Creating a web-base interactive map visualising the geographic variations of the burden of diabetes to inform policy making: An example from Tasmania, Australia

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OBJECTIVES

- Using Tasmania, a state of Australia as an example, our study aimed to use mapping in combination with statistical analyses to visualise the geographic variations of diabetes burden and identify areas where targeted interventions are needed.

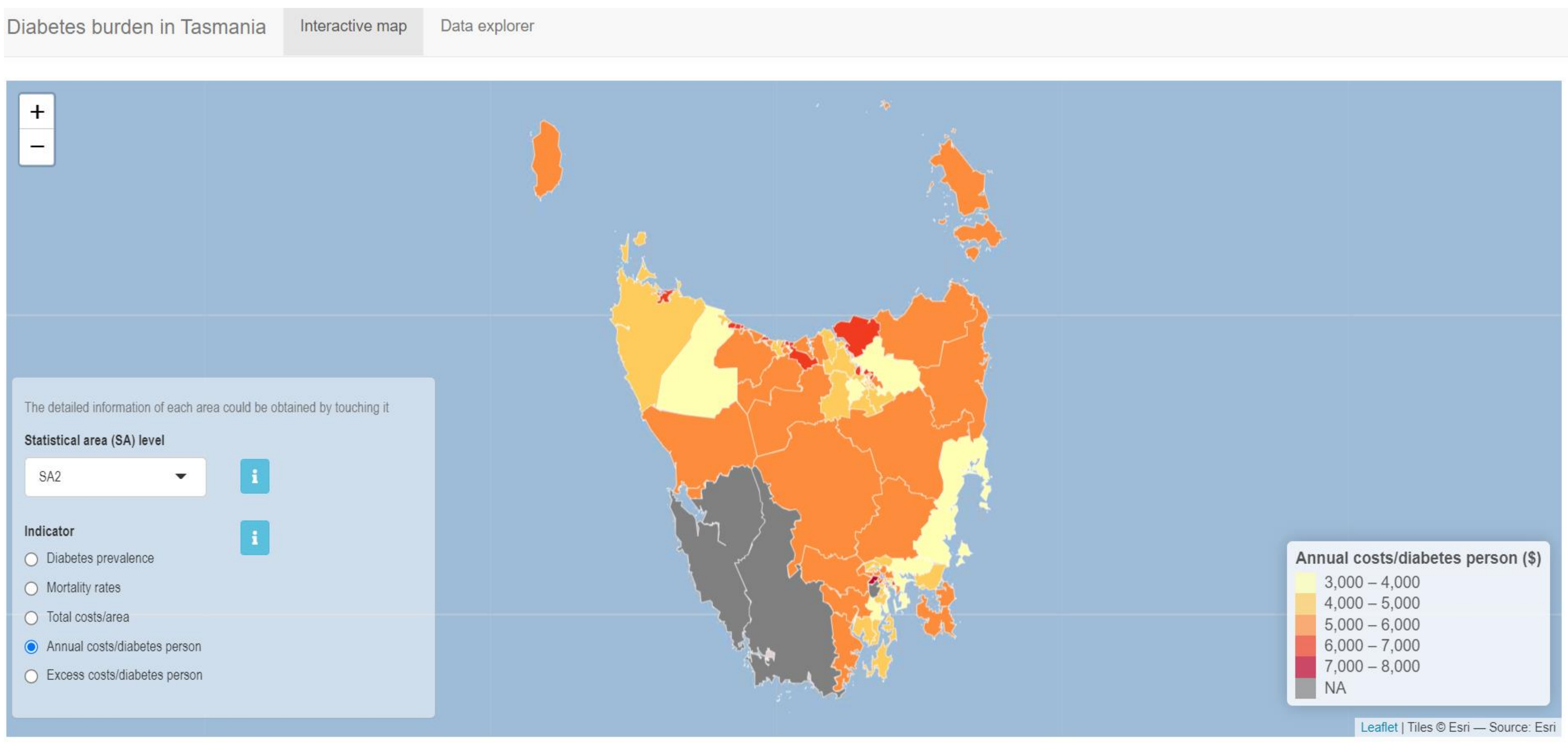
METHODS

- Using diagnostic criteria supported by International Statistical Classification of Diseases and Related Health problems 10th Revision Australian Modification (ICD-10-AM) diagnosis codes, 51,324 people with diabetes were identified from a population-based dataset during 2004-2017 in Tasmania.
- An interactive map visualising geographic distribution of diabetes prevalence, mortality rates, and healthcare costs in people with diabetes was generated. Diabetes prevalence and mortality rates were age-standardised based on the Australian population in 2017.
- The cluster and outlier analysis was performed based on statistical area level 2 (SA2) to identify areas with high (hot spot) and low (cold spot) diabetes burden. SA2 is one of the main geographic structures designed by the Australian Bureau of Statistics to ensure the consistency in geography to facilitate data comparing in different periods. In general, SA2 represents a suburb (or a group of suburbs).
- Fisher's exact test was conducted to investigate the association of hot/cold spots and socioeconomic status measured using the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintiles.

RESULTS

- There were geographic variations in diabetes burden across Tasmania, with highest age-adjusted prevalence (6.1%), excess cost ($2627), and annual costs per person ($5982) in the West and North-West of Tasmania (**Figure 1**).

Figure 1: The web-based interactive map of the burden of diabetes in Tasmania

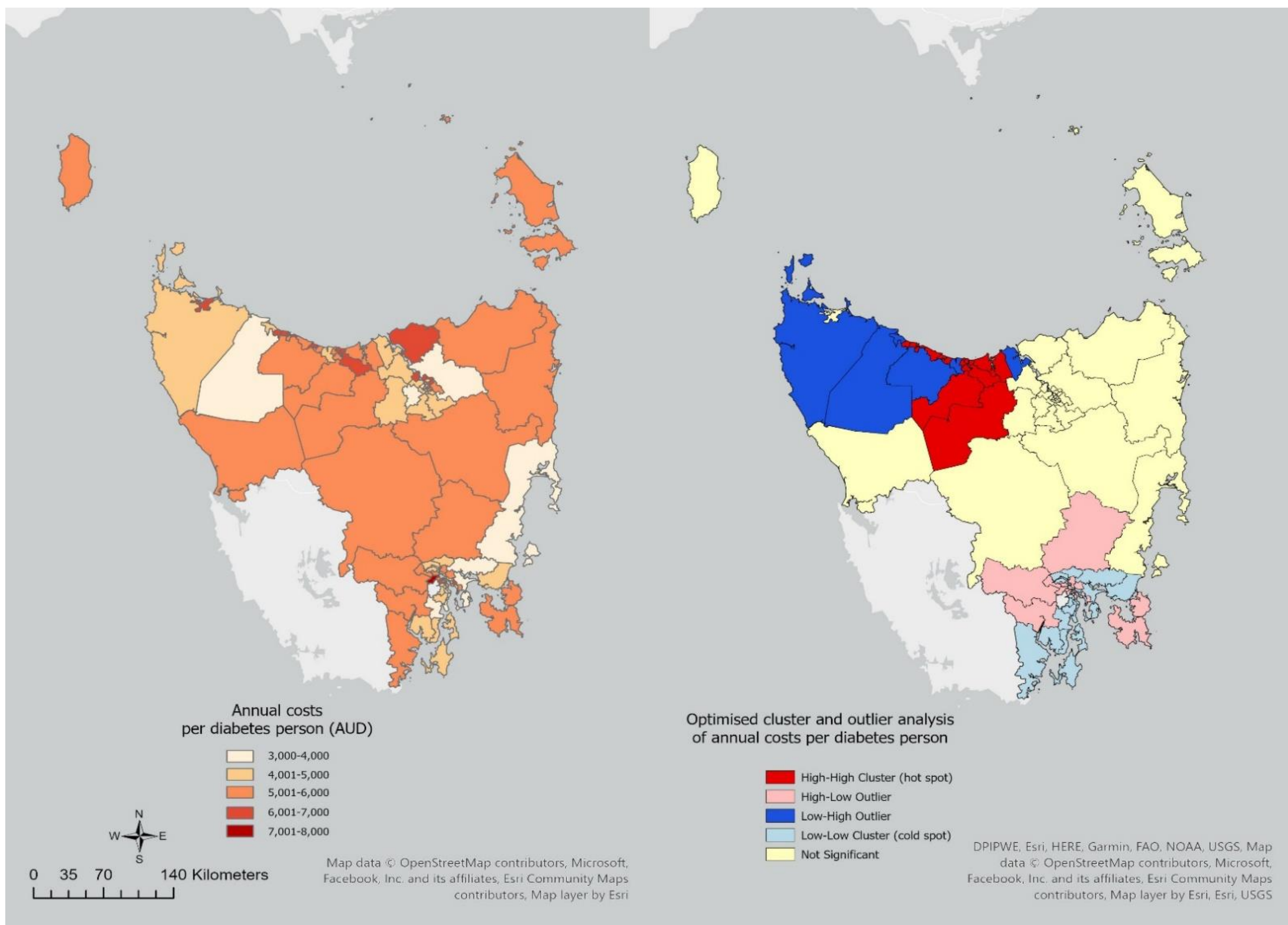


- Among 98 areas, 16 hot spots and 25 cold spots for annual costs, and 10 hot spots and 10 cold spots for diabetes prevalence were identified (p<0.05). 15/16 (94%) and 6/10 (60%) hot spots identified were in the West and North-West (**Figure 2, 3**).

RESULTS

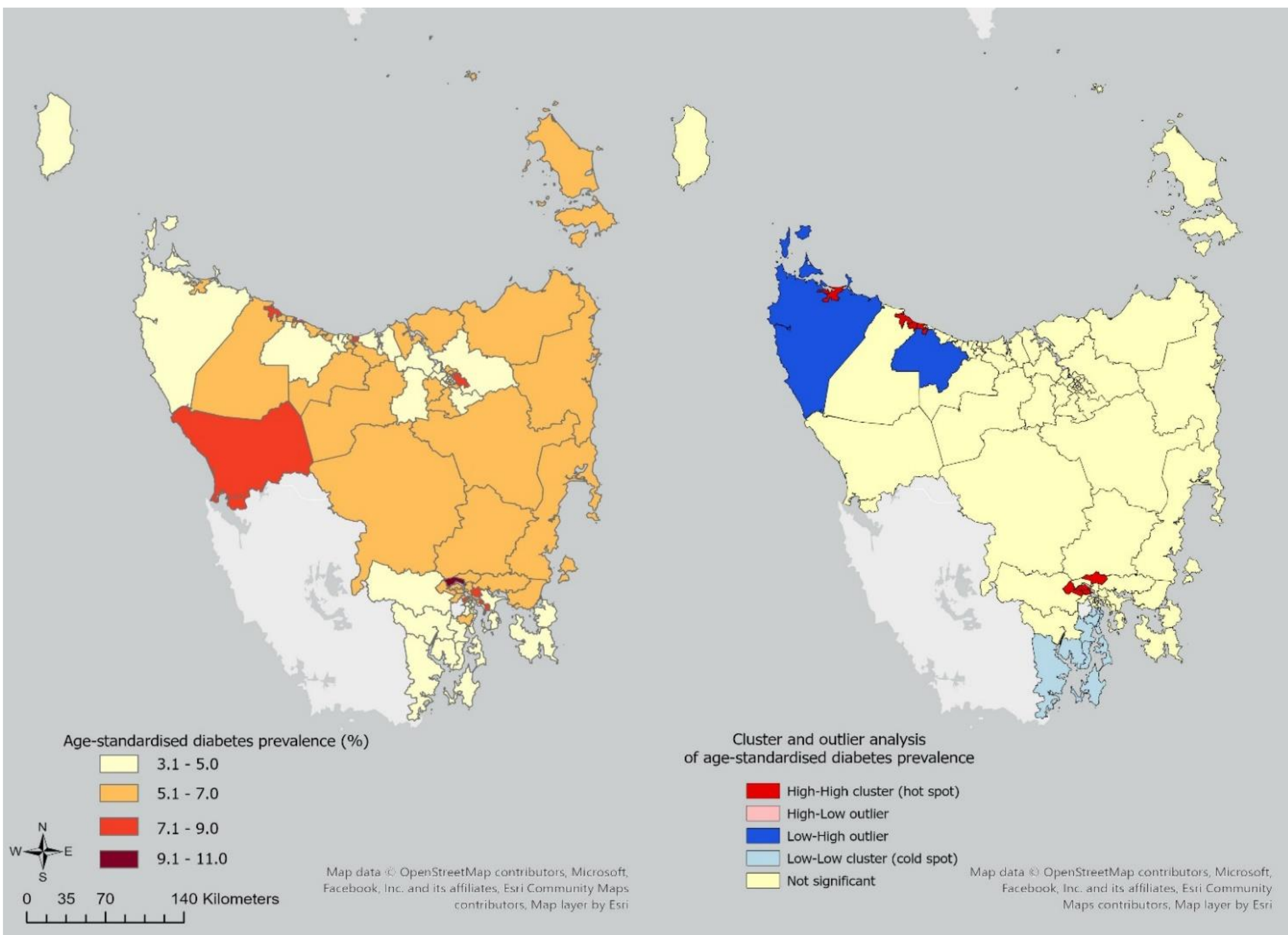
- There was an association between hot/cold spots and IRSAD quintiles (p=0.001 and p<0.001, respectively).

Figure 2: Annual costs per diabetes person (by statistical area level 2) and results of the optimised cluster and outlier analysis



High-high cluster: Area with high value of interest surrounded by neighbours with high values (hot spot)
High-low outlier: Area with high value of interest surrounded by neighbours with low values
Low-high outlier: Area with low value of interest surrounded by neighbours with high values
Low-low cluster: Area with low value of interest surrounded by neighbours with low values (cold spot)

Figure 3: Age-standardised diabetes prevalence in 2017 in Tasmania (by statistical area level 2) and results of the cluster and outlier analysis



DISCUSSION

- We have developed a method to graphically display important diabetes outcomes for different geographical areas. The method presented in our study can be applied to any other regions and countries to identify areas where interventions are needed to support evidence-based policymaking as well as enhance community's awareness.

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SCAN QR CODE TO OPEN THE MAP