

## **Risk of errors related to lack of identification unit dose of drugs**

### **ABSTRACT**

**Rima Baalbaki, Prof. Pascal Bonnabry**

**Pharmacy of the University Hospitals of Geneva (HUG), Switzerland**

This work has been done with the approval of the Nursing Management of HUG and logistical support for Ms. Hourie MINASSIAN.

The study was supported by the firm Sandoz, which funded the salary of the investigation.

This abstract is part of a 31 page report, released in March 2008 by the Hôpital Universitaire de Genève. To obtain the full report (only available in French) please contact Catherine Hartmann, [ed@eahp.eu](mailto:ed@eahp.eu)

### **Introduction**

An erroneous dispensing of a drug can lead to an administration error if subsequent checks do not permit to detect it before it reaches the patient. The main causes of non-detection are human failures and defects of the identification of unit dose of medicines. In fact, for the control to be possible until the last moment, each unit dose of the drug must contain on its blister all the information necessary for this control, in a totally readable manner. A study conducted by Patrik Muff demonstrated that nearly half the medicines do not meet these criteria. In order to estimate the impact of this identification problem in terms of serious adverse events and costs, it is necessary to quantify the feasibility of the controls taking into account the type and frequency of use of medicines at the Geneva university hospitals (HUG) (2200 beds).

### **Objectives**

- Measure the feasibility of final checks in several services of a university hospital.
- Assess the increased security that would be made by the comprehensive identification of each unit dose, by extrapolating data on known frequencies and costs.

### **Results**

The observations were conducted across 60 wards on 5310 unit doses of oral medicines (1088 in internal medicine, 1617 in surgery and 2605 in geriatric and rehabilitation wards). Unit doses of 366 medicines and 57 different manufacturers were observed. The solid oral medicines cut, extracted from their blister packs and the packages badly cut with scissors were removed from the analysis (4%, n = 202). The analysis was performed on 5108 observations.

In 35 % (n=1774) of the observations, the unit doses contained, in a comprehensive manner, all information (brand name, INN, dosage, dosage unit, expiry date and batch number) required for the control of the drug before its administration to patients.

In 49% (n= 2509) of the cases, at least one information was absent or not fully legible. For 16% (n = 825) of the observations, no information was indicated on the unit dose.

Only considering the legibility of the brand name, of the INN and of the dosage, 52% unit doses were completely identifiable, 31% were partially and 16% were not at all. For 38 of the medicines (n = 539, 11% of the observations), the unit doses were packed bulk, which did not allow control after dispensation. Twenty-three percent of all parameters observed were partially legible, 20% were in 1 part and 3% in 2 parts. The drugs used in surgery showed a better identification than in the two other departments.

The average scores by drugs (from 0.6 to 10) and manufacturers (from 3 to 8) showed a large variation. Medicines exposing the caregivers to the largest amounts of quality defects were Brufen 400 mg (sum = 973), Aspirin Cardio 100 mg (772), Dafalgan 1 g (732), Prontolax 5 mg (621) and Tramal 50mg (560).

For manufacturers, the following companies were concerned: Nycomed Pharma (2202), Streuli (1382), Abbott (1357), Sanofi-Aventis (1263) and Vifor (1233). The extrapolation model has estimated an error rate of administration of 0.15 to 0.35% with the range of drugs currently available at the HUG. If 100% of the doses were identifiable, the error rate would have been of 0.05%.

The HUG consuming about 20 million unit doses of oral medication a year, these rates represent 30,000 to 70,000 administration errors. Based on existing data, a annual number of 300 to 700 serious adverse events can be predicted for the HUG, with a cost of 1,800,000 to 4'200'000 Swiss Francs.

## **Conclusion**

This study demonstrates the significant gaps in the identification of unit doses of drugs, with a consequence of a daily exposure from caregivers to difficulties in conducting controls. Extrapolation of these results on the scale of a large hospital like HUG, taking into account the frequency of use of each drug, makes it possible to estimate the consequences in terms of serious adverse events and avoidable costs. By extending these results at the national level, we can estimate between 4,000 and 12,000 the number of serious adverse events that could be avoided each year in Switzerland with a complete identification of each unit dose of medicine. The corresponding costs are in the range of 25 to 75 Mio of Swiss Francs.

It is urgent that the pharmaceutical industry improves the identification of drugs, by printing on each unit dose all the information necessary to monitor and trace them. Moreover, the addition of a two-dimensional identifier (Datamatrix), which should allow in the future an electronic reading in addition to human controls, is also requested.

Since the migration to this ideal in some cases requires adaptations of the production lines, changes will have to be done in a phased manner. The most urgent matter is to get the printing of the complete brand name, the DCI and the dosage on each dose.

This concern must also be taken into account by the hospital drug commissions, who must privilege products with unit dose identification that are close to the above mentioned requirements. Within HUG, the results of this study will be analysed in detail, and a change of certain medicines presenting significant defects in quality will be considered, unless manufacturers can offer improvements in the short term.

*Reference:* P Muff, Rüeger M, Fejer T. Identifizierbarkeit von Einzeldosen fester Arzneiformen im Spital. Kongress der GSASA, St Gallen, 2003 (abstract).

Pharmacie des HUG - Rue Micheli-du-Crest 24 CH - 1211 Genève 14  
Tél (022) 372 39 74 - Fax (022) 372 39 70  
e-mail Pascal.Bonnabry@hcuge.ch - www.hcuge.ch/Pharmacie