Smart Cockpit : Predict & Prevent Drug Shortages in Hospitals !

Development and impact of a dashboard for drug shortage prediction and management: A before-and-after study

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Drug shortages are constantly increasing (+50% in 5 years in our hospital) and have impacts on patients, purchase costs and HR (Human Resources).

Current IT tools are insufficient to monitor and proactively anticipate drug shortages.

We developed a smart cockpit to manage and anticipate drug shortages and we evaluated it using various key performance indicators (logistical, financial, temporal).

METHODOLOGY

Data sources

2'200 drugs

> 100 ADC*

> 15'000 prescriptions**

Data bases

CEGID® (ERP#)

ADC Server

EMR‡

Data lake

Aggregation of data

Import of data and update twice a day

Dashboard

Combination of logistical data & clinical data

- Drugs are classified by their criticality (0-1-2-3-4)
- Real-time view of:
  - Stock shortages for the next 72 hours
  - Stock below two weeks
  - Drugs expiring soon
  - Pending orders

Drug Shortage Alerts

72h alert	• Sufficient stock level for the next 72 hours (YES/NO)
<2weeks alert	• Drug stock level <2 weeks based on monthly consumption
Non-received orders alert	• Non-received orders from suppliers for more than 7-14-30-60 days
Expiry date alert	• Drugs that will expire in the next 7-14-30-90 days
Overconsumption alert	• Drugs that have an overconsumption >50% in the past 14 days

Prospective interventional study comparing KPIs before and after

ERP# : Entreprise Ressource Planning
EMR‡: Electronic Medical Record
ADC* : Automated Drug Cabinet,
** : On average, there are between 15,000 and 16,000 prescriptions simultaneously within our hospital. These prescriptions are retrieved in real time and transferred to the dashboard via the data lake

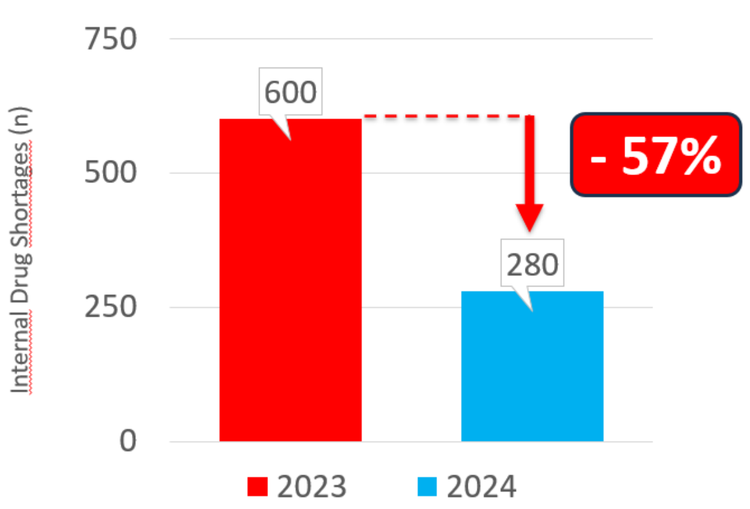
Evaluation

- 3 months WITHOUT Tool (01.02.23 - 30.04.23)
- 3 months WITH Tool (01.04.24 - 30.06.24)

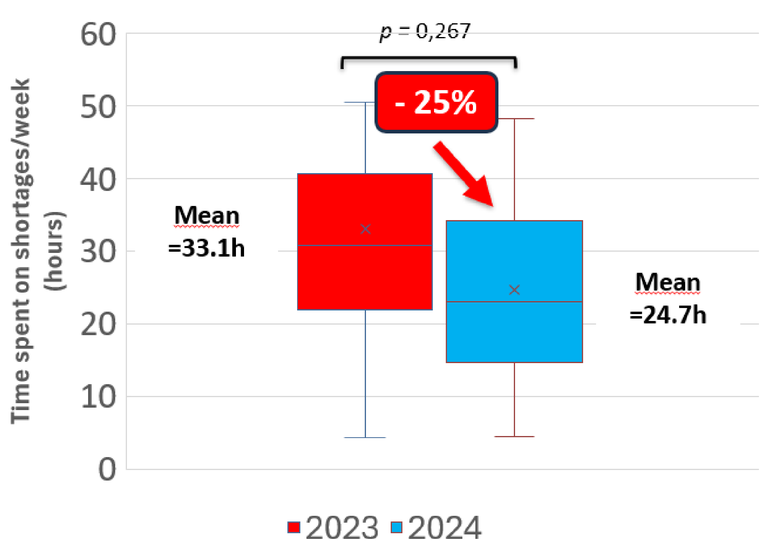
Logistical KPI	Financial KPI	Temporal KPI
• Number of drug shortages • Cause of shortage	• Human resources extra-costs ($) • Purchase of alternatives ($)	• Duration of drug shortages (days) • Human resources time spent on drug shortages (hours)

RESULTS

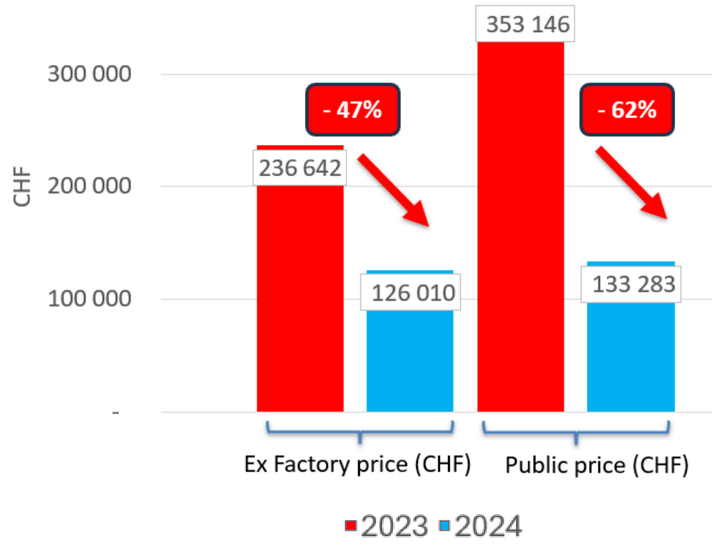
#1 Number of internal drug shortages



#2 Time spent on shortages/week



#3 Overcosts due to alternative purchase



CONCLUSIONS & PERSPECTIVES

Implementation of the cockpit has significantly reduced stockouts and associated costs. Shortages have decreased by 57% (internal stock) and management time has been reduced by 25%, while alternative purchase costs have dropped by 62%. Integrating logistical and clinical data has proven to be an effective strategy for anticipating drug shortages. The next steps will focus on further enhancing this approach by developing a supplier reliability index and a drug shortage risk index. Additionally, connecting the dashboard to a platform tracking supplier shortages at a national level will further improve proactivity in managing drug shortages.

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