Accessibility to Emergency Rooms with Staffed Hospital Beds in the Portland Metro Area Albert Chen, Leigh Grover

Introduction

Non-equitable access to healthcare has implications for community health and city planning.[4] Understanding if seniors, and those of low SES, have poor access to healthcare will be important for the city of Portland, as these populations may continue to grow. We have chosen to evaluate access to healthcare based on the proximity of emergency rooms and the number of staffed hospital beds in the area, measuring accessibility by means of travel time to these facilities.[2][9] This study will help identify at-risk groups who may have poor access to these facilities.

Methods & Materials

We have chosen population weighted centroids for census blocks as our method for aggregating the population.[3] We used datasets from RLIS and US Census. The network analyst tool was used in conjunction with the ESRI street network data from 2010 to measure the time required to travel from the centroid of a census block to the nearest healthcare facility.[6]



A total of 944 centroids were used to evaluate for travel time to the nearest facility in the Portland Metro Area. SPSS statistical software was used to run correlations and linear regressions for population variables of Medicare recipients ages 65+ and average per capita income of census blocks with the block centroid travel time from the nearest healthcare facility.





Most service areas with the optimal population to bed ratio are located centrally in Portland Metro, including areas surrounding OHSU, Providence St. Vincent, Legacy Good Samaritan, and Legacy Emanuel. However, the service area surrounding Providence Milwaukie, inbedded in the Metro region, has a high population to low bed ratio. It is likely that the population in Milwaukie does not depend on the nearest local facility for service, given their close proximity to surrounding facilities with higher number of staffed beds. As we go further from the center of the Portland metro area, there appears to be higher population to lower staffed bed ratio. The service area of Legacy Mount Hood stands out as having a high population to bed ratio, and does not have nearby high staffed bed facilities to compensate.









Results of the Pearson correlation indicated that there was a significant, positive correlation between minutes to hospital and average per capita income, (r (944) = .103, p = .002). A linear regression evaluated the prediction of minutes to hospital from average per capita income (F (1, 942) = 10.11, p = .002, $R^2 = .011$). The regression equation is: Y = 2.095E- $5X_{PerCapitaIncome}$ + 5.056. This very low R^2 value indicates that there are likely other variables that can better predict travel time.



Results of the Pearson correlation indicated that there was a significant, positive correlation between minutes to hospital and number of people age 65+ receiving Medicare, (*r*(944) = .234, *p* = .000). A linear regression evaluated the prediction of minutes to hospital from number of people age 65+ receiving Medicare (F(1, 942) = 54.383, p = .000, R^2 =.055). The regression equation is Y $= .016X_{Age65+withMedicare} + 4.969.$ This low R^2 value indicates that there are likely other variables that predict travel time, though it is more useful than average per capita income.

Results of the Pearson correlation indicated that there was a significant, inverse correlation between minutes to hospital and number of mass transit users(r (944) = -.242, p =.000). A linear regression evaluated the prediction of minutes to hospital from number of mass transit users (F (1, 942) = 58.394, p = .000, R^2 =.057). The regression equation is Y = - $.011X_{MassTransitUsers}$ + 6.493. This R^2 value, while stronger than the previous two variables, is still low and there are likely other variables needed to strengthen this model.

Conclusions

The results of our research did not indicate that the identified at-risk groups have poor access to the healthcare facilities in the Portland area based on travel time. In line with similar research done in other cities, it is observed that populations further from the city center have less access to facilities and its resources than those in core urban regions. [4][6][9] Another observation we noted was that good accessibility to healthcare facilities is likely to be associated with population groups that already have high degree of accessibility to other resources such as public transportation. As this topic is beyond the scope of our research, it may be an excellent topic for further research and discussion.

A noted shortcoming in our research is the assumption that populations go to their closest facility for service.[1][2] We noted this is not likely to be true in reality for two reasons: 1) In the map shown below, a wealthy census block population in Lake Oswego is allocated to the small local hospital in Milwaukie. It is likely that the population in Lake Oswego would go to OHSU for service given the minimal difference in time travel.



2) Other factors, including health insurance type, are more likely to explain differences in hospital access among population groups, rather than using travel time and proximity.

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