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# Chronic Respiratory Diseases
# – statistic model for individual control patients –

Florbela Correia[1] and Pedro Oliveira[2]
[1] Polythecnic Institute of Viana do Castelo
[2] Systems and Production Department – University of Minho
E-mail: florbelacorreia@esce.ipvc.pt
pno@dps.uminho.pt

## ABSTRACT

Chronic Respiratory Diseases constitute, today, a public health problem because of their social and professional repercussions that result in a diminished working capacity, associated with increasing treatment and care costs. Due to the relevance of Respiratory Diseases, we have use SPC (Statistical Process Control) techniques in order to control and monitor a set of chronic respiratory patients from an Hospital in Northwest Portugal (Centro Hospitalar do Alto Minho, Viana do Castelo). This set of patients has been periodically follow up, from August 1995 till July 2007.

In clinical practice, it has been observed that the variations between individuals might be larger than the registered variations in an individual [Winkel and Statland (1997), McLaren *et al.* (2000) and Queraltó (2004)]; therefore, the classic approach based on the study of groups might be less sensitive to the evaluation of the health status of each particular patient.

Thus, with the aim of developing an individualized patient follow up we have built control charts, uni and multivariate, one and two sided, for the relevant variables on the study of the disease. We have observed that, in particular, when the aim is to detect changes on the mean solely in one direction, which is the case of the patients under study, that the one sided multivariate charts can be a powerful tool in the control of those patients.

On the other hand, we have proposed and developed, for each patient, control charts with variable limits. It should be noted that each patient is considered as his own reference and that these charts permit the follow up of the patients on real time, signaling, not only worsening or improving episodes of the patient´s health status, but, moreover, adjusting the control values to the new phase of the patient evolution. Therefore, the proposed chart aggregates, in a single chart, the traditional information provided by the control charts for the mean and the dispersion, since it does register the evolution of the disease as well as the exhibited variability throughout the time.

Lastly, we have used a recent methodology, the so called Biplot graphical representation, with the aim of identifying similarities and dissimilarities between patients with several pathologies, which differences emerge as a function of the variables under study, and how these vary within each pathological group. The interpretation of the HJ-Biplot reinforces the indicators used by medical doctors for the pathological groups and is in accordance to the clinical practice.

## AUTHOR BIOGRAPHIES

**Florbela Correia** has a degree in Maths by University of Oporto and has the PhD Industrial Engineering, a scientific area of Numerical Methods and Statistical, by University of Minho.
She is a professor of Polythecnic Institute of Viana do Castelo since 1991 and she is developing researches in the area of Regression Models and Control Charts.
Her e-mail address is : florbelacorreia@esce.ipvc.pt .