Popular Science Summary

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Spatial statistics, given the appropriate data, is a field of study that can help solve problems in today's world by pinpointing strengths and weaknesses geographically in a "system". One such "system" is the Swedish health care institution, where equal health care for all is a priority.

A significant portion of the population in Sweden suffers from chronic illness, for these individuals, receiving the care they need is essential for a good quality of life. Region Skåne provides and coordinates health care in the Swedish region of Skåne, which includes the responsibility of finding any deficiencies in the organization. They utilise statistical methods to conduct analysis on the data they collect. In this case the data regards individuals in Skåne diagnosed with a chronic illness to investigate if their healthcare needs are being met.

Previous work has been done on this by (Lundgren, 2021) who investigated how different factors such as age, gender, foreign born, unemployment, education, etc., effect if individuals receive the proper care. The results attained from the model indicated that age is a relevant factor. Additionally modeling indicated that the municipality-factor may be a relevant factor i.e., the location where one lives may effect the level of health care received. To determine if the location where one lives is relevant, we need a spatial model that incorporates geographic dependence on municipal and postal code level.

We compared the model in (Lundgren, 2021) to spatial models which have spatial dependencies between postal code areas or between municipalities. Additionally, to improve the prediction for the age variable, we used a model where more known data is needed for calculating the probability. This gives a smoother and more predicatively accurate model as in Figure 1, where the left plot is the former model and the right is the improved. The figure shows the probability that a person receives needed care increases up until age 86 and there after decreases slightly.

The spatial model functions such that each area is dependant upon only its bordering areas. Figure 2 shows one of the results from our model. It indicates that people with a chronic illness living inside and beside the dark red areas are less likely to get the care they need, whereas the people with a chronic illness

living inside and beside the dark blue are more likely to receive the care they need. As we see most of the red areas are in the north of Skåne, this could simply be due to these regions being rural and distances being greater to health care centers, making them less accessible. Information like this is important to look into for Region Skåne and its healthcare system to pinpoint where clinics, funds or staff may be lacking and find a solution to work further to achieve the ideal of equal care for all.
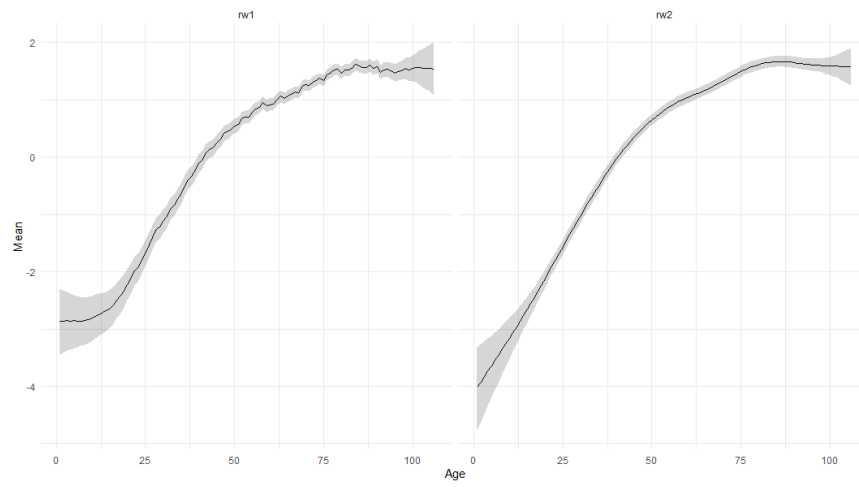
Figure 1: Plots of the age variable where the left plot is from the former model and the right plot is from the improved model.
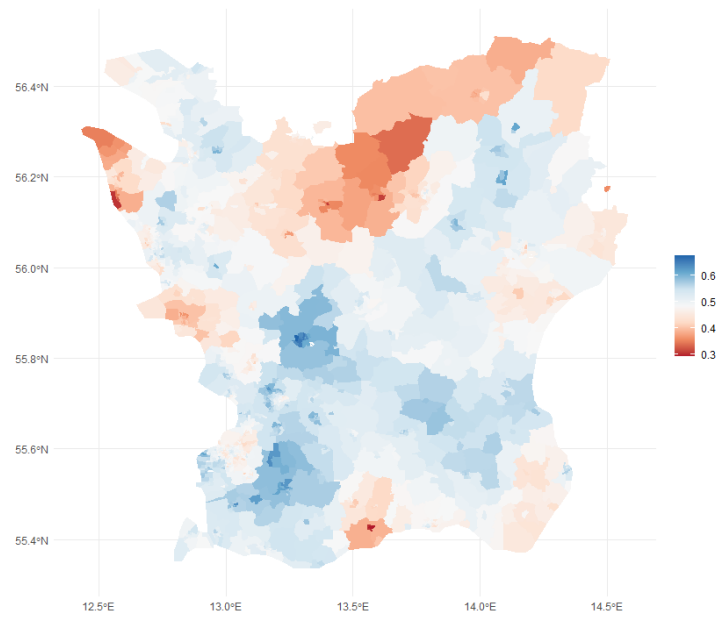

Figure 2: Map of Skåne from the final model where postal-code areas in red are indicating lack of care.

References

S. Lundgren. Regression analysis för utredning av omotiverade skillnader I tillgang till uppföljande vård för kroniskt sjuka I Region Skåne. 2021.