



Evaluation of the Alaska Lead Surveillance Program

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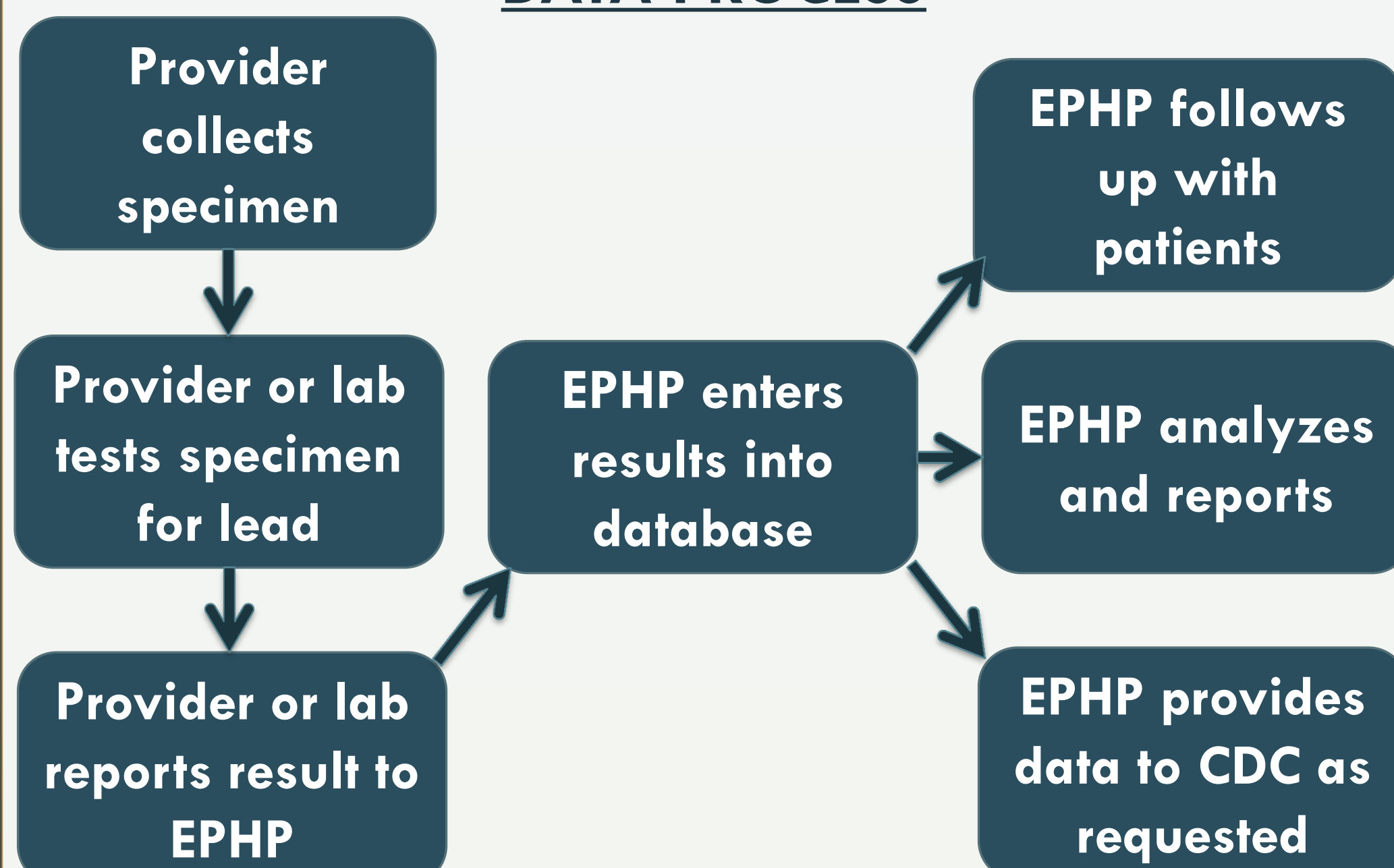
²CDC/CSTE Applied Epidemiology Fellowship Program



BACKGROUND

- Since 1995, the Environmental Public Health Program (EPHP) has collected all blood lead test results for Alaskans. Results must be reported by law.¹
- Blood lead testing is conducted by providers, Public Health Nursing, some employers, and other entities.
- EPHP follows up with patients who have elevated blood lead levels (eBLLs) to identify exposures, educate patients, and help with the medical management of patients.
- According to CDC, as of December 2015, an eBLL for people of all ages is at or above 5 µg/dL.² Due to staffing constraints, EPHP only conducts follow-up for the following:
 - ≥5 µg/dL in children <18 years old,
 - ≥25 µg/dL in non-occupationally tested adults ≥18,
 - ≥40 µg/dL in occupationally tested adults ≥18.
- Employers in some industries, such as mining, must provide testing for employees at least every 6 months.³ Head Start programs must ensure screening of participating children at 12 and 24 months.⁴ No other groups in the state are screened systematically for lead.
- EPHP is considering moving its lead database from MS Access to SQL to link it with other registries.

DATA PROCESS



OBJECTIVE

- Assess the effectiveness of the Lead Surveillance Program in identifying and managing Alaskans with eBLLs.
- Make recommendations for improving program.

METHODS

- The 2001 CDC Updated Guidelines for Evaluating Public Health Surveillance Systems⁴ were used to assess the proficiencies and limitations of the Alaska Lead Surveillance Program.
- Program attributes were assessed for their strengths and limitations through stakeholder and expert interviews.

RESULTS

Strengths	Limitations	Strengths	Limitations
USEFULNESS		ACCEPTABILITY	
- Identifies eBLLs and common sources of lead exposure. - Provides needed information for prevention and public health advisories.	Due to low screening, the program cannot accurately estimate the extent of lead-associated morbidity, and might not detect changes in disease patterns among some groups.	- Required reporting law ensures reporting. - Low cost of testing. - Good communication with providers, labs and patients.	- Some blood collection materials are difficult to use, especially with children. - Low access to health care in some areas hinders testing. - Varied understanding by providers and public of health concerns regarding lead.
SIMPLICITY		REPRESENTATIVENESS	
- Reporting is simple. - Staff can easily contact patients with eBLLs.	Manual data entry adds to system complexity.	Program very likely to identify eBLLs among occupationally exposed adults and children in Head Start programs.	- Representativeness varies by area and group. - No regular testing is done for most populations in Alaska. - Database is incomplete for non-elevated levels.
FLEXIBILITY		TIMELINESS	
- Program and testing methods easily adjust to changes in definitions. - Low funding requirements.	- Incomplete database precludes retroactive analysis following changes to definitions. - Software changes may affect database functionality.	- Tests are reported within the time required by law. - Follow-up on eBLLs is initiated within two business days of report. - Data entry of eBLLs are completed the day of report.	- Manual data entry is inefficient. - Non-elevated BLLs not readily entered into database. - No regular data cleaning makes analysis and summary reporting time-consuming.
DATA QUALITY		STABILITY	
20 years of data available. - Proposed plans to link database to state registries are expected to improve data quality.	- Data incomplete for many test results (Table). - Many non-elevated reports not yet entered. - Manual data entry raises potential for errors. - Gaps in institutional knowledge inhibit data cleaning for past years. - Software changes could negatively affect data quality.	System always operational during business hours.	- No regular data management. - Software changes may affect stability. - Decrease in staff or funding would further limit system capacity.

Table. Percent of information missing from EPHP blood lead level database

Information	Percent missing	Information	Percent missing
Last name	<1%	Lead level	<1%
First name	<1%	Age	4%
Gender	4%	Result ID	0%
Date of birth	0%	Race	88%
Client ID	<1%	Hispanic ethnicity	84%
Lab ID	<1%	City of residence	55%
Provider ID	2%	Zip code	66%
Test date	<1%	Sample date	13%
Lead result	<1%		

SENSITIVITY & POSITIVE PREDICTIVE VALUE

- Quantitative sensitivity is unknown since population eBLL prevalence in Alaska is unknown and database is incomplete for non-elevated BLLs.
- Positive predictive value is high since lab instruments have high accuracy and reporting of results is high.
- Contamination or low volume could cause false positive results and reduce positive predictive value. Though not quantifiable, the extent of these issues is likely to be low.

CONCLUSIONS

- The Alaska Lead Surveillance Program is effective at identifying at-risk individuals, especially those in industry and children in Head Start programs.
- Low access to health care and low public knowledge of the health concerns of lead reduces screening.
- Incomplete database reduces representativeness and data quality.
- Follow-up is timely and effective for communicating with patients.
- The Lead Surveillance Program meets the current needs for lead surveillance, but it could be greatly strengthened through outreach and data improvement efforts. However, limits on staff time may impede such efforts.

RECOMMENDATIONS

- Link database to state registries, such as the Permanent Fund Dividend and Department of Motor Vehicles, to improve data quality.
- Work with labs and providers to obtain more comprehensive information.
- Add checks to data entry process to reduce error.
- Implement regular data management procedures.
- Standardize reporting format and conduct regular reporting.
- Conduct outreach with underrepresented groups and health care providers.
- Work with partners to increase awareness of lead exposure and risks.

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