Upstream Prevention and Early Childhood Health:

Updates from the ALCANLink Project

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Agenda

1. Incidence proportion of maltreatment among children born in Alaska and populations experiencing the greatest burden.

2. Understand the link between pre-birth household challenges and future maltreatment.

3. Gain exposure to the developing pre-birth household challenges screener tool.

4. Learn about pre-birth factors and populations experiencing elevated prevalence of FAS and cleft conditions.

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ALCAN*Link*
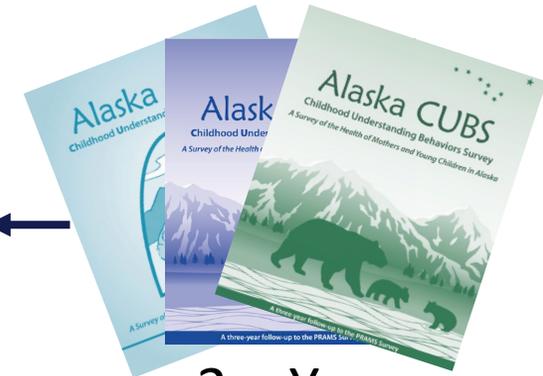Alaska Longitudinal Child Abuse and Neglect Linkage Project

A population-based mixed design

~1 per 5 sampled

2009 – 2021

Linked

3 – Year Follow – Up

- Permanent fund dividend
- Child welfare
- Medicaid
- Education & early learning*
- Vital records
- Vaccination records

Parent Images Credit: storyset.com

PRAMS/ALCANLink population

Respondent age at first maltreatment report, emigration, death, or administrative censoring.

```
        0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
2009  174   99  101   69   65   38   42   39   33   23   24   22   32   19  247  208
2010  177  114   70   65   43   34   44   51   33   24   24   24   28  229  194    0
2011  196  118   93   75   47   41   43   49   31   27   21   22  181  216    0    0
2012  135   74   61   56   47   39   33   22   33   18   18  291   86    0    0    0
2013  260  123   89   80   65   40   57   42   33   29  273  231    0    0    0    0
2014  225  122   79   76   48   62   54   34   32  250  233    0    0    0    0    0
2015  272  102   95   65   47   50   38   38  270  254    0    0    0    0    0    0
2016  255  117   75   49   41   35   43  286  273    0    0    0    0    0    0    0
2017  222   86   66   57   57   37  270  250    0    0    0    0    0    0    0    0
2018  192   95   64   44   36  304  279    0    0    0    0    0    0    0    0    0
2019  212   97   75   56  356  281    0    0    0    0    0    0    0    0    0    0
2020  217   93   71  362  285    0    0    0    0    0    0    0    0    0    0    0
2021  160   82  385  286    0    0    0    0    0    0    0    0    0    0    0    0
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| Birth Year	Phase	Respondents	Weighted Population (SE)
2009	P-6	1235	11033 (57.8)
2010	P-6	1154	11199 (93.7)
2011	P-6	1160	11185 (44.5)
2012	P-7	913	10862 (78.4)
2013	P-7	1322	11164 (54.0)
2014	P-7	1215	11047 (70.2)
2015	P-7	1231	10982 (46.8)
2016	P-8	1174	10879 (39.4)
2017	P-8	1045	10164 (89.4)
2018	P-8	1014	9775 (62.5)
2019	P-8	1077	9559 (66.9)
2020	P-8	1028	9211 (57.4)
2021	P-8	913	9108 (114.9)
Total		**14,481**	**136,168**

Contact with Child Welfare before Age 14
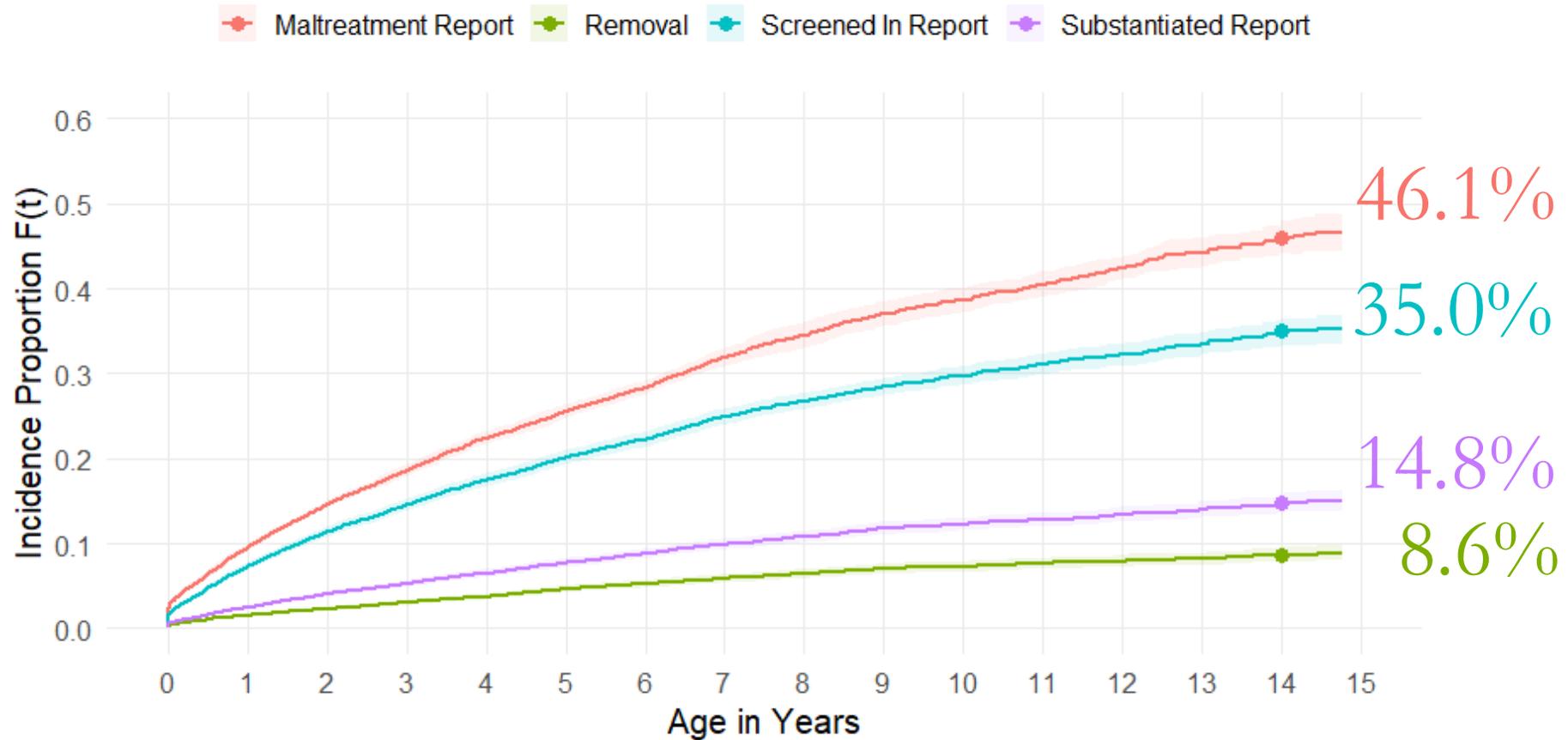
Risk of maltreatment report by race
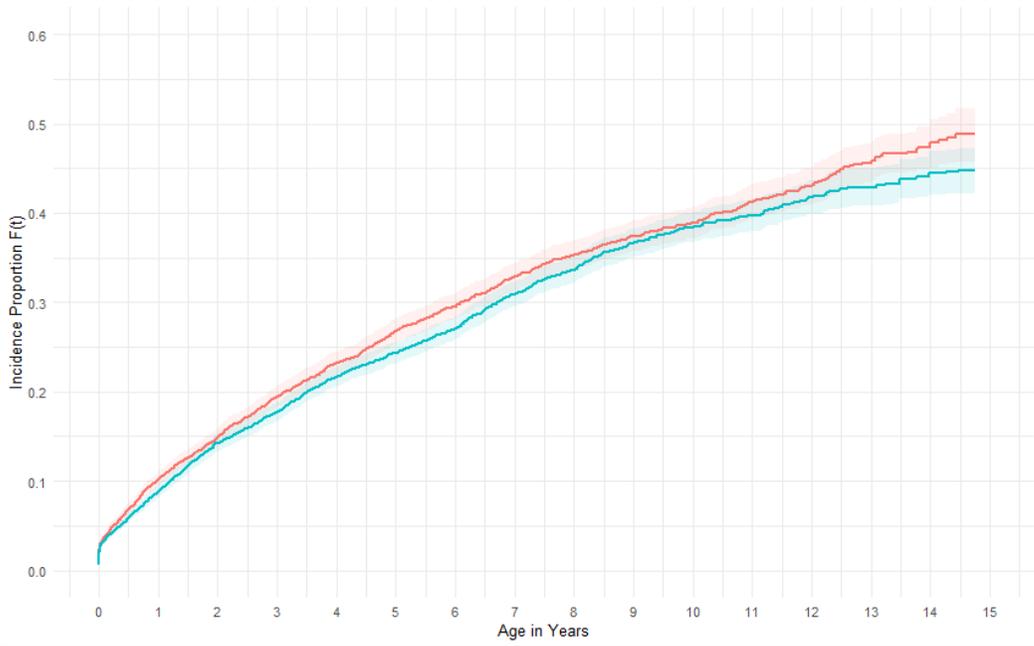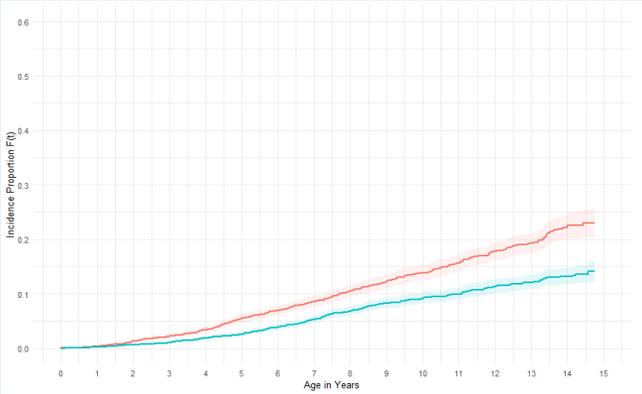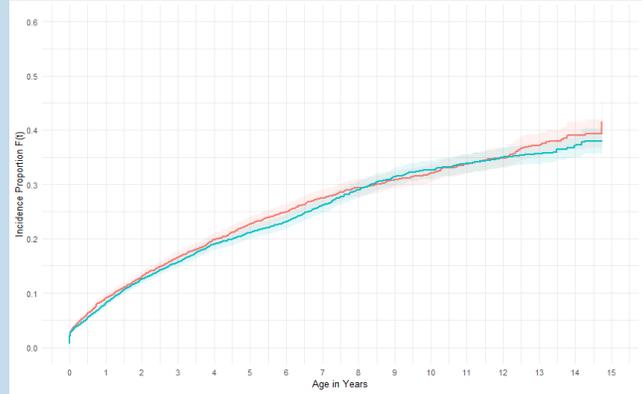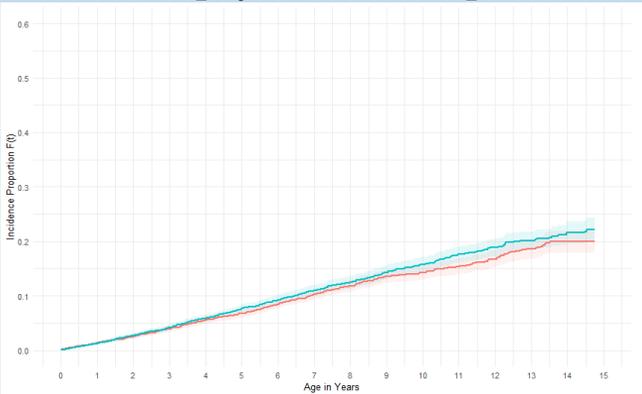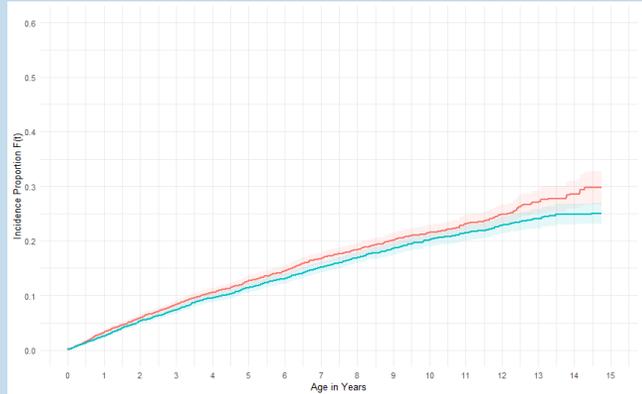
Risk of maltreatment report by race
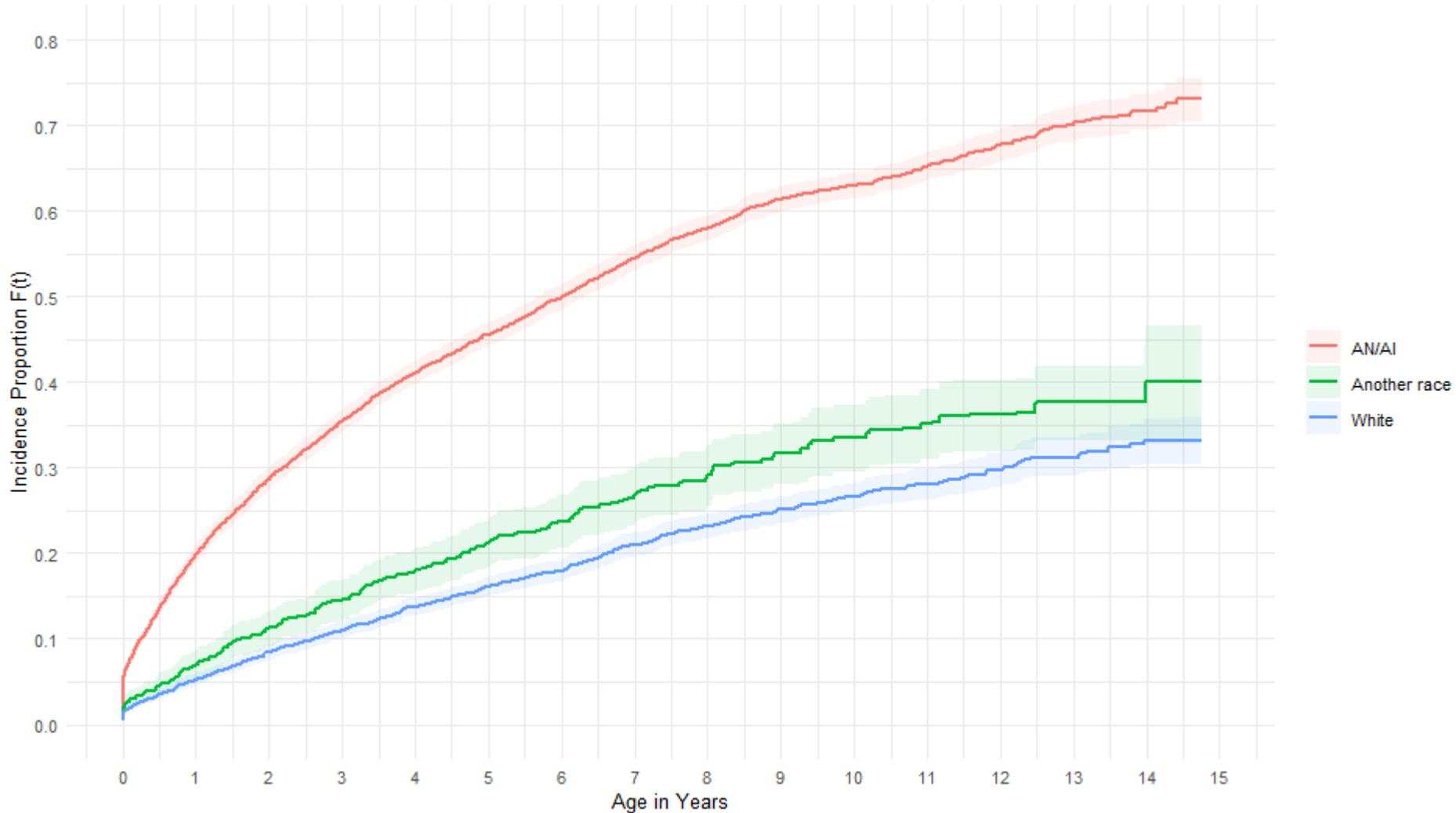
Before age 14 years:

- **72% of Alaska native** children will experience an allegation of harm

- **40% of Another race** children will experience an allegation of harm

- **33% of White children** will experience an allegation of harm

Risk of maltreatment report by public health region
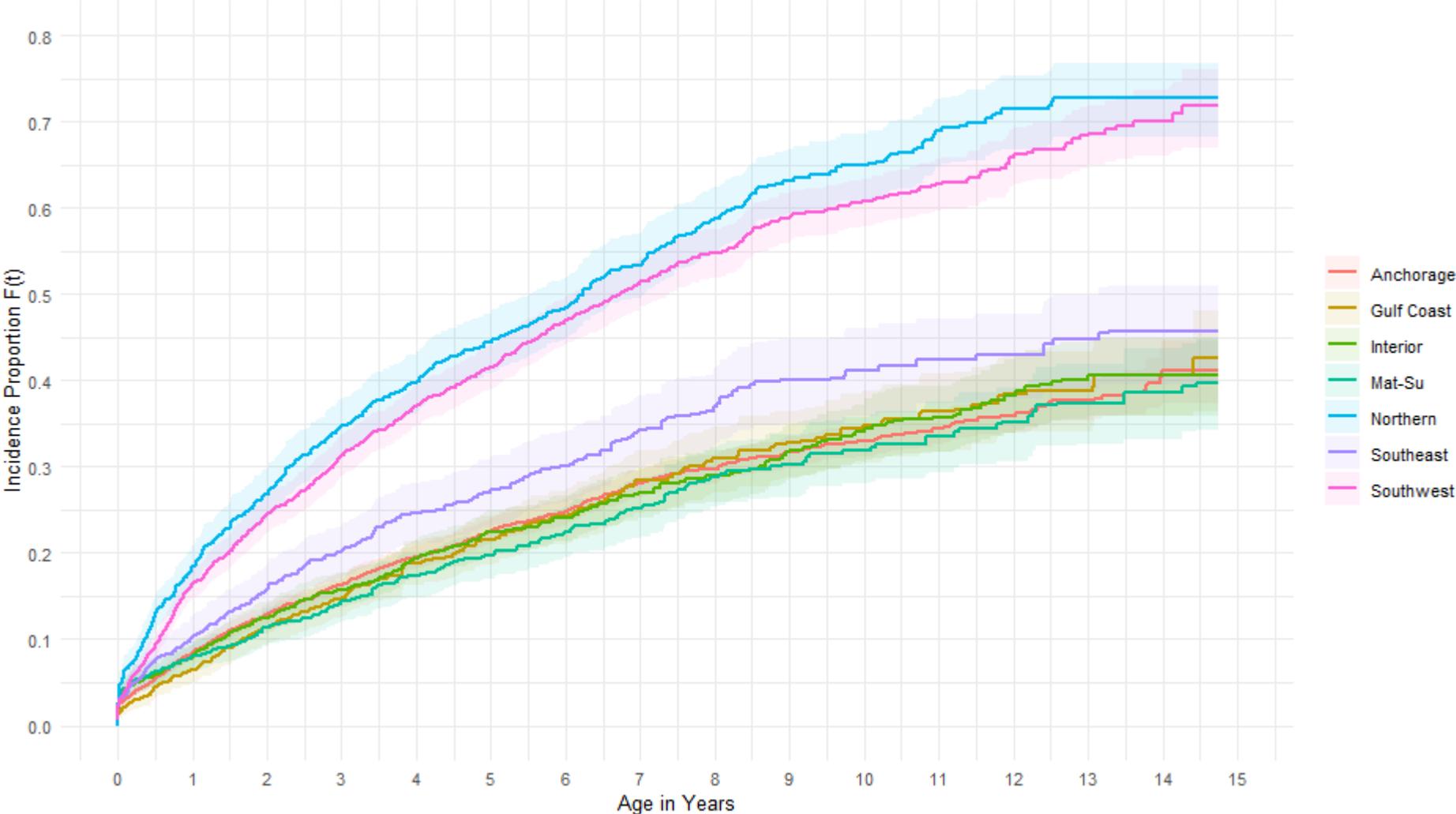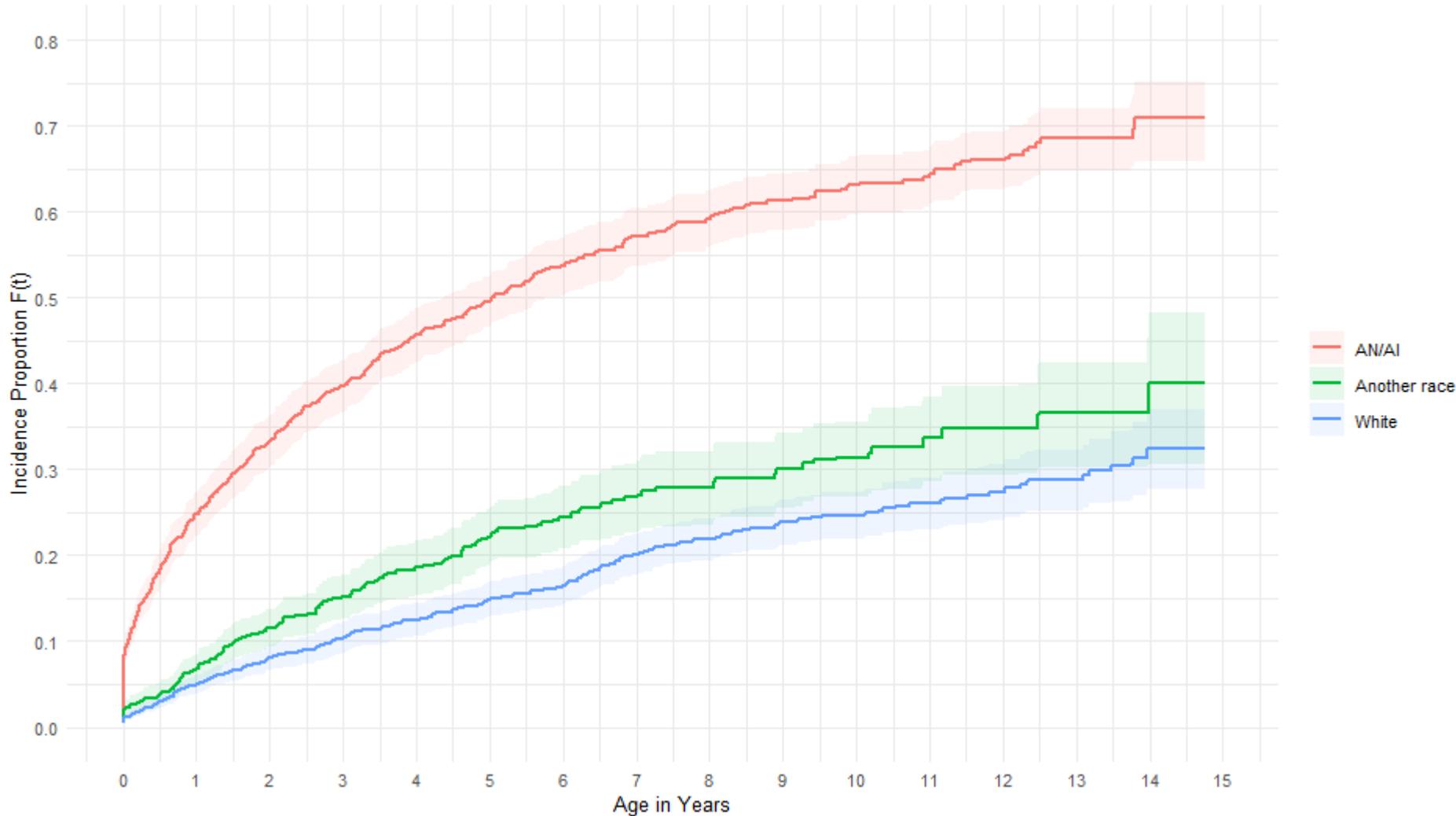
Risk of maltreatment report by race - Anchorage

Before age 14 years:

- **71% of Alaska native** children will experience an allegation of harm

- **40% of Another race** children will experience an allegation of harm

- **32% of White children** will experience an allegation of harm

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Analysis Brief

Dispelling Myths about Child Abuse among Indigenous People
Rittman DS, Parrish JW

March 2020

Background

We set out to clarify the observed elevated rates of child abuse among the Alaska Native/American Indian (AN/AI) population. Without clarification, the observed association could perpetuate institutional racism and misguided beliefs that likely results from, misunderstandings or lack of knowledge of underlying social determinants, and misinterpretation of crude relative comparison measures. Although AN/AI children receive more reports to the Office of Children's Services (OCS) for abuse, this should not be interpreted as causal.

We linked 2007–2016 Pregnancy Risk Assessment Monitoring System (PRAMS) data with administrative data from OCS. The data were used to adjust for pre-birth factors that independently predict contact with OCS for physical abuse and sexual abuse. We calculated the crude (unadjusted) and adjusted association of self-identifying as AN/AI, and child physical/sexual abuse reports.

Child physical abuse

- Without adjusting for known risk factors, children born to AN/AI mothers are 2.9 times as likely to be reported to OCS for physical abuse compared to children born to non-AN/AI mothers
- The unadjusted odds ratio (OR) for children born to AN/AI mothers and OCS contact for physical abuse is attenuated by 62% ($OR_{unadjusted}$ = 2.9, $OR_{adjusted}$ = 1.1) when adjusting for maternal substance use during pregnancy, socioeconomic status, marital status, maternal education, number of living children, and timing of prenatal care

Child sexual abuse

- Without adjusting for known risk factors, children born to AN/AI mothers are 3.2 times as likely to be reported to OCS for sexual abuse compared to children born to non-AN/AI mothers
- The unadjusted odds ratio (OR) for children born to AN/AI mothers and OCS contact for physical abuse is attenuated by 60% ($OR_{unadjusted}$ = 3.2 $OR_{adjusted}$ = 1.3) when adjusting for maternal substance use during pregnancy, socioeconomic status, marital status, maternal education, number of living children, and timing of prenatal care

Implications and recommendations

These findings reaffirm that child abuse is predicted by and associated with multiple social/behavioral factors, such as socioeconomic status and substance use, not ethnicity/race/status. Many of the covariates adjusted for in our models are likely broad indicators of underlying factors such as acute and intergenerational trauma, violence, or other social determinants of health that are disproportionately burdened on the AN/AI population. This information can help clinical providers guard against further stigmatizing the indigenous populations in Alaska by recognizing that while the crude unadjusted association indicates AN/AI have a higher probability of physical and sexual abuse, this elevated risk is due to the disproportion of socioeconomic, substance use, and other behavioral factors. This recognition ensures that conversations are targeted on root causes and facilitates supporting protective factors.

Analysis Brief

Comparing rates of child abuse between rural and urban Alaskan communities
Rittman DS, Parrish JW

March 2020

Background

We set out to explore the documented disparity that child physical and sexual abuse is elevated in rural Alaska. Although rural children receive more reports to the Office of Children's Services (OCS) for abuse, there is no geographic or cultural reasoning behind it.

We linked 2007–2016 Pregnancy Risk Assessment Monitoring System (PRAMS) data with administrative data from OCS. The data were used to adjust for pre-birth factors that independently predict contact with OCS for physical abuse and sexual abuse. We calculated the crude (unadjusted) and adjusted association of residence (rural vs urban) and child physical/sexual abuse reports.

Child physical abuse

- Children born in rural communities are 1.6 times as likely to be reported to OCS for physical abuse compared to children born in urban communities
- The unadjusted odds ratio (OR) for children born in rural communities and OCS contact for physical abuse attenuates by 54% ($OR_{unadjusted}$ = 1.6, $OR_{adjusted}$ = 0.7) when adjusting for maternal substance use during pregnancy, socioeconomic status, marital status, maternal education, and number of living children
- In the final adjusted model, rural residence transitions from a risk to a protective factor against physical abuse

Child sexual abuse

- Children born in rural communities are 1.8 times as likely to be reported to OCS for sexual abuse compared to children born in urban communities
- The unadjusted odds ratio (OR) for children born in rural communities and OCS contact for sexual abuse attenuates by 52% ($OR_{unadjusted}$ = 1.8, $OR_{adjusted}$ = 0.8) when adjusting for maternal substance use during pregnancy, socioeconomic status, marital status, maternal education, and number of living children
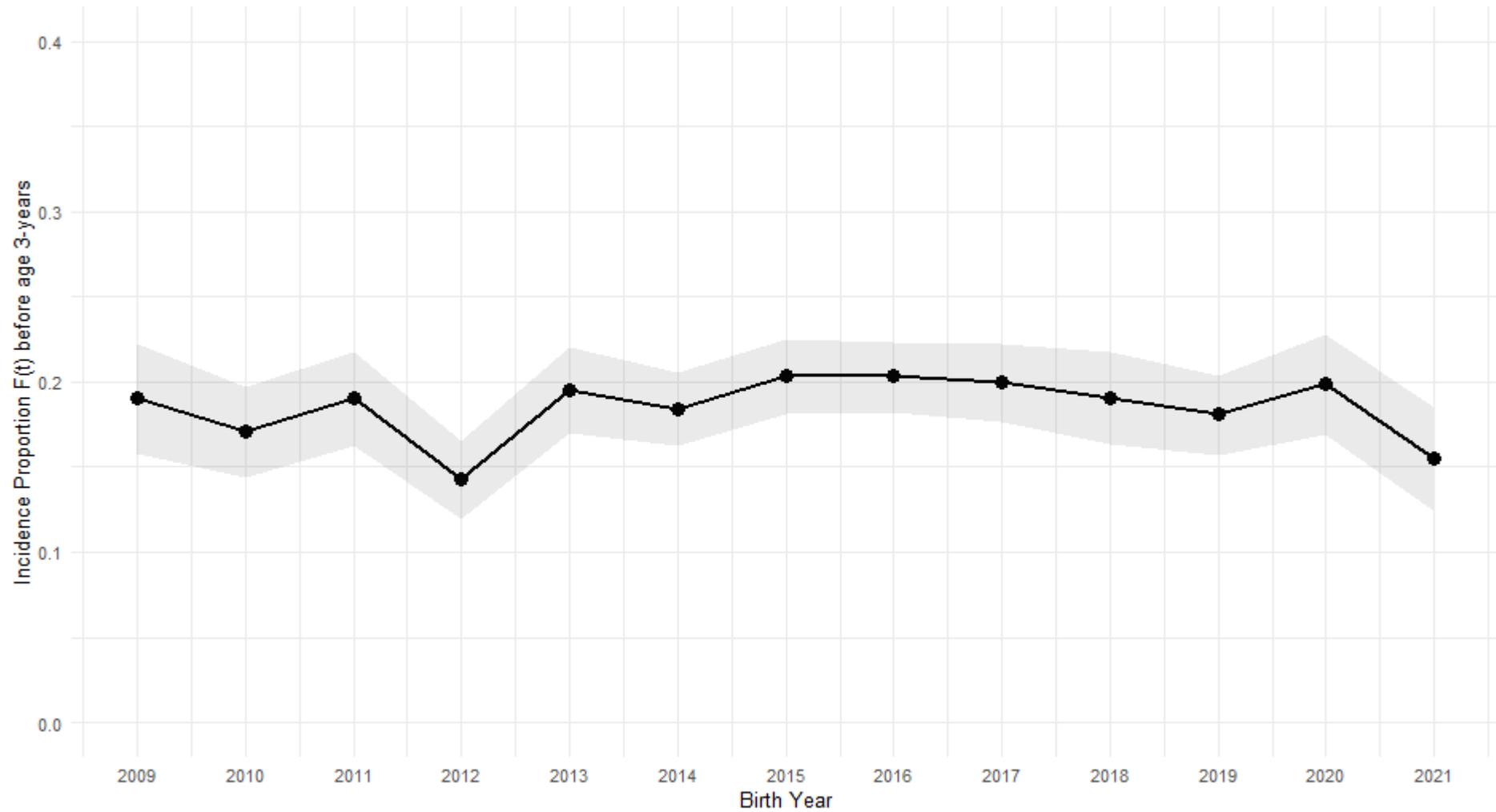
Implications and recommendations

Health and safety are influenced by factors at the individual, familial, community, and societal levels. Although children living in rural communities have an elevated risk of experiencing a physical abuse and/or sexual abuse report, it appears that this disparity is driven primarily by substance use and economic challenges. After account for these two factors, living in a rural community is actually protective against physical abuse (relative to children living in urban communities). This "reversal" of effect is likely due to multiple unmeasured factors such as increased cohesion with community and multiple supports. Providers should be aware of this important connection between community and child abuse, and avoid generalized language that may weaken the collective strengths of individual communities. Given these findings, prevention efforts in rural communities should focus around substance use and resources, while in urban areas, additional broader considerations are likely needed.

Risk of maltreatment report before age 3 by birth year

Pre-Birth Challenges & Their Impact on Early Childhood Experiences

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Pre-Birth Household Challenges on PRAMS

Illicit Drug Use

Mental Illness

Divorce/Separation

Incarcerated Relative

Argued with Partner More Than Usual

Mother Treated Violently or Threatened

Financial Struggles/Homelessness

Family Member in Hospital

Moved to New Address

Substance Abuse and/or Death in Close Community

Job loss or Work Hours Cut

Alcohol Abuse/Misuse

A Change in the Number of Household Challenges is Associated with Change in Risk of OCS Report

Pre-Birth Household Challenges

Low (<2) → Low (<2)
High (2+) → High (2+)

Early Childhood Household Challenges → OCS Maltreatment Report

		Probability of a report	Odds of transitioning
High Proportion → High Proportion		**60%**	from high to low: 0.12
→ Low Proportion		43%	
Low Proportion → High Proportion		**84%**	from low to high: 0.20
→ Low Proportion		13%	
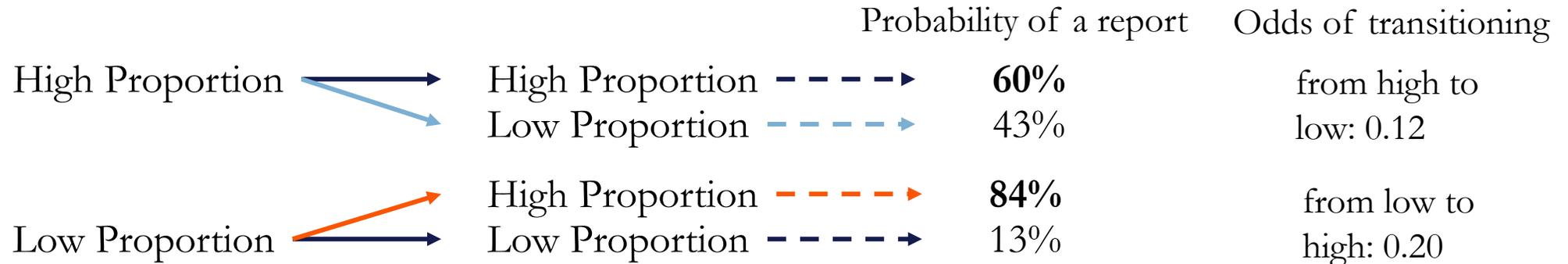
OCS: Office of Children's Services

Husa et al. (2023)

Household challenges screening and referral tool concept

1. Target the pregnancy period
2. Identify and classify risk in context of protections
3. Connect families with mitigation resources/services

Prevention/Intervention

No need for services

Provide or implement treatment plan

Care coordinator

Maternal assessment and population-based model predictions

Analytics, predictions, and assessments
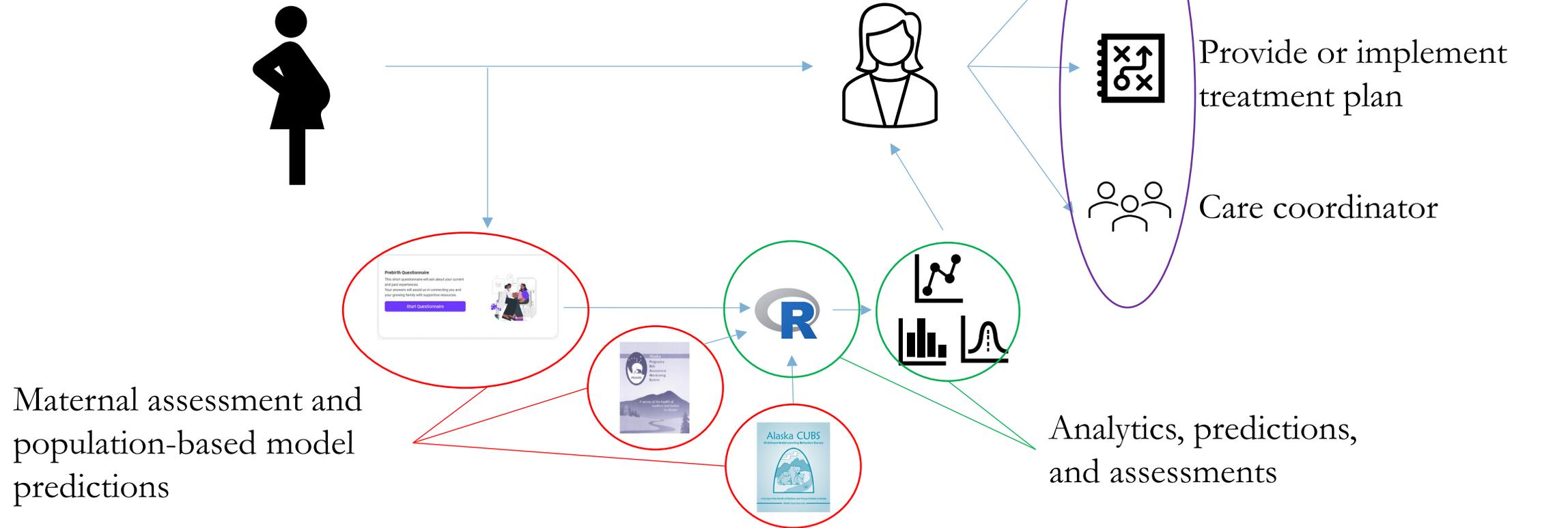
Prebirth Questionnaire

This short questionnaire will ask about your current and past experiences.

Your answers will assist us in connecting you and your growing family with supportive resources.

Start Questionnaire

Disclaimer

Your answers in this survey will not affect eligibility for the services you receive. You information will be held with utmost confidentiality, and this information will not be misused or made public. We encourage participation as your answers help us connect you to supportive resources.

Patient Information

Patient Info

Jane
Doe
123-456-7890
123 Fake Street
jd@fakeemail.com
Dr. Cure
<20 years
Married
<12 years

Next

https://octopus-app-m2lmv.ondigitalocean.app/

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Do any of these apply to you?

Please review each question below and select all that apply:

| Yes | No | During the month before you got pregnant were you covered by Medicaid. |

| Yes | No | Are you currently or planning to use WIC (The Supplemental Nutrition Program for Women, Infants, and Children.). |

| Yes | No | When you got pregnant, were you trying to get pregnant. |

| Yes | No | Do you currently or have you in the past 12 months smoked marijuana or hash. |

| Yes | No | Do you currently or have you in the past 2 years smoked cigarettes. |

During the 12 months before pregnancy did you:

| Yes | No | Have your teeth cleaned by a dentist/hygienist. |

| Yes | No | Diet to lose weight. |

| Yes | No | Exercise 3 or more days a week. |

All done!

Questionaire Completed

Hand back to clinician

🚩 Patient is at high risk of prebirth intervention based on their results

Risk Tip
A red flag shows high risk factor, which across the chart means they need to be consulted on additional resources and aid.

Risk Factors

Group	Priority
Financial Stress	1
⦿ Stress Out of Work:	
◯ Stress Bills:	
Substance Use Stress	2
◯ Prenatal Binge:	
Housing Stress	3

Prompt
- Are they pursuing or engaging in any educational or vocational opportunities?
- What is their current employment status?

Individual Characteristics

Note	Question	Response
	Maternal Education:	<12 years
• Low education is a strong indicator of household challenges that are not measured in this tool. Ensure the birthing parent has supports to help them care for themselves and their child. If not, refer them to Home Visiting services and/or Help Me Grow regardless of the risk score.		
	On Medicaid:	Yes
	Maternal Age:	<20 years

Analysis

Jane Doe
jd@fakeemail.com

Send summary PDF to email

Save & Print summary PDF for filing

Send summary to HelpMeGrow w/ Patient consent

Finish

- Risk level classification
- Risk factors identified prioritized based on model risk
    - Prompts for conversation provided
- Individual characteristics highlighted

Risk levels
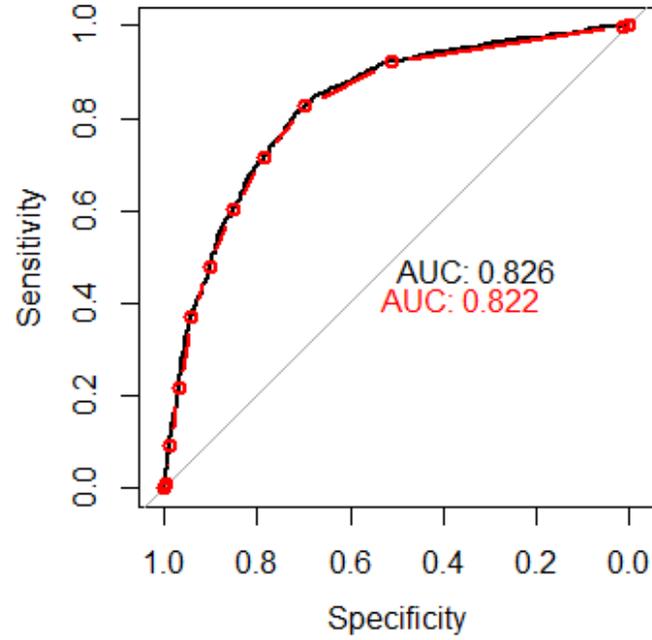
Risk Score	Accuracy	Sens	Spec	PPV	NPV	
0.8	0.6944	0.1540	0.9792	0.7959	0.6871	
0.7	0.7274	0.2863	0.9599	0.7902	0.7185	
0.6	0.7475	0.4195	0.9204	0.7353	0.7505	
0.5	0.7673	0.5528	0.8803	0.7089	0.7888	
0.4	0.7690	0.6644	0.8241	0.6657	0.8233	
0.3	0.7520	0.7769	0.7388	0.6106	0.8627	
0.2	0.7060	0.8717	0.6186	0.5464	0.9014	***
0.1	0.5554	0.9506	0.3470	0.4342	0.9303	**

Patient is at high risk of prebirth intervention based on their results

Risk Tip
A red flag shows high risk factor, which across the chart means they need to be consulted on additional resources and aid.

Patient is at medium risk of prebirth intervention based on their results

Risk Tip
A yellow flag shows medium risk factor, which across the chart means they should be consulted on additional resources and aid.

Patient is at low risk of prebirth intervention based on their results

Risk Tip
A green flag shows low risk factor, which across the chart means they can but dont need to be consulted on additional resources and aid.

Intent and next step of the screening tool:

Intent

1. Support early identification of expecting families that may benefit from additional services.
2. Support conversations about risk through protective factor prompts.
3. Connect families with entities that can help them navigate systems to meet identified needs (upstream headwaters are often glaciers).

Next Step
Validate through RCT.

ALCANLink and Alaska Birth Defects Registry Linkage Project

Prebirth factors and populations experiencing elevated prevalence of FAS and cleft conditions AK birth years 2009-2018

Project Process

AK birth years 2009-2018

+

Alaska Birth Defects Registry

Linkage

- Validation
- Prevalence estimates on specific birth defects

Specific demographic analysis

Identified partners who may be interested in further analysis of specific defects

Analyzed prebirth factors of interest relationships to FAS and cleft conditions

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Birth Defects Examined

Anencephalus
Anophthalmia / microphthalmia
Anotia / microtia
Aortic valve stenosis
Atrial septal defect
Atrioventricular septal defect
Biliary atresia
Bladder exstrophy
Choanal atresia
Cleft lip alone
Cleft lip with celft palate
Cleft palate alone
Cloacal exstrophy
Clubfoot
Coarctation of the aorta
Common truncus
Congenital cataract
Congenital posterior urethral valves
Craniosynostosis
Deletion 22 q11
Diaphragmatic hernia
Double outlet right ventricle
Ebstein anomaly
Encephalocele
Esophageal atresia / tracheoesophageal fistula
Fetal Alcohol Syndrome
Gastroschisis
Holoprosencephaly
Hypoplastic left heart syndrome
Hypospadias**
Interrupted aortic arch
Limb deficiencies
Omphalocele
Pulmonary valve atresia and stenosis
Rectal and large intestinal atresia / stenosis
Renal agenesis / hypoplasia
Single ventricle
Small intestinal atresia / stenosis
Spina bifida without anencephalus
Tetralogy of Fallot
Total anomalous pulmonary venous connection
Transposition of the great arteries
Tricuspid valve atresia and stenosis
Trisomy 13
Trisomy 18
Trisomy 21 (Down syndrome)
Turner syndrome***
Ventricular septal defect

Met criteria for further analysis

Anencephalus

Aortic valve stenosis
Atrial septal defect

Cleft lip alone
Cleft lip with celft palate
Cleft palate alone

Clubfoot

Craniosynostosis

Fetal Alcohol Syndrome
Gastroschisis
Holoprosencephaly

Hypospadias**

Omphalocele
Pulmonary valve atresia and stenosis

Spina bifida without anencephalus

Trisomy 21 (Down syndrome)

Ventricular septal defect

Criteria
- Estimated N of linked IDs above 30
- Between confidence intervals

FAS prevalence per 10,000 live births

Condition	ALCANLink Raw N	ALCANLink Estimated Prevalence (95% CI)	ABDR report prevalence (95% CI)
Fetal Alcohol Syndrome	49	22.8 (14.8, 35.3)	36.7 (33.3, 40.5)

Some populations may be more at risk for having a baby with Fetal Alcohol Syndrome.

Maternal race			
Alaska Native/American Indian	317	92.2	37944	24.3 (19.8, 29.7)
Asian/Pacific Islander	8	9.4	14656	6.4 (3.3, 11.7)
Black	11	6.2	7079	8.7 (4.0, 18.4)
White	126	80.2	99674	8.1 (6.4, 10.0)

Prevalence #s AK 2007-2021

More descriptive epidemiology data available at
https://rpubs.com/AK_ABDR/1043709

Can PRAMS survey data help us
understand this disparity?

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Pre-Birth factors analyzed from PRAMS

Smoking behaviors

Alcohol Use

Divorce/Separation

Incarcerated Relative

Argued with Partner More Than Usual

Mother Treated Violently or Threatened

Financial Struggles/Homelessness

Family Member in Hospital

Maternal closeness to someone with substance misuse

Death in Close Community

Job loss or Work Hours Cut

Prenatal Care Received

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The odds of FAS occurring among children born to AN/AI mothers is nearly 3 times as high as the odds of FAS among children born to white mothers.

2.8

Smoking behaviors

Alcohol Use

1.2

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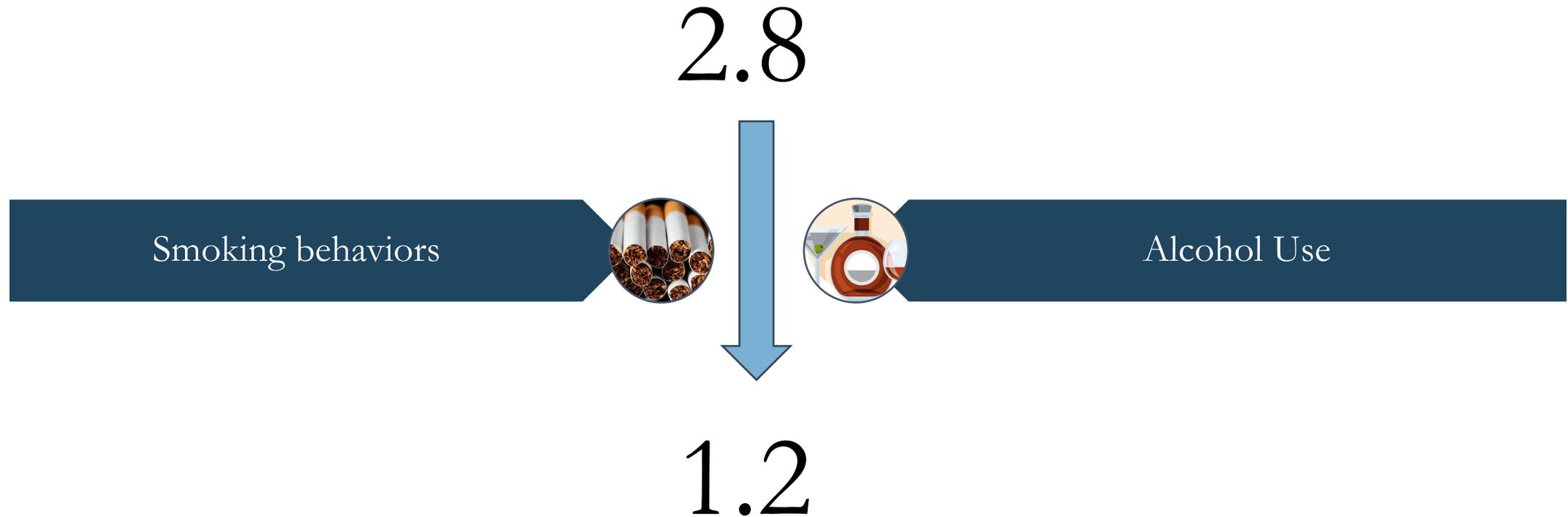
Household stressors have further impact

1.2

Financial Struggles/Homelessness

Maternal closeness to someone with substance misuse

Mother Treated Violently or Threatened

1.0
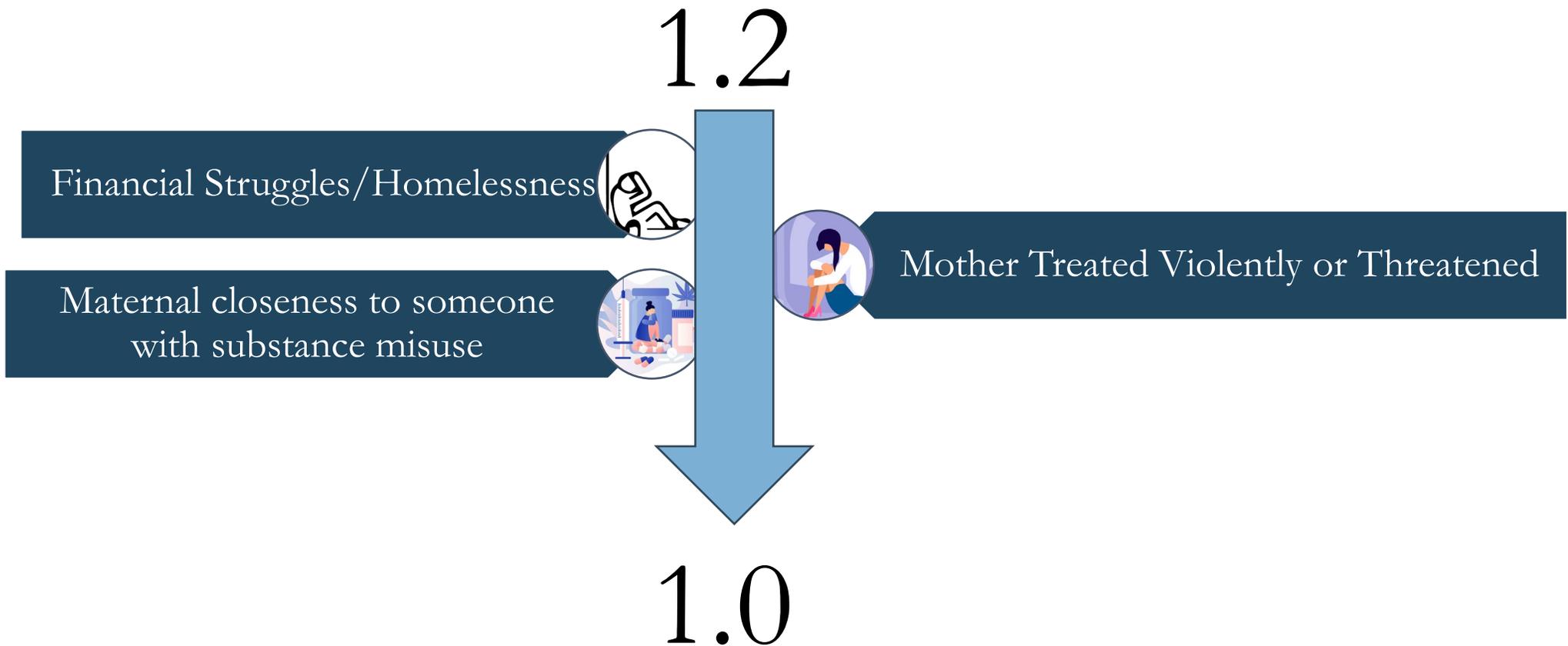
Cleft condition prevalence per 10,000 births

Condition	ALCANLink Raw N	ALCANLink estimated prevalence (95% CI)	ABDR report prevalence (95% CI)
Cleft Lip	11	6.6 (3.1, 14.0)	9.1 (3.3, 19.8)
Cleft Palette	27	19.1 (11.6, 31.5)	21.9 (12.7, 35.7)
Cleft Lip and Palette	14	4.9 (2.2, 10.9)	10.9 (5.2, 21.9)
New Variable created: Any Cleft Condition	37	23.1 (14.9, 35.7)	-

Population prevalence

Birth characteristics	ALCANLINK Raw N	ALCANLINK weighted prevalence per 10,000
Birth Weigh (grams)		
<2500	19	64.2 (46.5, 88.6)
2500+	18	20.9 (12.6, 34.7)
Maternal Age		
<20 years	4	24.0 (8.5, 67.6)
20-24	9	21.6 (8.6, 54.1)
25-29	5	13.4 (5.1, 35.8)
30-34	11	35.5 (16.7, 75.4)
35-39	6	26.6 (6.5, 108)
40+	2	19.4 (6.3, 59.6)
Medicaid		
Enrolled	31	36.9 (22.9, 59.3)
Not Enrolled	6	8.9 (3.0, 59.3)

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Population prevalence

Birth Characteristics	ALCANLink Raw N	ALCANLink weighted prevalence per 10,000
Maternal Race		
AN/AI	19	33.2 (20.4, 54.1)
Asian/PI	5	46.3 (14.5, 147)
Black	2	10.4 (4.3, 24.9)
White	10	16.2 (7.3, 35.9)
Unknown	1	
Maternal Education		
<12	8	22.8 (10.5, 49.3)
12	15	41.3 (22.7, 75.1)
12+	12	12.6 (5.4, 29.5)
Marital Status		
Married	17	17.6 (9.0, 34.4)
Unmarried	20	33.3 (18.9, 58.6)

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More to come…

Future analysis areas with the any cleft condition variable:
Health behaviors, household stressors, public health regions,
pre-natal care visits

Have ideas? Come chat

Questions?

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ALCANLink website:
http://dhss.alaska.gov/dph/wcfh/Pages/mchepi/ALCANlink/