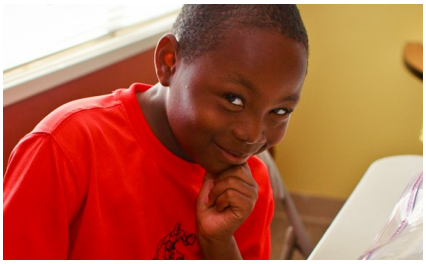
foundation for
healthy generations
CREATING ENDURING HEALTH EQUITY



Health, Safety & Resilience:

Foundations for Health Equity

Statewide Summary—
Fall 2014 / Winter 2015

NEUROSCIENCE
EPIGENETICS
ADVERSE CHILDHOOD EXPERIENCES
RESILIENCE

Coalescing for Change

The Science of Hope

April 18-20, 2016 Hilton Seattle Airport & Conference Center

Learn More: healthygen.org/science-hope

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The Learning Institute at Healthy Gen

Inspired by the landmark Adverse Childhood Experience Study, The Learning Institute at Healthy Gen is an expansive network of community, research and policy leaders who are engaged to generate health equity. The Learning Institute is supported by a curious and creative team that convenes thought leaders, analyzes data, synthesizes perspectives, and provides education. We carefully craft tools that help people use emerging scientific discoveries to improve the legacy of health across the generations.

The Institute is committed to thoughtful listening, reflecting and remembering with equal measure to rapid cycle learning and developmental evaluation. We provide bi-directional leadership and support; our work within the community allows us to deliver community findings to systems and policy leaders, our work with scientists and policy leaders enables us deliver new knowledge as it emerges from the rapidly changing landscape of discovery to people who use it to improve the health and social spheres of family and community life.

> "In order to improve public health, we need to improve society."
>
> Sir Michael Marmot, Epidemiologist

About this Report

This report presents breaking news from the people of Washington State, viewed through the lens of a bundle of science we are calling "NEAR": **N**euroscience, **E**pigenetics, **A**dverse Childhood Experiences, and **R**esilience.

The source of data used to generate maps, data tables and charts in this report is the Washington State Behavioral Risk Factor Surveillance System, or "BRFSS." BRFSS is a random telephone survey of adults sponsored by the Washington State Department of Health and the Centers for Disease Control and Prevention. It gathers information about things people do that affect their health, such as risky and preventive behavior, injury prevention, chronic conditions, as well as access to health care and health care use. The survey includes a core set of questions asked by all states and an additional set of questions asked in Washington State. Adults, 18 years of age and older, who live in households with a landline telephone are randomly selected for interviews. Adults with cellular telephone numbers registered in Washington State are also randomly selected for interviews.

Professionals at The Learning Institute have been working consistently since 2007 to improve the data available from Washington adults. We have systematically added questions to the BRFSS, and as a result Washington now has:

1. Three years of data about ACE prevalence among adults (2009, 2010, 2011; N=32,132);
2. Multiple years of data about adult adversities that have origins in Adverse Childhood Experiences and reflect the progressive nature of adversity, given current policies and societal responses (e.g.: inability to work, incarceration, homelessness);
3. Multiple years of data about individual and community resilience factors that can help us chart a course to enduring health equity; and
4. Enough data to estimate the current rates of intergenerational transmission of ACEs statewide and in some regions—we look forward to learning about community variation in those rates.

Washington is the only state in the nation with this depth and breadth of ACE and resilience related data.

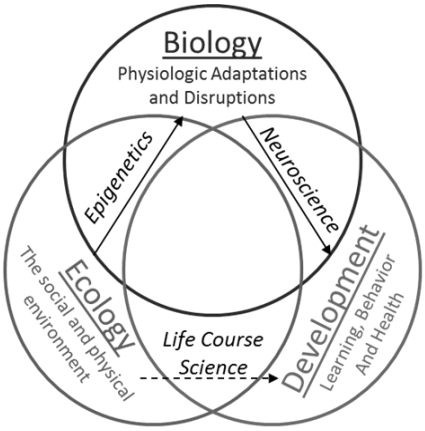
N.E.A.R

No one scientific perspective can chart a course to flourishing. Wisdom and N.E.A.R. science are coming together to help us understand how we can create a strong foundation for healthy generations.

Neuroscience

Our brain is arguably the most adaptable part of our body. Adverse or traumatic childhood experiences can cause our stress chemicals to stay at high levels in the body for long periods of time, and have a lasting effect on brain mass and functioning. Three factors powerfully determine effects: type of experience, gender, and the age/stage of development when the experience occurs. Adaptations to stress and trauma may not be evident immediately, and can show up later in life.

"Humans … possess brains that are exquisitely sensitive to their environments and are equipped to adapt to early stress." "A behavior is adaptive insofar as it helps an organism survive. Within a violent context, hyper-arousal, vigilance, and aggression are clearly useful. However, many associated features of these adaptations confer risk in other contexts." (Mead, 2010)



Life Course Ecology of ACEs & Resilience

Epigenetics

The human genome is the set of six billion genetic instructions for building and maintaining a human being. Genetic code is organized in the form of DNA (deoxyribonucleic acid) strands (chromosomes) that have capped ends (telomeres) that help prevent the strands from fraying or sticking together. In order to manifest physical, behavioral, and functional aspects of a human being, genetic code needs to be translated – a process studied in the field of epigenetics. Experience can trigger chemical translational enhancers or silencers – so that genetic code either has a chance to convey its message, or not. Experience can also cause wear and tear of the telomeres that protect the strands of DNA. These alterations may have long term impacts on mental and physical health, may shorten life span, and may be passed on to the next generation.

The field of epigenetics explains, at least in part, why some people may find life easier than others, and why the history of a people matters for future health and longevity. This field also helps us to understand that our interactions with one another day by day can shape enduring health equity. "One of the most appealing aspects of [what we are learning] about how experience is embedded 'under the skin' is that it allows us to start to chart a molecular bridge between the world and the DNA that might be responding to that world." [Nurturing behavior] "triggers a signaling pathway – providing one avenue of hope for a possible rerouting of deleterious epigenetic effects." (Szyf, 2013)

Adverse Childhood Experiences

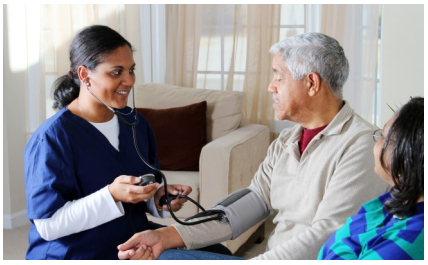
ACEs are common across all socio-economic lines, have a cumulative effect throughout the life course, and are the most powerful determinant of the public's health.

Resilience

This briefing contains breaking news from Washington adults about resilience factors that may be key to helping all of us to prevent high ACE scores in the next generation.

Mead, H.K., Beauchaine, T.P., Shannon, K. (2010) Neurobiological Adaptations to Violence across Development. Developmental Psychopathology, 22(1):1-37
Szyf, M., Bick, J. (2013); DNA Methylation: A Mechanism for Embedding Early Life Experiences in the Genome, Child Development, January/February, 84 (1):49-57

ADVERSE CHILDHOOD EXPERIENCES



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Adverse Childhood Experiences (ACEs)

The ACEs Study

is the largest epidemiologic study of life course effects of adversity during development.
This CDC & Kaiser Permanente study with over 17,000 participants found: ACEs are common, interrelated, and have a powerful effect on health & wellbeing.

- ACEs are the most powerful known determinant of health
- ACEs are common across all socio-demographic and race/ethnicity boundaries
- ACE categories are interrelated and have a cumulative effect, the more ACE categories (ACE Score) the greater the risk of mental, physical, behavioral, productivity, social crises in the population
- ACEs drive costs in all sectors of society

The Ten Categories of ACEs are:

Indicators of Family Dysfunction

1. Mentally ill, depressed or suicidal person in the home
2. Drug addicted or alcoholic family member
3. Parental discord – indicated by divorce, separation, abandonment
4. Incarceration of any family member
5. Witnessing domestic violence against the mother

Abuse of Child

6. Child physical abuse
7. Child sexual abuse
8. Child emotional abuse

Neglect of Child

9. Physical Neglect
10. Emotional Neglect

> **When I learned about ACEs what I found out was - that I was normal. That other people that had the same experiences as I did made a lot of the same decisions. I was able to really look at it as part of a growing and healing process instead of a deficit or me being bad or me being broken.**
>
> ***Wessel-Estes, 2014***

ACEs Affect Washington Adults

Washington collected ACE scores from the adult population from 2009 through 2011 via a telephone survey of adults sponsored by Washington Department of Health and the CDC. Neglect questions did not make it through the CDC's rigorous testing process; so Washington's survey considers 8 ACEs. In Washington: 62% of adults have at least one ACE; 26.5% have ≥ three; 5% ≥ six.

In Washington, the higher the ACE score in a population, the higher the likelihood of these and other problems:

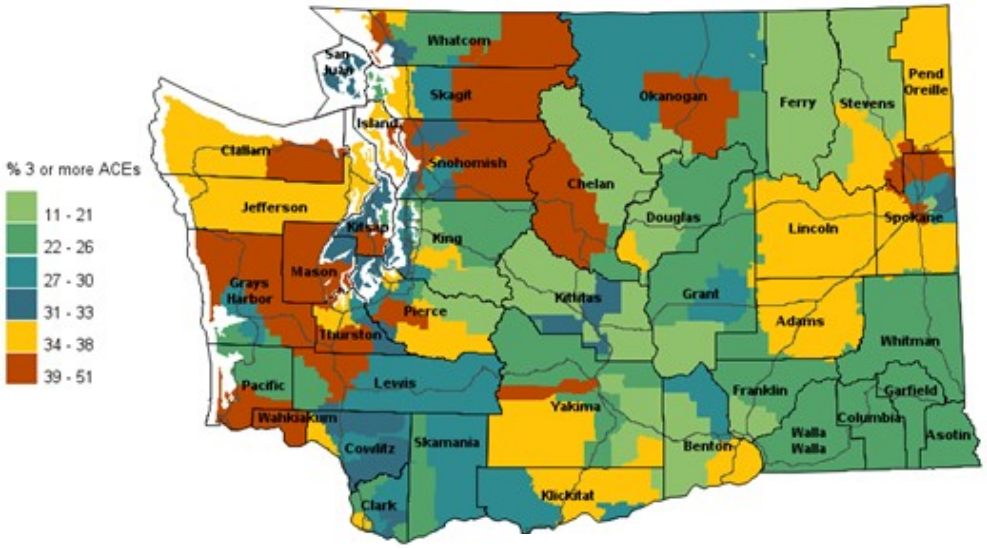
- **Disease:** COPD, Cancer, Heart Disease, Asthma, Cardiovascular, Liver Disease
- **Risks:** Smoking, Drinking, Illicit drug use, Risk of HIV
- **Poor Mental Health:** Depression, frequent mental distress, anxiety, nervousness, serious mental illness
- **Other Challenges:** Disability, Divorce, Incarceration, Homelessness, Intimate Partner Violence, Workplace Injury, Unemployment

It has been invaluable to collect enough years of data from Washington adults to learn about variations in ACEs and Resilience across counties and locales. Locales are school districts or groups of school districts with combined population of 20,000 or more residents.

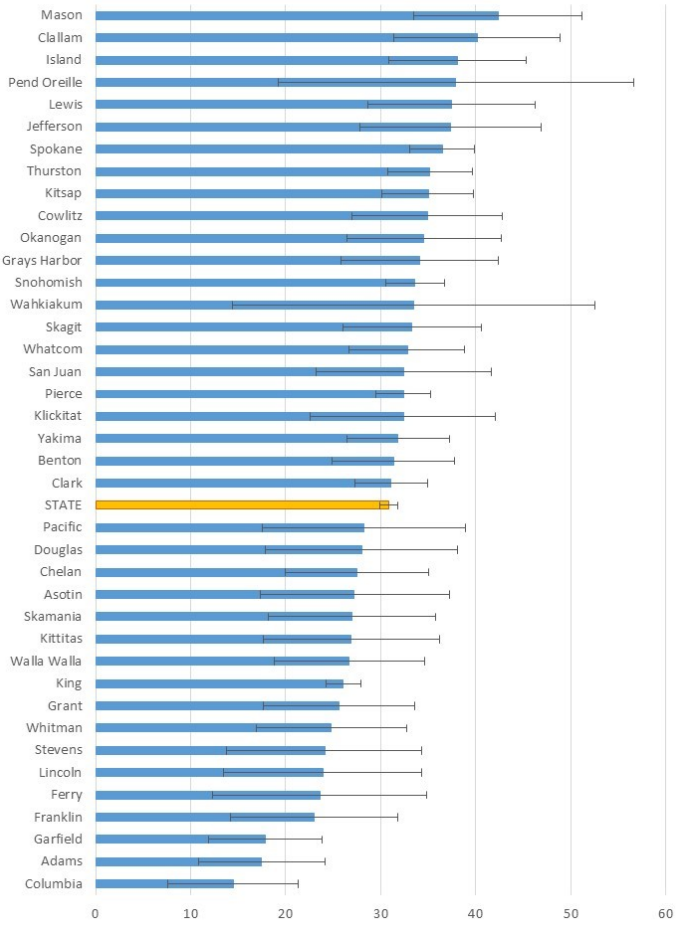
Wessel-Estes, P., Wesel-Estes, S. (2014) Personal and Parental Reflections on ACEs and Resilience; https://www.youtube.com/watch?v=jUJHvbPrL0I

ACE Burden in Washington State

Population with ≥3 ACEs, Locales: Ages 18-64



Percent of People, Age 18-64 with 3+ ACEs



On average, 26.5% of adults in Washington have an ACE score of 3 or more.

However, ACE prevalence varies from community to community and from one age group to another. Prevalence, in epidemiology, is the proportion of the population found to have a condition, such as ACEs.

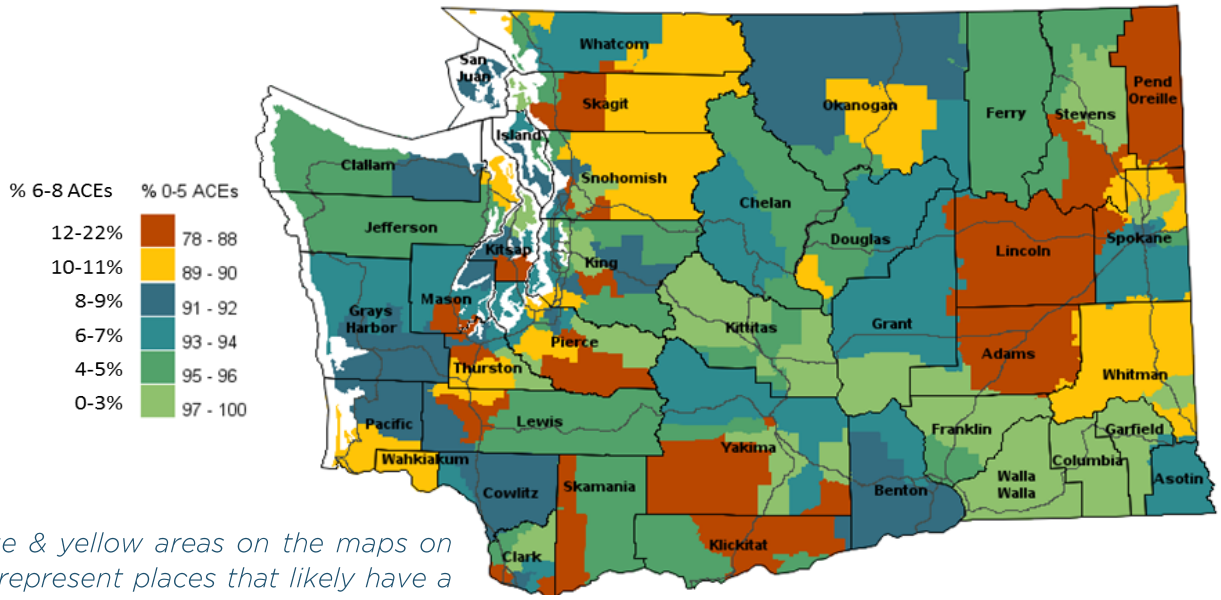
Each incremental increase in ACE scores – whether from 1 to 2 or from 7 to 8 – carries increased risk.

ACE Burden in Washington State

At 6+ ACEs adults are 9 times more likely to experience life dissatisfaction and 4.6 times more likely to suffer from chronic diseases and engage in risky behaviors such as smoking.

Anda & Brown (2010)

Population with ≥6 ACEs, Ages 18-64



The orange & yellow areas on the maps on this page represent places that likely have a high proportion of people with ≥6 ACEs.

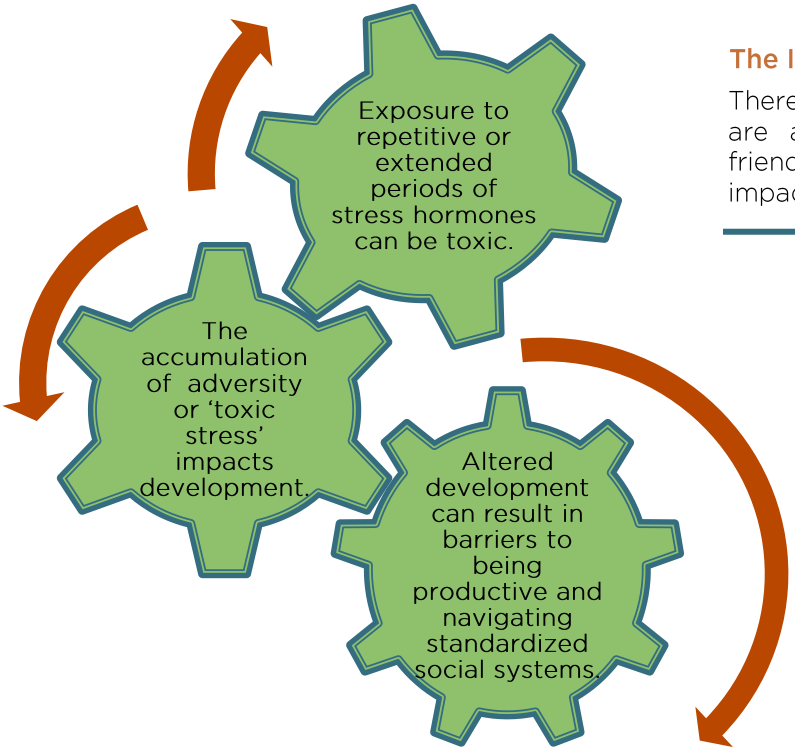
When we look at maps that show prevalence of ≥3 ACEs, we can miss important details about the people we work with. Some communities have average or mid-high prevalence of ≥3 ACEs simply because they have many people with low ACE scores and many people with very high ACE scores, and not because they have a large number of people with mid-range scores. People with high ACE scores may have increased risk of challenges in many arenas of their lives – we can learn from them by asking "How have you done so well?"

⇒To work with sample size issues, we mapped the % with ≤5 ACEs. Deductive reasoning suggests these areas have a high % of people with ≥6 ACEs.

Health, Safety, Living, Working, and Social Conditions May be More Challenging in Places where Many People Have Very High ACE Scores

Anda, R., Brown, D. (2010) Adverse Childhood Experiences and Population Health in Washington; The Face of a Chronic Public Health Disaster; Retrieved from ACE Interface.com, 2014

ACEs: Personal & System Impacts



The Impacts of ACEs are Widespread & Costly

There are many social and behavioral health costs that are attributable to ACEs. As professional, family, friends, neighbors and co-workers we experience the impact of ACEs every day.

Ways ACEs may Manifest

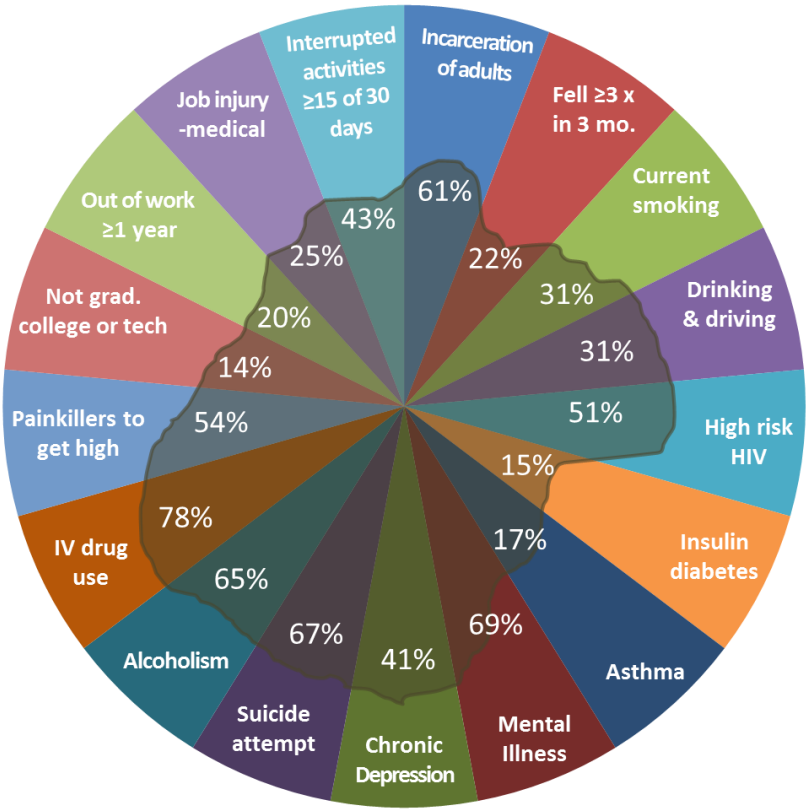
Cardiovascular disease, Cancer, HIV, Asthma, Obesity, Chronic Illness, ADD/ADHD, Anxiety & Depression — Health

↓Language and reading skills, School Suspension & Expulsion Drop out, Tardiness & Absenteeism, ↓Problem Solving Skills, Bullying — Education

Unemployment, Likely to work Low Wage Jobs, On the Job Injury, Decreased Functional Days, Decreased Ability to Work — Business

Difficulty w/ social cues, Promiscuity, Homelessness, Poor Decision Making Skills, Out of Home Placements & Terminations, Social Isolation, Risk of Divorce, ↓Sense of Belonging — Community & Family

↑ Aggressiveness, & risk for conflict, Incarceration, Domestic Violence, Early Initiation of Substance Use — Criminal Justice



Major Cost Centers

- Behavioral Health
- Child Welfare
- Corrections
- Economic Assistance
- Health
- Housing & Shelter
- Special Education
- Workforce

Population Attributable Risk (PAR):

Population Attributable Risk means the portion of a disease or condition that is caused by a disease agent. The gray area in the center of this diagram represents the portion of each of these conditions that is attributable to ACEs. As we reduce ACE prevalence from one generation to the next all of these problems will be reduced concurrently.

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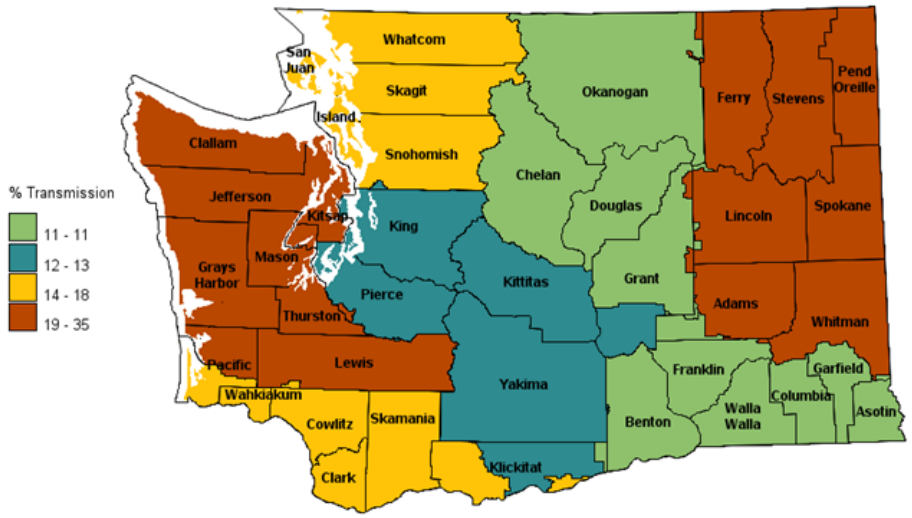
Intergenerational Transmission of ACEs

ACEs in Younger and Older Parenting-Age Adults

One way we can get a *clue* about intergenerational transmission of ACEs is to compare the ACE scores of adults, ages 35-54 (older), with the ACE scores of adults ages 18-34 (younger). Our goal is that younger adults have lower ACE scores than older adults. In most counties in Washington, younger adults have higher ACE scores - so we need to reverse this trend. The good news is that some communities are already succeeding!

Percent of Adult Population Transmitting ≥2 Household Functioning ACEs to Children



Regional analysis, instead of county or locale, is due to sample size.

Intergenerational Transmission map based on updated data

Measuring Transmission of 5 Household Functioning ACEs in BRFSS

Washington is the only state measuring ACE transmission using questions added to the BRFSS. The 5 Household Functioning ACEs include having in the home:

(1) a mentally ill, depressed or suicidal person,
(2) a drug addicted or alcoholic person,
(3) parental discord, divorce or separation,
(4) an incarcerated family member , and
(5) witnessing domestic violence against the mother or father.

Because of the neurobiological and epigenetic effects of ACEs, parenting can be more difficult for people with high ACE scores. Analysis of BRFSS and other data illuminates what we can do to help parents, in ways that make it easier for them to protect their children. We include new insights about transmission in the resilience section of this report.

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Resilience

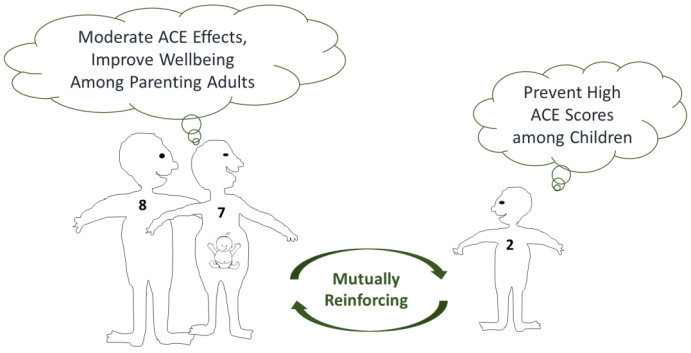
There is no single definition of resilience in the literature; but two themes are ever present: adversity and doing well. Resilience research includes a wide range of studies that define adversity and doing well in a variety of ways. There are studies that identify factors that are correlated with achieving a milestone in life such as high school graduation, remaining drug free through adolescence, or staying out of jail. There are also studies that follow a group of people through many decades to identify factors that are correlated with mid-life adjustment, work and family success, or child abuse prevention. Resilience literature highlights three social spheres that we need to strengthen as we work to help people who have experienced adversity and trauma to do well: 1) Capabilities, 2) Attachment and belonging, and 3) Community, culture, spirituality (the sphere of life that is larger than self and family).

In the context of this report, we consider how cumulative experience affects individual, family and population health and wellbeing. In this resilience section, we consider a question with potential to dramatically improve health equity over time:

What individual, relational, and community factors can improve health, safety and prosperity among parenting age adults with middle and high ACE scores?

Parents are the most powerful people for preventing Adverse Childhood Experiences in the lives of their children. The context of their lives, and the help they receive, can make a difference in how well they feel and how well they function – and by extension, can make a difference in the nurturing, safety and security that parenting adults can offer to their children.

Promote Virtuous Cycle of Health



What we do matters

In this report, our definition is: In the face of adversity, people can navigate life well and actively participate in preventing ACEs in the next generation.

Resilience occurs in relationship with one another—we all have arenas in our lives where help from other people or from a resilient community matters.

By listening to adults in Washington, we are learning about the leading indicators of success that we might be able to monitor to make sure we are on the right track. We have systematically added questions to the Behavioral Risk Factor Surveillance System Survey with an eye toward developing a resilience index – the scores from which would reliably predict moderation of ACE effects and lower ACE scores in the next generation. We have pulled from the Strengthening Families framework, the LongScan Study, Chicago Neighborhoods Project Studies, and research about civic engagement and social capital to learn how we can all participate more effectively in supporting parents – and, in turn, preventing ACEs.

The Help that Helps:
Social & Emotional Support

4 Resilience Themes Make a Difference, Together: Stunning Effects

Using all the resilience questions added to BRFSS from 2009 through 2012, Healthy Gen experts conducted a factor analysis to learn about the help that helps parenting age adults (18-64). A factor analysis tells us which questions, taken together, are good indicators of a single resilience dynamic. We found four distinct factors:

1. Feeling socially & emotionally supported, and hopeful (Support),
2. Having two or more people who give concrete help when needed (Help),
3. Community reciprocity in watching out for children, intervening when they are in trouble, and doing favors for one another (Community Reciprocity).
4. Asking for help for friends (Social Bridging).

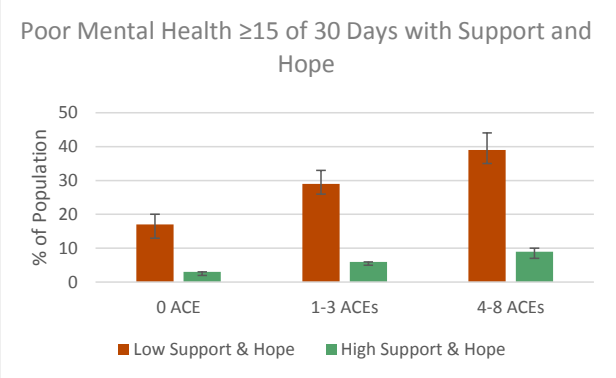
Layering Up

Each of these four factors is correlated with better outcomes, even among people with high ACE scores. And, our preliminary analysis shows that stunning improvements to health, safety, productivity come from layering up – building high rates of all four factors concurrently. The statistical analysis necessary to provide visual graphs of outcomes correlated with "Layering Up" is complex and requires more peer review than we had time to complete for the Fall publication.

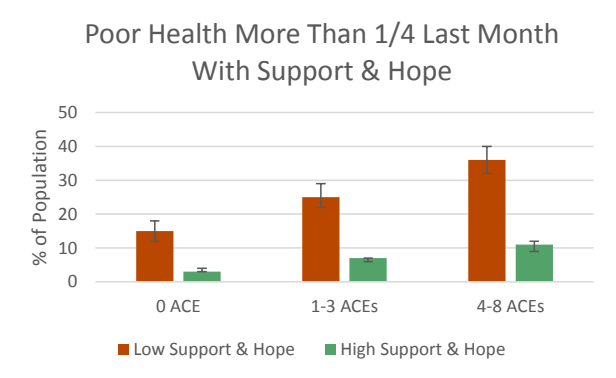
1. Feeling Socially & Emotionally Supported, Age 18-64 (Support) – Better Outcomes

As the ACE Score goes up, the percent of people who report days with poor mental health goes up too. However, at each level of ACEs, people with high feeling of being supported and hopeful report fewer days of poor mental health than those who have low feelings of support and hope. This good news is a recurring pattern for many dependent variables.

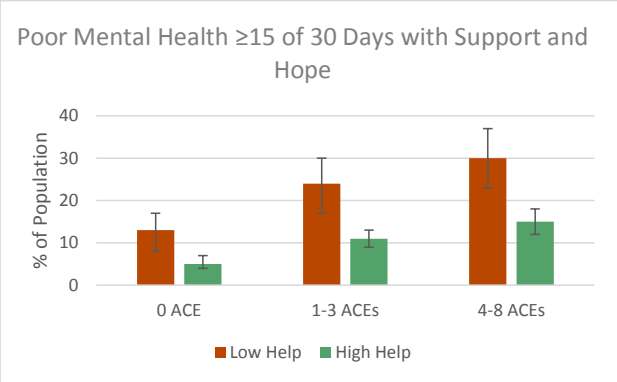
⇒ At the highest level of ACEs, the percent of people with high support and poor mental health is *less than a fourth* of the people with low support who report days with poor mental health.



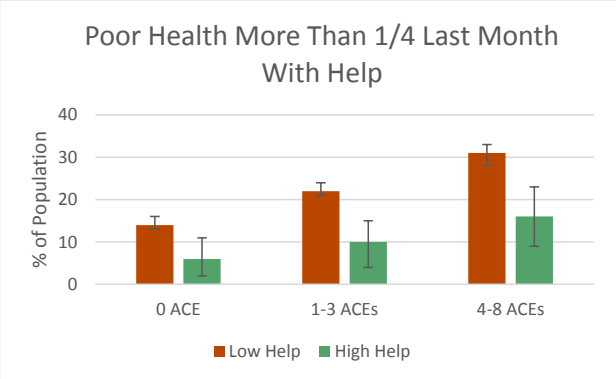
⇒ At the highest level of ACEs, the percent of people with high support and poor physical health is *less than a third* of the people with low support who report days with poor physical health.



2. Having 2 or more People who give Concrete Help, Age 18-64 (Help) – Better Outcomes



⇒ At the highest level of ACEs, the percent of people that are experiencing high help and poor mental health is *less than half* of the people with low help and poor mental health.



⇒ At the highest level of ACEs, the percent of people with high experience of help and poor physical health is *nearly half* of the people with low experience of help who report days with poor physical

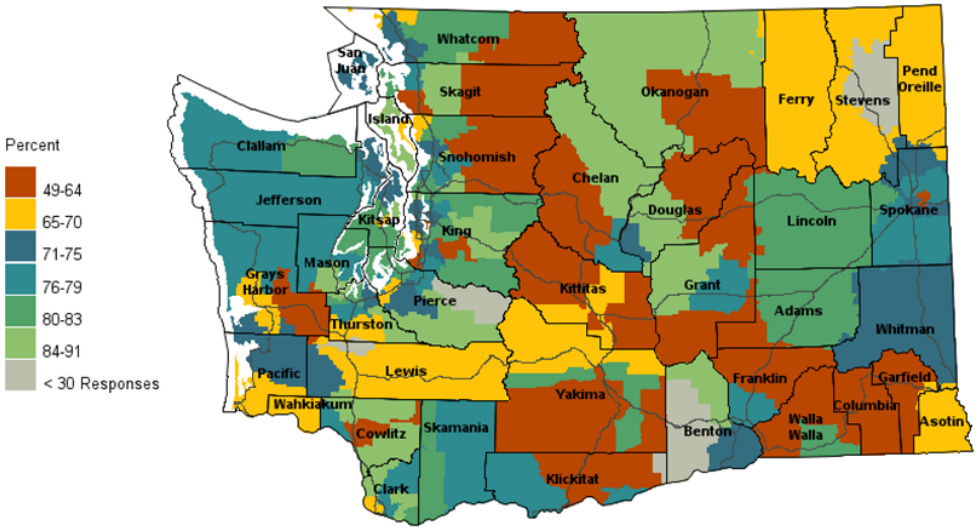
3 & 4. Community Reciprocity & Social Bridging: watching out for children, intervening when they are in trouble, and doing favors for one another; and asking for help for friends – A Rising Tide Lifts All Boats

Communities with high rates of Community Reciprocity & Social Bridging have better overall rates of obesity, symptoms of mental illness, alcohol consumption among women, and physical activity. Preliminary review of the most up to date data show correlations with: happiness, worrying about money for rent, having a primary care physician, not graduating from college, experiencing housing instability, and being hungry with no money for food.

We are learning more about this important dynamic every week – stay tuned for Healthy Gen News!

Support in Washington State

Resilience Index '09-'10
Population reporting both High Emotional Support & Hope: Ages 18-64 (by Locale)

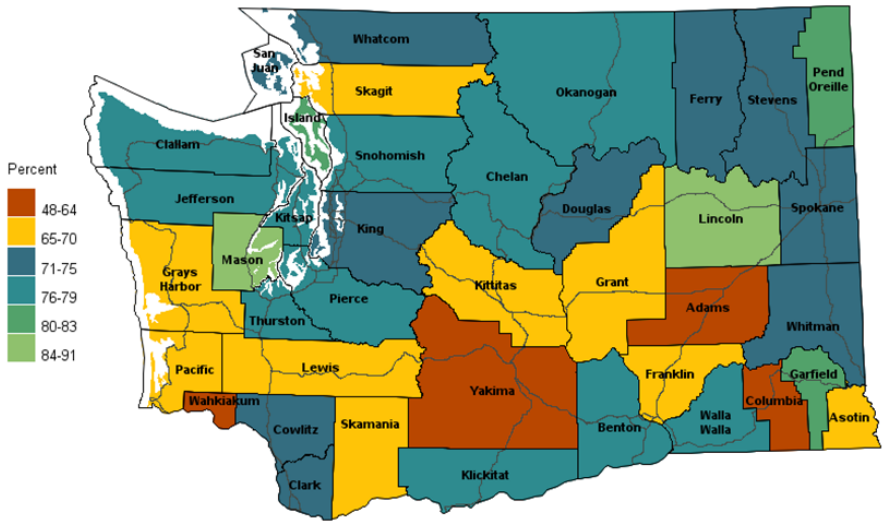


BRFSS Questions to calculate Resilience Indices: 1) Emotional Support & Hope

- How often do you get the social and emotional support you need?
- During the past 30 days, about how often did you feel hopeless – all of the time, most of the time, some of the time a little of the time or none of the time?

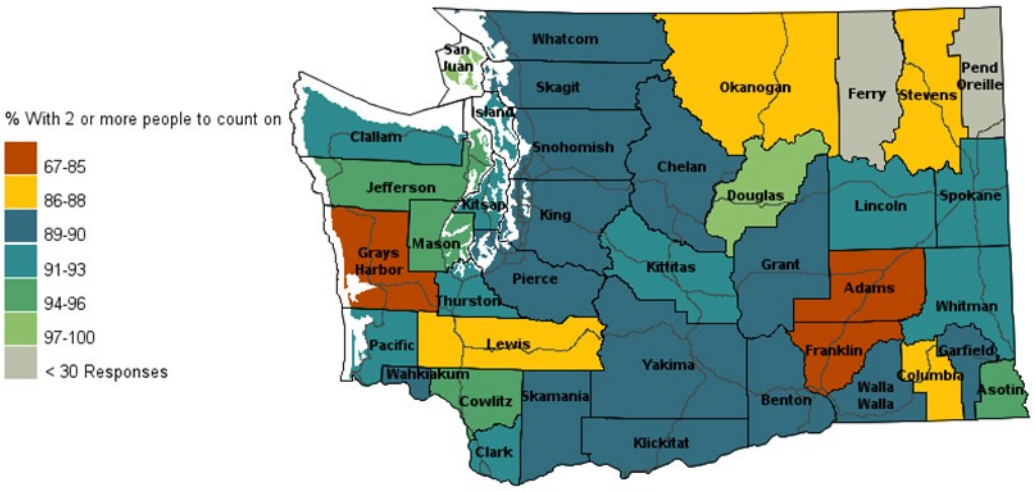
Continuing to collect data is crucial. With increased sample size we can learn more. As you can see when we compare the County maps (above) to the Locale maps (below) there is more detailed information that might be used to create targeted efforts, differentiated approached, etc. As we have only begun collecting these resilience indicators we still don't have high enough sample size for some areas, which show up as light grey.

Resilience Index '09-'10
Population reporting both High Emotional Support & Hope: Ages 18-64 (by County)



Practical Help in Washington State

Resilience Index '11
Population reporting High Practical Help: Ages 18-64 (by County)

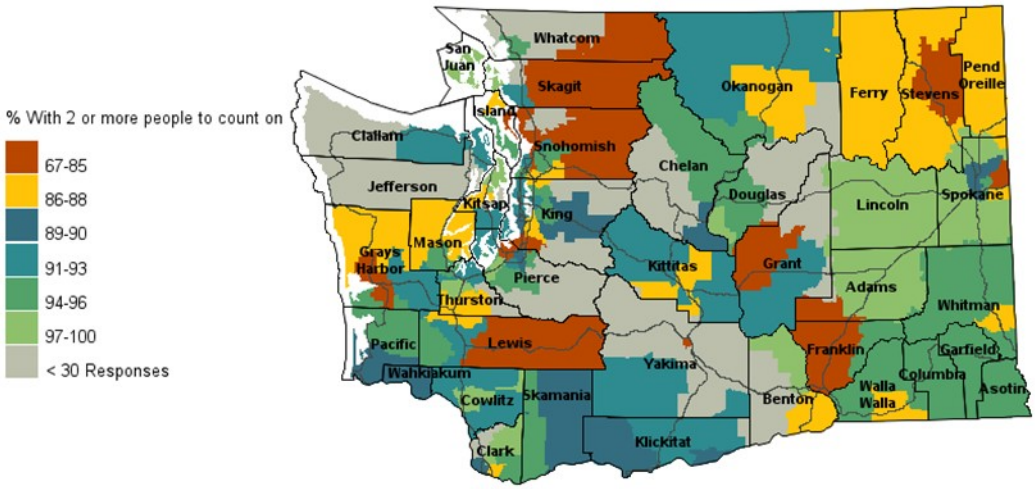


BRFSS Questions to calculate Resilience Factor: 2) Practical Help

- How many people could you count on to come help you if you called for practical help, like someone to pick up groceries, talk about a problem or provide you or a household member with care?

> **"I've had so much negative in my life and hardly any positive. I went through the motions with my kids, trying to parent them the best I knew… now I'm involved. You know that saying 'it takes a village to raise a child' it's my favorite saying in the world because my village came together."**
>
> **Children's Resilience Initiative [Christianson], 2014**

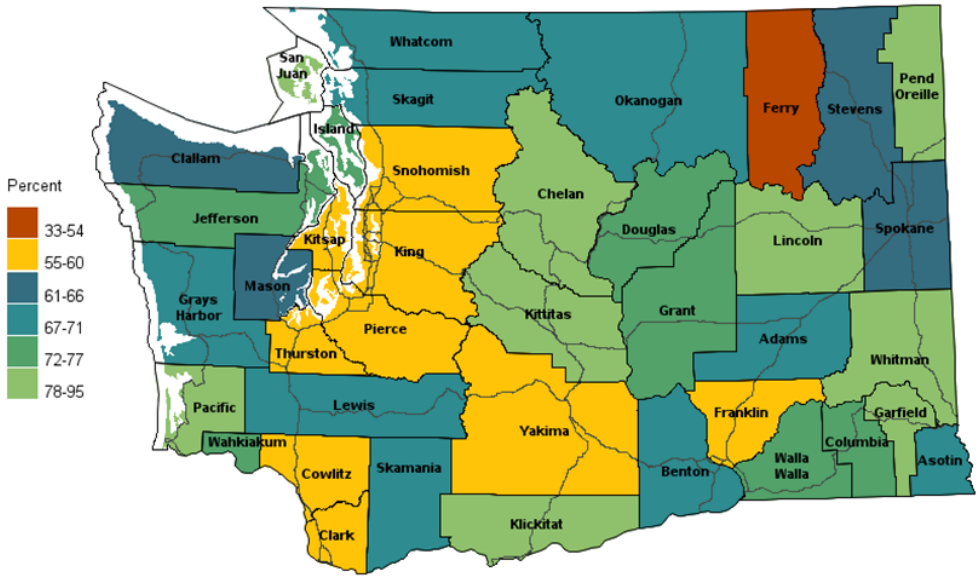
Resilience Index '11
Population reporting High Practical Help: Ages 18-64 (by Locale)



Christianson, W., (2014) Annett's Story; http://www.youtube.com/watch?v=inlNW47-O4M

Community Reciprocity in Washington State

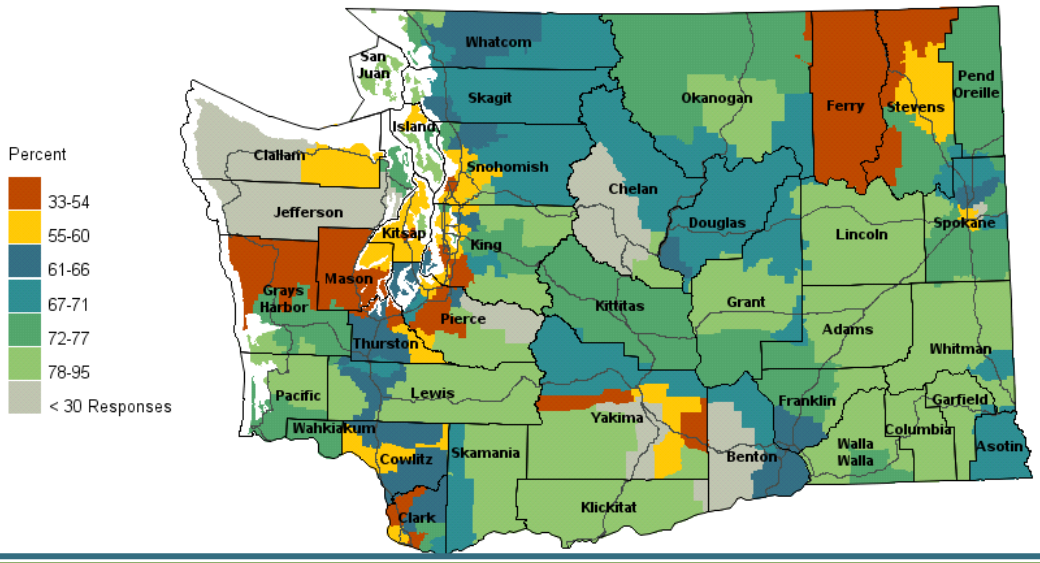
Resilience Index '12 & '13
Population reporting High Community Reciprocity: Ages 18-64 (by County)



BRFSS Questions to calculate Resilience Indices: 3) Community Reciprocity

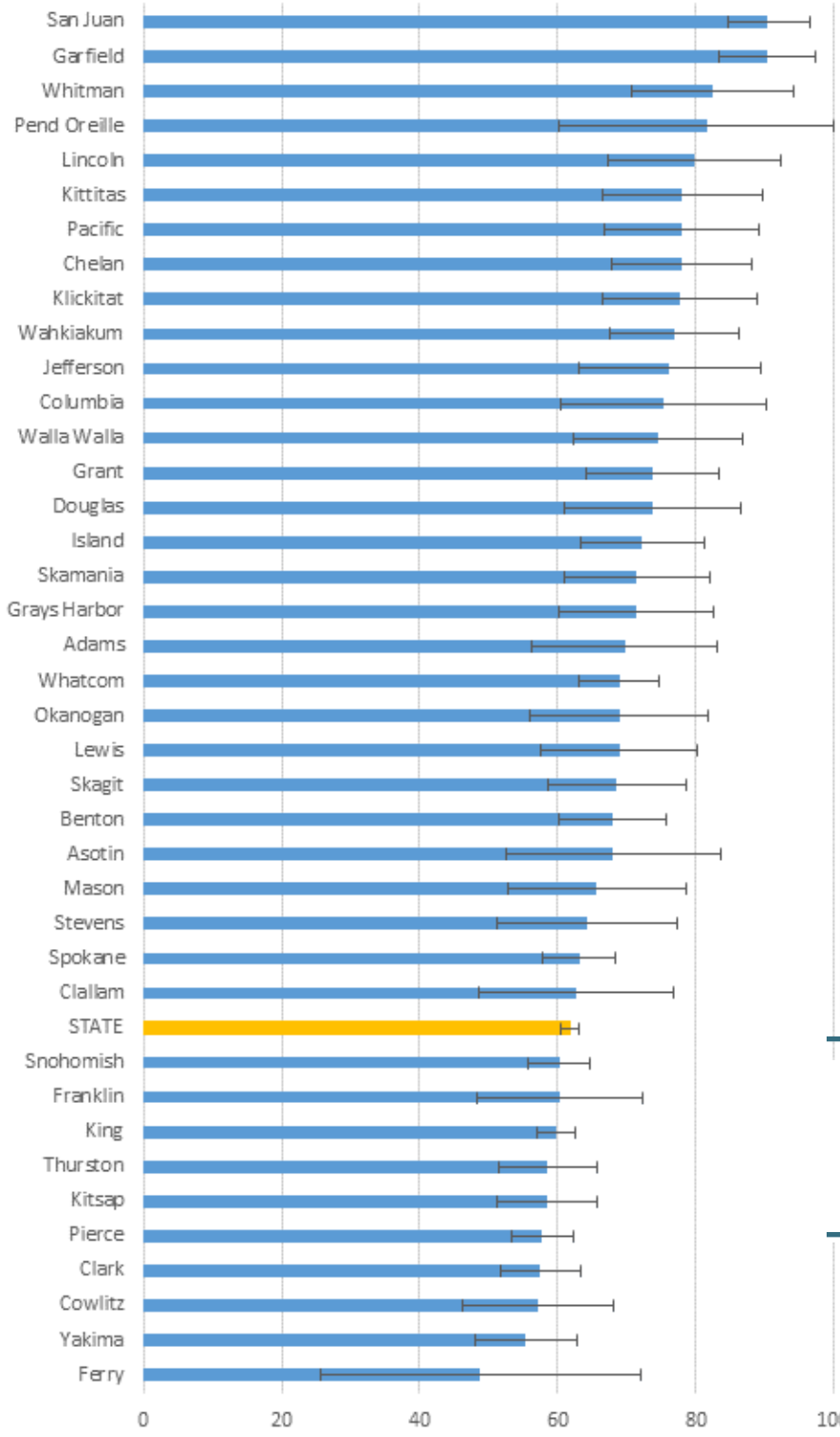
- Please tell me how much you agree or disagree with the following statement: You can count on adults in your community to watch out that children are safe and don't get in trouble.
- How often do you and people in your community do favors for each other? By favors we mean such things as helping with shopping, lending garden or house tools, watching over property and other small acts of kindness.
- Please tell me how likely or unlikely you think this is: Your community members can be counted on to intervene if children are skipping school and hanging out in your community. Is this very likely, somewhat likely, neither likely or unlikely, somewhat unlikely or very unlikely?

Resilience Index '12 & '13
Population reporting High Community Reciprocity: Ages 18-64 (by Locale)



Community Reciprocity in Washington State

Percent of People, Age 18-64 with Community Reciprocity index



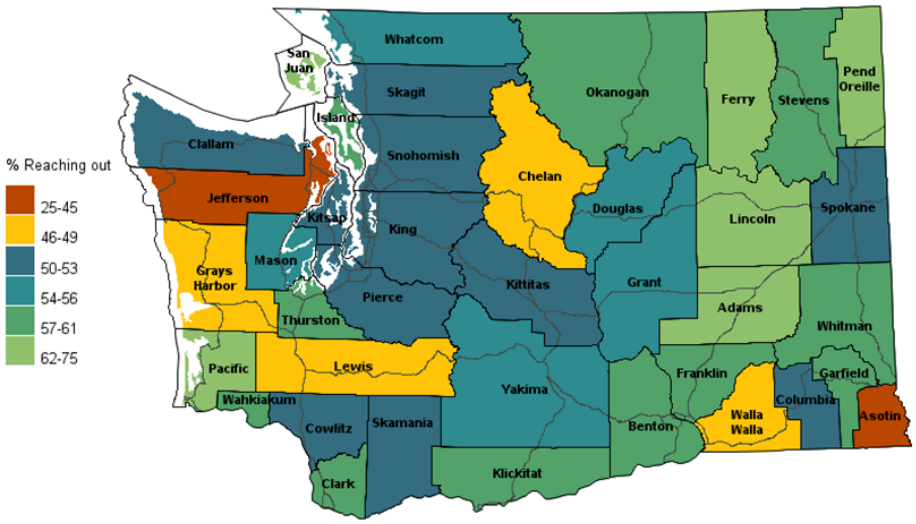
People Working, Laughing, Playing Together; foster a sense of belonging, security, and community identity.

We believe that people and communities thrive when all are healthy, included and connected.

FOUNDATION FOR HEALTHY GENERATIONS
419 3RD AVE WEST, SEATTLE, WA 98119 WWW.HEALTHYGEN.ORG 206-824-2907

Social Bridging in Washington State

Resilience Factor '12 & '13
Population reporting High Social Bridging: Ages 18-64, by County

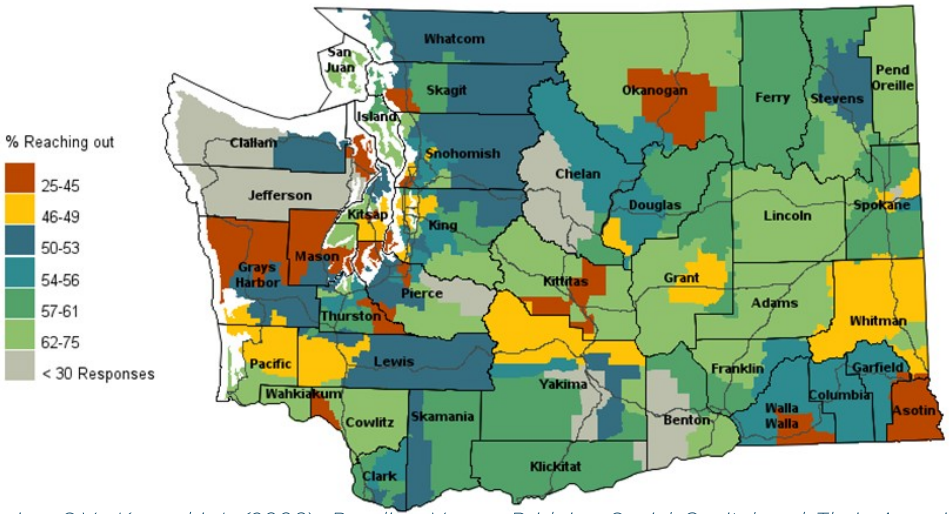


BRFSS Questions to calculate Resilience Factor: 2) Social Bridging

- Think about the people you rely on for help and support. How common is it for you to reach outside this circle of people to give or receive practical help or social and emotional support?

> **"Interventions and policies that leverage community bonding and bridging social capital might serve as means of population health improvement."**
>
> **(Kim, 2006)**

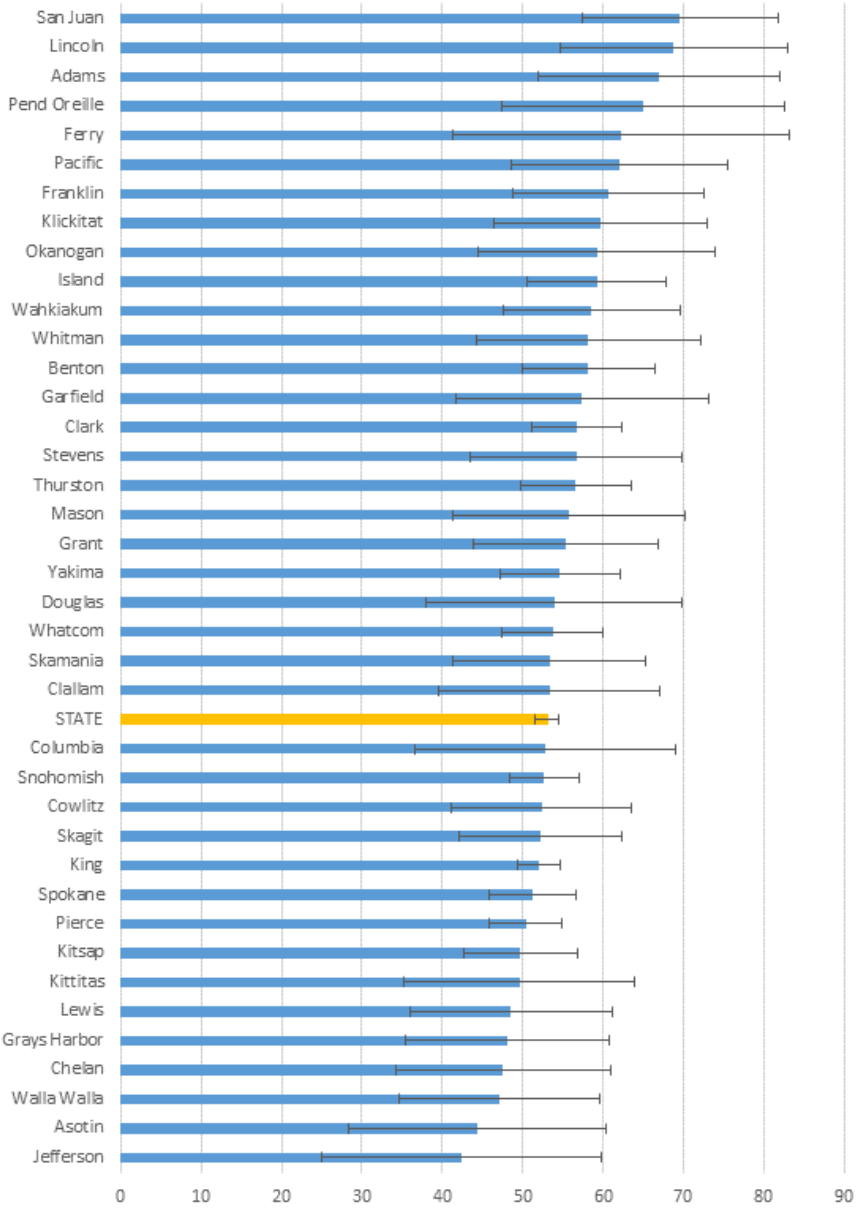
Resilience Factor '12 & '13
Population reporting High Social Bridging: Ages 18-64, by Locale



Kim, D., Subramanian, S.V., Kawachi, I. (2006); Bonding Versus Bridging Social Capital and Their Associations with Self Rated EHealth: A Multilevel Analysis of 40 US Communities; Journal of Epidemiology and Community Health, Feb 60(2): 116-122 Retrieved from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566138/

Social Bridging in Washington State

Percent of People, Age 18-64 with High Social Bridging



Technical Notes: In all resilience bar chart analyses, we have controlled for race/ethnicity, gender, income and education. 95% confidence intervals are included in all charts.

Data Source: Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System, supported in part by Centers for Disease Control and Prevention, Cooperative Agreement Number U58/DP001996-1 through 2 (2009 -2010) and U58/SO000047-1 through 3 (2011-2013).

NOTES

NOTES

Content Review

Introduction to the Learning Institute ❖ NEAR Summary ❖ ACEs: The original study & WA findings ❖ Intergenerational Transmission ❖ Resilience: Literature review & WA data

Learning Institute Focus:

- **We focus on leadership support** in two spheres: 1) community and 2) knowledge management
- **We continue to convene deep conversations** that are designed to illuminate new knowledge and co-host learning events.
- **We expand the bundle of science we are working with** to include Neuroscience PLUS epigenetic, immune, endocrine, and other biologic pathways; ACEs & Resilience – meaning the individual, group and community factors that mitigate effects from toxic stress across the life course.
- **We are developing and disseminating tools and materials to help leaders in many disciplines and communities** to apply this science for transformative improvements in health, safety and prosperity.
- **Our work is designed to support rapid learning cycles** between practice based evidence and research, including but not limited to evidence based practice (because we will also disseminate basic research and findings from analysis of data to communities, and ask communities to inform what data is collected and what analysis is done).