Scottish School of Primary Care

GP Clusters

Briefing

Paper 1

Prescribing Safety

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Collaborative Quality Improvement in General Practice Clusters

This paper is the first in a series that relates to areas of quality and safety on which general practice clusters could usefully focus improvement activity. Each paper summarises research, guidelines and other evidence about areas of care which can be improved, and improvement methods and interventions.

Prescribing Safety

Primary care prescribing is a high-benefit, high-cost and high-risk activity, but most prescribing improvement activity historically has focused on benefit (ensuring that people get prescribing known to be beneficial, such as aspirin after heart attack) or on cost. Primary care prescribing also commonly causes harm, with preventable adverse drug events causing up to 4% of emergency hospital admissions. This paper describes measures and improvement methods which have been clearly shown to improve primary care prescribing safety in large, pragmatic, cluster-randomised trials and in real-world use in Scottish general practice.

The problem

The problem is high-risk or potentially inappropriate primary care prescribing. This is prescribing which is clearly risky but which will sometimes be appropriate (see appendix 1). For example, prescribing ibuprofen to someone who has had a stomach ulcer is risky, but could be appropriate if that was the only way to control their pain. Such prescribing needs regular review and active management including appropriate monitoring, because it causes considerable harm.[1-5] Preventable drug side effects cause up to 4% of emergency hospital admissions.[6] There are several sets of validated high-risk prescribing indicators[7-10] including two which were developed for use in UK general practice. High-risk prescribing in primary care is common and varies fourfold between Scottish general practices,[11] with similar variation between practices in England,[12] and greater variation for 'failure to monitor' indicators than for those measuring high-risk prescribing.[12] At patient level, high-risk prescribing is most strongly associated with polypharmacy. The more drugs a patient is prescribed, the more likely they are to be receiving a high-risk prescription.[11,12] This reflects the difficult balance between need (sicker people have more need for drugs) and risk (sicker people are more likely to be taking interacting drugs or have conditions which makes some prescribing risky). The correct level of high-risk prescribing is therefore not zero, since in some patients need and expected benefit will outweigh risk (although monitoring is easier to define as being always required). Focusing active improvement activity on patients who are at particularly high risk of drug side effects therefore has the potential to significantly improve prescribing safety.

Can high-risk prescribing be improved?

There have been three large, pragmatic, cluster-randomised trials of improvement interventions carried out in a total of 367 UK general practices (two trials were done in Scotland, involving ~300 practices in five Health Boards). All three of the interventions have been shown to reduce high-risk prescribing. Taken together with two ongoing trials in 280 Scottish practices and current implementation work in >500 English practices, the findings define core elements which would be feasible to use the planned GP clusters.

Core elements for improvement

Define a set of high-risk prescribing indicators which are important. This should draw on published lists from consensus studies[7, 8, 10] or previous research (appendix 1) but the choice should be determined by what matters in the settings where the innovation will be used.

- Educate clinicians about the risks of the targeted prescribing, including the trade-offs between benefit and harm in individual patients. Written education alone is unlikely to be effective, but educational outreach is.
- Use informatics to measure how common high-risk prescribing is in each practice in order to provide feedback and evaluate change (critical), to identify patients for review (critical), and to support structured review (more optional since can be achieved in other ways).
- Ensure that patients with high-risk prescribing are reviewed by a physician or pharmacist who makes a structured judgement about appropriateness and takes action if necessary.

Blends of core elements shown to be effective

The three evaluated interventions use different blends of the core elements (see appendix 2 for more details).

The EFIPPS intervention was implemented in 95% of practices in NHS Ayrshire and Arran, NHS Lanarkshire and NHS Lothian. It used written education + feedback using routine pharmacy claims data over one year + support for patient identification. It reduced high-risk prescribing by 12% by 15 months after feedback started. We are currently examining what happened in the year after feedback ceased. Also of note is that the control arm received written educational material about the targeted prescribing and access to searches to identify patients, but this had no effect on prescribing, consistent with the literature that written educational material alone is usually ineffective. The EFIPPS intervention is the least effective of the three but in principle is the simplest and cheapest to deploy at scale.[13, 14]

The PINCER intervention was implemented in 72 English practices who volunteered to take part (25% of those approached participated). It used educational outreach by a pharmacist + informatics using data extracted from practice electronic medical records to identify patients and provide simple feedback + 12

weeks support from a pharmacist to review patients and improve systems. It reduced high-risk prescribing by 29% at 6 months and 22% at 12 months. It reduced drug monitoring failure by 44% at 6 months and 36% at 12 months. Of note is that high-risk prescribing and monitoring failure was more reduced at 6 months than at 12 suggesting that its effect waned over time.[15] It requires having access to pharmacists to support review and work with primary care practices.

The DQIP intervention was implemented in 33 Tayside practices who volunteered to take part (50% of those approached participated).

It used educational outreach by a pharmacist + informatics using data extracted from practice electronic medical records to identify patients, provide weekly feedback, and support structured review + financial incentives to review (£15/$25 per patient reviewed). It reduced high-risk prescribing by 37% at 12 months. This effect was sustained in the 12 months after the financial incentives ceased because the intervention also reduced new high-risk prescribing.

The DQIP intervention also led to large reductions in related emergency hospital admissions with gastrointestinal bleeding, acute kidney injury and heart failure. These were pre-specified secondary outcomes, but we believe this needs confirming in other studies. The PINCER intervention is currently being implemented in 530 'spread' practices in England and the evaluation of this will be powered to definitely examine emergency hospital admission.

Implementation in real-life NHS practice

Several Health Boards have implemented improvement activity based on the six EFIPPS measures which have been built into PRISMS (the main NHS Scotland tool which Boards use to manage primary care prescribing). This included NHS Forth Valley where it was an element of their 2013/14 Whole Systems Working enhanced service under which practices agree to focus on a set of clinical and organisational areas which change year by year. Practices are paid on completion of the work, but can choose when and how to implement it, and Boards provide education and informatics support to facilitate implementation. NHS Forth Valley:

1. Focused on three of the EFIPPS indicators (element 1 – indicator choice).
2. Delivered a 45 minute educational workshop on the risks of this prescribing as part of a Protected Learning Time session, with short written educational material to supplement this (element 2 – education).
3. Measured practice rates of high-risk prescribing for these three indicators in PRISMS and gave practices comparative feedback showing their rate compared to other practices (element 3 – informatics for feedback), and then provided practices with searches to run in their own clinical IT system to identify patients for review (element 3 – informatics for patient identification).
4. Asked practices to review the clinical record of all patients identified, to make any changes to prescribing they judged necessary, and organise appropriate follow-up if required (element 4 – review of identified patients where clinical decisions are left to professional judgement).

There is good evidence that the real-world Forth Valley intervention was very effective (figure 1) with more than a thousand patients having their prescribing changed as a result. There was no improvement in the three EFIPPS indicators which were *not* targeted, increasing confidence that the observed changes were due to the improvement activity.

Implication for collaborative quality improvement in general practice clusters

The six EFIPPS measures (appendix 1) and the Scottish Therapeutics Utility (STU - a practice-based tool integrated with the GP electronic medical record which makes measurement and patient identification straightforward). Other measures are less suitable for implementation in PRISMS since they require data about the conditions a patient has, but could be straightforwardly be implemented in STU for use by practices in GP clusters, with the advantage of having consistently measured indicators rather than relying on ad hoc and likely variable practice-created searches.

Prescribing safety would be a suitable topic for early implementation of general practice clusters because it is a topic which matters to Health Boards and which GPs find engaging and consider important, where there are a number of validated indicators which can be measured in PRISMS and in GP clinical IT systems, and where focusing GP attention on the targeted prescribing leads to large reductions in high-risk prescribing with some evidence that related emergency hospital admissions are reduced.

Figure 1: Impact of the Forth Valley prescribing safety improvement intervention

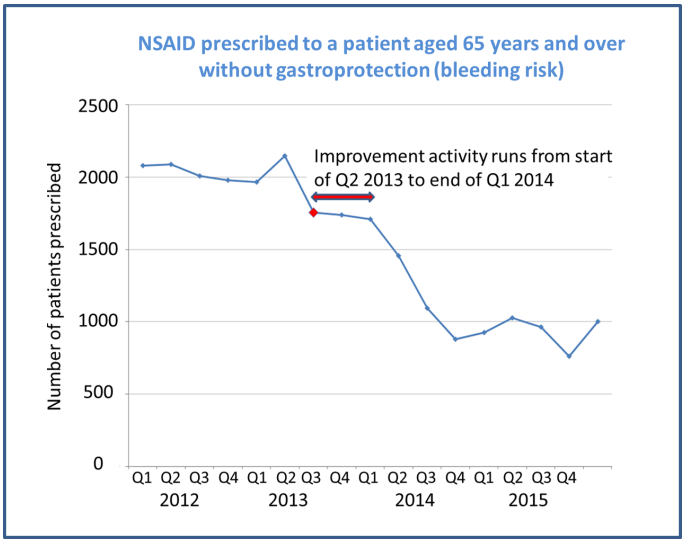

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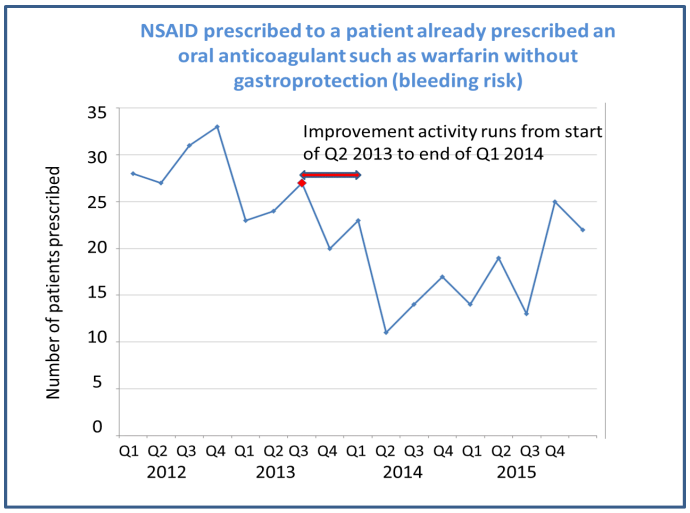
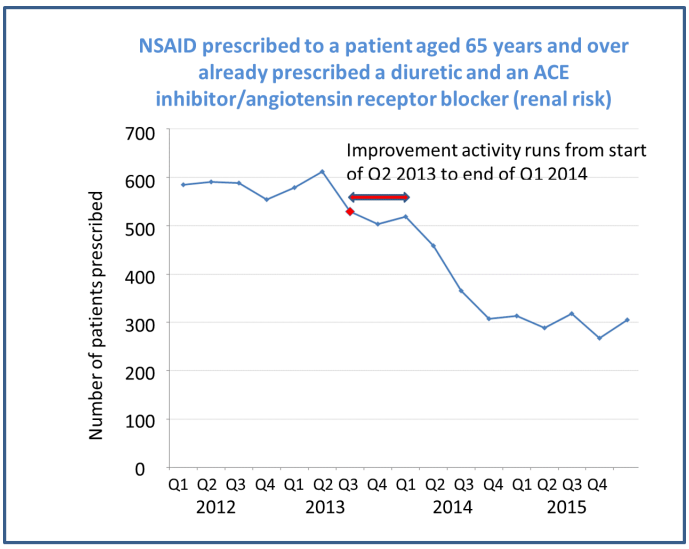
Figure 1: Impact of the Forth Valley prescribing safety improvement intervention (continued)





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Appendix 1: What is high-risk prescribing?

There are drugs which are *always* contraindicated in some patients. Prescribing in that situation is therefore a 'never' event similar to cutting the wrong leg off. However, such prescribing hardly ever happens and so isn't a frequent cause of harm. Most drug-related harm is caused by commonly prescribed drugs with fairly small risks, but there are groups of patients in which risks are predictably higher. For example, non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (eg Advil) can cause stomach ulcers or bleeding in anyone. But these side effects are much more common in older people, in people who have had ulcers or bleeding before, in people taking other drugs with the same side effects such as aspirin and so on. In these patients, prescribing an NSAID is predictably high-risk but even so will be appropriate in some people. The prescribing we are targeting is therefore "high-risk" or "potentially inappropriate", but the correct level of it is *not* zero, since prescribers have to make an individualised decision about risks and benefits that takes account of patient preferences and expected benefit. PINCER also targeted a range of measures of 'failure to monitor'. The table shows the measures targeted in the three trials, which are drawn from published consensus lists.[7, 8, 10, 16] We are currently working in two areas with 130 practices to extend targeting to ~50 measures simultaneously, but we wouldn't recommend most organisations or clusters starting at such a scale.

Prescription of a non-steroidal anti-inflammatory drug (NSAID) to someone with previous peptic ulcer or gastrointestinal bleeding without co-prescription of a gastroprotective drug
Prescription of an NSAID to someone aged 75 years and over without co-prescription of a gastroprotective drug
Prescription of an NSAID to someone already prescribed aspirin or clopidogrel without co-prescription of a gastroprotective drug
Prescription of an NSAID to someone already prescribed an oral anticoagulant without co-prescription of a gastroprotective drug
Prescription of an NSAID to someone with chronic kidney disease stage 3 or worse
Prescription of an NSAID to someone already prescribed a diuretic and an ACE inhibitor or angiotensin receptor blocker (the 'triple whammy')
Prescription of an NSAID to someone with heart failure
Prescription of a thiazolidinedione to someone with heart failure
Prescription of a beta-blocker to someone with asthma
Prescription of a long-acting beta-2 agonist inhaler to someone with asthma without co-prescription of an inhaled corticosteroid
Prescription of a combined oral contraceptive to a woman with a history of arterial/venous thromboembolism
Prescription of a combined oral contraceptive to a woman aged 35 years and older who is a current smoker
Prescription of a combined oral contraceptive to a woman with a body mass index ≥40
Prescription of oral or transdermal estrogen to a woman with a history of breast cancer
Prescription of oral or transdermal estrogen without a progestogen to a woman with an intact uterus
Prescription of both aspirin and clopidogrel without co-prescription of a gastroprotective drug
Prescription of aspirin or clopidogrel to someone already prescribed an oral anticoagulant without co-prescription of a gastroprotective drug
Prescription of an antipsychotic drug to a person aged over 65 years with dementia
Amiodarone prescribed for >1 month at a dose of >200mg/day
Methotrexate prescribed without full blood count or liver function test done in the last 3 months
ACE inhibitor or loop diuretic prescribed long term without electrolytes/renal function test done in the last year
Warfarin or other coumarin anticoagulant prescribed without INR done in the last 3 months
Lithium prescribed without lithium level in the last 3 months
Amiodarone prescribed without thyroid function test in the last 6 months

Appendix 2: Summary of the three interventions evaluated in trials

	PINCER[15, 17]	DQIP[18]	EFIPPS[13, 14]
Population served	Primary care (~25% of eligible practices took part), ~37,000 patients at high risk of ADEs. At baseline, 3% had high-risk prescribing, and 15% had monitoring failure.	Primary care (~50% of eligible practices took part), ~30,000 patients at high risk of ADEs. At baseline, 4% had high-risk prescribing	Primary care (~94% of eligible practices took part), ~160,000 patients at high risk of ADEs. At baseline, 6% had high-risk prescribing.
Targeted prescribing	12 measures including a 7 drug-drug/drug-disease interaction measures and 5 monitoring failure measures	9 measures, all relating to high-risk NSAID and antiplatelet prescribing	6 measures, 5 relating to high-risk NSAID and antiplatelet prescribing, 1 for antipsychotic use in older people with dementia
Intervention	(1) Educational outreach visit by a pharmacist, with supporting written material. The EOV included education about targeted prescribing and discussion of its root causes, and how to organize improvement. (2) Informatics to identify patients for review. The data used came from GP electronic medical records. (3) The pharmacist led the reviewing of patient charts and made recommendations to the practice for changes in prescribing.	(1) Educational outreach visit by a pharmacist, with supporting written material. The EOV included education about targeted prescribing and discussion of how to organize improvement. (2) Informatics to identify patients for review, facilitate review, and feedback progress over time in a run-chart. The data used came from GP electronic medical records. (3) Financial incentive for the practice to review identified patients ($15/review).	(1) Written educational material sent once. (2) Downloadable searches to identify patients needing review. (3) Feedback using sent quarterly for one year, comparing practice rates of high-risk prescribing to a 'best in class' benchmark. The data used came from the NHS Scotland pharmacy payment system.
Key roles	(1) Multidisciplinary team to choose measures. (2) Informatics expertise to operationalize measures, and provide patient list to practices. (3) External pharmacist led EOV and chart review. (4) Practice worked with external pharmacist to change current and future prescribing.	(1) Multidisciplinary team to choose measures. (2) Informatics expertise to operationalize measures, design and run online tool to support patient identification and review, and feedback of progress. (3) External pharmacist led EOV. (4) Practice was responsible for all change to current and future prescribing.	(1) Multidisciplinary team to choose measures. (2) Informatics expertise to operationalize measures, and automate sending of feedback. (3) Practice was responsible for all change to current and future prescribing.
Duration of the intervention	12 weeks	48 weeks	One year
Effectiveness	At 6 months, 29% reduction in high-risk prescribing, 44% reduction in monitoring failures. At 12 months, 22% reduction in high-risk prescribing, 36% reduction in monitoring failures	At 48 weeks, 37% reduction in high-risk prescribing. Large reductions in related emergency hospital admission.	At 15 months, 11% reduction in high-risk prescribing.
Sustainability after intervention ceased	Modest bounce back at 12 months compared to 6.	Sustained in the 48 weeks after incentives ceased.	Not examined yet (we are currently extracting data for the year after feedback ceased)
Patient involvement	We had public and patient representatives on project advisory groups, and carried out focus group work with patients during design. However, all decisions about prescribing remained the responsibility of clinicians in discussion with patients and we did not attempt to directly influence this (eg through clinician shared-decision making training). This is an interesting area for future work.		