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Abstract Title:

Predicting A&E attendances at MDH - a crystal ball?

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Abstract

Background

This study aimed to develop forecasting methodology that allows hospital management staff to predict patient admissions in the emergency department, with a focus on alcohol related complaints.

Methods

Daily patient intake statistics were obtained from Mater Dei Hospital for years 2012-2015, filtering complaints related to alcohol. This was analysed to obtain evidence of patterns in patient intake, and a probability model was created based on the findings. Seasonal 3 period moving averages, together with exponential forecasting methods were used and compared.

Results

Attendances to A&E tend to be associated with seasonality, type of day (in relation to weekends and public holidays), age group and gender. Different models were assessed for fit using the mean squared error (MSE) and mean absolute deviation (MAD). Exponential smoothing using the formula $F2 = F1 + \alpha(A1 - F1)$ where F2 refers to the current month forecast, F1, the previous month forecast, A1, the previous month actual count and α being a coefficient that was varied for sensitivity analysis. An α of 0.8 gave the best fit with actual data based on the above measures.

Conclusions

The predictability of admissions to A&E for different complaint types could bring some relief to service planners and managers. The authors are also exploring the possibility of linking such a model to events advertised on Facebook to improve further the model's forecasting ability.

Message

- Admissions to A&E can be predicted to a substantial degree.



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- The accuracy of any forecasting model depends heavily on the accuracy of the information included in the data captured in A&E records.

Author contributions:

Michael Ciantar and Matthew Cremona are the main authors of the study, under the supervision of Ing Clifford De Raffaele. Dr Alexandra Distefano and Dr Neville Calleja provided admissions data and expertise related to the nature of the hospital data variables.