



Implementing chemotherapy dose-banding using retrospective data analysis and exponential calculus

^{1,2} M. Fleury, ¹ L. Falaschi, ^{1,2} P. Bonnabry

¹ Pharmacy, University Hospitals of Geneva, ² School of Pharmaceutical Sciences, University of Geneva, University of Lausanne, Switzerland
 mapi.fleury@hcuge.ch

Want to do the same?

Follow the Dose-Banding Underground Map!

Pharmacy
Centralised chemo production unit

Best practice

Background

Chemotherapies are generally prescribed and produced as a function of Body Surface Area (BSA). The most recent literature recommends that marketed drugs continue to use BSA-based dosing when supported by clinical evidence. If not, it recommends dose-banding (DB) with adjustments made for other important parameters.

The most recent literature

Bins S, Ratain MJ, Mathijssen RH. Conventional dosing of anticancer agents: precisely wrong or just inaccurate? Clin Pharmacol Ther. 2014 Apr; 95(4): 361-4

Determining the optimal dose in the development of anticancer agents

Ron H.J. Mathijssen, Alex Sparreboom and Jaap Verweij

Dose banding of chemotherapy in the Edinburgh Cancer Centre



Experiences of other hospitals

Purpose

Determine which of the drugs compounded in our centralised chemotherapy production unit were potential candidates for DB for adults, whilst guaranteeing patient safety and meeting the needs of physicians, pharmacists and nurses.

Material and methods

Discussions with interdisciplinary teams and senior physicians took place in order to promote acceptance of the project and its deployment.

Database analysed

A database of chemotherapy doses produced between 2010 and 2013 was analysed to define a Top 10 chart of the most common protocols and compounds. Dosage patterns were analysed, and new bands were modelled using exponential calculus in order to aid DB decision-making.

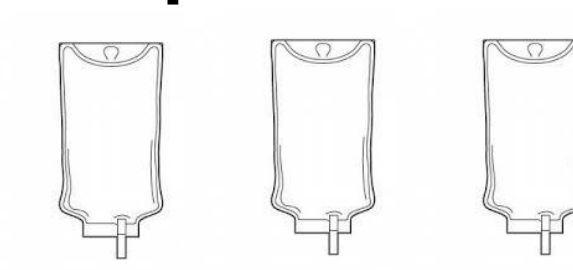
Impact of dose preparation on nurses

Goal: manufacture of fractionated additional doses

10 mg 20 mg 30 mg



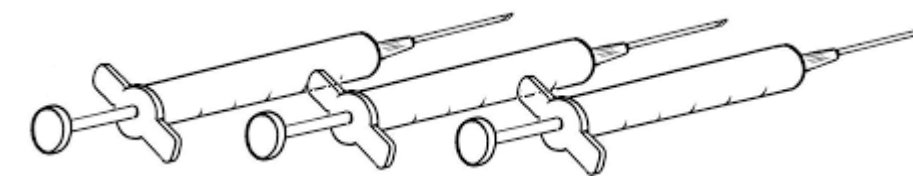
Goal: manufacture of complete doses



Dose prescription ... 70 mg ?

In the ward: total dose preparation before administration

10 mg + 30 mg + 30 mg



Dose prescription ... 70 mg ?

"Ready to administer" infusion bag

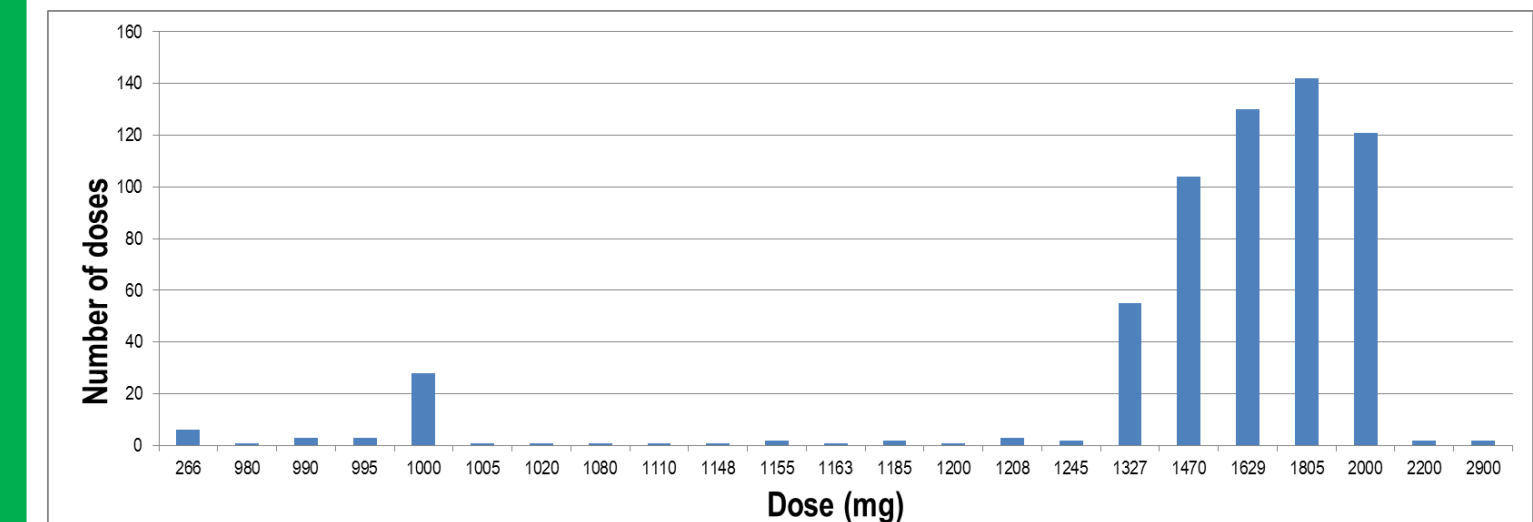


● Product stability

● Automation

Conclusion

Chemotherapeutic doses can now be prepared in bands, and pharmacy activity can be rationalised by producing doses in batches or campaigns. The imminent introduction of automation should ensure accuracy of the doses delivered. Future studies should examine product stability so that planning for chemotherapy production becomes highly efficient.



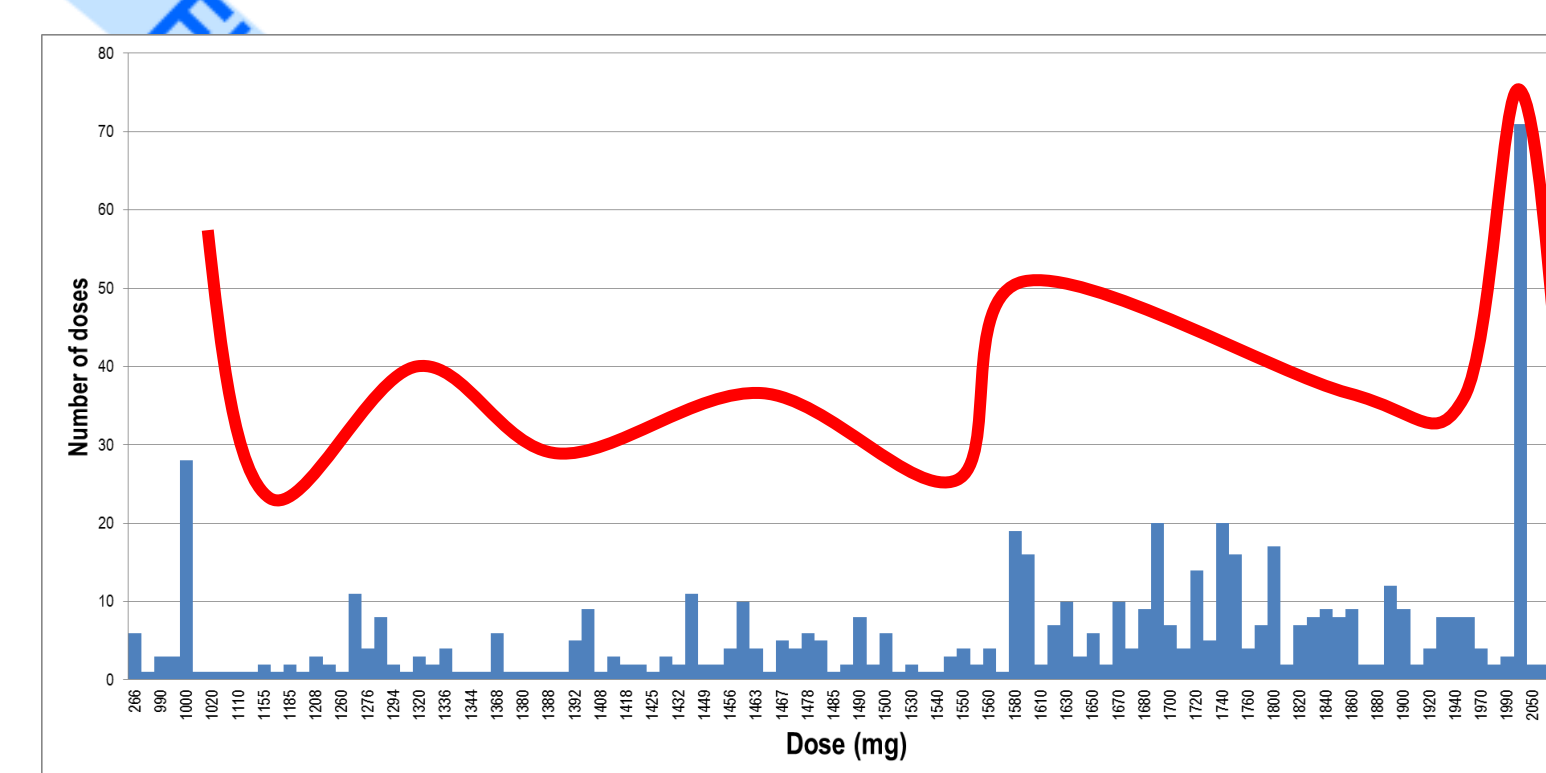
● 5 band doses = 90% of annual production needs

1327mg, 1470mg, 1629mg, 1805mg and 2000mg
 Following the new specifications, just two bands (2000 mg and 1805 mg) already fulfil 50% of annual production needs; producing five band doses streamlines 90% of annual production needs.

● Exponential calculus starting from the higher doses

			Δ 5%
2100 mg	2000 mg	1900 mg	100 mg
1995 mg	1900 mg	1805 mg	95 mg
1895 mg	1805 mg	1715 mg	90 mg

● Identification of trends in prescription



● Retrospective analysis of gemcitabine manufacture in 2013

613 infusion bags in 111 different doses, ranging from 266 mg to 2900 mg

Result

Application to gemcitabine

"Let's please keep using 'Ready to administer' doses!"

Senior physicians

"We're already banding doses when we round-off calculation."

Max 5% margin of difference from the usual prescribed dose

Possibility of prescribing doses above those suggested using BSA

Integration of bands into the electronic prescribing system

Nurses