



HEALTH EFFECTS
MONITORING PROGRAM

Baseline Study Results
Yellowknife General Population

Presented by Dr. Laurie Chan, Project Leader
Yellowknife, May 14, 2019

What is the Health Effects Monitoring Program?

A long-term program to monitor the levels of arsenic and other contaminants in the body of residents of Yellowknife, Ndilo and Dettah.



HEALTH EFFECTS
MONITORING PROGRAM

Objectives

- Establish** | Baseline levels of arsenic exposure in body
- Monitor** | Levels of contaminants in the body over time
- Ensure** | That remediation efforts do not negatively impact people's health
- Address** | Public concerns through clear and transparent communication



Prospective Cohort Study

Baseline sample collection

Child and Adult participants

2017-2018

Follow-up sample collection

Child participants

2022

Child and Adult participants

2027



Health Effects Monitoring Program Team

Principal Investigator: Dr. Laurie Chan

Professor and Canada Research Chair in Toxicology and Environmental Health at the University of Ottawa

- Renata Rosol, Project Manager
- Elizabeth Liske, Community Project Coordinator
- Anna Bergen, Nurse Practitioner
- Iana Nazarenko, Research Assistant
- Carine Côté-Germain, Field Coordinator
- Emmanuel Yumvihoze, Laboratory Manager
- Rajendra Parajuli & David Hu, Post-Doctorate Fellows
- Janet Cheung & Claudia Tanamal, Graduate Students



Partnerships

Advisory Committee

- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
- GNWT- Environment and Natural Resources
- GNWT-Health and Social Services
- Yellowknives Dene First Nation
- North Slave Métis Alliance
- City of Yellowknife
- Giant Mine Oversight Board (GMOB)
- Health Canada

Other research partners

- Statistics Canada
- Institute for Circumpolar Health Research
- Génome Québec



Research Team



2017



2018



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April 2017 Community Meetings

Sample Collection

Wave 1 Sept-Dec 2017



Wave 2 Apr-June 2018



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Who participated in 2017-2018?

1



Yellowknife population

Random selection of households



1 Adult, 1 Child from
consenting household

2

Volunteers

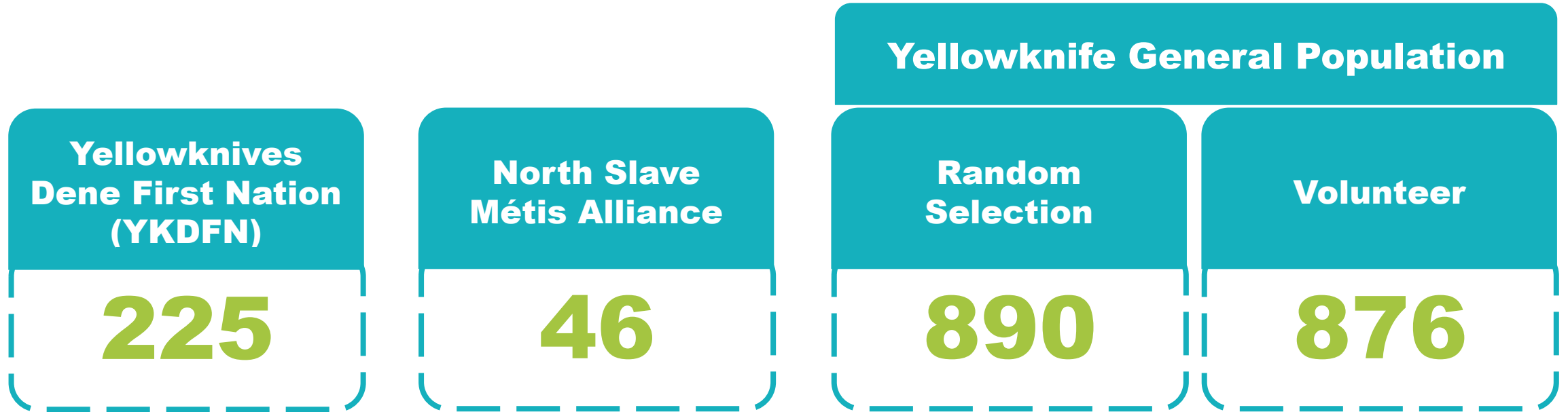
**Yellowknives Dene
First Nation**

**North Slave
Métis Alliance**



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Who participated in 2017-2018?



2037 participants in total



Who participated in 2017-2018?

Randomly selected



217 Children



673 Adults

890 Total

Volunteers



191 Children



685 Adults

876 Total

Overall



506 Children



1531 Adults

2037 Total



Laboratory Analysis



What was collected?

Results so far



Questionnaire

**Life-style and
Exposure
History**



Urine

**Arsenic
exposure
(days)**



Toenail

**Arsenic
exposure
(months)**



Saliva

**Genetic factors
for arsenic
metabolism**



What was measured so far?



- **Total arsenic**
- **Arsenic species**
- **Other metals of concern**



Total arsenic



WHAT GUIDELINES DO WE COMPARE OUR RESULTS TO?

The CHMS has similar participant numbers, ages, and gender.

Canadian Health
Measures
Survey (CHMS)

represents

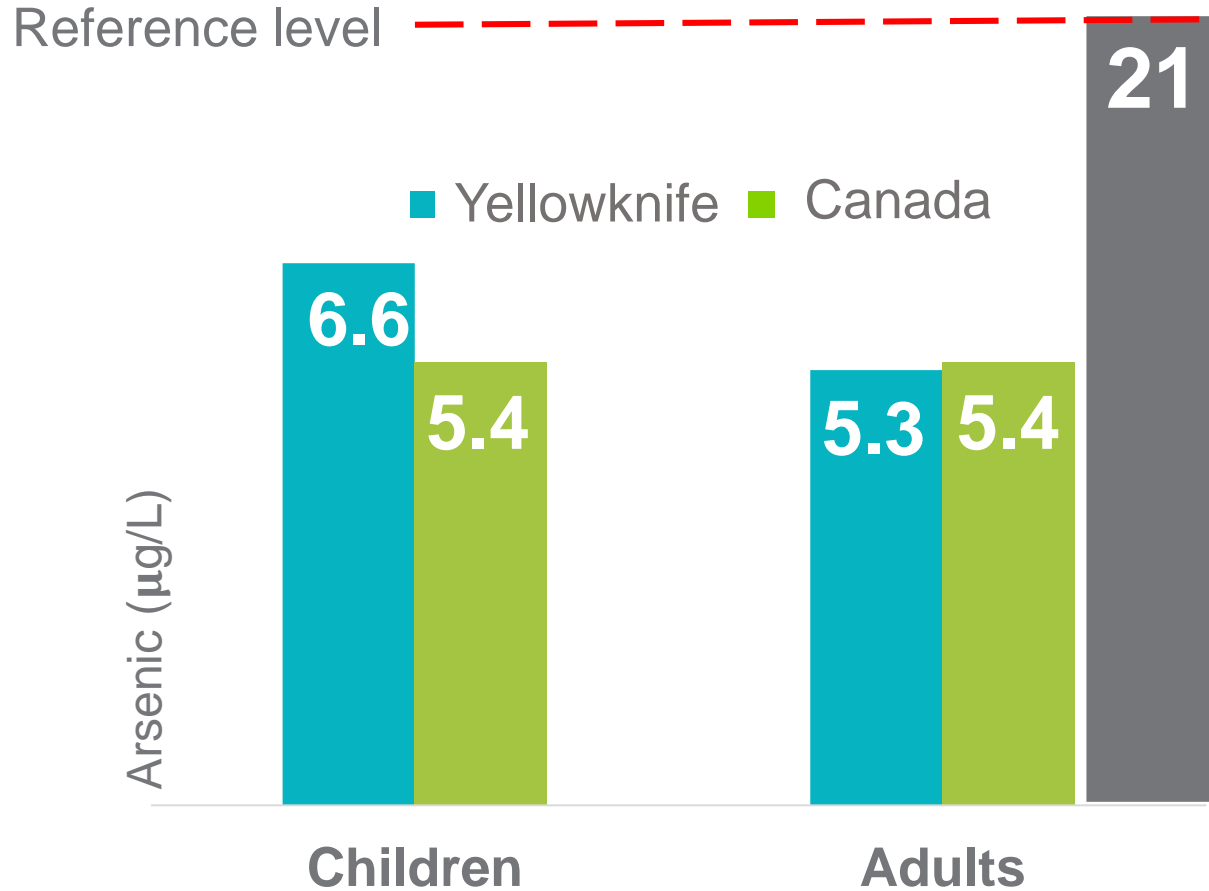
Canadian population

REFERENCE LEVEL set by CHMS
is **21 ug/L** Arsenic in URINE



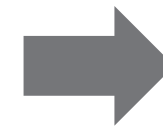
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Urine Results Yellowknife (random) Comparison with CHMS



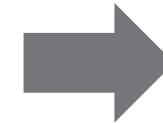
REFERENCE LEVEL set by CHMS
is **21 ug/L** Arsenic in URINE

Children



HIGHER

Adults



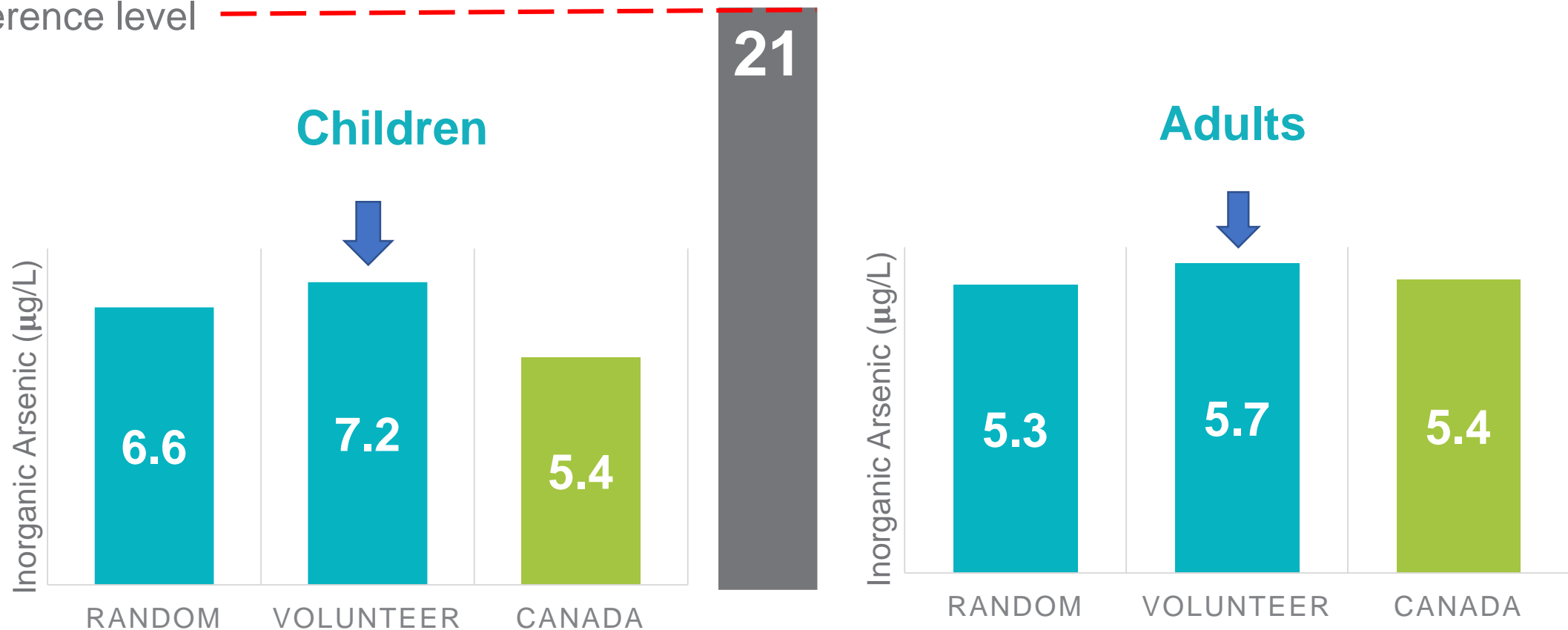
SIMILAR



Urine Results Yellowknife (volunteers) Comparison with CHMS



Reference level



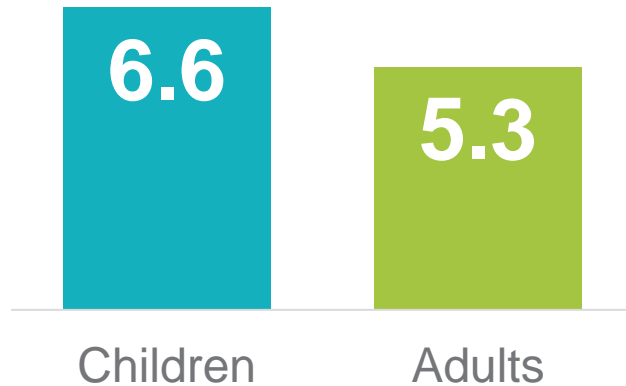
Urine Results

Random Selection & Volunteers



Random

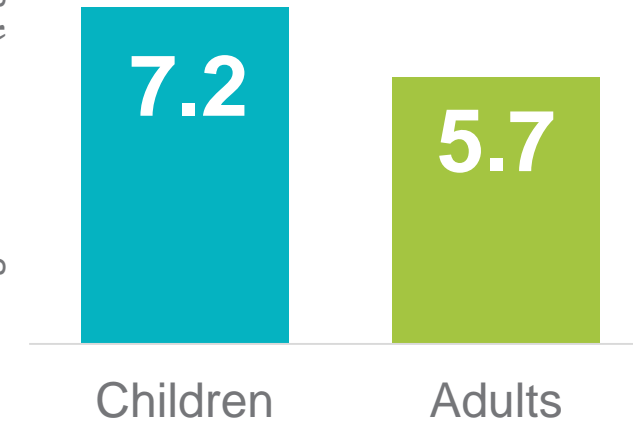
Inorganic Arsenic ($\mu\text{g/L}$)



Children **higher** than adults

Volunteer

Inorganic Arsenic ($\mu\text{g/L}$)

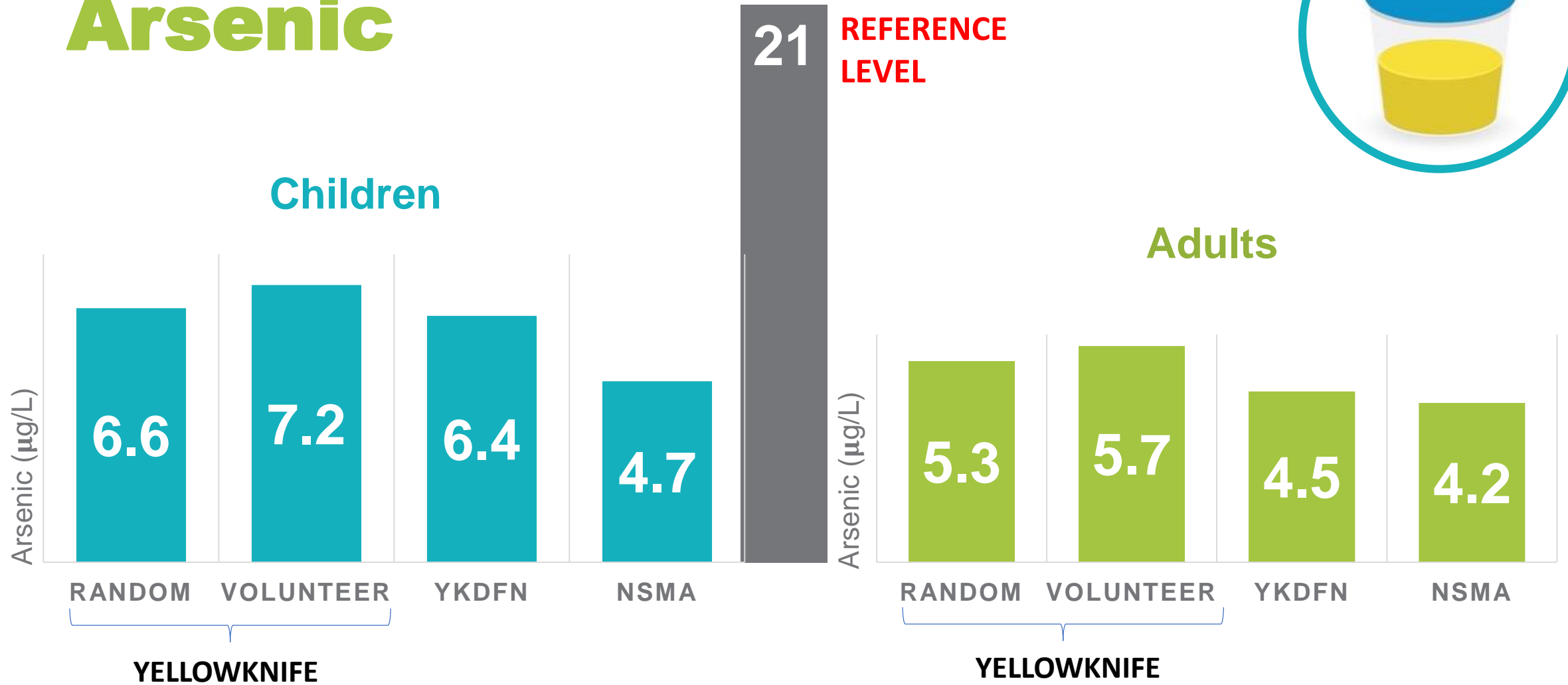


Children **higher** than adults



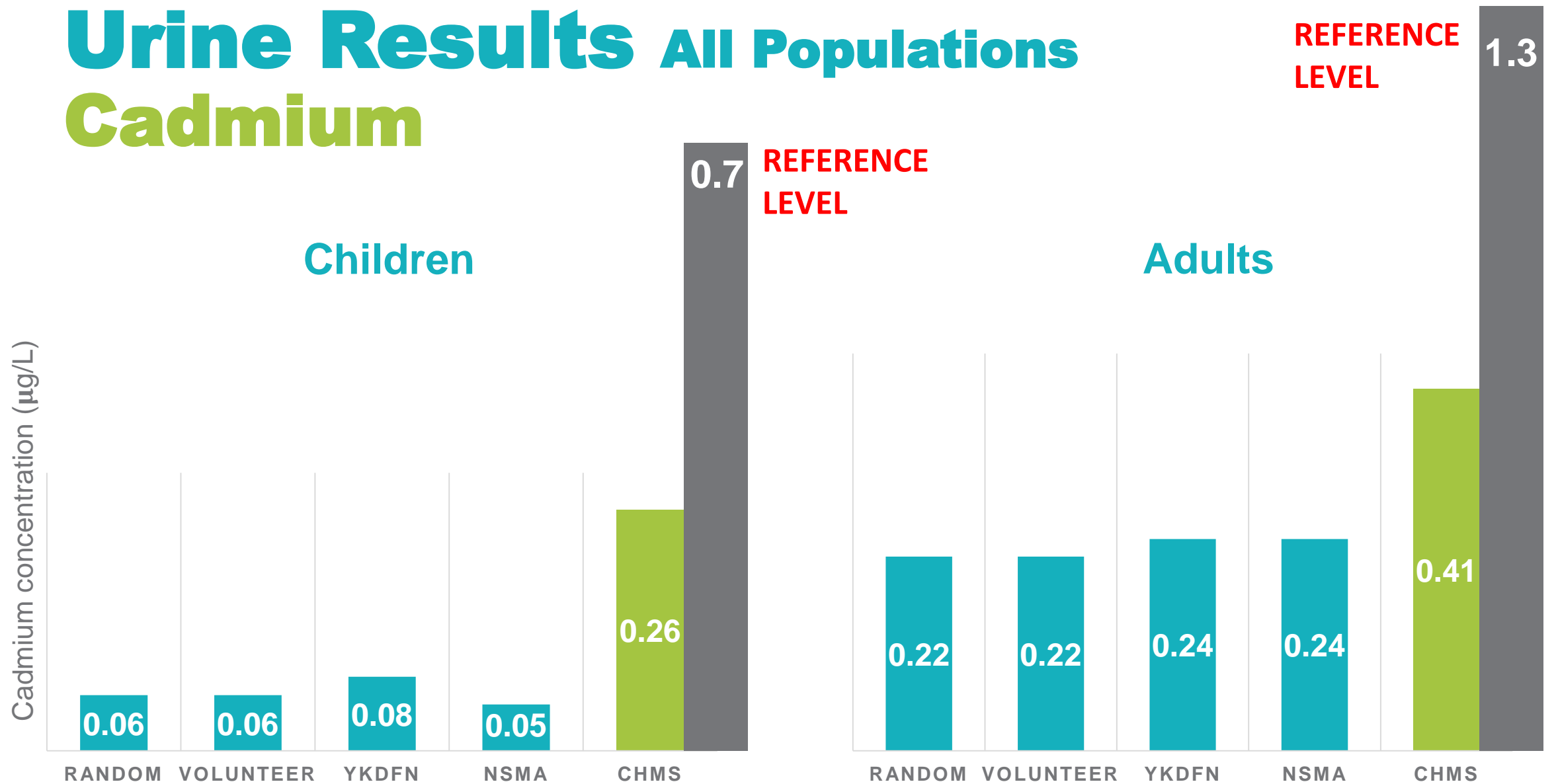
Urine Results All Populations

Arsenic



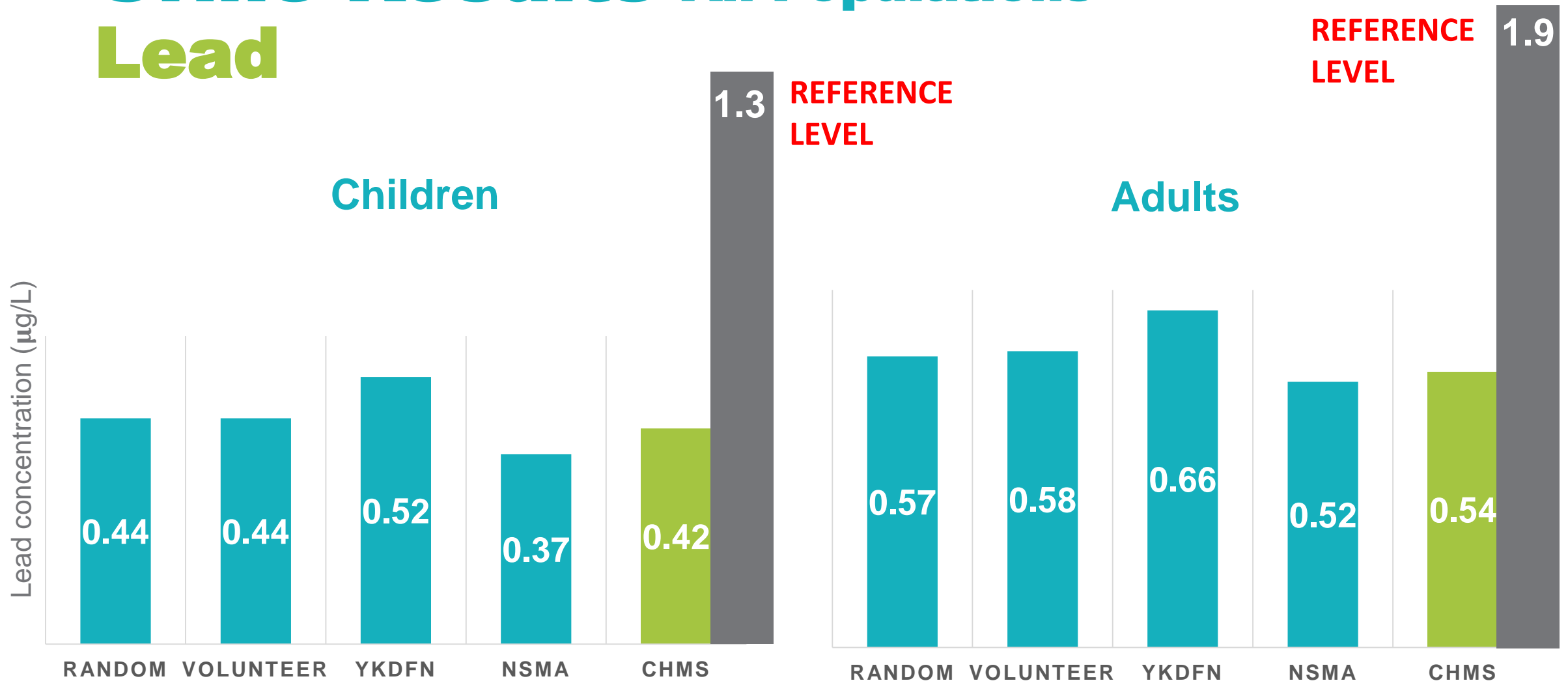
Urine Results All Populations

Cadmium



Urine Results All Populations

Lead



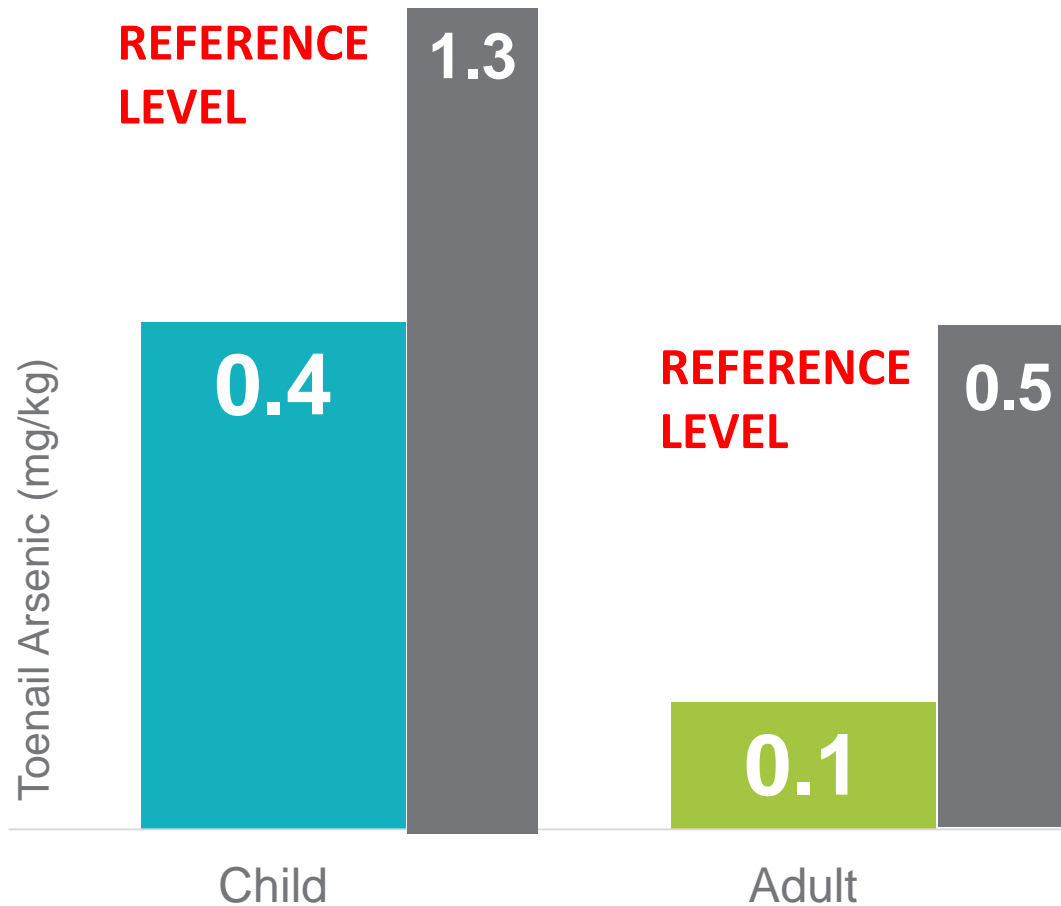
Anyone above the reference level for arsenic or lead

- **Follow-up with nurse practitioner**
- **Answer additional questions**
- **Provide additional samples**

The higher result does not mean that your health is at risk.



Toenail Results All Populations



- CHMS has NO toenail reference level so we compared to our study data.
- These findings are comparable to other old mining towns in Arizona, Australia and the United Kingdom.

A higher result does not mean that your health is at risk.



Toenail Results All Populations



Child toenail arsenic was **higher** than adults.

Toenail arsenic was **higher** in Wave 2 (Spring) participants than Wave 1 (Fall).

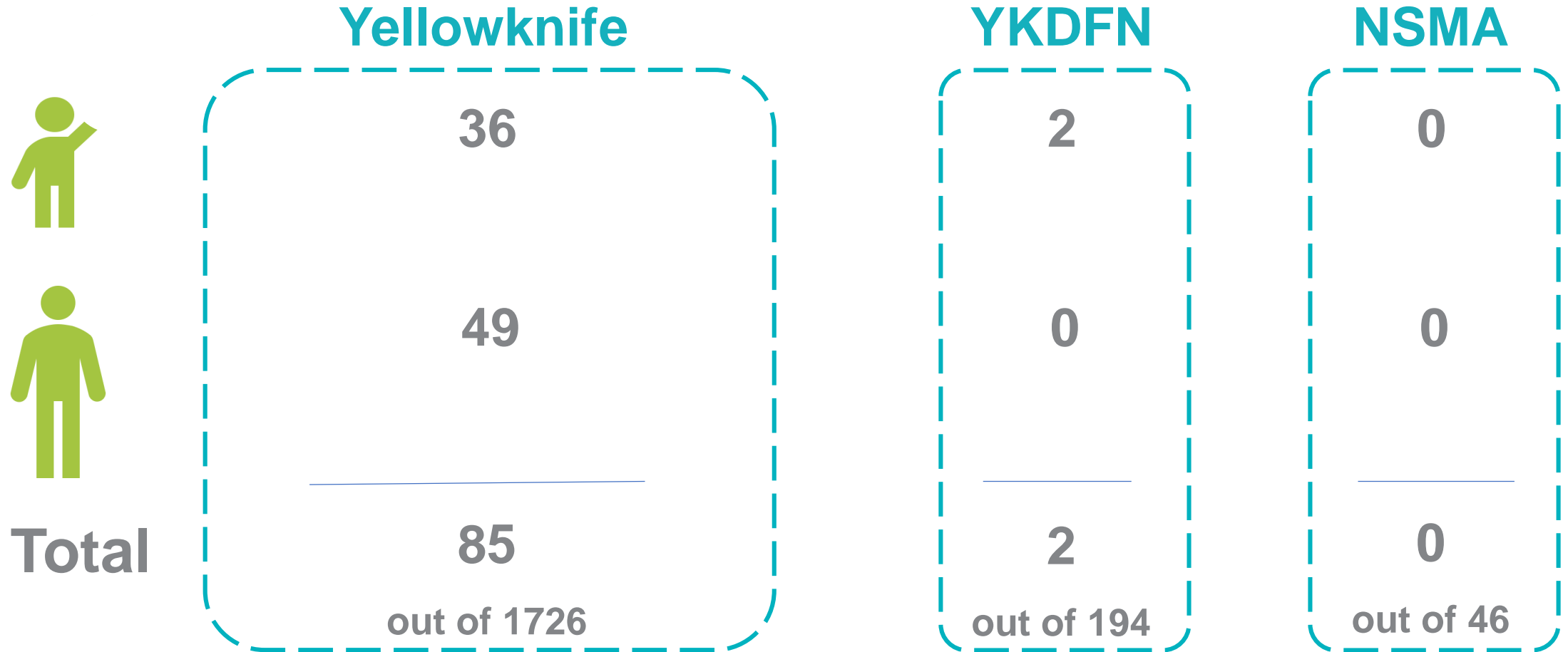


Number of participants above Reference Levels for All Populations



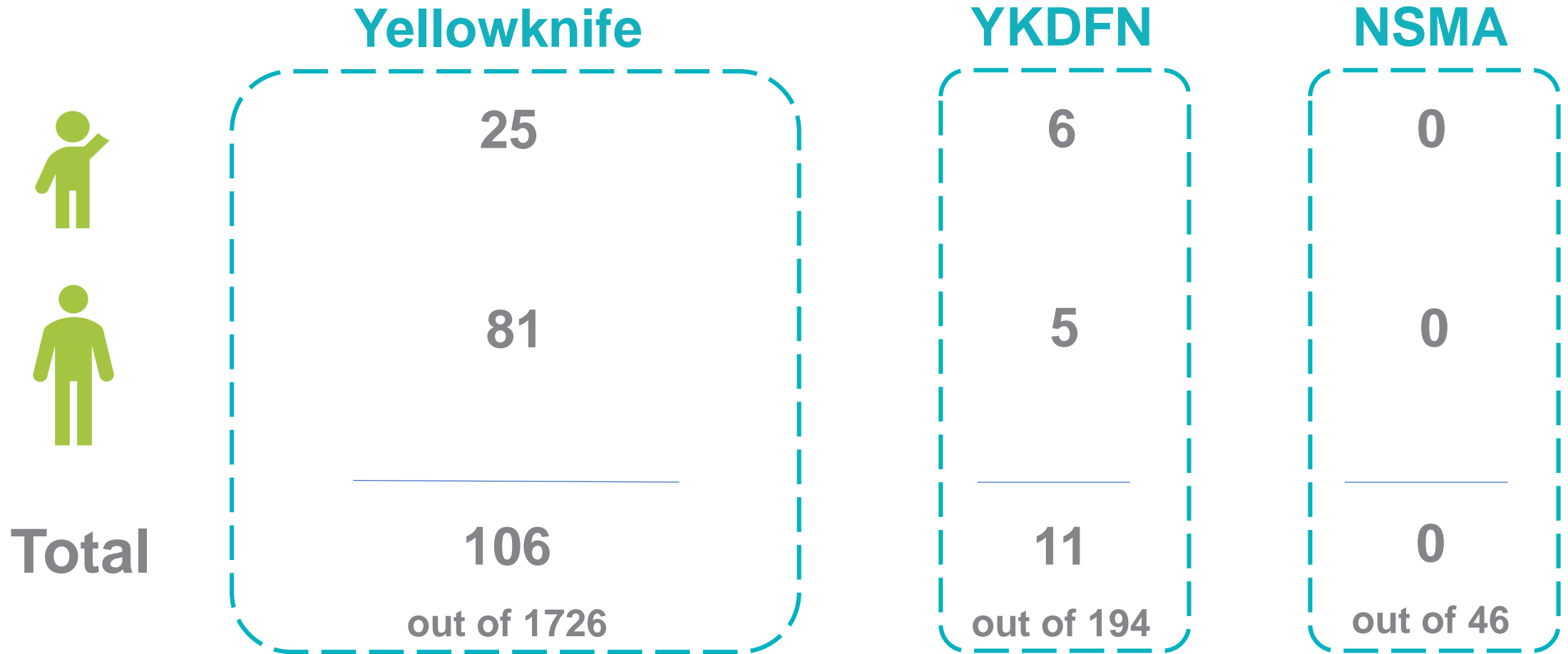
Exceedances All Populations

URINE Arsenic



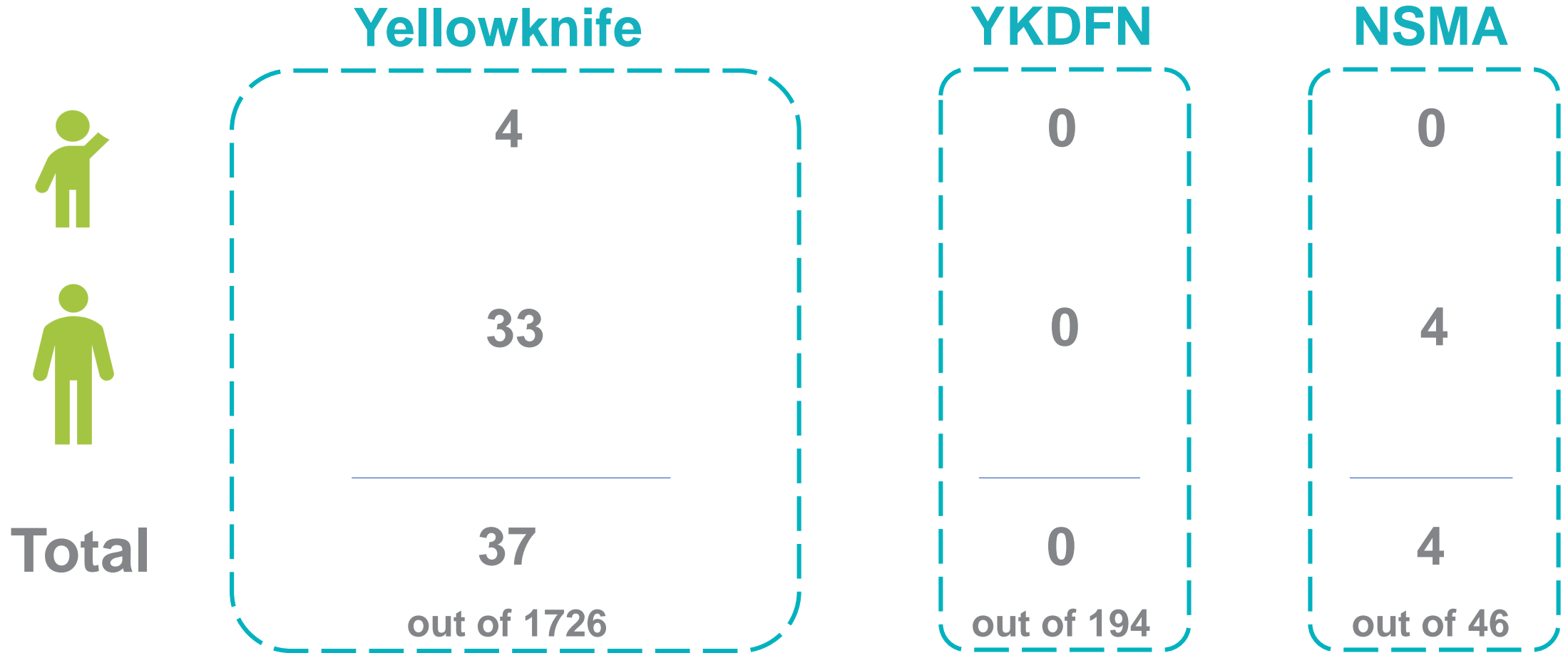
Exceedances All Populations

URINE Lead



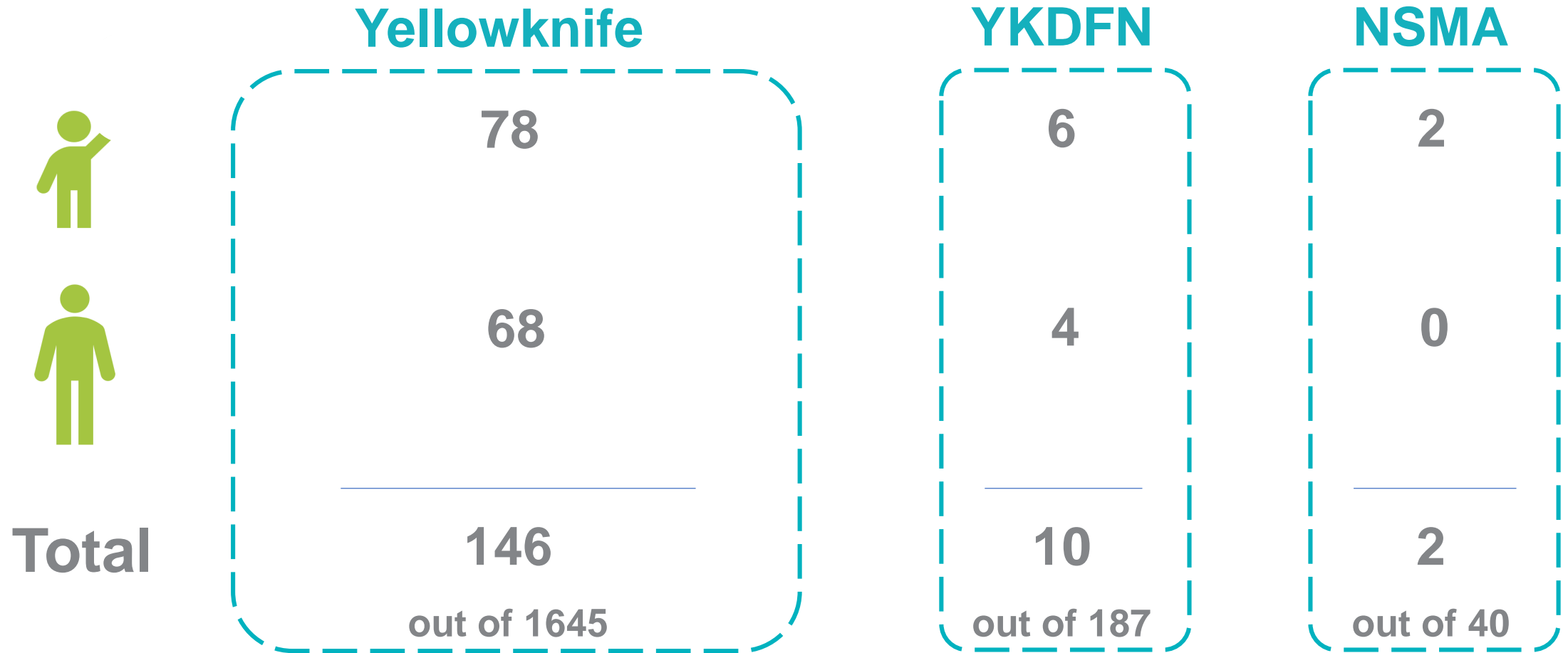
Exceedances All Populations

URINE Cadmium



Exceedances All Populations

TOENAIL Arsenic



What is next?

More results to come in 2020



**More testing
of Toenails**



**Diet and
lifestyle
factors**



**Genetic info
related to
arsenic**



**Medical
History**



What is next?

Timeline



Contact Us

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