

Adapting Prenatal Metals Screening Procedures to New NJ Partners

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Introduction

NJ Biomonitoring (NJB) partners with University Hospital (UH) in Newark, NJ to offer prenatal and perinatal toxic metals screening as a standard-of-care to the patient population, in which all expectant and new mothers are tested for lead and mercury.

Lead and mercury readily cross the placental barrier and increase the risk of the following effects:^{1,2,3,4,5}

- Neurological problems
- Low birthweight
- Birth defects
- Obesity
- Cardiometabolic disease
- Vision problems
- Miscarriage
- Intellectual deficits
- Preeclampsia
- Premature birth
- Motor impairment
- And more...

The following data are from UH with the testing range as 0-5 µg/dL for lead and 0-5 µg/L mercury:

	Not Detected (<0.5 µg/dL)	Detected (0.5-1 µg/dL)	Potential Health Effects (1-5 µg/dL)	Above Health Limit (elevated) (≥5 µg/dL)
Lead in Mothers	35.5 %	38.8 %	24.7 %	1.08 %
Lead in Babies	59.9 %	26.5 %	12.9 %	0.740 %
	Not Detected (<0.25 µg/L)	Detected (0.25-1 µg/L)	Potential Health Effects (1-5 µg/L)	Above Health Limit (elevated) (≥5 µg/L)
Mercury in Mothers	11.4 %	39.2 %	45.1 %	4.55 %
Mercury in Babies	9.01 %	31.2 %	51.1 %	8.69 %

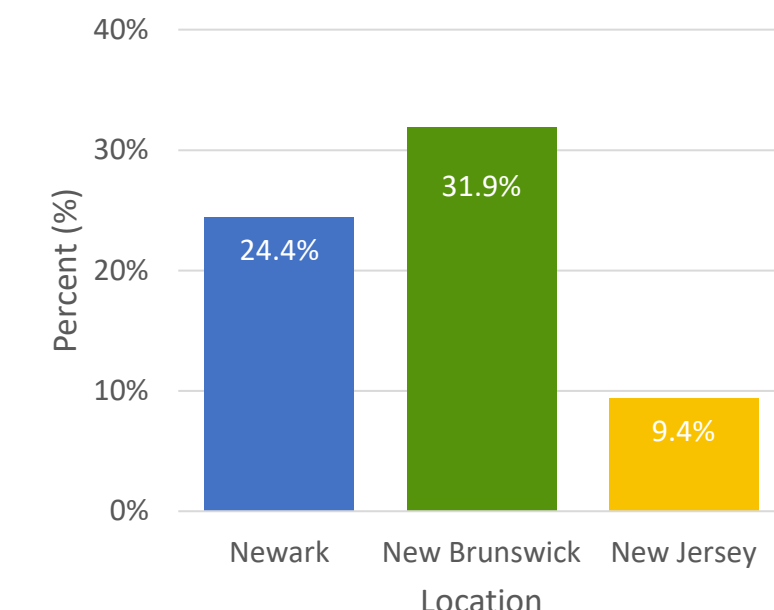
The data reveal the substantial need for metals testing. In November 2021, NJ assumed the CDC's blood lead reference value of 3.5 µg/dL, increasing the number of mothers and infants above the limit to 2.04% and 1.18%. Since the program's inception, over 1,000 cases of elevated blood lead and mercury have been discovered. Without testing, these patients may have suffered harmful effects without an avenue for treatment.

Demographics & Risk Factors

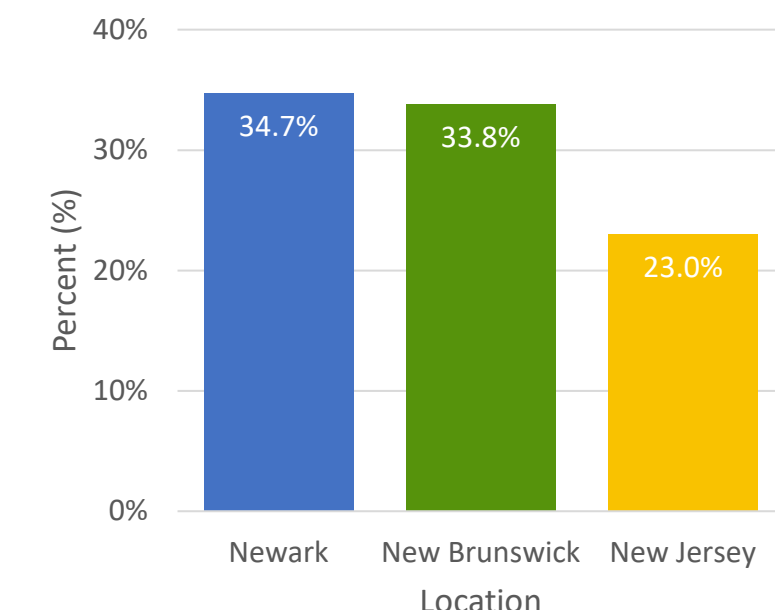
NJB's data from the prenatal screening program in UH is specific to UH's patient population. Saint Peter's University Hospital in New Brunswick, NJ provides the opportunity to study a population that varies from Newark.

Poverty and foreign-born status are risk factors for heavy metal exposure.^{6,7} These two factors present frequently in New Brunswick and will enable the program to reach patients who may benefit from testing and treatment.

Population Living in Poverty⁸

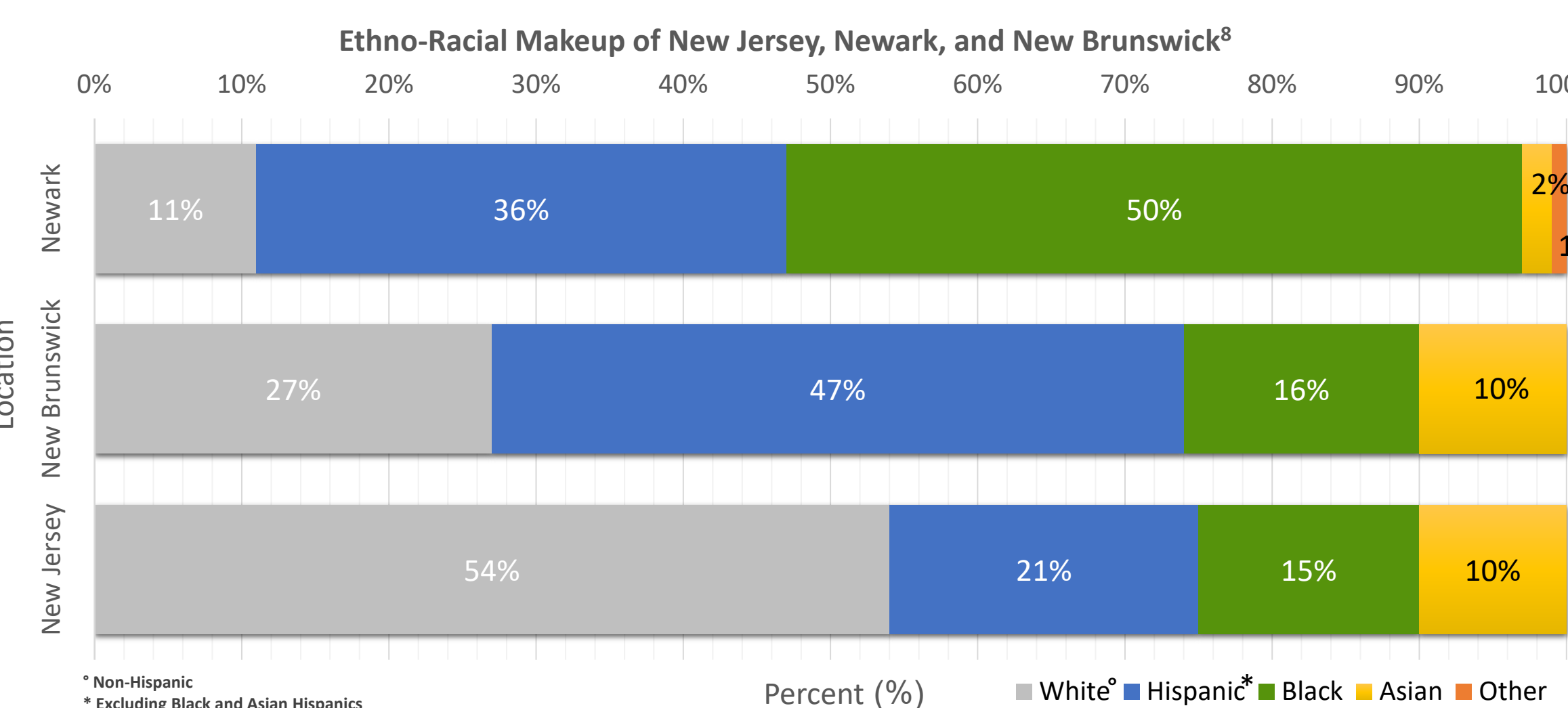


Foreign-Born Population⁸



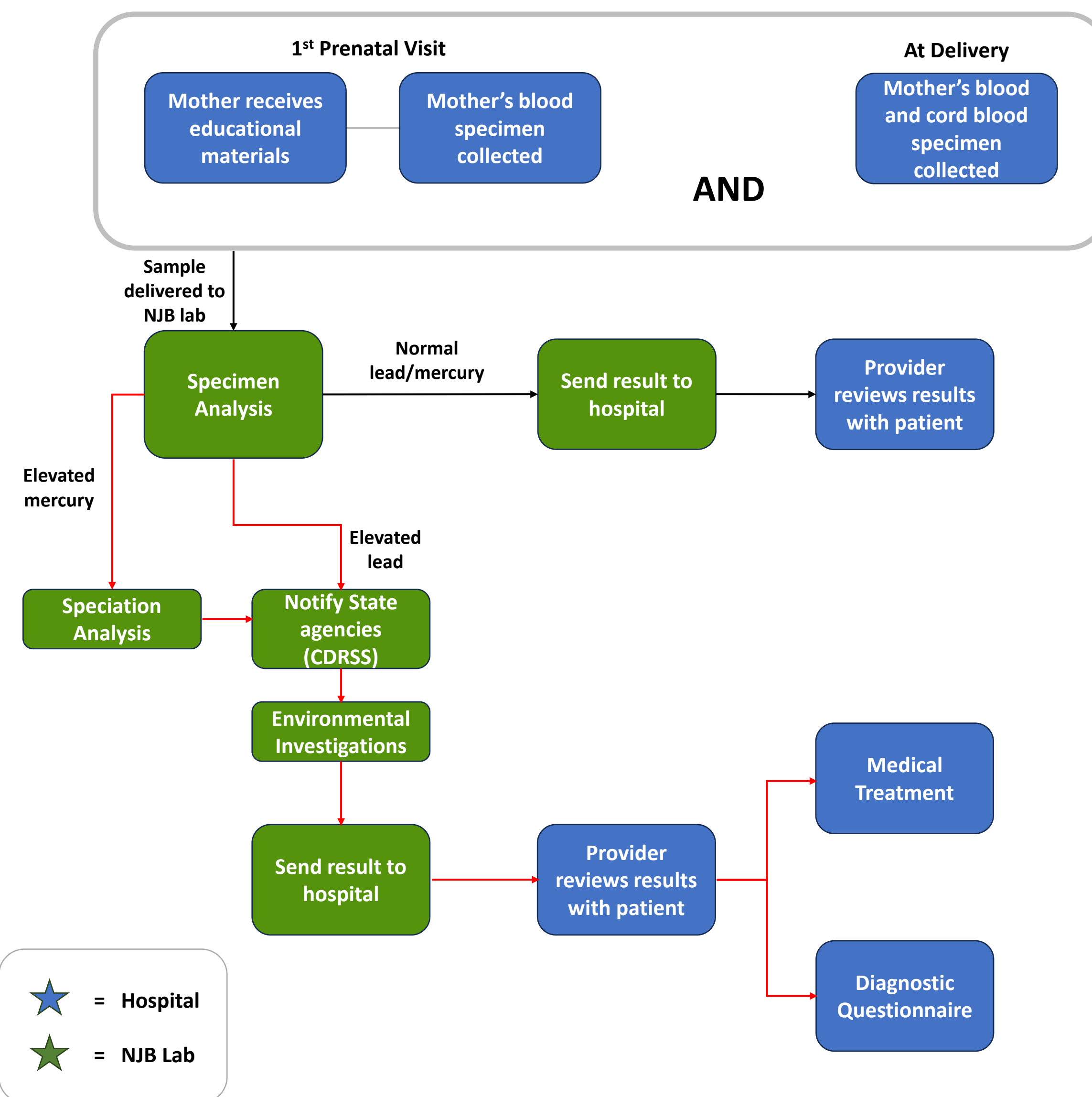
Race and Ethnicity

- ❖ Hispanic/Latino children are at risk for high rates of elevated blood lead⁹
- ❖ Asian women of childbearing age have 3-4x higher risk of mercury exposure¹⁰
- ❖ Poverty, traditional medicine, and living in inner cities are often routes of exposure⁹
- ❖ High rates of fish consumption increase levels of methylmercury in the blood¹⁰
- ❖ New Brunswick is nearly half Hispanic/Latino⁸
- ❖ 1 in 10 people in New Brunswick are Asian⁸



Methodology

NJB first developed the following model to be implemented at UH for prenatal screening:



The existing model is being adapted for use at Saint Peter's University Hospital. Implementation is an involved process that requires several steps for successful integration:



Results

Progress

Step	Status
Plan model for prenatal screening program	Complete
Create diagnostic questionnaire to identify lifestyle risk factors and potential sources of toxic metals exposure	Complete
Install phlebotomy station for specimen collection in OB/GYN clinic	Complete
NJB site visit to St. Peter's University Hospital	Complete
Create and sign legal documents for data use and materials transfer	In progress
Create test in EPIC (hospital EMR) for patient ordering, reporting, and record keeping	On schedule
Define specimen collection and centralization protocols	On schedule
Train hospital staff on program background and protocols	On schedule
Arrange transportation for specimens to be transferred to NJB laboratory	On schedule

Challenges Overcome

No phlebotomy station	Saint Peter's has installed a phlebotomy station in the hospital's OB/GYN clinic for local and faster service
Nursing shortage and leadership turnover	Addressed staffing challenges by hiring more nurses as well as appointing new department heads
Data agreements	Data use and materials transfer agreements have been revised based on new NJDOH privacy and security requirements and are now in review
Follow-up care	NJB partners provide resources for follow-up care, (environmental interventions through State agencies and Child Lead programs)

Conclusions

Prenatal Testing

- ❖ Lead and mercury exposure is dangerous for mothers and fetuses.
- ❖ Particular socio-economic and ethnic populations prevalent in New Brunswick face higher risk of exposure to heavy metals.

Program Expansion

- ❖ NJB is on track for successful integration of the prenatal screening program with Saint Peter's University Hospital.
- ❖ Challenges faced have been successfully addressed through strong partnership and communication.
- ❖ Having a champion at the hospital assures progress and support.
- ❖ NJB's program model remains unchanged to date.

Future Plans

- ❖ NJB plans to use data and methodology from the program to bolster a mercury tracking program addressing the high rates of exposure.
- ❖ With more evidence of successful integration, NJB will continue to expand screening to vulnerable populations.
- ❖ Third party payment agreements will help secure the future and longevity of the programs.
- ❖ Data generated will help justify prenatal heavy metals screening as a standard-of-care for all pregnant people, both in NJ and across the United States.

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Acknowledgements

St. Peter's University Hospital – Dr. Day-Salvatore and Team

NJ Biomonitoring and ECLS Team, Doug Haltmeier, Veronica Chandra, Arman Hosen, Lauren Lettiere, Latasha Blue, Sandra Camacho, Dr. Peixue Ma, Dr. Thomas Kim, Rosalind Finney, Quality Assurance, Legal, and administrative staff, NJDOH Senior Management, and Communications

University Hospital (Newark, NJ)

CDC Biomonitoring Grant #NU88EH001326

CDC Biomonitoring Grant #NU88EH00132NJDOH

