The connection between an individual’s health and the place in which they live, work, and play is deeply rooted in how communities are built and the historical and current socio-economic conditions and policies influencing their daily lives. Environmental factors, such as ability to walk to work or school, or the ability to access culturally appropriate fresh food, can over time contribute to a lack of physical activity and poor nutrition. Eventually, these behaviors can lead to obesity and high blood pressure that can further lead to chronic diseases, such as heart disease and stroke. With increased geographic isolation and a disconnection to services and transportation options, rural residents are at risk for negative health outcomes and health disparities (Downey, 2013).
The National Institutes of Health (2002) includes rural Americans as a population group with high health disparities, represented as higher prevalence of obesity, diabetes, heart disease, cancer, physical inactivity, and poor diets. Efforts to address these disparities are “typically focused on the health care system and access-to-care barriers among individuals. Little attention has been directed to rural public health, which includes population-based, preventive approaches to improving the physical, mental, and social well-being of rural residents” (Downey, 2013).

Weaving together an approach to address community health and equity was the driving force to develop an initiative called Kitsap Strong, serving a population of 260,000 in Kitsap County, Washington. Made up of over 40 organizations and agencies organized into five networks and four committees, Kitsap Strong was developed through a “collective impact” process to address the interconnected public health and social challenges impacting Kitsap County residents (Kania et al., 2017). Many of the agencies that had been partnering since the early 2000s to address some of these challenges recognized the opportunity to create a network of partners working to improve health outcomes through the application of the NEAR sciences.

The integration of neuroscience, epigenetics, adverse childhood experiences, and resiliency into what is known as the “NEAR sciences” bundle, represents cutting-edge research and a framework for developing innovative approaches to address social, educational, and equity issues within any community. In order to understand what the Kitsap Strong initiative is trying to do, it’s important to understand the science it is built upon.

**Neuroscience** is a quickly developing field, and recent research in neurosciences has revealed hidden truths about the nature of the brain and what humans need to thrive (Languis et al., 2012). For example, neuroscience has increased the understanding of how humans respond to immediate threats and prolonged stress through the release and use of cortisol in the stress-response system (Nestler et al., 2008). While prolonged exposure to stress can be “toxic,” social relationships help to moderate the stress response and calm the nervous system (Coan et al., 2006). Trusting relationships serve to reduce stress and create a brain that is ready and able to learn and grow (Zak, 2017). Healthy activities like exercise and mindfulness can help reduce toxic stress hormones (Hoffman-Goetz et al., 1994). Diet and nutrition also play an important role in cognition (Bellisle, 2004), and specific nutrients like omega-3 fats contribute to healthy brain development in children and adults (Innis, 2008). Community factors like poverty, educational attainment, job availability, and social connectedness all have an effect on the amount of “toxic stress” impacting parents and their children, influencing brain development and health, educational, and career outcomes across the lifespan.

**Epigenetics** has received much attention since the breakthrough mapping of the human genome (Allis et al., 2015) because it has disrupted the “nature vs. nurture” debate, providing scientific evidence that social contexts can actually impact gene expression. For example, in laboratories, mother rats who lick their young help to release a gene for social interaction and caring, which is expressed when their offspring go on to care for their own young (Champagne, 2008). Similarly, holocaust survivors passed memories of their experiences on to their children through epigenetic markers (Yehuda et al.,
2016), influencing the physical health outcomes of future generations. Diet and exercise may also impact how genes are expressed; for example, a multi-generational study in Sweden showed that, for women who experienced famine during their adolescence, their paternal grandchildren (sons daughters) had higher risk of cardio-vascular disease (Bygren et al., 2014). Epigenetics shows that the effects of “historical trauma” are not confined to ancient history, and some catastrophic events like slavery, colonization, or the Great Depression continue to influence the lifelong health outcomes for future generations.

**Adverse Childhood Experiences**, or ACEs, are early experiences in the lives of children and youth, that are linked to life-long vulnerability to chronic disease, negative social outcomes, and even early death (Felitti et al., 1998). The original ACEs study examined over 17,000 adult Americans and uncovered ten disruptive childhood experiences including abuse and neglect, parental substance abuse, mental illness, and divorce. Almost two thirds of the study respondents experienced at least one of these ACEs. As the number of ACEs increased in respondents, so too did the likelihood of long-term negative social and health outcomes like decreased educational attainment, increased poverty, cardiovascular disease, liver disease, mental health disorders, substance abuse, incarceration, and death. The annual Behavioral Risk Factor Surveillance System surveys have found similar trends in a nationally representative sample of over 53,000 Americans between 2009 and 2014 (Centers for Disease Control and Prevention, 2017). Researchers are now suggesting “many adult diseases should be viewed as developmental disorders that begin early in life and that persistent health disparities associated with poverty, discrimination, or maltreatment could be reduced by the alleviation of toxic stress in childhood” (Shonkoff, J. et al., 2012).

**Resilience** is a growing body of research studying how processes in the lives of individuals help them to recover from difficult events or stressful situations (Masten, 2015). Resilience is developed both through an individual’s internal psychological capacities like grit or stick-to-it-ness (Duckworth et al., 2007) and through external social relationships and networks that can provide material and emotional support (Armstrong et al., 2005). The study of resilience also translates to systems, including community and ecological resilience after natural and human-made disasters like war or hurricanes (Adger, 2000). Supporting resilient individuals and systems can lead to a thriving community.

Knowing that every community has risks from violence, drugs, hatred, and environmental contamination, every community also has the strength and capacity to support individuals and families, considered the building blocks of community resilience. Kitsap Strong has found a way to contribute to building of resilience through the work of five networks and four committees providing support and infrastructure to all activities.

**FIVE NETWORKS OF KITSAP STRONG**

1. Graduate Kitsap and Mason: A multi-county project to reduce educational inequalities and improve access to and completion of post-secondary education and career success. Emphasis is to ensure all students in the community obtain the education necessary to obtain a living wage.

2. NEAR Training and Education: A network providing training and education on the NEAR sciences in schools, social service agencies, and faith-based and community groups.

3. Trauma Informed Community: A project to translate NEAR sciences for daily use in clinical and community settings in order to create community services, programs, and policies which are more responsive to trauma.

4. HEAL (Healthy Eating Active Living): A coalition developing policy tools and strategies to increase access to healthy food and physical activity opportunities.

5. Thriving Neighborhoods: A grass-roots initiative focused on helping neighbors form strong connections and intervene to offer help when children or elders are in danger or need.
FOUR COMMITTEES SUPPORT EACH NETWORK

1. Leadership: Responsible for guiding collective efforts, developing a common agenda, shared goals, and ensuring that networks and committees are resourced and supported.

2. Funding: Organizations that are financially contributing to the initiative provides support and actively seeks out additional funding.

3. Data: Group of experts analyzing ACEs data in the community.

4. Policy: Group of leaders collaborating with Washington Nonprofits to inform state and local policy.

The NEAR sciences bundle encourages a shift in perspective and practice, forcing local agencies and organizations to reconsider policies, systems, and practices that place shame, blame, and fault on adults for a childhood that they “never asked for” and that was compounded by the community’s particular response to their survival behaviors.

Developing a resilient and thriving community ecosystem is critical to addressing the lifelong effects of adversity for those who have experienced high levels of toxic stress in childhood and adulthood. Agencies and organizations within this initiative realize that ACEs and other sources of “toxic stress” disproportionately affect impoverished and minority individuals, so a focus on equity in social services and education is central to the work.

Kitsap County leaders and funders are recognizing this science and the interconnectedness of the social challenges facing families in the community and are working with Kitsap Strong to support this initiative. Diverse agencies and organizations are coming together to explore possibilities, recognize shared challenges, create shared measurement, and emphasize prevention and systemic approaches toward collective goals to increase the health and well-being for all residents.