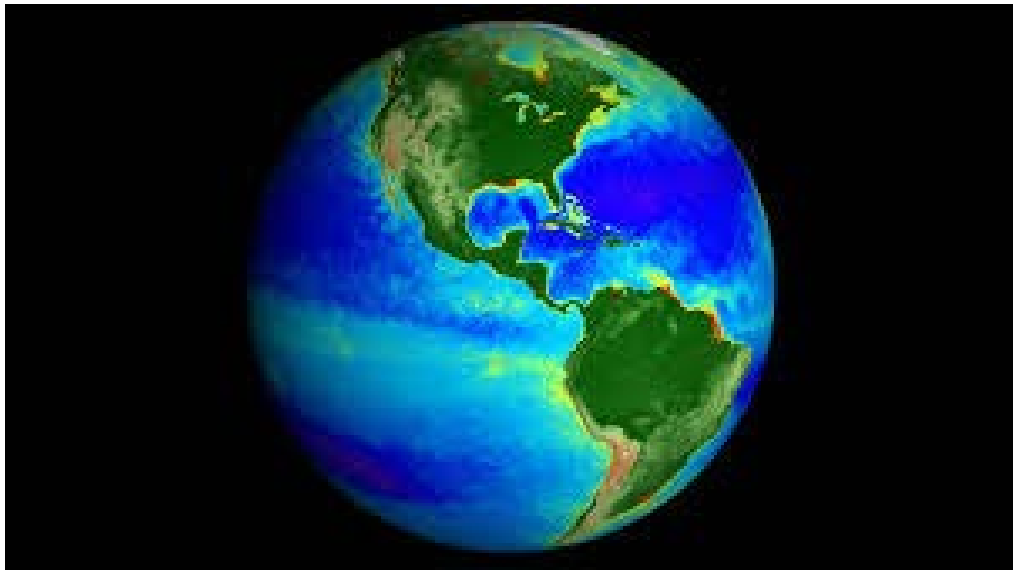
Limitations of population-based data

- Important pieces of the puzzle are missing from data sources
  - Motives, intentions, perceptions
  - Life course factors (previous medical events, exposure to trauma…)
  - Sensitive topics (e.g. domestic violence, drug use)
  - Systems and their impact on mom and baby
  - Actual causes are more complex than an ICD code

- Even data that is included can be wrong
  - Missing or inaccurate data elements
  - Missing cases

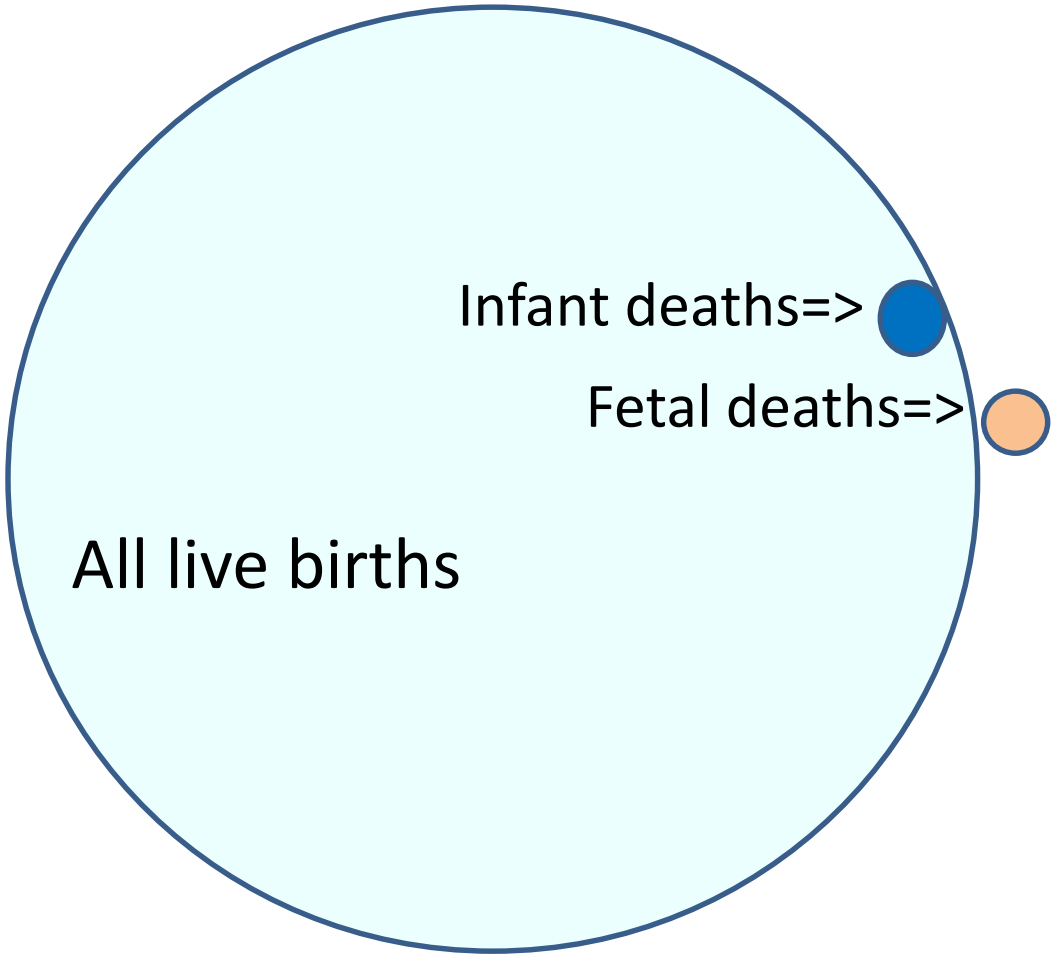
Limitations, continued

If the world is this



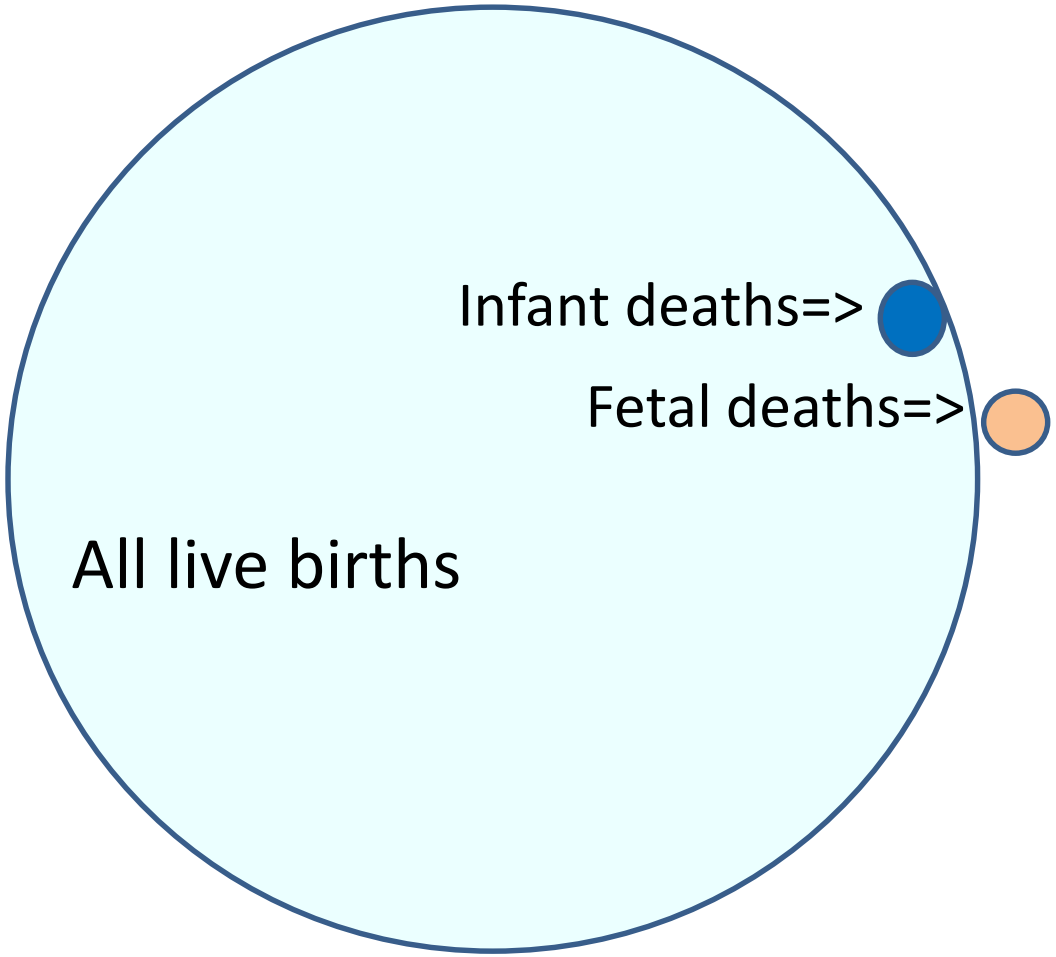
Vital records data shows us this

Limitations of FIMR Data



First, deaths are a **very small subset** of the population we would address with prevention activities

Limitations of Case Review Data



Second, deaths are **not** a random or **representative** sample.

Generally a higher prevalence of risk factors.

Important reminder from the epidemiologists:

- If you want to prevent a bad outcome, you can't intervene (after the fact) with the people who had the bad outcome

- Instead, you work (in advance) with the people who are

  AT RISK of having the bad outcome

A data story

	Infant deaths
Midwife birth attendant	10
All	60

Say (just pretend) we found that having a midwife birth attendant is a contributor to 10 of the 60 deaths we reviewed

Is this a problem we should address?

Add some population data for context

Say that we know the community had 10,000 births
And we reviewed all the deaths

	Infant deaths	Births
Midwife birth attendant	10	
All	60	**10,000**

Question: How many of the births had Midwife birth attendant?

	Infant death	Birth
Midwife birth attendant	10	?
All	60	10,000

We will explore
two realistic possibilities for
?
how many of the births had a midwife attendant

36% like Albuquerque

and

3% like San Antonio

How many of the births had Midwife birth attendant?

. . . if your city is like San Antonio, 3% of births is 300 …

	Infant death	Birth	Mortality Rate
Midwife birth attendant	10	300	
All	60	10,000	

IMR=10 x 1,000 ÷ 300

IMR= 60 x 1,000 ÷ 10,000

How many of the births had Midwife birth attendant?

. . . if your city is like San Antonio, 3% of births is 300 …

	Infant death	Birth	Mortality Rate (per thousand)
Midwife birth attendant	10	300	33.3
All	60	10,000	6.0

Risk of death is HIGHER among those with Midwife birth attendant. Midwife birth attendant is either dangerous itself or is a marker for something else that's dangerous.

How many of the births had Midwife birth attendant?

. . . if your city is like Albuquerque, 36% of births is 3,600…

	Infant death	Birth	Mortality Rate
Midwife birth attendant	10	3,600	2.8
All	60	10,000	6.0

2.8= 10 x 1,000 ÷ 3,600

The risk of death is LOWER among those with Midwife birth attendant. Perhaps another factor is more influential than "other birth attendant" in the cases we reviewed.

Different conclusions based on population prevalence of a risk factor,

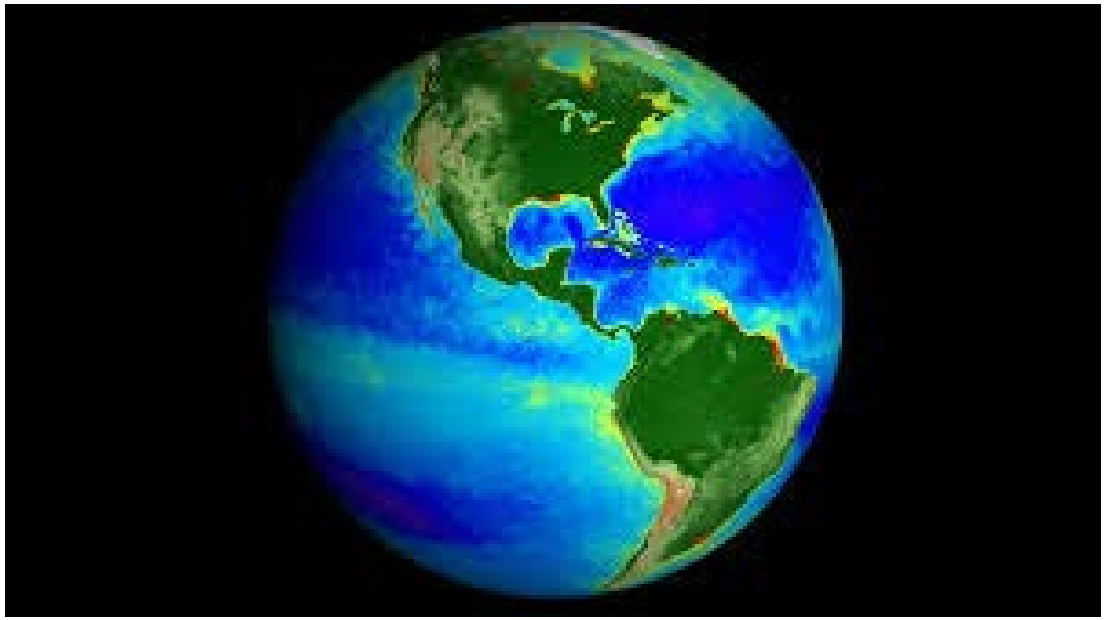
no difference in death data

Caution: Interpret in light of other evidence.

If your local data tells you that smoking does NOT contribute, don’t believe it. There is overwhelming evidence that it does.

Each information source is one window into reality.

- FIMR sees all the complexity, depth and reality for the case it reviews.
- Population data adds breadth



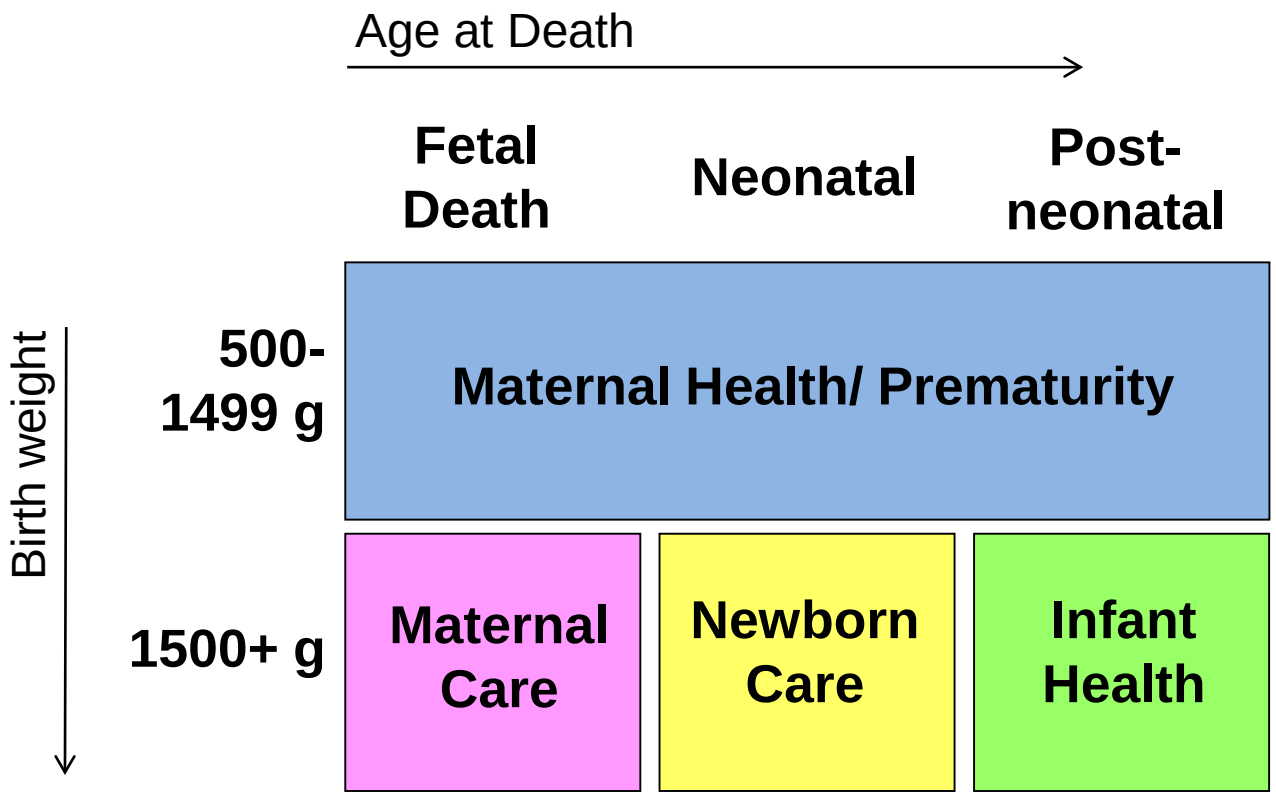
Some general uses of population-based data

Assess risk
Assess preventability
Estimate maximum potential impact
Estimate expected impact of intervention
Plan to measure change

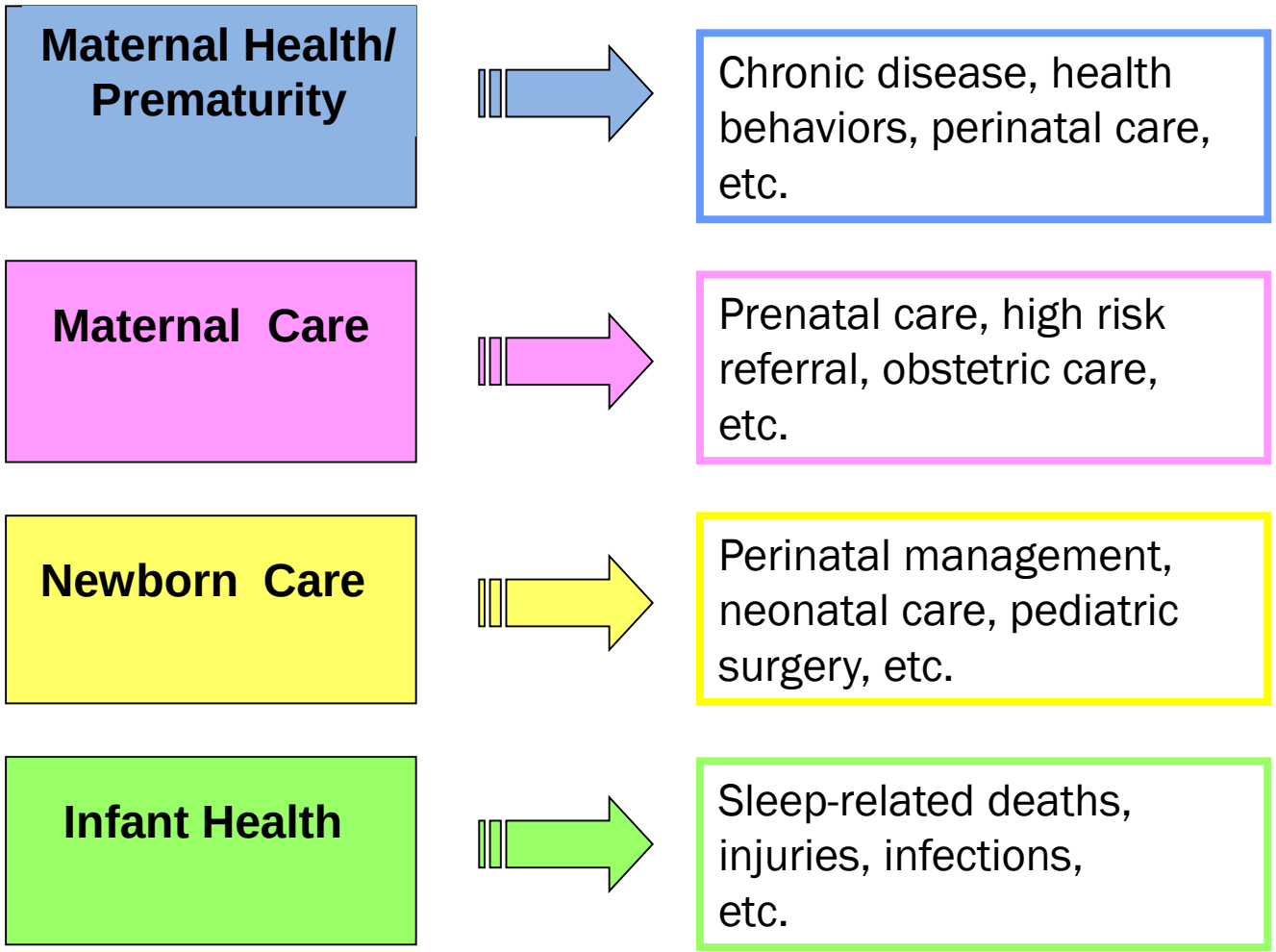
Perinatal Periods of Risk Approach
The 6 Stages

1. Assure Community and Analytic **Readiness**
2. Conduct **Analytic** Phases of PPOR
3. **Develop** Strategic Actions for Targeted Prevention
4. Strengthen Existing and/or **Launch** New Prevention Initiatives
5. **Monitor** and Evaluate Approach
6. **Sustain** Stakeholder Investment and Political Will

The Four Periods of Risk



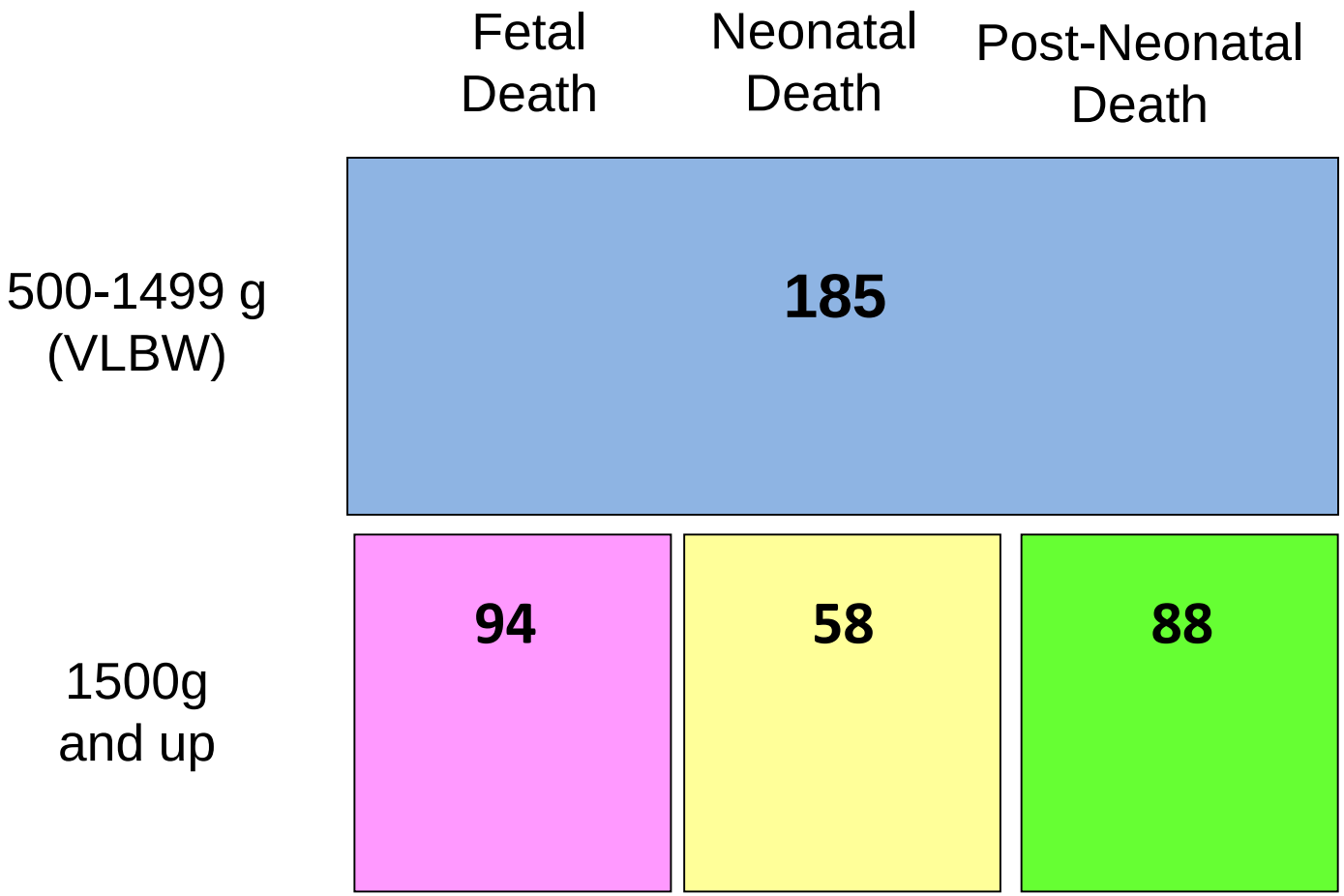
Each period of risk is associated with its own set of risk and prevention factors



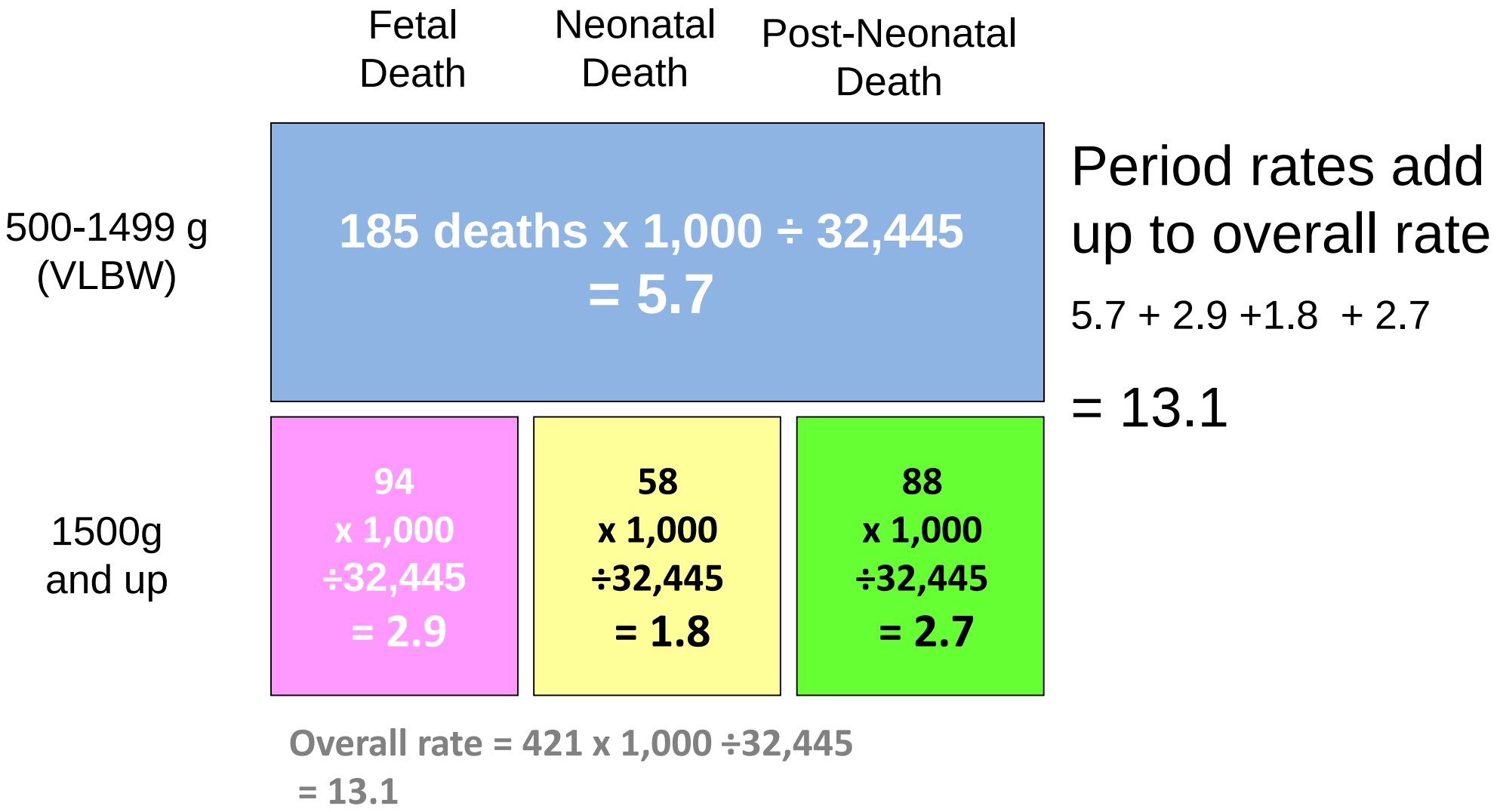
PPOR Analytic Steps

1. Sort the deaths into the four periods of risk, count them, calculate a rate for each period (divide by births)
2. Estimate preventable mortality using the reference group
3. In-depth investigation of period(s) of risk with the most preventable mortality

1. PPOR first analysis step (sort the deaths into periods)



1. PPOR first analysis step (Calculate Rates)



Period rates add up to overall rate

5.7 + 2.9 +1.8 + 2.7

= 13.1

What rates should we expect to see in each period of risk?

- PPOR answers this question using a reference group, a real population of mothers that experience the best outcomes—low fetal and infant mortality rates.

A typical reference group includes NH white women, 20 or more years of age, with a college education.

Example reference group rates

Reference Group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
	1.8	1.2	0.9	0.7	4.7

- Mortality above these rates is considered preventable
  - underlying justice assumption
  - population-based way to assess preventability

PPOR Steps

1. Sort the deaths into the four periods of risk, count them, calculate a rate for each period (divide by births)
2. Compare your population's rates to the reference group's rates using . . . *SUBTRACTION*

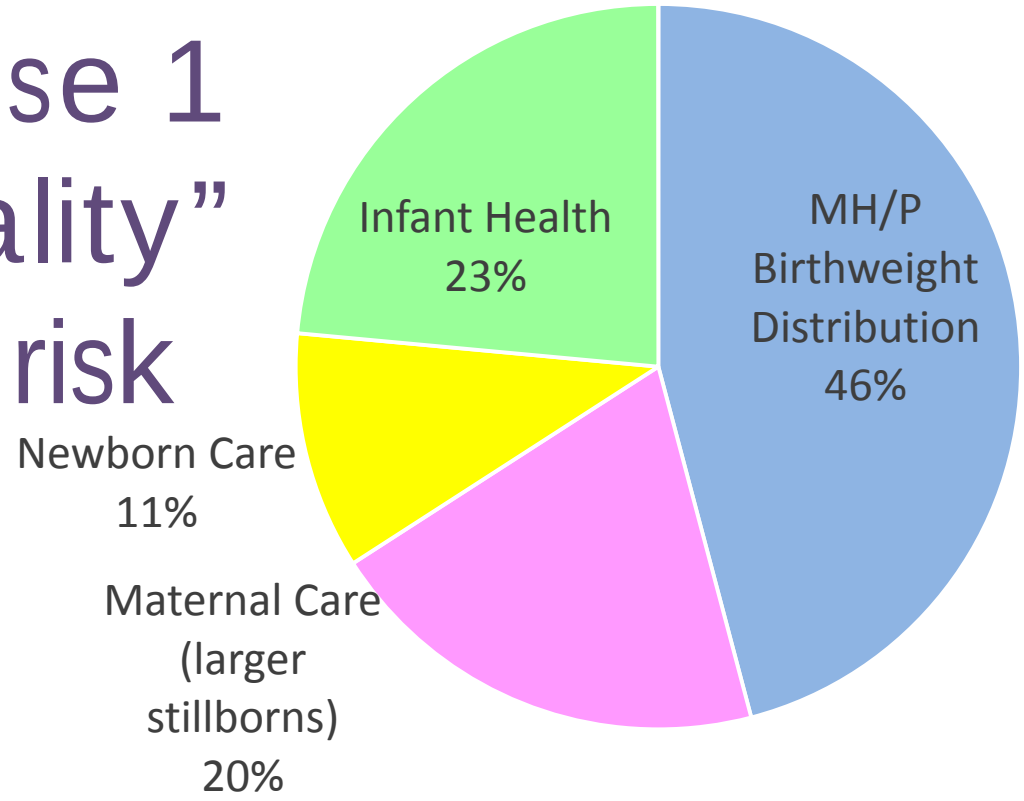
Estimating Preventable Mortality

NH Black	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
	5.7	2.9	1.8	2.7	13.1

Reference Group	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
	1.8	1.2	0.9	0.7	4.7

Excess Mortality Rate	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
By Subtraction	3.9	0.7	0.9	2.0	8.4

Results of Phase 1 "excess mortality" by period of risk

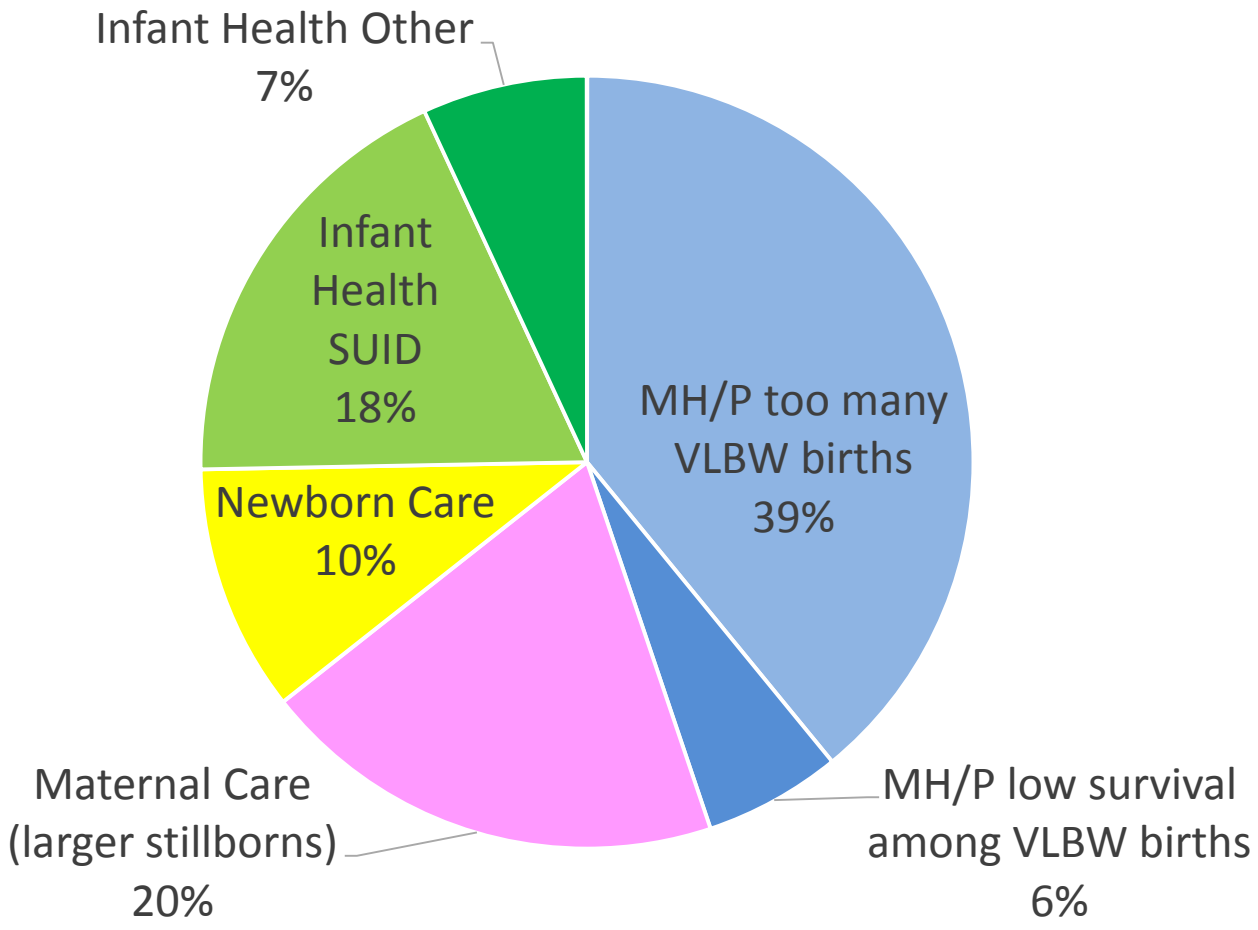


Excess Mortality Rate	Maternal Health/ Prematurity	Maternal Care	Newborn Care	Infant Health	Fetal-Infant Mortality
By Subtraction	3.9	0.7	0.9	2.0	8.4

3. In-depth investigation “Phase 2 analysis”

- Periods of risk with the highest excess mortality are investigated to determine causes and areas for prevention. (Analysis plan depends on which risk period.)
  - Identify the most important **probable causes** for excess mortality
  - Examine the **risk factors for those causes** (compare study and reference populations)
  - Estimate the potential **impact** of risk factors

3. Initial findings divide blue and green periods of risk each into two major causes



3. Causes of the “excess” VLBW births

- Analytic steps focus on determining which of the known causes of being born very low birth weight are most likely to be causing the PREVENTABLE very low birthweight births that are occurring in our community.
- Based on
  - Our own birth certificate data
  - Published scientific research

Example PPOR analysis endpoint

- Short list of known causes of preventable very low birthweight births that ARE important in this community
  - Hypertension
  - Obesity
  - Unmarried
- Long list of known causes that do NOT seem to explain this community's excess mortality (e.g. prenatal care, plurality, previous preterm birth, delivery method, quality of NICU, birth defects, medical attendant, poverty…)

How might FIMR add information to our investigation?

- Do the deaths we reviewed tell a story of late diagnosis or untreated hypertension? Pre-eclampsia? Is there a system problem such as uninsurance, late prenatal care, missing inter-conception care?
- What is the reality of the recording of “unmarried” on birth certificates? Based on deaths, do unmarried women usually have a stable partner? Do they have a lack social support or stable housing?

How might PPOR data inform our FIMR process?

- Should our Case Review Team focus for a time on very low birth weight births? On mothers with hypertension? Unmarried mothers?
- Should the CRT or the CAT do a more in-depth investigation of marital status to search for root causes?

PPOR and FIMR can fit together well!

- Each can inform the other
- Both can inform our action to prevent fetal and infant deaths