

ABSTRACT

## A forecasting tool for predicting asthma related emergency department visits and hospitalizations using heterogeneous data sources

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New Zealand (NZ) is one of the countries with the highest prevalence and mortality rate due to asthma. Organisation for Economic Co-operation and Development (OECD) statistics [3] indicate NZ has one of the highest hospital admission rates for asthma of OECD countries. According to recent records [1], on average 77 New Zealanders each year lost their battle to asthma. Furthermore, the cost burden of asthma to the NZ economy has not improved over the years [2]. Not much work has been accomplished in the direction of population health forecasting for asthma in NZ. The aim of this study is to develop a prediction model for anticipating asthma-related hospitalisations in Auckland, NZ while exploiting diverse heterogeneous data sources. These sources accounts for triggers that exacerbate asthma conditions like meteorological and air quality factors plus the social media resource accessed through Google search trends. The research work is divided into two parts; in the first phase I analysed the relationship between trigger parameters and asthma using the Pearson Correlation Coefficient. Subsequently, in part two a comparative examination has been conducted based upon the prediction models developed using different machine learning techniques on the continuous data of 1097 days. The experimental evaluation shows that the best forecasting tool could predict asthma-related hospitalisation with an accuracy of 78.87% while the precision and recall for the model were 79.80% and 78.87%. The outcome achieved from implementing such a model would be beneficial for public health surveillance, thereby helping in more efficient and timely healthcare resource deployment.

### References

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