Perinatal Periods of Risk
Practice Collaborative

Frequently Asked Data & Analytic Questions

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“I have just one more question...”

New PPOR User
“What do you mean by two PPOR Analytic Phases?”

New PPOR User
What do you mean by PPOR Analytic Phases?

**Phase 1: Identifies the populations with excess mortality.** It examines the 4 mortality components—Maternal Health/Prematurity, Maternal Care, Newborn Care & Infant Health—for various populations and uses a reference group to estimate excess mortality.

**Phase 2: Explains the excess mortality.** It examines reasons for the excess mortality through further epidemiologic studies, mortality reviews and community assessments.
Phase 1 PPOR Analysis:
Boston, 1995-97

Number of Deaths

Age at Death

Birthweight

Fetal

Neonatal

Post neonatal

500-1499g

108

1500g

77

27

29

Total = 241

% of Excess Mortality

Total Excess = 106
Phase 2 Studies

Maternal Health/Prematurity

Birthweight Distribution

Birthweight-Specific Mortality

Infant Health

SIDS

Injury

Infection

Anomalies
Fetal & Infant Mortality Reviews

- Focus FIMR activities on the group contributing to the gap.
- Describe in greater depth the risk factors, events or services that may contribute to the gap.
- Validate the quality of vital records and other information.

“Paint the faces behind the numbers”
“What are linked birth and infant death files?”

New PPOR User
Linked Birth & Death Certificates

- Infant Deaths
  - Live Birth Certificate
    - Birth Characteristics
  - Infant Death Certificate
    - Death Characteristics
- Fetal Deaths
  - Fetal Death Certificate
Birth Versus Death Cohort

Birth Cohort
- Births
- Deaths
  - 1999
  - 2000

Death Cohort
- Births
- Deaths
  - 1999
  - 2000
“What is the quality of our certificates? Can we use Fetal Deaths?”

New PPOR User
Data Quality Issues

- Unlinked certificates
- Missing birthweight & gestational age
- Missing education, race, or Hispanic origin
- Fetal death certificates
Percentage of Missing Infant Deaths, U.S. Cities, 1995-97

Unlinked deaths
Unknown birthweight & gestational age
Percentage of Unknowns for Fetal Deaths, U.S. Cities

The chart shows the percentage of unknowns across different categories: Missing, Imputed, Age, Race/Ethnic, and Education.

- **Missing**: The highest percentage of unknowns is found in the Missing category, with values ranging from 25% to 100%.
- **Imputed**: The Imputed category has a lower percentage of unknowns, with values ranging from 0% to 40%.
- **Age**: The Age category has a very low percentage of unknowns, with values close to 0%.
- **Race/Ethnic**: The Race/Ethnic category has a moderate percentage of unknowns, with values between 20% and 80%.
- **Education**: The Education category has a variable percentage of unknowns, with values ranging from 0% to 100%.

The chart provides a visual representation of the distribution of percentage of unknowns for fetal deaths in U.S. cities.
Relationship Between Gestational Age and Median Birthweight

Gestational Age (Weeks)

- Infant Deaths
- Fetal Deaths
Imputation I: Fetal Deaths

- **BW Unknown**
  - **GA >= 32**
    - **Y**
      - **BW >= 1500**
    - **N**
      - **GA >= 24**
        - **Y**
          - **500 <= BW < 1500**
        - **N**
          - **< 500**
  - **N**
    - **< 500**

- **GA Unknown**
  - **BW >= 500**
    - **Y**
      - **GA >= 24**
    - **N**
      - **< 24**
Imputation II: Infant Deaths

- **BW Unknown**
  - **GA >= 31**
    - Y: **BW >= 1500**
    - N: **500 <= BW < 1500**
  - N: **< 500**

- **GA Unknown**
  - N / A
Cumulative Percentage of Unknown BW by Known GA

Gestational Age (Weeks)

- Infant Deaths
- Fetal Deaths
“Do we really have to eliminate <500 gram babies? They are a large part of our deaths…”

New PPOR User
Ratio of Fetal Deaths to All Live Births <32 Weeks

Gestational Age (Weeks)

Honolulu
Virginia Beach
New York
Ratio of Fetal Deaths to All Live Births <32 Weeks

Gestational Age (Weeks)
Ratio of Fetal Deaths to All Live Births <32 Weeks

Gestational Age (Weeks)

- Max
- 90%
- 75%
- Median
- 25%
- 10%
- Min
Percentage of All Live Births
< 2000 grams

Birthweight (Grams)
Percentage of All Live Births <2000 grams

Birthweight (Grams)

Min
10%
25%
Median
75%
90%
Max

200-299
300-399
400-499
500-599
600-699
700-799
800-899
900-999
Alternative Categories for Perinatal Periods of Risk

Extra Categories

- <500g category(ies) for live births
- <24 wks category(ies) for fetal deaths

Warning: Extra categories are not a good way to meet the minimum criteria of 60 deaths.
“Why are fetal deaths of less than 24 weeks gestation excluded from the analysis, but infant deaths of all gestations are considered if they are of 500 grams or more?”

New PPOR User
Differences in Reporting of Fetal and Infant Deaths

- Differential reporting requirements for fetal deaths depending on States
- Uniform reporting requirement for live births/infant deaths
- Differential reporting of very small babies (or fetuses)
“Do we need to exclude babies of less than 500g and fetal deaths of less than 24 weeks gestation from the denominator of feto-infant mortality rates?”

New PPOR User
PPOR Mortality Rates for Atlanta, GA, and Washington, DC, Computed with Different Denominators

PPOR Mortality Rates

Atlanta
DC

Total
MH
MC
NC
IH

PPOR Mortality Rates
“Which reference group should we use? Do I need to use a national reference group? Where can I find one?”

New PPOR User
Examine the “Opportunity Gap”

Reference Groups

 Attempt to choose a simple optimal group; at least 15% of the population

U.S. studies:

- 20 or more years of age
- 13 or more years of education
- Non-Hispanic white women
Overall Feto-Infant Mortality Rate
Omaha, Nebraska, 1995-97

52% Excess Mortality
External Reference Group

18% Excess Mortality
Internal Reference Group
Potential Reference Groups

- Traditional group: non-Hispanic white women of 20+ years with 13+ years of education.
- Population under study (internal)
- Population from the larger community (external)
- National reference group (external)
- Same as above but with new characteristics
Potential Reference Groups

Recommendations

- Need at least 60 deaths in the group. Harder to do in-depth analyses.
- Acceptable to community; redefines the target.
- At minimum, use standard group along with a new reference group.
- External reference groups are useful when the number of events for the reference group are <60 deaths or data quality problems.
“What is the difference between residence and occurrence? Which one should we use?”

New PPOR User
Place of Residence Versus Occurrence at Birth

Residence at Birth

Occurrence at Birth

Residence  Occurrence  Death

Residence  Occurrence  Death
Place of Residence Versus Occurrence at Birth

Residence at Birth
- Residence
- Occurrence
- Death

Residence at Birth
- Residence
- Occurrence
- Death
“Who should we include in our PPOR analysis? Can I just study a high risk area or population?”

New PPOR User
Communities Want to Target Specific Groups

- High risk geographic area(s)
- Specific racial or ethnic group
- Teens
- Clients
- Healthy Start Area
Targeting Recommendations

- Need to have at least 60 feto-infant deaths and the more the better
- Generally better to have bigger than your target and measure your targets contribution to the whole
- Study multiple groups at one time
- Be careful not to bias your study due to selection bias
PPOR Analysis: Boston, 1995-97

Number of Deaths

Age at Death

Birthweight

500-1499g

108

77

27

29

Total = 241

% of Excess Mortality

Total Excess = 106
Communities Want to Exclude Specific Groups

- Congenital anomalies
- Twins and multiple gestation births
- Occurrences out of the community
“Why do we need at least 60 deaths in all cells?”

New PPOR User
Question:
During a single year, MC mortality rate increased to 4.0 in one of the five cities. In which of the following cities do you think that is more likely to happen?

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<tr>
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<th>City A</th>
<th>City B</th>
<th>City C</th>
<th>City D</th>
<th>City E</th>
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<td>4,000</td>
<td>10,000</td>
<td>20,000</td>
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<td><strong>MH Deaths</strong></td>
<td>10</td>
<td>20</td>
<td>50</td>
<td>100</td>
<td>500</td>
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<td><strong>MC Deaths</strong></td>
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<td>25</td>
<td>50</td>
<td>250</td>
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<tr>
<td><strong>NC Deaths</strong></td>
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<td>4</td>
<td>10</td>
<td>20</td>
<td>100</td>
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<td><strong>IH Deaths</strong></td>
<td>5</td>
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<td>25</td>
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Death Rates and 95% Confidence Limits for Increasing Numbers of Deaths
Non-Hispanic Blacks: Percentage of Number of Deaths by PPOR Category, 37 Cities
Width of the Ratio of the 95% Confidence Limit to the Number of Events
Width of the Ratio of the 95% Confidence Limit to the Number of Events (cont’d)
Minimal Number of Deaths

Number of Deaths

Age at Death

Fetal

Neonatal

Post neonatal

Birthweight

500-1499g

1500g

500-1499g

1500g

23

15

8

14

Total = 60
Minimal Number of Deaths

95% Confidence Intervals for the Ratio of Rate_2 / Rate_1 by PPOR Category

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<th>MC</th>
<th>NC</th>
<th>IH</th>
<th>Tot</th>
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<tr>
<td>3</td>
<td>2.0</td>
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<td>1.1</td>
<td>0.9</td>
<td>2.0</td>
<td>1.5</td>
</tr>
</tbody>
</table>

MH_T:MH_R = 46/8000 : 23/8000 = 2.0
MC_T:MCR = 30/8000 : 15/8000 = 2.0
NC_T:NC_R = 16/8000 : 8/8000 = 2.0
IH_T:IH_R = 28/8000 : 14/8000 = 2.0
TOT_T:TOT_R = 120/8000 : 60/8000 = 2.0
“What to do if there are less than 60 deaths in the reference group?”

New PPOR User
Small Number In the Reference Group

- Usually less deaths because of lower rates.
- Usually more missing data because it requires more data elements.
- For precise Excess rates, Reference rates need to be precise (narrow confidence limits).
Should We Use the Internal Reference Group Then?

- Check your data quality.
- Check how different internal rates are from external rates – large differences may be due to instability.
- Measure variability using Confidence Intervals.
- Bottom line – you can always use an external reference group.
“How many years should we combine?”

New PPOR User
Recommendations on the Number of Years to Use

- No more than 5 years due to changes in medical practice
- Need at least 60 deaths in every population you want to study
- Phase 2 analyses require even more deaths. Combine as many years as possible and appropriately.
- Time trends can be studied separately.