

CHAPTER FOUR

4.1 DISCUSSION

As previously mentioned, there has been an increased awareness and documentation of the effects of weather changes on health, especially in Britain. As an example the work of Anderson et al can be mentioned, where asthma admissions were linked to thunderstorms, attributed to rises in pollen or fungal spore counts occurring alone or in combination with rainfall¹⁴

This study is a starting point to identify, and put into context, certain identifiable variables that may contribute towards the burden of allergic diseases. If linked to prescription rates for these diseases, certain correlations can be found, which will identify the causal aspects.

A time series analysis has the possibility of matching daily data with several parameters as explained, giving a broad view of the influence of several factors in the causal chain of events. By examining and analyzing a period of more than one year, seasonal influences could be determined. By testing the accuracy of the model by investigating the residuals and by determining the autocorrelogram of residuals for example, the model has been found to be applicable and reliable. Enough data has been found to make the deductions meaningful, since the Arima method is appropriate only for a time series that is stationary, and there should be at least 50 observations in the input data.

From the data, and with the ARIMA model, it was possible to formulate predictive equations, where possible future values for the prescriptions for asthma and allergic rhinitis can be predicted or forecasted, taking the 4 predictor variables into consideration.

This may help preparing health suppliers in coping with expected increases in prescriptions, as weather changes manifest in future.

4.2 POSSIBLE SHORTCOMINGS OF THIS STUDY

- Only weather parameters were investigated: no inclusion of allergens (for example pollen counts) was done, due to lack of sufficient data. Also were no air pollution factors accounted for, although some data (smoke, and

sulphur dioxide) might have been available for at least part of the study. Concerning wind speed: this was only measured at low level, and air movement at high levels were not taken into consideration.

- Using specific drug related codes, and not disease diagnostic codes, might be more accurate and comprehensive, but could also lead to false positive findings (see also bias). The pattern of prescriptions related to the overall prescription rate (all medications) was also not investigated.
- Codes used for prescriptions reflected only visits by patients to General Practitioners at their surgeries, and excluded patients who visited Specialists, or people admitted in Hospitals (Private or Public sector). It also excluded patients who were ill, but for some reason either did not visit their usual (participating) doctor or took over-the-counter medication. Certain groups might thus not have been included in the investigation (the very ill, and the not-so-ill).
- The geographical area where data was obtained from was relatively small, due to lack of weather parameters in surrounding areas. Ideally a larger patient base and geographical area should have been used. This could then have contributed towards a more meaningful comparison between geographical areas.

4.3 SUMMARY

In a time series analysis, where data from a weather station was paired to prescriptions for allergic diseases, an analysis over a time period of one year revealed the following:

- Rainfall and Wind speed do not influence prescriptions for Asthma, as the p-values (at $\alpha = 10\%$ level of significance) are $> \alpha$
- Temperature variance (Maximum minus Minimum), and Humidity changes do influence prescriptions for Asthma, as the p-values are $< \alpha$. This fits in with previous studies where exposure to cold air triggers asthmatic attacks, as well as drying of airways.
- None of the above variables (rainfall, wind, temperature, and humidity) influences prescriptions for allergic rhinitis, with p-values all $> \alpha$ (significantly). This is perhaps to be expected, with allergic rhinitis more

likely to be triggered by other environmental factors (allergens), which were not measured in this study.

5.1 BUDGET AND FUNDING

No funding was required for the project.

4.4 CONCLUSION

Further work is needed to expand on what have been investigated, but meaningful insight has been acquired in the process, which will be applicable and useful to doctors and patients alike.

The findings will also be of help to the GP organization and medical aid schemes, in that better planning may be done concerning expected prescriptions, as well as insight into the pattern, and manifestations of allergic diseases.