Position Paper on electronic decision support within Newcastle upon Tyne Hospitals

Introduction

The Newcastle upon Tyne hospitals NHS Foundation Trust implemented electronic prescribing since 2009. The system is live with Drug-Allergy checking but is not live with Drug–food, drug-drug, dose range checking and therapeutic duplication. This design setting was informed by the relative efficacy of alerts vs alert fatigue and the configurability of the Multum interaction matrix.

It was intended to review this decision in light of further developments within the system or developments in evidence / experience with the system. This paper describes the current position for reactive decision support with recommendations on how to handle this functionality over the next two years.

Alert options within the EPR system at Newcastle Hospitals

There are two main options for alerting processes, these are Multum alerts and Discern rules.

Multum alerts are based on an interaction matrix supplied by Multum UK. This matrix is updated on a quarterly basis. The interaction matrices are ranked and configured by interaction type and severity. It is possible to display or suppress alerts based on type and severity and by user position. It is also possible to individually customise the rating and content of individual alerts. The alerts cannot however be configured based on patient's location, clinical condition, laboratory results, age or other factors which may limit efficacy through alert fatigue.

Discern rules are custom rules developed and maintained by Newcastle hospitals. They are based on highly definable and bespoke logic criteria. The rules have three components:

- **Evoke criteria** – This describes the trigger for the event e.g. Drug A is prescribed for a female patient aged over x using Surginet
- **Logic criteria** – Further filters to refine the scenarios e.g. patient is on ward x have current prescriptions for a,b,c but not d, the most recent potassium level is above x.
- **Alert outputs type** – This defines what users see as a result of meeting the above criteria. This can be information only, the alerts can suppress orders, prompt for more information and suggest alternative prescriptions.

The flexibility of Discern rules allows very specific interventions to be implemented, they carry however a development and maintenance burden. As the Trust's electronic systems develop further it is likely that the role of rules will increase.

Current status and recommendations of reactive decision support

Table 1 summarises the current status and recommendations

Interaction type	Preferred configuration	Current status	Advantages / disadvantages	Recommendations
Drug – Food interaction	A limited range of high risk alerts	Not active	Food is not documented on eRecord. Most alerts are non-significant	Do not implement.
Drug – Drug interaction	A limited range of high risk interactions	A limited range of bespoke interactions are in place. Multum interactions are live for pharmacy staff	Risk of alert fatigue. Lack of configuration items based on clinical scenario.	A combination of filtered Multum rules and bespoke rules . Review mCDS developments
Dose range checking	A range of advisory rules implemented that do not impede specialist areas	Limited to bespoke rules to detect gross error in paracetamol and certain PICU medications	Multum content is improving. Multum content is based largely on product based ordering. Bespoke rules are time consuming. Currently no ability to filter by conditions	Maintains limited range. Increase paediatric rules based on experience. Extend to adult setting where issues are identified.
Therapeutic duplication	A limited range of rules for medication with narrow therapeutic windows or toxic effects in overdose. No impact on need to multi-prescribe	Not active	Unable to cope with PRN + Regular orders. Unable to differentiate between in-patient and discharge medication. Expected to generate thousands of alerts per day.	Do not implement Multum until further configuration options are available.

Drug – Drug Interaction checking

A project (see attachment) has recently been undertaken to identify a method to implement Multum drug-drug interaction. This attempted to quantify the incidence of these interactions, which specific interactions would present in Newcastle Hospitals and which if any could be de-activated. Based on this a range of "Contra-indicated" interactions was activated for pharmacy staff. After a pilot period, staff were followed-up to determine the usefulness of the alerts and opinions on how to develop. Staff indicated that the alerts were useful even if interventions were not required and they indicated that they would wish the alerts to continue. They questioned whether the alert should be extended to medical staff citing the following issues:

- Alerts for PRN medications were usually not appropriate
- Excess alert in certain clinical areas
- Likelihood of Alert fatigue

Based on this it is planned to continue with the Multum alerts for pharmacy staff and to continue with bespoke alerts for medical staff. The ongoing configurability of Multum will be reviewed by the pharmacy informatics team, where additional flexibility is available the ongoing need for any bespoke rules will be

Proposal for developing bespoke alerts

Given the development and maintenance burden for bespoke alerts it is proposed that a strict governance processes is put in place for the development of bespoke alerts (see summary below.) During 2016 a limited range of bespoke. New developments will therefore be on an as required basis and will be identified by clinical staff, by prescribing interests groups and through DATIX reports. Initial governance will be provided by the Medication Safety Working Group (MSWG.) This group will review requests for appropriateness and provide prioritisation or where necessary be refused.

The governance process will require clear definition of requirements on the part of the requestor, this will assist those creating the rules to determine time scales or additional education / developments required for implementation. Further governance will be provided by the Medicines Management Committee (MMC) through reporting. A key component of the governance process is a formalised release with acknowledgment of the limitations of reactive decision support described below.

The time taken for development of rules will vary according to the complexity of the rule and external factors such as erecord change freezes. Rule development is subject to the three domain path to production methodology employed by IT services. This is controlled by a weekly change approval board. Allowing for a second draft during development the minimum turnaround time for a fully defined rule will be four weeks.

In order to determine the manpower requirements for a wide development of interaction rules the informatics team will maintain a log of development time for each rule.

Summary of development process

Step	Staff / Process	Comments
Identification of rules for development	Four sources of request • Pharmacy clinical staff • Medication Safety Pharmacist • MSWG review of incidents • Ad Hoc request via Servicedesk Solutions Request Form. SRF form escalated through IT to Pharmacy Informatics Team.	
Specification of rule(s) requirement(s)	To be completed by requestor. Supported by Informatics team	See Appendix A
Draft rule methodology defined	Informatics team	
Estimate of workload and turnaround time	Informatics team	
Approval for rule development	MSWG	
Submit change control for rule development in N1BLD	Informatics team	
Change approval Board	Informatics team / IT	Meets weekly (Tuesday)
First draft of rule(s) created in N1BLD	Informatics Team	
Review of rule configuration and output	Requestor	
Second draft of specification created	Requestor	Modify Appendix A
Final draft of rule agreed	Requestor / Informatics	
Submit change control for rule amendment in N1BLD	Informatics team	
Change approval Board (Weekly meeting)	Informatics team / IT	Meets weekly (Tuesday)
Final draft of rule(s) created N1BLD	Informatics Team	
Review of final draft of rule configuration and output	Requestor	
Training development needs identified	Requestor and Informatics team	
Approval for rule progression into live	MSWG	
Definition of monitoring requirements	MSWG	
Submit change control for rule build in N1PRP	Informatics team	
Change approval Board	Informatics team / IT	Meets weekly (Tuesday)
Rule created created in N1PRP	Informatics Team	
Submit change control for rule build in N1PRD	Informatics team	
Change approval Board	Informatics team / IT	Meets weekly (Tuesday)
Rule created in N1PRD	Informatics Team	
Define monitoring requirements and assessment of efficacy	Requestor Informatics team	
Deliver Training / development needs	Requestor / Informatics Team	
Rule go-live in N1PRD	Informatics team	
Audits of rule	Requestor	Supported by Informatics team
Documentation of man-hours needed for rule development	Informatics Team	
Annual review of rule	Requestor	For any changes identified return to start of process.

Limitations and cautions

Whilst interaction checking may reduce interaction type errors, there are limitations and cautions which should be taken into account when requesting and approving build.

- Alert fatigue – override of alerts.
- Use of misc prescription.
- Absolute blocks on interactions may compromise clinical care when risk vs benefit is justified.
- Reporting processes for alerts are limited to a one-week retention period
- For interaction checking to be effective it must be conducted on one prescribing medium and the prescribing process must contain all medication.
- A specific area of failure is the out-patient setting, typically only medication for which a supply is needed are prescribed. This omits medication prescribed in primary care. Pending full roll-out within out-patients there is also likely to be a combination of paper and electronic prescriptions. The specific mitigation options for this are :
    - Not to prescribe in out-patients and provide a consultation with all subsequent medication prescribed by GP.
    - Where 1) is not possible, all medication must be added to the prescription (paper or electronic)
    - Subject to 1 and 2 where electronic prescribing is implemented in out-patients uptake must be 100%, with exceptions only in the event of a down-time

APPENDIX A Specification proforma for requesting interaction checking on eRecord

Name of requestor(s)	
Description of the interaction	
Reason the interaction checking is needed (refer to any incident number where applicable)	
Any other information regarding the request	
Using the below describe how and when you think the interaction check should work. Factors to include are listed below	
When should the alert trigger (selecting drug / signing)	Selecting drug / signing drug order / opening patients chart / drug administration **NB: If more than one is selected the following questions may require different advice – all must be stated.**
What are the triggering drug(s) ***(This refers to the drug being prescribed when the alert fires)***	(NB: State the list of named drugs. Stating a class of drugs e.g. QT prolongating agents will not be accepted) *If needed see extension sheet*
What are the currently prescribed drugs . **(This refers to the drugs that are already prescribed, with which the trigger drug interacts)**	(NB: State the list of named drugs – a class of drugs e.g. QT prolongating agents will not be accepted) *If needed see extension sheet*

For the list of drugs above are any routes included or excluded	*If needed see extension sheet*
For the list of drugs above are any doses included excluded	
Suggested alert text, include any hyperlinlks	
Should the alert be advice only	
Should the alert be a permanent block	
If the alert is a permanent block who should the user contact for advice and how	
Should the alert guide to an alternative prescription. If yes state details	
For advice only alerts how should alerts be limited	No limit / once per admission all users / once per admission per user / once every x mins / once only
Does the alert advice vary for any combination of trigger and current drug?	

Triggering drugs extension sheet

Drug name	Route		Dose		Variations in advice for this drug
	Included	Excluded	Included	Excluded	

Current drugs extension sheet

Drug name	Route		Dose		Variations in advice for this drug or specific combination of this drug and one of the
	Included	Excluded	Included	Excluded	