

Part I: ePapers

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1 DIGITAL TRANSFORMATION OF THE ACUTE MEDICAL TAKE – IMPROVING STANDARDS OF CARE

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Objective With over 50 acute medical referrals per day at Royal Bolton Hospital, an efficient and safe acute medical take process is crucial to maintain high standards of clinical care. The existing process involved multiple non-communicating patient lists to track referrals. It also relied on manual data entry – resulting in patients being missed for clerking or not being identified for senior review – thereby missing national targets. A quality improvement project was designed to i). assess the functionality and safety of the current medical referral process and ii). develop a safer and more usable referral and patient tracking system.

Methods A new automated electronic Acute Medicine Referral List (AMRL) was outlined by the trust's IT team and clinicians. It was designed to integrate into the existing Electronic Patient Record (Allscripts).

The new AMRL system integrates into existing clinical practices of A&E and AMU clinicians. Clinical performance data from the pre-existing process and the new AMRL were benchmarked against Society of Acute Medicine Quality indicators, and analysed to assess the impact on the medical oncall team's working patterns, patient flow and patient outcomes.

A pre-intervention benchmark audit cycle (7 days of admission data) was carried in February 2020. The AMRL and referral process was subsequently implemented in November 2020. Following an interim spot audit and user survey, minor refinements were made to the AMRL. Two post-intervention audit cycles (7 days admission data) were then performed in January (6 weeks post intervention) and April 2021 (5 months post intervention).

Results Since introducing the electronic AMRL, patients waited less time for medical clerking (\bar{x} 00:13 hours) and senior review (\bar{x} 04:58 hours). There was also a 6.4% increase in the proportion of patients clerked within the 4 hour target window. When looking at weekend data, the impact of AMRL is more marked. The waiting times for medical clerking and consultant reviews at the weekend have improved by 25.1% and 26.1% respectively. There was a significant increase in the proportion of patients being reviewed by a consultant within 14 hours. This improvement was sustained through multiple audit cycles.

Overall, there was a measurable improvement in clinical performance against the national clinical quality indicators. The average hospital length of stay reduced by 1.3 days, equating to a reduction of approximately 15600 total occupied bed stays per annum.

Conclusions The introduction of the Acute Medicine Referral List, a single consolidated electronic patient list and referral process, has improved standards of care and patient flow within the organisation. Timely senior decision making has prompted earlier discharges and a reduction in overall

inpatient length of stay – resulting in an estimated cost saving of £3.1 million.

The AMRL demonstrates how the unification of both patient referral listing and workflow systems can improve standards of patient care and experience. The primary reasons for success of the AMRL include: 1) the ability to integrate within established clinical and workflow systems and 2) stakeholders were responsive to feedback from end users, addressing pitfalls promptly to continuously improve on the systems usability and functionality.

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2 EVALUATION OF MAST (MANAGEMENT AND SUPERVISION TOOL) TO SUPPORT NHS COMMUNITY MENTAL HEALTH TEAMS IN IDENTIFYING RISK OF CRISIS AND COMPLEXITY ACROSS CASELOADS

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Objective The Management and Supervision Tool (MaST) helps NHS mental health care professionals identify patients who are most likely to need psychiatric hospital admission or home treatment, due to severe mental illness, through a Risk of Crisis (RoC) algorithm driven by electronic health record (EHR) data analytics. MaST improves the efficiency of case-load management of Mental Health Professionals. We describe the derivation and validation of the MaST RoC algorithm, and its implementation to support preventative mental health-care in the NHS.

Methods The RoC algorithm was developed and evaluated with EHR data from six UK NHS trusts using Ordered Predictor List propensity scores informed by a priori weightings from pre-existing literature, as well as real-world evidence evaluating the associations of clinical risk factors with mental health crisis using NHS EHR data. Mental health crisis was defined as admission to a psychiatric hospital or acceptance to a community crisis service within a 28-day period. Predictor variables included age, gender, accommodation status, employment status, Mental Health Act (MHA) status (under section or Community Treatment Order), and previous mental health service contacts (including hospital admissions and crisis services). Data were analysed using Ordered Predictor List propensity scores. The algorithm was derived using structured EHR data from 2,620 patients in a single NHS trust and externally validated using data from 107,879 patients in five other NHS trusts. Qualitative and quantitative data on feasibility, acceptability and system efficiency impacts of MaST implementation were obtained through staff surveys and local audits.

Results The factors associated with greatest propensity for mental health crisis included recent previous crisis, multiple previous crises, higher number of mental health service contacts in recent weeks, MHA section, accommodation status and employment status. The RoC algorithm identified 64% and 80% crises in its top quintile. Sentiment analysis of staff surveys suggested that the use of MaST improved productivity by reducing time taken to access patient information to

support caseload management that was previously difficult to obtain through manual review of EHRs.

The systems efficiency audit revealed a reduction in duration of crisis and inpatient admissions following MaST implementation.

Conclusion The MaST RoC algorithm supports the identification of people more likely to use crisis services in NHS mental health trusts, is feasible to implement, and improves systems efficiency. The visualisation of these insights enables improved caseload management within community mental health teams. EHR-derived algorithms can support real-world clinical practice to improve outcomes in people receiving NHS mental healthcare.

3 THE DOCUMENTATION OF ALLERGY ACROSS ELECTRONIC SYSTEMS FOR PATIENTS PRESENTING TO EMERGENCY DEPARTMENTS IN LEEDS

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Objective How consistent is the recording of allergy documentation across multiple electronic systems in patients presenting to the emergency departments of a large UK tertiary trust?

Over 20% of the UK population are affected by one or more allergic disorders (1) and there has been shown to be a 615% increase in the rate of hospital admissions for anaphylaxis in the UK, between 1992 and 2012 (2). Correct documentation of patient allergies is essential to protect patients and prevent avoidable drug errors, estimated to cause around 1080 deaths annually in secondary care across England (3). Our objective was to determine how consistently allergies were recorded across multiple patient electronic record systems, in patients presenting to the emergency departments (ED) of Leeds Teaching Hospitals Trust.

Methods 50 patients were randomly selected from those presenting to the ED between 25th and 27th October 2021 with an allergy recorded on at least one electronic system. A further 51 patients were randomly selected from the those who had presented with anaphylaxis between 1st April 2020 and 31st March 2021. Their allergy status was then analysed retrospectively from the following five electronic records: Yorkshire Ambulance Service patient report form, Symphony (ED patient information system), the medical assessment record, Leeds Care Record (primary care summary) and eMEDS (electronic prescribing system). The patients' records were then compared for accuracy relative to each other and if they were not identical, compared against part 1.2.1 of NICE guideline CG183 (5). This states that their medical record must include one of the following: 'drug allergy', 'unable to ascertain' or 'none known'. Patients who did not have identical records, but 'unable to ascertain' listed instead, were recorded in a separate group as meeting this guideline due to the nature of ED presentations.

We excluded the following allergies: hay fever, dust mites and pollen. The group presenting with anaphylaxis had to have previously been diagnosed with the allergy before that attendance.

Results 413 individual electronic allergy records were analysed, of which 214 records were part of the anaphylaxis group and

199 were part of the non-anaphylaxis group. Only 17% of patients had synonymous records across the 5 possible electronic systems. Overall, 33% of patients had at least one record that stated they did not have an allergy when at least two others stated they did have an allergy. Concerningly in the anaphylaxis group, 20 individual records (9%) across 15 patients (27%) had records that stated they did not have an allergy, despite their attendance for an anaphylaxis reaction. 27% of all patients had either synonymous records or records that met the NICE guideline. Every patient who had three or more allergies did not have synonymous records.

Conclusion The inconsistency of recording allergy status in a patient's health record demonstrates the importance of improved interoperability between electronic systems, to reduce the risk of administration errors and patient harm due to multiple versions of the 'truth'. To mitigate the limitations of the current systems, it is important clinicians review the patient's allergy status every time a medication is prescribed. This can be especially challenging in emergency and urgent health care environments, when due to a patient's clinical status, they may be unable to provide an accurate allergy history.

Our findings are consistent with those of other studies, including a 2008 study which compared two key forms of patient allergy documentation, 36.5% of these records were not synonymous (4). This further suggests the need for additional research, not just across the trust but nationally. Depending on the results it is likely further safety measures may need to be introduced, especially in areas where multiple patient information systems are used or in patients who cannot accurately recall their own allergies. Further audits should also be carried out against the second part of the NICE guideline CG183, part 1.2.2, which sets criteria for how the allergy should be recorded (5).

4 REDUCTION OF ORDER ALERTS THROUGH FILTERS: IMPACT ON PHARMACISTS' OVERRIDE RATE AND PERCEPTIONS OF ALERT FATIGUE

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Objective Clinical decision supports (CDS) in electronic medication order systems identify alerts for clinicians. However, CDS may cause alert fatigue, which is the tendency for clinicians to ignore prompts presented by CDS due to excessive numbers and/or their perceived limited clinical significance. Alert fatigue may increase the risk of missing clinically relevant alerts. At North York General Hospital, pharmacists managed over 50% of all medication CDS alerts amounting to approximately 60 alerts per day per pharmacist with an override rate of over 90% indicating a high likelihood of alert fatigue. Thus, we attempted to reduce pharmacists' alert fatigue utilizing customizable filters.

Methods Optimizing medication CDS has traditionally centered around turning on or off alerts, changing alert severity levels or clinician role tailoring. These strategies can be labor and time-intensive requiring clinicians from different specialties to review hundreds of individual alerts. As such, this study pursued the use of customizable, context-based filters to reduce unnecessary alerts. Utilizing data from the EHR vendor's