



Of snarks, boojums and national drug charts

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DECLARATIONS

Competing interests

AJ was a member of the expert panel that developed the Standards for the design of hospital inpatient prescription charts, published by the Academy of Royal Medical Colleges in collaboration with the Royal Pharmaceutical Society and Royal College of Nursing in 2011. NB and BDF were part of a team funded by the General Medical Council to study prescribing errors in UK general practice (2009–2011), and part of a team funded by Connecting for Health to study the electronic transmission of prescriptions (2007 to date). BDF was part of a team

There have been frequent suggestions over the last few years that a national inpatient drug chart is needed for the UK NHS. Here we draw on The Hunting of the Snark,¹ Lewis Carroll's nonsense poem, described by Carroll as 'An Agony, in Eight Fits', to critique this movement, where Agony is used 'in the old sense of a struggle that involves great anguish, bodily pain or death.'²

In most UK hospitals, medicines are prescribed on a paper drug chart, a proforma on which doctors prescribe, pharmacists annotate and nurses record administration of medicines. The drug chart was developed in the late 1960s, and shown to be safer than the previous system of nurse transcription onto medicine cards.^{3–6} Some variant of the drug chart has been at the end of beds in English and Welsh wards ever since; Scotland and Northern Ireland have a similar document, the Kardex, usually kept centrally on the ward. The stimulus for the current movement to create a national chart was the excellent EQUIP study⁷ of prescribing errors made by hospital doctors. The study, funded by the General Medical Council (GMC), the regulator for the medical profession in the UK, found the prevalence of prescribing errors in inpatient and discharge medication orders to be 8.9%, unacceptably high. The GMC, in a press release⁸ which accompanied the launch of the report, called for a national drug chart to improve safety. Others have echoed the call.^{9,10} Here, in eight Fits, we explore and critique the case supporting this initiative. The first three Fits summarize the commonly used arguments for a national chart, and our critiques of them; the remainder represent additional arguments against a national chart.

Fit the first: The EQUIP study suggested that differences between drug charts predispose to

error.⁷ How strong is this evidence? First, drug chart design was not actually a major cause of error.⁷ In this study, the investigators studied the causes of error by inviting doctors to come to interview prepared to talk about a case in which they had made an error in the past. There were only two of 85 errors in which interviewees felt that the variation in drug chart designs was a contributing factor. For three other errors, poorly designed drug charts were also mentioned, but good design and standardization are not the same. Second, the methodology may have biased the causes of errors reported. We know that prescribers are not aware of most errors that they make,^{11,12} and suggest that to understand causation, people need to be interviewed about their errors soon after they are made. We previously interviewed doctors within 96 hours of making a serious prescribing error which they were not aware of at the time, and variation in drug charts never emerged as a cause.¹¹ Finally, if you knew you had made errors in the past, would you be tempted to describe one in which you had been culpable (and may look foolish or ignorant), or describe one in which the fault could be laid elsewhere? In our view the methodology might over-represent errors in which unfamiliarity with the drug chart was the cause.

Fit the Second: Two studies from Australia suggest that standardization of drug charts, in combination with education, reduces error. The first study,¹³ oft cited in support of drug chart standardization, showed that when five hospitals adopted a standard drug chart, the prevalence of prescribing error reduced from 24 to 19 errors per 100 medication orders. An Australia-wide pilot of a national chart then reported a reduction from 41 to 28 errors per 100 medication orders¹⁴ – both

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NB created the concept and led on the writing of the paper. All three authors contributed to further refinement of the ideas and writing of the paper

studies reporting the prevalence of error with the new charts to be higher than in the UK EQUIP study.⁷ However, the high baseline rates were partly due to hospitals having prescribing systems in which prescribers did not indicate the times at which doses were to be administered. Prescribers instead specified only the number of daily doses which nurses then had to transcribe into specific drug round times, resulting in an additional source of error. Beyond telling us that some Australian hospitals appear to have had a poorly designed drug chart at baseline, it is not evidence that a national drug chart will reduce errors in the UK. Most English drug charts are already more like the re-designed Australian one, rather than those used at baseline. In each case, education programmes also accompanied the introduction of the new chart, which could also have accounted for the improvement. Others have voiced concerns about the benefits of the Australian national chart.¹⁵ In the UK, we¹² have found an example in which one hospital had a higher rate of prescribing errors due to the lack of a section to specify the maximum dose or frequency for 'when required' medication. Such findings suggest there is a clear case for advice on good design and content of drug charts, such as using the standards recently recommended by the Academy of Medical Colleges.¹⁶ However, this is not the same as recommending a national drug chart.

Fit the Third: Closer to home, the evidence from Wales shows that a national chart is achievable.¹⁷ Wales has successfully implemented a national chart, albeit a country with a population less than half that of London, and a strong sense of national identity. However, a key reason for the introduction of this standard chart was to facilitate training with a Welsh e-learning package for prescribing, so that all training material could be based on the standard drug chart. The effects on prescribing error have not been measured, nor has there been a study to establish if it created any new problems or workarounds. The accompanying education on prescribing may also account for any perceived benefits. Perhaps the conclusion is that junior doctors and new staff should be educated about local drug charts and how to use them.

Fit the Fourth: The fallacious view that one chart is sufficient. Even within autonomous institutions such as NHS hospital trusts there is

rarely 'one' drug chart – there are usually variations on the main chart for different clinical areas such as short stay units, paediatrics and critical care, plus other supplementary charts, such as for sliding scale insulin and heparin infusions. Drug charts also need to support local practices such as those required to meet local CQUIN targets in England.¹⁸ Being able to adapt charts locally increases the scope for design to be responsive to local needs and financial drivers. The notion of one national chart seeks to oversimplify a complex system, where one size simply will not fit all.

Fit the fifth: Few technologies are intuitive; people need to be educated in how to use them. A drug chart is a technology, albeit a basic one. The lack of a standard drug chart could be seen as the problem, but the problem could equally be seen as a lack of education in the use of drug charts. Drug charts vary in detail, but are largely the same. An analogy is cars, which may be different in the location of various controls but are all basically the same, and anyone with a valid driving license should be able to drive any car. Undergraduate medical prescribing education should be based on a typical drug chart; post-graduate prescribing education could then focus on specific charts in use in the relevant hospital. To focus the blame on a technology can distract from the importance of education in good prescribing and the appropriate use and understanding of local prescribing stationery. We believe that instead, NHS organizations should focus on appropriate induction for medical staff regarding local prescribing stationery. Medical schools should use typical examples of hospital drug charts when teaching prescribing, and medical students should be encouraged to familiarize themselves with drug charts during their clinical placements through involvement in prescribing audit, structured observation of the prescribing and administration of medication, and through mock prescribing assignments.

Fit the sixth: There were 21 recommendations given in the GMC funded EQUIP report,⁷ but the accompanying press release⁸ focused only on one of these, the one relating to drug chart standardization. The other 20 recommendations, mainly relating to medical staff education and other aspects of the clinical environment, were largely ignored.

Fit the seventh: Electronic prescribing is increasingly prevalent in UK hospitals. Currently it is used in many hospitals for cancer and discharge medication systems, but increasingly it will also be used for all inpatient prescribing. The disparity between different systems, for example in entry screens and decision support, is so vast that current UK prescription charts appear identical in comparison. Here is a technology that is already supplanting the current prescription charts, and can create a new and significant risk of error.¹⁹ Presenting and inputting information on a computer screen is very different from on paper, and in our view, working on how best to support user interface design for electronic prescribing is far more important than the standardization of paper drug charts, which will soon be defunct.

Fit the eighth: At the start of *The Hunting of the Snark* we are told that the Baker had been warned that you must be careful when hunting a Snark, for if yours is also a Boojum then you will 'softly and suddenly vanish away'. We think a national drug chart is both Snark and Boojum, and are concerned that the things that will be softly and suddenly vanishing away are the quality of life, and the lives, of patients who are harmed while calls for a national drug chart take the time and energy that could be applied to addressing more important causes of prescribing error. Instead, other actions to prevent prescribing errors are needed, including better induction programmes, feedback on prescribing errors made, incorporation of safe prescribing into both undergraduate and postgraduate education, and judicious introduction and use of electronic prescribing. The benefits of these are much less likely to 'softly and suddenly vanish away'.

References

- 1 Carroll L. *The Hunting of the Snark: An Agony in Eight Fits*. London: The British Library Publishing Division, 1876
- 2 Gardner M. *The Annotated Snark*. Penguin: London, 1962:43
- 3 Calder G. The prescribing and administration of drugs in hospitals. *J Hosp Pharmacy* 1965;280-3
- 4 Crooks J, Clark CG, Caie HB, Mawson WB. Prescribing and administration of drugs in hospitals. *Lancet* 1965;i:373-8
- 5 Crooks J, Weir RD, Coull DC, et al. Evaluation of a method of prescribing drugs in hospital and a new method of recording their administration. *Lancet* 1967;i:668-71
- 6 Hill PA, Wigmore HM. Measurement and control of drug-administration incidents. *Lancet* 1967;i:671-4
- 7 Dornan T, Ashcroft D, Heathfield H, et al. *An in Depth Investigation into Causes of Prescribing Errors by Foundation Trainees in Relation to their Medical Education. EQUIP Study. A Report to the General Medical Council*. 2009. See http://www.gmc-uk.org/FINAL_Report_prevalence_and_causes_of_prescribing_errors.pdf_28935150.pdf (last checked 1 January 2012)
- 8 GMC. *GMC Calls for a National Prescription Chart to Reduce Errors* [press release]. 2009. See <http://www.gmc-uk.org/news/5156.asp> (last checked 31 December 2011)
- 9 Lancet. How to reduce prescribing errors [editorial]. *Lancet* 2009;374:1945
- 10 Velo GP, Minuz P. Medication errors: prescribing faults and prescription errors. *Br J Clin Pharmacol* 2009;67:624-8
- 11 Dean B, Schachter M, Vincent C, Barber N. Causes of prescribing errors in hospital inpatients: a prospective study. *Lancet* 2002;359:1373-8
- 12 Franklin BD, Reynolds M, Shebl N, Burnett S, Jacklin A. Prescribing errors in hospital inpatients: a three-centre study of their prevalence, types and causes. *Postgrad Med J* 2011;87:739-45
- 13 Coombes ID, Stowasser DA, Reid C, Mitchell CA. Impact of a standard medication chart on prescribing errors: a before-and-after audit. *Qual Saf Health Care* 2009;18:478-85
- 14 Coombes ID, Reid C, McDougall D, Stowasser D, Duiguid M, Mitchell C. Pilot of a national inpatient medication chart in Australia: improving prescribing safety and enabling prescribing training. *Br J Clin Pharmacol* 2011;72:338-49
- 15 Millar AJ, Silla RC, Lee GE, Berwick A. The national inpatient medication chart: critical audit of design and performance at a tertiary hospital. *Med J Aust* 2008;188:95-9
- 16 Academy of Royal Medical Colleges. *Standards for the Design of Hospital In-patient Prescription charts*. 2011. See <http://aomrc.org.uk/projects/standards-in-patient-prescription-charts.html> (last checked 2 January 2012)
- 17 Anon. New all-Wales drug chart looks set to increase patient safety. *Hosp Pharmacist* 2004;12:185
- 18 Department of Health. *Using the Commissioning for Quality and Innovation (CQUIN) Payment Framework*. 2008. See http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091443 (last checked 2 January 2012)
- 19 Koppel R, Metlay JP, Cohen A, et al. Role of computerized physician order entry systems in facilitating medication errors. *JAMA* 2005;293:1197-203