WARD BEDS MANAGEMENT IN A UNIVERSITY HOSPITAL IN AN EUROPEAN REGION

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With the aim of providing tools for managing the occupancy rate in the hospital units, in this work we will apply diferent regression models to the data set which contain information of every admission during the period that goes from January 2016 to November 2021. The point of using the regression models we will adjust during this work is, among others, to get the nature of some variables, such as daily admissions or patient's length of stay. The objective is to set up of diferent regression models that will allow us to predict the occupancy rate of a hospital unit, or an admission's length of stay and to be able to make predictions about the duration of the hospital stay dás/vos pacientes, e dá taxa de ocupación de cada uno deses cinco servizos. We work with generalised linear linear generalised models (GLMs) and generalised additive models (GAMs), with the idea of being able to model variables with overdispersion, such as length of stay or number of admissions and discharges recorded and discharges recorded. In addition, by using two additive models, we can avoid the need for parametric hypotheses of parametric hypotheses for the effects of the different explanatory variables considered.

For the modelling of the length of stay in the Internal Medicine Department, the most complex to model because of the of modelling because of all the patient typology it encompasses, we obtained that the GAM model model with a negative binomial response variable improves in terms of explained variance, by 36:34% over the GLM model with a negative binomial response variable to the GLM model with Poisson response variable and by 13:41% to the GLM model with Negative Binomial response variable negative binomial response variable. For this reason, it was decided to use this model for the adjustment of all services of all the services.

A much more intense seasonal component was observed in the number of discharges than in the number of admissions, with this difference being more marked in the Internal Medicine Department. However, a similar pattern was observed in the General Surgery and Traumatology Departments, most likely due to the high number of scheduled
probably due to the high number of scheduled admissions in these services. This implies that the service has some control in organising admissions, so that the arrival of patients is not as "random" as in other cases. You will note that in most of the services there is a peak in admissions on Fridays and a drop in admissions on Sundays, except in the Cardiology Service, where the drop in admissions occurs on Saturdays.

Although as the model is adjusted, we could now only make predictions one day in advance, a prediction could be made recursively for instants $t + k$ with $k = 2; 3; 4; ....$ Naturally, when making predictions for a horizon longer than one day with the information available at the initial moment, the results of these predictions worsen. One aspect to work on would be to improve the results of longer-term predictions, since the more reaction time we can guarantee to the Admissions Service, the better its response capacity will be.