opened, to the hospital and patients' home conditions (light, temperature, humidity and microbiological).

Purpose

- To check the SODF-MUC requirement, after the container opening, in order to determine special conditions for its repackaging and storage.
 - Dry place that does not exceed 40% average relative humidity at 20°C or the equivalent water vapour pressure at other temperatures.
 - Room with temperature under 25°C.
 - Refrigeration, (temperature between 2° to 8° C).
 - Protected from the light.
- To quantify the importance of the annual net price of hospital SODF-MUC.

Material and methods Pharmaceutical and technical data of SODF-MUC were extracted from 89 technical sheets inserted in the website of the State Medication Agency.

Dispensations and its price, during the period 1 July 2017 to 30 June 2018, were obtained from the management programme of the Pharmacy Service.

Results Three SODF-MUC had a lack of a technical data sheet.

Fifteen SODF-MUC (16.8%) reduced their expiration date (some drastically) after opening the bottle.

Twenty-nine SODF-MUC (32.6%) should be protected from moisture, 18 contain desiccant and 11 recommended to keep medication in the original container and/or in closed bottle.

Thirty-two SODF-MUC (35.9%) do not need special storage conditions, seven contain desiccant.

Ten SODF-MUC (11.2%) have desiccant in the container and colloidal silica as excipient.

Nine SODF-MUC need protection from light, three of these have the same active principle as the other six SODF-MUC which do not require this condition.

In terms of management, 7 63 063 units of 29 SODF-MUC were dispensed, whose net price during the year reached € 13,292,223. It means that 1.3% of the total of specialties consume 16% of annual medication expenditure.

Conclusion The amount and cost of SODF-MUC dispensed are high and their correct use in patients' homes is not guaranteed. Hospital pharmacy departments need conditions suitable for repackaging. This problem would probably be avoided if the SODF-MUC were marketed in single-dose containers.

REFERENCES AND/OR ACKNOWLEDGEMENTS

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No conflict of interest.

2SPD-037 OVER 5 YEARS OF MEDICINES SHORTAGES IN A UNIVERSITY HOSPITAL

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Background Drug shortages, widely reported by healthcare professionals and patients over recent years, are an increasing concern for hospital pharmacists.

Purpose The aim is to verify the impact of a large number of long-term medicines shortages on the daily work of a hospital

pharmacist, in a university hospital (858 beds, 1500 medicines).

Material and methods Since 2013, the hospital pharmacist has identified the medicines shortages and determined the time of unavailability, which has resulted in the implementation of a method for managing medicine supply issues.

Results The number of medicines shortages was 197 (2013), 204 (2014), 260 (2015), 225 (2016), 251 (2017) and 196 (until September 2018). The duration of drug shortages is classified into minor (≤ 15 days), moderate (15 to 60 days) and major (≥ 60 days). The number of drug shortages with major duration is increasing over those years (37 in 2013, 53 in 2018). The procedure is based on: searching alternative(s) supported by a decision algorithm (one alternative for 53% of medicines shortages, two for 7% and three for 1%) and deploying a team of hospital pharmacists, pharmacy technicians and administrative personnel. Moreover, a spreadsheet including the results can easily be consulted to be informed about the proposed alternative. Finally, to secure a supply chain potentially at risk of alternative treatment, a communication platform concerning these changes has been developed and the multidisciplinary team is working in collaboration with the Medico-Pharmaceutical Committee to support clear communication to the other healthcare professionals.

Conclusion The implementation of a management structure for medicine supply issues, led by a hospital pharmacist, has become indispensable in dealing with the significant number and duration of current medicines shortages.

REFERENCES AND/OR ACKNOWLEDGEMENTS

Time spent by Belgian hospital pharmacists on supply disruptions and drug shortages: an exploratory study.

E. De Weerd and al. March 2017.

No conflict of interest.

2SPD-038 HOW LONG DO HOSPITAL PHARMACISTS SPEND IN MANAGING MEDICINES SHORTAGES?

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Background The incidence of medicines shortages has increased during the past few years. In Europe, most of the hospital pharmacists estimate that they spend at least 5 hours (h) per week dealing with shortages.

Purpose The objective was to quantify the time dedicated to managing shortages.

Material and methods A prospective study was conducted in a university hospital over two three-week periods in 2018. Each person from the supply and purchasing staff collected the daily time dedicated to managing shortages. The following data was collected: medicines affected, staff qualifications, supply shortage types and action taken.

Results The average time devoted to shortages was 6.6 hour per day (min=2.6 – max=12.1). The supply staff dedicated 5.4 hour per day (2.2–11.3): 2.1 hour for monitoring, 1.0 hour for meetings, 0.5 hour to update shortage tracking files, 0.5 hour for software settings, 0.4 hour to follow-up existing orders, 0.4 hour for order adjustments, 0.3 hour for writing information notes designed to professionals working in clinical units and 0.2 hour for shortage-suppliers lists analysis. The purchasing staff dedicated 1.2 hour per day (0.2–3.4):

0.4 hour for shortage analysis, 0.4 hour for solution research, 0.3 hour for alternative medicine market creation and 0.1 hour for closing shortage files. The overall time allocation was 33% for pharmacy residents, 31% for pharmacy technicians, 27% for pharmacists, 6% for administrative agents and 3% for pharmacy students. The mean time per shortage was 0.7 hour: 0.7 hour per shortage with quotas that needed medical validation, 0.6 hour per shortage with equivalent medicine and per shortage which implied stock monitoring, 0.5 hour per shortage with supply quotas and per shortage with near equivalent medicine, and 0.3 hour per shortage without alternative.

Conclusion These results may have been underestimated because of difficulties in data collection and because the time spent by clinical pharmacists was not implemented. However, this study shows precisely the time spent in managing shortages and will be useful in staff organisations as shortages are increasing.

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No conflict of interest.

2SPD-039

MEDICINE SHORTAGES IN A GENERAL COUNTY HOSPITAL: EVALUATION AND ESSENTIAL QUALITY

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Background Medicine shortage in hospitals is defined as insufficient patients' supply, without generic substitution. The particular problem has been reported by both professionals and patients, and acknowledged by European institutions. The cited causes range from production disruptions to trade and distribution factors.

Purpose This study aimed to register medicine shortages in a middle-range general hospital during one year, analyse the causes and correlate them to medicines' anatomical therapeutic category (ATC) and essential quality.

Material and methods Medicine shortages were reported daily from 1 August 2017 to 31 July 2018 and analysed according to three causes: medicine's withdrawal (MW); manufacturing/importing problems (M/I); and delayed hospital pharmacy's response to stock replacement (HPR). Days to restore availability were recorded and categorised in two groups: 1–3 days (automated re-stock) and more than 4 days (pharmacists' involvement). Shortage cases were also stratified according to ATC. All medicines recorded shortages were classified into five classes using a Modified Essentiality List (MEL)¹: 5, 4, 3, 2 and 1, with 5 attached to high priority.

Results Two-hundred and ninety-nine shortage cases were reported concerning 239 medicines. A new shortage case was reported every 1.2 days: 4% concerned MW, 40% M/I and 56% HPR. Average days to restore availability for M/I and HPR were 52 and 11, respectively. For M/I cause, 114 shortage cases (94.21%) needed more than 4 days to restore, while for HPR causes, 97 cases (58.43%). Neurological and cardiovascular regimens' shortages were first (26%) and second (15%) categories, regardless of cause. For M/I causes,

neurological regimens' shortages were first (21%) and medicines for alimentary track and metabolism second (13%) categories. MEL class 5 comprised 53 cases (18%), including lithium, nitroglycerine, verapamil, loperamide and tuberculin. MEL class 2 comprised 152 (51%) cases.

Conclusion Shortage cases are very often reported to the hospital pharmacy. HPR is the more frequent reason for a shortage case, the quicker to resolve, and demands strong pharmacists' involvement. For the M/I cause of a shortage, there is a much longer restoration time. The use of MEL classification sets the priority for an efficacious response, especially if combined with local distribution conditions. The re-ordering model of our pharmacy is being reviewed.

REFERENCE AND/OR ACKNOWLEDGEMENTS

1. *WHO Essential Medicines' List* (March 2017).

No conflict of interest.

2SPD-040

IS PNEUMATIC TUBE DELIVERY SAFE FOR MEDICINES?

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Background Sending drugs by pneumatic tube system is an efficient alternative in large hospital areas, especially in emergency cases. But modern systems are high-speed constructions and this creates high gravitational forces on the products.

Purpose The purpose of our study was to examine the influence on the stability of packaging, various pharmaceutical preparations and active ingredients.

Material and methods G-forces created in the pneumatic tube system were evaluated by accelerometer. Furthermore, variations of temperature were monitored during the transportation process. Different pharmaceutical forms (e.g. powder, ointments, emulsions), packaging materials and loadings were tested under worst-case conditions (mostly remote ward, more than three delivery processes per product). Afterwards the integrity and stability of the products were analysed following pre-defined procedures.

In addition, literature research was performed to identify unstable molecules that may not be sent under these conditions.

Results Our literature research showed that especially protein-based medicines (e.g. antibodies) are characterised by low stability when confronted with physical stress. Therefore, these products were excluded from this study as well as cytotoxic drugs, dangerous goods and compressed-gas containers.

During the conducted 60 rides, temperature stayed within the limit of 15°C–25°C. Maximum g-force measured was 16 g. We detected the following issues:

- Powder or ointments leak from plastic containers;
- Multi-phase formulations tend to separate;
- Powder in ampules are compressed irreversibly into the head of the ampule; and
- Emulsions are destroyed by increasing viscosity.

Conclusion Our results prove that protection of primary packaging is not enough. The influence of strong g-forces on the stability of pharmaceutical preparations and molecules has to be observed. Hospital pharmacists have to bring their knowledge of physical drug stability. However, the analytical