

This article was downloaded by: [University of York]

On: 12 January 2010

Access details: Access Details: [subscription number 907742919]

Publisher Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Science as Culture

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713444970>

Making Sense of Medicines: 'Lay Pharmacology' and Narratives of Safety and Efficacy

Andrew Webster ^a; Conor Douglas ^a; Graham Lewis ^a

^a Science and Technology Studies Unit, University of York, UK

To cite this Article Webster, Andrew, Douglas, Conor and Lewis, Graham(2009) 'Making Sense of Medicines: 'Lay Pharmacology' and Narratives of Safety and Efficacy', Science as Culture, 18: 2, 233 – 247

To link to this Article: DOI: 10.1080/09505430902885631

URL: <http://dx.doi.org/10.1080/09505430902885631>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Making Sense of Medicines: ‘Lay Pharmacology’ and Narratives of Safety and Efficacy

ANDREW WEBSTER, CONOR DOUGLAS & GRAHAM LEWIS

Science and Technology Studies Unit, University of York, UK

ABSTRACT *How do patients make sense of their medication, how do they link it to their own state of health, and how do they cope with it within the context of their daily life? Such questions represent significant gaps in traditional medical sociology, which has to date been dominated by research into the role of producers and intermediaries in shaping the social world of medicines. This paper examines the social construction of the meaning of medicine through a detailed exploration of patients who have been prescribed warfarin, an anticoagulant (blood thinning) drug, to treat various chronic cardiovascular disorders. Through the development of the concept of ‘lay pharmacology’ we locate these meanings within wider collectivities of other patients, family and the anticoagulation clinic itself. We ask whether we can anchor these meanings within the patients’ own understanding of their condition and of their treatment, and how in light of both they make sense of the anticoagulation regime they are asked to follow. We compare clinical notions of the safety, efficacy and side effects of drugs with lay versions of the same in order to suggest how the latter may be drawn on in clinical settings to help inform clinical dialogue with patients more directly, while, at a more general level help inform clinical trials and allow for a constructive dialogue with those in public policy who are tasked with ensuring the delivery of safe and cost-effective medicines. More broadly, in an era of so-called ‘translational medicine’ how expert and lay understandings are actually brought together is a public policy issue that should be given much greater priority.*

KEY WORDS: Lay pharmacology, warfarin, pharmacogenetics

Introduction: Understanding the Meaning of Medicine(s)

While there has been a wealth of social science research in the field of health and medicine in general, previous sociological work on medicines *as such* and their cultural meaning for patients and consumers has been relatively limited. An exploration of the ways in which patients make sense of drugs as medication is worth pursuing for two reasons: first,

Correspondence Address: Andrew Webster, Science and Technology Studies Unit, Department of Sociology, University of York, York YO10 5DD, UK. Tel. +44(0)1904 43 4740; Fax: +44(0)1904 43 4702; Email: ajw25@york.ac.uk

because for many people drugs are typically the most important and physically tangible form that medicine as practice takes. In this sense they act as not merely a chemical but a social encapsulation combining definitions of ill-health, the body and treatment. Secondly, these lay understandings of medical practice shape the ways in which patients actually conform to prescribed clinical regimes. This relates to wider public policy issues about the better use of medicines including the greater 'personalisation' of treatment and the need to reduce their adverse effects, especially at a time when the cost of drugs continues to rise.

Previous studies that focus on lay interpretation of medicine include those by Britten and colleagues (Britten *et al.*, 2004; Pound *et al.*, 2005; Britten, 2008), which explore the ways in which patients actively resist medication, and that by Green *et al.* (2006) in their analysis of HRT and women's own risk assessment of the value of the therapy within the context of their lives. A particularly valuable study by Cohen *et al.* (2001) emphasises the importance of understanding the ways in which the meaning of medication is culturally constructed inasmuch as medicine is 'socially embedded' (p. 442) in differing thresholds of normality and abnormality which reflect wider social relations. This is especially apparent through the research the authors conducted in the area of psychoactive drugs (such as Valium and Prozac). Acknowledging that while there are specific cultural features characterising this class of drug (in their link to lifestyle and behavioural expectations for example), they believe that 'all classes of prescribed medications' can be understood as being mediated and their use shaped and constructed by cultural repertoires and social relations 'beyond an individual consumer's body' (p. 449). As they say:

Medications themselves are much more than material objects with physiological effects; they are also *representations* that carry meanings and shape social relations as they evolve in conjunction with individuals and collectivities (p. 442, emphasis added).

Cohen *et al.* call for research on other forms of medication in order to build a better understanding of this process.

In this paper we seek to contribute to this work by examining the constructed meanings of the drug warfarin. Unlike psychoactive drugs used to manage what are often culturally and socially contested disorders associated with 'non-specific, uncertain, or speculative biological substrates' (Cohen *et al.*, 2001, p. 443), warfarin is deployed quite routinely in health care systems across the world to manage what are regarded as biologically quite specific blood-related or cardiovascular disorders, such as deep vein thromboses or venous embolisms. As such, this case provides a good example of a highly routinised medication that is seen to treat symptoms of non-contested disorders.

Among cardiovascular disorders, warfarin has also been shown to prevent strokes in patients with non-valvular atrial fibrillation (AF), and it has been estimated that of the 21,000 strokes per year among patients with AF, 3,000 are probably prevented by anticoagulation. The use of warfarin has thus increased to such an extent that patient numbers have doubled in most anticoagulant clinics in the last five years, and the trend is set to continue. Currently, 1% of the whole UK population (600,000 patients) and 8% of those over 80 years (154,000 patients) are prescribed warfarin (Kamali & Pirmohamed, 2006; Wadelius & Pirmohamed, 2007). However, the major risk from warfarin treatment is haemorrhage; the incidence varies from 10 to 24 episodes per 100 patients for all bleeding complications and from 1.2 to 7.0 episodes per 100 patients for major bleeding

complications. The risk of bleeding is related to warfarin dose plus genetic and environmental factors such as vitamin K, gender, body size etc. Because warfarin has a narrow therapeutic index (that is, a relatively small range within which it is effective and beyond which adverse drugs reactions appear), the dose required to achieve therapeutic anticoagulation is very close to the dose that leads to over-anticoagulation. The maintenance dose also varies widely between different individuals (from 0.5 mg/day to more than 10 mg/day) (Wadelius & Pirmohamed, 2007).

The physiological effects of warfarin are therefore extremely important for a large number of people both positively as a therapeutic agent but also more negatively as a potential source of serious side effects and risks. It is important to understand how the drug is experienced and how these effects are understood by those taking it, especially for a chronic disorder over a long period of time.

This paper takes the opportunity of drawing on evidence from a three year hospital-based study in the North West of England¹ on the use of pharmacogenetic (PGx) testing to improve the accuracy of warfarin dosages, to explore these physiological and hermeneutic dimensions: these, we suggest, comprise what we call a 'lay pharmacology' through which patients make sense of the drugs they are prescribed and their role in their treatment. This sense-making though, as Cohen *et al.* argue, occurs not simply at the level of individuals but also 'collectivities', and in the paper we locate lay pharmacology within the wider collectivities of other patients, family and the anticoagulation clinic itself. We ask whether we can link the lay meaning of medicines to patients' own understanding of their condition and treatment: how might the meaning of medicine vary across different conditions, personal circumstances and the experience of the clinic itself? We also ask how, in light of this patients make sense of the anticoagulation regime they are asked to follow, particularly in regard to personal judgments they make about the perceived safety and efficacy of the drug.

This is not only of analytical interest: it raises questions with respect to both health care practitioners' and the UK (and indeed other) government's ambition to ensure a more effective compliance with medical prescriptions. Compliance with a drugs regime presumes that patients will follow prescribed doses for specific periods of time: in exploring their use of warfarin we show below how concerns over the severity of their condition, starting and coming off the drug and comparisons made with others prescribed warfarin shape the patients' understanding of the role of the drug. Understanding this may well help provide a more informed approach to securing compliance itself.

The matter of patient compliance has, it should be noted, already been the subject of critical commentary (Armstrong, 2005), much of which has focused on the disciplining of patients by medicines acting as a form of surveillance and control beyond the clinical encounter itself. Such critiques led to a more patient-centred discourse of 'concordance' rather than compliance in an attempt to reframe the management of medicines as a two-way process between the medic and the patient. Others (e.g. Ives, 1980; Pound *et al.*, 2005) have pointed to the ways in which non-compliance can be seen as an alternative 'grammar' through which patients seek to redefine the terms of which their illnesses are to be managed, which in many cases can lead to a search for alternative forms of diagnosis and medicine (Sharma, 1993, 2000; Saks, 2000). In contrast, recent work suggests that in some contexts, notably with medically unexplained symptoms, patients may actively seek a medicalising of their condition and the treatment (including medication) this will bring (Nettleton *et al.*, 2004).

These different forms of engagement with drug regimes reveal patients as active diagnostic agents in seeking access to and managing medicine. Often, though, as in Cohen *et al.*, this has been about special classes of drug linked to explicit lifestyle or behavioural conditions. The more mundane, everyday, experience of patients with chronic conditions who occupy a more typical position with respect to medics and medicine is as important a topic for sociological investigation, and it is precisely this category of patient we discuss in what follows. Moreover, the notion of the patient as an active diagnostic agent has been advanced within science and technology studies (STS) by Oudshoorn (2008) and in our discussion we take up this theme as providing a potentially fruitful terrain for further STS work focusing on medicines as such. Finally, we draw out some of the wider societal issues relating to the management and safety of medicines.

Methods

The research discussed here was embedded in a larger clinical project examining some 1,100 patients treated with warfarin. The clinical research was centred on developing a pharmacogenetic test for warfarin that would generate new evidence about the possible merits of changes to the prescription process. By integrating genetic information about individual patients (so-called personalised medicine) into the prescribing algorithm through which doctors assign doses of warfarin, new clinical and health economic guidelines could potentially be developed for its delivery in the longer term (Webster *et al.*, 2004).

Our principal role was to examine the meanings, experiences, and views of the patients participating in the clinical study itself. We interviewed three groups of patients twice, staggered over an 18-month period, who were regular visitors to the anticoagulation clinic in the hospital. In total we completed 45 interviews, following the treatment regime of each patient.²

The use of semi-structured interviews allowed respondents to speak openly and freely about their health biographies and express their views on their treatment regimes, while at the same time allowing us to guide the interview in areas relevant to the warfarin experience. We also selected patients referred to the clinic with different medical conditions—atrial fibrillation (irregular heartbeat), deep vein thrombosis (DVT) and pulmonary embolism (PE), an acute clotting condition only found in the lungs. This was important if we were to determine how patient narratives about the safety and efficacy of warfarin were being shaped by their broader understanding of their health in general.

Not surprisingly, given these conditions are typically (though not exclusively) associated with the ageing process, our respondent group had a mean age of 66 with many in their early 70s. This also meant that these older patients often had had to cope with other health problems—‘co-morbidities’—and we were interested in discovering whether this was an important factor shaping their interpretation of warfarin. Moreover, the conditions they presented with at the start of the study changed during the period in which we saw them, either stabilising or deteriorating, so we were keen to see how this affected their views on warfarin.

Once the interviews were completed our analytical approach to the material centred on the experiences of the patient both in the clinic and at home. In taking the body seriously we extended the ‘illness experience’ approach within medical sociology (e.g. Conrad, 1987; Fitzpatrick *et al.*, 1984) not only to examine what it is like to have a condition such as AF, DVT, or PE but—importantly for our purposes here—what it is like to be

prescribed a drug where there is difficulty in establishing a stable or 'normalised' dose. We adopted the approach suggested by Bury (1982) and analysed the qualitative material emerging from our interviews as biographies or narratives which enabled us to link the experience of warfarin and patients' conditions with their wider concerns (i.e. relational, material and practical affairs) that exhibit the 'social embedding' of medications. Understanding some of the respondents' biography helps to provide a more complete picture of what it is like to be 'a patient', what it is like to have a condition, and the concurrent needs and requirements it creates.

Patient Narratives as Lay Pharmacology

Clinical pharmacology as a form of expert knowledge seeks to ensure that prescribed drugs are not only safe but also efficacious, effective and have minimal side effects or 'adverse drug reactions' (ADRs). The aim is to deliver 'rational prescribing' whereby the correct medication, dosage level and frequency, and point at which medicine should be withdrawn, can be determined. In the case of warfarin, given its narrow 'therapeutic index' prescribing in the first few days of presenting with a blood clot is typically a matter of trial and error, with dosage levels adjusted until the thinning of the blood is stabilised at a 'normal' level. Even so, as noted above, about 25% of patients experience side effects (bleeding). Within this context, then, what do safety, efficacy and ADR mean for patients themselves?

As we have argued above, patient perspectives on drugs need to be situated within their personal health narratives and conditions for which they receive medical (drug) therapy. It is important to explore this in regard to both the specific condition (such as a DVT) that warfarin treats and any other illnesses or co-morbidities the patient might suffer from at the same time, for patients' beliefs and behaviour with regard to the first are shaped by their experience of the second. Patients may well be taking a number of different drugs for related or quite discrete conditions or be on medication to counter the side-effects of warfarin itself. Sometimes they feel they are on so many drugs they cannot determine what the precise effect of warfarin is:

The effect of warfarin I can't really say because I've been on so many other drugs . . . what warfarin's affect on me is I can't really specify because it is part of the whole regime of things (P029).³

In addition, patients often relate the use of warfarin with reference to the other conditions they have. For example, the need to be treated with warfarin might be seen as a marker for something else, especially if the dose is seen as being high:

I suppose I am [ok] as far as warfarin is concerned, but I feel like I have anxieties about other things as well, you know. I think, 'is this because there is something up with my blood?' You know? Why is it that this isn't happening for me, why am I not . . . why am I having to stay on this high level? (P015).

Or, its role is to manage complications associated with other problems they have:

They reckon the clots are there because of the actual operation, which can happen with knee replacements I believe? So it was just unfortunate you know what I

mean. It is just stuff with the arthritis and lungs and heart. I sound fit as a fiddle don't I? [laughing] (P014).

Other chronic co-morbidities, even if terminal, might be seen to be of secondary importance when compared with the painful conditions that warfarin is used to relieve:

The restriction of blood in [my calf], that was terrible painful, I wanted treatment for that, I didn't give a toss really about the cancer . . . mobility is more important than a short future I think, what's the point of having a long future if you're immobile? (P029).

Those who have experience of chronic illness often have a more technical knowledge of their condition that draws on the language of the clinic and is used to interpret the potential effect of warfarin. As one respondent observed:

I've already got funny blood. My platelets are—well, they're not bad now, but they were very low—we're going back now at least three years. At one point, my platelets dropped to 45 with no reason for it at all. Then they started climbing again, again for no reason at all. They were quite pleased when I got to what they call the lower end of normal, and since then it's gone up a little bit more again. I think I'm about 145 now. I was a bit bothered, as I know that with a low platelet count, coagulation can be a bit of a problem (P017).

At the same time, those with a chronic condition often expressed concern that they would have to take warfarin for the foreseeable future, in some cases for the rest of their life.

I've always had a psychological barrier about being dependent on a drug. I've never wanted that. Needs must [require that I take the drug] (P029).

Well with my condition I was absolutely amazed but at the time I don't think I could think about that, and I still can't because it was a big shock—I had never taken a tablet before and I am not a tablet taker. I would sooner, I don't know, go to the herbalist or something. All of a sudden to be given all these tablets and say, 'Oh you take them every day' (P005).

The perceived role and value of the drug is then linked to a broader range of judgements that patients make, and which are part of a complex lay pharmacology that, while varying in its specific detail across individual patients, has a number of common features that we found across our sample population. We have organised these narratives according to what we can explore as lay accounts of 'safety', 'efficacy' and 'side effects' that parallel but are distinct from the equivalent clinical versions.⁴

(a) Safety

For most of our respondents, safety was framed in terms of knowing someone else who had been put on warfarin, and the confidence this inspired. Many of the patients we spoke to had had a long history of cardiovascular disorders such as heart attacks, thrombosis,

strokes and so on. Some had relatives or friends with a history of similar difficulties and who had also been prescribed warfarin, and this provided them with a personal reference point, a sense of reassurance that the drug was tried and tested and ‘well-proven’ among people they knew well, even if it caused problems in the early stages of treatment:

I have got a friend and she has been on them 15 years, and she said when she first went on them, she had like the effects that I am having, so tired and you know. So it is good to hear someone else [saying] ‘after you have been on them for quite a few months it will start easing, and you will start feeling not so tired . . .’ (P012).

Family history can also be an important reference point: one of our respondents was receiving treatment for a DVT, which, she said, derived from a genetic predisposition in her family towards a clotting in the blood. In fact, familiarity with the drug, at least in name, meant that many were reluctant to consider alternatives that were offered through a clinical trial, compared with warfarin, which was seen as a ‘well-established’ drug. At the same time, the drug was often associated with its use as a rat poison, pointing up not only its evident toxicity as a chemical (rather than therapy as a drug) but also its unpleasant association with vermin, and whether as such it should be used on humans:

The one thing I know from going to the warfarin clinics when you get talking is that they get the shock of warfarin. It’s not like getting a few tablets—people get a bit scared about it. The old rat problem (P006).

This seemed best dealt with through black humour: ‘I always call them rat tablets’ (P002).

We’re the rats and you’re the rat catchers! (P012).

Patients’ understanding of the safety of warfarin was also related to its impact on their daily lives and for those who bruised or bled more easily, acting in ways to minimise this, establishing certain limits or thresholds beyond which they would try not to go. This might involve limits in DIY, playing sport, or simply kicking a football with grandchildren. Safety then was less to do with warfarin’s toxicological side-effects, discussed below, and more to do with managing its social side-effects in such a way as to try to retain a ‘normal’ life. Taking warfarin itself became for many a normalised part of their daily routine, and indeed, it was evident that the majority of our respondents (80%) saw this routinisation as an important outcome of the initial visits to the clinic. The advice they received when first coming to the anticoagulation clinic was key:

[The doctor] must have sat there for 40 minutes and she was explaining I think ‘don’t be worried, this is what’s going to happen, you’ll need some injections and you’ll need warfarin tablets’ and she kind of went through that very first bit of the treatment, just the first bit, and she went through it slowly and carefully and kind of set everything up for me (P021).

‘Setting everything up’ refers to the routine that patients experienced, typically twice a week for an initial period to have their blood tested, a procedure that normally takes an hour to complete. The test is used to determine a patient’s score against a standardised

'International Normalised Ratio' (INR) that measures the time it takes for blood to clot. The clinical meaning of the INR test itself was, however, something of a black box to most of the respondents. As one observed:

I come for my blood test because the INR level . . . I know sort of what it is, it doesn't mean much to me, it's kind of all over the place at the moment (P021).

When things are 'all over the place', safety was also seen in terms of securing reassurance through regular clinical and even informal self-monitoring:

You see, I get my pulse taken every Saturday by a friend and that makes me feel good. It's just checking on yourself all the time. I don't mind how many times I have to come [to the clinic]—I just want to have peace of mind (P019).

All our respondents were hoping to get to a point where they had a stabilised INR for this would mean that they were in control of their blood and so in control of their daily lives. This was especially so among those respondents we talked to through follow-up interviews:

I've kind of organised it, I know that after tea of a night I'll take my tablets, I'll use my diary just to . . . I kind of do a week ahead, have a diary in the kitchen that my sons write things in if they're going somewhere, just a household what's happening, as I flick over it on a Sunday I write my doses for each day and I know after tea I have my tablets, no problem . . . I'm in my comfort zone now (P014).

Overall, therefore, the lay sense of the safety of warfarin was secured through different ways in which the risks of the drug could be shared with others—family, friends, clinicians (groups that evoke the term 'collectivities' in the work of Cohen *et al.* above)—in such a way that they could be managed at a more interpersonal level. Safety is then dependent on mobilising social relations and a mix of lay and professional knowledge and practice. Coping and complying with a drugs regime set down by a clinician is much more likely where the regime is affirmed and confirmed by others around you. At the same time, while some sort of acceptance of the drug's overall safety could be and was effectively secured in this way, what specific side effects meant in practice required more individual coping strategies.

(b) *Efficacy*

Beyond the matter of securing a sense of the safety of the drug, patients also had their own accounts of efficacy, how and when the drug might be experienced as working. Clinical definitions of efficacy focus on the biomedical outcome of a compound—such as the reduction of blood pressure—which may have no directly evident meaning for the patient who does not as such experience the effect in itself. In addition, we were interested in how this lay sense of efficacy tied in with their understanding of and possible concerns about dosage levels. We explore these in more detail here.

Understanding the process through which patients make sense of the efficacy of the drug is essential as it will have ramifications for the treatment regime. Some patients attributed high efficacy levels to the drug, and so felt much safer through taking it:

I'm not boasting or bragging, but I think it does some good for you, those tablets, they must do. It stops the clot and it stops the thingy, and you get that little bit of extra out of life I think. You know you can take your tablets and you're safe . . . I swear by the warfarin (P002F).

In light of this confidence in the drug, coupled with the seriousness of their conditions, some were unwilling to consider the termination of their treatment: 'I'd still take it, I wouldn't care what you said' (P002F), and in the advent of terminating and then recommencing the treatment regime 'once I got back onto it I said they weren't getting me off it!' (P002F). Those patients who are put on warfarin for life, hope for a regime that offers a balance between dosage level and frequency of monitoring:

I'd had a thrombosis in this leg, oh several years earlier, and I'd been on warfarin for six months. Now, when I had this thrombosis, one doctor told me that I'd be on warfarin for life, which didn't worry me at all because they get the dose down to a level so that you don't have to go more than once every month (P019F).

Connected to the patients' understanding of the appropriate length for an efficient treatment regime is their understanding of what constitutes an effective dose of warfarin. In the absence of constructing their own accounts of their warfarin dose many patients deferred to the staff in the anticoagulation clinic:

I don't really know what dose I should be on, whether I should be on a low one or a high one, I don't know what's going on inside, so I can't say to you six is high, one is very low, because if it was six, I need six don't I. If they prescribe one I only need one milligram (P025).

However, for other patients who had experienced serious thrombotic events, no amount of warfarin was too much to address their potentially life-threatening condition.

I was quite pleased because I thought, well the more they give me they are really going to thin me blood out. Common sense tells you that it has to be doing you some good. I don't know whether it works for everyone, but it has worked for me really (P014F).

Sometimes, however, expectations about how much warfarin was needed could be considerably higher than that envisaged by the clinician:

The fact that I have had a near death experience [. . .] I wouldn't . . . if they were to turn around to me and say 'you are on this low dose', I honestly don't think for everything I have just gone through, right, that . . . it would all be worth while in the respect that I've had this massive illness, I have nearly died, and you have just given me that! What happens if it comes again? I don't trust you! I don't believe you! I want something that I believe is going to be stronger and is going to carry me through. Now that is just what would be floating around my head (P024).

In contrast, the perceived power of the drug meant that some patients sought a reduced dosage if possible:

I don't think I'd like to be on any higher. I'm comfortable with four to five. It would be nice to come down to two, but who knows? (P008F).

Precisely because of the therapeutic power invested in warfarin, it is perhaps not surprising to find that some patients believed that a *gradual* reduction of dosage levels would 'make sense' rather than a sudden termination of the treatment, which can occur. These lay definitions of efficacy prompted some to express concern about the clinic's decision to reduce dosage levels dramatically towards the end of the care, inasmuch as this might trigger a possible new blood clot: 'I thought they would wean you, but apparently they don't' (P015F).

In general, warfarin's reputation as a powerful drug was commented on by all patients, many discussing and comparing notes on the different doses they were on. The perceived power of the drug was seen as both its strength as a therapeutic but also a matter of concern if prolonged use was required. The variability of the drug regime in the first few weeks of visits to the ACC was typically regarded as getting the body/drug in balance, while there was a commonly shared view that a dosage level of 3–4 mg was the norm. Those on very high dosages would hope to move down towards this level as quickly as possible. Stabilising dosage is related to the third issue we now turn to, patients' understanding and management of side effects.

(c) Side Effects

Patients are advised at the ACC about the possible side-effects of the treatment, and the signs that they should look for, such as bruising which indicates internal bleeding, and the dangers of blood loss through wounds or cuts. From a clinical perspective, this indicates an INR still in need of stabilisation; from the patient's perspective, bleeding and other side effects are measured in terms of their perceived dangers and risks with respect to matters of everyday life, as well as whether they have other health problems that could compound the ADRs. Those on longer-term doses also develop various strategies for self-diagnosis where the patient acts as an active diagnostic agent in the management of their condition.

The reputation or prior experience through friends and family of warfarin meant that most of our respondents recognised its potential side effects, ones, which precisely because they were very visible, might be thereby more easily managed. As one said:

If they say they're going to put you on another drug, I'd say no. I don't want to take it. You know the side effects of warfarin—you either get bleeding, so if you get cut you've got to watch it ... With warfarin you know well what it's going to do (P002F).

In terms of coping with ADRs within their everyday lives, patients describe risks through reference to social, health-related matters, both encapsulated in the initial comment below from one of our respondents (P002), and work-related problems described by the comment that follows:

A lot of friends are on it, and drinking—I don't think you should drink if you're having it really. People say a pint or two pints, but they don't know the damage they're doing, or what any tablet does. . . . With having my diabetes, as I'm a diabetic as well, if I get cut you've got to go right to the hospital or this centre and get seen to (P002F).

It's for my good isn't it, you know so . . . I don't mind. It's just that it is making me so . . . tired. I'm tired, I can't do nothing! I mean, I used to be up six o'clock in the morning doing windows, cleaning. I can't even brush the floor because me arms go like lead. That's no excuse. And me legs, I can't even walk to the shop, and I feel like ohhhh, lead you know (P024).

Certain side effects are seen as more difficult to manage than others, especially external bleeding, which though clinically the same whether internal or external, is seen as more critical:

I panic in case I cut myself. I don't mind the bruising really but if anything starts bleeding . . . (P010F).

I just bent down to put me socks on and the next minute there was blood dripping on the floor. It did scare me (P010).

In reading the significance of ADRs patients have to become diagnostic agents at home and thereby determine whether or not to contact the ACC:

I had to come to the warfarin nurse the week after so I showed it to her. She asked me what I'd done and she said it's only the unexplained bruises that I needed to tell her about. She said if I knew I'd done it and I'd treated it it's all right (P010F).

In one, unusual, case, a respondent took this diagnostic role further by recording in her own diary her experiences with medications:

I have written about my time with drugs, with all these different medications I have had, for my own therapy. Because I felt writing it down was helping me. I was getting it out of my system. So I have wrote a lot about it. I have written everything. It is in the house you know, and all the drugs I have ever been on, I have put down because I have never forgot them (P014).

Taking on responsibility for coping with ADRs was also linked to patients' understanding of other medicines and the disorders for which these were prescribed:

I mean it is the same with tablets. I never used to read the leaflets until I was put on this. I got tablets in the house that I can't take with warfarin. Because I have to ask them about all that when I go down (P010).

I am sure it says [referring back to the form that mentions her warfarin treatment end date] . . . 'stop date the twenty-fourth of June'. Yeah, but in the event of me starting

the chemo, I might have to come off it anyway. I might wouldn't I, because they might interact mightn't they? (P015F).

Overall, our respondents made sense of the side effects of warfarin using a range of personally relevant criteria to evaluate the degree of risk suggested by the symptoms. The same symptoms did not, therefore, trigger exactly the same responses (and so contact with the ACC) across our sample. As with judgements about safety and efficacy, in coping with side effects, patients drew on information not only from the clinic but other patients, kin and friends, and over the time (six months) we saw them develop localised understandings that wove these three measures of the utility of warfarin into a workable lay pharmacology.

There were a number of themes that emerged in the six monthly follow up interviews that appeared to work to stabilise the meaning of warfarin. These were a sense of familiarity with the side effects, meeting and discussing warfarin with other people who they discover are also taking the drug, and the sense of being monitored by the clinic through both occasional visits for tests and ongoing notification in the post about whether any adjustment was needed in the daily dose. Monitoring was often seen as a source of security, a sense of still being under clinical review even at a distance. Even so, coping with the potential side effects in the early period of treatment meant that patients *self-monitored* their behaviour, seeking to avoid situations where they might expose themselves to risk: as one, who said he bled easily, observed,

Sometimes, in the first couple of weeks, I wouldn't even go out on my own because I was frightened of falling (P010).

There were some patients who at the end of the six month period were taken off warfarin as the primary condition—such as the blood clot—had been treated. However, such patients were anxious to retain some form of monitoring given their experience but this was typically not available. Instead, again self-monitoring is deployed:

I just keep checking my legs and check my legs are OK in case anything else happens (P016).

Even if physical symptoms do not reappear, anxieties that they might seem ever-present:

I'm guessing it happens to most people who've been anywhere near warfarin because you're on warfarin, you're on warfarin for a reason, when you come off then [the worry] sort of all comes back (P026).

For those still prescribed warfarin, a biologically stable dose was in one sense culturally reinforced in a stabilised daily routine. Here self-monitoring was allied with a daily rhythm which created a sense of control:

The stability of it, I've accepted the fact that I'm going to be on warfarin for the rest of my life, so the acceptance is part of it. I've organised myself and my little routine so I know what I'm doing, and it just gives you that sense of control (P021).

Conclusion

This paper has focused on the ways in which patients construct the meaning of their medication, how they link it to their own state of health, and how they cope with it within the context of their daily life. In doing so we have sought to show how patients create a knowledge-base for their treatment regime through what we have called a lay pharmacology. Building on Cohen *et al.*'s (2001) notion of the dynamic and collective meaning of medicines, we have deployed the standardised clinical criteria used to judge the value of medicines (safety and efficacy and side effects) in order to make visible lay constructs of such values. From a more normative position, this might provide a basis on which to build a better understanding among clinicians of patient views that could inform clinical dialogue with patients more directly, and could help inform the clinical trials process itself. By definition, this lay pharmacology is localised and highly indexical so we are not suggesting that it might in some sense be distilled and captured and used instrumentally to 'improve' the trials algorithm. But sensitivity to the issues we raise above would make for a much more nuanced and effective understanding of the repertoires patients draw on when complying with or mediating a treatment regime.

We believe that many of the aspects of lay pharmacology—such as locating the drugs' role within a biographical health narrative and playing an active role as a diagnostic agent—would be likely to be found in other studies. Patients' perceptions of the warfarin treatment both converge with and at times can diverge from the conventional clinical perspective. We saw the latter most clearly in respect to both expectations relating to a high dosage being safer and concern about sudden reductions in dosage towards the end of a course of treatment. Perspectives on safety and efficacy of the drug can then diverge from the clinic's policy which might create tensions between the ACC and patient about the appropriate course of treatment (and so the meaning and practice of compliance/concordance). This has implications not only with respect to the health and well being of the patient, but also for those policies that seek, on the one hand, to contain the growing drugs bill in part through more effective and efficient use of (both generic and brand-name) drugs, while on the other to devolve greater responsibility to individuals for their care. The evaluation of such policies is typically based on health outcomes; understanding health relationships may, in light of the above, be of equal importance.

Mention was made above about the project on which this paper is based, an examination of the potential value of PGx tests to improve the accuracy of dosage levels for patients who are prescribed warfarin. The objective of such tests is to try to remove side effects and achieve 'normalised' warfarin levels earlier than otherwise would be the case, by 'personalising' dosage levels from the start of treatment.

There are some key lessons for the future deployment of PGx tests in the clinic (see Webster *et al.*, 2004; Pirmohamed & Lewis, 2004; Martin *et al.*, 2006) which the discussion of lay pharmacology suggests and which open up possible sites for future STS analysis. The first of these is associated with the potential of a PGx test to render a more precise and safer dosage regime with respect to patients' everyday compliance with it. On the one hand, we could expect concerns over side-effects to recede as dose stabilisation would be achieved more rapidly and precisely: as one patient said, 'Because I would be on lower dose quicker ... I would at least know which path I am going down wouldn't I?' (P015). On the other hand, given that this will mean a range of dosage which might well include what currently would be regarded as 'high', reassurance will need to be

given that prior lay experience and understanding (via family and friends) should not be used as a benchmark on which to determine the severity of one's regime. Secondly, if the apparent stability of a PGx regime is secured, the margin of risk and significance attributed to side-effects will increase and the personal coping strategies will either be redefined or made more difficult. Finally, co-morbidities are likely to always exist and patients will experience side effects from *other* drugs that they are taking, and may well mistakenly attribute these to warfarin, or alternatively residual warfarin effects to other drugs.

These various issues provide a potentially fruitful terrain on which an STS analysis of medication could be built. This would focus, for example, on the potential for the disruption of standardised clinical criteria, on the work that patients undertake to make sense of and respond to their reading of their bodies as Oudshoorn (2008) has shown in her own research on patients suffering from cardiovascular disorders. She shows there that the medical regime only works because of the hidden labour that all parties must expend; while her empirical focus was on the technology of telemedicine, a relatively recent and 'high tech' innovation, the same issues arise with respect to warfarin as a very mundane form of (chemical) technology. A second area of inquiry could focus on the mobilisation of more collective lay pharmacologies within very specific disease areas possibly driven by the shared interests of members of a patient charity.

We have argued in this paper that the concept of a lay pharmacology and in particular its framing in terms of narratives about safety, efficacy and side-effects helps to address the call by Cohen *et al.* to determine how drugs might be 'socially embedded' beyond those considered in their work on psychoactive drugs. We have suggested that this framing not only helps us to understand the cultural repertoires that patients use to establish thresholds of concern/coping in respect to the medicines they take, but also from a more methodological perspective could allow for a constructive dialogue with those in public policy who are tasked with ensuring the delivery and cost-effective use of safe medicines. This is because such criteria form the foundation of the licensing and use of all medicines, and in an era of so-called 'translational medicine' how expert and lay repertoires are actually translated into each other (rather than, as is often presented, handed down from one to the other) is a public policy issue that should be given much greater priority by national agencies charged with overseeing patient safety and the management of an increasingly expensive drugs bill.

Acknowledgements

The authors would like to thank the Department of Health for providing the funding on which this paper is based, as well as the research nurses at the hospital who helped to secure the respondents. The project received ethics approval from the NHS COREC.

Notes

¹'Variability in response to warfarin: a prospective analysis of pharmacogenetic and environmental factors', Department of Health Pharmacogenetics Research Programme. Purpose and focus of the Department of Health Pharmacogenetics Research Programme is available at: http://www.dh.gov.uk/en/PublicHealth/Scientificdevelopmentgeneticsandbioethics/Genetics/DH_084147.

²We also undertook a series of interviews with the clinical and nursing staff, but this will be reported on in detail elsewhere.

³The code shown after each quote relates to the patient number in the sample: P001 etc refers to first round of interviews; P00F1 refers to follow-up interviews with the same patient.

⁴The latter relate to (increasingly internationalised) standards derived from clinical trials through which regulatory authorities license new drugs, and depend on standardised groups of patients. As a result the prescribing physician cannot predict with any certainty the likely reaction of any given patient to a particular drug.

References

- Armstrong, D. (2005) The myth of concordance, *Health*, 9, pp. 23–27.
- Britten, N. (2008) *Medicines and Society: Patients, Professionals and the Dominance of Pharmaceuticals* (Basingstoke: Palgrave Macmillan).
- Britten, N., Stevenson, F., Gafaranga, J., Barry, C. and Bradley, C. (2004) The expression of aversion to medicines in general practice consultations, *Social Science and Medicine*, 59(7), pp. 1495–1503.
- Bury, M. (1982) Chronic illness as biographical disruption, *Sociology of Health and Illness*, 4(2), pp. 167–182.
- Cohen, D., McCubbin, M., Collin, J. and Pérodeau, G. (2001) Medications as social phenomena, *Health*, 5(4), pp. 441–469.
- Conrad, P. (1987) The experience of illness: recent and new directions, in: J. Roth and P. Conrad (Eds) *Experience and Management of Chronic Illness: Research in the Sociology of Health Care*, 6, pp. 1–31 (Greenwich, CT: JAI).
- Fitzpatrick, R., Hinton, J., Newman, S., Scambler, G. and Thompson, J. (Eds) (1984) *The Experience of Illness* (New York: Tavistock).
- Green, E., Griffiths, F., Henwood, F. and Wyatt, S. (2006) Desperately seeking certainty: bone densitometry, the Internet and health care contexts, in: A. Webster (Ed.) *New Technologies in Health Care*, pp. 71–83 (Basingstoke: Palgrave Macmillan).
- Ives, T. J., Bentz, E. J. and Gwyther, R. E. (1980) Drug-related admissions and patient non-compliance, *Hypertension*, 2, pp. 757–764.
- Kamali, F. and Pirmohamed, M. (2006) The future prospects of pharmacogenetics in oral anticoagulation therapy, *British Journal of Clinical Pharmacology*, 61(6), pp. 746–751.
- Martin, P., Lewis, G., Smart, A. and Webster, A. (2006) *False Positive? The Commercial and Clinical Development of Pharmacogenetics*, Report to the Wellcome Trust, London. Available at: www.york.ac.uk/res/pgx/publications/
- Nettleton, S., O'Malley, L., Watt, I. and Duffey, P. (2004) Enigmatic illness: narratives of patients who live with medically unexplained symptoms, *Social Theory & Health*, 2, February, pp. 47–66.
- Oudshoorn, N. (2008) Diagnosis at a distance: the invisible work of patients and healthcare professionals in cardiac telemonitoring technology, *Sociology of Health and Illness*, 30, pp. 272–288.
- Pirmohamed, M. and Lewis, G. (2004) Implications of pharmacogenetics and pharmacogenomics for drug development and health care, in: E. Mossialos, M. Mrazek and T. Walley (Eds) *Regulating Pharmaceuticals in Europe: Striving for Efficiency, Equity and Quality*, pp. 279–298 (Maidenhead: Open University Press).
- Pound, P., Britten, N., Morgan, M., Yardley, L., Pope, C., Daker-White, G. and Campbell, R. (2005) Resisting medicines: a synthesis of qualitative studies of medicine taking, *Social Science and Medicine*, 61(1), pp. 133–155.
- Saks, M. (2000) Professionalization, politics and CAM, in: M. Kelner, B. Wellman, B. Pescosolido and M. Saks (Eds) *Complementary and Alternative Medicine Challenge and Change*, pp. 223–238 (Australia: Harwood Academic Publishers).
- Sharma, U. (1993) Contextualizing alternative medicine the exotic, the marginal and the perfectly mundane, *Anthropology Today*, 9(4), pp. 15–18.
- Sharma, U. (2000) Medical pluralism and the future of CAM, in: M. Kelner, B. Wellman, B. Pescosolido and M. Saks (Eds) *Complementary and Alternative Medicine Challenge and Change*, pp. 211–222 (Australia: Harwood Academic Publishers).
- Wadelius, M. and Pirmohamed, M. (2007) Pharmacogenetics of warfarin: current status and future challenges, *Pharmacogenomics Journal*, 7(2), pp. 99–111.
- Webster, A., Martin, P., Lewis, G. and Smart, A. (2004) Integrating pharmacogenetics into society: in search of a model, *Nature Reviews Genetics*, 5, pp. 7–13.