

**Data Analytics Subgroup, Infant Mortality Study**  
**November 9, 2018 Meeting**  
**Discussion Guide**

## Purpose of meeting

Develop a data analytics plan that takes into account the Study Charge, work group interests, available staff and data, the study timeline, and existing analytic work products.

## Purpose of Data Analytics Subgroup

1. Provide input on the data analytics approach and methods used by state staff to analyze data for the following 2 (of 6) tasks in the legislation mandating this study:
  - a. “examine factors, beyond the known factors of low birth weight, teen pregnancy, poor nutrition, and lack of prenatal care, affecting the mortality of African American Infants and infants in rural area in the United States and in the state”; and
  - b. Identify the costs “associated with low birth weight babies and infant mortality”
2. Provide input to state staff and contractors conducting a literature review of existing literature on the factors described above.
3. Review and provide feedback on data analysis and research results.
4. Provide input on the presentation of the analysis and results to the larger work group for inclusion in the study report.
5. Develop draft recommendations for consideration by the larger workgroup.

## Study Tasks contained in Legislation

1. examine factors, beyond the known factors of low birth weight, teen pregnancy, poor nutrition, and lack of prenatal care, affecting the mortality of African American infants and infants in rural areas in the United States and in the State;
2. research programs in other countries, states, and localities, including Baltimore City, that have aimed to reduce the infant mortality rate;
3. make recommendations on methods to reduce the mortality rate of African American infants and infants in rural areas;
4. make recommendations on ways to use pregnancy navigators or community health workers to assist pregnant women with the goal of reducing the infant mortality rate;
5. make legislative recommendations regarding the establishment of a permanent council for lowering rates of disparity with respect to infant mortality; and
6. make recommendations regarding methods to reduce the costs associated with low birth weight infants and with infant mortality.

## Eight Priority Risk Factors for Intervention from the 2011 Maryland Infant Mortality Study

- Priority Chronic Conditions Before and During Pregnancy Maryland PRAMS Data
  - Hypertensive disorders during pregnancy (11% prevalence) and chronic hypertension before pregnancy (4% prevalence)

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- Other medical conditions such as gestational diabetes and pre-pregnancy diabetes, heart disease, obesity, and asthma as well as tobacco use, binge drinking, intimate partner violence and depression
- Fertility Treatment Maryland PRAMS Data
- Infant Sleep Position, Co-sleeping, Postpartum Maternal Tobacco Use Maryland PRAMS Data
- Timing And Effectiveness of Prenatal Care Vital Statistics data
- Maternal age
- Prior Pre-term Birth Vital Statistics data
- Birth Hospital Level of Care, if Very Low Birth Weight (VLBW) Vital Statistics data
- Early Term Deliveries (37-38 weeks gestation) Vital Statistics data

### Data from 9/17/18 meeting--Summary

- Infant mortality (IM) rates have decreased, but racial and geographic disparities persist
- Infant mortality among other minority women has increased in recent years, however
- Compared to other states, Maryland Black NH IM rates are among the lowest.
- Rural infant mortality rates were on the decline but have increased since 2012 (slide 12)
- The rural vs non-rural comparison depends on race.
- Rural IM is higher than non-rural if race-adjusted analysis, due to worse rural rate in Blacks. The recent race-adjusted rural disadvantage is entirely due to the Black rural disadvantage (compared to Black non-rural)
- Black rural is worse than Black non-rural recently. Black rural did not improve recently, while Black non-rural did
- Regardless of geographic area, IM's among Black NH infants consistently higher than other groups.
- Census tract specific definitions of rural areas should be considered
- White rural and non-rural trends are essentially identical to each other.
- The solution is to address rural and non-rural Black outcome
- This analysis identified a number of factors that are strongly associated with infant mortality, but it doesn't tell us which factors are actually causing deaths (administrative data sets are not well designed for this).

### Generate a list of potential data analytics questions

*Discussion questions:*

1. Given the charge of this group and the data presented at the September meeting, what questions are outstanding that need further data analysis?
2. Re: 2011 analysis--do we still like this list? Are there other risk factors that should be added, or any that should be removed? Should we update this analysis with more recent data?
3. What kind of impact do we want to make with the study recommendations, and what sort of data do we need to help support that effort?
4. Are we thinking sufficiently "outside the box"? What "off-the-wall" ideas do you have that we should consider?

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Initial list of questions for discussion (based on questions raised in discussion in September 17<sup>th</sup> work group meeting and previous state steering committee meetings)

1. David's key analytical steps:
  - a. Who are we trying to reach? Who is at risk?
  - b. Who do we reach them and get them engaged? What sort of system/programs does this require?
  - c. Once we've engaged them--what determinants are we trying to impact (ex. smoking, diabetes, etc.) and how do we do that?
  - d. How do we monitor the data to be sure that we are making progress?
2. Questions related to geography:
  - a. what percentage of the Maryland population falls in each geographic subgroup for the census tract level trends (ex. rural)?
  - b. Can we look at change in population over time? Is the urban population getting larger or the rural population? Does population shift from rural to urban impact the rates?
3. Finances and funding
  - a. Have the funding levels for programs focused on IM changed over time? [Note that this question may fit better in the Innovative Programs Subgroup charge]
  - b. What does per capita investment (public, private, insurance) look like across jurisdictions
  - c. Identify the costs "associated with low birth weight babies and infant mortality"
  - d.
4. Health Care Quality
  - a. What questions do we have about health care quality?
  - b. What gaps in care or quality might data help us see?
5. Access
  - a. Are behavioral health services integrated and available easily to families? Are services co-located with prenatal care? [Note that this question may fit better in the Innovative Programs Subgroup charge]
  - b. Are babies being transferred to Baltimore who don't need that level of care because some hospitals want to avoid high intensity babies? What is the impact on family and infant social needs and bonding?
  - c. Are discharges coming too early?
  - d. How could we look at access to OB services, given different provider types that provide this care? What about wait times?
  - e. Should we look at transportation access? How would we measure this?
  - f. Should we be looking at access issues outside of healthcare?
  - g. Access to dental care
6. Social Determinates
7. Questions related to time

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- a. If we think through a time model, from the parent's childhood until 1 year post-birth, what points in time span do we have questions about?
8. Race
  - a. Can the data tell us anything about the presence of absence of bias and the impact of that on outcomes?
9. Maternal Age
  - a. What is the role of teen pregnancy in infant mortality?
  - b. What is the role of increasing maternal age?
10. Behavioral health
  - a. What data do we have on maternal behavioral health and substance use? What about other adults in household?
11. Other factors
  - a. How much of a factor is birth spacing?
  - b. Can the data tell us anything about the impact of incarceration during pregnancy or at birth?
  - c. Home births: Given recent law on direct entry midwives, is there any data on home births that would be informative?
  - d.

### Additional Ideas and Open Discussion

What additional ideas and questions should be added to the list?

### Evaluation/prioritization of list based on study charge, available staff, available data, and the study timeline.

What are the highest priority questions for you on the list we have created?

- Do these questions fit in the study tasks?
- Do we have access to appropriate data sets to answer these questions
- How time consuming/complicated is this analysis and can it be done with the resources available?
- What questions have already been answered by existing analytic work products that we can reuse, rather than recreate?

State administrative datasets include birth and death certificates, hospital discharge, and PRAMS as well as claims databases.

### Discussion of Analytics Methods and Approaches for Prioritized Items

1. Definition: Is infant mortality defined as 0-1, 0-2?
2. Geography:
  - a. What level of geographical analysis should be used (county, census tract, etc.) and how should that analysis be used?
  - b. How should we define "rural"?
  - c. What level of geographic analysis can our available data support?
3. Time—what time periods do we want to examine? How do we want to look at change over time? What are the constraints in the data to these choices?

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4. Race
  - a. Race-adjust geographic data
5. Models:
  - a. Factorial Design Analysis: 2x2 table that presents these four cells for each item (factor prevalence or factor association with outcome): rural White, non-Rural White, rural Black, non-rural Black (see page 11)
6. Measures: Prevalence, severity, etc.

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**Table 1: *potential division of labor between subgroups***

	Data	Innovation	Experience
Identify high risk	<p>*What items in our surveillance data identify high risk? *Which items are true determinants (causal)?</p> <p>*Are determinants distributed differently between Black/White and rural/non-rural?</p> <p>*Do determinants have different effects between Black/White and rural/non-rural?</p> <p>*Are rural communities doing even worse than rural counties (the granular rural definition question)</p>	<p>What innovative approaches exist in the literature and elsewhere for identifying women at high risk for bad pregnancy outcomes</p> <ol style="list-style-type: none"> <li>1) When pregnant</li> <li>2) Before/between pregnancies</li> </ol>	<p>*How would the community identify high risk persons?</p> <p>*What does the community think of our current approaches to identifying high risk persons?</p>
Reach and engage	<p>Are Maryland programs reaching Black and rural persons in appropriate numbers and proportions?</p>	<p>What innovative approaches exist to reach and engage these women?</p>	<p>*How would the community want reach and engage? *What does the community think of current efforts to reach and engage?</p>
Deliver interventions	<p>What programs are being delivered in Maryland? How many served, with what interventions?</p>	<p>What new determinants, or innovative interventions exist?</p>	<p>What does the community think about current intervention delivery?</p>
Track outcomes	<p>What do the data say in Maryland about program success?</p>	<p>What is the evidence of success for these innovations?</p>	<p>Does the community think what we do works?</p>

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*Example table #1: State wide*

Metric	Statewide			Urban Jurisdictions			Rural Jurisdictions		
	All race	NH Black	NH White	All race	NH Black	NH White	All race	NH Black	NH White
Infant mortality rate									
Infant mortality count									
LBW Rate									
LBW count									
VLBW Rate									
VLBW count									
Neonatal mortality rate									
Neonatal mortality count									
Post-neonatal mortality rate									
Post-neonatal mortality count									
% of birth with any NICU days									
Total NICU days									
Mean NICU days per birth									

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Median Nicu days per birth

Total NICU costs

Mean NICU costs per birth

Median NICU costs per birth

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***Example table #2: By Jurisdiction***

Jurisdiction X or Region, i.e. ES	2000-2005			2006-2011			2012-2017		
	All race	NH Black	NH White	All race	NH Black	NH White	All race	NH Black	NH White
Metric									

Infant mortality rate

Infant mortality count

LBW Rate

LBW count

VLBW Rate

VLBW count

Neonatal mortality rate

Neonatal mortality count

Post-neonatal mortality rate

Post-neonatal mortality count

% of birth with any NICU days

Total NICU days

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Mean NICU days per birth

Median Nicu days per birth

Total NICU costs

Mean NICU costs per birth

Median NICU costs per birth

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**Example of Factorial design approach to the IM study**

Hypertension during pregnancy and its relationship to Very Low Birth Weight (**data from 2011 report**, or **hypothetical** [red or other color])

**Prevalence of HTN during pregnancy:**

	Rural	Non-Rural	Total
Black	<b>16%</b>	<b>12%</b>	<b>12.8% ('05-'08) 16.2% ('09)</b>
White	<b>10%</b>	<b>10%</b>	<b>8.6% ('05-'08) to 11.7% ('09)</b>
Total	<b>13%</b>	<b>11%</b>	<b>11.5%</b>

**This hypothetical pattern of rural and non-rural prevalence within race groups could contribute to an overall rural disadvantage, which is confined to a Black rural disadvantage.**

Even if hypertension has the same adverse effect in both Blacks and Whites, the prevalence difference will create a rural Black disadvantage. If hypertension has a greater adverse effect on Blacks, then the Black disadvantage will be even larger than the prevalence disadvantage would suggest. So we also chart the association metrics (risk ratio and risk difference):

**Relative prevalence (prevalence ratio) for VLBW outcome by HTN status in pregnancy (HTN/Not):**

	Rural			Non-Rural			Total
Black	<b>3.4</b>	<b>3.8</b>	<b>3.8</b>	<b>3.4</b>	<b>3.0</b>	<b>3.0</b>	<b>3.38 (7.1% if HTN/2.1% if not)</b>
White	<b>3.3</b>	<b>3.3</b>	<b>3.6</b>	<b>3.3</b>	<b>3.3</b>	<b>3.0</b>	<b>3.29 (2.3% if HTN/0.7% if not)</b>
Total							

The red, purple and blue represent three sets of cell values that would be consistent with the marginal values (items under total). Red represents similar risk for all four cells, purple represents risk excess for rural in Blacks only, and blue represents and risk excess for rural in both races.

**Prevalence difference for VLBW outcome by HTN status in pregnancy (HTN - Not):**

	Rural	Non-Rural	Total
Black			<b>5.0 percentage points (7.1% if HTN - 2.1% if not)</b>
White			<b>1.6 percentage points (2.3% if HTN - 0.7% if not)</b>
Total			