

# Conducting Subject Matter Expert Calls with Study Participants with Elevated Results from the Ongoing NJHANES Biomonitoring Study



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## Introduction

The NJ Health and Nutrition Examination Survey (NJHANES) began in 2021 as NJ's first statewide population biomonitoring surveillance study. NJHANES examines the health, nutrition, and chemical body burden of >500 residents using questionnaires and biospecimens for over 120 chemicals. During project planning, the team identified several challenges to reporting results directly to participants including:

- The lack of consensus on reference ranges and follow-up values
- Report readability and comprehension
- Limited participant scientific literacy

Results need to be communicated to participants in an understandable way to maximize their value and utility in reducing exposures. To assist participants in understanding their exposure results, NJHANES conducts subject matter expert (SME) calls for participants with exposure above our established follow-up values.

## Methodology

### Establish reference and follow up values

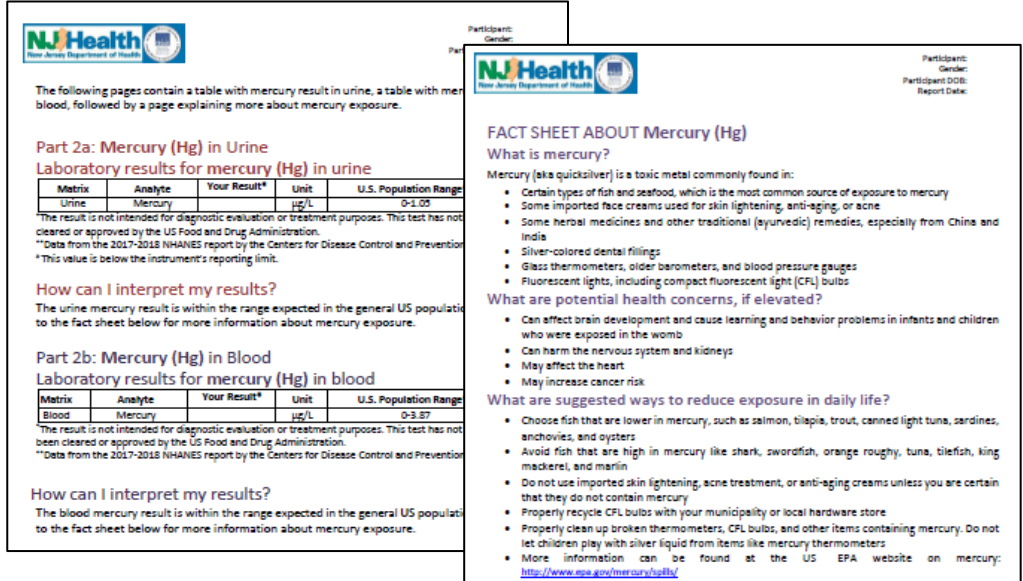
The NJHANES team conducted extensive research to establish reference ranges and follow-up values based on federal and other state data. Balancing concern for the participants' well-being and program capacity to conduct call, we selected the following criteria:

- Most recent CDC NHANES 95<sup>th</sup> percentile times three as a default
- Derived from lowest of NJ mandated reportable levels or 3x 95<sup>th</sup>
  - Arsenic (As):  $\geq 100 \mu\text{g/L}$  in urine
  - Cadmium (Cd):  $\geq 5 \mu\text{g/L}$  in whole blood;  $\geq 3 \mu\text{g/L}$  in urine
  - Lead (Pb):  $\geq 3.5 \mu\text{g/dL}$  in whole blood;  $\geq 80 \mu\text{g/L}$  in urine
  - Mercury (Hg):  $\geq 11.6 \mu\text{g/L}$  in whole blood;  $\geq 20 \mu\text{g/L}$  in urine
- CDC-ATSDR, NJ, and NHANES data used to set normal ranges

### Establish report protocol and template

The team considered the following factors while determining whether to report individual results:

- Ethical concerns/right-to-know
- CLIA reporting requirements
- Inclusion of educational materials
- Inclusion of interpretations



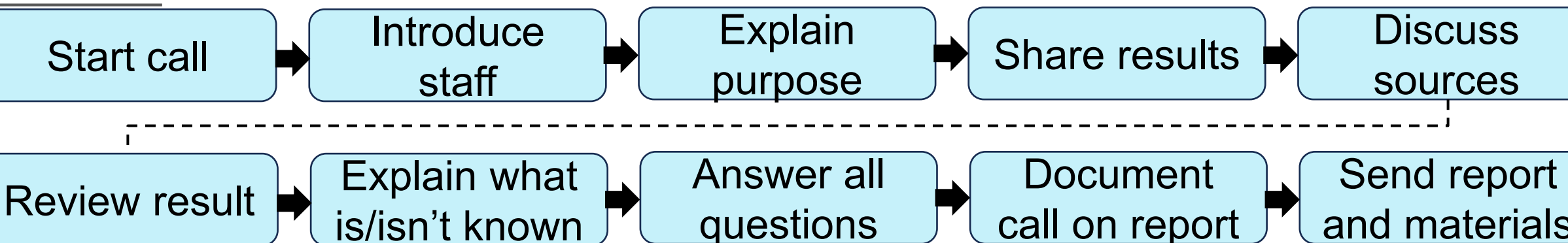
The reports were designed to include results, a reference range, sources of exposure, and ways to minimize exposure. Terminology was selected to meet goals.

### Establish SME call protocols for results above follow-up value

#### PRIOR TO SME CALL

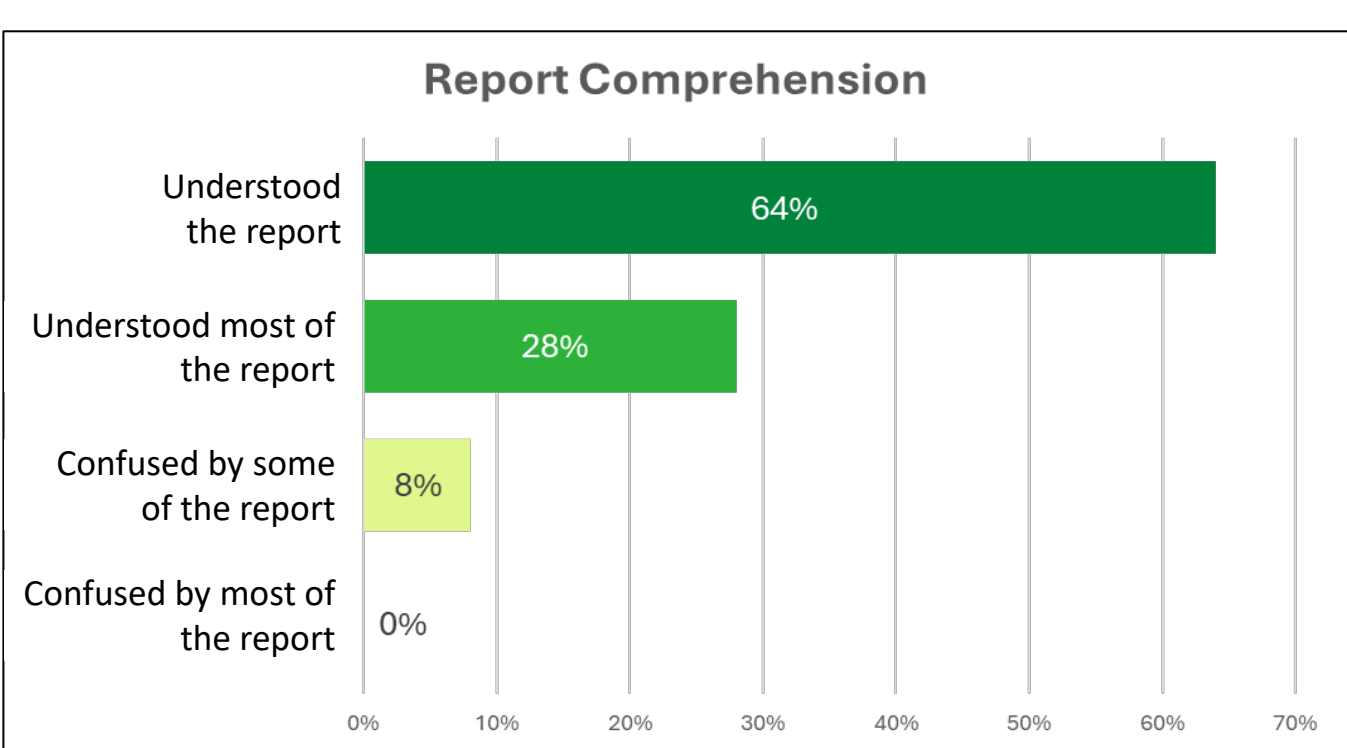
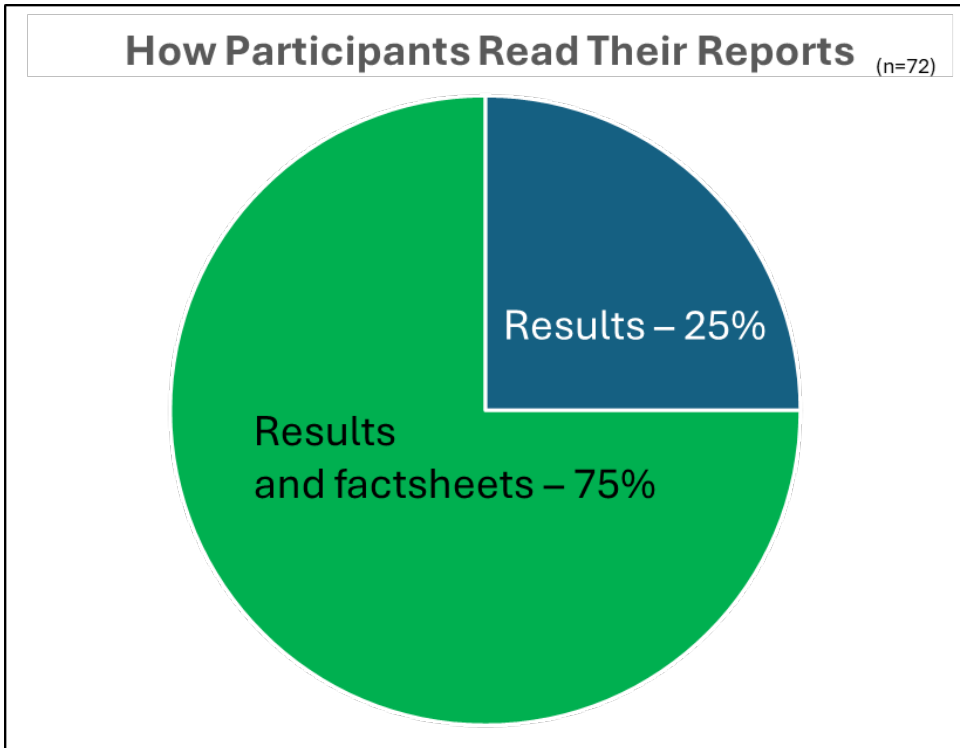


#### SME CALL



## Results

The study recruited and consented 503 participants; each opted to receive their exposure reports. To date, 470 individuals received their initial reports for As, Cd, Hg, and Pb. Intermediate reports were sent with additional information to 58 participants. We sent surveys to the first 250 participants to complete the study to gauge their satisfaction and received 82 responses. Of those who answered the question, 100% read their report; 75% of whom read the report and factsheets and 92% indicated they understood most or all of the report.



The NJHANES team held 74 SME calls with 52 participants who had chemical levels above the predefined follow-up values. Some participants received multiple calls as additional exposures were identified. Follow-up samples were collected and tested for three participants.

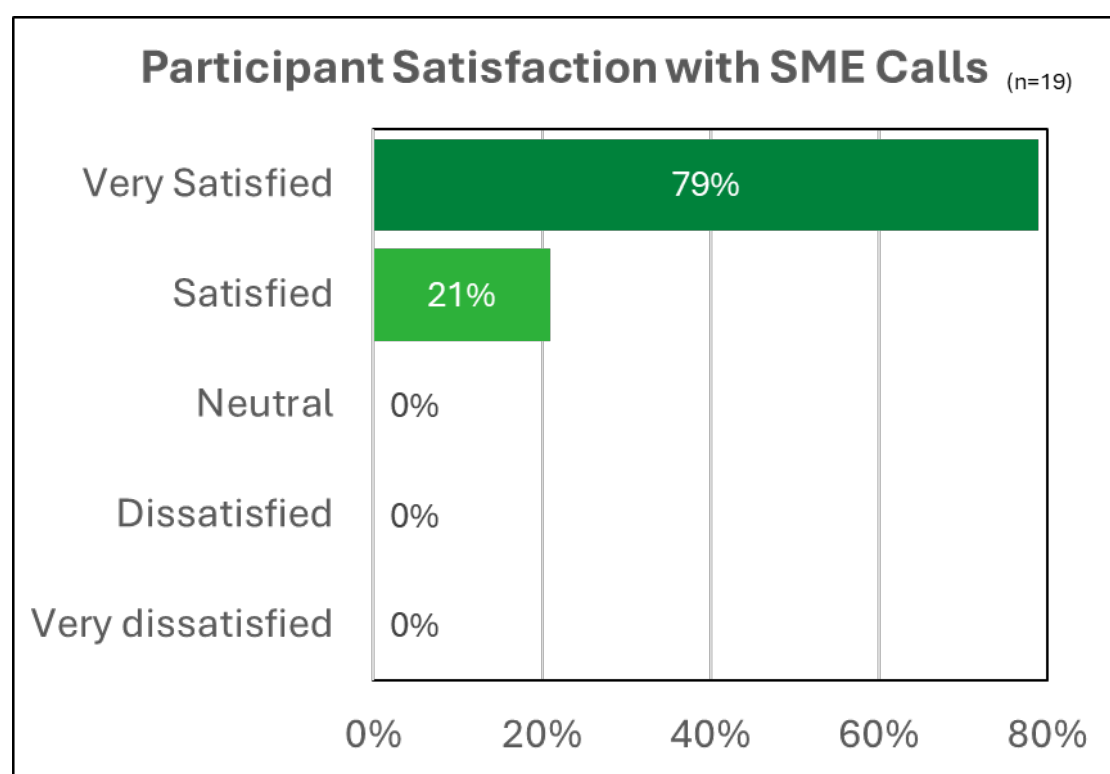
Chemical Category		Calls
Metals		46
Volatile organic compounds (VOC)		21
Polycyclic aromatic hydrocarbons		7
Nicotine metabolites		3
Per- and polyfluoroalkyl substances		1

Metals	Calls
Arsenic	18
Mercury	11
Lead	7
Barium	4
Cadmium	3
Uranium	2
Thallium	1

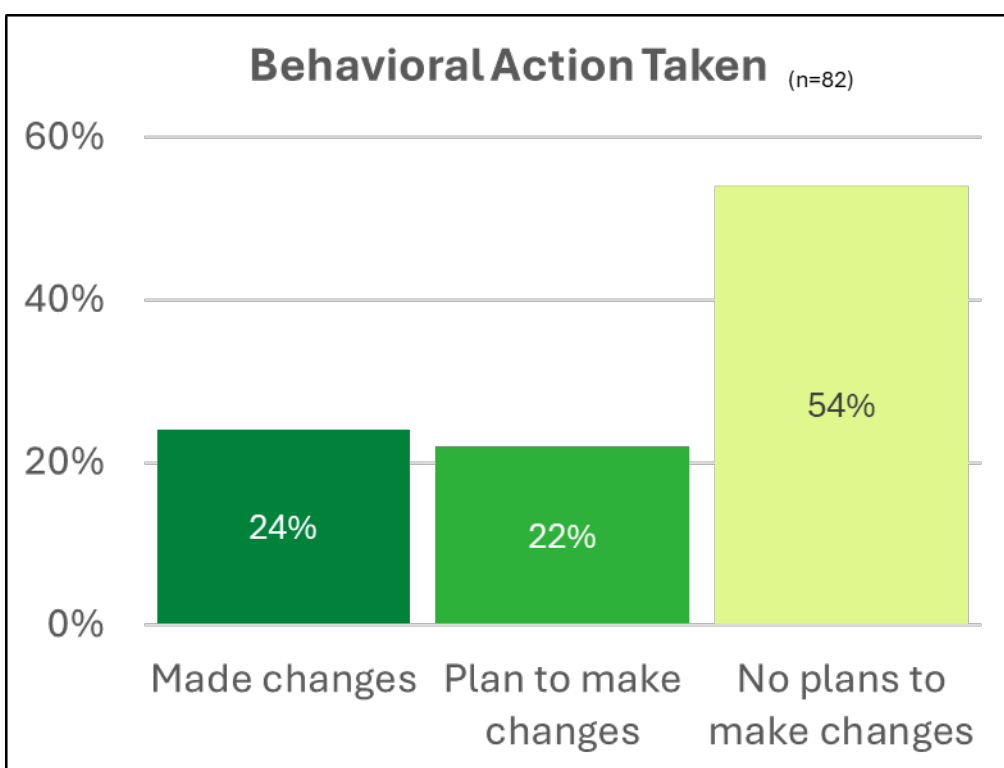
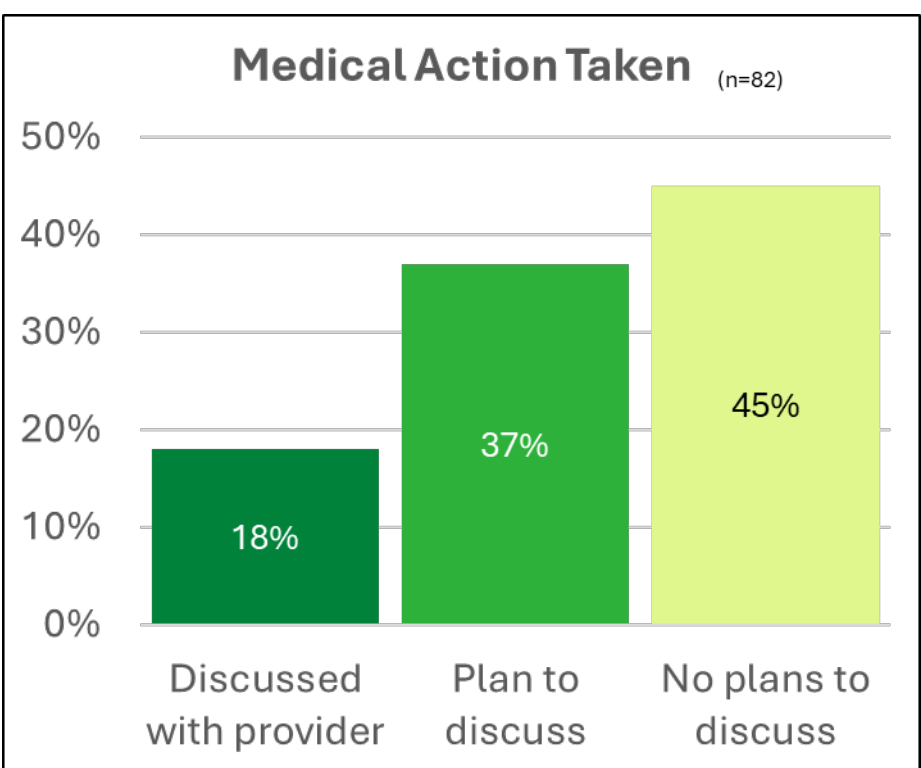
VOC	Calls
BPMA	8
TTCA	7
BMA	4
MHBMA3	2



Metals were discussed in ~90% of calls, with high arsenic and mercury being the most common. Elevated VOCs were found in ~40% of participants receiving SME calls. All results available at the time of the call are discussed, not just for the chemicals that prompted the call.

Of the 82 participants who responded to the satisfaction survey, 19 indicated they had received an SME call with every individual stating they were satisfied or very satisfied with their experience.

The goal of reporting results to participants is to provide information needed to reduce their exposures. NJHANES encourages participants to share their results with their medical providers. Of the 82 respondents, >50% shared or plan to share their results with their



providers and nearly 50% made, or plan to make, changes to their behaviors or their homes including changing diets (e.g., type and/or amount of fish consumed), moving chemicals to a shed, and getting a water filter. *Note: Responses include participants with no elevated results.*

### Case study: Participant with elevated mercury and other chemicals

Metal	Initial	Follow up (+8mo)
Blood Hg ( $\mu\text{g/L}$ )	26.9	3.38
MeHg vs. InHg	96% / 4%	87% / 13%
Urine Hg ( $\mu\text{g/L}$ )	1.66	4.18
Thallium ( $\mu\text{g/L}$ )	0.617	1.43

Participant had elevated mercury – 96% methylmercury (MeHg) and 4% inorganic Hg (InHg). Based on the questionnaire and SME call, they switched to smaller fish and consulted their provider. Follow-up tests show their Hg levels decreased 87%.

Their VOC levels dropped as they started cooking with a fan. Urine Hg is likely due to dental amalgam. Participant was referred to NJ Poison for consultation for the increased thallium.

## Conclusions

Results communication to study participants is challenging and requires significant consideration in the project planning stage. Based on participant feedback, NJHANES reports were readable and understandable. Participants were encouraged to reach out with questions during consent and again through the satisfaction survey (two reached with questions after responding).

Participants felt comfortable on the calls and occasionally shared their medical histories, their personal lives, and in one case, their struggles with their water provider. Most were eager to learn more about their exposures and how to reduce them going forward.

Additional materials that were requested by participants included:

- Smoking cessation information
- Fact sheets for other chemicals
- Information on water testing
- Guidance on mercury in fish
- Lead and arthritis information



SME calls focused on explaining the results to participants without causing undue concern or fear. We found including the person who conducted the consent, the SME, and a manager to be most effective in placing the individuals at ease. Our data show that participants overwhelmingly found these calls to be beneficial and resulted successfully in medical follow up and behavioral change.

## References

NJHANES - [nj.gov/health/phel/env-testing/chemical-terrorism-lab/biomonitoring\\_projects.shtml](https://nj.gov/health/phel/env-testing/chemical-terrorism-lab/biomonitoring_projects.shtml)

Center for Disease Control and Protection NHANES Survey - [cdc.gov/nchs/nhanes/index.html](https://cdc.gov/nchs/nhanes/index.html)

NJ mandatory reporting - [nj.gov/health/workplacehealthandsafety/occupational-health-surveillance/labregs.shtml](https://nj.gov/health/workplacehealthandsafety/occupational-health-surveillance/labregs.shtml)

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