

Increasing pharmacy productivity by expanding the role of the intravenous compounding robot in a comprehensive cancer centre

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INTRODUCTION

In the IRCCS Candiolo comprehensive cancer institute, injectable anticancer drugs are compounded in the pharmacy-based preparation unit also with the compounding robot APOTECAchemo (Loccioni, Italy) to guarantee high level of quality and safety. The robotic system was installed in late 2016 in the Grade C cleanroom and is bidirectionally interfaced with the electronic prescribing software.

In 2018, the oncology pharmacy implemented workflow improvements to manage the growing

workload due to the centralization of the activities of two additional hospital's satellite pharmacies. This study aimed at analyzing the pharmacy performances before and after the centralization, the impact of the robotic production to meet increasing pharmacy productivity, and the overall medication turnaround time.

METHODS AND MATERIALS

Data were collected from both the Hospital Information System and the workflow management software APOTECAmanager and examined over a 2-year period (2017-2018). The total annual throughput in terms of doses prepared and patients treated were determined. Productivity, number of active ingredients processed, average usage time per day, and dosage

accuracy (i.e. % discrepancy between compounded and prescribed dose) were calculated for the robotic system. Moreover, the medication turnaround time (MTAT) for outpatients, defined as total time from the release of a medication order by the prescriber to administration of the medication to the patient, was measured over three months.



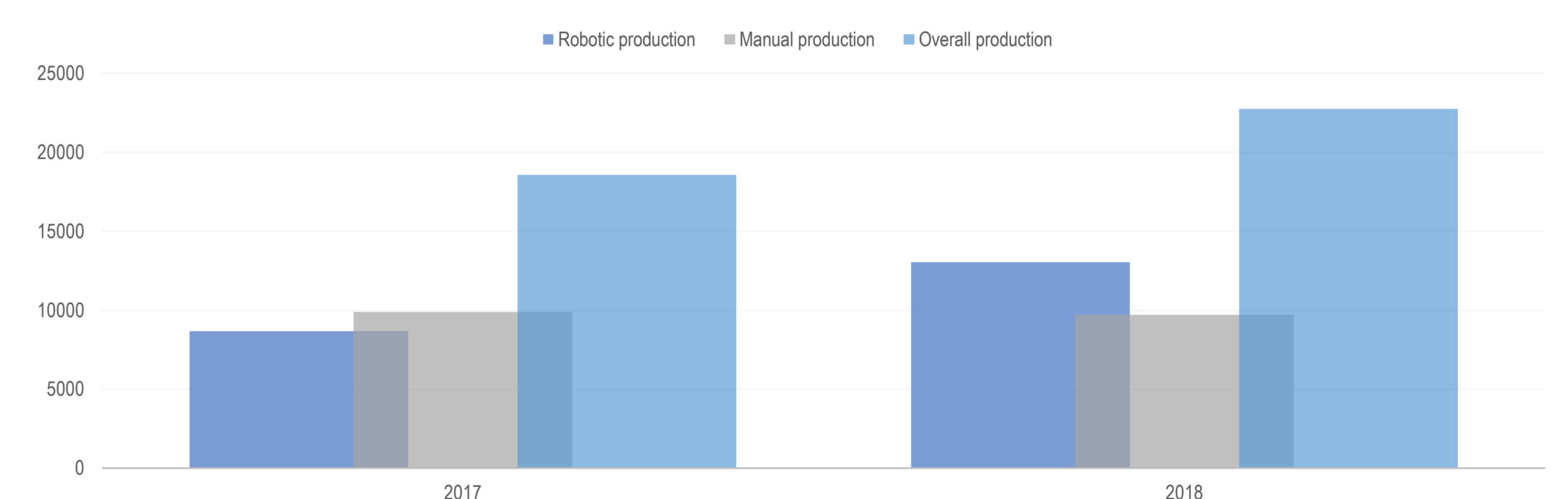
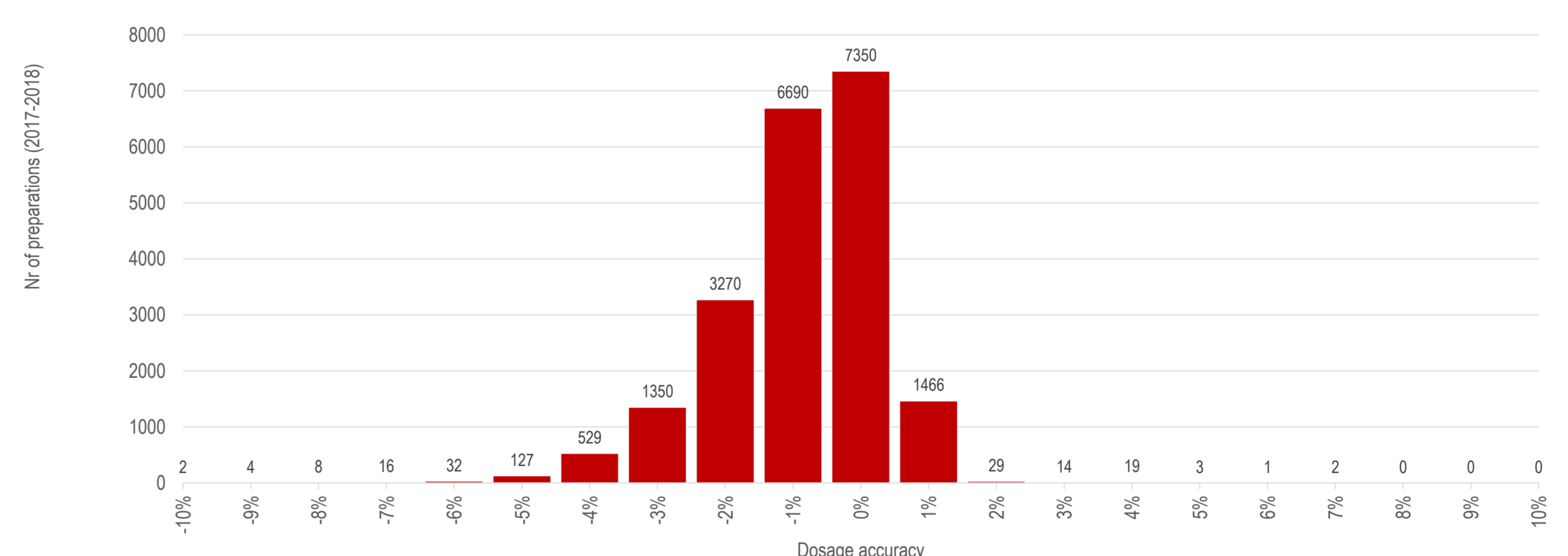
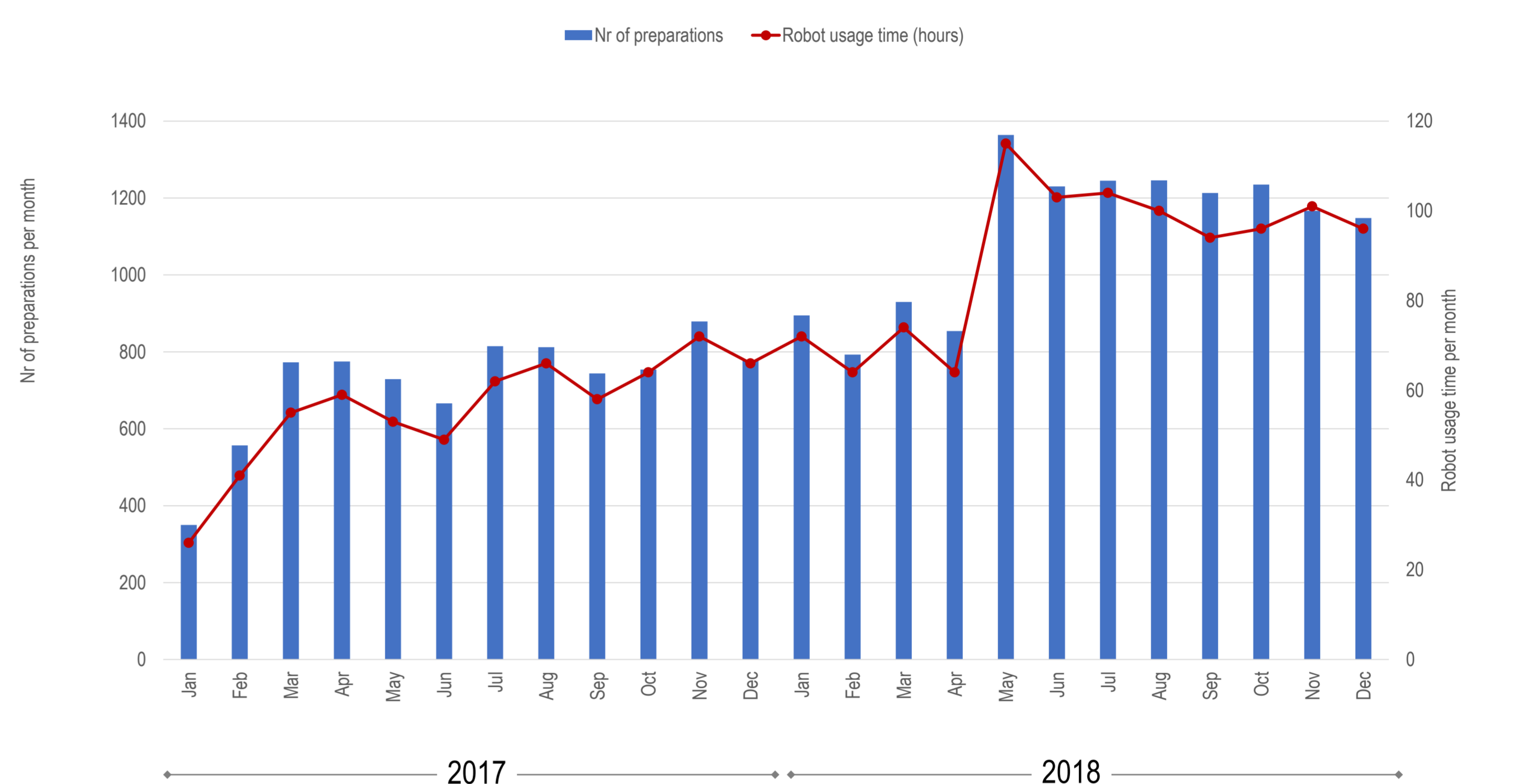
RESULTS

Overall pharmacy performances

- +18%** Annual amount of doses prepared (from 18,574 doses/year in 2017 to 22,754 doses/year in 2018)
- +16,8%** Annual amount of patients treated (from 1,421 patients/year in 2017 to 1,660 patients/year in 2018)
- 24,7%** Average MTAT for outpatients (from 2.8 hours/medication order in 2017 to 2.1 hours/medication order in 2018)

Robotic compounding process

- +50,4%** Annual doses prepared with the robotic system APOTECAchemo (from 8,677 doses in 2017 to 13,047 doses in 2018)
- +10%** Robot compounding ratio of the overall doses prepared (from 47% in 2017 to 57% in 2018)
- +58%** Average usage time of the robot (from 2.09 hours/day in 2017 to 5.01 hours/day in 2018)
- +50%** Number of active ingredients processed by APOTECAchemo (from 20 in 2017 to 30 in 2018)
- > 95%** Doses prepared by the robot in 2017 and 2018 (21,724 doses) with a dosage accuracy $\pm 2.0\%$



CONCLUSIONS

The study revealed that the oncology pharmacy was able to meet escalating demands of ready-to-administer anticancer drugs by satellite hospitals, by making more use of the robotic system without increasing the pharmacy staff. The pharmacy workflow changes enabled reduced MTAT and better order-processing efficacy, thereby providing improved patient care.

