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參展科別 **地球與環境科學科**

作品名稱 **The impact of climate variability on infectious disease**

得獎獎項 **二等獎**

國　　家 **South Africa**

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Abstract

Diarrhoea is an infectious disease that claims many lives (particularly among infants) and is known among many other infectious diseases, to have a relationship with climate. This projects quantifies this relationship by comparing health insurance treatment claims for diarrhoea and anti-diarrheal drug sales data from the private health sector with temperature and rainfall data provided by the South African Weather Service.

The data were then analysed and show that incidence is highly seasonal and varies among regions with different seasonal climates. The results show that climate variability can explain 73% of diarrhea incidence variation with rainfall explaining 8% and minimum temperature explain the other 65 %. Preliminary predictions of future monthly percentage increases in incidence were then made for a series of time ranges. This project demonstrates that with predicted climate data one can predict future variations of diarrhoea allowing the health sector to be adequately prepared.

Background Research

- It is commonly known that viruses such as pneumonia and influenza occur seasonally; more commonly in cold months due to people being in closer proximity to each other.
- Diarrhea is also known to occur more commonly in warmer seasons and less so in colder seasons.
- Disease like the zika virus and malaria are restricted to tropical climates due to mosquitoes preferring tropical climate
- Infectious diseases are an important source of illness and mortality in South Africa, particularly among poorer communities

Data from 3 sources of were used:

- Claims data from a health insurance company (Dependent variable)
- Sales data from a national pharmacy (Dependent variable)
- South African weather service (Independent variable)
- The claim data was turned into a percentage by dividing it by total live insured during that month
- Sales was detrended to get rid of the increase caused by the growth of the company
- Annual cycles were calculated by making an average out of all months (eg average of all Januarys)

- Anomalies were calculated by subtracting the average month from a month and the average of all months from a month
- These were then compared with the weather data to see what caused peak diarrhea seasons
- The El Niño Summer 2015/16 was compared to the average summer to see what effect it had on incidence**.**

Conclusions

- The results show that temperature is a large factor in determining diarrhoea incidence, with higher temperatures resulting in higher incidence (for both cases and drug sales).
- The results suggest that rainfall does, contrary to the hypothesis, play a part in diarrhoea incidence variation with high rainfall lowering cases and lower rainfall resulting in higher cases and sales in general.
- If climate change continues unmitigated, then we can expect diarrhoea to become a more significant disease than it already is.

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Good presentation of statistics on disease cases and drug sales in the study area (in S. Africa) with respect to time history . Useful finding in term, of correlations with environmental parameters. Limited by the sources the statistical data (not the fault of the author) Need to strengthen the understanding of the results in terms of different types/sources of the studied diseases.