Workflow-based data solutions are required to support antimicrobial stewardship in general practice

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INTRODUCTION

Overuse of antibiotics contributes to the growing problem of antibiotic resistance in pathogens, which is impacting not only on health systems but the global economy.[1 2] To manage the problem, we must ensure adequate treatment and prevention of infection, while looking for opportunities to minimise the harm from unnecessary use of antibiotics.[3] To optimise antibiotic prescribing, we must know which antibiotics are being prescribed, to whom they are prescribed and the clinical indications for those prescriptions. These data can then be analysed for opportunities to effect and monitor change in antimicrobial stewardship (AMS) programmes. Most of the antibiotics consumed by humans are prescribed in the community,[4–8] so the general practice setting is important for AMS. Community antibiotic data often come from dispensed prescriptions (sales),[5] but dispensed prescriptions may include prescriptions from other community settings and providers (eg, residential facilities, hospital outpatients)[7 9] or may not include all general practice prescriptions (eg, private prescriptions).[10] This obscures the specific contribution by general practitioners in general practice. The reasons for prescriptions are not available in most dispensed prescriptions. Surveys are also used,[11–13] which collect the reason(s) for prescription, but these are resource intensive. A range of commercially available clinical software is used in general practice but they have limited interoperability, so the secondary analysis of electronic medical records (EMRs) and the targeting and monitoring of AMS initiatives has been difficult.

The aim of this study is to investigate the extent to which prescribing data available from Australian general practice EMRs can be used to identify possible targets for AMS by comparing antibiotic prescribing with antibiotic prescribing guidelines.

METHODS

Data were extracted from the deidentified patient records of consultations conducted between 1 January 2010 and 31 December 2014 from 50 general practices in Melbourne's eastern suburbs using POpulation Level Analysis and Reporting (POLAR) for general practice (formerly known as MAGNET).[14] Importantly, data were extracted from nominated fields in the EMR but not from free-text progress notes. Further details are provided with the analysis of the prescribed antibiotics.[15]

RESULTS

Data related to antibiotic prescriptions were available from 39 of the 50 practices. The other 11 practices did not have data for all 5 years. Over the 5 years, 597 302 antibiotic prescriptions were provided to 164 552 patients. Thirteen (33.3%) of the 39 practices (231 388 (38.7%) of the prescriptions) had no reason-for-prescription (reason) data recorded in the nominated field of the EMR. None of the other 26 practices had a reason documented for all antibiotic prescriptions, and there were 5748 different versions of reasons used for the antibiotic prescriptions. Many entries were free text, with some being uninterpretable (eg, single letters), or containing typographical errors. The number of antibiotic prescriptions with an interpretable reason was 103 217 (17.3%). Some reasons provided for an antibiotic prescription were attributed to an underlying condition, for example, asthma, or a symptom/sign, for example, fever, rather than a diagnosis.

DISCUSSION

We found recording of an interpretable reason for prescription of an antibiotic to be low in the EMRs currently in use in this cohort of Australian general practices. The separate field available for recording this information does not appear to be useful to

general practitioners (GPs). This problem has also been reported in the 2019 Antimicrobial Use and Resistance in Australia (AURA) report. Since 2015, only 33.4% of prescribed systemic antibiotics had a reason for prescription recorded (p 85).[16] The AURA report gathers data from the largest, but non-randomised, voluntary sample of Australia-wide general practice EMR data (MedicineInsight).[17] The lack of reason-for-prescription has also been reported from general practices in England, where 31%,[18] and 33.2%[19] of systemic antibiotic prescriptions could not be linked to a reason for prescription. In Denmark, 32% of systemic antibiotic prescriptions had no clinical indication and, of those with a clinical indication, 26% were 'infection'.[20] Among a 19 million person cohort of privately insured patients in the USA, where reason for prescription is inferred from the diagnosis code, 28.5% of oral antibiotic prescriptions had no diagnosis code.[21] In the Netherlands, where prescribers are now required to write the indication on the prescription for 39 medicines (including some antimicrobial agents), there was poor recording of diagnosis codes and the authors called for improvements to Dutch prescribing software to allow easy linkage with the indication.[22]

A limitation is the small sample size, but a range of commercially available clinical software was used in these 39 practices. This study highlighted that some software uses standardised coding, others use free-text entries, and in some software or practices, this field may either be absent or is able to be turned off.

Poor and missing diagnostic coding in antibiotic prescribing and a lack of EMR standardisation are jeopardising the ability to conduct effective AMS in general practices. To enable meaningful analysis and feedback, the reason for prescription should be recorded in a standardised field suitable for data extraction. Clinical software packages should be designed to better facilitate consistent documentation of the reason for prescription and to fit within the workflow of a GP consultation. Information technology solutions[23–25] are urgently required to improve the EMR to support antimicrobial stewardship initiatives in the general practice setting. Until these are in place, it will be difficult to accurately target AMS programmes to general practice and to monitor progress over time.

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