IMPACT OF SEA LEVEL RISE ON AGING POPULATION'S ACCESSIBILITY TO ESSENTIAL SERVICES IN HONOLULU, HAWAI'I

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ABSTRACT

Demographic studies have shown two trends: (1) elderly population is growing as a consequence of longer life expectancy; (2) population in low elevation coastal zones will significantly increase. One of the potential risks of living in low elevation coastal zones is the projected sea level rise. As sea level rises, more and more frequent flooding can cause disruptions and damage to the roadways in coastal areas. Seniors could be especially vulnerable to such disruptions given their need for emergency services, which could also increase because of the adverse impacts climate change has on health. This study aims to investigate the impacts of sea-level rise on the aging population's accessibility to essential services and its implication for long term adaptation planning using Honolulu, Hawai'i as a case study. Using Cohort Change Ratio (CCR), the study projects the elderly population in each Traffic Analysis Zones (TAZs) in future decades. Road segments and essential facilities (grocery stores, police stations, fire stations, and hospitals and clinics) at risk under different sea-level rise scenarios (1.1 feet, 2.0 feet, and 3.2 feet) are identified. Network connectivity from each TAZs to nearest essential services are analyzed. The results show that while the physical impacts on infrastructures are mild, some vulnerable communities' access to essential services will be greatly affected even under 1.1 feet sea-level rise scenarios. Especially some areas with a high projected density of the elderly population will be cut off to essential services due to transportation bottlenecks. For the rest of the population, sea level rise could significantly reduce the number of people with timely access to essential services. The results not only urge transportation network planners to take actions to make sure transportation connectivity

to vulnerable elder population at-risk are protected, but also suggest that over the long-term land use planning would be one of a key factors to adapt to climate change. These findings have broad implications for other coastal locations with similar development and growth patterns, and the methodology used could be easily adapted to be used in a variety of other metropolitan areas across the country to conduct similar vulnerability analyses to aid in adaptation planning in practice. Also, audience will learn the emergent needs of sea level rise adaptation planning.

Key words: Elderly population; Accessibility; Coastal road infrastructure; Sea level rise adaptation