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Efficiency and thoroughness trade-offs in high-volume organisational routines: an ethnographic study of prescribing safety in primary care

Abstract

Background: Prescribing is a high-volume primary care routine where both speed and attention to detail are required. One approach to examining how organisations approach quality and safety in the face of high workloads is Hollnagel's Efficiency and Thoroughness Trade-Off (ETTO). Hollnagel argues that safety is aligned with thoroughness and that a choice is required between efficiency and thoroughness as it is not usually possible to maximise both. This study aimed to ethnographically examine the efficiency and thoroughness trade-offs made by different UK general practices in the achievement of prescribing safety.

Methods: Non-participant observation was conducted of prescribing routines across eight purposively sampled UK general practices. Sixty-two semi-structured interviews were also conducted with key practice staff alongside the analysis of relevant practice documents.

Results: The eight practices in this study adopted different context-specific approaches to safely handling prescription requests by variably prioritising speed of processing by receptionists (efficiency) or GP clinical judgement (thoroughness). While it was not possible to maximise both at the same time, practices situated themselves at various points on an efficiency-thoroughness spectrum where one approach was prioritised at particular stages of the routine. Both approaches carried strengths and risks, with thoroughness-focussed approaches considered safer but more challenging to implement in practice due to GP workload issues. Most practices adopting efficiency-focussed approaches did so out of necessity as a result of their high workload due to their patient population (e.g. older, socio-economically deprived).

Conclusions: Hollnagel's ETTO presents a useful way for healthcare organisations to optimise their own high-volume processes through reflection on where they currently prioritise efficiency and thoroughness, the stages that are particularly risky, and improved ways of balancing competing priorities.

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Introduction

General practitioners (GPs) and non-medical prescribers commonly prescribe medicines during face-to-face consultations, but most prescriptions are actually printed by a non-clinical administrator outside of clinical consultations.[1-3] In the UK, patients can request medicines without consultation in person and such requests may be for 'repeat' or 'acute' medicines.[4 5] Repeat requests are for chronically-used medications that had previously been authorised by the prescriber at the last medication review (called 'refills' in the US). Acute requests are for items that have not been formally authorised for repeat issue. Repeat and acute prescribing are both examples of high-volume organisational routines in that practices process tens or hundreds of such prescriptions daily, and the volume of this work is increasing in healthcare internationally.[6] In the UK, repeat prescribing accounts for three quarters of prescriptions and four-fifths of drug costs,[4] and at least 43% of the UK population has at least one repeat drug authorised, rising to over 75% of people aged over 60 years.[6]

Prescribing errors are a major cause of adverse events in healthcare and a key safety concern internationally.[7 8] A recent study found that 4.9% of all prescription items in UK general practice contained a prescribing and/or monitoring error, with 0.2% of items containing a severe error.[9] However, variation between general practices in how they organise their prescribing systems to minimise risk has been less examined. While an understanding of error and of formal systems to improve safety is important, the value of complementing this by examining the informal work of inter-professional teams to create safety is increasingly recognised.[10-14] This focus is important because healthcare work as it is done in practice in complex organisational settings often differs greatly from how it is formally written down in protocols and guidelines.[1 15-21]

A useful approach to examining how quality and safety is achieved in the face of high workloads is Hollnagel's Efficiency and Thoroughness Trade-Off (ETTO).[22] Hollnagel argues that individuals and organisations are required choose between being efficient and being thorough, writing: "*If demands to productivity or performance are high, thoroughness is reduced until the productivity goals are met. If demands to safety are high, efficiency is reduced until the safety goals are met*".[22(p.15)] According to Hollnagel, safety is closely aligned with thoroughness, whereas efficiency is more closely aligned with managing high-volume demands. Prescribing outside of consultations is a high-volume organisational routine that takes place in a complex context where both speed and attention to detail are required. The aim of this paper is to ethnographically examine the efficiency and thoroughness trade-offs made by different UK general practice organisations in the achievement of prescribing safety.

Methods

Setting

The study was conducted in the NHS in Scotland and England from January 2011-April 2014 using a multi-site ethnographic design across eight general practices. Ethical approval for this study was obtained from NHS East of Scotland Research Ethics Committee B (11/AL/0016). Practice sampling was purposive. We initially approached two practices (1 and 2) where we had conducted 12 months of ethnographic research in 2005-6 since longitudinal change was of interest to the wider study. The remaining practices were then sampled to ensure heterogeneity in terms of size (smaller [<~7000 patients] or larger), location (urban or rural), and socioeconomic deprivation (affluent, mixed or deprived) which we thought likely to influence organisation (size) or workload (rurality and deprivation) (Table 1).

Table 1: Study practice characteristics

Practice no.	Country	Practice size	Number of GPs (FTE)	Number of reception-ists (FTE)	Practice urban/rural location	Practice socioeconomic deprivation*	Duration of fieldwork
1	Scotland	~4000	~4	~7	Urban	Mixed	Long-term
2	Scotland	~9000	~8	~10	Urban	Deprived	Long-term
3	Scotland	~5000	~4	~7	Urban	Mixed	Long-term
4	Scotland	~8000	~8	~10	Rural	Affluent	Long-term
5	England	~5000	~4	~7	Urban	Mixed	Short-term
6	England	~6000	~4	~7	Rural	Affluent	Short-term
7	Scotland	~9000	~8	~10	Urban	Deprived	Short-term
8	Scotland	~8000	~8	~10	Rural	Affluent	Short-term

*Deprivation is determined from the Scottish Index of Multiple Deprivation (SIMD)[23] and NHS England National General Practice Profiles[24].

Data collection

Data collection was conducted by a researcher trained in anthropology and took place in two phases. Long-term ethnographic fieldwork was conducted in Practices 1-4 over 24-months in 2011/12 and focused on everyday practice life and how patient care was achieved across different organisational contexts, professional groups, and patient populations. A key finding from this fieldwork was the complex role of practice context and inter-professional collaboration in the achievement of safe care across high-volume

organisational routines, including repeat and acute prescribing and test results handling. An element of the wider project was to examine the methodological strengths and challenges of conducting short-term, policy-relevant ethnography that built on longer-term fieldwork. Short-term fieldwork of one week per practice was therefore conducted across Practices 5-8 in 2013/14 focusing on key high-volume routines identified in the first four practices. Data collection combined 1,787 hours of non-participant observation of the everyday working practices of team members along with interviews and documentary analysis. The aim was to develop a rich and detailed description of each practice,[25] and examine similarities and differences across all eight settings. Informed consent was obtained from all practice team members prior to fieldwork commencing. Fieldwork was undertaken during normal working hours in reception areas, administrative back offices, consulting rooms, meeting rooms, coffee rooms and corridors. During the long-term fieldwork, a standard list of data to be collected on the key stages and safety practices across key high-volume routines was developed, and used across all eight practices, supplemented with detailed fieldnotes specific to each practice as well as a fieldwork diary for more general fieldnotes.

Towards the end of fieldwork, a total of 62 semi-structured interviews were conducted with GPs, practice nurses, practice managers and receptionists across the eight practices (Table 2) (see also interview topic guide supplementary file). Interviewees were selected based on their involvement in practice routines, and gave informed consent to participate. Interview topics included: practice organisation and culture,; patient population; interviewee descriptions of the organisational routines that they were involved in; and workload distribution. Interviews lasted approximately 60 minutes and were recorded and transcribed verbatim.

Table 2: Practice interviewees by profession

Practice number	GP	Practice nurse	Practice manager	Administrative staff	Total
1	2	2	1	3	8
2	2	2	1	3	8
3	2	2	1	2	7
4	2	2	1	3	8
5	2	1	1	3	7
6	2	1	1	3	7
7	2	2	1	2	7
8	3	2	1	4	10
Total	17	14	8	23	62

Data analysis

Analysis explored patient safety in the context of repeat and acute prescribing routines. SG led on the development of the coding framework, with themes prioritised and finalised through discussion with BG (an academic general practitioner with training in and experience of qualitative research). Analysis drew on recent research focussing on positive dimensions of safety,[26-28] the informal work required to achieve safety across different healthcare organisational routines and contexts,[1 2 29] and Hollnagel's ETTO.[22] Fieldnotes and interviews were annotated with observational and theoretical notes as fieldwork progressed and shared between the researchers. Preliminary themes were identified through scrutiny of initial transcripts and a coding framework was subsequently developed that was embedded in the data collected, with informal prescribing safety practices and key risks used as sensitising concepts during the course of analysis.[30] The analytical framework was applied and refined according to emerging themes as the fieldwork developed using NVivo 8 software.[31 32] This constant comparative method continued until no further categories emerged.

Results

In all eight practices, the routine for handling prescription requests had three similar formal stages involving close collaboration between GPs and receptionists (Figure 1). At each stage, practices variably prioritised the speed or quality of processing. The following sections examine each stage in turn and how speed and quality of processing were prioritised across the eight practice settings.

Stage 1: Receptionist checks whether patient's prescription request is allowable

A core receptionist task was to distinguish between prescription requests that were routine pre-authorised 'repeats' that only required a GP signature, and requests that required further attention from a clinician because they were for an 'acute' (not pre-authorised) item or there were factors that made a repeat request problematic. On receipt of a prescription request, receptionists would usually conduct initial compliance checks via the practice IT system to ascertain whether the patient had made the request too early or if they were due a medication review. All allowable requests would then be printed out for a GP to check and sign, with any acute or problematic repeat requests either processed or brought to a GP's attention.

The high volume of requests received by many of the practices due to their serving populations with high levels of need or complexity (Practices 1, 3, 5, 7, and 8) meant that these practices prioritised speed of processing to ensure that requests were dealt with in a timely manner. Receptionists in these practices were therefore permitted to issue and print a limited range of acute items beyond routine repeat prescriptions. Levels of receptionist authority varied across the eight practices, with these differences partly influencing the approaches to prescribing adopted by these practices (Supplementary table 1). In Practice 7, for example, the 'repeats secretary' was permitted to issue, amend (e.g. the drug dosage), and print the widest range of medication of any practice in the study with minimal GP oversight. For example, she was observed amending the prescribed number of co-codamol tablets (a paracetamol/codeine combination painkiller) from 300 to 224 tablets to align prescription intervals in their electronic record. On another occasion, she amended a nursing home patient's dosage of memantine (a dementia treatment) from 10mg to 20mg. The GPs had authorised the change after a recommendation from a hospital specialist, but she delayed implementing it to prevent any confusion from misaligned monthly repeats requests. This receptionist's role was justified in terms of her extensive knowledge of the patients and their drugs, developed over her many years working for the practice. The practice also received a very high volume of requests (~2,000/week) due to the socioeconomically deprived patient population that it served, with this providing further justification for the approach adopted. In contrast, Practice 8 was medium-sized and situated in an affluent town with a high proportion of older patients with multiple long-term conditions, associated with a relatively high number of requests (~1,200/week). Practice 8 adopted a more restrictive approach to achieving efficiency where the multi-tasking receptionist team was only permitted to issue a limited range of non-repeat items prescribed by the district nurses (e.g. catheters, dressings). While the GPs acknowledged that allocating a level of prescribing autonomy to the receptionists introduced some risk, this was within clearly defined limits and was considered essential so they could focus on more complex cases:

> *Now you may think well it only takes you three minutes or something to print that prescription off, but actually when you factor in the volume that comes through during the day, then each one of those is time saved.* (Practice 8, GP1)

In contrast, Practices 2, 4, and 6 focused on ensuring that all acute and problem requests were reviewed by GPs, with receptionists only permitted to issue items that were formally authorised as 'repeats' on the IT system. Like Practice 7, Practice 2 dealt with a very high volume of prescription requests from its socioeconomically deprived population (~2,000/week). All members of the multi-tasking reception team

worked on prescriptions, with a strictly defined "*division of labour*" (Office Manager) between clinical and administrative staff. Most routine work was therefore managed by the receptionists, who filtered more complex work to the GPs. Practice 4 had adopted a similar approach but for different reasons. This practice was situated in an affluent town with a large elderly population with a moderate volume of prescription requests (~700/week) and a strong focus on individualised GP-led patient care. The receptionist was only permitted to print routine repeat prescriptions, which the GPs justified in terms of the increased risk that receptionist autonomy brought to the system:

> *We've debated over the years about giving the repeats receptionist a list of things that are OK to re-authorise. You know, you could include paracetamol or aqueous cream or something innocuous like that. So you couldn't kill yourself with aqueous cream but you could kill yourself with paracetamol … But I mean that is the extreme end of concern, and maybe we're just being a bit untrusting or inflexible perhaps in feeling that we GPs are the only people that can exercise judgement…* (Practice 4, GP2)

However, this approach also impacted on GP time, which was problematic for all practices as the volume of prescription requests and therefore GP workload steadily increased across all areas of practice work.

Stage 2: GP checks repeat, acute and problem requests

All eight practices prioritised speed in the distribution of repeat prescriptions for signing and authorisation by GPs, although how this was achieved varied across individual practices (Supplementary table 2). In the majority of practices, receptionists either handing all routine repeats to the duty GP (Practices 1, 2, 3, 5, 6), or dividing them evenly across all of the GPs present that day (Practices 7 & 8). Practice 4 had adopted a mixed approach, with the duty GP initially receiving all repeats and those that they were unable to complete by 11am shared across the other GPs during the morning coffee break.

In contrast with the signing of repeat prescriptions, which was widely considered to be routine, all of the practices emphasised the importance of GP oversight in the processing of acute or problem requests, although the extent of this oversight varied across practices. In some, GPs had complete oversight of checking, printing and signing the acute and problem requests (Practices 2, 3, 4, 5, 6, 8). In these practices, this was perceived necessary to check the appropriateness of the medication being requested and any potentially undesirable interactions with existing medication. The majority of these practices also ensured that the GP who reviewed the request was the one who was knew the patient best, although approaches to this varied across practice settings. In Practices 2, 3 and 8, the receptionists would check the practice

computer for each acute request received to see which GP had seen the patient last or whom they saw most regularly. In the remaining practices where receptionists were allowed to check and print some acute requests (Practices 1, 3, 5, 7, 8), GPs were responsible for double-checking these requests at the point of signing via post-it notes or notes in the 'problems book'. In Practices 4, 5 and 6, the GPs would divide the acute and problem requests between themselves during the shared morning coffee break with the intention of encouraging informal discussion between the clinical team which the practice particularly valued, as well as thorough and therefore safe processing of acutes despite increasing GP workload:

> *I think being patient-centred isn't what generates hard work. I think what generates hard work is having high standards, and that's about all the meticulous things you have to do to look after things properly, and that means looking carefully at prescription requests and thinking about what you're doing. You know, conscientious care takes time, and the care that we're providing for patients has become just unimaginably more complex over the last 25 years.* (Practice 4, GP2)

Other practices emphasised speed in the processing of acutes. For example, the receptionist in Practice 1 allocated all acute requests to the duty GP either in their tray at reception or opportunistically in the corridor, while in Practice 7 all of the GPs worked part-time and the receptionists would divide the requests evenly between the GPs present that day. While such an approach ensured rapid processing, it also potentially compromised on attention to detail on the part of the GPs:

> *I suppose the main issue is you're not just doing your own patients' prescriptions. Obviously if we had a different system where you all did your own, which I've seen in other practices, then as a general rule you do have a better knowledge of the patients. But if you're not doing them every day, and particularly if you're part-time, it does mean that the turnaround time for patients to get their scripts is longer.* (Practice 1, GP2)

Stage 3: Receptionist collects signed repeat prescriptions

Practices had specific systems for organising how authorised prescriptions were collected and processed by receptionists. In all of the practices, the collection of repeat prescriptions was efficiency-focussed, although the way in which this was achieved varied. In Practices 1, 3, 5, 6, 7 and 8, the GPs would return the signed prescriptions to the receptionist either at their desk or at an agreed location such as the GPs' pigeonholes or collection trays (Supplementary table 3). Such an approach was considered safe because it ensured that the receptionists received the signed prescriptions directly and that they were all

processed together. It also provided further opportunities for GPs and receptionists to informally discuss any problematic requests. In Practices 2 and 4, receptionists were required to collect the signed repeat prescriptions from individual GP consulting rooms. While this approach ensured thoroughness in GP oversight, it frequently delayed final processing as the GPs returned the prescriptions to the receptionists at different points in the day.

All of the practices also focussed on speed in the processing and collection of acute and problem prescriptions, although how this was done also varied. In many of the practices, GPs would authorise, print and sign all (Practices 2 and 6) or most (Practice 1, 3, 5) of the acute prescription requests and return them to the receptionist (Supplementary table 3). Such an approach was considered safe as it ensured that GPs had full control of this stage of the process, that there were fewer steps involved, and that patients received their prescriptions in a timely manner. In Practices 7 and 8, the GPs would regularly authorise then return acute requests with a note attached for the receptionist to print the prescription and return it for signing. Individual GPs in the other practices would also occasionally adopt this approach when they lacked time.

> *I know that on a busy day I can receive a request from a receptionist where, for example, a lady has handed in a urine specimen and the nurse has dipped it and it shows there's a urine infection, and she asks "can we have a prescription for antibiotics please?" and I can say yes please do a prescription for a certain drug and inform the patient. So I can hand that back to them and they deal with it, it doesn't require me to do it.* (Practice 8, GP1)

While this approach was more rapid for the GP at the initial authorisation stage, it incorporated several additional steps and required additional levels of GP trust in the ability of receptionists to carry out the work correctly.

Key risks associated with each stage of the process

Tables 3-5 summarise the key risks involved at each stage of the routine that were identified during the course of ethnographic observation across the eight practices. In stage 1, receptionists in all practices had to make decisions regarding the nature of each request received (repeat or acute) and how it should be processed, with this largely driven by practice-level definitions of what constituted 'routine' and 'complex' (Supplementary table 1). The efficiency-focussed approaches adopted by Practices 1, 3, 5, 7 & 8 were risky in that they were dependent on receptionist knowledge and expertise around the identification and

processing of more complex acute and problem requests, with practices varying in terms of how they defined complexity. In contrast, the thoroughness-focussed approaches adopted by Practices 2, 4 and 6 meant that all acute and problem requests were processed by GPs which was widely perceived as safer, but could result to delays in request processing and therefore in treatment, with potential risks for other areas of care since GP time spent on prescribing was not available for other work.

Stage 2 presented different kinds of risk as the work involved the distribution of authorised repeat as well as more complex acute and problem requests by receptionists across the GPs (Supplementary table 2). The majority of the practices had adopted efficiency-focussed approaches to handling routine repeat requests by allocating the processing of routine repeats to the duty GP. Key risks with this approach centred on the duty GP often not knowing the patient and therefore having to rely more on receptionist judgements in Stage 1 about what was routine. In contrast, the majority of the practices had adopted thoroughness-focussed approaches to acute and problematic repeat requests. The key risks associated with these approaches centred on a reliance on receptionists to identify problems, and the additional time required to (re-)distribute requests between GPs (Practices 2, 3, 8) (Supplementary table 2).

In Stage 3, all of the practices had focussed on efficiency due to its largely administrative nature. This stage presented fewer risks that centred on GP processing delays due to competing demands for time. The only approach that presented a higher degree of risk was that taken by practices that allowed receptionists to print out GP-authorised acute requests, and the additional steps and increased receptionist responsibility that this approach required (Practices 7 & 8) (Supplementary table 3).

Discussion

The eight general practices in this study adopted different context-specific approaches to handling prescription requests. While some practices prioritised speed of processing, others focussed on ensuring that all prescription requests were subject to clinical judgement. Practice-level approaches were linked to a complex range of factors including team composition (e.g. number of GPs and receptionists), prescribing workload, perceived complexity of different kinds of work, and the patient population. Repeat prescribing is a high-risk activity,[4,5] with UK prescribing guidelines tending to focus on GPs as central prescribing decision-makers and administrative staff having very specific levels of authority.[33] However, alongside previous ethnographic studies,[1,2] this paper has shown that levels of GP and receptionist prescribing input

and authority vary significantly across practices, with the individual approach adopted having different implications for patient safety.

The findings from this study parallel Hollnagel's Efficiency Thoroughness Trade-Off (ETTO),[22] with practices making choices between being more efficient and being more thorough. However, while Hollnagel emphasised that it is not usually possible to maximise both efficiency and thoroughness at the same time and that only thoroughness was associated with safety, this paper has shown that in the context of high-volume primary care routines, both efficiency and thoroughness are associated with different versions of safety and risk. Thus, while careful attention to detail was a key component of safe prescription processing, rapid processing also contributed to safety by ensuring timely treatment. In this study, practices situated themselves at various points on an efficiency-thoroughness spectrum, with one approach to safety prioritised at different stages of the routine (Tables 3-5). Every approach adopted had different strengths and risks, although efficiency-focussed approaches presented greater risks to patient safety due to their higher reliance on administrative staff. Most practices emphasising efficiency had done so out of necessity to deal with high workload, as GP time in particular was constrained by other demands. Such practices were typically located in more deprived areas or had higher numbers of frail older patients, neither of which is fully accounted for by current UK payment formulae.[34-37] Thoroughness-focussed approaches were widely considered more desirable in principle, but were often challenging to implement in practice due to workload volume and competing demands. A key issue for future safety and quality improvement work is therefore to examine the desirability of adopting one approach over another and the strengths, trade-offs and risks inherent in the use of different approaches.

This study adopted an ethnographic approach involving many hours of detailed observation combined with in-depth interviews across eight carefully sampled general practices by a trained anthropologist. This allowed a detailed comparison of safety and risk mitigation practices across multiple stages of practice prescribing routines that an interview study would not have access to, and which practice teams themselves often took for granted. While key limitations were the relatively small number of study practices and the summarised accounts of highly complex practice characteristics, processes and practices, we anticipate that the efficiency and thoroughness trade-offs identified will have applicability beyond the study practices and organisational routine examines, and that it will resonate with quality and safety improvers, researchers and practitioners more widely in the UK and internationally.

Conclusions

We found that Hollnagel's Efficiency and Thoroughness Trade-Off (ETTO) approach is a useful way of examining context-specific variations in repeat prescribing safety and risk both within and across general practice contexts. As patient demand for prescriptions increases, practices face challenges in how they balance rapid turnaround of prescriptions requests (efficiency) and effective clinical oversight (thoroughness). If efficiency and thoroughness are conceptualised as a safety spectrum, then one approach to safety improvement for individual practices to consider would be whether they currently emphasised efficiency and thoroughness, why this was the case, and whether there were potentially better ways of optimising the safety of their prescribing routine given the broader practice organisational context. It would also be useful for practices to focus on stages of the routine that were perceived as particularly risky, and whether there were better ways of balancing competing priorities. This approach has the potential to be combined with quantitative prescribing outcome data to better inform those decisions, and to examine how different ways of organising for efficiency and thoroughness are associated with prescribing and other safety outcomes. Further research is also required to better understand the strengths and risks of innovations such as non-medical prescribing and the increasing use of electronic prescriptions.[38] More generally, this approach is likely to be relevant to other healthcare organisations to understand how high-volume processes and organisational routines work in practice, and could be better optimised.

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Figure 1: Key formal stages of processing repeat, acute and problem prescription requests

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