Replicating the Alaska Longitudinal Child Abuse and Neglect Linkage (ALCANLink) Methodology

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Jared Parrish and Abigail Newby-Kew

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Office of Planning, Research, and Evaluation
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200 Independence Avenue, S.W.
Washington, D.C. 20201
Attention: Jenessa Malin and Christine Fortunato
Project Officers
Contract number: HHSP233201500035I
OPRE report number: 2021-252

Submitted by:

Mathematica
111 East Wacker Drive, Suite 3000
Chicago, IL 60601-4303
Phone: (312) 994-1002
Fax: (312) 994-1003
Matt Stagner, Project Director

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Introduction

This appendix is an overview of the ADHSS/OHSU project, conducted as part of the CMI Data Linkages work. It was written by the site team, with the Mathematica team working with the site to ensure consistency in information, level of detail, and presentation across sites.

Overview

The Alaska Longitudinal Child Abuse and Neglect Linkage project (ALCANLink) was developed to examine over time the incidence of maltreatment, predictive and etiologic factors, and disparities related to maltreatment. ALCANLink is a population-based mixed-design strategy that integrates those births that were sampled and mothers who subsequently responded to the Pregnancy Risk Assessment Monitoring System (PRAMS) survey with child welfare and other administrative data. ALCANLink partnered with the Oregon Health Authority and Oregon Health Sciences University to replicate the ALCANLink methods. This project estimated the cumulative incidence to first report, screen-in, substantiation, and removals in Oregon by age 9 and compared the cumulative risk distributions over time with those observed in Alaska.

Partnership history

The ALCANLink replication project was conducted through a joint partnership between the Alaska Division of Public Health (AKDPH), Oregon Health Authority (OHA), and Oregon Health Sciences University (OHSU).

The principal investigator and primary contact for this project was Dr. Jared Parrish. Dr. Parrish developed the ALCANLink methodology and implemented it in Alaska. Dr. Parrish oversaw this project to ensure model adherence, timely completion, and statistical consistency. Dr. Parrish first initiated the partnership with Oregon in early 2018 by forming connections with the Oregon Health Authority and state child welfare director. Although other states expressed interest in replicating ALCANLink, the partnership between Dr. Parrish and Oregon was ultimately selected. This was due in part to the fact that Dr. Parrish's former colleague, Abigail Newby-Kew, left AKDPH to pursue her doctorate in epidemiology at OHSU-PSU.

The second major partnership, established during preliminary work conducted before the CMI Data Linkages work, was with the OHSU-PSU School of Public Health (SPH). Abigail Newby-Kew, a doctoral student in epidemiology at OHSU-PSU SPH and a former co-worker of Dr. Parrish, was hired as an independent contractor for this project. This partnership between AK and SPH was formalized through that contract. In this capacity, she was tasked with coordinating activities, facilitating data sharing and partnerships between OHA and OHSU, and conducting analyses. Ms. Newby-Kew served as the primary Oregon contact and worked closely with Dr. Parrish. Dr. Lynn Marshall, Abigail Newby-Kew's academic advisor was also part of the OHSU- PSU partnership. She advised on project analysis and reporting and has served as the Principal Investigator for the project IRB application.

The third partner in this project was the Oregon Health Authority (OHA). This partnership was also established during preliminary work conducted before the CMI Data Linkages work, though it has expanded in scope over the course of the grant. Although the partnership was not formalized as such, two of the data sources used in the project were housed within the OHA, and data use agreements between OHSU-PSU and OHA are in place. The project also went through review and received official approval from the OHA Science and Epidemiology Council. Beyond OHA's role as a primary data steward for PRAMS and Vital Records, project partners at OHA contributed to project design and reporting and facilitated communication with Child Welfare and Integrated Client Services. Suzanne Zane, the senior MCH epidemiologist with OHA, and John Putz, the principal executive manager of the MCH Surveillance Unit, were actively engaged with these aspects of the project.

Background

Although annual estimates indicate that about 10 percent of children whose ages range from newborn to 7 are reported to child welfare for maltreatment, cumulative incidence estimates that account for out-of-state emigration and competing cause mortality indicate that 32 percent of children born in Alaska have such reports before age 8—three times that of the annual estimate (Parrish et al 2020; Parrish et al 2017; Kim et al 2017). There has been internal validation of these estimates in Alaska, but external validation is needed. By investigating the proposed research questions and clearly documenting the process, external validation will establish the feasibility of these methods for a multi-state, regional, or even national model. Multi-state data based on administrative data linkages that are standardized between states will enable estimates of the cumulative incidence of maltreatment and comprehensive research projects that would deepen understanding of the factors associated with and predicting maltreatment across jurisdictional and structural boundaries.

Research Questions

1. Testing external validity: Does the cumulative incidence of the time to first maltreatment report in Oregon differ from that observed in Alaska?
   a. Do demographic population frequency distributions confound the between-state comparisons?
   b. Accounting for population loss when estimating the cumulative incidence over time in Oregon, can the Alaskan cohort data inform and improve estimates in the absence of population censoring information (i.e., administrative censorship: data including whether a child left the state and is thus no longer part of the analytic population)?

2. Testing internal validity: Is the cumulative incidence to first report, contact, and substantiation estimated through the Oregon 2009 PRAMS linkage consistent with a full Oregon 2009 birth cohort linkage to child welfare?
   a. What are the key components required for successful replication of ALCANLink methods?
   b. What partners are required?
   c. What minimal resources are necessary?
   d. What technology/skill sets are required?
   e. What challenges impact fidelity?

Sub-question 1.b was not addressed due to timing constraints.

Data

Sources

The data sources used for this project are in Table A.1.

Table A.1. Data sources

Data source	Description of data
Oregon Health Authority, Oregon Public Health Division, Section of Maternal and Child Health	2009–2011 Oregon PRAMS data set and corresponding two-year follow-up (PRAMS-2); 4,867 surveys; includes text and numeric variables for PRAMS Phase 6 Core survey questions and demographic information listed on the birth record
Oregon Health Authority, Center for Health Statistics	All Oregon resident birth and death records for 2009, and records for PRAMS respondents during 2009–2011; 47,188 records; Includes text and numeric variables.
Oregon Department of Human Services, Children, Adults and Family Division	All child welfare administrative records of allegations, including type of allegation and investigative findings for the years 2009–2018 for children born in 2009 and for children born in 2009–2011 whose mothers responded to the PRAMS survey
ALCANLink	The ALCANLink data has linked the 2009–2011 PRAMS cohort to vital records and child welfare records (allegations, type of allegation, and investigative findings) ; 3,549 survey respondents representing over 200 data elements.

Source: Project documents.

Linking process

As part of AKDPH agreements with the State of Oregon data stewards, data linkages were completed by Oregon Integrated Client Services (ICS). ICS used separate but similar processes to the ones used in Alaska (ALCAN) to link data; the latter are described in Parrish et al. (2017). The use of the exact same algorithm to link records in different states would be unwise because the algorithm should reflect the nuances of the location. ICS brought in data from multiple state programs and agencies on a monthly basis and made or maintained individual-level links using available identifiable data (that is, name, date of birth [DOB], Social Security number [SSN], race/ethnicity). These sources included both birth certificate records and child welfare records. For the Oregon Longitudinal Child Abuse and Neglect (OLCAN) request, ICS leveraged the individual-level link that already existed to create unique project IDs.

ICS used a combination of probabilistic, deterministic, and manual matching each month to make/maintain the individual-level links (Table A.2). Each month, each "class" of probabilistic matching components (one class might be Names-DOB, another might be Names-SSN, etc.) went through iterations in which the matching criteria gradually loosened. With some exceptions, most of the matching components were a mix of deterministic matching on some fields and probabilistic matching on others. Records went through multiple matching components, and the highest-scoring match was chosen at the end. Data cleaning and standardization also took place before matching, and there was a manual process of cleanup after. Much of the linking and processing of data were programmed in a software called RedPoint.

Table A.2. Data linkage methods

Data source	Variables used to link (and linking destination)	Linkage approach
PRAMS and PRAMS-2	Birth certificate number (to vital records)	Deterministic
Vital records (birth and death)	First, last, and middle names; DOB (to CPS)	Deterministic followed by probabilistic
Child protective services	First, last, and middle names; DOB (to vital records)	Deterministic followed by probabilistic

Source: Project documents.

CPS = child protective services; DOB = date of birth.

The ALCANLink program maintains and updates (annually) a master name list for the PRAMS sampled child.

For the PRAMS cohort, we first processed annual data through an Extract Transformation and Load (ETL) tool called Pentaho®. This tool systematically identifies and merges in new information for cases that have already been linked (using ID Keys and Foreign Keys).

The data were first deterministically linked based on the child's first and last names, sex, and date of birth. Duplicates are assessed and manually resolved. Using the procedures above, second twins are identified in the base birth records and isolated and linked to ensure correct matches. Finally, probabilistic matching is performed on the remaining unmatched PRAMS records to the incoming files to specify those that need manual review. Using a weighted Jaro-Winkler edit distance scoring method, probable matches with a score of 0.89-0.99 are manually reviewed and classified. These data are compared against a standing name change repository and other resources in the state for verification.

All known variations of the name were included in a long file with a common ID and linked against incoming records. Names with the highest probability match for the common ID were included, with others removed.

Middle name and maternal and paternal information were used for manual review qualifiers. City of residence was also considered if needed. Manual review consisted of first assessing whether there were any duplicates of the name and date of birth in the birth record or incoming record sets. If true, measures to codify were taken to distinguish the record; if false, all possible administrative sources were reviewed, and once these were exhausted, if the record was not confirmed, it was rejected.

The R statistical environment was used with the RecordLinkage package. The review thresholds were established using a Petro Distribution and subsample single-layer neural network for confirmation of established thresholds. These thresholds were set to limit the amount of manual review conducted but still establish a reasonable probability of capturing all possible cases. Given that these methods attempt to replicate a longitudinal prospective cohort, losses to follow-up are mitigated if reasonably possible.

Analytic Methods

The researchers calculated the cumulative incidence using the same methods (using R) in both Alaska and Oregon.

Operationally, the researchers measured the incidence proportion of first allegations, investigations, and substantiated allegations using a Kaplan-Meier method for the full birth cohort analysis and an Aalen-based hazard method for the complex sample data. Using the survivorship function S(t), the incidence proportion was calculated as 1- S(t). Estimates use administrative data to censor observations due to death (competing cause mortality) and emigration before age 9. Due to the known and documented nonlinear incidence in the occurrence of maltreatment (that is, higher incidence in younger children) and population loss that can occur in birth populations as a consequence of death, out-of-state emigration, and missed linkages in the study design, simple proportion at the end of a the period or x/n will consistently underestimate the incidence, and these methods mitigate this limitation.

Analysis 1: Validation analysis using the 2009 birth cohort

Full birth cohort analysis. Two congruent analyses were conducted for both Alaska and Oregon among the full 2009 linked birth cohort and the PRAMS linked birth cohort. In both Alaska and Oregon, the 2009 in-state resident births were linked with child welfare and death records through 2018. We calculated age in decimal years to first event, death, or administrative censorship. Events that we considered were first report, first screen-in, and first substantiation, resulting in three age calculations for each child. We also calculated corresponding indicator variables (0 = No event, 1 = Event) for each event type per individual. Working with the survival package in R, we used a Kaplan-Meier method to calculate survival. Based on the relationship described briefly above between survival S(t) and the Incidence Proportion F(t), we were able to derive the cumulative incidence as 1-S(t). Consistent with the concept of "instantaneous risk," F(t) estimates the risk of an event at any time (t), where time (t) is calculated at an event of interest. Thus F(t) is equivalent to the summation of calculated risk over n intervals of length k. Formula A.1:

$$F_{(t)} = \int_0^t f_{(t)} dt = f_{(t)} \frac{dF(t)}{dt} = 1 - e^{-H_t} = 1 - e^{-\sum_{K=1}^{K} \lambda_k t_k} \approx \frac{I * \overline{D}}{(I * \overline{D} + 1)} = R$$

PRAMS birth cohort. In both Alaska and Oregon, the 2009 records for the child in the PRAMS sample at birth child were linked with child welfare and death records through 2018. We used the same methodology described above for the full birth cohort but with the survey package in R. To calculate standard errors, the Aalen (hazard-based) estimator was used.

We plotted 1-survival curve to visualize the cumulative incidence for both the full and PRAMS cohorts by each state. Using the PRAMS cohort, we completed this for all events considered and by subset demographics to compare the consistency in the estimation. We also tabulated F(t) within age intervals and compared these tabulated data between the PRAMS estimates and observed full birth cohort estimates.

Analysis 2: Analysis of 2009–2011 PRAMS cohort

Using the Oregon PRAMS linked cohort from 2009–2011, we calculated the cumulative incidence to first report, screen-in, and substantiation using the same methods described above. Using a three-year cohort increased our sample size, thereby reducing our standard errors. We expanded the subgroup estimates using multiple indicators available on PRAMS, but focused on maternal stressors, mental health, and substance use reported during the pre-birth period. We completed comparative analyses by group using cox-proportional hazard models.

Because the Alaska cohort can account for out-of-state emigration using a unique administrative data set, we originally intended to investigate the probability of censorship due to emigration in the Alaska cohort by demographics and investigate the utility and need for adjusting the Oregon cohort estimate with methods such as inverse probability weighting (IPW). This analysis was delayed because it took so long to obtain these data and because of the impact of COVID-19 on available staff time. These analyses will still be conducted at a later date.

Findings

Question 1, Testing external validity: Does the cumulative incidence of the time to first report in Oregon differ from that observed in Alaska?

The purpose of this descriptive research question was to fully describe the cumulative incidence of child welfare reports, investigations, and substantiations in the two populations of interest. Based on differential populations, reporting laws, and CPS investigation/substantiation policies, we anticipated differences between the two states. Describing the similarities and differences will facilitate future pooled analyses by guiding hypothesis development and identifying potential confounding factors.

We compared the incidence proportion (IP) in Alaska and Oregon before age 9 for both the 2009 resident birth cohorts and 2009 PRAMS cohorts. We considered reports, investigations, and substantiations (Table A.3). Age 9 was chosen based on data availability, as our Oregon linkage contained data through 2018. We found that before age 9, the cumulative incidence of both states' measures of child welfare involvement were similar in the full birth cohort. However, the Oregon PRAMS cohort underestimates involvement with child welfare to a greater degree than the Alaska PRAMS cohort for each measure.

Table A.3. Incidence proportion of child maltreatment allegations before age 9 for reports, investigations, and substantiations in Oregon and Alaska, 2009 full birth and PRAMS cohorts

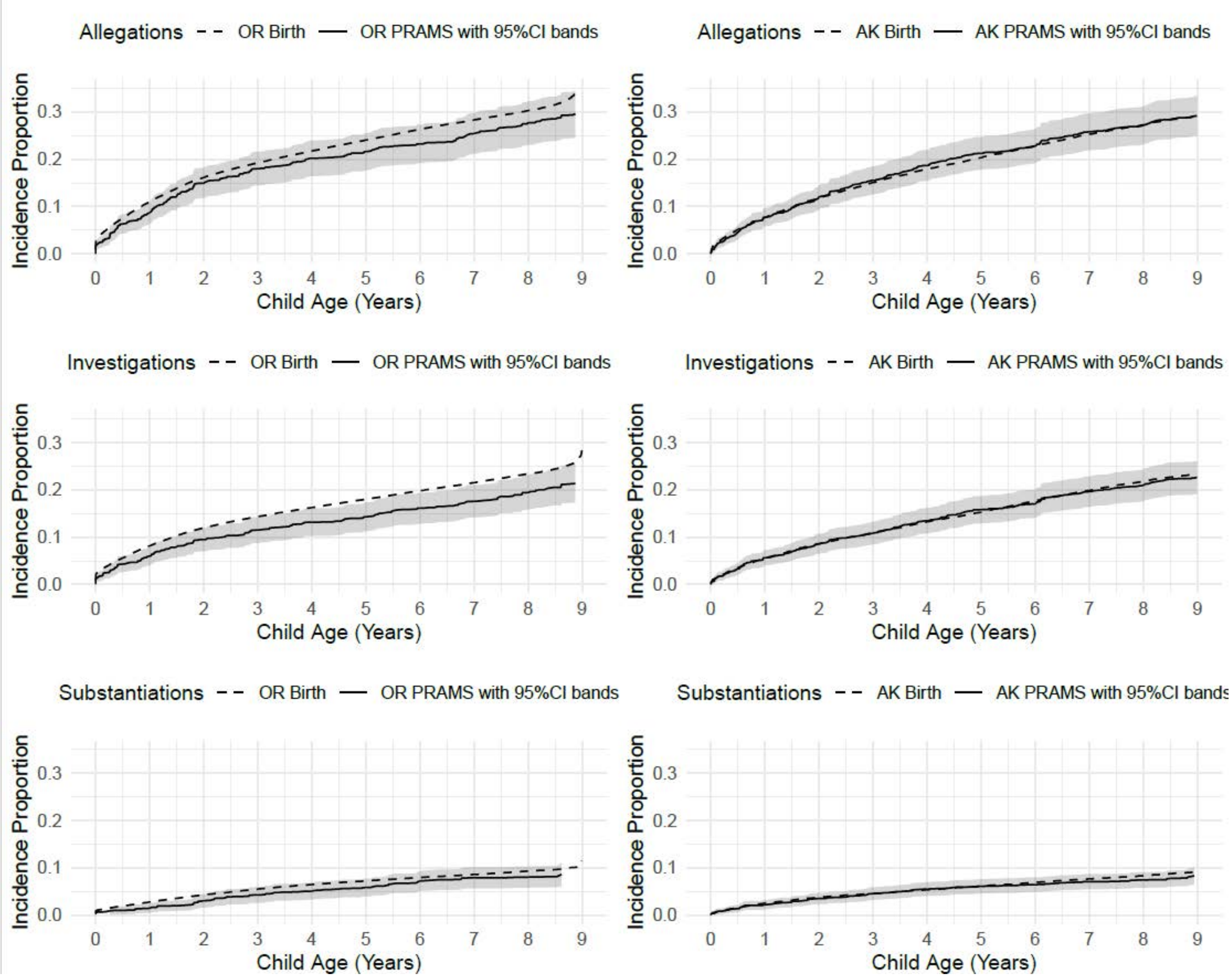
	Oregon 2009				Alaska 2009			
	Birth cohort N = 46,338		PRAMS cohort N = 1,652		Birth cohort N = 11,187		PRAMS cohort N = 1,235	
	N (%)	IP	n (%w)	IP (95%CI)	N (%)	IP	n (%w)	IP (95%CI)
Reports	15,135 (32.7)	32.0	585 (29.8)	28.7 (24.0, 33.4)	3,247 (29.0)	29.1	386 (29.0)	29.1 (25.0, 33.3)
Investigations	11,836 (25.5)	25.0	457 (21.8)	20.9 (17.1, 24.7)	2,613 (23.4)	23.5	302 (22.4)	22.6 (19.1, 26.1)
Substantiations	4,654 (10.2)	9.9	174 (8.6)	8.3 (6.0, 10.5)	1,014 (9.1)	9.1	126 (8.2)	8.3 (6.5, 10.1)

Source: Project documents.

Note: IP = incidence proportion of child maltreatment allegations; PRAMS = Pregnancy Risk Assessment Monitoring System.

Compared with children in Alaska, a higher proportion of Oregon children were involved with child welfare throughout the study period (Figure A.1). This may be particularly meaningful in the first year of life, as 11.0 percent of Oregon children are reported to child welfare before their first birthday, although only 7.6 percent of Alaska children are.

Figure A.1. Incidence proportion child maltreatment allegations, investigations, and substantiations among Oregon and Alaska 2009 Full Birth and PRAMS cohorts



Question 1.a. Do demographic population frequency distributions confound the between-state comparisons?

Although no direct between-state comparisons were attempted due to timing constraints, there was a descriptive analysis that compared the incidence of child maltreatment between states for an array of variables available on the birth certificate (Table A.4). Qualitatively, the relative incidence of maltreatment was similar in Oregon and Alaska.

Table A.4. Incidence proportion of child maltreatment allegations before age 9 for reports, investigations, and substantiations in Oregon and Alaska, 2009 full birth and PRAMS cohorts, by demographic factors

	Oregon 2009				Alaska 2009			
	Birth cohort		PRAMS cohort		Birth cohort		PRAMS cohort	
	N	IP	n	IP (95%CI)	N	IP	n	IP (95%CI)
Sex								
Female	23,201	31.6	822	29.1 (22.3, 35.9)	5,289	29.5	608	32.1 (25.5, 38.7)
Male	24,483	32.4	830	28.2 (21.8, 34.6)	5,897	28.8	626	26.2 (20.9, 31.5)
Race								
American Indian/Alaska Native	1,381	58.6	347	55.3 (43.7, 66.9)	2,949	53.5	437	52.0 (42.1, 61.9)
Black	1,303	58.8	244	59.1 (44.9, 73.2)	460	32.7	44	63.4 (8.3, 1.0)
Asian	2,157	13.3	235	12.3 (7.7, 16.9)	573	24.3	34	12.4 (0.0, 27.9)
NHOPI	835	30.3	91	28.5 (15.3, 41.6)	363	20.2	39	23.2 (1.8, 44.6)
White	40,742	32.0	909	28.6 (23.2, 33.9)	6,710	19.2	614	18.7 (14.9, 23.3)
Ethnicity								
Hispanic	9,690	32.6	386	29.1 (23.4, 34.8)	1,041	25.2	115	33.3 (14.7, 5.2)
Not Hispanic	37,995	31.9	1,266	26.9 (21.0, 32.8)	9,499	29.9	1,004	29.0 (24.6, 33.3)
Marital status								
Married	30,882	19.9	671	16.7 (12.7, 20.7)	6,911	17.1	720	17.7 (13.7, 21.7)
Unmarried	16,793	54.2	981	49.3 (37.3, 61.2)	4,263	48.7	511	48.1 (37.8, 58.4)
Maternal education								
< 12 years	9,324	49.6	368	42.2 (29.7, 54.7)	1,469	55.5	177	56.6 (36.9, 76.9)
≥12 years	38,131	27.7	1,277	25.6 (20.6, 30.5)	9,284	24.8	973	25.2 (21.0, 29.4)
Maternal age								
< 20 years	4,131	60.2	168	49.0 (25.5, 72.5)	1,113	49.2	138	51.7 (30.9, 72.5)
≥ 20 years	43,551	29.3	1,484	26.8 (22.1, 31.5)	10,072	26.9	1,096	26.2 (22.2, 30.3)
Gestational age								
Preterm	3,787	38.4	121	0.26 (0.10, 0.42)	1,183	37.5	291	35.4 (22.7, 48.0)
Term	43,858	31.5	1,531	0.29 (0.24, 0.34)	9,418	28.5	881	29.1 (24.4, 33.7)
Previous life births								
0	19,434	29.8	689	24.3 (17.7, 30.8)	4,230	26.0	494	26.1 (19.7, 32.6)
≥ 1	28,163	33.5	961	31.9 (25.3, 38.4)	6,789	31.3	714	31.1 (25.5, 36.7)

Source: Project documents.

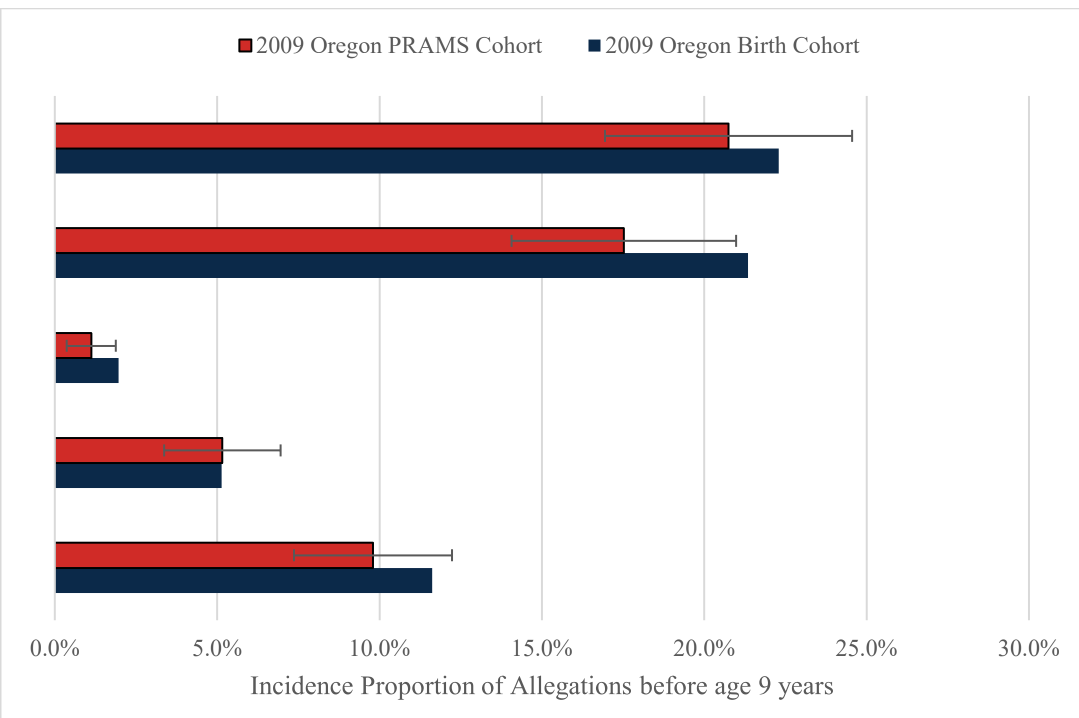
Note: NHOPI = Native Hawaiian or Other Pacific Islander; PRAMS = Pregnancy Risk Assessment Monitoring System. IP = incidence proportion of child maltreatment allegations.

Question 2, Internal Validation: Is the cumulative incidence to first report, contact, and substantiation estimated through the Oregon PRAMS linkage consistent with a full Oregon birth cohort linkage to child welfare?

This question is key to determining whether the ALCANLink method can be generalized to another region that has different demographics, different PRAMS sampling strata, and a different jurisdictional structure than Alaska. The Tables (A.3 and A.4) presented above for Question 1 illustrate the comparability in cumulative incidence at age 9 between the 2009 Oregon PRAMS and 2009 Oregon full birth cohorts. The estimated cumulative incidence of child maltreatment among the Oregon PRAMS cohort is consistently (but not significantly) an underestimate of that observed in the full birth cohort. (Full birth cohort estimate is captured within the 95 percent confidence intervals of the PRAMS estimates). We observed large confidence intervals in some demographic strata that were not oversampled by PRAMS. These include teen mothers and preterm infants. The consistent underestimate of cumulative incidence of reports is also observed for each unique type of maltreatment allegation with the exception of sexual abuse (Figure B.2). The difference is not significant for any maltreatment type with the exception of neglect.

We determined that ALCANLink can be successfully used in Oregon, but that any new jurisdiction may want to consider a comparative full birth cohort linkage to understand how PRAMS distributions may differ from those observed in the full population.

Figure A.2. Incidence proportion of child maltreatment allegations before age 9 for reports by maltreatment type: Oregon 2009 PRAMS and 2009 full birth cohorts



Question 2a: What are the key components required for successful replication of ALCANLink?

The ALCANLink method is a relatively simple linkage that requires few resources. However, we identified a number of requirements that are key for successful replication.

A strong partnership with at least one stakeholder within the health department is necessary for building relationships, gaining support from additional stakeholders, and ensuring support for navigating and understanding state systems. Although buy-in from all data stewards is necessary, they do not need to be primary members of the project team. In addition, it is important to have an advisor within the child welfare office because of state-by-state variations in the way allegations are categorized and screened. Due to the standardized nature of PRAMS and birth certificate data, a lower level of support for data interpretation is needed from these agencies. In addition to a strong team, the primary resource needed for this project is a researcher with the time and capacity to navigate the state system and identify and implement all necessary replication steps.

We found that the primary technology skill set required for this project replication is competency with R statistical analysis software. Although we approached the project with the idea that our team would also need to include an expert SAS programmer, our final replication protocol involved only R. In addition, it is necessary for someone with advanced knowledge of data linkage protocols to be involved with the project. Depending on state requirements, this individual may be a member of the team or a state agency. The ALCANLink data sets are not large, and advanced computing servers are not necessary to handle analysis.

The primary challenge that affected fidelity for this replication process was our inability to conduct data linkage ourselves. However, we worked closed with the Oregon data linkage agency to ensure that their protocol was similar to the one initially used for ALCANLink. However, without the right partners in place, replication can be challenging.

Next steps

Given the delays brought on by COVID-19, the project is behind the anticipated schedule for disseminating findings. We've presented initial findings to the CMI network and the Oregon Child Welfare leadership. We are also planning to present initial findings to the Oregon Public Health Research Group in February 2021. We intend to present these results at multiple conferences (for example, the Council of State and Territorial Epidemiologist and City Maternal and Child Health Epidemiology conferences). To date, presentations on the project and/or initial findings have been given at the Western Regional Epidemiology Network Annual Conference, OHUS-PSU Doctoral Seminar and other courses, and the OHSU School of Public Health Conference.

We are currently writing up our findings from the replication work and will be submitting to *Public Health Reports Journal* as a methods paper. The principal investigator is developing a short two-page replication brief that will be sent to CDC PRAMS, which is aware of ALCANLink but not the replication work.

The replication work findings that are validation-focused are less useful to policymakers but provide the foundation for future work. Initial analyses focusing on parental stressors such as IPV, economics, and mental health will be described in oral presentations to multiple Oregon agencies and partners, written reports, and peer-reviewed publications. As the development of this cohort will serve as the basis for a dissertation project, multiple manuscripts will be derived from this established cohort.

Finally, the replication findings will be presented through a webinar to Alaskan partners. This will focus on comparative and pooled analyses to describe differences, similarities, and exploration of population risks and the factors contributing to these risks.

Lessons Learned About Administrative Data Linkage Practices Related to Examining the Incidence and Risk of Child Maltreatment

Overall, ALCANLink was relatively easy to replicate. As with any data linkage project, it would have been helpful to know all the review processes required in Oregon and who ultimately had authority to approve each step. For future expansions Dr. Parrish plans to provide the principal investigator from the state a worksheet to complete to help them identify all the processes, reviews, protocols, and contacts before they begin. This would enable them to initiate all necessary processes in a timely manner and determine which steps could be contracted out or delegated to a graduate student.

We also learned the power of in-person meetings. The project principal investigator (Dr. Parrish) was able to travel to Oregon and meet with multiple partners. These in-person meetings help establish relationships and generate excitement. Based on how successful these were, we would have planned and scheduled more of them upfront. As we’ve learned with all the online meetings due to COVID-19, we often try to multitask, and can come to a meeting less prepared because of stacked meetings throughout the day. In future replication projects, in-person meetings would be preferred.

We also confirmed that although the PRAMS data were weighted to the birth population, some populations are under- or overrepresented, which can impact analyses. The weighted population tends to underestimate the observed cumulative incidence (though not to a statistically significant degree). If the likelihood of responding to PRAMS is associated with the outcome of interest, confounding due to selection bias may be introduced and should be considered when constructing etiologic/comparative assessments. It is critical that researchers conducting etiologic analyses with these data establish causal diagrams that consider the sampling design of PRAMS and potential impact of linkages.

Finally, we learned that with a limited amount of resources and consistent effort, these methods can be replicated in other jurisdictions resulting in data that can be used for comparative and inter-jurisdictional pooled analyses. This is critical, as it could enable investigations among underrepresented populations by expanding sample sizes, and also identify universal impacts. We are excited about these methods and the potential for expanded usage.

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