



# NWHRN Healthcare System Hazard Vulnerability Assessment

## *District Level Review*

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The Northwest Healthcare Response Network

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## Contents

PROJECT OVERVIEW.....	3
MID-CYCLE REVIEW AND VALIDATION .....	4
HAZARDS .....	5
METHODS.....	8
RESULTS.....	11
CENTRAL DISTRICT .....	12
Summary and Demographics .....	12
Results and Analysis .....	14
NORTH DISTRICT .....	15
Summary and Demographics .....	15
Results and Analysis .....	17
NORTHWEST DISTRICT .....	18
Summary and Demographics .....	18
Results and Analysis .....	20
WEST DISTRICT .....	21
Summary and Demographics .....	21
Results and Analysis .....	23
THE REGION 4 HEALTHCARE ALLIANCE .....	24
Summary and Demographics .....	24
Results and Analysis .....	26
Conclusion and Future Work .....	27



## PROJECT OVERVIEW

### Introduction

The Northwest Healthcare Response Network (NWHRN) is a healthcare coalition responsible for coordinating healthcare-related preparedness, response, and recovery activities within its service area of 15 counties and 25 sovereign tribal nations in Western Washington. To help assure preparedness and response activities align with identified healthcare and regional vulnerabilities, the NWHRN collaborated with tribal, healthcare, public health, emergency medical services, fire, and emergency management partners to assess hazards in its coalition service area to build a Healthcare System focused Hazard Vulnerability Assessment (HVA).

### Purpose

HVAs form the basis of emergency management programs and assist in prioritizing organizational activities and resources. The original HVA served as a compliment to individual facility and healthcare organization HVAs by developing a hazard analysis for the healthcare community at both a coalition-wide as well as individual district-based levels. The purpose of the HVA review was to provide a mid-cycle assessment of the Healthcare Coalition HVA to ensure the analysis continues to provide an accurate representation of the hazards that will have the greatest impact to healthcare. Specific objectives to achieve this goal include:

- Review the ranking of identified hazards from the previous Coalition HVA and update as appropriate.
- Introduce the concept of “stressors” to account for the current and rapidly changing environmental conditions that can contribute to the level of impact a certain hazard may have on healthcare.
- During the review process, determine if certain hazards are impactful to healthcare and should remain as a standalone hazard, or if they should be removed and incorporated into other hazard definitions or as stressors.
- Update hazard definitions to better determine the specific impacts the hazard may have on the healthcare system.
- Discuss with local partners in each of the Network’s four districts the level of impact of each hazard to the healthcare system within their district.
- Using the collected data to produce a total of five updated HVAs: a full coalition HVA discussing hazards and their healthcare impacts, as well as four district HVAs providing a risk analysis for each district.
- Collaborate with the Region 4 Healthcare Alliance to develop an HVA for the healthcare partners within their service area: Wahkiakum, Cowlitz, Clark, and Skamania counties. The findings will create a full state-wide healthcare HVA assessment.
- Share the findings of the project with local, regional, tribal and/or state partners.



The project was divided into three major phases:

- **Phase 1:** Internal review of current Coalition HVA and county, city, state, and tribal HVA's.
- **Phase 2:** Focus group-based discussions with district and Region 4 Healthcare Alliance partners.
- **Phase 3: Compile and update data based on group discussions.**

## MID-CYCLE REVIEW AND VALIDATION

During the internal review process, NWHRN staff assessed the list of hazards that were previously rated to determine if there were any additional hazards that would be relevant to add. It was determined that one additional hazard would be added this year's assessment. Extreme Heat was added as a standalone hazard separate from the Severe Weather hazard due to the direct impact's healthcare experienced during the 2021 Heat Wave Event.

NWHRN staff assessed last year's list of hazards to determine if there were any hazards that should be reconsidered a standalone hazard. It was determined that several hazards should be put to vote to decide whether to keep, remove, or break into standalone hazard. These hazards were: Avalanche, Drought, Erosion-Coastal, Fire-Structure, and Tsunami and Seiches. In each of the district group discussions, participants first voted on whether the hazard should continue to be a standalone hazard. If they determined the hazard should remain, then they voted on the likelihood and impact ranking.

During the mid-cycle review and validation process, NWHRN staff incorporated the feedback, suggestions, and input from the previous year's participant discussions and adjusted the definitions and for some hazards, and/or updated the name of the hazard. This was done to better depict the hazard through the lens of healthcare impacts and in turn get a more accurate assessment of associated risk. The review resulted in updated names for the following hazards: Earthquake was separated into Earthquake- Minor Damage and Earthquake- Major Damage, Fire- Wildland/WUI was separated into Direct-Impact Wildfire and Indirect-Impact Wildfire, and Terrorism was separated into Mass Casualty Attack: Simplex Attack and Mass Casualty Attack: Complex Attack.

Definitions were updated or adjusted for the following hazards: Cyber Threat, Earthquake- Minor Damage and Earthquake- Major Damage, Energy Emergency, Direct- Impact Wildfire and Indirect- Impact Wildfire, Flooding, Extreme Heat, Mass Casualty: Simplex Attack and Mass Casualty: Complex Attack, and Severe Weather.

Additionally, the concept of "stressors" was integrated into the process which asked partners to consider how current challenges, such as limited resources, high patient volumes, etc. could amplify the level of risk posed by each hazard. Participants were encouraged to incorporate these stressors into how they evaluated each hazard.

To see the original list of hazards follow the link here: [2021 List of Hazards](#)

The same definitions of likelihood and impact were utilized during the mid-cycle review process. Consistent with the original HVA under review, the NWHRN used the following definitions for the likelihood of a hazard occurring:

- Low
  - *Chance*: Could occur at some time.
  - *Frequency*: Has occurred 3 times or less in the past 10 years.
  - Probability: <35%
- Moderate
  - *Chance*: Might occur at some time.
  - *Frequency*: Has occurred more than 4-6 times in the past 10 years.
  - Probability: 35-65%
- High
  - *Chance*: Will likely occur in most circumstances.
  - *Frequency*: Has occurred at least 7 times in the past 10 years.
  - Probability: >65%

Likelihood & Impact Ranking Key	
Green	= Low
Yellow	= Moderate
Red	= High

## HAZARDS

The hazards highlighted in yellow are the hazards that were up for vote to keep as a standalone hazard. The hazards highlighted in green are the hazards that had their title adjusted. The hazard in red is the newest hazard introduced during the review process.

**Avalanche** – An avalanche is a mass of loosened snow or ice that suddenly, and usually swiftly, slides down a mountain, growing by collecting additional material as it descends.

**Cyber Threat** – Cyber threat is a human caused technological threat. It can be caused accidentally from faults in software programming code, or deliberately by malicious hackers. Cyber threats are disruptions to information technology, communications systems, and/or critical infrastructure. They can be caused accidentally from faults in software programming code, for example, or deliberately by malicious agents. This hazard considers actual disruptions or successful attacks on our healthcare systems.

**Dam Failure** – A dam is an artificial barrier built across a watercourse to impound or divert water. Dam failure is the sudden, rapid, and uncontrolled release of impounded water resulting in downstream flooding.

**Drought** – Drought is a prolonged period of low precipitation severe enough to reduce soil moisture, water, and snow levels below the minimum necessary for sustaining plant, animal, and economic systems.

**Earthquake- Minor Damage** – An earthquake is shaking of the ground caused by a sudden slip on a fault. Specifically, minor damage earthquake is defined as Modified Mercalli Intensity (MMI) I-VII ranging from not felt to minor structural damage (6 or below on Richter magnitude scale). Frequency: thousands per year in WA. (Previously identified under the hazard Earthquake)

**Earthquake- Major Damage** – An earthquake is shaking of the ground caused by a sudden slip on a fault. Earthquakes can result in variety of primary and secondary hazards. Modified Mercalli Intensity (MMI) VIII-X+ ranging from destructive to catastrophic (above 6 on Richter magnitude scale). Frequency: 1 every 15 years. (Previously identified under the hazard Earthquake)

**Energy Emergency** – Energy emergencies include any disruption to the energy infrastructure of Western WA. This includes power outages and pipeline incidents. For power disruptions specifically loss of main power (8+ hours) impacting ability to perform normal patient/resident care.

**Erosion (Coastal)** – Coastal hazards in Washington include both coastal manifestations of region-wide hazards like earthquake, tsunami, severe storms and flooding, as well as hazards unique to the coast, including coastal erosion, tidal inundations and climate change-induced sea level rise.

**Fire- Structure** – Our region experiences three types of fire threats: structure fires, wildfires and wildland urban interface (WUI) fires where development is adjacent to densely vegetated areas.

**Fire- Wildfire- Direct Impact**- Direct-Impact wildfire is an uncontrolled fire starting in an area of combustible vegetation that directly threatens a healthcare facility. Climate change projections anticipate an increase in wildfire conditions throughout Washington. (Previously identified under the hazard Fire-Wildland/WUI)

**Fire- Wildfire- Indirect Impact**- Indirect-impact wildfire is an uncontrolled fire starting in an area of combustible vegetation that is impacting a community at large. Climate change projections anticipate an increase in wildfire conditions throughout Washington. (Previously identified under the hazard Fire-Wildland/WUI)

**Flooding** – Western Washington is very prone to flooding. Flooding typically occurs after the Cascades experience large, wet and warm weather systems after winter snowpack has accumulated during the winter



months. Climate change is projected to increase the frequency of strong atmospheric rivers and accelerate snowmelt, increasing the likelihood of flooding.

**Hazardous Materials** – Hazardous materials incidents include the unwanted, unplanned, or deliberate release or escape of substances that may cause or create a potential risk to public health, safety, or the environment.

**Health Incident** – Health includes disease outbreaks, pandemics, and bioterrorism incidents. An outbreak can be characterized by the extent of spread of the disease.

**Extreme Heat** - Temperatures substantially hotter and/or more humid than average and posing a high or very high risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration. Climate change will increase the frequency, duration, and intensity of extreme heat events.

**Landslide** – Landslides occur when gravity overcomes the strength of the soil and rock in a slope, often with the help of contributing factors such as heavy rainfall, erosion of the toe of a slope, ground shaking, or human action. Landslides also include debris flows, mudslides, and mudflows.

**Mass Casualty Attack- Simplex Attack**- Simple attack: Single confined location, Majority of injuries are trauma. Often short duration incident. (Previously identified under the Terrorism Hazard)

**Mass Casualty Attack- Complex Attack**- Complex: Often multiple locations, injury types range from trauma, burn, chemical, etc. May include the targeting of critical infrastructure. Highly dynamic and variable in duration. (Previously identified under the Terrorism Hazard)

**Severe Weather** –Severe weather: an atmospheric disturbance featuring sustained strong winds (40+ mph) and/or significant precipitation (rain or snow). Climate change is anticipated to increase the intensity of storms.

**Social Unrest** – Social unrest includes a wide range of activities from violent to peaceful, legal to illegal, criminal to principled and highly planned to completely spontaneous which disrupts a community or organization. Many of these events can be broadly categorized as civil disturbances.

**Supply Chain** – An interruption to the network of suppliers, storage facilities, transporters, and distributors involved in the production, delivery, and sale of critical products.

**Transportation-** Transportation hazards involve all modes: aviation, surface (road, rail, and pipeline) and marine where a vehicle accident is the primary impact.

**Tsunami and Seiches** – A tsunami is a series of waves typically generated during an earthquake by sudden displacement of the sea floor or lakebed. Seiches are water waves generated in enclosed or partly enclosed bodies of water by the passage of seismic waves (ground shaking) caused by earthquakes.

**Volcano and Lahars** – Washington State has five active volcanoes (defined as a vent in the earth's crust through which magma, rock fragments, gases, and ash are ejected from the earth's interior): Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens, and Mount Adams.

## **METHODS**

A modified version of the Delphi technique was used for the HVA review process of assessing the district level hazard impact and risks. The Delphi technique is a method of consensus building involving collating the judgment of a small group of subject matter experts. This technique was chosen based upon its success in previous HVA projects. The main modification to the technique is the limitation of the information review to a single round of virtual focus groups for each district, rather than including a second-round distribution of an online survey to a wider audience.

For each district focus group, participants were provided background information on the project, an overview of established hazards and asked to assess two components of each hazard: the likelihood of the hazard occurring, and the impact of the hazard to the district's healthcare infrastructure if the hazard were to happen. For the hazard likelihood, focus group participants were asked for their assessment and vote on the current rating of the likelihood derived from the 2021 Coalition HVA. Participants had an opportunity to vote to either keep the current rating or to change it. Following the discussion on likelihood, participants were asked to evaluate and vote on the potential district level healthcare infrastructure impact of each hazard and once again vote to either keep the current impact rating or change it. Participants were asked to evaluate potential impacts in four general categories:

- Public Health and Patients – Impact of hazard to people/patients
- Facility – Impact of hazard to healthcare facility/facilities
- Infrastructure – Impact of hazard to healthcare related resources i.e., medical supplies/equipment, PPE, etc.
- Other – Other potential healthcare impacts i.e., staffing shortages, etc.





Each hazard can result in impacts to one or more of these four categories, and the severity of the impact may differ between each category. After reviewing the impact of each hazard and holding an open discussion, participants were asked to provide a rating of the hazard using a three-point Likert-type scale (Low, Moderate, or High). The NWHRN provided the following definitions to guide participants in ranking impact:

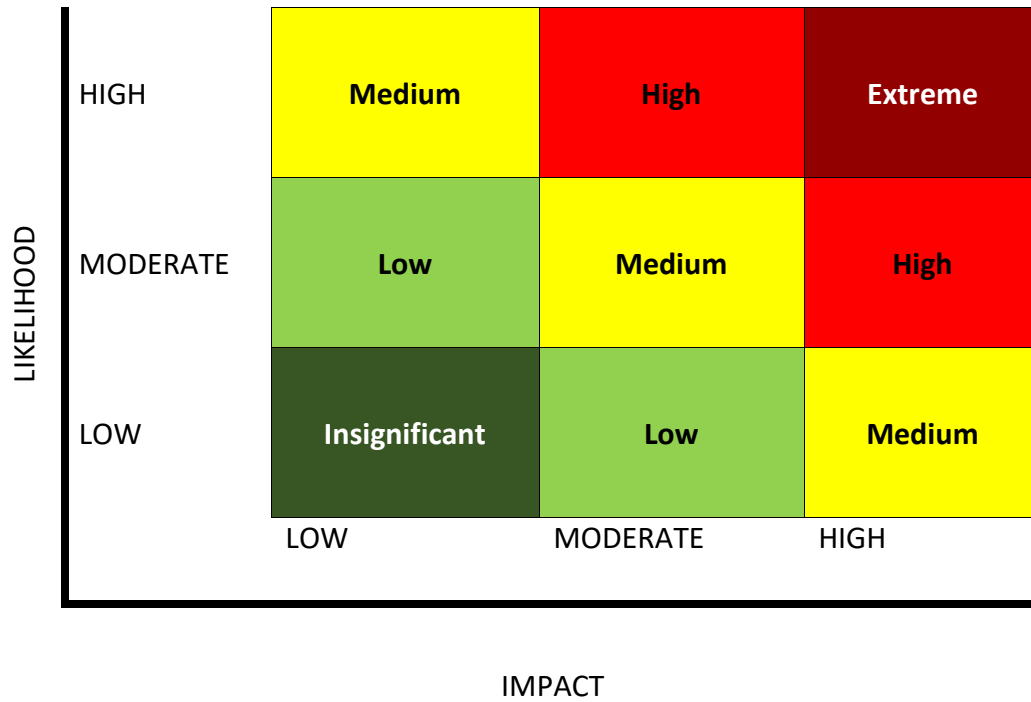
- Low – Causes minimal disruption and can be managed at the daily operational level.
- Moderate – Cannot be managed through normal operational means (e.g., activation of incident command structure and/or emergency operations plan) but does not threaten the ability of the regional healthcare system to continue providing essential services.
- High – Cause significant disruption and threatens the ability of the regional healthcare system to continue to provide essential services.

Once participants voted on hazards impact, utilizing a polling feature, results were displayed to the group. Hazards were deemed to have reached consensus of at least 60% of the focus group participants.

### **Risk Matrix**

Hazards reaching consensus for both likelihood and impact ratings were then plotted on a hazard risk matrix to create a final risk profile. This risk matrix provides a high-level summary of the stratified hazard risk levels for each district with those hazards considered high in likelihood and impact are rated as 'extreme,' and those with low likelihood and impact are rated as 'insignificant'.

Figure 1: Hazard Risk Matrix Template



## RESULTS

The aim of the HVA review process is to ensure that the results of the Coalition HVA remain accurate, up to date, and a current representation of the most impactful hazards and vulnerabilities to healthcare. Across all four Districts, health hazard and cyber threat are the two hazards that consistently were ranked in the extreme category. The chart below depicts the hazard rankings for each of the Districts and the Region 4 Healthcare Alliance.

Matrix Designation	Central District	North District	Northwest District	West District	Healthcare Alliance
Extreme	Cyber Threat Health Incident	Cyber Threat Health Incident Heat- Extreme	Cyber Threat Energy Emergency Health Incident Heat- Extreme Severe Weather Supply Chain Transportation Incident	Cyber Threat Flooding Health Incident Heat Extreme Severe Weather Supply Chain	Cyber Threat Flooding Hazardous Materials Health Incident
High	Earthquake- Minor Damage Energy Emergency* Hazardous Material Heat Extreme Mass Casualty Attack- Simplex Attack Mass Casualty Attack- Complex Attack Severe Weather Social Unrest Supply Chain Transportation Incident	Energy Emergency Flooding Severe Weather	Fire-Wildfire- Direct Impact Fire-Wildfire- Indirect Impact Flooding Mass Casualty Attack- Simplex Attack Mass Casualty Attack- Complex Attack	Dam Failure Earthquake- Minor Damage Energy Emergency	Heat-Extreme Severe Weather
Medium	Earthquake- Major Damage Fire- Wildfire-Direct Impact Fire- Wildfire- Indirect Impact Flooding Landslide Volcano	Dam Failure Earthquake- Minor Damage Earthquake- Major Damage Fire- Wildfire-Direct Impact Fire- Wildfire- Indirect Impact Landslide* Mass Casualty Attack- Simplex Attack Mass Casualty Attack- Complex Attack Social Unrest Supply Chain Transportation Incident Volcano	Earthquake- Minor Damage Earthquake- Major Damage Landslide Volcano	Earthquake- Major Damage Fire- Wildfire- Indirect Impact Hazardous Material Landslide Mass Casualty Attack- Simplex Attack Mass Casualty Attack- Complex Attack Social Unrest Transportation Incident Volcano	Dam Failure Earthquake-Minor Damage Earthquake- Major Damage Energy Emergency Fire-Wildland- Direct Impact Fire- Wildland- Indirect Impact Landslide Mass Casualty Attack- Simplex Attack* Mass Casualty Attack- Complex Attack Social Unrest Supply Chain Volcano
Low		Hazardous Material	Hazardous Material	Fire- Wildfire- Direct Impact Tsunami & Seiches	Transportation Incident
Insignificant	Dam Failure	Tsunami & Seiches	Dam Failure Social Unrest Tsunami & Seiches	Fire-Structure	Tsunami & Seiches

## CENTRAL DISTRICT

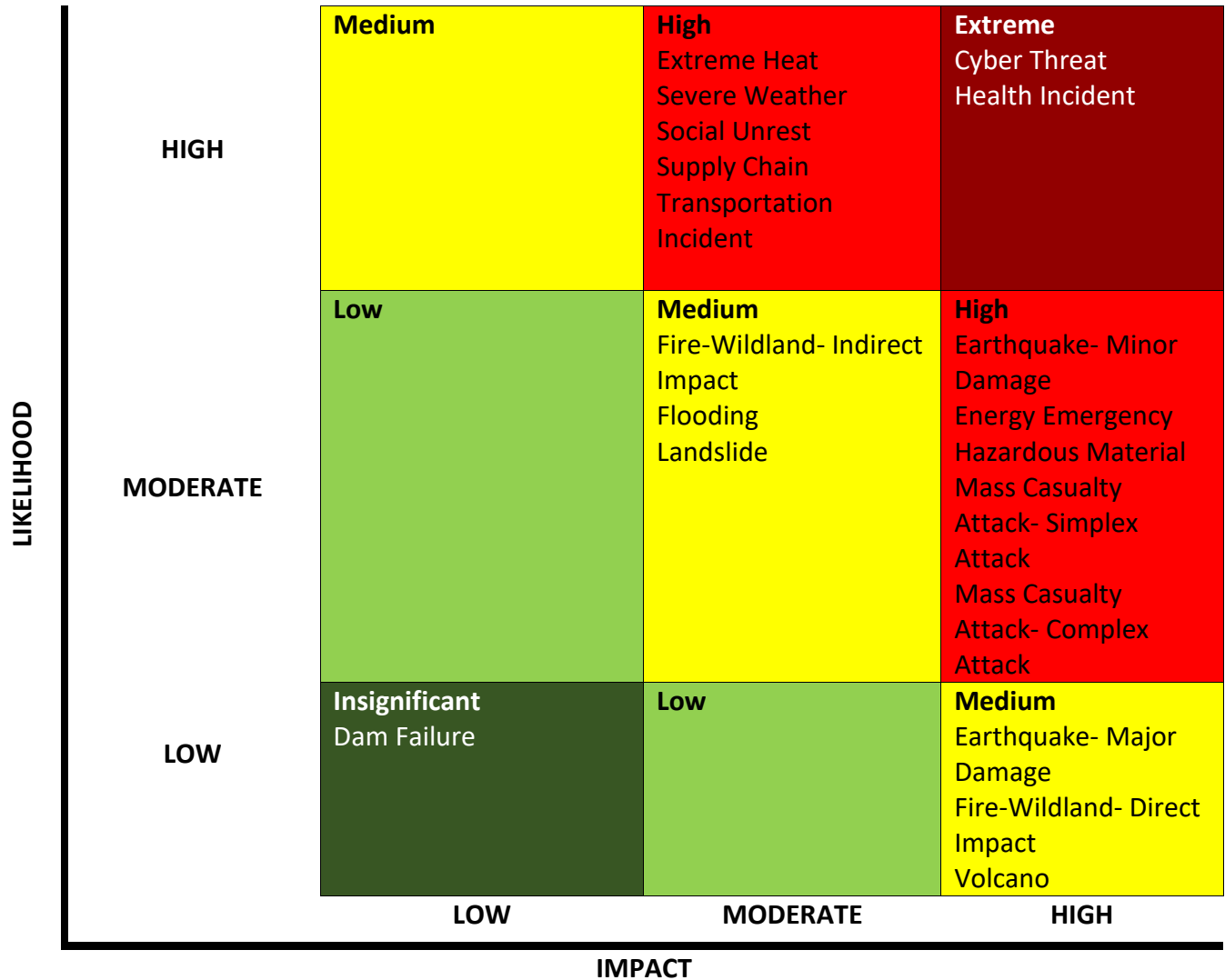
### Summary and Demographics

Central District (King and Pierce counties) held its focus group on Monday, May 2<sup>nd</sup> and May 9<sup>th</sup>, 2022, with a total of 15 individuals participating. Professional backgrounds among individuals included members from Hospitals, Public Health, Outpatient Clinics, Home Health, LTC, Healthcare Alliances, and one state-wide response NGO.

**Figure 2:** Hazard Matrix Results

MATRIX DESIGNATION	HAZARD	MATRIX DEFINITION
Extreme	<ul style="list-style-type: none"> <li>• Cyber Threat</li> <li>• Health Incident</li> </ul>	'High' likelihood and 'High' impact
High	<ul style="list-style-type: none"> <li>• Earthquake- Minor Damage</li> <li>• Energy Emergency*</li> <li>• Hazardous Material Incident</li> <li>• Mass Casualty Attack- Simplex Attack</li> <li>• Mass Casualty Attack- Complex Attack</li> <li>•</li> </ul>	'Moderate' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Extreme Heat</li> <li>• Severe Weather</li> <li>• Social Unrest</li> <li>• Supply Chain</li> <li>• Transportation Incident</li> </ul>	'High' likelihood and 'Moderate' impact
Medium	<ul style="list-style-type: none"> <li>• Earthquake- Major Damage</li> <li>• Fire- Wildland- Direct Impact</li> <li>• Volcano</li> </ul>	'Low' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Fire- Wildland- Indirect Impact Flooding</li> <li>• Landslide</li> </ul>	'Moderate' likelihood and 'Moderate' impact
Low		'Low' likelihood and 'Moderate' impact
		'Moderate' likelihood and 'Low' impact
Insignificant	<ul style="list-style-type: none"> <li>• Dam Failure</li> </ul>	'Low' likelihood and 'Low' impact

**Figure 3:** Hazard Risk Matrix





## Results and Analysis

Based upon the Hazard Matrix, the most extreme risks to Central District's healthcare system are Cyber Threats and Health Incidents based upon their high likelihood and high impact as rated by the focus group. The matrix also identifies Earthquake- Minor Damage, Energy Emergency, Hazardous Material, Mass Casualty Attack- Simplex Attack, Mass Casualty Attack- Complex Attack, Extreme Heat, Severe Weather, Social Unrest, Supply Chain, and Transportation Incident as high priority risks.

Climate Change was noted as an ongoing stressor that will exacerbate the impact of climate-associated hazards and was taken into consideration during the voting and ranking process of the relevant hazards. Extreme Heat was voted in as a standalone hazard and ranked at a high-level hazard. Through the HVA review process, several hazards were re-ranked based upon discussion and review. Hazardous Material and Energy Emergency were lowered in ranking from the extreme ranking and were moved down to high ranking. Supply Chain went from a medium ranking to a high ranking. Last year, Earthquake was categorized in the high ranking. This year the Earthquake hazard was broken out into Minor Damage and Major Damage with Earthquake- Minor Damage getting a high ranking and Earthquake-Major Damage getting a medium ranking. The following hazards were voted out as standalone hazards for Central District: Avalanche, Drought, Coastal Erosion, Fire-Structure, Tsunami, and Seiches.

## NORTH DISTRICT

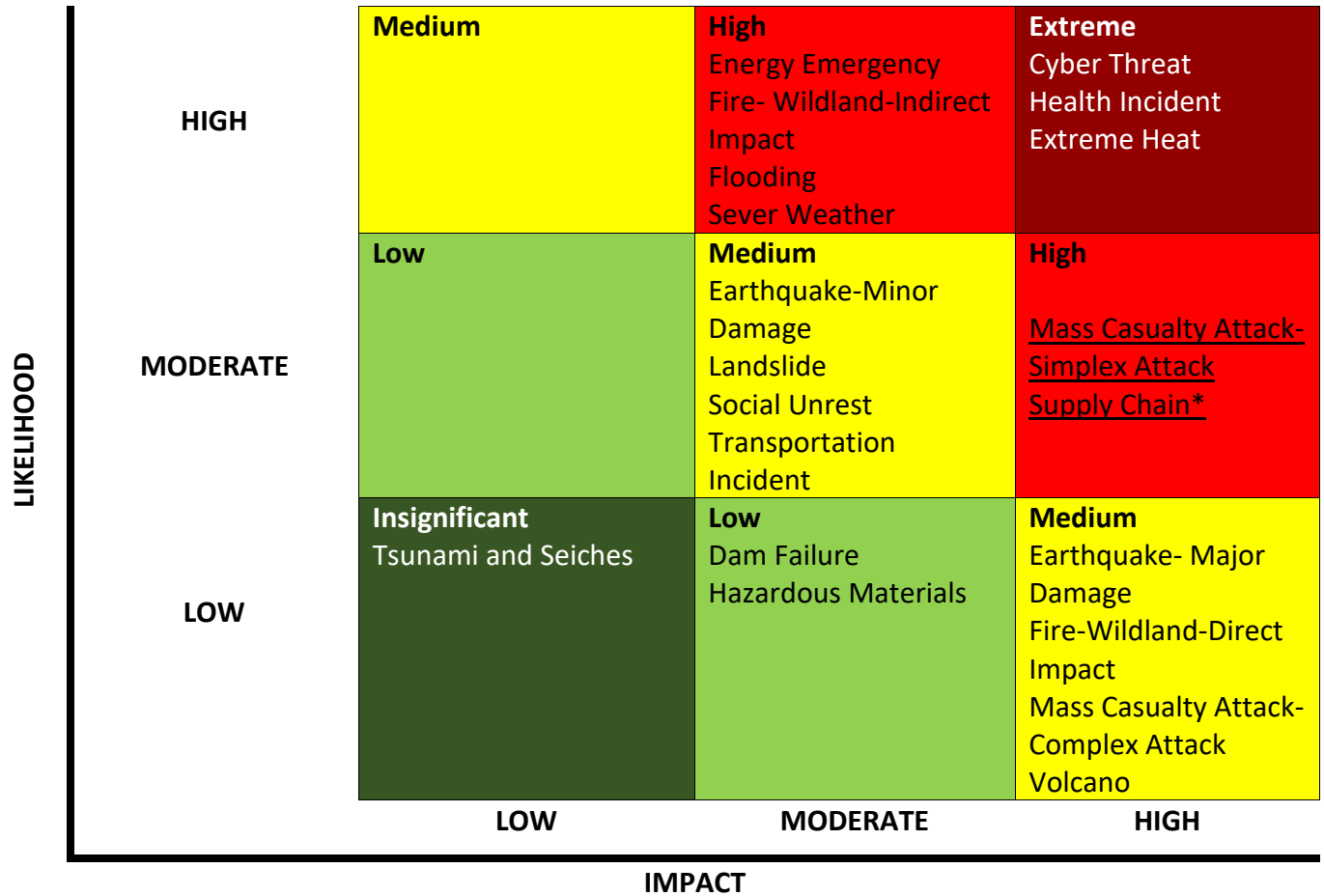
### Summary and Demographics

The North District (Island, San Juan, Skagit, Snohomish, and Whatcom counties) hosted its focus group on Friday, April 29<sup>th</sup>, 2022. A total of 14 individuals participated. This group was primarily composed of highly experienced individuals, with a diverse professional background. The sectors that represented through the participants were Hospital, LTC, Outpatient Clinics, Fire, EMS, County Emergency Management, Surgery Centers, Home Health, DOH, and Hospice.

**Figure 4:** Hazard Matrix Results

MATRIX DESIGNATION	HAZARD	MATRIX DEFINITION
Extreme	<ul style="list-style-type: none"> <li>• Cyber Threat</li> <li>• Health Incident</li> <li>• Extreme Heat</li> </ul>	'High' likelihood and 'High' impact
High	<ul style="list-style-type: none"> <li>• Mass Casualty Attack-Simplex Attack</li> </ul>	'Moderate' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Energy Emergency</li> <li>• Fire- Wildland-Indirect Impact</li> <li>• Flooding</li> <li>• Severe Weather</li> <li>• Supply Chain*</li> </ul>	'High' likelihood and 'Moderate' impact
Medium	<ul style="list-style-type: none"> <li>• Earthquake- Major Damage</li> <li>• Fire- Wildfire-Direct Impact</li> <li>• Mass Casualty Attack- Complex Attack</li> <li>• Volcano</li> </ul>	'Low' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Earthquake- Minor Damage</li> <li>• Landslide*</li> <li>• Social Unrest</li> <li>• Transportation</li> </ul>	'Moderate' likelihood and 'Moderate' impact
		'High' likelihood and 'Low' impact
Low	<ul style="list-style-type: none"> <li>• Dam Failure</li> <li>• Hazardous Materials</li> </ul>	'Low' likelihood and 'Moderate' impact
		'Moderate' likelihood and 'Low' impact
Insignificant	<ul style="list-style-type: none"> <li>• Tsunami and Seiches</li> </ul>	'Low' likelihood and 'Low' impact

Figure 5: Hazard Risk Matrix







## Results and Analysis

Based upon the Hazard Matrix, The North district reconfirmed the most extreme risks as Cyber Threats and Health Incidents based upon their high likelihood and high impact as rated by the focus group. Additionally, Extreme Heat was added and ranked in the extreme risk category. The matrix also identifies Energy Emergency, Fire-Wildland- Indirect Impact, Flooding, Severe Weather, Mass Casualty Attack- Simplex Attack and Supply Chain as high priority risks.

Climate Change was noted as an ongoing stressor that will exacerbate the impact of climate-associated hazards and was taken into consideration during the voting and ranking process of the relevant hazards. Extreme Heat was voted in as a standalone hazard and ranked at a high-level hazard. Through the HVA review process, several hazards were re-ranked based upon discussion and review. Dam Failure went from a low hazard ranking to a medium. The hazard used in last year's HVA of Fire-WUI/Wildland was ranked at Insignificant, however this year, both Fire-Wildfire-Direct Impact and Indirect Impact were ranking of Medium. The hazard used in last year's HVA of Terrorism that was ranked high, is now listed as Mass Casualty Attack-Simplex and Complex Attack and were both ranked at medium.

Last year Supply Chain was introduced to the HVA process as a standalone hazard due to the significant and ongoing impacts shortages have had on the healthcare system. In each of the districts, partners voted on whether Supply Chain should be a unique hazard and then if it passed, they ranked the hazard. The North District was the only district to not vote it in as a standalone hazard in 2021. This year, however, Supply Chain was once again introduced to be voted on as a standalone hazard and was approved and then ranked at a medium ranking for this year's HVA.

The following hazards were voted on to be removed as standalone hazards: Avalanche, Drought, Coastal Erosion, and Fire-Structure.

## NORTHWEST DISTRICT

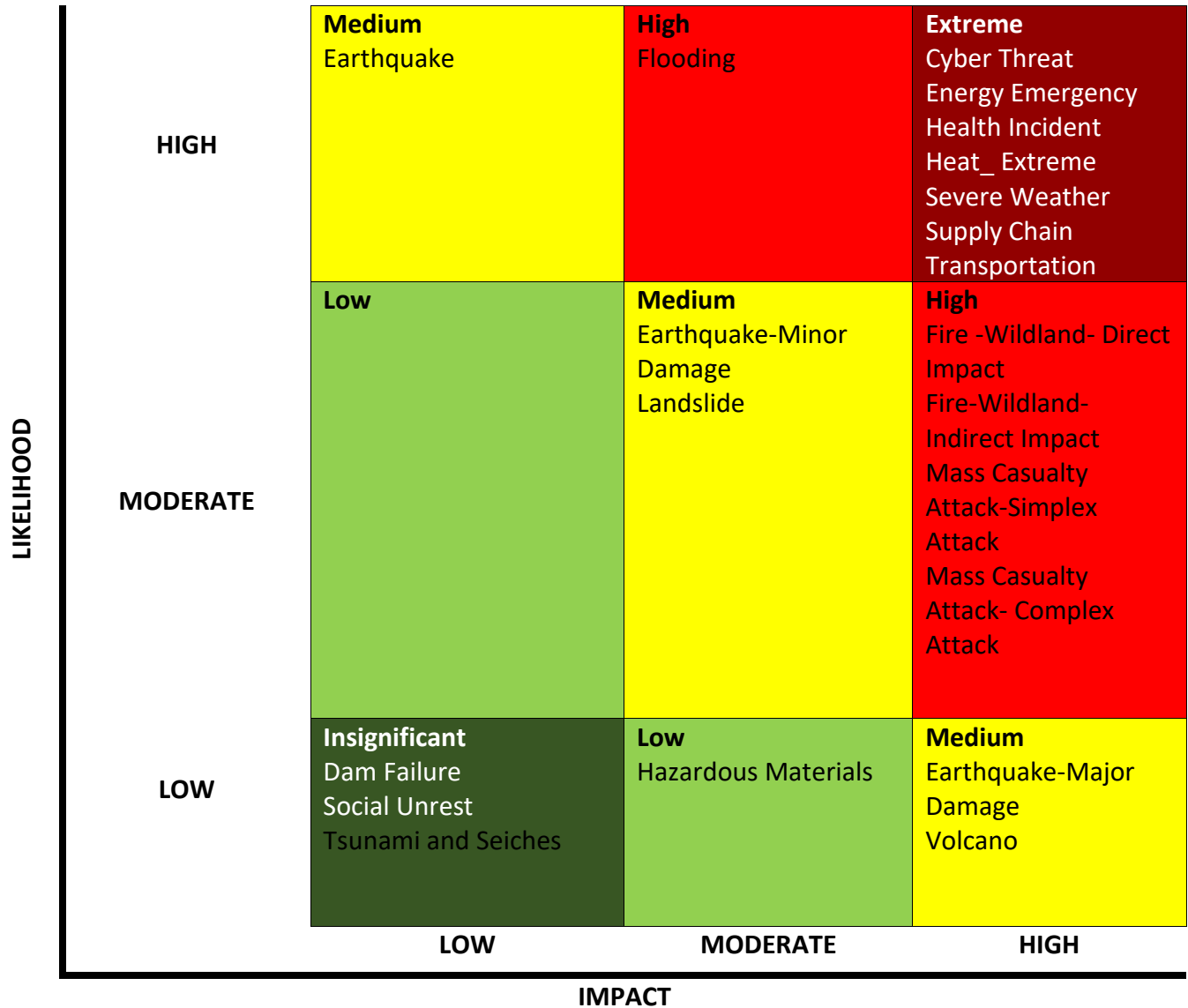
### Summary and Demographics

The Northwest district (Clallam, Jefferson, and Kitsap counties) held its focus group on Wednesday May 11<sup>th</sup>, 2022. In total 13 individuals participated. The participants came from a variety of professional backgrounds including county Emergency Management, Outpatient Clinics, LTC, Fire, EMS, Public Health, Hospital, Community Health Center, and Private Ambulance.

**Figure 6:** Hazard Matrix Results

MATRIX DESIGNATION	HAZARD	MATRIX DEFINITION
Extreme	<ul style="list-style-type: none"> <li>• Cyber Threat</li> <li>• Energy Emergency</li> <li>• Health Incident</li> <li>• Extreme Heat</li> <li>• Severe Weather</li> <li>• Supply Chain</li> <li>• Transportation Incident</li> </ul>	'High' likelihood and 'High' impact
High	<ul style="list-style-type: none"> <li>• Fire-Wildland-Direct Impact</li> <li>• Fire-Wildland-Indirect Impact</li> <li>• Mass Casualty Attack-Simplex Attack</li> <li>• Mass Casualty Attack-Complex Attack</li> <li>• </li> </ul>	'Moderate' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Flooding</li> </ul>	'High' likelihood and 'Moderate' impact
Medium	<ul style="list-style-type: none"> <li>• Earthquake- Major Damage</li> <li>• Volcano</li> </ul>	'Low' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Earthquake- Minor Damage</li> <li>• Landslide</li> </ul>	'Moderate' likelihood and 'Moderate' impact
		'High' likelihood and 'Low' impact
Low	<ul style="list-style-type: none"> <li>• Hazardous Material</li> </ul>	'Low' likelihood and 'Moderate' impact
		'Moderate' likelihood and 'Low' impact
Insignificant	<ul style="list-style-type: none"> <li>• Dam Failure</li> <li>• Tsunami and Seiches</li> <li>• Social Unrest</li> </ul>	'Low' likelihood and 'Low' impact

Figure 7: Hazard Risk Matrix



*\*Did not reach consensus*



## Results and Analysis

Based upon the Hazard Matrix, the most extreme risks to Northwest District's healthcare system, based upon their high likelihood and high impact as rated by the focus group, are Cyber Threats, Energy Emergencies, Health Incidents, Extreme Heat, Severe Weather, Supply Chain and Transportation Incidents. The matrix also identifies Flooding, Fire- Wildland Direct Impact, Fire-Wildland Indirect Impact, Mass Casualty Attack- Simplex Attack and Mass Casualty Attack- Complex Attacks high priority risks.

Climate Change was noted as an ongoing stressor that will exacerbate the impact of climate-associated hazards and was taken into consideration during the voting and ranking process of the relevant hazards. Extreme Heat was voted in as a standalone hazard and ranked at a high-level hazard. Through the HVA review process, several hazards were re-ranked based upon discussion and review. The Supply Chain hazard went from a high to an extreme ranking. The landslide hazard went from a high ranking to a medium ranking. The Social Unrest hazard and Tsunami and Seiches hazard went from a medium ranking to an insignificant ranking.

The following hazards were voted on to be removed as standalone hazards: Avalanche, Drought, Coastal Erosion, and Fire-Structure.

## WEST DISTRICT

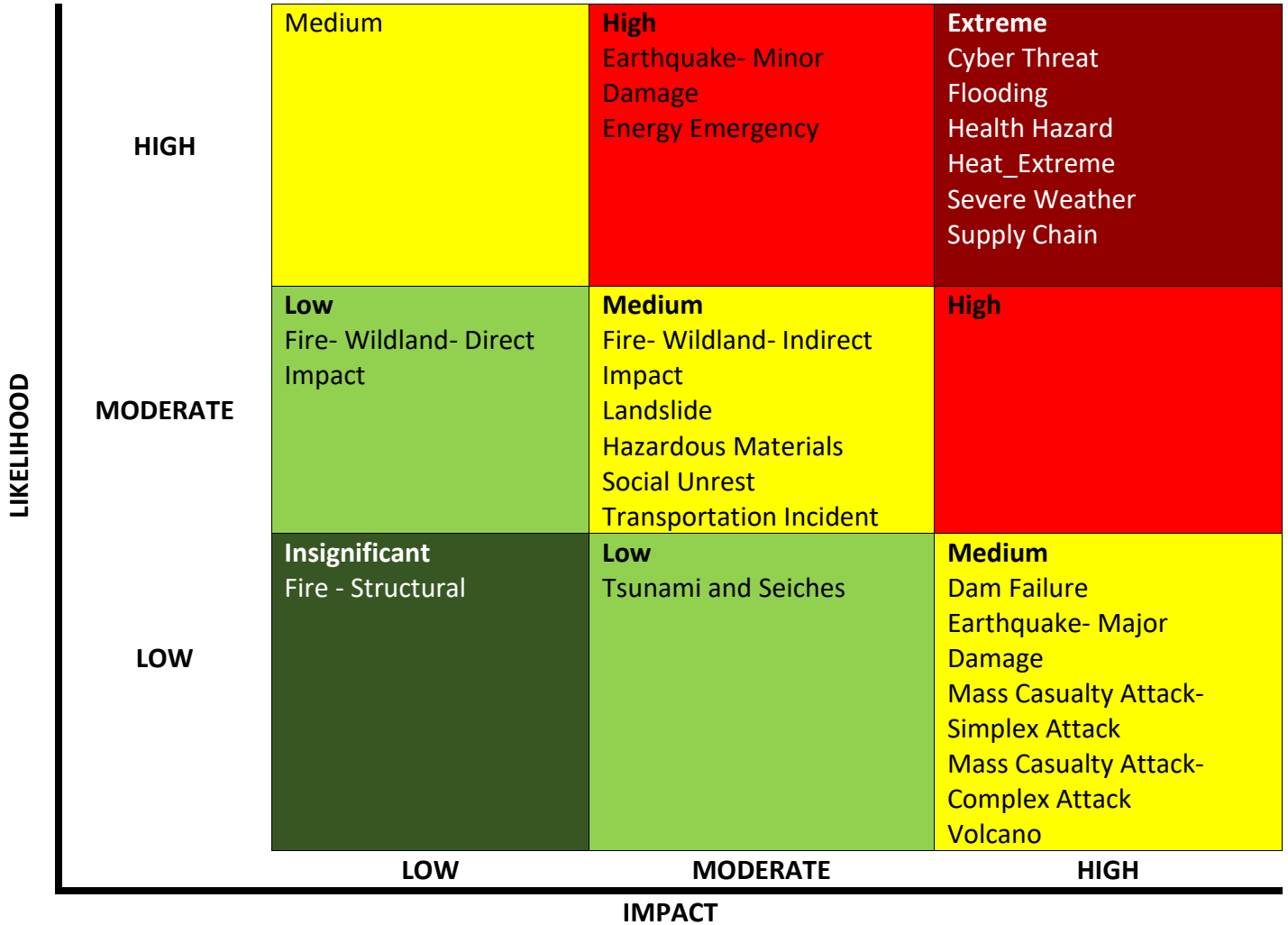
### Summary and Demographics

The West district (Grays Harbor, Lewis, Mason, Pacific, and Thurston counties) hosted its focus group on Friday May 6<sup>th</sup>, 2022, with a total of 13 individuals in attendance. The participants came from a variety of different professional backgrounds including Private Ambulance, county Emergency Management, Home Hospice, LTC, Hospital, Outpatient Clinics, Public Health, DOH, and Dialysis.

**Figure 8:** Hazard Matrix Results

MATRIX DESIGNATION	HAZARD	MATRIX DEFINITION
Extreme	<ul style="list-style-type: none"> <li>• Cyber Threat</li> <li>• Flooding</li> <li>• Health Hazard</li> <li>• Extreme Heat</li> <li>• Severe Weather</li> <li>• Supply Chain</li> </ul>	'High' likelihood and 'High' impact
High		'Moderate' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Earthquake- Minor Damage</li> <li>• Energy Emergency</li> <li>•</li> </ul>	'High' likelihood and 'Moderate' impact
Medium	<ul style="list-style-type: none"> <li>• Dam Failure</li> <li>• Earthquake- Major Damage</li> <li>• Mass Casualty Attack- Simplex Attack</li> <li>• Mass Casualty Attack- Complex Attack</li> <li>• Volcano</li> </ul>	'Low' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Fire- Indirect Impact</li> <li>• Hazardous Materials</li> <li>• Landslide</li> <li>• Social Unrest</li> <li>• Transportation Incident</li> </ul>	'Moderate' likelihood and 'Moderate' impact
		'High' likelihood and 'Low' impact
Low	<ul style="list-style-type: none"> <li>• Tsunami and Seiches</li> </ul>	'Low' likelihood and 'Moderate' impact
	<ul style="list-style-type: none"> <li>• Fire- Direct Impact</li> </ul>	'Moderate' likelihood and 'Low' impact
Insignificant	<ul style="list-style-type: none"> <li>• Fire - Structural</li> </ul>	'Low' likelihood and 'Low' impact

Figure 9: Hazard Risk Matrix





## Results and Analysis

Based upon the Hazard Matrix, the most extreme risks to West District's healthcare system, based upon their high likelihood and high impact as rated by the focus group, are Cyber Threats, Flooding, Health Incident, Extreme Heat, Severe Weather, and Supply Chain.

Climate Change was noted as an ongoing stressor that will exacerbate the impact of climate-associated hazards and was taken into consideration during the voting and ranking process of the relevant hazards. Extreme Heat was voted in as a standalone hazard and ranked at a high-level hazard. Through the HVA review process, several hazards were re-ranked based upon discussion and review. The Energy Emergency hazard went from an extreme ranking to a high ranking. Supply Chain went from a medium ranking to an extreme ranking. Dam Failure, and Earthquake- Minor Damage, went from a medium ranking to a high ranking. Tsunami and Seiches went from a medium ranking to a low ranking.

The following hazards were voted on to be removed as standalone hazards: Avalanche, Drought, and Coastal Erosion.

## THE REGION 4 HEALTHCARE ALLIANCE

### Summary and Demographics

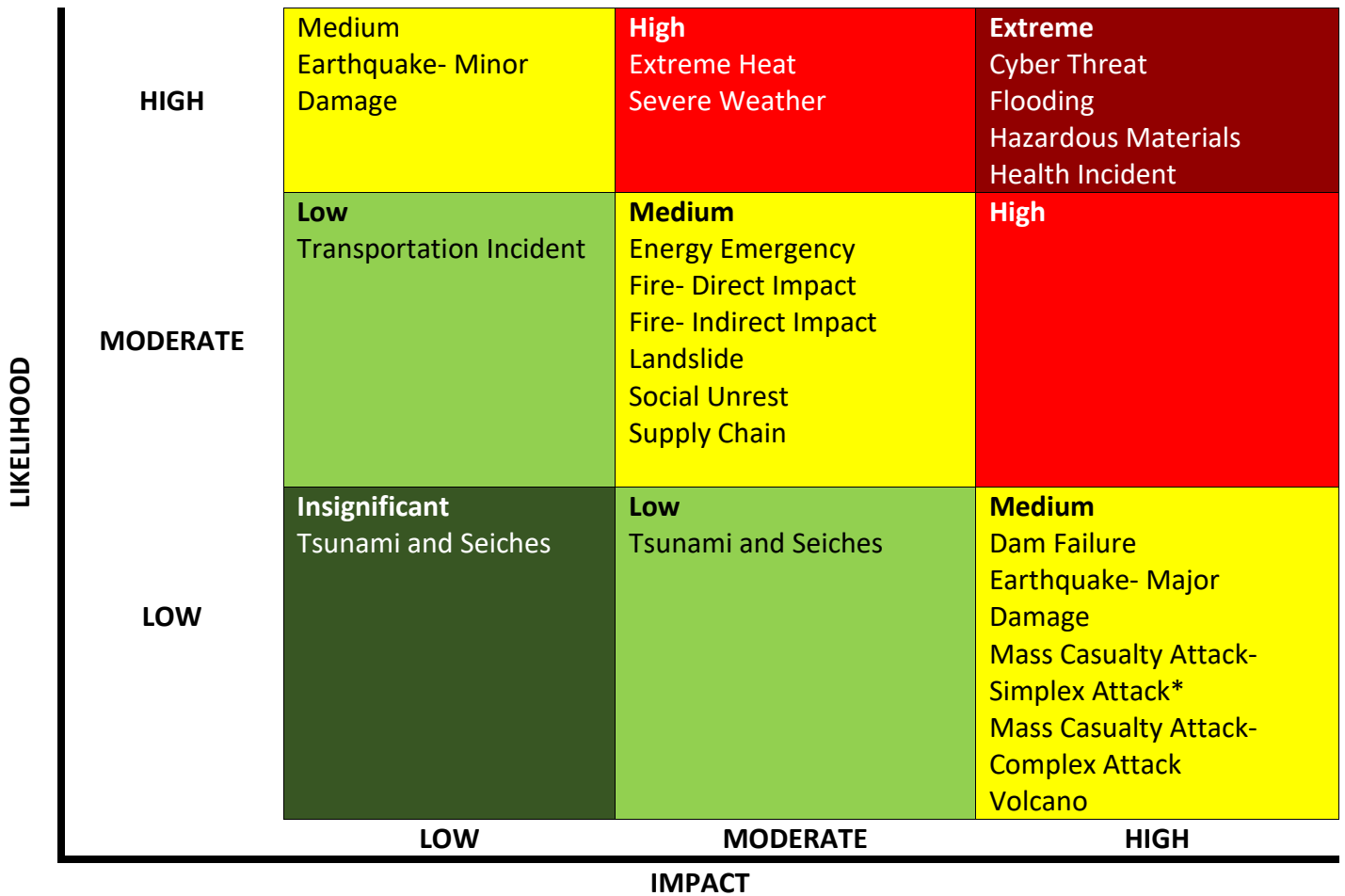
The Region 4 Healthcare Alliance (Wahkiakum, Cowlitz, Clark, and Skamania counties) hosted its focus group on Tuesday May 17<sup>th</sup>, 2022, with a total of 11 individuals in attendance. The participants came from a variety of different professional backgrounds including county Emergency Management, Home Hospice, LTC, Hospital, Outpatient Clinics, Public Health, DOH, and Dialysis.

**Figure 8:** Hazard Matrix Results

MATRIX DESIGNATION	HAZARD	MATRIX DEFINITION
Extreme	<ul style="list-style-type: none"> <li>• Cyber Threat</li> <li>• Flooding</li> <li>• Hazardous Materials</li> <li>• Health Incident</li> </ul>	'High' likelihood and 'High' impact
High		'Moderate' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Extreme Heat</li> <li>• Severe Weather</li> </ul>	'High' likelihood and 'Moderate' impact
Medium	<ul style="list-style-type: none"> <li>• Dam Failure</li> <li>• Earthquake- Major Damage</li> <li>• Mass Casualty Attack- Simplex Attack*</li> <li>• Mass Casualty Attack- Complex Attack</li> <li>• Volcano</li> </ul>	'Low' likelihood and 'High' impact
	<ul style="list-style-type: none"> <li>• Energy Emergency</li> <li>• Fire- Direct Impact</li> <li>• Fire- Indirect Impact</li> <li>• Landslide</li> <li>• Social Unrest</li> <li>• Supply Chain</li> </ul>	'Moderate' likelihood and 'Moderate' impact
	<ul style="list-style-type: none"> <li>• Earthquake- Minor Damage</li> </ul>	'High' likelihood and 'Low' impact
Low		'Low' likelihood and 'Moderate' impact
	<ul style="list-style-type: none"> <li>• Transportation Incident</li> </ul>	'Moderate' likelihood and 'Low' impact
Insignificant	<ul style="list-style-type: none"> <li>• Tsunami and Seiches</li> </ul>	'Low' likelihood and 'Low' impact



Figure 9: Hazard Risk Matrix





## Results and Analysis

Based upon the Hazard Matrix, the most extreme risks to the Region 4 Healthcare Alliance's healthcare system, based upon their high likelihood and high impact as rated by the focus group, are Cyber Threats, Flooding, Hazardous Material Incident, and Health Incident. Additionally, both Extreme Heat and Severe Weather were ranked at a high ranking.

Climate Change was noted as an ongoing stressor that will exacerbate the impact of climate-associated hazards and was taken into consideration during the voting and ranking process of the relevant hazards. Extreme Heat was voted in as a standalone hazard and ranked at a high-level hazard.

The following hazards were voted on to be removed as standalone hazards: Avalanche, Drought, and Coastal Erosion, and Fire-Structure,



## Conclusion and Future Work

This fifth NWHRN Healthcare and first year Region 4 Healthcare Alliance Hazard Vulnerability Assessment Review represents an update of the 2021–2022-year HVA assessment which included findings from the Region 4 Healthcare Alliance and all four district HVAs. While this work is part of a larger HVA project representing a full coalition level HVA, these results can also be interpreted on their own and will help guide and prioritize planning and response efforts within Region 4 Healthcare Alliance geographic footprint, as well as more broadly across the Western Washington NWHRN Coalition service area.

The NWHRN plans to continue to partner with the Region 4 Healthcare Alliance in supporting future healthcare Hazard Vulnerability Assessments. Throughout this HVA project, significant feedback was received on several components including the definitions of hazards and data gathered for likelihood and impact. The NWHRN plans on reviewing this feedback, identifying actions to take, and incorporating those changes into future HVA documents. The NWHRN plans to review our Coalition HVA biannually and will partner with the Region 4 Healthcare Alliance to support the same frequency of review for their HVA. We will continue to review the city, county, and state partner HVAs, updated hazard information, and experience with real world events as part of the ongoing process to keep our healthcare focused HVA as current and relevant as possible.

The upcoming NWHRN Hazard Vulnerability Assessment will start a new cycle which will include a complete review and update of the entire HVA process. NWHRN will be working throughout the coming year alongside our partners, including the Region 4 Healthcare Alliance, to update and incorporate ongoing feedback into the HVA process.