

**Washington State Climate Change Response Strategy**  
**Topic Advisory Group (TAG) Report- TAG 2 Human**  
**Health and Security**

**Final Draft - January 27, 2011**

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## **1. Introduction**

### **Describe the purpose and objectives of the TAG.**

The human condition is inextricably linked to the natural environment. As such, we know climate change will impact population health. In 2007 the Preparation and Adaption Workgroup (PAWG) began work to determine the potential human health impacts associated with climate change in Washington and to make recommendations on minimizing these impacts. The work of the Human Health and Security Technical Advisory Group (TAG 2), directed by E2SSB 5560(2009), builds on the foundation of the PAWG report using new information from the Climate Impact Group(CIG) and others to continue refining assumptions and projections to inform strategies to bolster and build resilience across communities in the state.

The challenges we face as a result of climate change come at a time of unprecedented economic crisis and at a time when the entire public health system is in the process of examining and reshaping its approach to service. However, the impacts of climate change are not expected to introduce entirely new fields of work to public health, but rather are expected to exacerbate current conditions over a range of public health issues. As a result, the recommendations of the human health and security TAG focus on how to bolster existing systems and integrate climate considerations into a new and emerging public health system.

## **2. Overview of the Impacts of Climate Change**

### **a) Summarize the observed and projected impacts of climate change relevant to the TAG (human health and security) using information from CIG and other published sources.**

The key aspects of climate change being considered by TAG 2 are increasing temperature and changing weather patterns.

#### **Increasing Temperature**

Increasing temperatures are expected to bring about potentially harmful changes in local vegetation, disease vectors, and air quality. In addition, increasing temperatures will likely increase the incidence of drought in some areas, decrease water quality due to sea level rise and salt water intrusion into drinking water supplies, and potentially augment and impact the effect of urban heat islands.

Salathe et al (2009) performed two climate simulations for the state of Washington. These regional models were created based on large-scale global models using local topographical features at a smaller resolution. The two models (20km and 36 km grid spacing) were of a fine enough resolution to account for the differences in values of the mountains and coasts. Even though the results for

temperature showed a considerable difference between the two models and between seasons, the results do suggest an increase in temperature across the state. The models predict an increase of as much as 5 degrees Fahrenheit (annual average) by 2059 during the summer in the southeastern portion of the state. Both models predict less warming along the coast during spring and summer.

Based on Pacific Northwest modeling of meteorological parameters and ambient air pollutants, Washington State can expect increase in ambient concentrations of ozone (Salathe et al, 2009). Projections suggest forest area burned by climate change influenced fires will at least double by 2050 (Littell et al, 2009) with a resulting increase in particulates. In addition, increases in temperature may also produce a longer pollen season and increase the allergenicity of some aeroallergens (Beggs, 2004; Shea et al 2008).

### **Changing Weather Patterns**

Another potentially harmful impact of climate change to health and security is changing weather patterns including more frequent storms and varying precipitation patterns.

Changing precipitation patterns are expected to shift the state's water supply from sources supplied primarily by snow melt to those supplied primarily by rain. Timing of precipitation could contribute to more frequent flooding in some areas but also cause drought in others. The CIG projections for precipitation averaged over all models anticipate a small increase of 1 - 2%, but with changes toward wetter autumns and winters and drier summers. Increases in extreme high precipitation in western Washington and reductions in Cascades snowpack are consistent projections across all models. As a result of these changes, the April 1 snowpack is projected to decrease by 40% by the 2040s leaving sensitive watersheds, particularly in central and eastern Washington subject to drought (WACCIA, 2009).

At the same time, rising temperatures globally will result in higher sea-levels, and potentially increase the intensity of storm events such as storm surges. (Nicholls, 2004). Higher temperatures will lead to more rain-on-snow events; a major trigger of the periodic river flooding that is already a frequent occurrence in the state. (Hoo and Sumitani, 2005). More frequent storms coupled with sea level rise will have significant impacts on coastal areas as well as flooding and power outages throughout the state. Sea level rise may also potentially affect drinking water quality as the result of sea water intrusion, raising additional water supply issues.

## **b) Describe the implications of climate change for the topic area (human health and security) and the TAG specific perspective on those impacts.**

**Heat related health outcomes** – The National Institute of Environmental Health Sciences reports that extreme heat events cause more deaths annually in the US than all other extreme weather events combined. These deaths are likely under-reported due to the broad range of health problems which can be caused by excessive heat. In addition to heat stress and heat stroke,

excessive heat can also lead to health complications such as heart attack, stroke, and respiratory illness, especially in sensitive populations like the elderly and the young. Temperatures are projected to rise across Washington State and the greatest impacts from heat events can be expected in cities with milder summers, less air conditioning and higher population density.

The numbers of excess deaths due to extreme heat events were projected using statistical modeling for four areas of Washington State: the greater Seattle area (King Pierce and Snohomish counties), Spokane County, the Tri-Cities and Yakima County. This analysis found that mortality rises significantly after heat waves lasting three or more days. It was estimated for ages 45+ that there may be as many as 211 excess deaths from all non-traumatic causes from thermal stress in the greater Seattle area by 2025 and just under 1000 by 2085. Spokane, Tri-Cities, and Yakima may have as many as 31 excess heat-related deaths for ages 45+ for all non-traumatic causes by 2025 and 76 by 2085 (Jackson et al, 2009)

**Respiratory and cardiovascular disease** – Rates of mortality from respiratory and cardiovascular disease are expected to increase due to declining air quality and increasing temperatures. Contributing factors include increases in summertime ozone concentration, increases in pollen/fungal spores, and increases in particulate matter due to wildfires.

The National Mortality and Morbidity Air Pollution Study has identified a number of acute and chronic respiratory and cardiovascular (heart disease and stroke) health risks from exposure to these airborne contaminants (Dominici et al, 2003). Increased exposure to ozone and particulate matter (PM) air pollution have been implicated in premature death in adults, increased rates of infant mortality, worsened asthma or chronic obstructive pulmonary disease (COPD) in children and the elderly, low birth weight or prematurity in newborns, and increased incidence of serious respiratory infections, lung cancer, heart attack and stroke. Asthma and other allergic diseases such as seasonal allergic rhinitis (“hay fever”) have increased in the population in the last decades and pollen is an important trigger for asthma and allergic symptoms. Ozone and PM are also asthma “triggers” and have been implicated in the development of asthma in children. It has been argued that the climate change that has already occurred may explain some of the rise in asthma incidence (Beggs and Bambrick, 2005). In addition, studies suggest co-exposure to allergens and air pollutants increase the potential for allergic symptoms to develop and may also increase the severity of response (Wyler et al., 2000; Shea et al, 2008).

These air pollution related morbidities are important public health priorities in Washington State. In 2008, heart disease was the leading cause of death in Washington State residents over 65 years of age (Center for Health Statistics, Washington State Department of Health, December 2009). Prematurity and low birthweight were the third leading causes of infant mortality in Washington State in 2008 (Center for Health Statistics, Washington State Department of Health, December 2009). Washington’s adult asthma rate is higher than the United States average and 1 in 9 households (with children) have at least one child with asthma (The Burden of Asthma in Washington State: 2008 Update, May, 2009). Asthma costs in medical expenditures and lost

productivity are already more than \$400 million every year (The Burden of Asthma in Washington State, June 2005).

In general, worsening air quality will have a disparate impact on elderly, young, urban and rural poor (due to lack of access to chronic condition care and urban hotspots for ozone/particulate matter, rural hotspots for wildfire impacts.) Also, there will be relatively higher exposure for individuals who spend more time outside such as the homeless, children active in sports, and outdoor laborers. People with existing respiratory or heart problems will also be at increased risk (Climate Change and Health Effects, EPA, 2010)

**Infectious Disease** – Climate change is expected to bring emerging zoonotic diseases to Washington. Flooding may contaminate wells and food supplies, as well as create other unsanitary conditions, causing an increase in infectious disease. The large number of climate sensitive variables in infectious and vector-borne disease transmission makes the modeling of the effects of climate change very complex and less certain. What follows is a list of some variables and how they are projected to impact disease as a result of climate change.

- **Snowpack** - The amount of accumulated snowpack each year plays a role in the amount of water readily available for irrigation as well as excess flooding, which can create abundant mosquito habitat. Longer, drier summers and changing distribution patterns of vertebrate hosts could increase the distribution range of *Dermacentor* ticks, which are capable vectors of several pathogens, including Rocky Mountain spotted fever, tularemia, and Q fever, as well as causing tick paralysis. Milder winters in western Washington could cause an increase of *Ixodes pacificus* tick populations, which is the western US's Lyme Disease vector.
- **Mosquito borne diseases** -Should climate change result in longer warmer seasons, the state could see occasional local transmission of malaria occur, similar to what California has experienced. The introduction of exotic mosquito-borne diseases remains a concern. The recently introduced species, *Ochlerotatus japonicus*, is a known vector of filariasis and has been shown to transmit West Nile virus (WNV) in the laboratory. Global travel has increased the very real threat of introducing other diseases such as Rift Valley fever and Japanese Encephalitis. Other arboviral diseases that have occurred in Washington State and that may be sensitive to climate change are Western Equine Encephalitis and St. Louis Encephalitis, though no cases have been reported since 1988 (Washington State Department of Health, 2008).
- **Waterborne illnesses** – With increased frequency of flooding events comes potential increases in risk of waterborne illnesses. Outbreaks of waterborne diseases frequently follow heavy precipitation (Curriero et al., 2001; Thomas et al., 2006), hurricanes (Setzer and Domino, 2004) and flooding (Wade et al., 2004). Both surface water and ground water used for drinking may be affected (Rose et al., 2000), though generally surface water contamination is the greater risk. Sea water intrusion could also negatively impact water quality, particularly in coastal areas, causing further water supply problems/issues.
- **Deforestation** - The potential of increased forest decimation through beetle infestations with the subsequent increasing risk of severe forest fires will impact the habitat and distribution of

rodent populations, which would in turn impact the risk of exposure to the diseases they can carry, such as hantavirus.

- **Foodborne illnesses** - Research shows a significant correlation of foodborne illnesses with ambient temperature at the time of illness and with the previous week's temperature. Depending on the type of foodborne illness, for every degree centigrade rise in temperature, results showed 2.5 - 6% relative increase in risk of foodborne illness (Lake, IR, et al Epidemiol Infect, 2009).

**Injury** - Injuries are expected to increase due to severe weather events such as storms and flooding. Furthermore, power outages in the aftermath of severe weather events can contribute to injury from carbon monoxide poisoning when people use generators or barbeques indoors for cooking and alternative sources of heat.

The number of people killed by climatic, hydrological, and meteorological disasters in 2009 was the highest of the last decade, with 147,722 deaths reported worldwide. Scientific evidence supports that global warming will be accompanied by changes in the intensity, duration and geographical extent of weather and climate extreme events; therefore, the threat to human health and well being from such events as hurricanes, wildfires, flooding and tornadoes is likely to continue, and perhaps worsen. (IWGCCH, 2010)

**Mental Health** – Projected increases in extreme weather events are anticipated to bring associated increases in mental health impacts. The most common mental health conditions associated with extreme weather events are expected to be post traumatic stress disorder, depression, sleep difficulties, social avoidance, and drug or alcohol abuse. In addition, individuals being treated for mental illness are at greater risk during heat events because some drugs interfere with the body's ability to regulate temperature.

Extreme weather events potentially create both short and long term mental health and stress impacts. The severity of mental health impacts following an extreme climate event will depend on the degree to which there is sufficient support capacity, both during and following the event. During the recovery period, mental health problems and stress related disorders can arise from geographic displacement, loss of property, death or injury of loved ones, and the stress involved with recovery efforts. Furthermore, the chronic stress-related conditions and disorders resulting from severe weather events may lead to additional negative health effects. (IWGCCH, 2010)

Ultimately, the effects of migration, unemployment, cost of living, and reduced services is experienced by individuals in terms of their ability to cope in their daily lives; psychological stress has been defined as occurring when “an individual perceives that environmental demands tax or exceed his or her adaptive capacity” (Cohen et al., 1995) The effects of stress on illness are well established; stress effects immune and inflammatory responses and is implicated in cardiovascular disease, depression, infectious disease, and others. (Cohen et al., 2007) Anecdotal information

coming from New Orleans indicates that one of the most lasting challenges facing the public health system in the aftermath of Hurricane Katrina has been meeting mental health needs.

### **3. Key Risks and Vulnerabilities**

For all projected health impacts, the most vulnerable populations are children, elderly and people with existing respiratory, cardiovascular or other chronic disease. People who work outdoors will also be especially vulnerable to effects of heat.

Western Washington, particularly the greater Seattle area, is expected to see a higher level of mortality from heat events than Eastern Washington, even with population taken into account. There are several possible reasons for this projection including the urban heat island effect being much stronger in more densely populated areas, economic inequality being greater in urban portions of Seattle, and greater levels of residential air conditioning existing in Eastern Washington. (Jackson et al, 2009).

People living near the coast or near rivers likely to flood are at greater risk from extreme weather events, erosion, flooding, and salt water intrusion into drinking water supplies. They are also at greater risk from mental stress caused by displacement.

Another vulnerable group will be non-English speaking populations. Public health outreach and communication efforts will be critical in order to inform and educate non-English speakers how to prevent injury and illness associated with extreme weather events, poor air quality, and infectious diseases.

Finally, socioeconomically disadvantaged populations have few resources for adapting to a changing environment; the poor are most vulnerable not only to the direct health impacts of our changing climate but to indirect health impacts as well, namely increased economic pressures leading to worsened health care access and public safety, and increased stress and illness.

### **4. Unifying Themes and Overarching Strategies to Prepare for and Adapt to Climate Change.**

**a) What are the key elements of a successful strategy? What are the key principles that inform the development of the strategies?**

**b) What are the criteria for prioritizing strategies?**

The Human Health and Security TAG identified these guiding principles for identifying and prioritizing recommendations:

- Bolster community adaptation and resilience capacities by enhancing existing systems and tools.
- Provide multiple benefits to a community rather than being narrowly focused



- Protect the health of the most vulnerable segments of the population.
- Promote and support local community action.
- Result in systems that are flexible enough to effectively respond to new and/or changing climate predictions and impacts.
- Link strategies and initiatives to directions and efforts coming from the federal government

### **c) What are the priority strategies, overarching strategies, and themes?**

TAG 2 identified several overarching themes for recommended strategies and actions necessary for adaptation and prevention of all projected impacts. These themes include surveillance, communication and education, and mitigation of the disproportionate impacts to the poor.

**Surveillance** – To prepare and adapt to the anticipated as well as unanticipated, effects of climate changes upon the residents of Washington State, critical public health surveillance systems will need to be enhanced. The ongoing and systematic collection of data is critical for monitoring changes in the magnitude of current public health threats and early detection of new or emerging threats. Both the PAWG and TAG 2 identified three areas where surveillance systems are critically important to public health preparation and adaptation.

- Zoonotic Disease Surveillance
- Air Quality Monitoring
- Notifiable Conditions Surveillance

**Communication** – Outreach and education is a core function of public health prevention work. We need to integrate climate change discussion into public health’s existing priorities. We know that single messages will not work for all populations/audiences, nor will single-pronged methods of delivery. Therefore, as with the above recommendation, we encourage analyzing how climate change can be messaged at the same time agencies are considering how best to communicate their intervention (e.g. preventing heat stress) to targeted audiences.

**Social Equity** – Both the PAWG and the TAG recognized that the health impacts of climate changes will fall disproportionately on those in lower socio-economic brackets. Low income individuals, people of color and those with limited English proficiency often experience higher rates of chronic stress and have poorer health outcomes regardless of the stressor. These individuals also typically experience poorer existing health conditions, more barriers to health care, unstable employment, and lower quality housing. In addition the poor are more likely to lack access to healthy food, have fewer transportation options, and live in neighborhoods with lower social and financial capital, higher crime rates, and more safety concerns. As a result of infrastructure deficits in these areas, climate change effects are likely to exacerbate one or more of the above factors, or multiply the outcome between one or more factors that may further reduce the ability and adaptive capacity of individuals and communities to cope with climate change effects.

## **5. Recommended Adaptation Strategies and Resilience Actions**

### **a. Identify key barriers or opportunities for taking action to address climate change impacts**

The general response strategies needed to prepare and adapt for the health implications of climate change fit well within existing core public health activities and services. The key barrier currently facing the public health system is the economic situation that has had a significant negative impact on the current ability to deliver services, not to mention the ability to address new threats to public health. Local and state funding for public health has been rapidly eroding, resulting in the loss of trained public health professional staff ranging from 25 - 40% in some jurisdictions and compromising our overall public health system's ability to respond to critical health issues.

In response to the dual challenges of a severe funding crisis and a change in the nature of preventable disease and illness in our state the Secretary of Health formed a workgroup in 2010 to look at reshaping the governmental public health system in Washington and develop an *Agenda for Change*. Given the outlook for a slow economic recovery, TAG 2 recommends that response strategies that address the projected health implications of climate change fit within the overall context of the *Agenda for Change*, rather than create a stand-alone climate change response strategy. TAG 2 also believes that since the underlying causes of climate change are not fully embraced by all, fitting our recommended strategies into core public health efforts may be the most effective means to move forward to prepare communities to address the potential implications of climate change.

The overarching objectives contained in the *Agenda for Change* include:

- “Focus our communicable disease capacity on and enhance the most effective and important elements of prevention, early detection, and swift responses to protect people from communicable diseases and other health threats.”
- “Focus on policy and system efforts to foster communities and environments that promote healthy starts and ongoing wellness, prevent illness and injury, and better provide all of us the opportunity for long, healthy lives.”
- “With healthcare reform, it is time for public health to more effectively and strategically partner with the healthcare system to improve access to quality, affordable, and integrated health care that incorporates routine clinical preventive services and is available in rural and urban communities alike.”

### **b. What initiatives, policies, programs and tools are already in place to prepare for and adapt to climate change?**

Climate change is expected to increase a number of public health challenges that already exist - disease, injury, and mental health impacts related to flooding, drought, and extreme temperature. As such, the public health system and its partners already have numerous programs and initiatives in place to assist communities prepare for and respond to public health issues. The real challenge and opportunity is in expanding existing initiatives to fill any gaps and then to work creating messaging and informational links that connect these existing adaptation and preparation activities to the broader climate change and public health discussion.

Some of the existing programs already in place include:

#### **Air Quality –**

- The Department of Ecology and its partners operate a network of PM2.5 and ozone monitors throughout Washington State. There are currently 11 official Ecology network ozone monitors and nearly 60 PM2.5 monitors as well as other monitors that are not part of the official network. Nearly all these stations provide near-real-time data on air quality conditions and can be accessed via Department of Ecology's website.
- NW-AIRQUEST (Northwest International Air Quality Environmental Science and Technology Consortium, <http://lar.wsu.edu/nw-airquest/>) is a consortium of U.S. and Canadian federal, state, tribal, and local government agencies and universities in the Pacific Northwest that seeks to maintain and enhance a sound scientific basis for air quality management decisions in the region. NW-AIRQUEST has several tools that will be useful in understanding the impacts of climate change on the Pacific Northwest, including a regional Weather Research and Forecasting (WRF) meteorological model (<http://www.atmos.washington.edu/mm5rt/>), and the AIRPACT air quality model (<http://lar.wsu.edu/airpact-3/introduction.html>).
- EPA Region 10 convenes annual meetings of the program managers of the state and local air quality programs. This is a useful group for discussing and disseminating climate change issues in the Pacific Northwest region. Similarly, the Washington Air Quality Managers Group consists of the Washington Air Quality program managers and meets every 3-months.
- The American Lung Association in Washington provides regional air quality forecasts and an email alert service know as e-forecast. This is a tool to give residents of the Northwest fast, accurate notification when air quality has deteriorated and may affect health-sensitive people. It's called the Breathe Easy Network.

#### **Thermal Stress –**

- When heat advisories are issued by the National Weather Service, many local communities open cooling centers to accommodate those in need. One example is

the city of Kirkland with their Kirkland residents can chill at Community Centers program.

- The Washington State Department of Health provides informational resources about precautions to reduce the risk of heat exhaustion and heat stroke.

#### **Extreme Weather/Emergency Preparedness -**

- The Washington State Department of Health actively works with water systems to help them prepare for both drought and flood response. Two important tools include the drought resource guide and the flood response guide.
- The Emergency Management Department provides valuable resources that address public health concerns in the Comprehensive Emergency Management Plan, the State Hazard Mitigation Plan and its foundation document the Hazard Inventory and Vulnerability Analysis. These plans are built on local input and help guide strategy for appropriate response when a variety of significant events occur. In addition FEMA has recently expanded their mapping capabilities through their RiskMAP initiative which allows them to provide both a broader and more detailed range hazard identification services.

#### **Communicable Disease -**

- Monitoring for vector borne diseases at the state and local level is accomplished through the Notifiable Conditions Surveillance system under (chapter 246-101 WAC) which directs health care providers, facilities, laboratories, veterinarians and others to notify public health authorities of cases of certain diseases or conditions. The state then forwards the reported data to the CDC monthly to be incorporated in national and international tracking.
- The Washington Tracking Network integrates environmental data about hazards and exposure with public health data to try and make connections to health outcome information.
- Mosquito Control Districts under chapter 17.28 RCW are special purpose districts which may be formed to directly control mosquitoes within their boundaries. Currently there are districts formed in, Adams, Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima Counties.

#### **c. What additional strategies are needed to prepare for and adapt to a changing climate?**

The work identified above is critically important to public health preparation and adaptation. TAG 2 wishes to emphasize that first and foremost current activities must be maintained and not diminished as we consider additional strategies to pursue. The additional objectives which follow take their origins from the *Agenda for Change*.

**Objective:** “Focus our communicable disease capacity on and enhance the most effective and important elements of prevention, early detection, and swift responses to protect people from communicable diseases and other health threats.”

**Strategy:** Enhance surveillance and reporting systems in order to support early detection and swift response to emerging threats associated with climate change.

**Action:** As efforts to advance the *Agenda for Change* continue, the Public Health Improvement Partnership should focus efforts on maintaining and rebuilding the core capacity and systems that support our public health surveillance systems at the state and local levels.

**Action:** The Department of Health should focus future efforts in the development of their Environmental Public Health Tracking network on data and indicators which are linked to climate change and healthy communities issues. Specifically, targeting meaningful data sets that position us to better understand changes in zoonotic disease patterns and disease vectors, air quality conditions, and harmful algae blooms will assist our future efforts in preparing and adapting to climate change related conditions which can affect health.

**Action:** The Department of Health and the Washington Health Care Authority should make every effort to leverage the current federal efforts under National Health Care Reform to strengthen standardized electronic medical records as part of “meaningful use” infrastructure development. Using this federal initiative to enhance syndromic surveillance and electronic laboratory reporting should help to support the efforts needed to rapidly detect emerging health issues and position the health system for timely and effective community response actions.

**Strategy:** Enhance emergency planning efforts at the local level so that communities are able to quickly respond to climate change related conditions which have the potential to affect health.

**Action:** The Department of Health, University of Washington, and other state agencies should continue to look for funding opportunities that can support more localized forecasting and risk modeling for focused planning efforts that can address the potential health implications of climate change (e.g. extreme heat events; flooding and other extreme weather events; potential for increased forest fires, etc.). Localized forecasting and risk modeling will greatly enhance the ability of a community to be prepared to address the potential effects of climate change. As part of those efforts, updated

census mapping of vulnerable populations will also assist in targeting resources during emergency response efforts.

**Action:** The Military Department - Emergency Management Division, should partner with the Department of Health and other state agencies to explore opportunities to bolster local emergencies response plans to specifically address projected climate change impacts for their local area. Whether projected local issues are associated with potential extreme heat events, or increased flooding due to sea level rise, local planning and preparedness will greatly influence the resiliency of a community to potential climate change related events.

**Strategy:** Enhance communication efforts in order to raise awareness about the potential health implications of climate change and support community engagement in preparation and adaptation efforts.

**Action:** The Department of Health, in collaboration with the Northwest Center for Public Health Practice and other academic practice partnerships, should develop a web-based resource hub aimed at providing information and technical resource links to the public health community for all aspects of climate change adaptation and preparedness. This type of resource would greatly enhance the ability of local communities to take advantage of all of the good work being conducted across the country on the health associated implications of climate change. This resource should be available in several languages to ensure it meets the needs of communities most at risk.

**Action:** The Washington State Public Health Association should be encouraged to dedicate time at the annual Joint Conference on Health as an important venue to raise awareness and engage the public health and health care community on the health implications of climate change. Another important aspect of this of engagement would be to raise awareness of the tools and opportunities for local communities to prepare for the various health implications of climate change. Examples would include health impact assessment tools and highlighting linkages between community planning, climate change, and public health.

**Action:** As opportunities arise the Department of Health, academic practice partnerships, and other public health organizations should pursue partnership with for-profit and non-profit organizations dealing with climate change to raise awareness and promote initiatives of the health implications of climate change.

**Objective:** “Focus on policy and system efforts to foster communities and environments that promote healthy starts and ongoing wellness, prevent illness and injury, and better provide all of us the opportunity for long, healthy lives.”

**Strategy:** Encourage the Governor to pursue opportunities to enhance cross agency initiatives and actions to support healthy and sustainable communities, including those with connection to climate change adaptation and resiliency issues.

**Action:** The Governor’s Natural Resources Cabinet should identify potential policy areas which link climate change impacts to both environmental and human health consequences (such as reduced Green House Gas emissions through land use and transportation, heat island mitigation, flood plain and low shoreline development) and develop policies and practices to limit or mitigate these areas of concern.

**Strategy:** Incorporate strategies that address the projected health implications of climate change into on-going efforts to address chronic disease and healthy community initiatives.

**Action:** The Department of Health should consider the health implications of climate change in their overall healthy community initiatives – leveraging the efforts of these various initiatives to address important chronic disease issues while at the same time addressing projected health implications of climate change.

**Action:** The Department of Health should pursue future funding opportunities (e.g. CDC Prevention Funds) to support the enhancement of critical public health infrastructure that is needed to promote healthy communities, including addressing the projected implications of climate change.

**Objective:** “With healthcare reform, it is time for public health to more effectively and strategically partner with the healthcare system to improve access to quality, affordable and integrated health care that incorporates routine clinical preventive services and is available in rural and urban communities alike.”

**Strategy:** Work to ensure that all segments of a local community have access to care in response to climate change related events.

**Action:** The State of Washington, including the Department of Health, should support the capacity of local health jurisdictions to continue their work with the health care community to ensure access to quality, affordable, and integrated health care.

**Strategy:** Enhance awareness of the projected health implications of climate change and strategies to address those implications throughout medical system – including the mental health system.

**Action:** The Department of Health should pursue opportunities to engage, and disseminate information on the projected impacts of climate change on human health, with the Washington Medical Association, Department of Social and Health Services, UW Medical School and School of Public Health, Schools of Social Work at WSU, PSU and Eastern Washington University, as well as throughout the state’s mental health system (RSNs). This should include efforts to raise awareness of the overarching mental health effects resulting from of the social and environmental disruptions associated with emergencies.

**Action:** During extreme weather events, and when possible in advance of predicted events, provider alerts should be disseminated to the medical and mental health communities, so they can be best prepared to serve members of their communities that may be adversely impacted.

#### **d. Additional Considerations**

The Human Health and Security TAG wishes to particularly emphasize that the health impacts of climate change will fall disproportionately on those in lower socio-economic brackets.

As stated earlier in this report, people who stand lower in society's hierarchy undergo more chronic stress and have worse health outcomes no matter what the stressor. They also typically experience poorer existing health conditions, more barriers to health care, unstable employment, and lower quality housing. In addition, the poor face more barriers to accessing healthy food, have more limited transportation options, and live in neighborhoods with lower social and financial capital, high crime rates, and unsafe built environments. There is also a greater likelihood that climate change effects will either exacerbate one or more of the above factors, or create synergies between factors that may further reduce the ability and adaptive capacity of individuals and communities to cope with climate change effects.

In light of the above, the Human Health and Security TAG recommends that in any and all follow-up action addressing the impacts of climate change, special consideration be given to the poor and disenfranchised members in our communities.



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