



Adverse Childhood Experiences

Overcoming ACEs in Alaska

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Advisory Board on Alcoholism
and Drug Abuse



Alaska Mental Health Board



The high cost of childhood trauma

An opportunity for change

In the past two decades, we've learned two key things about Alaskans' health:

- Childhood trauma is far more common than previously realized; and
- The impact of this trauma affects individuals over a lifetime and societies over generations.

A keystone 1998 study asked middle class Americans how many traumas they had experienced as a child. Traumas included physical abuse, witnessing domestic violence and having a parent in jail. Researchers then developed an 'adverse childhood experiences' (ACE) score — the more traumas, the higher the ACE score.

Researchers compared scores to measures of adult health and well-being, and found strong links with poor health, social challenges and low earning power. If children experience trauma, this undermines their ability to learn and cope, which in turn undermines their health and ability to earn a living.

Stress from trauma shows up at the cellular level, follow-up studies found, and its influence can be passed on genetically from one generation to the next. This relates directly to many of the health and social problems we wrestle with in Alaska.

This information is incredibly important for Alaska, where rates of child abuse and domestic violence are so high. No nationwide ACE study has been done, but Alaska's first measured rates, in 2013, were higher than those of an earlier five-state study by the U.S. Centers for Disease Control and Prevention.

From low income to lung cancer, the likelihood of a host of problems rise along with trauma scores. Not surprisingly, so does Medicaid participation. The good news is that, if children have positive influences in their lives, they can overcome trauma. The catch phrase among those who support them and their families is, "Resilience trumps ACEs!"

Many of us — individuals, groups, communities, and government agencies — are already working to break the cycle of childhood trauma. We can use ACE data to guide our efforts to reduce human suffering, activate human potential, and save a significant amount of public money.

Together, we can meet this challenge and make Alaska communities even better places to grow up.

Alaskans can follow efforts across the state to prevent and mitigate the impact of ACEs on the "Overcoming ACEs in Alaska" website: dhss.alaska.gov/abada/ace-ak



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Adverse childhood experiences

What are ACEs?

In the late 1990s, the Centers for Disease Control and Prevention and Kaiser Permanente (a health care plan group provider network) asked more than 17,000 members of a Kaiser Health Maintenance Organization in San Diego whether they had experienced various kinds of trauma before age 18. The unexpected and striking results of this Adverse Childhood Experiences Study served as the basis for more than 80 peer-reviewed journal articles and statewide ACE studies.

The eight most commonly measured* traumas are in two general categories:

Table 1

Abuse	Household Dysfunction
1. Physical	4. Living with Someone with Mental Illness
2. Sexual	5. Living with Someone with Substance Abuse
3. Emotional	6. Separation or Divorce
	7. Living with Someone who went to Jail or Prison
	8. Witnessing Domestic Violence

**The original study also asked about physical and emotional neglect. Several states, including Alaska, did not include neglect data resulting a shorter survey.*

Researchers created a scoring method to determine the “dose” of each study participant’s exposure to each type of “adverse childhood experiences,” or ACEs.

A person who reported no exposure to any of the adverse experience categories would have an ACE score of zero. A person who reported exposure to all eight categories of trauma would have an ACE score of eight.

ACEs are common, linked with health outcomes

The researchers were surprised at the high number of ACEs reported by their middle-class subjects. Two thirds of adults studied had experienced at least one adverse childhood experience. (Table 2)

Researchers found striking correlations between childhood trauma and a wide range of long-term health and economic outcomes. The higher the ACEs score, the higher the incidence of disease, risky behaviors and negative social outcomes. It is clear that ACEs have a big impact on many of the difficult and entrenched health problems that Alaska faces.

Table 2

ACE Score	Prevalence
0	33%
1	26%
2	16%
3	10%
4 +	16%



These graphs are representative of many ACE studies exploring the relationships between the dose of childhood trauma and the likelihood of poor health / behavior outcomes, perhaps the most striking is the suicide link, (Fig. 1).

As the number of ACEs went up so did the likelihood that those surveyed had experienced poor social, economic or health outcome, (Fig. 2).

Researchers have also found links between ACEs and these health and social outcomes:

- Asthma • Depression • Drug abuse • Fetal death • Frequent headaches • Hallucinations • Health-related quality of life • Insufficient sleep • Intimate partner violence • Liver disease • Sexual assault • Teen pregnancy • Low yearly income • Medicaid participation • Home ownership • Separation and divorce

It is important to remember that the ACE studies and Alaska's ACE analyses are population-based studies and are not predictions of outcomes for individuals. Indeed, some of the people who are able to overcome ACEs can be our best teachers about resiliency in the face of adversity.

Stress and the developing brain

The initial ACE study was designed by researchers who were not sure what the mechanism for these poor outcomes was. It was clear that ACEs led to negative results (Fig. 3) but just how they did was unclear. Researchers developed the pyramid model, to the right, to explain what they were seeing. When the ACE researchers and brain researchers collaborated, a much clearer picture began to emerge.

The Center for the Developing Child at Harvard University reports that, "It's important to distinguish among three kinds of responses to stress: positive, tolerable, and toxic. As described below, these three terms refer to the stress response system's effects on the body, not to the stressful event or experience itself.

- Positive stress response is a normal and essential part of healthy development, characterized by brief increases in heart rate and mild elevations in hormone levels. Some situations that might trigger a positive stress response are the first day with a new caregiver or receiving an injected immunization.

Fig. 1

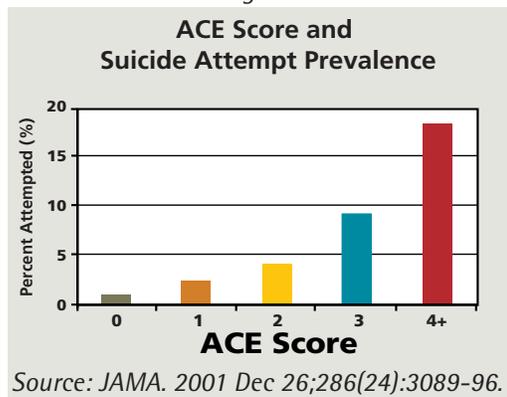


Fig. 2

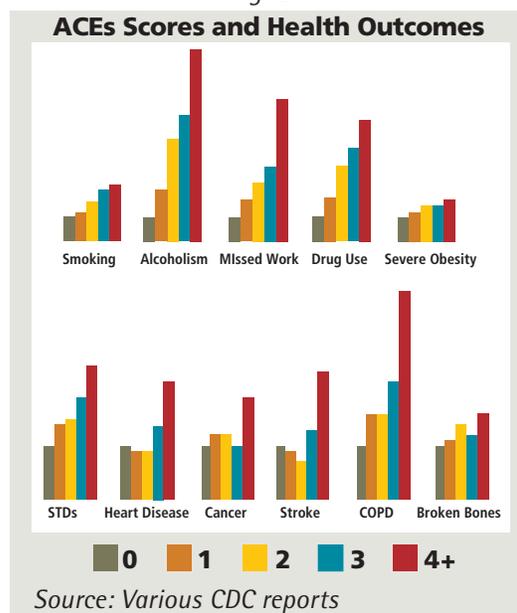
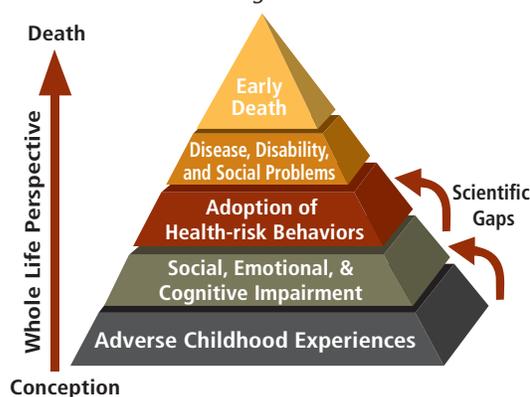


Fig. 3





- Tolerable stress response activates the body's alert systems to a greater degree as a result of more severe, longer-lasting difficulties, such as the loss of a loved one, a natural disaster, or a frightening injury. If the activation is time-limited and buffered by relationships with adults who help the child adapt, the brain and other organs recover from what might otherwise be damaging effects.
- Toxic stress response can occur when a child experiences strong, frequent, and/or prolonged adversity — such as physical or emotional abuse, chronic neglect, caregiver substance abuse or mental illness, exposure to violence, and/or the accumulated burdens of family economic hardship — without adequate adult support. This kind of prolonged activation of the stress response systems can disrupt the development of brain architecture and other organ systems, and increase the risk for stress-related disease and cognitive impairment, well into the adult years.

Toxic stress affects the brain and the body and has implications for a child as he or she develops. The first steps in brain development are the most basic, and focus on survival. The next steps involve crucial social and intellectual building blocks such as bonding with parents, learning to talk, and learning to get along with others. Those are children's most important lessons in terms of building a foundation for success for the rest of their lives."

When young children feel safe and nurtured, they are calm. This frees their brains, at a neurological level, to develop these more advanced skills.

Children who experience early trauma — toxic stress — are often in a chronic state of crisis. Because they feel unsafe or threatened, their brains spend more time in basic, survival-oriented stages of development. They are too busy trying to cope, trying to feel OK, to focus on more complex learning. These children are often easily overwhelmed by minor stressors such as a change in their schedule or routine. They are used to trauma, expect it at every turn, and so are always ready to react. Small disruptions feel as if they are major. They have difficulty soothing or calming themselves without a reliable and consistent caregiver. This compromises their ability to learn. In seriously stressed children, researchers have observed:

- Less development of the upper brain;
- Smaller brain size; and
- Fewer brain connections.

This brain research is vital for Alaska schools. A child coming to school from a toxic home environment or having experienced toxic stress earlier in life may react quite differently than a child coming from a secure home. The ability to learn is impaired and the pathways in the brain may need to be rewired.

Many schools around Alaska are using this science to help all children be more ready to learn and grow when they are in school.



Generational impacts

The impacts of overwhelming stress on the brain's development naturally continue into adulthood. As Alaskans exposed to this degree of stress grow up, they may start using drugs as a way to cope with their damaged stress responses. This in turn could lead to prison. If they start families of their own, these become ACEs for another generation. These are examples of behavioral influence — positive or negative habits that parents pass on to their children by example. Positive habits children may pick up from their parents include reading and exercising. Negative habits include smoking and responding to challenges with violence.



Recent research has shown that childhood experiences also have a genetic influence. Physical changes in our genes, triggered by trauma, get passed to our offspring. A study of Swedes over three generations found connections between men going hungry during their youth and rates of cardiovascular disease and diabetes among their children and grandchildren. In some ways, we inherit the experiences of our parents and grandparents as well as their physical characteristics.

Historical trauma

Epigenetics, the science that looks at how people's genes are affected by their environment, is beginning to show how historical traumas continue to affect the children of survivors in biological ways at the cellular level, as well as in behavioral ways. The good news coming from this emerging science is that **we can change our biology, and our lives, for the better.**

A 2013 [article](#) on epigenetics in Discover magazine used these analogies:

"You might have inherited not just your grandmother's knobby knees, but also her predisposition toward depression caused by the neglect she suffered as a newborn.

Or not. If your grandmother was adopted by nurturing parents, you might be enjoying the boost she received thanks to their love and support. The mechanisms of behavioral epigenetics underlie not only deficits and weaknesses but strengths and resiliencies, too. And for those unlucky enough to descend from miserable or withholding grandparents, emerging drug treatments could reset not just mood, but the epigenetic changes themselves. Like grandmother's vintage dress, you could wear it or have it altered. The genome has long been known as the blueprint of life, but the epigenome is life's Etch-A-Sketch: shake it hard enough, and you can wipe clean the family curse."

This is particularly important in Alaska, which has seen historical traumas such as rural outbreaks of disease that killed nearly entire communities. We also have groups of people born in Alaska or in other parts of the world who have experienced trauma from outside the home. Wars, racism, displacement from a homeland, and loss of culture have been shown to lead to poor health and economic outcomes. Alaskans have experienced all of these things.

Fig. 4



Source: *The Alaska Mental Health Board / Advisory Board on Alcoholism and Drug Abuse*



Alaska ACE findings

Behavioral Risk Factor Surveillance Survey: ACEs questions

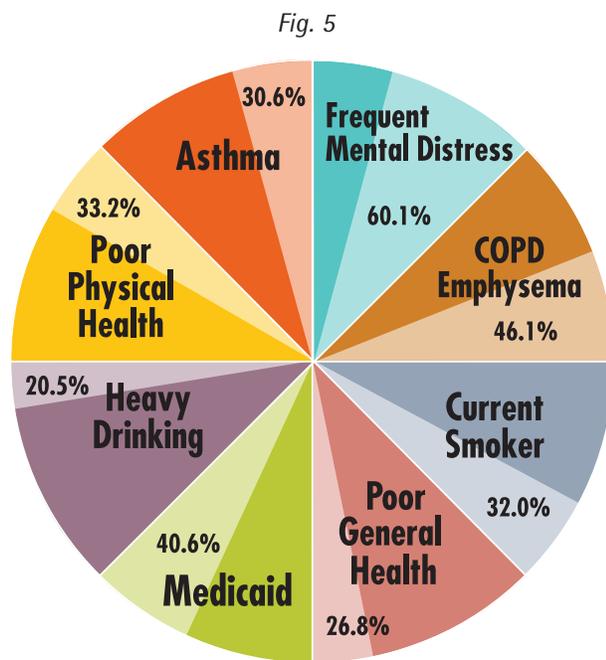
The Behavioral Risk Factor Surveillance Survey (BRFSS) is a public health phone survey of adults, developed by the U.S. Centers for Disease Control and Prevention (CDC), conducted in all states and territories nationwide. To better understand childhood trauma, the CDC developed a set of ACEs questions that states could add to their BRFSS surveys starting in 2009. Alaska became the 20th state to do so in 2013.

The Alaska Division of Public Health surveyed more than 4,000 Alaskans 18 years and older for 2013's BRFSS. The responses give us insight into the relationship between ACEs and chronic disease in Alaska, and how our ACE rates compare with other states.

Alaska population attributable risks

The graphic to the right shows the degree to which childhood trauma contributes to poor health in Alaska. The paler areas represent the proportion of each outcome which can be linked back to ACEs. For example, studies suggest that 32 percent of current smokers would not be smoking if we did away with all of the adverse childhood experiences we measured.

This linkage, known as population attributable risk, is basically how often something happens in a group of people that have been exposed to something, compared to how often it happens in a group without exposure. For example, how often does chronic obstructive pulmonary disease happen among Alaskans who had childhood trauma, compared to Alaskans who didn't? Looking at the high population attributable risks for these outcomes and ACEs, the potential savings in human and economic costs from reducing childhood trauma is astounding.



Watch for details on costs associated with ACEs in information boxes throughout this report.

The **CO\$T**



Comparison to other states

One of the best ways to gauge the results of the Alaska ACE survey is to compare them with other states. There are no national statistics on ACE scores available, however in 2009 the CDC released a study comparing ACE data from five states (Arkansas, Louisiana, Tennessee, New Mexico, Washington) that used the BRFSS ACE module. This analysis covered more than 23 million people (2010 Census), with direct surveys of more than 26,000 respondents.

Once Alaska added the ACE module to our 2013 risk factor survey, we could compare our data with the CDC's five-state study. Generally Alaska had higher ACE scores.

Table 2

ACE Rates in Six States						
Adverse Childhood Experience	Alaska	Arkansas	Louisiana	New Mexico	Tennessee	Washington
Year study released	2013	2009				
ABUSE						
Verbal/Emotional	31.0%	24.3%	21.1%	28.1%	19.2%	34.9%
Physical	19.1%	14.1%	10.5%	19.5%	12.9%	18.1%
Sexual	14.8%	10.9%	9.9%	12.9%	12.7%	13.5%
HOUSEHOLD DYSFUNCTION						
Mental Illness in the Home	21.9%	17.0%	16.6%	19.4%	17.1%	24.3%
Incarcerated Family Member	11.5%	5.5%	7.2%	7.1%	8.6%	6.6%
Substance Abuse in Home	33.8%	25.5%	26.6%	29.9%	28.3%	32.7%
Separation or Divorce	31.7%	23.3%	27.1%	24.4%	29.1%	26.0%
Witnessed Domestic Violence	18.7%	15.1%	14.5%	18.9%	17.1%	16.6%

Alaska's 2013 Behavioral Risk Factor Surveillance Survey ACEs data compared to the CDC's five-state study in 2009 using the same BRFSS module. Numbers in red indicate the highest percentage of the problem of the states reviewed.

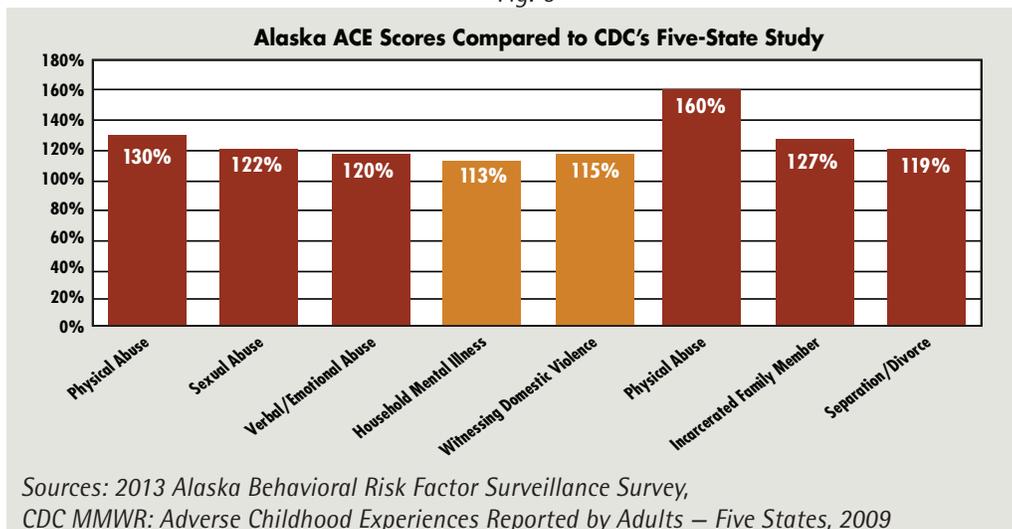
Source: CDC Morbidity and Mortality Weekly Report, Vol. 59, No. 49 Dec. 10, 2010; Alaska BRFSS, 2014

The rates reported by Alaska adults for each category of adverse experiences were higher than the five-state study's average rates. In all but two of the categories, these higher rates were statistically significant given the two studies' sample sizes. The three categories of adverse experiences with significantly higher rates among adults in Alaska — incarcerated family member, household substance abuse and separation and divorce — were also found to be significantly higher in a sample of Alaska children when compared with a national rate.



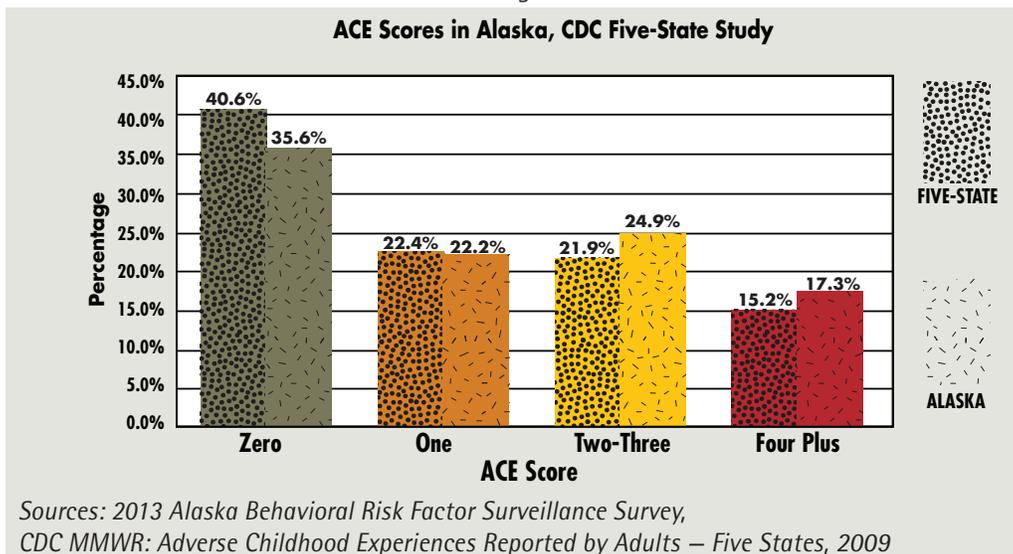
Figure 6 shows that Alaska 2013 BRFSS ACE scores as a percentage of the mean ACE rates in the CDC's 2009 five-state study. A percentage of 100 percent would mean Alaska's rate was equal to the five-state average. Gold bars indicate the difference between Alaska's rate and the five-state average is not statistically significant.

Fig. 6



While the rates in different categories are important for those Alaskans who work to prevent those traumas, the overall statewide ACE score or “dose” of ACEs sheds light on the general health outcome at a population level. (Again, individuals may have widely different outcomes depending on their unique personalities, experiences and the protective factors they have.) Alaska's ACE score results are higher than five-state averages.

Fig. 7



The Alaska Department of Labor and Workforce Development estimated that there were approximately 550,000 Alaskans aged 18 and older in 2013. What does the five-point difference between the five-state average of 40.6 percent of residents with an ACE score of zero to Alaska's 35.6 percent mean? If Alaska were to improve to the level of the five states, approximately **27,500 more adults would have zero ACEs**. If Alaska could reduce the percentage of people with four or more ACEs to the level of the five states, then **more than 11,500 Alaskans would have a lower ACE score**. Changing an ACE score for 11,500 people may not seem significant but evidence suggests it would have a great impact on many health, economic, and social outcomes.



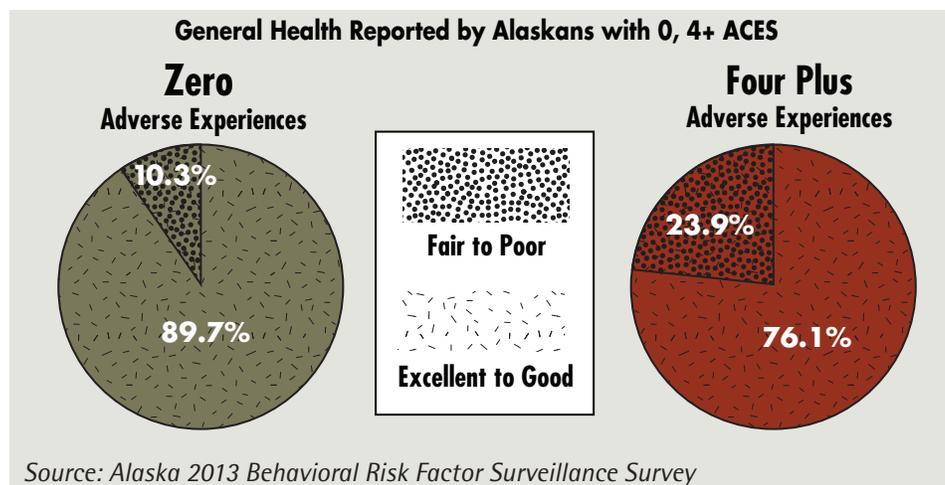
Health and economic costs for Alaska

Alaska's results are similar to those of other ACE studies have found. The more ACEs a person has, the more likely he or she is to experience poor health, both self-reported and measured.

Health outcomes

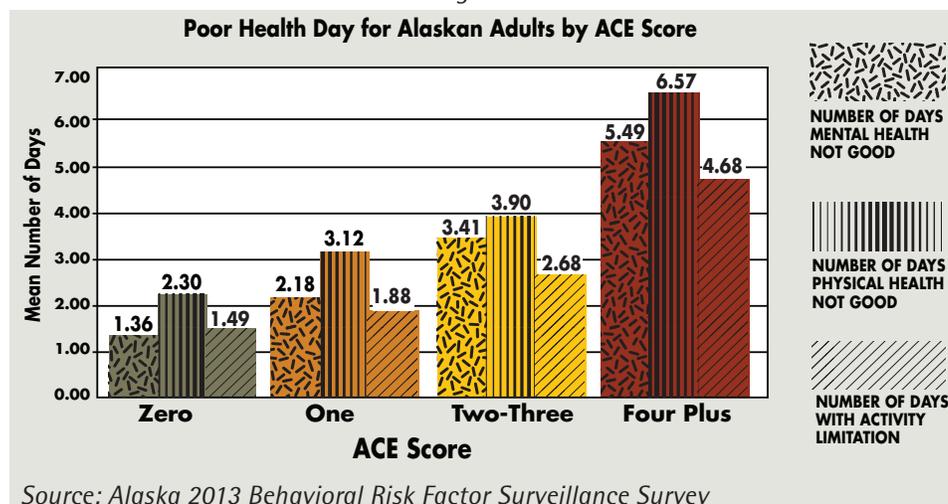
An analysis of Alaskans' general health shows that people with four or more ACEs reported that their general health was "fair to poor" at more than twice the rate compared to those with zero ACEs, (Fig. 8).

Fig. 8



Alaskans were asked the number of days of poor mental and physical health outcomes during the previous month they experienced. The average number of days in that month this led to limited activities was reported as well. The results are shown in Figure 9 and demonstrated that the more ACEs Alaskans had the higher average number of days impacted per month.

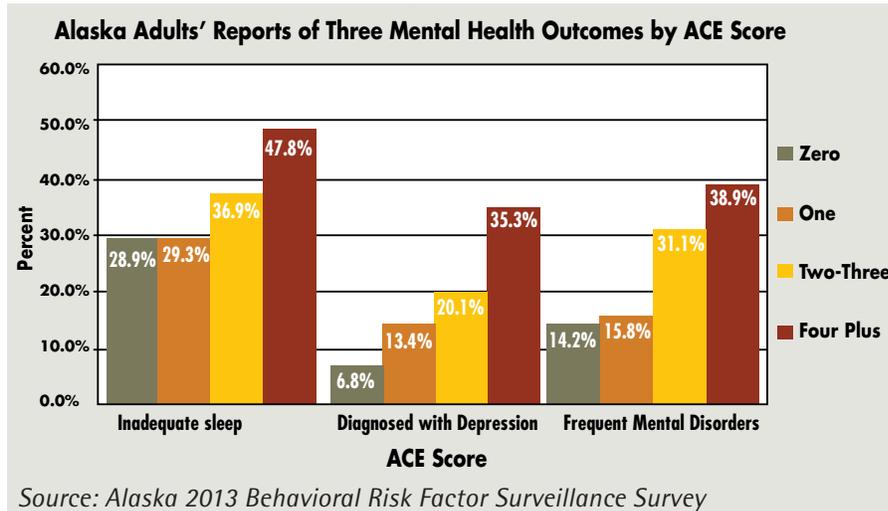
Fig. 9





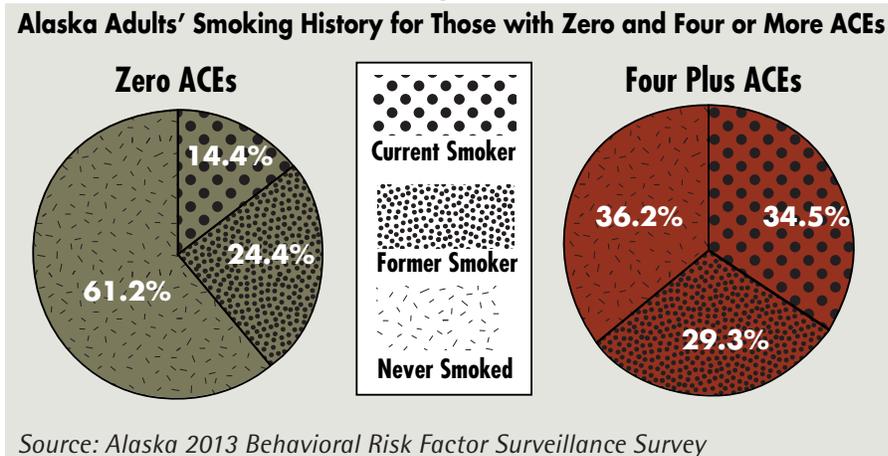
Alaskans reported increasing difficulty with sleep, depression and frequent mental distress as their ACE scores rose. Figure ten displays these results. For example Alaskans with four or more ACEs were more than 5 times more likely to report having ever been diagnosed with depression than their peers with zero ACEs.

Fig. 10



Smoking in Alaska costs \$576 million annually. While rates are improving, it remains a large and costly health problem. The likelihood of being a current smoker is 240 percent higher for an Alaskan with four or more ACEs compared with zero ACEs. Additionally, Alaskans with zero ACEs are significantly less likely to have ever smoked in their lifetimes. (Fig. 11)

Fig. 11



Current Smoker

32.0%

The Alaska ACE research indicates that, of adult smokers in 2013, the smoking of 32 percent could be linked back to ACEs. If we reduced the estimated \$576 million smoking cost for our state by 32 percent by eliminating ACEs, we could see a potential savings of \$186 million.

The COST



Substance abuse in Alaska has been estimated to cost the state \$1.2 billion dollars annually in direct and indirect costs. The original ACE research found multiple connections between ACEs and substance abuse, from intravenous drug use to alcoholism. The Alaska BRFSS asks questions about alcohol but not prescription or illicit drug abuse. Looking at the CDC research and other states' data, though, we can estimate that a significant amount of drug abuse in Alaska is linked to ACEs.

20.5%
Heavy Drinking

The Alaska research suggests that 20.5% of adult heavy drinking is linked back to ACEs. If 20 percent of other substance abuse is also tied to ACEs (a conservative estimate), then we can estimate that \$246 million in annual costs due to substance abuse in Alaska are linked to ACEs.

The **CO\$T**

Economic and educational impacts

Childhood trauma can reduce Alaskans' ability to earn a good living. The impact starts early by undermining educational achievement. Alaskan adults with four or more ACEs are more than 250% less likely to have graduated from high school than those with zero ACEs. Graduation rates for college show that having zero ACEs almost doubles an Alaskan's chance of having a four year degree than those with four or more ACEs, (Fig. 12).

Fig. 12

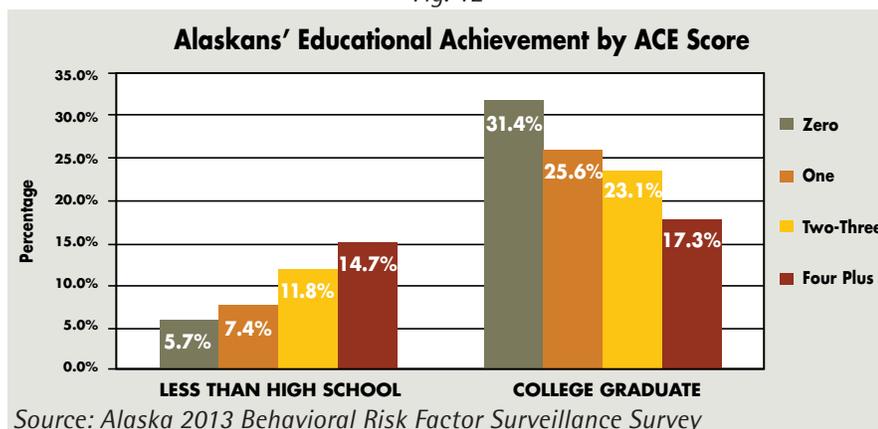
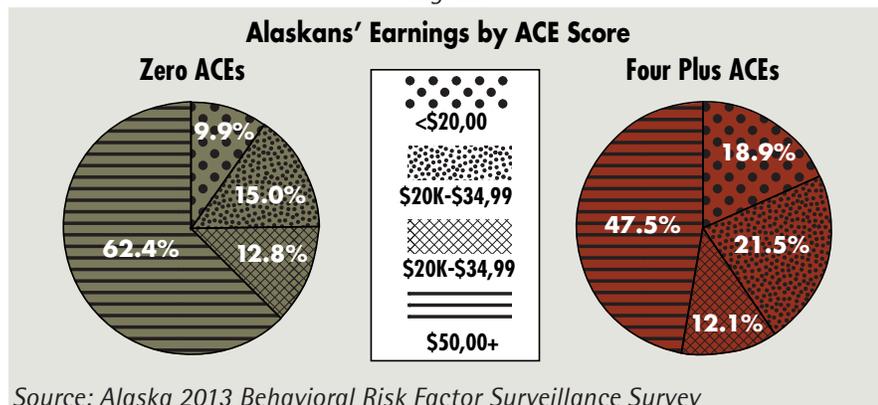


Figure 13 graphs the annual income reported by Alaskan adults with zero and four or more ACEs. Having a ACE free childhood is linked with higher annual income.

Fig. 13





Health care access and Medicaid enrollment

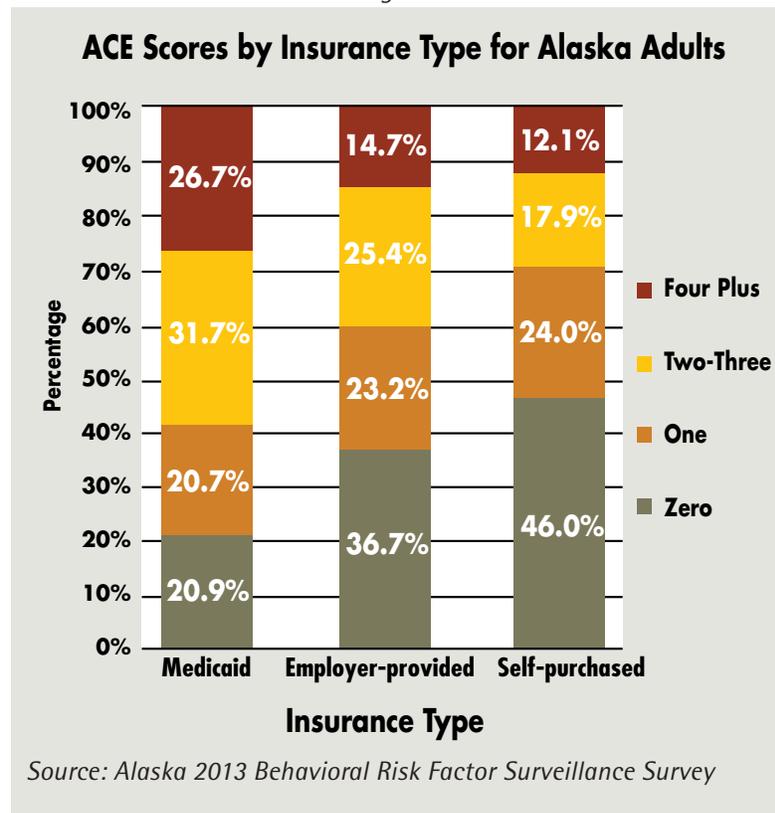
Medicaid eligibility for adults is related to financial hardship, poor health or a combination of both. As a result, it is not surprising that people using Medicaid as their health insurance have higher ACE scores than those in the private health insurance market, given what we have seen above when it comes to poor economic and health outcomes for Alaskans with higher ACE scores.

There has been considerable attention paid to the costs of Medicaid and ways to contain and improve this large system. Much of this discussion is related to care delivery and payment reforms. Bringing the prevention and mitigation of ACEs into the equation has the potential to pay large dividends.

In 2012, Alaska Medicaid spent \$1.38 billion to provide care for 146,476 Alaskans' health care. Of these Alaskans served, 53,794 were adults age 20 or older at a cost of \$860 million, or 62.1 percent of the total.

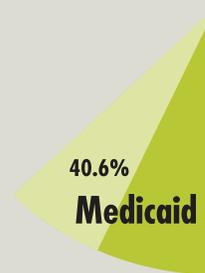
Alaskans who report Medicaid as their source of health insurance report significantly higher ACE scores than those who report employer provided or self-purchased health insurance (fig 14). Due to the poor health outcomes associated with high ACE scores this means that Medicaid has enrollees with significantly worse health prospects than other insurance types. This disparity leads to higher treatment costs and a higher burden on government resources.

Fig. 14



The **CO\$T**

Alaska research suggests that 40.6% of the state's Adult Medicaid enrollment is linked back to ACEs. In 2012, that means that approximately \$350 million of Adult Medicaid (age 20+) costs in Alaska could have been prevented by the elimination of ACEs.





Conclusion

Our brains can recover from trauma, but it is a challenging process. It is more cost-effective, in human and financial terms, for children to grow and develop in a healthy environment than to try to help them heal from toxic stress later. This means interrupting the ACE cycle. Fortunately, there are many opportunities to do so.

Alaska has many groups working on mitigating ACEs, trauma prevention, and community resilience & wellness. For more information on this and other resources, and updates on what is happening around the state, visit the “**Overcoming ACEs in Alaska**” website, dhss.alaska.gov/abada/ace-ak.

Building resilience and preventing ACEs

Across Alaska, people are working in large and small ways to prevent childhood trauma and ease the effects of damage already done. Here are a few examples (as of early 2015):

- Statewide, teachers and public health nurses provide teens with information on healthy relationship and life skills. They have partnered with the Alaska Departments of Health and Social Services and Education and Early Development, the Council on Domestic Violence and Sexual Assault, and the Alaska Network on Domestic Violence and Sexual Assault on a 7th, 8th and 9th grade, evidenced-based curriculum for the 7th-9th grade called “the Fourth R for Healthy Relationships.”
- A statewide webinar series on trauma-informed schools was completed in January 2015. Hundreds of educators and school staff participated. The series will be offered again in 2015-16 and can be accessed online at no cost
- The Division of Public Health partnered with the Alaska Native Tribal Health Consortium and the Alaska Family Violence Prevention Project to develop a teen safety card, a gender-neutral resource developed for Alaska teens with guidance from Alaska teens. The card provides information about healthy and unhealthy relationships characteristics, what consent looks and sounds like, and where to get help if needed. Another safety card was designed specifically for women.
- The Division of Behavioral Health has promoted trauma informed care for several years. Efforts include development of “Trauma 101” and “Trauma 201” curriculum for behavioral health providers, used around the state.
- Teens Acting Against Violence (TAAV) is a violence-prevention and youth-empowerment program at the Tundra Women’s Coalition for teenagers living in Bethel. Participation is voluntary and open for any interested teens age 12–18.



- The Alaska Mental Health Board and Advisory Board on Alcoholism and Drug Abuse have coordinated the efforts of many organizations to gather Alaska specific ACE data. The Boards have focused since 2008 on community wellness and personal resilience.
- Donlin Gold – a corporation doing business in Alaska - has embraced community wellness as part of their mission. In 2013 it won the Workforce Association's National Employer of the Year Award. Donlin Gold has seen that a healthy workforce helps everyone.
- The Association of Alaska School Boards, through its Initiative for Community Engagement (ICE), has been working for nearly two decades with schools and communities to create healthier school and community climates to support youth resilience.
- The Council on Domestic Violence and Sexual Assault and Green Dot, etc., are developing an Alaska-specific teaching tool on how to intervene in potentially dangerous everyday situations — like calling a cab for someone who has been drinking, or offering the number for the local women's shelter to someone experiencing domestic violence. The Green Dot curriculum is being implemented in Anchorage, Bethel, Homer, Kenai and Prince of Wales.
- In Homer, teens lead ACE awareness sessions that focus on resilience-building strategies. They are working on training that emphasizes how to build resilience and will share this resource at a national conference in Oregon spring 2015.
- People in Kodiak and Kotzebue are focusing on how ACEs affect their communities and how to make positive changes for all their residents.
- The Mat-Su Borough held an ACEs Summit and has created a broad range of work groups to identify strategies to address ACEs as a way to improve the schools, reduce substance abuse, and improve the health of its residents.
- Yakutat decided the best way to prevent substance abuse is to tackle ACEs. They developed public service announcements to educate their community about the connection between ACEs, binge drinking, and alcohol abuse.



Next Steps

We've learned that many Alaskans have experienced ACEs. We now understand that when we break the cycle of trauma and toxic stress, our efforts pay off in many ways.

From the highest level of political power in Alaska to homes where family members care for our youngest and most vulnerable citizens, we all have a role in making our communities places where adults can overcome a rough start and thrive, and where the next generation is raised in a healthier, more supportive environment.

Alaskans can follow efforts across the state to prevent and mitigate the impact of ACEs on the "Overcoming ACEs in Alaska" website: dhss.alaska.gov/abada/ace-ak

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See also: *Echoes of the Holocaust: Bulletin of the Jerusalem Center for Research into the Late Effects of the Holocaust*, Talbieh Mental Health Center. Jerusalem, Israel: Talbieh; Mental Health Center (D 804.3 .E28)

Miscellaneous

Accumulated data on ACEs in Alaska. Alaska Department of Health and Social Services, Division of Public Health, Section of Chronic Disease Prevention and Health Promotion: [2013 Alaska Behavioral Risk Factor Surveillance System](#)

Alaska Family Violence Prevention Project Clearinghouse, including material on "The Amazing Brain": <http://dhss.alaska.gov/dph/Chronic/Pages/InjuryPrevention/akfvpp/clearinghouse.aspx>

In this podcast, childhood trauma expert Dr. Robert Anda describes the Centers for Disease Control Adverse Childhood Experiences (ACE) Study. David Driscoll offers an Alaska perspective on childhood trauma; Elizabeth Ripley discusses what grantmakers are willing to fund; and Bill Hogan of the UAA College of Health opens the sessions and facilitates audience questions and answers. Recorded Oct. 23, 2012. <http://greenandgold.uaa.alaska.edu/podcasts/index.php?id=724>

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**Advisory Board on Alcoholism
and Drug Abuse**



Alaska Mental Health Board

State of Alaska
Department of Health and Social Services
ABADA/AMHB

Governor, Bill Walker
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