Does cost matter? A review of influences on GP prescribing of new medicines

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Abstract

Aims

Uptake of new medicines is known to be slower in the UK than in many other European countries. Previous research found that cost and price appeared unimportant in influencing GP behaviour. However, GPs may be more cost-conscious as a result of recent UK government policy. An updated literature review was undertaken to identify published evidence that could shed light on this hypothesis.

Methods

Two separate searches were undertaken on ten electronic databases. Strategy 1, an update of a previous review, used key terms for primary care physicians, uptake, medicines, and 'new'. Strategy 2 focussed on terms relating to incentives and prescribing in primary care. Records were screened for eligibility and data from relevant papers were extracted using Bonair and Persson's typology for determinants of the diffusion of innovation.

Results

The process of uptake of new drugs was found to be gradual and cumulative, with GPs typically holding conflicting views on new medicines that they managed through a variety of information-seeking strategies. Recent evidence suggests a shift in GP attitudes towards central policy initiatives, with GPs slowly accepting the need for external scrutiny and national standards. Self-reported evidence indicates that the cost of drugs and cost pressures do inform prescribing decisions. However, GPs do not see the cost of new drugs as a significant barrier to prescribing, particularly if patients have few alternative therapeutic options.

Conclusions

There is tentative evidence of a change in GP attitudes towards government initiatives and that cost does influence prescribing decisions. However, the generalisability of these findings is unclear.

Introduction

A literature review undertaken in 2003 explored factors affecting the uptake of new medicines and other technologies in primary care.[1] The review found little evidence to suggest that price or cost were important influences on the demand for new technologies. However, interviews with primary care trust (PCT) prescribing leads provided anecdotal evidence to suggest that price and cost were, in practice, important determinants of general practitioner behaviour. One explanation for this apparent contradiction is that recent government reforms and policy were influencing GP prescribing behaviour, but this phenomenon had not yet been evaluated or documented in the published literature.

In 2006, further research to update and extend the previous review was undertaken. Three central questions were addressed by this update. First, how competitive is the market for new medicines in primary care? Second, what are the main determinants of medicines uptake and what are the main determinants of geographical variations? Lastly, how important are price and cost in determining prescribing behaviour?

Methods

The review focussed on studies addressing the prescribing of medicines in the primary care setting. UK studies were of primary interest, although research conducted in other countries was also retrieved if relevant to the research questions.

Ten electronic databases were searched using two separate search strategies. The first search used the strategy designed for the earlier review, which covered the period from 1992 to 2002. The update covered literature published between 2002 to March 2006. A second strategy was developed to incorporate prescribing incentive terms, and covered the period from 1992 to March 2006. As different databases require strategies written in different terminology, an initial strategy was designed for Medline and then 'translated' for other databases. A summary of the broad categories of terms that used in the strategies is presented in Box 1 and Table 1 shows a list of the databases searched.

Box 1: Summary of terms for search strategies

Strategy 1: update of original review

- primary care physician terms
- UK terms
- 'new' terms
- technology terms
- uptake terms
- limits: language=English, year of publication: 2002-2006

Strategy 2: search for incentives influencing prescribing

- prescribing terms
- drug terms
- incentive terms
- 'change' terms
- limits: language=English, year of publication: 1992-2006

Table 1: Electronic databases searched

Database	Server
Allied and Complementary Medicine Database (AMED)	OvidWeb
Cumulative Index to Nursing and Allied Health Literature (CINAHL)	OvidWeb
Health Management Information Consortium (HMIC) (3 databases: HELMIS, DHdata and the King's Fund databases)	OvidWeb
Econlit	WebsSpirs version 5.1
EMBASE	OvidWeb
Medline	OvidWeb
PAIS International Database	WebsSpirs version 5.1
SIGLE	WebsSpirs version 5.1
Sociological abstracts	CSA Illumina: http://uk1.csa.com/

Once the searches had been run, records were downloaded and entered into bespoke reference manager software (EndNote 6). Records were then screened for eligibility for inclusion. Determinants were classified using Bonair and Persson's (1996) framework for the diffusion of innovation,[2] which classifies determinants of adoption as (a) actors; (b) structural /environmental characteristics; and (c) product characteristics. Relevant data were abstracted from included papers, including study design, technology, setting (location; level of care), determinants and key findings. Evidence relating to the determinants of uptake was synthesised narratively and, where appropriate, tables and figures were used to illustrate or summarise key messages.

Results

Records were screened and checked for eligibility for the review. Of the 550 records in the update review, 79 were considered to be potentially eligible and were ordered or retrieved. A further five references were identified from checking the bibliography of included studies, bringing the total number of potentially eligible references to 84. As a small number of *references* reported different analyses of the same data, the total number of potentially relevant *studies* was 81. Fifty-two of these studies were subsequently excluded from the review, the main reasons being that they did not assess new medicines (33), factors affecting prescribing (13) or were focussed solely on secondary care (3). One paper could not be obtained within the review timeframe, another paper was specific to US financing system (and was therefore not generalisable to the UK) and one was a commentary on an excluded study.

Characteristics of the included studies

Twenty-nine new studies were included in the review. Table 2 summarises the study designs adopted, the country in which studies were set and whether studies focussed exclusively on primary care. As in the previous review, the principal focus was on evidence from studies based in the UK (N=17),[3-22] with findings from non-UK studies (N=12)[23-35] used to help interpret UK studies or to fill in gaps where no UK evidence could be identified.

Table 2 shows that the evidence base for this updated review comprised mainly of uncontrolled studies: only one randomised study was identified and the reference was a protocol for an ongoing trial, so findings were not available.[31] The most popular design was qualitative interview studies, which essentially involved soliciting views from GPs on their reasons for prescribing decisions. However, two studies complemented this approach with analyses of prescribing data.[22 33]

Table 2: Key characteristics of the new included studies

		UK studies N=17	Non-UK studies N=12	All studies N=29
Total number studies		17	12	29
Design[α]	Qualitative / interviews	8[β]	2	10
	Uncontrolled study	6	2	8
	Longitudinal analysis	*5*	*1*	*6*
	Cross sectional study	*1*	*1*	*2*
	Review/ think piece	3	1	4
	Analysis of prescribing data	1	8	9
	RCT	0	1	1
	Non randomised controlled study	0	1	1
Health care setting	Primary care only	13	8	21
	Primary and secondary care	3	3	6
Country	England	13	0	13
	Scotland	2	0	2
	Europe	1	0	1
	Multiple[γ]	1	0	1
	Wales	0	0	0
	N. Ireland	0	0	0
	Republic of Ireland	0	3	3
	Australia	0	1	1
	Germany	0	1	1
	Denmark	0	1	1
	Finland	0	1	1
	US	0	5	5

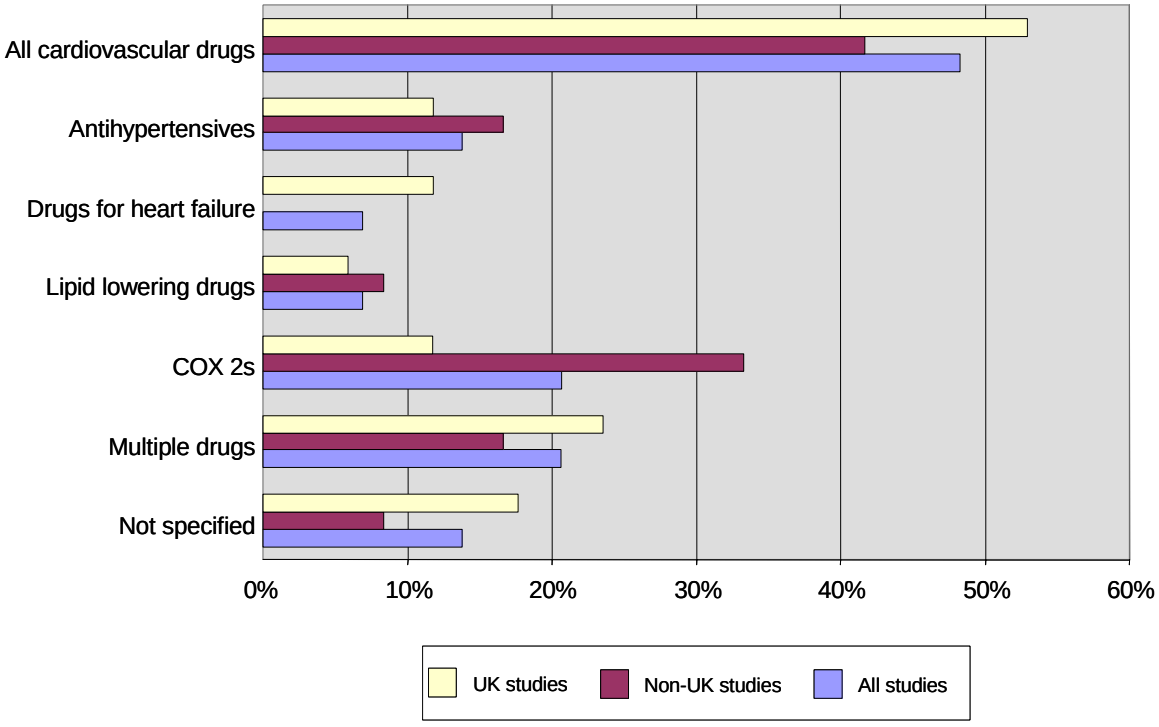
[α] some studies included more than one design

[β] one qualitative study was run in parallel with a randomised trial[14]

[γ] this study examined data from Canada, France, Germany, UK, US, and five Nordic countries[11]

Studies included a wide range of pharmaceutical classes and Figure 1 shows the most commonly assessed drugs, broken down by whether evidence related to the UK or primarily to other countries. Some studies reported multiple classes of drug, indicated by 'multiple drugs' in Figure 1: for example, the study by Prosser et al (2003) considered 19 new drugs.[20] Around half of all studies in the updated review explicitly assessed drugs for cardiovascular disease and about one in five studies looked at factors affecting doctors' prescribing of COX-2s (selective inhibitors of cyclo-oxygenase-2, a type of non-steroidal anti-inflammatory drug used in the treatment of arthritis). Other drugs considered but not shown in Figure 1 include medicines for migraine,[20 26] antidepressants,[3 35] antibiotics,[10 20 35] atypical antipsychotics[18] and anti-dementia drugs (acetylcholinesterase inhibitors: AChEIs).[33]

Figure 1: Key drug (classes) assessed by new studies (N=29)



Determinants of uptake: actors

From the more recently published literature, the key actors (and their interrelations), whose influence on prescribing behaviour was considered, included:

- Patients (and carers)
- Hospital specialists
- GPs with a special interest (GPwSIs)
- Prescribing advisers
- Pharmacists (hospital ward/ community)
- Nurses (specialist nurses)
- Pharmaceutical representatives
- GPs (characteristics)

The new studies reinforced many of the messages from the 2003 review. Findings from the UK underlined the centrality of the patient-doctor relationship in shaping prescribing behaviour.[3 9 10 12 16 17 22] However, all these studies relied primarily on self-reported data from interviews or questionnaires, so the objectivity of this finding is unclear. Hospital specialists also appeared

influential, although it seemed that so-called 'high' prescribing GPs (those with higher rate of uptake of new medicines) were more trusting of specialists' advice or lead than 'low' prescribers.[20] Lipman and colleagues (2004) describe the 'complex social interaction' between GPs, patients and hospital doctors.[16] In this interview study with 11 GPs, eight respondents mentioned the 'power' of hospital doctors, who were seen as the chief initiators of anti-coagulant therapy. Specialists were perceived as being disease-orientated, difficult to challenge and poor at communicating. This suggests that the influence of specialists sometimes jarred with the more patient-centred ethos of general practice:

> the main problem we have is the communication of patients coming out of hospital . . . it's improving, but still you know we get faxed through flimsy discharges that you can't read . . . 'Patient Warfarinised, latest INR 2.3'[a] or whatever and that's it.[16]

Similarly, Armstrong's study of GP prescribing of antidepressants found that GPs contrasted their own – holistic – approach to the more clinical attitude of psychiatrists.[3] GPs therefore saw themselves as less likely to medicalise their patients' depression and more likely to use non-pharmaceutical therapeutic options.

The role of other clinicians in bridging the gap between primary and secondary care was investigated by several studies. Fuat and colleagues undertook two related studies of GPs' treatment of heart failure.[12 13] Qualitative interviews with 30 GPs in the north east of England found that these doctors were poor at diagnosing heart failure and 'under-confident' about prescribing for the condition.[12] GPs appeared reluctant to 'unlearn' lessons from undergraduate medical training (e.g. on the risks of beta blockers):

> How can we adequately manage heart failure in general practice, given the modern advances that we are all unsure about?[12]

To address the barriers to uptake of prescribing, a new 'integrated management system' was introduced, offering support to GPs. In addition to a specialist clinic, staffed by a GPwSI and a

[a] international normalised ratio (blood monitoring)

specialist nurse, improved communication with secondary care was facilitated by pharmacists, who made notes on secondary care prescribing directions to clarify and explain why medications had been changed or stopped.[13] In the follow up study, GPs were reported to be more confident in their prescribing, and prescribing rates at the new clinic were 'high'. Whilst the approach appears sensible, the impact upon prescribing was not formally evaluated relative to a control group and nor were GPs' views on the intervention solicited. This latter issue is important because there is evidence to suggest while GPs who play a more specialist or managerial role can influence 'rank and file' GPs, this influence may be resented and perceived as divisive.[36]

The study by Morrison (2004) employed hospital pharmacists to provide better pharmaceutical information to GPs.[17] The intervention was well-received by GPs, although the impact upon prescribing was not reported. Only one study looked at the impact of PCT prescribing advisers: Wathen and colleagues (2004) found that advisers could help reinforce NICE[b] guidance, with 43% of GPs interviewed citing pressure from local advisers as a factor influencing their prescribing decisions for PPIs.[22]

Wathen's study found that in addition to prescribing advisers, pharmaceutical representatives can be an important source of advice for GPs.[22] The influence of pharmaceutical representatives upon prescribing of new drugs was explored in more detail by Prosser and colleagues (2003).[20] The frequency of reps' visits was a key difference between 'low' and 'high' prescribers of new medicines in this study. Examining prescribing patterns for 19 drugs introduced between 1998 and 1999, the authors identified 'outlying' GPs: 'high' prescribers were defined as those prescribing nine or more of the 19 new drugs, whilst 'low' prescribers had prescribed fewer than two. Seven of the 17 'high' prescribers saw reps at least three times a week, whereas none of the 'low' prescribers received visits more than once weekly. Although both groups criticised industry information as being selective and over-positive, low prescribers tended to seek other professional information to aid decisions, whilst high prescribers relied more their own judgement in 'separating the wheat from the chaff'.[20] However, it was unclear whether – or to what extent – high prescribers behaviour was shaped by these visits or whether doctors were simply more interested in new drugs and were utilising reps to help inform their decisions. In

[b] National Institute for Health and Clinical Excellence

support of Prosser's findings, one US study included in Rubin's review reported that three-quarters of physicians surveyed found pharmaceutical marketing information to be useful, and considered themselves capable of managing bias.[32]

As well as these 'external' actors affecting GPs' prescribing habits, characteristics of the GPs themselves may be associated with the rate of uptake of new medicines. Prosser's 2003 interview study with 30 GPs identified some commonalities and three differences in approach between low and high prescribers of new drugs.[20] In terms of demographic characteristics, there were no significant differences between the groups in terms of gender, number of years qualified or whether they were working full time. For both high and low prescribers, prescribing decisions were informed by the 'need' for the drug (specifically, whether the new drug offered any therapeutic advantage or whether alternative treatments were available), and the impact of 'cost pressures', with the high cost of some drugs restricting use to patients for whom alternatives were ineffective or not tolerated. Three key differences between high and low prescribers were identified. First, and unsurprisingly, there was a difference in GPs' attitudes to new drugs. Low prescribers were more conservative, and more likely to see themselves as 'cautious and sceptical'. Second, the two groups of GPs differed in their perception and management of risk. High prescribers were more willing to experiment, were more ready to accept the licensing body's judgement on safety or efficacy, more willing to accept risks in areas where they felt they had expertise, and more comfortable 'testing' a new drug with small numbers of patients, 'so that colleagues can learn from you'.[20] In contrast, low prescribers felt that licensing approval represented an insufficient guarantee of safety or of (relative) effectiveness and several cited a period of two years after which they would 'feel a greater ease' in prescribing a new drug. In other words, low prescribers seemed to wait for accumulated evidence on safety and efficacy in routine use, provided either in the peer-reviewed literature, or by other doctors (especially hospital doctors). However, for classes of drug with which they felt unfamiliar, high and low prescribers were similarly cautious. The third key difference between high and low prescribers related to the acquisition of information. High prescribers were more likely to follow specialists' leads and less likely to question the reliability of their decisions. Low prescribers were more likely to cite peer-reviewed literature as a source of information, which they used to test other

sources such as information from pharmaceutical reps. One high prescribing GP remarked that '*no-one else is going to tell us about new drugs'*. Prosser and colleagues conclude:[20]

> It is likely that most prescribers will hold a mixture of conflicting attitudes over new drug adoption, on the one hand favouring cautiousness whilst at the same time desiring to treat patients more effectively.

There was some relevant evidence from outside the UK. Dybdahl and colleagues report two longitudinal analyses of prescribing data for 191 Danish GP practices.[26 27] Focussing on four new drugs, Dybdahl's 2004 study used six indicators to measure adoption (uptake) rate.[26] The authors explored whether the prescribing level for a new drug (e.g. esomeprazol) was related to the prescribing level of all drugs from the same therapeutic group (e.g. protein pump inhibitor (PPIs)). However, this analysis failed to identify a consistent association between GPs' level of drug prescribing and their adoption of new drugs of the same therapeutic class.[27] Whilst there was some evidence of a within-class correlation for PPIs and the new migraine drugs, little association was found for COX 2 s or angiotensin II antagonists – in fact, high prescribers of NSAIDs[c] appeared to be *less* likely than low prescribers to adopt COX 2s. Possibly, this could reflect GPs' concern with side effects, although the study provided no evidence to support this. Dybahl and colleagues conclude that a simplistic notion of 'early adopters' may be inappropriate for GPs.[26 27]

Determinants of uptake: structural /environmental issues

In the update review, structural or environmental factors reported to influence the uptake of new medicines included:

- Evidence / information (guidance / regulation / management)
- Incentives
- Support structures
- Rurality

Consideration of the actors involved in influencing uptake has shown that GPs vary in their attitudes to and use of 'scientific' information, with prescribers drawing to various degrees upon

[c] non-steroidal anti-inflammatory drugs

others, including patients, for 'evidence'. Indeed, sometimes patient preferences or beliefs were reportedly accorded more importance than the 'official line', overriding scientific evidence in influencing a prescribing decision.[3] Thus, it is important to consider the context in which evidence is communicated to GPs, to see whether any light can be shed on what influences the uptake of new medicines.

Since previous research had demonstrated that passive dissemination of information has little effect on prescribing behaviour, Wathen and Dean (2004) sought to test this finding for NICE appraisals.[22] As many NICE-approved drugs fall within the remit of secondary care, the authors focussed their study on four appraisals relevant to primary care (Table 3). The study drew on information from three sources: semi-structured interviews with a purposive sample of 12 GPs from one PCT; a postal survey of 81 GPs from the same location; and PCT prescribing data covering the period 6 months before and 12 months after the introduction of guidance. *Overall, NICE guidance – in isolation – was found to have little impact on uptake.* Where other sources of evidence supported the guidance, then adoption was more likely. The greatest increase in prescribing rates was seen for the COX 2 drugs, with the guidance on PPIs having little impact and study GPs universally rejecting the guidance on zanamavir.

There was some evidence to suggest that the turn of the century witnessed a shift in GPs' attitudes to clinical guidelines. Evidence[d] from the late 1990s found that a sizeable minority (around one-third) of GPs studied expressed an aversion to guidelines. Pollock and colleagues (2003) cite several examples:[37]

> I'm old enough not to believe in rigid guidelines as being other than control mechanisms. I think that flexibility is the way that the health service will survive…
>
> I hate guidelines. You know, when someone says 'Here's the guideline', you almost feel like putting them in the bin.

[d] Evidence from an excluded study (that did not address new medicines)

A more recent study provided tentative evidence that attitudes may be shifting. Conducted alongside a randomised trial designed to increase the uptake of guidelines for asthma or angina, Harrison's study (2003) interviewed GPs at three time points over the years 1999 to 2000 to investigate why doctors in both groups had increased their uptake of guidelines to similar extents.[14] Adoption was not associated with any particular GP or practice characteristics. Rather, general pressures from central government and the 'clinical governance activities' of local PCTs were seen as the key reasons for the observed change:

> Respondents were generally aware of contemporaneous developments both locally and nationally, but did not have either very specific or very accurate knowledge of what these developments entailed. Rather, they perceived that clinical work would become less autonomous and subject to greater accountability, a trend that few intended to resist. The only plausible candidate for the source of such perceptions is the publicity given to government policy, and we suggest that GPs are responding strategically to perceptions that the medical profession is under increasing external scrutiny by accepting the need to account for their clinical actions in formal terms.[14]

Importantly, GPs reported changing their recording practice – for example, recording individual decisions not to adhere to NICE-approved guidance, though the study did not explore whether this was associated with a change in prescribing behaviour. A separate study conducted in 2000 found that some 'research conscious' GPs expressed hostility towards 'prescriptive' guidelines, although they appeared to feel more comfortable in interpreting and applying guidance flexibly.[16]

Incentive schemes may be introduced for a number of reasons. Aims include the reduction of healthcare resource use, modifying clinical practice, improving quality of care or achieving specific health target(s).[19] In Europe, these policy interventions tend to develop quickly and are often all encompassing; this makes evaluation problematic, as it permits neither time to collect adequate before and after data, nor scope for a controlled evaluation.[19] Furthermore, such incentives are often one strand in a raft of other organizational changes, which makes their distinct impact difficult to discern.

In the UK, prescribing incentive schemes were first introduced in the 1990s and were targeted at non-fundholding GP practices. Participation was voluntary, with practices rewarded for achieving budgetary targets. The Scottish non-fundholding scheme differed from English one, in that schemes could not be financed from prescribing allocations.[21] Positive effects of the Scottish scheme upon the uptake of some drugs were observed (e.g. ACE inhibitors). In the Republic of Ireland, where most GPs work as single-handed practitioners and as there is no Drug Tariff, options for achieving cost savings through switching to generics are limited. A financial incentive scheme introduced in 1993 to reduce prescribing costs was found to have a short-term effect, with most savings being produced by switching to cheaper drugs and decreasing prescribing rates.[35] However, only some GPs were able to meet the targets. There was evidence that those meeting the targets ('savers') were also slower to adopt new drugs. However, it was unclear whether the scheme caused this effect or whether 'savers' were by nature more conservative in their prescribing behaviour.[35] A study of fundholding, which embodies similar incentives to those of the Irish scheme, found no evidence that fundholders were slower than non-fundholders to use newer, more expensive medicines.[38] Ferguson's 2000 study of an incentive scheme in one London borough found that even when practical support was offered, practices were reluctant to participate.[10] In light of the implementation barriers faced by the study, the authors sound a note of caution regarding the potential value of incentives and suggest that incentives could distort clinical priorities:[10]

> Incentives may have a role; however, they have limitations. Factors such as time, priorities and perceptions about the proposed change may be more critical.

From 2000 to 2004, primary care organisations (PCOs) in England were legally required to operate a prescribing incentive scheme for their general practices.[39] The secretary of state for health issued directions (which have statutory force) to specify the types of target, maximum rewards and use of 'good cause for failure' provisions that schemes should include. Ashworth and colleagues studied how the balance between cost and quality indicators adopted by schemes operating in London and the south east of England changed over time.[4 5] Over two years, schemes became more quality-focussed and there was a large increase in schemes addressing

some government targets (e.g. on statins). There was tentative evidence that larger payments were associated with better cost control, but the impact upon prescribing quality was unclear. Although the study did not directly address medicines, interview data from Mahmood (2003) revealed that some GPs see incentive schemes as attempts to control their behaviour and encroach on clinical judgment and freedom.[36]

The new GMS contract includes a voluntary quality and outcomes framework (QOF), which offers incentive payments linked to several prescribing targets. Unsurprisingly given the recent introduction of the contract, the review identified no empirical evaluations of the impact of the QOF upon prescribing behaviour.

Risk-sharing schemes may also include a financial incentive. Use of an 'outcomes guarantee' to encourage the appropriate and responsible prescribing of statins for patients with coronary heart disease was studied by Chapman and colleagues.[6 7] The pilot risk-sharing scheme, which covered 26 (67%) GP practices in North Staffordshire, was a multifaceted approach involved audit and intervention. The nurse-run audit identified 'at risk' patients, namely those not achieving target cholesterol levels and not already receiving statin therapy. These patients were invited to attend a clinic where their cholesterol levels were assessed, and then referred to their GP who was free to prescribe any statin. Over the following 12 months, patients attended four further clinics in which cholesterol levels were measured and adherence to therapy recorded. For patients receiving one particular statin (atorvastatin), the manufacturer agreed to refund the provider if a specified percentage of patients did not achieve their target level for low-density lipoprotein cholesterol.[7] This guaranteed outcome was based on national targets, reduced by 20% to allow for non-compliance. Of the 1400 patients assessed, an additional 375 patients were newly prescribed a statin. However, as the study was uncontrolled it is unclear whether this rate of uptake differs from usual practice. Over 40% of patients prescribed atorvastatin achieved target, but no refund was due from the manufacturers: this was because patients were excluded from the study due to inadequate baseline (30%) or follow up (7%) data, or because the dose was still being titrated towards target (20%) at the assessment time.

The study by Chapman illustrates the use of a separate clinic to identify new patients that might benefit from pharmaceutical therapy.[7] The study by Fuat (2005) also used a special clinic as part of 'an integrated management system' in order to screen GP referrals, diagnose and initiate therapy in heart failure patients.[13] In the light of a rapidly advancing evidence base, it seems that these types of clinic may play a valuable role in supporting and informing GPs' prescribing behaviour. However, there is a need for further research to formally evaluate the benefits or harms or these interventions, as there is some evidence that shared care can confuse the lines of responsibility.[16]

One Australian study investigated the impact of rurality upon prescribing. Behan and colleagues (2005) found no difference between the rate of uptake of COX 2 selective inhibitors when comparing rural and urban areas, and suggested that marketing and patient demand explained the high level of uptake across both locations.[23] No UK study assessing the causes of geographical variations in the uptake of prescribing of new medicines was identified.

Determinants of uptake: product characteristics

Findings from the update review were very similar to those of the evidence reviewed in 2003. Key product characteristics identified as influencing the uptake of new medicines included:

- effectiveness
- safety
- cost
- uncertainty

Armstrong's study of GPs behaviour[3] found that prescribing was characterised by 'stability and continuity, and the uptake of prescribing of a new medicine was a gradual and cumulative process. Following a 'creeping awareness' of the new technology, GPs typically experimented with the drug on small numbers of patients to see if it worked and was tolerated. Safety issues were the only type of evidence for which GPs exhibited any real interest.[3] Evidence from the Republic of Ireland supported this finding, with an analysis of GP prescribing data indicating that safety concerns were an important reason for GPs switching from NSAIDs to COX 2 inhibitors.[24]

Prosser's 2003 study of high and low prescribers found that attitudes to cost were similar between the two types of GP.[20] Both groups reported that they took account of economic issues when drugs were therapeutically equivalent, that their prescribing behaviour reflected cost pressures and the need to balance cost with effect. Neither group indicated that they were reluctant to prescribe new, high cost drugs although these GPs conceded that cost was a barrier to uptake for patients for whom cheaper alternatives were available.[20]

Wathen and Dean (2004) examined the impact of NICE guidance on primary care prescribing.[22] From survey and interviews, it was clear that most GPs were concerned with the side-effects associated with non-selective NSAIDs and that COX 2s were generally perceived to be safer. However, more than three-quarters of GPs expressed concern that this relative advantage could prove to be unfounded. Cost was also an important prescribing determinant. Wathen's study did not ask respondents to rank factors affecting uptake, so their relative importance is unclear. However, Table 3 shows that between 42% and 69% of respondents cited cost as a barrier to uptake.

Table 3: Summary of findings from the postal survey by Wathen and Dean (2004)[22]

Drug (NICE guidance No.)	Effectiveness	Cost	Side effects	Safety	Comment
PPIs (7)	X 30%	√ 82%	-	-	Two-thirds saw guidance as in line with their current practice – no need to change. Cost savings were the major encouragement to uptake.
Rosiglitazone (9)	√ 35%	X 42%	√ 46%	√ 63%	One third felt the drug avoided the need for insulin injections, although interviewed GPs expressed the view that 'the drug was not living up to expectations'.
Zanamavir (15)	X 80%	X 69%	-	-	GPs rejected the validity of this guidance, which seemed also to damage their general confidence in NICE
Orlistat (22)	X 40%	X 58%	X 54%	-	The main barrier to prescribing was the difficulty experienced by patients in demonstrating a weight loss of 2.5 kg before initiating therapy.
COX 2s (27)	-	X 64%	√ 68%	X 48%	The main drive to encourage prescribing was the poor safety profile of existing NSAIDs. Despite the concern about the unproven long-term safety of COX 2s, the known safety problems with the older drugs encouraged uptake of the newer drugs.

√: cited as an encouragement to prescribing (% citing); X: cited as a barrier to prescribing (% citing); '-': not reported; N=81

The conflict or tension within the GP role, 'prescribing dilemma' of balancing patient need (demand) and the 'cash strapped' NHS is felt more acutely by some GPs than others. Pollock

and Grime's study of a small sample of GPs in the late 1990s reports how one GP felt about this dilemma:[37]

> In terms of financial implications, my use is sometimes inappropriate. But in that impossible world of wearing two hats … I'm comfortable with what I'm doing. Regardless of what those who hold the purse strings may feel, I'm in an impossible situation where you can't win. My conscience is clear.

This GP's comment suggests that he failed to recognise that cost is important because it represents foregone benefit: 'inappropriate use' for one patient inevitably has repercussions on the availability of treatment for other patients.

A lack of confidence in the evidence, concern that claims of superior efficacy, cost-effectiveness or tolerability may prove to be unfounded and bewilderment over the – real and apparent – contradictions in the evidence base may be summed up by the term 'uncertainty'. Mortimers' review (2004) of atypical antipsychotics ('atypicals') for the treatment of schizophrenia summarises this point:

> The first-line use of atypical antipsychotics brings much extra complexity to the clinical decision-making process, especially in view of the unclear long-term benefits of these drugs.[18]

For Mortimer, the uncertainty around atypicals hinges on their side-effects – new ones are emerging as experience with the drugs grows – and the uncertain pharmacoeconomic profile. The author suggests that audit would be one way of encouraging the uptake of NICE guidance on this topic, although she emphasises that the Institute's guidance to physicians is to *consider* rather than to *prescribe*.[18] In the US, Suther and colleagues (2004) explored the characteristics of genomic medicine (GM)[e] that were associated with uptake.[34] Surveying 400 US 'primary care' physicians, the authors found that propensity to adopt was affected by GPs' perceptions

[e] Genomic medicine covers diagnosis, prevention and treatment that take into account patients' genetic makeup; thus, this technology is more akin to a package of care that includes the options for new medicines

about the relative advantage of GM compared with existing treatments, its complexity and by its compatibility with current practice. Two-third of GPs needed to be able to 'trial' GM, and around half wanted colleagues to adopt before they did so.[34] However, simply providing this type of information to GPs will almost certainly be insufficient to tackle uncertainty and so effect change.[40] For example, Ferguson's study of an incentive scheme to encourage uptake of prescribing for H. pylori found that despite concerted efforts to educate them, some GPs still found it difficult to both assimilate and integrate evidence into practice.[10]

Discussion

GPs prescribing behaviour seems to be characterised by stability and continuity; however, this is not necessarily indicative of a lack of competition in the market for medicines in primary care. Within the UK, the rate of uptake of new medicines varies and this suggests that clinical freedom and autonomy – and hence choice – are still very much part of general practice. However, it appears that the impact of central guidance upon GPs and their 'creeping awareness' of the need for evidence to inform decisions is increasing. Alongside this raised awareness of external guidance and scrutiny, GPs generally appear confident in making 'appropriate decisions', taking into account the circumstances of individual patients through consultation and dialogue. Where this confidence is lacking, support structures are being established to provide appropriate guidance to guide treatment decisions. GPs also vary in their attitudes to and use of different sources of information about drugs, with notable differences between high and low prescribers of new drugs. The evidence is also clear that GPs consider several product characteristics when making drug choices and that they believe that cost and cost pressures inform that decision.

Some studies considered several different types of determinant that influenced the uptake of new medicines. Central to all other influences was the doctor-patient relationship. Other actors played influential roles, although their influence varied between GPs. Although there was some research suggesting that support systems can help increase the uptake of new medicines by identifying patients who may benefit from pharmaceutical therapy, there is a clear need to ensure that these systems complement general practice and minimise the threat to the holistic nature of primary care.

No single study explored reasons for variations in GP behaviour across the UK. Rather, UK studies typically surveyed or undertook data analyses for relatively small numbers of GPs within a particular geographical region. The existing evidence base is therefore unable to address the issue of what causes geographical variations in prescribing within the UK. National databases, which provide data on prescribing (e.g. as collected by the Prescription Pricing Division) and on GP and practice characteristics (e.g. the General Practice Research Database (GPRD)), are potentially useful sources for further research.

Surprisingly little evidence was found on the impact of financial incentives in influencing prescribing, and no evaluation of how the new GP contract has impacted the uptake of medicines was identified. With the advent of the QPID (where QOF data is held), which can be linked to Hospital Episode Statistics (HES) data and to some primary care databases, future evaluations of the impact of the new contract may be expected to materialise over the next few years. Currently, it appears that incentives may play a role in increasing the uptake of new medicines, but there may also be a risk that unintended consequences ensue. Future evaluations should therefore ensure that benefits, harms and costs are all considered if the full effects of incentives are to be understood.

Identifying reasons for GP behaviour is an intrinsically difficult task. Reliance on self-reported motivations may be biased by the way that questions are framed and presupposes that the respondent is a) aware of his motives and b) is truthful in reporting these. Exploring which factors influence decision-making and how doctors make trade-offs has been tried using hypothetical scenarios,[42] but the generalisability of this approach to routine behaviour is unclear. However, analyses of routine databases are also problematic insofar as they rely heavily on the quality and appropriateness of data collected and – in common with all observational studies – identify associations rather than attribute causality. This may be a research area where the application of multiple methodologies is called for, attempting to compensate for and address each approach's respective shortcomings.

An aspect of Alan Williams' legacy is that he challenged clinicians' ethical stance about the importance and role of costs in their decisions. Writing almost two decades ago on the clash between health economics and clinical freedom, Alan Williams (1988) argued that doctors:[41]

> … have absorbed these (economic) considerations comfortably within what they would still regard as their own clinical judgment rather than as part of any wider "extraneous" economic or social responsibility.

Williams' point was that doctors have always taken cost into account, but the way that this is done is 'selective and haphazard'. Regrettably, the evidence reviewed here suggests that little has changed!

Conclusion

This review provides tentative evidence that GPs do think about cost when making decisions about new medicines. However, there is no evidence that GPs who are more likely to prescribe new medicines attach any more importance to cost than do the so-called 'low prescribers'.[20] Whilst no study found that GPs see cost as a barrier to prescribing new medicines, it appears that cost does inform this prescribing decision, particularly when there are therapeutic alternatives that may be tried first.

Suggested questions for discussion

1. Is the research question framed too loosely? If so, how could we be more specific about the sense in which 'cost matters'?
2. The existing evidence base is characterised by small scale and poorly controlled studies. How do we think this could this be improved?
3. Anecdotally, the quality and outcomes framework (QOF) in the new GMS contract seems to have had a significant impact on doctors' behaviour. What findings do we think may emerge from future evaluations of the QOF?

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