

RESILIENCE PLANNING
FOR
ELDERLY RESIDENTS
in OREGON COASTAL
COMMUNITIES

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ABSTRACT

When a catastrophic event happens, senior residents who are physically or mentally disabled, are placed at a much greater risk of injury or death. Researchers in the aftermath of hurricanes' Katrina, Sandy, and Harvey, consistently record elderly residents presenting the most difficult challenges for emergency personnel during evacuation and post trauma care. The focus of this research analysis is to target the population of senior residents who live in elderly care facilities along the Oregon coast. To ensure the best possible quality of life at the end of life it is critical to understand the special needs of the elderly care facilities in Oregon's coastal communities who are potentially facing a catastrophic disaster from a major earthquake and tsunami. Timely evacuation of these residents may not be practical. Vertical evacuation will require adequate reserves of food, water, and medical supplies. Information on the number and location of adult residential care facilities is not identified in an easily accessible database, population numbers can only be teased from census and Department of Human Services records, there is no database on their special needs, or how to contact next of kin. This research was designed to discern the importance of coalescing location information along with the special needs of these residents and if the assisted living facilities are prepared to evacuate or shelter in place. Qualitative interviews were held with directors of assisted living facilities in five Oregon counties with low-lying coastal exposure to understand their level of preparation in the imminent threat of a Cascadia Subduction Zone earthquake and tsunami.

INTRODUCTION

Empirical evidence demonstrates a consistent rhythmic movement of the tectonic plates in the Earth's lithosphere at the conversion point where the North Atlantic tectonic plate collides and moves over the top of the Juan de Fuca tectonic plate (Figure 1), this conversion

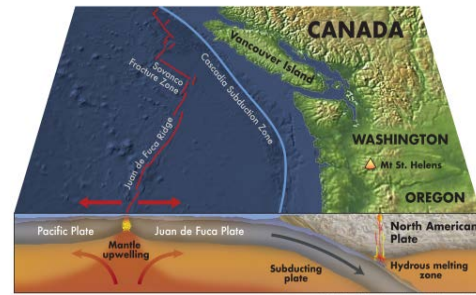


Figure 1 (CSZ)

point is called the Cascadia Subduction Zone (CSZ), (OSSPAC,2013).

The CSZ runs adjacent to the Washington, Oregon, and Northern California shorelines (Figure 2) (OSSPAC, 2013). Evaluations of magnetic shifts in the layers of lava flows on the floor of the Pacific Ocean, combined with geologic samples from the Cascade Mountain range, document seismic activity and movement of the plates (Figure 2). Within the last 4,000 years there has

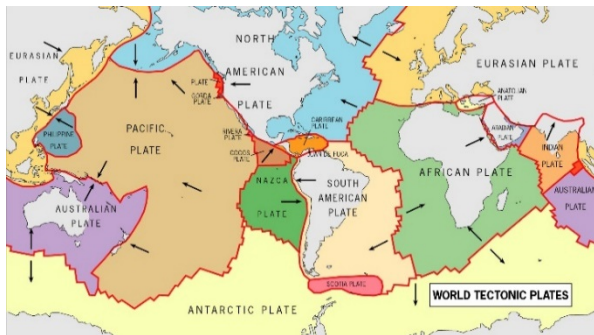


Figure 2 (Tectonic Plates)

been a major earthquake registering a Richter magnitude of 8.0 or greater along the CSZ with rhythmic precision every 300 years (OSSPAC, 2013). The last CSZ event was recorded during the encampment of Lewis and Clark, January 26,

1700, which suggests the next major earthquake should have taken place by the year 2000 (OSSPAC, 2013). There is every reason to believe within the next 50 years there will be a major stress relief and shift in the Earth's surface at this subduction zone, only this time there is a well-developed and heavily populated infrastructure in place (OSSPAC, 2013).

Earthquake prognostication is not a popular subject. Talking about vulnerable populations that will be affected by an earthquake or tsunami draws less attention, and narrowing

down the list to elderly residents in assisted care facilities along the Oregon coast does not stimulate a high level of concern for many people. I started this research almost four years ago during a series of geology and volcanology courses at OSU Cascades in Central Oregon, collecting rocks and data in the lava fields that are predominant throughout the area. I became mesmerized by the predictable rhythm of the CSZ in comparison to other earthquake zones such as the San Andreas fault. Most earthquakes are the result of the release of tension between two tectonic plates (OSSPAC, 2013). The San Andreas Fault is a strike-slip interface between two very large tectonic plates, which suggests it is going to reoccur; however, it is less predictable. Whereas the Juan de Fuca plate is a significantly smaller broken off portion of the much larger Pacific plate and it is easy to see how it is being swallowed underneath the much larger North American plate (USGS, 2017). The rhythm of the stress relief in the CSZ resembles a punctuated equilibrium graph of human development and demonstrates a rhythm like a heartbeat, therefore indicating a much more reliable prediction of earthquake activity.

Hurricane Katrina, Superstorm Sandy, and Hurricane Harvey provide disaster researchers with a significant amount of post-event data on how vulnerable populations, especially elderly residents, influenced evacuation and recovery efforts (Bamford, 2015). The information from major tropical storms can help Oregon's policy makers prepare emergency responders with information on elderly demographics that could save lives and prevent suffering. However, the social construction of vulnerable populations has unevenly distributed the availability of resources to protect them from natural and manmade disasters. When a catastrophic event occurs such as a hurricane or earthquake, elder residents who are frail, disabled, suffer from hearing loss, poor eyesight, poor mobility, and are reliant on others for their care, are significantly disadvantaged placing them at a much greater risk of injury or death (Bamford, 2015). Residents

housed in senior care facilities rely solely on their caregivers for their needs and protection in a disaster. The majority of residential care facilities in Oregon are privately owned, many within a matrix of large corporations that have an inventory of 2,000 to 4,000 facilities nationwide, which poses some major challenges for a virtually powerless population in the event of a catastrophic event.

The primary objectives of my research was to understand and bring light to the special needs of elderly care facilities facing a realistic and potential catastrophic disaster along the Oregon coast. The research recommendations in this paper can provide policy makers with critical information to substantiate cost benefit analysis for resilience planning, and to suggest policy recommendations for current and future facilities. The second objective is to drive home the importance of having a collective database for emergency personnel with critical information for evacuation, rescue, and post trauma care for this population. Young or elder no one should have to suffer at the end of life no matter how long they have lived or their social stratification. We have the capacity to provide better resilience planning for our elderly residents; however, policy makers must realize a sense of urgency to ensure the right measures are taken to care for our older generation in the face of a catastrophic event. *In the case of a catastrophic event to what extent are Oregon's elderly residents accounted for?*

LITERATURE REVIEW

Research Lens

“The social construction of target populations refers to the cultural characterizations or popular image of the persons or groups whose behavior and well-being are affected by public policy” (Schneider, Ingram, 1993).

There are several distinctions in the levels of care for senior residents; however, for this paper I am going to use elderly care facility, elderly care units, nursing homes, skilled nursing

units, and assisted living facilities, interchangeably to make the reading less cumbersome and redundant. I am also going to use seniors, elder persons, elderly, older generation, and persons at end-of-life, interchangeably for the same reasons. An adult foster care home is different from an assisted living facility and was not a primary focus of this research. Adult foster care is traditionally provided in a single home environment, with a significantly smaller number of residents and limited support staff. Adult foster care homes normally have single ownership, are not a part of a larger corporation, and fall under different guidelines than a residential care facility. Often the rent is much cheaper in a foster care home than assisted living homes and the residents do not require daily medical monitoring from a licensed practitioner (Stringfellow, 2017).¹ Residents of elderly care units are often less ambulatory than residents at home or in an adult foster care home and dependent on wheelchairs, walkers, or confined to a bed, therefore entirely dependent on the staff for all of their needs. It is because of these reasons, the larger numbers, and locations of these senior care facilities they are the focus of this research.

Senior residents mirror the effects of social and economic inequities and how they affect end-of-life circumstances as well as the quality of life in our last years if we are lucky enough to grow old (Abramson, 2015). Health disparities, structural inequalities, culture and social connectedness, as well as financial reserves, separate those who can afford to live at home and those who spend their last days in a nursing home (Abramson, 2015). Living in an adult care facility close to the ocean is not the same as sitting outside listening to the waves and seagulls from a familiar lounge chair with all your belongings relatively close by in a familiar location.

¹ There were three adult foster care homes visited; however, there were few if any reserves in the way of food and water, and there was only a car or minivan available for evacuation as well as the owners' main form of transportation. Adult foster care homes are not required to have licensed medical personnel on site. Due to the absence of medical supervision, small numbers of residents per site, and patient ambulatory requirements, these homes were excluded from the focus of this research paper.

Families who are working and just making ends meet may not have the resources to give their parent or loved one the medical supervision and therefore be able to care for them at home so they can live comfortably at end-of-life. An assisted living home in most of Oregon's coastal communities is very similar to living in the same environment in any other urban or rural setting. The residents cannot see the ocean from their rooms and only on special occasions are they loaded into the company van and taken out into the fresh air of the beach. Historically family members do not regularly visit, and the residents spend most of their time either in their rooms or in the dining room for meals.²

In the United States, we have created a social structure where seniors in an environment like a nursing home are often discounted in the larger picture, their population numbers are small, and they have little to no power over their lives. Seniors who live in long-term care facilities are disproportionately affected by a catastrophic event and are affected by the absence of state policies and guidance for sheltering in place or evacuation (Ling, Johnson, McBee, 2014). And there are assumptions regarding the level of care in a nursing home that are often taken for granted, such as having nutritional food to eat, fresh water, necessary medications, and a support staff dedicated to care for all the residents; even in the face of a disaster. There are no assumptions the staff will abandon care in the case of an emergency, the building is unsafe because it was built on subservient soils in the face of an earthquake, or it is located in a known tsunami inundation zone prone to flooding disasters. If a disaster occurs, we

“Patrick...you don't want to live in a place like this. It takes balls to live in here. This is not fun.” ED; elderly care unit.

² Corey Abramson Ph.D. is the author of *The End Game*; winner of the 2016 Outstanding Publication Award; American Sociological Association Section on Aging and the Life Course. *The End Game* is a brilliant research project on the socioeconomic inequalities surrounding American elderly residents at end-of-life.

also assume there are adequate reserves such as water, food, medicine, and oxygen regeneration equipment that will last until help arrives.

The empirical data on hurricane victims indicates senior residents were the most vulnerable population during and after Katrina, Sandy, and Harvey (Bamford, 2015) (NOAA, 2017). Hurricanes can be tracked in time to evacuate residents to avoid loss of life; however, the first warning of an earthquake is going to be the ground shaking. Seniors with adequate financial reserves and a supporting community have choices, such as where they want to live and how they can sustain a recognizable quality of life before and after a catastrophic event. Upper SES families who have planned for retirement and end-of-life may not be aware of the impact of their previous life decisions until the time comes when a catastrophic event affects their lives (Abramson, 2015). These choices are much different than the choices left to marginalized seniors who are less fortunate. Marginalized persons in assisted living situations are significantly affected by public policies that hold land use regulations in compliance for placement and relocation of nursing homes. Their numbers are small and power to make changes is virtually nonexistent, which places seniors in residential care facilities prone to suffering in a natural disaster if land use planners do not take their needs into consideration. No persons should be subjected to undue suffering at end-of-life because others who have the power to make changes are not doing enough. We have created this social stratification and it is through this lens the foundation for this research was built.

Background

Approximately four in ten people in the U.S. live along coastal shorelines (Figure 3), contributing \$6.6 trillion to the U.S. Gross Domestic Product (Bamford, 2015). In 2012 there were eleven weather and climate disaster events including Hurricane Sandy. These events caused a total of 377 deaths and over \$110 billion in damages (Bamford, 2015). The impact to financial and human capital has placed coastal resilience planning into the forefront of federal policy makers and precipitated the President's Executive Order 13653; "*Preparing the United States for the Impacts of Climate Change*" (Bamford, 2015).



Figure 3 (Clatsop County)

Although it is unlikely Oregon will face a major hurricane there is significant data indicating the potential for a catastrophic earthquake and subsequent tsunami. The information from major tropical storms can help Oregon's legislators prepare emergency responders with information on elderly demographics that could save lives and suffering. Hurricane Katrina, Superstorm Sandy, and Hurricane Harvey provide disaster researchers with a significant amount of post-event data on how vulnerable populations influenced their recovery efforts. The lack of knowledge on how to access human resources was predominantly more evident with elderly residents (Bamford, 2015). Survivors of Hurricane Sandy who did not have financial resources in reserve are still struggling seven years later. Many service industry jobs and small businesses have yet to return to New York and New Jersey that were destroyed during the storm and subsequent flooding (Bamford, 2015). Elderly persons in residential care housing during Hurricane Katrina were entirely dependent on the evacuation plan of the assisted living homes they were in. When the directors and staff were challenged with moving people on oxygen, in

wheel chairs, and others more severely disabled, some locations made the decision to stay in place and attempt to ride out the storm (Youngman, 2009). Unfortunately, that was a bad decision and there was significant loss of life (Youngman, 2009).

In 2014, the 77th Assembly of the Oregon Legislature adopted the Oregon Resilience Plan (ORP), (OSSPAC, 2013). The ORP is a research document pioneered by Scott Ashford Ph.D. from Oregon State University that includes an action plan and timetables, outlining the current condition of Oregon's infrastructure, enabling Oregon policy makers to budget for resilience planning resources (OSSPAC, 2013). Roads, bridges, fuel storage units, schools, underground utilities, government buildings, and private property, are prioritized by the level of earthquake and tsunami resilience along with costs and timelines for reconstruction. The ORP is the product of the Oregon Seismic Safety Policy Advisory Commission (OSSPAC), which is a coalition of engineers, geologists, oceanographers, marine studies professionals, and seismologists who report directly to the Governor and legislative assembly (OSSPAC, 2013). Key bridges, 44 schools, and the State Capitol, are currently under renovation scheduled to bring the infrastructure to current earthquake standards (OSSPAC, 2013). The ORP is the most influential resource in front of Oregon's Legislators and is the first officially ratified plan to protect Oregonians facing a catastrophic disaster such as an earthquake (Oregon.gov, 2017). References to senior population demographics are not in the ORP and information must be teased from a series of documents within the census matrix. The critical elements for evacuation and post trauma care are also not included in the ORP (OSSPAC, 2013). Because the ORP is the primary document for Oregon's state legislators budgeting for resilience planning, inclusions for vulnerable residents is a necessary addition that needs consideration.

Post Trauma Care

In the last five years there has been a significant increase in disaster resilience research for marginalized residents; but this is not a one size fits all problem. In New Orleans 71% of the fatalities from Katrina were 65 and older (Ling, et al. 2014). Red Cross and FEMA responders treat everyone who comes into triage center during emergencies; however, post triage elderly individuals with chronic diseases, and/or disabilities, may also be subject to multiple conditions that only trained professionals who deal with seniors regularly will recognize (Ling, et al. 2014). Dementia and other cognitive impairments can exacerbate fear, anxiety, and mask symptoms of diabetes, heart disease, and other chronic conditions (Ling, et al. 2014). Placing these residents as quickly as possible into a safe recovery environment post disaster is critical to their long-term survival.

Inequalities in the socio-demographic make-up of New Orleans exacerbated the uneven impact of the hurricane in the different sections of the city and surrounding areas (Cutter, Emrich, Finch, 2010). It was in the *social* catastrophe that told the story of people stranded in the Superdome waiting for days without food and water. The disaster was in the failed response time from FEMA that left people on rooftops waiting for rescue, and elderly residents in care centers who either drowned or spent days without care before they were eventually found and transported if they survived that long (Cutter, et al. 2010). The news cameras are gone, there are 31% fewer residents, 46% fewer children enrolled in public schools, 22% of the labor force is missing, and 48% fewer state-licensed hospitals operating than there were prior to the storm (Cutter, 2010). Socially marginalized elder residents were primarily housed in the highest risk neighborhoods, and the socio-economic stratification of the neighborhood was a determining factor emergency personnel acknowledged preparing for a disaster such as Katrina (Cutter,

2010). The homes and residential care facilities built in low-lying flood zones were almost wiped out of existence because resilience planners did not demonstrate enough concern for senior citizens who were trapped there (Cutter, 2010). In 2019, Orleans Parish is still trying to recover.

Residents with financial reserves who were tracking the hurricane evacuated to safe locations. Those with enough reserves could afford to wait for insurance companies to fight over the extensive damage while they decided to relocate either temporarily or permanently (Bamford, 2015). The extra resources required by elder residents who live on social security and other government transfer programs are not there for them to relocate, and many senior residents of Orleans Parish are still living in uncertain conditions, unfamiliar surroundings, and filled with anxiety and fear this will be their end-of-life status (Cutter, 2010). For every 1\$ spent on resilience planning, 7\$ is saved; or turn that around and realize for every 1\$ not spent Oregon taxpayers will pay seven times that amount in post-earthquake costs. Oregon legislators can learn from the mistakes Katrina, Sandy, Harvey, and Maria left in the wake of destruction. Quantifiable research since Katrina has changed the Social Vulnerability Index (SoVI) to resolve some of these issues in the future (Cutter, 2010), however, throughout Oregon there are elderly care facilities still located within the tsunami inundation zones and new facilities are being approved for construction in the TIZ on subservient soils.

Oregon

There are 36 counties in Oregon that will suffer loss of life and infrastructure damage relative to their proximity to the earthquake epicenter(s) (OSSPAC, 2013). Seven counties border the Oregon coastline, with Columbia and Multnomah counties³ upstream from the mouth of the

³ These two counties are not a part of the seven counties that border the coastline but were included here to demonstrate there is more research to be completed throughout Oregon. Both counties are vulnerable to storm

Columbia River. Of the seven coastal counties, five were chosen for this research project based on tsunami inundation maps and critical locations of elderly care facilities.⁴ Clatsop, Lincoln, Linn, Coos, and Curry counties have an approximate population count of 300,000 residents; 51,000 residents are 65 years old and over (US Census, 2017). Post hurricane data from Katrina, Sandy, and Harvey, recorded approximately 62% loss of life for elderly residents (FEMA, 2016). A 62% loss of life to elderly residents in these five Oregon counties would be approximately 31,620 persons.⁵ Although this report is focusing on coastal conditions in the five counties listed above, it is to be noted that infrastructure damage from older apartment buildings and other poorly constructed housing projects will also face significant loss of life in many of the inland Oregon communities (OSSPAC, 2013). These numbers are a significant indication further research is needed throughout the remaining Oregon counties.

Centralized Database

The empirical data from previous hurricane events demonstrates elderly residents as a whole especially those residing in a care facility, are going to require the most time and resources to evacuate and care for post trauma. A database available to emergency responders will benefit survivors and their families as a tool to reduce suffering. Residential care facilities are privately owned and managed, therefore their records will be completely lost or unavailable for post recovery if the building is destroyed. GIS mapping technology offers the perfect mechanism to benefit Red Cross and FEMA personnel with valuable information for each site. Embedded in the layers of attributes for each facility location could include (but not limited to);

surge backing up from the mouth of the river and are critical for resilience planners because all the reserve fuel supplies are stored here, which will make recovery more difficult if they are consumed by flooding (OSSPAC, 2013).

⁴ Further explanation of why each county was chosen is in the methods section of this research paper.

⁵ There is no information denoting how many of these residents are in an assisted living facility. Some elder residents may be living closer or further away from the ocean, living with family, or isolated living privately.

number of staff and their contact information, number of residents, contact information for next of kin, special needs of each resident, and any identifying marks such as tattoos, birth marks, etc. Not only will this information be of significant benefit to survivors and their families, it will provide emergency personnel with valuable data to identify those persons who are unidentified in a triage center, or did not survive.⁶

FEMA supports the use of GIS mapping (Figure 4) to utilize databases in hazard

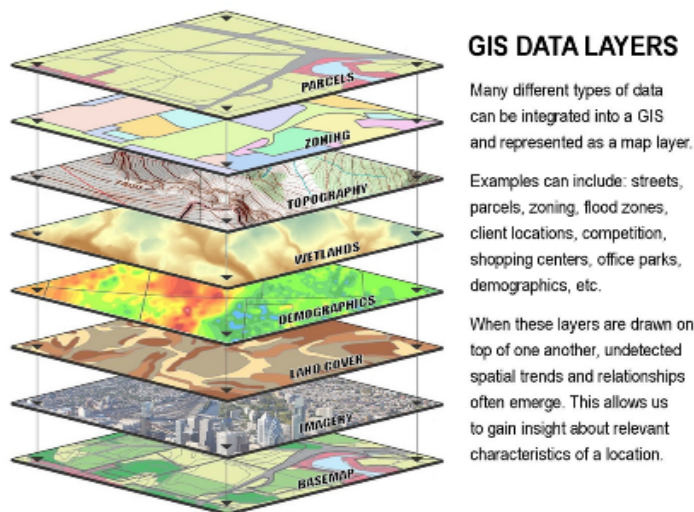


Figure 4 (GIS MAP)

mitigation. In recent collaboration with Portland State University and local jurisdictions, information was collected onsite by FEMA representatives working in Oregon as a part of the Hazard Mitigation Assistance program (FEMA, 2016).

In December of 2015, Oregon

received a Presidential Major Disaster Declaration (4258DR) post a significant storm event that affected fourteen Oregon counties. Data from landslides, storm surge, river flooding, and population density centers, were used to locate areas in the greatest need of assistance. FEMA provides a web site with the tools used by researchers to map the endangered areas and establish a base of information in a GIS format (FEMA, 2016). The FEMA web resource also describes several methods on how to present information for policy planners in a dramatic and effective

⁶ There has been significant progress on this issue since I began this project. Further information is in the Summary section of this paper.

manner to help them understand the financial burden Oregon residents face in protecting vulnerable populations (FEMA, 2016).

METHODS

Five Oregon coastal counties were chosen for research out of the seven counties that abut the Pacific Ocean. Clatsop, Lincoln, Linn, Coos, and Curry counties were selected because of their low-lying topography and therefore have the most vulnerable urban development to tsunami inundation (OSSPAC, 2013). County and city maps were overlaid with TIZ maps produced by NOAA⁷ to determine the most vulnerable areas and number of sites within the tsunami inundation zones. Clatsop, Lincoln, Linn, Coos, and Curry counties had the most sites that appeared to be in or close to the TIZ and therefore designated for further onsite research. Within each of these five counties there are active agencies distributing information to local residents and tourism points of interest about the potential of earthquake and tsunami events. In each of these counties, there are defined tsunami evacuation routes with designated signage.

Once the elderly residential care facilities and adult foster care homes were identified online in each county a primary client was randomly chosen out of the nine residential care facilities in Clatsop County. The primary client was also chosen because it is located in one of the most dangerous locations on the Oregon coast due to the proximity to a coastal river, subservient soil foundation, and their willingness to participate in the study. The client was unsolicited, however after a brief introduction the Health Services Director (HSD) agreed to participate in the research and help design the interview protocol, which was developed in two interviews aimed at understanding their specific evacuation and triage needs. The HSD was also

⁷ NOAA; National Oceanic and Atmospheric Administration has produced TIZ maps for all of Oregon's coastal counties and are available online.

the director of two other local care facilities during her career and had a clear understanding of local obstacles facing evacuation and sheltering in place. The two interviews took approximately one hour, thirty-five minutes each.

A series of qualitative interviews with twenty-one residential care facilities in the five designated Oregon coastal counties was held between April 2, 2018 through March 12, 2019. Each care facility was chosen for interview based on vulnerability to earthquake damage and those facilities constructed in recognized tsunami inundation zones. Twenty-four sites were visited, twenty-one sites granted personal interviews with the Executive Director from each site along with property tours of the facility's tsunami room and reserve resources.



Each interview followed the interview protocol and took approximately one hour to complete⁸. The interviews were either recorded, transcribed and coded for this research project, or notes were taken during the interview and walk through of the facility for those participants not wishing to be recorded. All sites were interviewed after receiving and understanding the verbal consent form and IRB approval. Each site was visited without prior announcement and in all but two sites, the staff was available and willing to participate in the interview. The qualitative interview protocol was designed to encourage the respondent to expand their answers to include any information they felt was important. All participants were asked the same questions from the interview protocol briefly outlined below.⁹

⁸ This was a series of qualitative interviews to stimulate conversation and draw out any concerns the Executive Director or staff of the facility was concerned about. The entire interview protocol is in the Appendix.

⁹ The complete interview protocol is in the Appendix for review.

Interview protocol:

1. There is a lot of information being presented to Oregon residents [especially here on the coast] about earthquake and tsunami preparedness. If you are here and the ground starts shaking what are you going to do?
2. Have you ever moved everyone [staff and residents] from this facility at one time, e.g. an evacuation drill? What was your experience and how long did it take?
3. Are you required to perform evacuation drills?
4. For those residents that need assistance, how do you determine which residents to evacuate first?
5. Do you need emergency services to help you evacuate everyone?
6. Do you know where you would go? Do you have an emergency route to higher ground planned?
7. If you [or the staff person in charge at the time] make the decision to shelter in place what requirements might you have for resident survival that might be different from the general population, for example oxygen or medication?
8. Can you elaborate on the importance of an early warning system that alert you AHEAD of the emergency sirens and the ground shaking?
9. So, in best case scenario all or most of the staff and residents have survived; do you have a plan in place for after the earthquake and the water recedes?
 - a. Do you know where Red Cross shelters are going to be located and how you will be notified?
 - b. How long do you foresee people surviving who have special needs e.g. oxygen and other medications?
 - i. What are some of the special needs your residents are going to require?
10. What steps have you, or the owners of this facility, already taken to provide access to information to emergency personnel on staff and the residents?
 - a. Such as special needs and notification to next of kin?
 - b. Is there a benefit in having a database for Red Cross and FEMA emergency personnel on special needs and contact information for next of kin for survivors in their care?
11. Now that we have vetted some of this out loud, is there anything that comes to mind you would like to add?

The recordings and notes from each interview were transcribed and the responses were placed into a coding matrix based on the code definition the information supported the most.¹⁰

1. Geographical Informational Map (GIM)
 - a. All information stored in one place.
 - b. Database site hosted for emergency personnel access.
 - c. Database support for CBA.
2. Notification Next of Kin (NNOK)
 - a. Organizational chart with contact information (facility)
 - b. Staff database including special medical needs, notification next of kin.
 - c. Resident database including special medical needs, notification next of kin.
3. Early Warning System (EWS)
 - a. Evacuation time
4. Cost Benefit Analysis (CBA)
 - a. Evacuation support
 - b. Early warning system
 - c. Special needs of elderly residents' post disaster
 - d. Geographical Informational Mapping

¹⁰ The Codebook was utilized to tease out critical information that could assist policy makers in determining how much financial assistance would be required to help all the elderly care units either relocate, evacuate, or shelter in place. Facilities were asked if they wanted information on residents and staff stored on a secure server for Red Cross and FEMA personnel to access. A more detailed review of the Codebook is in the appendix.

RESULTS

Tsunami Inundation Zone (TIZ)

Nine out of twenty-four elderly residential care facilities visited are currently located in a recognized tsunami inundation zone and/or built on subservient soils that could face liquefaction during an earthquake¹¹ (OTC, 2017). Seaside, Lincoln City, Gold Beach, Bandon, and Brookings have emergency evacuation sirens that will notify the community of off shore earthquakes that could produce a local tsunami; however, they will not detect a CSZ earthquake in time to evacuate. A CSZ earthquake registering 8.0 or greater will potentially generate a tsunami when the tectonic plates shift at the subduction zone, the first warning will be the earthquake. In this case residents will have approximately 15 to 18 minutes after the ground stops shaking until the tsunami will flood the low-lying areas with devastating results including extensive loss of life as well as infrastructure damage (OSSPAC, 2013). In areas without emergency warning systems, residents will not be notified of a tsunami generated off shore.

Evacuation Preparedness

Out of the twenty-four sites visited only two are privately owned. Nineteen facilities are members of larger corporations with headquarters out of state, and three facilities are headquartered in the Willamette Valley. The senior living units owned by companies out of state disclosed they were under corporate policies that directed them to have evacuation plans in place and were to be prepared to move the residents to a triage

Buildings constructed on unstable foundation could collapse in moderate level earthquakes (OSSPAC, 2013).

Buildings not constructed under current earthquake resilience standards are unsafe for residents to shelter in place (OSSPAC, 2013).

¹¹ Quantifiable data chart is located in the Appendix for further review. The chart includes facility codes correlated with onsite data individualized to each location.

center as soon as there is an indication of an earthquake. The adult foster care homes reported being concerned they do not have adequate transportation onsite to move all the staff and residents in a timely manner. Directors of twenty-one care facilities also expressed their apprehension about having enough time to evacuate their residents once the earthquake happens. Seven facilities disclosed the parent company is aware the local living units will have to shelter in place despite corporation protocol to evacuate. Fourteen units said they will shelter in place, and will be forced to ignore corporate evacuation protocol.

“Our main objective is saving lives...that’s it. We’re not concerned about breaking policy or laws and that information getting out there.”

Care units that regularly move residents to local events report taking between thirty minutes to an hour to load transportation vehicles due to the tedious restrictions of disabled residents. Damage from an earthquake to the parking lot and nearby streets may be a significant factor in determining whether the facility can evacuate, or they need to shelter in place. One of the directors noted; *“If the building remains functional the bus is going to be a moot point, we won’t be able to get to it. The bus sits on our property but I don’t know what the property would look like - or the road. There will be fissures and breaks in the asphalt, that sort of thing.”*

Seven of the residential care sites visited have a ‘tsunami-room’ with provisions to

“I fully expect that every building that was constructed 15 or more years ago will completely pancake. You’ll lose the whole first floor.”

shelter in place; however, there were limited supplies in each unit, and it is questionable (by staff) if the provisions would last longer than two or three days and for how

many people. Three facilities have been identified by emergency personnel as emergency triage centers; however, they do not have supplies for residents outside of their facility and do not know as of this writing how to prepare for outside residents seeking food and shelter.

Out of 21 centers interviewed only one facility in Astoria is realistically prepared for a vertical evacuation. The Clatsop Care Unit is a large three-story brick building constructed on a rock base that sits high above the city and waterline. They are equipped with reserve propane storage, large reserve generators adequate for several days of service, with food and water reserves for a projected two weeks survival if needed.

Only five out of twenty-one sites interviewed report having sufficient water storage for more than two or three days. All twenty-one of the facilities interviewed expressed concerns over where to store reserve water indicating the subflooring on the upper floors was not sufficient to hold enough water to last a minimum of five days depending on how many staff and residents survive. There are four units with reserve water and propane tanks, but they are located outside on the ground floor, which could be vulnerable to being immediately disabled in a major earthquake or flooding. Several sites reported they have enough water; however, they are referring to water stored in the hot water tanks. When asked if they (E.D. or Administrator) have ever examined the tanks and know how to extract the water in case of emergency, all of them reported they have not, and they did not know if a hose and tools were located near the tanks for emergency access.

Medical supplies in nineteen out of twenty-one sites are delivered once a month, depending on when the cycle is interrupted by an earthquake there is potential for medical supplies to be in short supply. *“We don’t have oxygen in our infrastructure so anybody that has oxygen has a concentrator that runs by electricity [that will also fail]. We have a generator here but that also requires fuel. Will we be able to get fuel for our generator and will it be safe? And water won’t last long. You’ve got to have what, 3 gallons of water per person and that is supposed to last for 3 days? And we’ve got 70+ people here? We don’t have room to store that.”*

Facility Relocation

Elderly care facilities in Oregon are privately owned, for-profit companies, operating residential housing on private land/public access and the owners (corporation headquarters) are out of the area. Most of the Executive Directors of the facilities interviewed believe relocation of their care units is not possible. Queries were sent electronically to several city and county land use departments searching for tax incentives for relocation of existing facilities, or restrictions that prohibit new construction in a TIZ. Below are responses from these departments:

“Good Morning, Patrick: Thanks for reaching out. The City of Warrenton Development Code has definitions for each land use category. Medical facilities are defined within a “professional service establishment.” However, we do not have a clear definition for elderly care facilities. It’s something we can take a look at when we start a code review this year. Finally, we don’t have specific code language for tsunami threats or financial incentives specific to this need.” Kevin Cronin; AICP; Community Development Director; Community & Economic Development Department; City of Warrenton.

“The city of Warrenton has just approved new construction in the purple zone of the tsunami inundation map. Anything within the zoning requirements can be built with city approval.” Pat Corcoran; OSU Sea Grant; Astoria, Oregon.

“Clatsop County does not offer any tax incentives to relocate an elderly care facility that is located within the tsunami inundation zone. The County’s codes do not specifically define either “elderly care facility” or “medical facility.” Additionally, I am not immediately aware of any such facilities that exist in the unincorporated areas

of the County.” Gail Henrikson; AICP Director; Clatsop County Community Development.

“The Building Codes Division has no monies or influence over monies for the development of any construction projects. We simply set minimum limits for how occupied structures must be constructed and the maximum standards that can be enforced in those structures.” Wendy McKay; North West Regional Coordinator; Building Codes Division; State of Oregon.

“There are no tax incentives available for relocation of existing elderly care facilities that we are aware of. There are different definitions of medical facility, some include elderly care units and others do not. Good luck with this project it is valuably needed.” Will Gaston; Disaster Recovery and Resilience Planning Specialist; Oregon Housing and community Services; Human Resources and Administrative Services.

“We have just been approved to build a second facility...it is in the tsunami inundation zone. The city planners were not concerned this was a potential problem; however, they were more concerned of having our residents in their community.”

“I don’t necessarily know much in the way of tax incentives for not developing in the tsunami-zone yet (I don’t think they exist, but I could be wrong), but I would encourage you to take a look at transfer of development rights as a potential option: <https://www.oregon.gov/lcd/FF/Pages/Transfer-of-Development-Rights.aspx>.” Meg Reed; Coastal Shores Specialist; Oregon Coastal Management Program; Oregon Department of Land Conservation and Development.

The lack of incentives with enough horsepower to persuade developers to move existing elderly care centers out of harm's way does not exist. It is going to be cheaper and less contentious for a large company to close the doors entirely instead of attempting relocation. A new facility in Bandon was recently approved for a secondary site, it is within the TIZ.¹²

Emerging themes from interviews

Many of the respondents reported being inundated in the last few years with earthquake and tsunami information, with the exceptions of Coos and Curry counties. One director reported that much of the information is being presented in the voice of 'impending doom.' Instead of helping the staff prepare to bolster provisions and make their buildings safe it is igniting fear and most people are planning to take care of themselves and their families first. The directors and staff feel powerless to change corporate direction, such as whether to evacuate or shelter in place, and their requests for more provisions and backup equipment such as large enough generators and fuel storage are going unheard. Putting adequate water supplies on upper floors for vertical evacuation requires adequate flooring support to hold significant weight, which means the majority of the facilities I visited would require some reconstruction and the administrators did not feel the corporation was prepared to finance the projects.

"We have an emergency evacuation manual and it is this thick [holding her hands in the air] I haven't read it yet but just as soon as I clear off my desk...I'm going to."

During staff interviews in Bandon, Gold Beach, and Brookings, it was disclosed that these are predominantly retirement communities with a large population of senior residents.

¹² Reported by the owner of the facility.
Patrick Whelan

Many elderly residents reside in private homes most of which are located close to the ocean and therefore on low-lying topography. This research was focused on care facilities because the demographic has little voice when it comes to their personal care and the decisions on resilience planning is solely in the hands of caregivers; but it should be noted the large population centers of elderly residents living in private homes still provides emergency responders with significant logistic challenges. I found several places within these communities (e.g. Brookings as a good example) that have dramatic undulating topography suggesting there will be parts of the community located on hills that might survive intensive flooding; however, they will be immediately isolated and emergency services will have difficulty locating and evacuating residents after the tsunami has inundated the area.

Oregon's beaches are the main destination points for the larger metropolitan areas in the Willamette Valley, which tells us at any given time there are more tourists in the area than residents. This presents emergency responders with higher than average population densities of people who are unfamiliar with the area (OSSPAC, 2013). Researchers from Oregon State University have identified much of the infrastructure within Oregon coastal counties that are constructed on unstable sandy soil foundations that could have deleterious effects in an earthquake of 5.0 and greater (OSSPAC, 2013).

RECOMMENDATIONS

1. Elderly care facilities and adult foster care homes within the tsunami inundation zone must be moved to higher more stable ground, and into buildings that are constructed for earthquake resilience. If it is not possible for staff to evacuate the residents in time to avoid a tsunami the facilities within the tsunami inundation zone and/or constructed on subservient soil foundations must be relocated for safety.

- a. Re-define the status of elderly care facilities for land use development, to a medical facility for elderly care and supervision. This will provide land use planners with a tool to control the location of new planned unit developments for elderly residents. The re-definition of terms will also allow land use planners the ability to extend urban growth boundaries to provide safe construction sites for these residencies.
- b. If the facilities buildings are not constructed under current earthquake standards, they are considered dangerous and the residents need to be relocated into buildings constructed to current earthquake resilience standards (OSSPAC, 2013).
- c. Parent companies of elder care units are encouraged to investigate assistance programs to relocate.
 - i. Pre-Disaster Mitigation (PDM) are hazard mitigation programs to mitigate project costs prior to a catastrophic disaster (DLCD, 2015). PDM programs are available to state, territories, Indian tribal governments, communities, and universities for planning and implementation (DLCD, 2015).
 - ii. The HMGP is a Hazard Mitigation Grant Program available to states and local governments for long-term disaster relief post a catastrophic event and may be applied for if loss of life is immanent (DLCD, 2015).
 - iii. FEMA offers Flood Mitigation Assistance (FMA) to assist states to reduce or eliminate costs related to flood damage (DLCD, 2015).
 - iv. The Urban Growth Boundary (UGB) can be modified by local jurisdictions to accommodate the relocation of elderly care units (DLCD,

2015). Moving the UGB enables city designers to reconstruct zoning requirements to protect vulnerable citizens and make it easier for these facilities to apply for assistance opportunities for relocation (DLCD, 2015).

- v. System Development Charges (SDC's) are often used in municipal planning because they are a more fluid form of reserve capital. SDC's are a one-time charge for new development to access municipal services, and often SDC's are raised to accommodate the needs of a city that directly impact the local population (DLCD, 2015).
- vi. These incentives are not enough and developers with nursing homes already constructed and housing residents may be tempted to close the units in lieu of relocation. Public policy from the State legislators could provide assistance programs for relocation that are enticing to maintain services in the community in question.

2. Until each care facility can successfully move to a safer location, emergency provisions must be bolstered in every location to shelter in place.

- a. Provisions must be increased and monitored weekly to ensure enough food, water, and necessary medical supplies can last a minimum of five days for all residents and staff.
- b. Water resources are critical, adequate water reserves must be stored in a safe location for access to last a minimum of five days for all residents and staff. Storage in hot water tanks is not sufficient, because they may be difficult to access, or disabled in an earthquake. For water extraction in case the hot water

tanks are intact, proper tools must be located immediately next to the tanks in case of emergency.

- c. Non-refrigerated food stocks must be on hand for a minimum of five days.
3. A GIS database hosted on both Red Cross and FEMA web sites for emergency access must be regularly updated to identify:
 - a. Locations of all elderly care facilities.
 - b. Numbers of residents and staff members.
 - c. Next of kin and special needs information for survivors and notification for loss of life.
 - d. The locations that can utilize emergency responder assistance for evacuation.
 - i. Some facilities are in locations that are unsafe to send in emergency responders to assist evacuation. Placing EMT's in this position will prove detrimental to evacuation efforts. Only those personnel trained [and designated] in the evacuation of elderly disabled residents can be of assistance.
 4. Cost benefit analysis from GIS information.
 - a. To determine support costs to assist each facility in preparation for sheltering in place.
 - b. Support continued research throughout all seven Oregon counties that border the coastline, and potentially all the 36 Oregon counties that could be affected by a catastrophic earthquake.
 - c. A cost benefit analysis can support the importance of funding to assist relocating each facility to a safer location. As a temporary solution financial assistance can

aid elder care facilities to make building modifications to house enough provisions of water, food, and medical supplies.

5. Current evacuation route signage is too small to read in an emergency and must be made

to a minimum of 24” x 24” for visibility. The signs are currently decoratively painted to blend into the environment but make it

“If you aren’t a part of the CERT Team here you don’t know [where the evacuation signs are]. I am a part of the NET Team which is out of Portland and that is useless down here. It needs to be posted at the board where you put your business card at Fred Meyers, where you post your couch for sale in Rite Aid, it needs to be in the bathrooms, it needs to be really public. They make such a big deal we need to be ready for the tsunami and the earthquake...that’s part of helping get ready. Everybody needs to know where to go. And not everybody is going to be able to find the little blue sign that day.”

hard to discern in an emergency. All evacuation signage is to be consistently color coded and painted in bright colors for quick identification.

6. This area of the Oregon coast is a destination resort community often with a larger population of tourists than permanent residents. More information on evacuation, emergency warning announcements, and preparation essentials for an earthquake and tsunami, should be clearly posted in key locations such as grocery stores, eateries, public restrooms, beach access, theaters, and all places where large concentrations of tourism occurs.

SUMMARY

When I began this research project three years ago there was little information on how elderly residents were accounted for in Oregon. Since that time researchers from different disciplines have started programs following up on previous queries from land use development offices, Department of Human Services, Red Cross, FEMA, OSU, and Portland State University. The most recent contribution is the GIS database created by Kristen Darmody MPH, Health

Equity Planner for the Oregon Health Authority; Department of Human Services; Office of Licensing and Regulatory Oversight (OLRO) in charge of licensing elderly residential care facilities, in all 36 Oregon counties.

Information is currently being gathered and submitted for input and the link is available for distribution to emergency management with GIS capability;

<https://geo.maps.arcgis.com/apps/webappviewer/index.html?id=0e0abd6972ce419b88bdf8169ec3f29f>

But she cannot do this work alone. The limited number of interviews confined to five of the seven Oregon coastal counties suggests further research is needed as well as updated data from local jurisdictions and private institutions to make the project work effectively. The interview protocol and codebook system proved successful for this project; however, it could be expanded to incorporate more information. The refined product can be utilized in all the remaining counties in Oregon to understand the implications of resilience planning for elderly residents.

No more than an idea three years ago, is now the beginnings of a GIS map layered with necessary attributes that will be beneficial for all catastrophic events. Locations and resident data are currently being imbedded in each pinpoint within multiple layers of data easily accessible by law enforcement and emergency management personnel. Each pinpoint can store and retrieve data e.g. what is at that location (residential, foster care, or in-home disabled), how many persons, what their special needs are, family contact information, number of staff personnel and their contact information, and if the facility has an evacuation plan.

Relocating an existing care facility has both positive as well as negative consequences. I wrote this thesis paper through the lens of social constructionist theory and the thirty-two years I spent working with land use developers. Despite information from the collected data, there is not

enough incentive for a developer of multiple sites (2,000+) to relocate the residents and operations of one facility to another location in lieu of closing it. The cost benefit analysis is skewed due to the value of a human life; however, if that cost is taken out of the equation the CBA shifts to the negative side when it comes to forecasting the costs of relocation. It is cheaper and less contentious for the corporation to close the operation instead of relocating it. The balance has to be weighted to demonstrate the loss of local employment and impact on the community. Pressure to relocate from within the facility could also generate the opposite reaction residents or their families are looking for and merely find the facility closed altogether.

The third part of this summary is to point out a universal challenge that occurred in all the catastrophic disaster recovery literature. There are many elderly residents working in service industry jobs who are not considered disabled, but they are classified as ‘the working poor.’ Financially they may be comfortable enough to not live on government transfer programs (other than Medicare or social security) which suggests that accurate records of the numbers and locations of these residents is buried in the matrix of DHS records; however, they too may have poor mobility, poor hearing, poor eyesight, and rely on medications and canes or walkers to be ambulatory, they may also rely on heart and/or diabetes medications that are critical to their survival. This number could be larger than resilience planners are aware of, which is another indication a more comprehensive research for each of Oregon’s counties is vital data for resilience planning.

CONCLUSION

Empirical evidence indicates there is going to be a major earthquake along the Oregon coastline within the next 50 to 100 years. There is going to be little warning, the ground is going to shake, and then somewhere between 15 and 20 minutes later [if the earthquake is severe enough] a tidal wave will follow and devastate the majority of infrastructure within the low-lying areas of all the Oregon coastal communities. The elderly residents in residential care facilities are in harm's way and emergency personnel cannot access their pertinent information if the facility they reside in no longer exists. Food, fresh water, and medical supplies will be transported by helicopter to triage centers with landing capability, isolated islands of people will be dependent on reclamation of the infrastructure until it can support traffic. Once an elderly person is transferred from a triage center to an outside location it is going to be critical for those residents to find medical support staff educated in elderly assistance care, financial assistance, and notification of next of kin, and the special needs of senior residents.



When we hear phrases such as; '*natural disaster,*' or '*an act of God*' all too often we do not take personal responsibility for the anthropogenic contribution we have made that places others in harm's way (Ashwood, 2016). In the promotion of Oregon's tourism industry, we allowed a large population to reside in areas that are going to be negatively affected by a natural catastrophe. The residents living in adult residential care are representatives of the people that gave us the courage to dream. To put a human on the moon and explore the depths of the oceans. Courage to find answers to diseases that extended all our lives and propagate a future full of

opportunity. I have seen the Beatles, watched Martin Luther King Jr. and Mother Theresa on television, I know exactly where I was when John Kennedy was assassinated, and the World Trade Center's fell in New York. I watched Captain Kirk use a flip phone and talked to a computer, while people laughed saying that was impossible and could never happen. Now we have an opportunity to pay back those people whose shoulders we stood on to give us the strength to follow our dreams. Letting them suffer or pass away unnoticed when a natural disaster comes to fruition is unacceptable. It is our obligation as a society to help socially marginalized persons by adapting public policies to new information that demonstrates where they live is unsafe. We are all in the race-to-the-finish together, and in this case there is room to make a difference.

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Page 5; Global tectonic plate map

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Page 10; Seaside Oregon

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* The direct quotes used throughout this paper are from the collaboration of elderly residential care staff during the interview process. They are intentionally not referenced by name and location to protect their anonymity in case their plans for evacuation and post trauma care conflict with institutional policies.

APPENDIX

Quantitative Chart											
County	Facility Code ¹	TIZ ²	Plan to evacuate		Shelter in Place		Preparedness	Prep. Ttl	Residents	Staff	EMT Access to Resident & staff data
			Corporate	In-house	Corporate	In-house					
Clatsop	C1	yes	yes	no	no	yes	-1,-2,-3,-4	-10	80	20	no
	C2	yes	yes	no	no	yes	-1,-2,-3,-4	-10	40	25	no
	C3	yes	yes	no	no	yes	-1,-2,-3,-4	-10	40	25	no
	C4	no	yes	yes	yes	yes	2,2,r1,	5	80	20	no
	C5	yes	no	no	yes	yes	-1,-2,-3,-4	-10	60	20	no
Lincoln	L1	no	yes	yes	yes	yes	2,2,r1,	5	80	20	no
	L2	yes	yes	no	no	yes	-1,-2,-3,-4	-10	35	23	no
	L3	no	yes	no	no	yes	-1,-2,-3,-4	-10	80	20	no
	L4	yes	yes	no	no	yes	-1,-2,-3,-4	-10	40	25	no
	L5	no	yes	no	no	yes	-1,-2,-3,-4	-10	80	20	no
Lane	La1	yes	under construction								
	La2	no	no	no	yes	yes	2,-2,-3,-4	-7	80	20	no
	La3	no	no	no	yes	yes	2,2,r1, ^x	5	80	20	no
Coos	Co1	no	yes	yes	yes	yes	2,-2,-3,-4	-7	80	20	no
	Co2	no	This facility is located well outside the TIZ and on stable ground; drove by but did not interview								
	Co3	no	This facility is located well outside the TIZ and on stable ground; drove by but did not interview								
	Co4	no	This facility is located well outside the TIZ and on stable ground; drove by but did not interview								
Curry	Cu1 ^y	yes	no	no	no	yes	-1,-2,-3,-4	-10	93	25	no
	Cu2	no	n/a	no	n/a	yes	1,2,r1	5	14	22	no
	Cu3	no	yes	yes	no	yes	1,2,-3,r1	0	42	32	no
	Cu4	no ³	no	no	no	yes	1,2,-3,r1	0	55	30	no
	Cu5	no	yes	no	no	yes	-1,-2,-3,-4	-10	35	28	no
	Cu6	yes	yes	yes	yes	yes	-1,-2,-3,-4	-10	100	35	no
	Cu7	no	no	no	no	yes	-1,-2,-3,-4	-10	60	35	no
								1254	485		

Quantitative Chart Key	
DATA KEY	
1	Facility names; Respondent names; and direct links to identity are confidential.
2	TIZ; Tsunami Inundation Zone
3	Built on high ground surrounded by low-lying areas indicating they will be cut off during emergencies.
4	Do not believe an earthquake or tsunami is a real threat; therefore do not believe in resilience planning.
5	The largest senior facility along the coast; in the TIZ; built on sand; 3 story buildings; do not believe an earthquake or tsunami is a real threat; therefore do not believe in resilience planning.
x	Designated local triage center. Water, generator are located outside on ground floor. There are not enough reserves for a triage center to support outside local residents.
y	Privately owned memory care facility. Building staff for second location.
Level of Preparedness	
Out of TIZ; unstable ground	1
Adequate provisions	2
Out of TIZ; stable ground	2
Reserve generator	r1
No reserve generator	-1
Inadequate food reserves	-2
Inadequate water reserves	-3
In TIZ; unstable ground	-4
*Several facilities indicate reserve water is in the hot water tanks. When asked if the ED or immediate supervisors knew how to get the water out of the water tanks no one had examined the tanks nor had any information on how to drain them, did not have proper tools and hose nearby therefore they were considered to NOT have adequate water reserves.	

INTERVIEW QUESTIONS

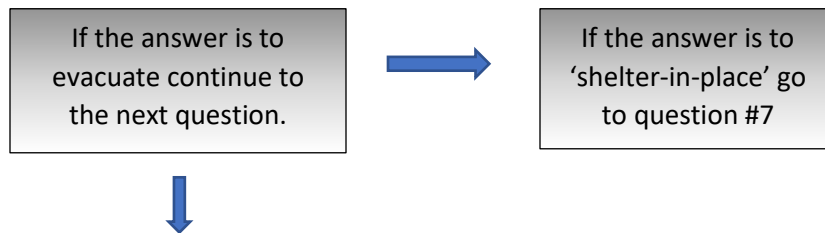
PROJECT TITLE: Resilience Planning For Elderly Residents
in Oregon Coastal Communities

Brent S. Steel, Principal Investigator, Oregon State University
Patrick Whelan, Graduate Researcher, Oregon State University

Questions for Participants

'We have discussed our interview today is about gathering aggregate information from all the residential care facilities and adult foster care homes along the Oregon coast on earthquake and tsunami preparedness. I am not here to gather site-specific information tied to your facility. In these preliminary interviews I am looking to understand the level(s) of evacuation preparedness, and what resources are going to be needed to assist survivors.'

1. There is a lot of information being presented to Oregon residents [especially here on the coast] about earthquake and tsunami preparedness. If you are here and the ground starts shaking what are you going to do?



2. Are you required to perform evacuation drills?
3. Have you ever moved everyone [staff and residents] from this facility at one time, e.g. an evacuation drill? What was your experience and how long did it take?
4. For those residents that need assistance, how do you determine which residents to evacuate first?
5. Do you need emergency services to help you evacuate everyone?
6. Do you know where you would go? Do you have an emergency route to higher ground planned?
7. If you [or the staff person in charge at the time] make the decision to shelter in place what requirements might you have for resident survival that might be different from the general population, for example oxygen or medication?

8. Can you elaborate on the importance of an early warning system that alert you AHEAD of the emergency sirens and the ground shaking?
9. So, in best case scenario all or most of the staff and residents have survived; do you have a plan in place for after the earthquake?
 - a. Do you know where Red Cross shelters are going to be located and how you will be notified?
 - b. How long do you foresee people surviving who have special needs e.g. oxygen and other medications?
 - i. What are some of the special needs your residents are going to require?
10. What steps have you, or the owners of this facility, already taken to provide access to personal information on the residents in your facility for emergency personnel?
 - a. Such as special needs and notification to next of kin?
 - b. Is there a benefit in having a database for Red Cross and FEMA emergency personnel on special needs and contact information for next of kin for survivors in their care?
11. Now that we have vetted some of this out loud, is there anything that comes to mind you would like to add?

I want to thank you for your time and professional courtesy. It is my intention to gain as much aggregate information as possible on all the elderly residential care facilities and adult foster care homes in along the Oregon coastline. I believe the more information we have the more lives will be saved, and the quality of life for survivors will be improved.

**Project Title: Resilience Planning for Elderly Residents
In Oregon Coastal Communities**

**Principle Investigator: Brent S. Steel
Oregon State University
Oral consent guide
01/07/19**

Introduction and Verbal Consent Guide

I am a graduate research student at Oregon State University, where I am working with Professor Brent Steel on a project studying aggregate information from all the residential care facilities and adult foster care homes along the Oregon coast on earthquake and tsunami preparedness. I am not here to gather site-specific information tied to your facility. In these preliminary interviews I am looking to understand the aggregate level(s) of evacuation preparedness, and what resources are going to be needed to assist survivors.

If you agree to participate in the study, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time. You have the right to refuse to answer particular questions. I am providing you with my contact information [Information will be faxed/emailed if interview is conducted over the phone.], and you should feel free to get back in touch with me if you have any questions for me about this study. I also have included contact information for the Institutional Review Board at Oregon State University if you have any questions about your rights as a study participant.

The information you provide will be kept confidential. Confidentiality will be kept to the extent permitted with the technology being used. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete and made public.

Would you be willing to participate in the study, and in particular, to talk with me about earthquake and tsunami preparedness for your facility? If you participate, you will have the option to review and comment on your interview notes. If you do not respond after two weeks, we will assume that your responses are acceptable to you.

We do not know what studies we might do in the future. We would like your permission now to use or share your responses without having to ask you again in the future. We will only use your responses in other studies regarding earthquake and tsunami preparedness. We will remove your name before we share your responses with other researchers.

Do you give consent for your identity to be revealed in all written data resulting from this study?

So that I don't miss any information, I would like to ask your permission to record our discussion. As soon as the information from this discussion has been transcribed, the tape will be destroyed. Would you be willing to have me tape the session?

Contact Information:

If you have any questions concerning the study, please contact myself at (541) 408.3058 or by email at whelanp@oregonstate.edu or Professor Brent S. Steel at (541) 737.2811 or by email at bsteel@oregonstate.edu. If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office, at (541) 737.8008 or by email at IRB@oregonstate.edu.

Codebook

Resilience planning for the protection of Oregon’s vulnerable residents in the event of a catastrophic natural disaster specifically the Cascadia Subduction Zone earthquake and tsunami.

Research Question: In the case of a natural catastrophic event to what extent are Oregon's vulnerable residents accounted for. This research focus is on elderly residents in Clatsop County, Oregon.

1. Geographical Informational Map (GIM)
 - a. All information stored in one place.
 - b. Database site hosted for emergency personnel access.
 - c. Database support for CBA.
2. Notification Next of Kin (NNOK)
 - a. Organizational chart with contact information (facility)
 - b. Staff database including special medical needs, notification next of kin.
 - c. Resident database including special medical needs, notification next of kin.
3. Early Warning System (EWS)
 - a. Evacuation time
4. Cost Benefit Analysis (CBA)
 - a. Evacuation support
 - b. Early warning system
 - c. Special needs of elderly residents’ post disaster
 - d. Geographical Informational Mapping

CODE	DEFINITION	EXAMPLE
GIS	<p>Geographical Informational Science</p> <p>A database in the form of a map that is comprised of several layers of attributes about each elderly care facility.</p> <p>This database is hosted on a site specifically designed for emergency</p>	<p>Then I can tell you that every facility, coastally, has what we call a tsunami room. And it has a stockpile of food.</p> <p>No, you can’t use the elevator. With the elevator it won’t work.</p> <p>No. I fully expect that every building that was constructed 15 or more years ago will completely pancake. You’ll lose the whole first floor.</p> <p>Well optimally the second floor is going to be the first line of defense for most of the people who won’t be able to get out. To shelter in place.</p> <p>We have an emergency evacuation manual and it is this thick [holding her hands in the air] I <i>haven’t</i> read it yet but just as soon as I clear off my desk...I’m going to.</p>

	<p>personnel in the event personal records are destroyed in the emergency.</p>	<p>We don't have oxygen in our infrastructure so anybody that has oxygen has a concentrator that runs by electricity [that will also fail]. We have a generator here but that also requires fuel. Will we be able to get fuel for our generator and will it be safe? And water won't last long. You've got to have what, 3 gallons of water per person and that is supposed to last for 3 days? And we've got 70+ people here? We don't have room to store that.</p> <p>If the building remains functional the bus is going to be a moot point, we won't be able to get to it. The bus sits on our property but I don't know what the property would look like - or the road. There will be fissures and breaks in the asphalt, that sort of thing.</p>
<p>NNOK</p>	<p>Notification Next of Kin</p> <p>Data referencing consensus of staff, and residents, of database available to Red Cross to notify next of kin; especially in the case the individual is alive.</p>	<p>Because you won't be able to get these people out, and what would be the benefit? By the time you get here you are pretty debilitated. Many of these people have devices with which to walk. Like a walker or a wheelchair. And we have lots of exit stairs, but what would we be exiting to? You know the goal is the water won't be as high as the second floor, but the wave will be.</p> <p>If the building remains functional the bus is going to be a moot point. We won't be able to get to it. The bus sits on our property but I don't know what the property would look like, or the road. There will be fishers and breaks in the asphalt, that sort of thing.</p> <p>Yes, and make them feel like we are their family and that somebody really does care when they don't see a family member for months weeks even years. Or if there is family, and lots of times there isn't.</p> <p>They show up at deaths door, expecting that everything is going to be great because now that I've showed up. And lots of times that person [client] waits until that person shows up and you never know why, and somehow it all gets settled in that very moment.</p>
<p>EWS</p>	<p>Early Warning System</p> <p>Data showing references to the importance of an early warning system.</p>	<p>Are you familiar with the series, Hunger Games? So, on Wednesdays they have this gigantic announcement that you can hear wherever you are here, warning you of – this is the warning system for a tsunami. It's just like Hunger Games and it is almost frightening. You can just here this gigantic voice come over the loudspeaker saying, <i>this is the warning system announcement and if you heard this at any other time this would be a warning for a tsunami, and you are to take the evacuation routes you are familiar with, and make yourself aware of the evacuation routes, and all that sort of thing</i>, and they do it on a routine basis, and then you hear it repeated again in Spanish for Hispanic people. It's pretty chilling, because by the time you hear the announcement if you are still sitting in here listening to it you are probably too late to get anywhere safe.</p> <p>I don't know if they have more stations set up and down the coast or not. I know they don't do anything like that in Astoria [where I live].</p>

		<p>We are 45 minutes inland by ship traffic. It takes 45 minutes into Astoria from the mouth of the Columbia river by way of water. So, they do not worry about tsunami there which is crazy. Because it will travel faster over water than it will over land. Warning you of doomsday. And I wonder how safe the infrastructure is that is making that announcement if the catastrophic earthquake will knock it out and we won't even have that warning. But it is just totally like Hunger Games.</p> <p>I would run around as fast as I could and get anybody who could walk up and down stairs and get them out of here. And the rest of them? I would tell the staff to run up the hill and get out of here. The people that have kids at home, the people that are young, they have a lifetime ahead of them, I would excuse them from staying here with people that kind of have a sentence to their life. We have a half a dozen people who have a hard time getting out of their door, their apartment door, on a good day. So, 15 minutes would buy us more time to remove healthy people.</p> <p>The other thing is the general public unless you are part of this whole cert team out here, unless you are part of that you don't know where the food supplies are or the triage centers. John Q Public doesn't know where those are. We don't have that posted on a poster indicating in the event of a catastrophic emergency the goal is to get you to this location. I don't have a clue where that is myself.</p> <p>These people have lived their lives. I have no intention of staying when the earthquake hits. I am going to go get my children and meet my [significant other] on higher ground...we have a meeting place.</p>
CBA	<p>Cost Benefit Analysis</p> <p>Data showing costs of evacuation support.</p> <p>Data showing costs of post disaster care for elderly residents.</p> <p>Data referencing special needs of elderly residents' post disaster care.</p>	<p>Our main objective is saving lives...that's it. We're not concerned about breaking policy or laws and that information getting out there.</p> <p>When you stop to triage a catastrophe, you don't stop to save someone who is having a heart attack because they are not viable. You say, 'I'll pray for you' and you move on...to the person who has a broken leg. Which really puts it down to a level that you understand, because you have had a heart attack. So, if you were having a heart attack because the gravity of the situation was causing you so much pain you were having a heart attack they would wish you well and they would move on.</p> <p>I have no illusion that what is right over our head is not going to fail. You could have rafters hanging down, insulation, wires, and all kinds of stuff you're going to have to thread you way through. It will be like the Poseidon Adventure where everything is upside down and nothing is where it belongs. Broken glass...</p>

		<p>If you aren't a part of the CERT Team here you don't know. I am a part of the NET Team which is out of Portland and that is useless down here. It needs to be posted at the board where you put your business card at Fred Meyers, where you post your couch for sale in Rite Aid, it needs to be in the bathrooms, it needs to be really public. They make such a big deal we need to be ready for the tsunami and the earthquake...that's part of helping get ready. That it is so broadcast that it is a part of what everybody knows. Everybody needs to know where to go. And not everybody is going to be able to find the little blue sign that day.</p> <p>It [the tsunami room] has stores of food in there they watch continually to make sure its all in date and those kinds of things, and x amount of water, and things you can fix that you don't have to heat it, cook it, that kind of stuff.</p> <p>We've got medication. We wouldn't get any more medication than what we've got onsite. And our medication generally comes 30 days at a time. But it depends on when it was last delivered. Medication would probably drop to a pretty low level on my list of worry...</p> <p>The water to take it with would be more concerning. Water mains will all break.</p> <p>You know, and they say, 'know where your gas shut off is?' I'm sorry but the gas is not going to break between the meter and my house! Its going to break before my meter and there could be jets of flame anywhere in the world at that time. We cook with gas, there's not going to be any gas, not going to have water, so everything we eat is going to be cold. We have plenty of blankets, we have plenty of pillows, I mean a person could make a 'place' where we could gather everyone together for sleeping and that kind of thing, so that would be the most prudent thing to do so that you're not running around like a chicken. And people might not like that, but you know we would gather those who remain in an area where we could tend to them. Because then you have economy of effort.</p> <p>We don't have oxygen in our infrastructure so that anybody that has oxygen has a concentrator that runs by electricity [that will also fail]. We have a generator here but that also requires fuel. Will we be able to get fuel for our generator and will it be safe?</p> <p>And it [water] won't last long. You've got to have what, 3 gallons of water per person and that is supposed to last for 3 days? And we've got 40 people here? we don't have room to store that.</p> <p>When I think about the Hunger Games [because of the sirens] I think about the catastrophic disasters and know that life will never be the same again in our lifetime, and I don't know how many lifetimes besides that. Do I live with that feeling of catastrophe hanging over</p>
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		<p>my head? No, I don't, a person cannot live with that hanging over their head and have any type of quality of life.</p> <p>However, we do not have a clear definition for elderly care facilities. It's something we can take a look at when we start a code review this year. Finally, we don't have specific code language for tsunami threats or financial incentives specific to this need." Kevin Cronin; AICP; Community Development Director; Community & Economic Development Department; City of Warrenton.</p> <p>The city of Warrenton has just approved new construction in the purple zone of the tsunami inundation map. Anything within the zoning requirements can be built with city approval. Pat Corcoran; OSU Sea Grant; Astoria, Oregon.</p> <p>Clatsop County does not offer any tax incentives to relocate an elderly care facility that is located within the tsunami inundation zone. The County's codes do not specifically define either "elderly care facility" or "medical facility". Additionally, I am not immediately aware of any such facilities that exist in the unincorporated areas of the County. Gail Henrikson; AICP Director; Clatsop County Community Development.</p> <p>The Building Codes Division has no monies or influence over monies for the development of any construction projects. We simply set minimum limits for how occupied structures must be constructed and the maximum standards that can be enforced in those structures. Wendy McKay; North West Regional Coordinator; Building Codes Division; State of Oregon.</p> <p>There are no tax incentives available for relocation of existing elderly care facilities that we are aware of. There are different definitions of medical facility, some include elderly care units and others do not. Good luck with this project it is valuably needed." Will Gaston; Disaster Recovery and Resilience Planning Specialist; Oregon Housing and community Services; Human Resources and Administrative Services.</p>
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Date of Notification	March 07, 2019	Study Number	IRB-2019-0073
Notification Type	Oversight Determination		
Principal Investigator	Brent S Steel		
Study Team Members	Whelan, Patrick R		
Study Title	Resilience Planning for Elderly Residents in Oregon Coastal Communities		
Funding Source	None	Cayuse Number	N/A

DETERMINATION: RESEARCH, BUT NO HUMAN SUBJECTS

It has been determined that your project, as submitted, does meet the definition of research but **does not** involve human subjects under the regulations set forth by the Department of Health and Human Services 45 CFR 46 because the intent of the project is to collect organizational level data.

Additional review is not required for this study.

Please do not include HRPP contact information on any of your study materials.

Note that amendments to this project may impact this determination. Please submit a *new* request if there are changes (e.g., funding, data sources, access to individual identifiers, interaction with research subjects, etc.).

The federal definitions and guidance used to make this determination may be found at the following link: [Human Subject](#)