Medication Safety in Hospitals

Abstract
Medication error and adverse drug reactions occur frequently, leading to a high burden of patient harm in the hospital setting. Many Irish hospitals have established medication safety initiatives, designed to encourage reporting and learning to improve medication use processes and therefore patient safety. Eight Irish hospitals or hospital networks provided data from voluntary medication safety incident and near miss reporting programmes for pooled analysis of events occurring between 1st January 2006 and 30th June 2007. 6179 reports were received in total (mean 772 per hospital; range 96-1855). 95% of reports did not involve patient harm. Forty seven percent of reports related to the prescribing stage of the medication use process, 40% to the administration stage and 9% to the pharmacy dispensing stage. This data is published to increase awareness of this key patient safety issue, to share learning from these incidents and near misses and to encourage a more open patient safety culture.

Introduction
International studies [1-4] have reported that adverse events (patient safety events resulting in patient harm) occur in 9 to 16% of hospitalisations. An early hospital study [5] determined a rate of adverse drug events (medication errors or adverse drug reactions resulting in patient harm) of 6.5 per 100 admissions, of which 28% were preventable. A recent estimate is that on average, a hospital in-patient is subjected to at least one medication error per day [6]. A study of medication error and adverse drug reaction reports in four Irish hospitals recorded 510 incidents/near misses in a three month period in 2006 [7]. There has been no major systematic study of adverse drug events in Ireland to date. Medication error data received from hospitals in the public health system and maternity hospitals by the Clinical Indemnity Scheme does not at present lend itself to detailed analysis. Medication safety initiatives have been established in many Irish hospitals, including collecting reports from staff regarding medication errors and adverse drug reactions. Collaboration between these hospitals results in dissemination of learning from medication safety issues beyond the hospital in which the issue was reported. Data from eight such initiatives has been pooled and analysed collectively in this paper.

Methods
All members of a medication safety special interest group, now formalised into the Irish Medication Safety Network, were asked for medication error and adverse drug reaction data from the time period 1st January 2006 to 30th June 2007 in a standardised format. The data set was minimised to ensure confidentiality. The data in this report has been collected in individual hospitals via voluntary incident and near miss reporting schemes, administered by medication safety specialists, risk managers and/or pharmacy departments, under the oversight of each hospitalâ s Drug Safety Committee or Drugs and Therapeutics Committee. Medication errors and adverse drug reactions were also reported by the participating hospitals to the Clinical Indemnity Scheme and/or to the Irish Medicines Board as appropriate. Eight hospitals or hospital networks throughout Ireland provided the requested data set, which was pooled and analysed.

Results
6179 medication safety incidents/near misses were reported from the eight participating hospitals or hospital networks. The mean number of incidents/near miss reports per hospital/network was 772 (range 96-1855). Although all reports were received within hospital reporting structures, 17 incidents originated in the community. The severity of incidents and near misses reported is described in Figure 1, using the United States National Co-ordinating Council for Medication Error Reporting and Prevention (NCCMERP) categories [8], adapted to include classification of adverse drug reactions. Eleven incidents may have contributed to or resulted in permanent or life-threatening harm or death (categories G-I). A further 315 incidents resulted in temporary harm (categories E-F). The remaining 95% of reports did not involve patient harm.

Figure 1: Severity of medication errors and adverse drug reactions reported

The prescribing stage was involved in the largest number of reports (47%). This was followed by the administration stage (i.e. the delivery of a medication to a patient by a healthcare professional, for its consumption or use) at 40% and the dispensing of the medication by a pharmacy (9%) (Figure 2). The most frequent types of incident/near miss reported were wrong dose (21.9%), omitted medicine/dose (20.2%), wrong medicine (10.1%) and â otherâ (Figure 3).

Figure 2: Stage(s) of the medication use process involved

Figure 3: Type of incident/near miss

Discussion
Patient safety and quality improvement are becoming increasingly important foci in Irish healthcare. Implementation of the recommendations of the Commission on Patient Safety and Quality Assurance [9] is expected to further promote this. Medication use in hospitals is an extremely complex process and it is estimated that there may be 30-40 steps involved in delivering a single dose of a medication to a patient, involving various healthcare professionals and patients, each of which has potential opportunities for error. Medication use in the community, both in self-caring patients and in long-term care, sheltered accommodation etc, is a similarly complex process and just as prone to error, although the literature describing error in the community is much more limited. The risk of medication error is increased at the interfaces between care settings; the need to reconcile and monitor patientsâ medication as they oscillate across boundaries, to and from home, hospital in-patient, out-patient and diagnostic services and other care facilities is well recognised. While the majority of errors do not cause patient harm, it is essential to recognise the potential for serious harm from incorrect or inappropriate management of medication. All healthcare organisations and all staff involved in the medication use process must therefore endeavour to reduce the error rate to ever lower levels by ensuring the safest possible systems of medication use, with monitoring for and learning from error to further guide risk reduction methods.

The medication safety initiatives established in many Irish hospitals attempt to address the risks associated with medication use, involving voluntary, non-punitive, confidential incident and near miss reporting, systematic analysis of reports and critical evaluation of the processes involved, and employing various measures to minimise the risk of recurrence and maximise patient safety. Individual organisations are thus attempting to minimise the risks to patients from medication use locally. Representatives from these initiatives in the acute sector have established the Irish Medication Safety Network. The groupâ s principal aim is to improve patient safety with regard to the use of medicines through collaboration, shared learning and action. Representatives from the group are working with bodies such as the Clinical Indemnity Scheme, the Health Service Executive and the Health Information and Quality Authority to advance the medication safety agenda nationally.

The data described in this analysis is a snapshot of the types of medication errors and adverse drug reactions occurring in the Irish hospital system. Some limitations of the study include that not all Irish hospitals were represented in the analysis. The information in this report has been collected by voluntary reporting systems and thus represents the medication errors and adverse drug reactions identified and reported within the participating hospitals, rather than an error rate. A more detailed analysis of the data was not possible due to lack of availability of detail and lack of resources to perform such analysis. The large â Otherâ category in the type of report (Figure 1) is indicative of the lack of uniformity across organisations in the manner in which data is collected and categorised and the lack of a specific category for adverse drug reactions.

A high medication error and adverse drug reaction reporting rate is a desirable first step in enabling hospitals to tackle medication safety risks to their patients. Other approaches such as risk assessment, use of trigger tools and observation studies are also valuable in piecing together the overall picture of medication safety risks. It is clear that medication error and adverse drug reactions occur in Ireland as elsewhere and in considerable numbers. It is hoped by the authors that sharing the learning from local medication safety incident and near miss reporting can result in raised awareness of the importance of the issue and the need to take steps to improve medication use processes nationally to minimise future risk to patients.

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