General practitioners’ views on using a prescribing substitution application (ScriptSwitch®)

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ABSTRACT

Background General practitioners (GPs) are increasingly pressured to prescribe cost-effectively, due to rising prescribing expenditure and limited budgets. A computerised prescribing substitution application (ScriptSwitch®) provides ‘pop-ups’ of cost-saving drug switches at the point of prescribing. It has been used by some United Kingdom local health commissioning organisations as part of a medicines management strategy.

Objective To explore GPs’ views on using this prescribing substitution application in their day-to-day clinical practice.

Methods Qualitative study employing face-to-face semi-structured interviews, undertaken with a convenience sample of eight GPs across five practices within one local health commissioning area in the North of England. Interviews were audio-recorded, transcribed verbatim and thematically analysed.

Results Six themes were identified including: (1) GPs’ acceptance, (2) the application’s impact, (3) external control, (4) disruption to workflow, (5) GP willingness to switch and (6) patient willingness to switch.

Conclusions Clinician, patient and organisational factors were identified which were assumed by GPs to affect the engagement with the application. Despite general acceptance of the application to enhance cost-effective prescribing, its impact was perceived to be limited within the context of existing cost-effective prescribing initiatives. The application’s perceived lack of ‘learning’—e.g. offering the same switch despite the prescriber repeatedly declining this—devalued users’ confidence in it. With patients varying in amenability and acceptance to drug switches, GPs appear to experience tension between considering individual patient choice and wider practice population prescribing priorities. Giving GPs more control in adapting the application to their own local prescribing priorities may enhance its success.

Keywords: clinical electronic prescribing, decision support systems, evidence-based practice, health expenditures, qualitative research

What this paper adds

• This paper provides insight into end-users’ views of an electronic prescribing substitution application used in UK primary care.
• Similar prescribing applications in primary care need to consider their capacity to allow adaptation and ability to personalise interventions in line with end-user preferences and practice needs.
INTRODUCTION

Rising prescribing expenditure is an international healthcare cost burden, despite finite resources and overall restricted budgets.1 This inflation relates to contextual factors including: increasing drug prices, an ageing demographic with prevalent chronic disease and pay-for-performance measures for primary care clinicians (e.g. the Quality and Outcomes Framework in the UK).3-4 Subsequently, average prescription items per patient has approximately doubled over a decade,7 with prescribing expenditure in primary care accounting for 15% of the entire UK state health (National Health Service) expenditure in 2009 and rising.6 General practitioners (GPs) initiate 98.5% of primary care prescriptions in approximately two thirds of consultations.1 However, GPs do not consistently prescribe cost-effectively in line with best practice.7,9

The development of information technology use and the increasing emphasis on evidence-based practice have resulted in the implementation of clinical decision support tools. Computerised decision support tools at the point of care are considered important in promoting best practice.2,10,11,12 Although potentially disruptive, providing evidence-based prescribing choices may limit pressure on GPs to find time to appraise frequently changing drug information.4,13,14 Such interventions look to offer suitable prescribing alternatives requiring little ‘mousework’ to initiate or override2,15,16 and provide GPs support without threat to autonomy.16 The computerised prescribing substitution application ScriptSwitch® (Box 1, Box 2 and Figure 1) is advocated as a facilitator to cost-effective prescribing through engaging GPs’ awareness of locally promoted, cost-effective drugs’ and their prices. Drug cost information has been shown to be a modifiable factor in altering prescribing behaviour and welcomed by GPs.1,17,18 Factors relating to the application itself are important in its success for change, but ‘human factors’ also contribute.19 It is important to explore GPs’ experiences as application users who understand the context and consequences of utilising it in day-to-day clinical practice: aspects which can be poorly understood by those designing such tools.20 GPs are being allocated increasing roles in commissioning and improving quality of care. They are expected to provide patient-centred care alongside a focus on utilising resources to provide most benefit to wider patient populations.2 This article aimed to explore GPs’ views on using a prescribing substitution application, to gain some insight into barriers and enablers to successfully using such tools to promote cost-effective prescribing.

Box 2 Characteristics of the prescribing substitution application ScriptSwitch®

- A computerised, active, decision support software, which has been deployed in approximately 6,500 general practices throughout the UK.22
- Commissioned as a means to deliver locally preferred formulary choices, alongside brief information concerning dosage optimisation, safety or efficacy.2,7
- Provides automatic drug-switch recommendations at the point of prescribing and associated cost savings. These appear where cheaper drugs (both acute and repeat) to ones initially prescribed have been pre-programmed via the local health commissioning organisation.7,22
- Drug switches include expensive branded drugs to pharmacologically identical generic equivalents; expensive to cheaper drugs within the same class; switches between generics (e.g. preparation); and occasionally generic to cheaper brand switches.23
- Local health commissioning organisations’ Medicines Management teams choose and update alerts. Data related to switches accepted or declined, and the cost savings thereby achieved, are recorded and fed back to local health commissioning organisations.23

METHODS

A literature review looked for studies examining GPs’ views on what influences their prescribing behaviour, particularly prescribing expenditure. Medline 1948 to present, Embase, PsychINFO and Health Management Information Consortium were searched during September to October 2011 using tailored search strategies, key word and subject heading searches. Databases with ‘Autoalert’ function were activated to bring relevant, new publications to the researcher’s attention. Relevant grey literature including Government reports were also reviewed, alongside some relevant primary care prescribing and informatics textbooks. The literature review did not identify any literature on GPs’ views on using this particular prescribing substitution application, but did identify papers and grey literature on the use of prescribing decision support systems.

Qualitative methodology

A qualitative methodology was chosen to facilitate exploration and understanding of GP participants’ attitudes and
experiences with the application.\textsuperscript{24-26} Use of semi-structured interviews and open questions provided more in-depth responses and insight\textsuperscript{24,26,27} for thematic analysis.

**Sampling**
Medicines management data from one local health commissioning organisation in the North of England identified practices who had recently used or were currently using the prescribing substitution application. A convenient sample of fourteen practices within the above locality was identified.

**Recruitment**
Individual GPs’ names were obtained from the fourteen practices’ websites. The only exclusion criterion was GPs within these practices who did not activate the prescribing substitution application. Ninety eight GPs received hand-delivered, printed participation invitations and information sheets. A second batch was posted to non-responders after two weeks. Willing GPs emailed the researcher to organise convenient interview times and settings.

**Data collection**
Semi-structured interviews used a topic guide (see Appendix 1) to focus discussion, facilitate reflection, and explore experiences and attitudes.\textsuperscript{27} The topic guide was piloted with one GP. The data was retained as the topic guide remained unchanged. GPs had opportunity to ask questions before signing consent forms. Interviews took place at the GPs’ practices.

**Data analysis**
All recorded interviews were transcribed verbatim, anonymised and analysed as soon as practicable after interviews. Inductive thematic analysis was considered appropriate to identify themes as ‘repeated patterns of meaning’.\textsuperscript{29} The researcher (CH) became familiarised with

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**Figure 1** Flow diagram demonstrating the functioning of the prescribing substitution application ScriptSwitch\textsuperscript{®}
data through extensive re-reading alongside development of descriptive codes within most lines of text. Coded data extracts and participant number were electronically cut and pasted into separate word documents to allow grouping of linked and contradictory codes across all transcripts. Files were labelled with provisional interpretive code names and printed. Occasionally descriptive codes were hand-cut and reorganised under different interpretive codes, which were grouped under overriding key themes. Themes were categorisable as being related to either the context of prescribing; the application, or the doctor and their patients involved. Regular referral to original transcripts ensured data interpretation in context. Transcripts, codes and proposed themes were exchanged with a fellow researcher to ensure agreement, enhance rigour and minimise researcher bias or misinterpretation.

RESULTS

A total of eight GPs (Table 1) across five practices participated in interviews lasting up to half an hour.

Table 1 Demographics of participants

<table>
<thead>
<tr>
<th>GP</th>
<th>Gender</th>
<th>Practice population (approx)</th>
<th>Years as GP</th>
<th>Total GPs in practice</th>
<th>Perception of prescribing expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr 1</td>
<td>Male</td>
<td>12000</td>
<td>10</td>
<td>11</td>
<td>Good side of average</td>
</tr>
<tr>
<td>Dr 2</td>
<td>Female</td>
<td>11000</td>
<td>30</td>
<td>11</td>
<td>Just under average</td>
</tr>
<tr>
<td>Dr 3</td>
<td>Male</td>
<td>11000</td>
<td>9</td>
<td>11</td>
<td>On average</td>
</tr>
<tr>
<td>Dr 4</td>
<td>Male</td>
<td>6000</td>
<td>10</td>
<td>8</td>
<td>Rather over the average</td>
</tr>
<tr>
<td>Dr 5</td>
<td>Female</td>
<td>12000</td>
<td>9</td>
<td>12</td>
<td>Moderate</td>
</tr>
<tr>
<td>Dr 6</td>
<td>Female</td>
<td>7000</td>
<td>10</td>
<td>6</td>
<td>Generally on budget</td>
</tr>
<tr>
<td>Dr 7</td>
<td>Male</td>
<td>7000</td>
<td>8</td>
<td>6</td>
<td>Relatively low</td>
</tr>
<tr>
<td>Dr 8</td>
<td>Female</td>
<td>12000</td>
<td>11</td>
<td>12</td>
<td>About average</td>
</tr>
</tbody>
</table>

* From same practice
+ From same practice
^ From same practice

Six themes were identified within the data:
1. GPs’ acceptance of the prescribing substitution application,
2. the application’s impact,
3. external control,
4. effect on workflow,
5. GPs’ willingness to switch and
6. patients’ willingness to switch.

The themes will be discussed alongside relevant quotes, in the following three sections.

Context of cost-effective prescribing agenda

Cost-effective prescribing had been on GPs’ and practices’ agendas for some time before prescribing substitution applications were introduced. All GPs welcomed this particular application’s implementation in an attempt to limit unnecessary prescribing expenditure, although some were sceptical of its potential impact.

I think for a lot of practices which hadn’t been so vigilant about their prescribing costs it was a really good idea, a good way to kind of, you know, alert people to potential cost savings. (Dr 2, practice 2)

I was a little bit sceptical that it would make a huge amount of difference to us, because, you know our prescribing was already, well we thought was already of a good standard. (Dr 8, practice 4)

There were varying experiences and perceptions of this prescribing substitution application’s impact on altering GPs’ prescribing behaviour and expenditure amongst initiatives already in place. Several discussed the application more in terms of a reinforcer or reminder, rather than promoting new drug cost knowledge.

The big drugs, the cost saving drugs, we were already driving towards them, we were already very aware of them … we didn’t need a computer system to tell us that. (Dr 7, practice 5)

We’ve been working at this for a long time. A lot of those messages weren’t, weren’t new to us. (Dr 3, practice 2)

A range of cost-effective prescribing initiatives and improvements were mentioned as limiting the application’s impact, including practice formularies, generic prescribing, medicines management support and financial incentives. However, most still discussed how this application would be helpful to practices outside of the area with less cost-effective prescribing support in place. This notion was supported by the only GP (Dr 4) who admitted to working in a practice with high prescribing expenditure and limited practice formulary felt they were being alerted to frequent cost-saving switches.

I know there are some areas of the city where, the sort of, the history of medicines management and the practices haven’t been quite as good, that ScriptSwitch® was much better at making changes because there was still lots of prescribing behaviour that could be altered. (Dr 3, practice 2)

I mean the obviously one was dispersible aspirin I think is cheaper than normal aspirin - which I hadn’t realised. And yeah it’s only a few pence but you prescribe so much of the stuff that it makes sense. (Dr 4, practice 3)
Two themes related to how this application functioned. A couple of GPs discussed how its pop-up acceptance/decline data and savings within practices were collated by the local health commissioning organisation and reports disseminated back to the collective of practices. There were mixed views about the appropriateness of this.

I'm not sure that guilt is a good driver sometimes to change [...] The thing I didn't like about it was the reports that came around every month, telling you how you, or telling me, how badly I'd done compared to everybody else [...] it was a bit of a sting sometimes when you found you hadn't done very well that month. (Dr 4, practice 3)

It's difficult to know how ones' prescribing does compare with other practices ... we get some feedback, but it's very generalised. So the concept that all, a large number of practices in the area might also be going through the same exercise was good in the sense that it might be driving standard up across the district. (Dr 8, practice 4)

Although GPs could feedback to the their local Medicines Management team, many appeared frustrated by their own lack of control over what was communicated and targeted within the application’s pop-ups being sent to all practices.

I personally didn’t like about it, was the fact that it was centrally controlled and it wasn’t something that we had any influence over. So there were lots of sort of issues that particularly maybe weren’t an issue for this particular practice, and maybe issues that there were. But we you know we couldn’t influence on ScriptSwitch what it was telling us to do. (Dr 1, practice 1)

Perhaps almost slightly bombarded a little bit too much with almost sort of some very basic things. (Dr 6, practice 5)

Slow updating of the application’s pop-ups by the local health commissioning organisation was mentioned as causing pop-up repetition, making some suggestions out of sync with recent clinical guidelines or associated with decreasing cost savings.

Issues which were initially sensible and relevant either became less relevant or became obsolete because of changes in pricing by the pharmaceutical companies [...] Switches were being suggested which okay initially were clinically thought to be fine, but later maybe because of changes in clinical guidance actually became inappropriate. (Dr 1, practice 1)

The kind of trickle of information that came after the initial surge was perhaps not enough to keep us enthused with it. (Dr 8, practice 4)

However, there were variable perspectives on the extent to which the application impacted upon workflow. Several GPs recognised value in repetition, but appeared to indicate in the long term this may have became increasingly intrusive and devalued the software.

We know you have to keep telling doctors again and again if you’re going to make change, but actually if you’re being told the hundredth time the same message about using this drug instead of this drug or using trimethoprim for three days instead of five, you’ve got the message. And you sort of almost want to switch that message off, and put a new one on. (Dr 3, practice 2)

Most of the time it was just reminding us of things that we ought to be doing anyway, so that was good up until it became ‘yes but we know that, thank you’ (laughs). (Dr 1, practice 1)

There’s a limit to the tolerance to which you’ll accept those or look at those prompts over and over again. (Dr 8, practice 4)

There were variable attitudes towards the value of a potential ability to respond to the application’s alerts. Some mentioned potential benefit in blocking repetitive pop-ups, whilst others perceived this would cost time and effort.

I like to prescribe this particular steroid cream a lot in my dermatology work. If I’d had the opportunity to maybe say, I don’t want to switch this particular brand, if I opt to prescribe this item, please don’t ask me if I want to switch. (Dr 2, practice 2)

You’d have to customise it to some degree, it’s not a one package suits all scenario unfortunately […] then what you’re talking about is time feeding back into the system, we’ve got 10 minute consultations, we’re already pushed for time, it’s very difficult to do that in clinical practice […] you’re taking away from that patient-centred focus in that consultation. (Dr 7, practice 2)

The majority of GPs mentioned ease in overriding pop-ups prevented too much intrusion, with one GP implying...
desensitisation to pop-ups due to clinical systems widespread use in primary care.

I didn’t find it particularly intrusive because it’s a simple ‘do you want to make the switch? Do you not want to make the switch?’ box. So it’s very easy to hit no. (Dr 3, practice 2)

It had to use the same irritating pop-ups that we’re used to with SystmOne®. So, I actually, I didn’t find it that bad. (Dr 4, practice 3)

There were varying preferences for how pop-ups should appear on screen. A few GPs perceived the application software as being an additional bolt-on to the consulting system and prescribing process, suggesting there could be more integration.

Rather in the middle of a screen, on the edge of the screen, so that it’s there in the background rather than in your face, so that you’ve got it to refer to if you want to but you don’t feel like it smacks you in the eye. (Dr 8, practice 4)

I probably wouldn’t design ScriptSwitch® to be used by GPs because it’s a very in your face system. (Dr 7, practice 5)

The computer was fine, because it popped up, it was visible [...] it was very clear and you could easily choose to cancel it or go with its suggestions. So, that worked quite well. (Dr 5, practice 4)

Because it is a system which is external to what we’re using consulting wise, then, it does mean that it is an extra process to go through - it can’t seamlessly integrate [...] anything that adds the number of clicks to what you have to do per consultation is a potential annoyance … because there’s always a lot of mouse work to do. (Dr 1, practice 1)

In consultation decision making

Final themes related to the fact that both doctors and patients have individual views and attitudes towards cost when prescribing. Most GPs discussed cost when prescribing as important, however its prioritisation varied.

There are some people [GPs] who are either not interested or actually see it [cost] as something that gets in their way, or even find, sometimes like to be ... deliberately ignore so to speak (laughs). Generally speaking most people are sort of switched on these days and know they should be getting value for money from what they prescribe. (Dr 1, practice 1)

[Cost when prescribing is] not as important as clinical effectiveness I suppose [...] I’d have said to the patient something was expensive or I was using something because of their desire to use something. (Dr 6, practice 5)

I think economy has a very big part to play, so it is important in its realm, but I wouldn’t consider it as the most important thing to think about in consultations [...] Patient choice is the obvious [conflicting] one [...] I suppose because we are very patient-centred, we tend to put economic I suppose wrongly sort of somewhere down the list third or fourth really. (Dr 4, practice 3)

Several GPs felt that the application’s suggestions based on cost-saving were at times inappropriate, being either clinically or patient irrelevant.

If you’d have made every single switch that ScriptSwitch® suggested, you would have saved a whole lot of money, but, clinically speaking, many of them weren’t appropriate. Now whether that’s because the system is just comparing spreadsheet on spreadsheet, so there’s nothing sort of a clinical basis to that, because of cost basis. Or whether it’s because as you sit here and you’re interviewing a patient, you’re looking at the records, you know a lot more about that patient, therefore, you know, you’re more likely to refuse a change. (Dr 7, practice 5)

Several GPs described the application’s substitution suggestions as helpful and implementable when clinically equivalent suggestions did not require switching to completely different drugs.

It occasionally tried to, claim equivalences between drugs or doses which weren’t actually equivalent. So it would sometimes ask you to substitute someone who was on Co-Codamol 30/ straight 500mg to 8/500mg or something of that nature, which is clearly nonsensical [...] I definitely know there was one particular thing that we used to prescribe a lot of where there was another you know perfectly acceptable clinical equivalent which was, was vastly cheaper. (Dr 1, practice 1)

You think ‘oh yeah, it’s the same medication, just a little bit more that they have to take’ and actually cost saving was huge. So in that instance, it made sense. It was one of those things where it was directly comparable, it was interchangeable, it was the same medication, it wasn’t a switch from one medication to another [...] very little impact on the patient, no impact on the health of the patient yet you could make quite a big cost saving in those circumstances. (Dr 7, practice 5)

Furthermore, the potential cost saving associated with a switch and judgement on its worthiness was influential on whether the application’s substitution suggestions were implemented.

‘Change them to this and you’ll save a penny’ … you just have one patient that you know has been on it 18 years now, and I’m not going to change something for the sake of a penny. (Dr 7, practice 5)

But it was probably saving pennies, and it wasn’t ... no real value to the patient. (Dr 5, practice 4)
The product that it was offering you instead, would be so close to what you were already using that it didn’t seem worth making the switch [...] Close in price yeah. (Dr 8, practice 4)

Patient preference for particular drugs was influential if switches were implemented. Some GPs indicated a sense of obligation to prescribe some patients’ preferences, perhaps indicative of practice ethos or a particularly demanding patient population.

A patient might be very keen to try a certain product and it might not be the one that you’d prescribe or you might not feel that it was so necessary, but you end up prescribing for them. I think there’s lots of times where you do recognise that the evidence base for certain medications just isn’t strong…. But you know patients for whatever reason feel that medication does benefit them in some way, and it might be a placebo or habitual thing. (Dr 8, practice 4)

Sometimes we’re up against their wanting the non generic - that’s very rarely to be honest - but sometimes they swear by a particular brand and we are occasionally pushed into prescribing that. (Dr 5, practice 4)

One GP suggested that sometimes judgements are made about whether to even broach a suggested drug switch depending on their perception of the patient’s amenability.

Sometimes you’re busy or the patient, you know to kind of go through it with a patient and say ‘well there’s not really very much evidence for this’ or ‘this might be a better option’ or ‘have you ever thought about this approach?’ … sometimes within the confines of the consultation you don’t feel like you want to go down that road (laughs) … sometimes you can. (Dr 8, practice 4)

GPs mentioned varying confidence levels in discussing drug costs and impact on wider health services with patients. Generally it appeared GPs felt patients were not opposed to discussing cost-effectively to ensure fair distribution of resources with balancing patient-centred GP roles with duties to prescribe cost-effectively to ensure fair distribution of resources for the wider patient population. Although the GPs mentioned exceptions and preferences.

If a patient realises that the cost in one area goes down then it means there’s money elsewhere for services to improve [...] Some inhalers are £2, others are £30. And just actually seeing that, and we convey that information to the patient, I think often does make a difference. (Dr 7, practice 5)

If actually it is cost that would stop us prescribing something we’d be happy to say to them [patients], that if it is effective we’ll use it but if it’s not then there’s no reason for us to use something that … when there may be cheaper alternative. (Dr 6, practice 5)

It would depend on my relationship with the patient, sometimes you can say to the patient ‘oh my goodness, I’ve just realised there’s one that’s loads cheaper, let’s give you that’ and they’d be quite happy to go with that. Some patients wouldn’t be … so amenable to that [...] There’s perhaps an expectation that the more something costs, the better quality it is, and you don’t want to be giving the patients a budget version when there’s a deluxe version available. (Dr 8, practice 4)

**PRINCIPAL FINDINGS**

The findings demonstrate GPs were generally accepting of the prescribing substitution application’s attempts to reduce prescribing costs, but the majority were underwhelmed by its impact amongst other cost-effective prescribing initiatives. A major barrier appeared to be lack of GP control over the application. This was in terms of alert content and the inability to filter pop-ups, as the application could not integrate clinical patient information already in the electronic record, thus making irrelevant suggestions. Drug-switch recommendations were considered most helpful when clinically equivalent, minimising personal and health impacts on patients. Furthermore, the fact that prescribing is for an individual patient, sometimes barriers appear to exist in patients’ perceptions and preferences.

**Implications of findings**

The findings demonstrate that more control, adaptability and flexibility in such prescribing substitution applications could facilitate engagement of GPs more successfully. If there were options for customisation at practice level for individual GPs, this may enhance its acceptance despite being implemented externally. Findings indicate that GPs may prefer to be able to select a simpler system, for instance to permit only same drug switches as opposed to different drug suggestions.

Findings also demonstrate challenges faced by GPs in prescribing cost discussions in consultations with patients. Results provide further insight into wider tensions associated with balancing patient-centred GP roles with duties to prescribe cost-effectively to ensure fair distribution of resources for the wider patient population. Although the GPs mentioned budget awareness, this consideration will become increasingly more important for changing primary care landscapes, for example, the recent formation of clinical commissioning groups in the UK. However, prescribing expenditure containment remains an international issue given the global economic downturn, an ageing demographic and the associated increased healthcare costs.

**COMPARISON WITH EXISTING LITERATURE**

Prescribing decision support software often have variable effects, and although cost-saving drug alternatives at point-of-care have been considered useful, these are often used on ‘trial and error’ basis, with availability not necessarily corresponding with change.
Repetition and irrelevant patient or clinical suggestions promote resistance, particularly when GPs must respond before continuing the process. Alerts deemed controversial are regularly overridden and there is preference for equivalent switches to limit disruption to patient’s care. However, GP commitment to and preference of drugs can also cause overriding of suggestions against the evidence base, with prioritisation of safety; clinical effectiveness and patient preference over cost. GPs report a desire to customise alerts at a local level to meet their needs and reduce concern for unknowingly accepting outdated or unsuitable suggestions. This coupled with flexibility to alter interface display after real-life use could help maintain GPs’ interest and acceptance amongst various other prescribing initiatives. Furthermore, strong communication links with medicines management teams help to modify or remove unhelpful alerts and minimise the sense of surveillance or singling out of less cost-effective prescribing. Perhaps in relation to this, a recent review of features of effective computerised clinical decision support systems suggests that systems requiring practitioners to supply a reason if overriding advice are more likely to be successful.

However, pop-ups are considered unacceptable where they are perceived to negatively affect workflow, doctor-patient communication and relationships. As results indicate, simple cost-cutting substitutions such as generic prescribing are largely in place, and further cost-cutting is increasingly difficult despite GPs welcoming cost-information. Practitioners must make decisions on whether potentially small therapeutic benefits for individual patients are worthy of large costs to larger patient groups, creating tensions and ethical dilemmas. A utilitarian ethical perspective would permit cost-reduction to maximise limited resources to benefit the most; however, GPs face pressure from individual patient demands and choices. The ‘double-agent dilemma’ of GPs as doctors but also commissioners may jeopardise patients’ trust if GPs are seen to be making decisions with an economic mindset over acting as an advocate for individual patients. Thus patient understanding may be a major continuing barrier to drug switching. A recent review into clinical decision support success suggests a system, which provides simultaneous advice to both clinician and patient may be more empowering and effective.

Unintended consequences of prescribing substitution applications, in terms of GPs’ behaviour and putative savings, also need to be considered. For example, in relation to consultation workflow and generic prescribing, if GPs were to use applications as a ‘short cut’ by entering memorable brand names as a quick way of accessing the names of generic drugs which they had always intended to prescribe, then the system-logged ‘savings’ would in fact overestimate actual prescribing savings. Indeed, any business model for prescribing substitution applications which charges commissioners on the basis of a percentage of the subsequent putative savings might thereby generate extra costs for commissioners as a result of such unintended consequences.

Limitations of method
The study’s small sample, dictated by GPs’ willingness to participate and short timescale and scope of project, limits any claims for generalisability or transferability of the study findings. GPs were from practices in a small geographical area, therefore had similar medicine management input from the same health commissioning organisation. The smaller sample however provided complex, rich data saturated with similar themes.

Convenience sampling in an area where the prescribing substitution application use had ended may have introduced potential memory bias, with selective experiences or behaviours recalled. Furthermore, the low response rate means that those who were keen to participate may hold particularly strong views with regard to the application or prescribing issues, and may therefore not be representative of other GPs. Triangulation of data using alternative methods would have improved study validity and rigour, but was limited by project resources.

Calls for further research
Extending this research to include participants in other areas with different levels of cost-effective prescribing and initiatives may be of use.

CONCLUSION
Prescribing substitution applications may benefit from introducing more features that allow adaptability to personalise interventions in line with GP and practice needs. The potential benefits of the application appear to be recognised by the GPs interviewed, but there was a sense that updates which allowed the system to ‘learn’ from clinicians’ prior choices may facilitate its success and long-term acceptance. Being responsive to the end-users’ perspective may be of particular importance in light of the increasing GP commissioning roles and enhanced pressures to contain prescribing expenditure.

Ethical Approval
Ethical approval was granted from the University of Leeds (Ref: HSLTLM/11/015) and NHS Bradford & Airedale Research & Development department (Ref: 001_12_03_12_0000).

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APPENDIX

Topic Guide: General practitioners' experiences of and views towards using ScriptSwitch: Qualitative study of GPs who trialled ScriptSwitch

Ask participant to say (brief information):

1. Years working as a general practitioner (GP), number of GPs at practice, small or large expenditure practice

Experience of ScriptSwitch (any points in italics are just prompts for the student researcher if initial question does not provoke response, therefore will not necessarily be asked)

1. How important is having cost information to you when prescribing?

2. How was the experience of using ScriptSwitch early on?
   1) Was it integrated smoothly into your practice?
   2) Was it easy to use?
   3) How often did use its recommendations?

3. What were your attitudes towards ScriptSwitch early on?
   1) How did you feel towards the introduction of ScriptSwitch?
   2) About electronic prescribing support?
   3) About electronic prescribing support which emphasises cost?

4. Did your experiences or attitudes towards ScriptSwitch change over time at all?
   1) If yes, Why?

5. Can you give me any examples of how ScriptSwitch helped you when prescribing in the consultation?

6. Can you give me any examples of how ScriptSwitch did not help in some situations?

Why is your perspective on why scriptswitch use was ended?

Do you have any ideas which would have improved its influence on prescribing decisions?

7. What support or ideas do you feel will help to control prescribing expenditure?

8. Closing remarks: Anything else you wish to say? Thank you.