

**The Royal Australian and New Zealand
College of Radiologists
Quality Use of Diagnostic Imaging Program**

**Project ES2 - Phase 1
PROMOTING PUBLIC AWARENESS OF THE
APPROPRIATE USE OF DIAGNOSTIC IMAGING**

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EXECUTIVE SUMMARY

Extent of the issue

- The proportion or prevalence of inappropriate diagnostic imaging that is attributable to consumer demand is unknown in Australia and elsewhere

Acute low back pain as a model for inappropriate use of diagnostic imaging

- There is very well established evidence that lumbar x-rays are inappropriate for acute lower back pain in the absence of "red flags"
- From BEACH imaging data 2003-2004, it is known that: back complaints are the most common single presenting complaint in primary care for which diagnostic imaging is ordered (13.6% of all back complaint encounters resulted in an imaging order). Overall, chest x-rays are the most commonly ordered diagnostic imaging for a wide variety of conditions and complaints.
- While well defined data on inappropriate diagnostic imaging for back pain in Australia remains elusive, international data (from literature and other sources) indicates that 30-60% of x-rays ordered for back pain are inappropriate. With back pain having a lifetime prevalence of 70-80%, unnecessary diagnostic imaging for this condition may affect around 30% of the population at some time in their lives.
- Clearly, back pain is a useful model condition for the ES2 project

Reasons for inappropriate diagnostic imaging for back pain

Patients:

- Some patients believe in the value of x-rays
- Some patients expect an x-ray for acute low back pain

Health professionals:

- Doubt about capabilities (diagnosis; advice to patients)
- Beliefs about consequences (litigation, patient dissatisfaction)
- Time pressures (advice; explanations)
- Response to real or perceived patient expectations

Interaction between patient and health professional

- Health professionals tend to over-estimate patients' expectations for x-rays
- Patient satisfaction appears to be linked to being given good information about their condition

Interventions

Guideline implementation – generic evidence:

- A 2004 systematic review of 235 studies on the effectiveness of guideline implementation interventions, found a median 10% improvement in care across studies. This finding indicates that while it is possible to improve quality of care, expectations for dramatic improvements through guideline implementation are unrealistic.

Guideline implementation – low back pain specific:

- Select examples of controlled studies to implement low back pain guidelines in primary care were reviewed. Two of these looked at use of diagnostic imaging as an

outcome variable. While all three studies used multi-faceted interventions including patient information/education, all failed to show a significant change in clinical practices. These select studies illustrate the difficulty of overcoming the barriers to appropriate use of diagnostic imaging for back pain through guideline implementation in primary care.

- One study of guideline implementation in an emergency department significantly reduced x-ray use for back pain by requiring junior doctors to justify x-ray referrals using radiographers as “gatekeepers”.
- There is meagre evidence on the effect of educating acute low back pain patients in isolation but in recognition of the need, many guidelines contain information designed to be given to patients including the message that x-rays are usually unwarranted.

Mass media campaigns - generic

- Systematic reviews support mass media campaigns as a useful method for modifying the knowledge and attitudes of a large proportion of the community simultaneously, and for encouraging the use of effective services and discourage those of unproven effectiveness
- Mass media campaigns influence the general population including health care professionals
- The National Prescribing Service in Australia chose mass media, in conjunction with prescriber-directed interventions, to target the overuse of antibiotics for the common cold. Published papers support the success of such multi-pronged approaches.

Mass media campaigns - low back pain

- The Victorian WorkCover Authority's mass media campaign "Back Pain: Don't Take It Lying Down" succeeded in improving beliefs about back pain in the general population and in stated management practices among general practitioners.
- Whether a change in beliefs and stated management practices translated into real behavioural change (for example: patients remained active; fewer x-rays were ordered) remains unknown.

CONCLUSION

The inappropriate use of diagnostic imaging in a representative condition, acute low back pain, is driven by both health care professionals and their patients. The availability of evidence-based guidelines and interventions to implement guidelines in clinical practice have typically failed to overcome the problem. A mass media campaign successfully changed beliefs about back pain in the community and changed the stated management practices of general practitioners. However whether these changes in beliefs and stated practices translated to changes in behaviour and subsequent outcomes, such as a reduction in unwarranted x-rays, remains unknown.

RECOMMENDATIONS

1. Any intervention to reduce consumer demand for diagnostic imaging should target both consumers and health care professionals.
2. A mass media campaign with supporting interventions directed at health care professionals is likely to be the most successful strategy for reducing the overuse of x-rays for acute low back pain.

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INTRODUCTION

The inappropriate use of diagnostic imaging in the health care system costs the Australian community time, money, and health risks from unnecessary exposure to radiation. The purpose of this project, in this first phase, was to explore and recommend methods for promoting public awareness of the appropriate use of diagnostic imaging or, looking at it another way, to reduce consumer demand for unwarranted diagnostic imaging.

It was clear early in the project that the prevalence or proportion of diagnostic imaging requests that are primarily consumer driven is unknown. Even within a specific, well-studied condition such as acute low back pain, the contribution of consumer demand to the proportion of inappropriate diagnostic imaging is unknown despite consumer demand being an often cited reason for overuse of x-rays for this condition. The challenge then, was to investigate what *is* known about drivers for inappropriate diagnostic imaging, whether consumer demand influences referrals for diagnostic imaging, and if so, what interventions have been used to reduce consumer demand for inappropriate diagnostic imaging.

AIMS

1. To explore the reasons for inappropriate use of diagnostic imaging, using acute low back pain as a representative condition, with particular emphasis on the role of consumer demand
2. To review the interventions that have been used to reduce inappropriate diagnostic imaging, using acute low back pain as a representative condition
3. To recommend potential strategies to reduce consumer demand for inappropriate diagnostic imaging, using acute low back pain as a representative condition.

METHOD

Literature review

Following initial investigative searches, strategies were devised for the Medline, PubMed, CINAHL and PsychINFO databases from combinations and variations of the following terms: Back pain, Low back pain, Lumbar, Diagnostic imaging, Diagnostic test, Imaging, Radiography, X-ray, Consumer, Patient, Attitude, Belief, Demand, Expectation, Satisfaction, Mass media, Advertising, Billboard, Booklet, Patient Education, Health Education, Health Promotion, Leaflet, Marketing of Health Services, Pamphlets, Poster, Radio, Television.

Additional references were identified through recommendations by key informants, internet searches and 'snowballing' (Greenhalgh & Peacock, 2005.)

Abstracts were reviewed for relevance and culled where necessary. Full papers were then retrieved and reviewed and relevant papers included in the literature review.

The literature review was not exhaustive. The focus was on reviews where available and on salient and illustrative papers.

Interviews with key informants

Face-to-face meetings or telephone interviews were conducted with key informants. The informal methods used for these exchanges have been described elsewhere (NICS, 2006.)

RESULTS

Acute low back pain as a representative condition for inappropriate use of diagnostic imaging

Back pain is extremely common, with approximately 70% of men and 80% of women experiencing it at some time in their lives (Biering-Sorensen, Maniadakis & Gray, as cited in Kendrick, Fielding, Bentley, Miller et al., 2001). It has been estimated that in Australia, four out of five adults will have an occurrence of low back pain at some point in their lives, and each year approximately one in 12 will experience low back pain for the first time (Kent & Keating, 2005). In the 2001 National Health Survey, around 20.8% of the population (3.9 million Australians) reported that they suffered from back pain (AIHW, 2005). It is estimated that during 1993-94, back problems accounted for the largest proportion of Australian health system expenditure on musculoskeletal disorders (approximately \$A700 million) (Mathers & Penm, 1999).

In 2004-05, back complaint was the third most common condition for which people in Australia visited their General Practitioner (GP) (after cough and sore throat), and the most common condition for which imaging was ordered by Australian GPs (Britt et al., 2005).

There are differing opinions among researchers as to whether acute low back pain is a self-limiting illness, or a persistent, recurrent condition (Buchbinder, Jolley, & Wyatt, 2003; Kent & Keating, 2005). Despite the extent of the problem of low back pain, little is known about its causes (Leboeuf-Yde, Lauritsen, & Lauritzen, 1997).

Well established guidelines have been developed in various countries on the best way to treat low back pain. They generally recommend that patients stay active and minimise the use of medications, and that an x-ray is not needed unless there are 'red flags'—such as significant trauma, weight loss, thoracic pain, neurologic changes (Koes, van Tulder, Ostelo, Kim Burton, & Waddell, 2001)—that may indicate the possibility of tumours, infections or other serious conditions (Davis, Ciurea, Flanagan, & Perrier, 2004). Koes et al. (2001) conducted a study of primary care clinical guidelines for the management of low back pain published between 1994 and 2000. They compared guidelines from 11 different countries and found that they all advised that plain x-rays are not useful for patients with acute non-specific low back pain and should only be used for patients with 'red flags'. None of the guidelines examined in the Koes study recommended the use of radiography, and guidelines from the UK and the US advised against it.

Although low back pain guidelines seem to be generally well known, unfortunately they do not seem to be as widely followed in practice (Davis, Ciurea, Flanagan, & Perrier, 2004). It has been estimated that up to 50-60% of referrals for plain x-rays of the lumbar spine may be unnecessary based on clinical guidelines (Koes et al., Waddell et al., RCR Working Party, and Anon, as cited in Espeland & Baerheim, 2003; Espeland, Baerheim, Albrektsen, Korsbrekke, & Larsen, 2001).

With such a high proportion of unnecessary imaging occurring, it must be remembered that x-rays and CT scans are not innocuous tests. Imaging techniques that use ionising radiation “may have the potential to be carcinogenic” (Cross et al, as cited in Orchard, Read, & Anderson, 2005). A lumbar spine x-ray series exposes a person to a dose of radiation equivalent to 65 chest x-rays, or 158 days of normal background radiation exposure (Orchard, Read, & Anderson, 2005). For patients seeing their doctor about acute low back pain for the first time, the risks and costs associated with spine radiography do not seem to be worth the relatively small benefit (Kendrick, Fielding, Bentley, Miller et al., 2001).

Reasons for inappropriate diagnostic imaging for back pain

There is currently no generally accepted theory that explains the causes and symptoms of non-specific low back pain (Cherkin et al. and Chedraschi et al., as cited in Buchbinder, Jolley, & Wyatt, 2003). When patients go to their doctor about their low back pain, they typically expect a diagnosis and are often not happy simply being told that they have “non-specific low back pain” (Borkan et al., as cited in Buchbinder, Jolley, & Wyatt, 2003). The availability of more advanced imaging techniques has not shed any more light on the causes and symptoms of this problem (Buchbinder, Jolley, & Wyatt, 2003; Jarvik et al., 2003).

Patients' beliefs and expectations

Despite relatively widespread recognition among the medical community that plain x-rays usually fail to yield findings which either explain or alter clinical management of low back pain, many patients believe that they are valuable and even necessary (Deyo & Diehl, 1986; Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001). However expectations do vary among patients. Schers et al (2001) found that some patients with back pain did not think about an x-ray, some would ask if symptoms persisted, some would have liked an x-ray but had not insisted (and were satisfied with their GP's advice), and some who had thought about it would expect their GP to comply if they insisted, or if symptoms persisted.

Better communication about expectations is needed (Britten, 2004; Espeland & Baerheim, 2003; Little et al., 2004). According to Kravitz et al. (1996) understanding and attempting to meet expectations can lead to greater patient satisfaction (Kravitz et al., 1996).

Patient satisfaction

Patient satisfaction is a notoriously complex issue. So not unexpectedly perhaps, there have been conflicting results about whether referral for x-rays increases patient satisfaction (Deyo & Diehl, 1986; Kaplan et al. and Rocket et al., as cited in Kendrick, Fielding, Bentley, Kerslake et al., 2001). Giving a patient a diagnostic label has been found to increase satisfaction (Kaplan et al., as cited in Kendrick, Fielding, Bentley, Kerslake et al., 2001). This could mean that it is not the referral to radiography that makes the patient feel more satisfied,

but the thought that they will be provided with more information about their condition as a result of the x-ray.

Patient satisfaction does appear to be linked to the provision of good information, an adequate explanation of the problem and advice on how to manage it (Deyo & Diehl, 1986; Carey et al., Skelton et al., and von Korff et al., as cited in Buchbinder, Jolley, & Wyatt, 2003; McIntosh & Shaw, 2003). This is reflected in Deyo and Diehl's study (1986), which found that patients felt that they needed more and better quality information about their back pain. People who were not satisfied with the information provided to them were more likely to believe that they should have had more tests done.

Health professionals reasons for referral for diagnostic imaging

Health professionals refer patients for diagnostic imaging for back pain outside guideline indications for many reasons, including:

- In response to patient expectations and requests (Buchbinder, Jolley, & Wyatt, 2003; Espeland & Baerheim, 2003; Ihlebaek & Eriksen, 2004; Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- For legal reasons such as insurance compensation, or to prevent malpractice litigation (Espeland & Baerheim, 2003)
- In order to reassure themselves (Kendrick, Fielding, Bentley, Kerlake et al., 2001.)
- In order to reassure patients who may be concerned about the seriousness of their condition (Buchbinder, Jolley, & Wyatt, 2003; Kendrick, Fielding, Bentley, Kerlake et al., 2001; Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001). 'Sometimes an x-ray can take away the fear, and thus prevent chronicity' (Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- To prevent referral to a specialist (Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- To show patients that there is nothing wrong with them (for example, if they are unwilling to work) (Espeland & Baerheim, 2003)
- When unable to explain to a patient that an x-ray is not needed (Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- To avoid conflict or to end a difficult consultation (Espeland & Baerheim, 2003; Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- To build or maintain a relationship with the patient (Britten, 2004; Buchbinder, Jolley, & Wyatt, 2003; Schers, Wensing, Huijsmans, van Tulder, & Grol, 2001)
- For patient satisfaction (Buchbinder, Jolley, & Wyatt, 2003)

In focus groups with Australian GPs in 2005, O'Connor and colleagues from Monash University identified many of the barriers to appropriate advice to low back pain patients about staying active and barriers to not requesting lumbar x-rays. Their findings were in concordance with previous work (above) and were grouped into five themes – knowledge; skills and beliefs about capabilities; beliefs about consequences (patient dissatisfaction; litigation); environmental context and resources (time pressures); and social influences (real or perceived patient factors) (O'Connor et al., 2005).

Interactions between patients' and health professionals' expectations

As reported to this point, patients may believe that diagnostic imaging is useful for low back pain and expect to be referred for x-rays. Health professionals also have many reasons for

responding to patients if they ask for a radiography referral. But what of the interaction between the two during a consultation?

Cockburn and Pit (1997) found the strongest determinant of prescribing decisions to be doctors' opinions of patient expectations. Similarly, according to Little et al (2004) "*perceived* pressure from patients is a strong independent predictor of whether doctors examine, prescribe, refer, or investigate". To illustrate this point, Cockburn and Pit (1997) found in their study of prescribing behaviour in clinical practice, that patients who expected a prescription were almost three times more likely to receive one, but if a GP *thought* that a patient expected a prescription, that patient would be ten times more likely to get one.

The problem is that health professionals' interpretations of patient expectations and preferences may not be very accurate (Espeland & Baerheim, 2003), and this can result in tests and prescriptions that are neither wanted by the patient nor thought necessary by the health professional (Britten, 2004). Doctors may be making such decisions in the interests of their relationships with their patients without making sure that their assumptions around patients' preferences are correct (Britten, 2004).

In a review of studies of patient participation in decision-making, Guadagnoli and Ward (1998) document variability in patients' views on decision-making which can be broadly summarised into three categories - leaving decisions up to their doctor, a wish to share responsibility for decisions; and (less common) taking an autonomous role in decision making. The authors concluded that patients want more involvement in decision-making when they have sufficient information about the options, what they entail and what the consequences are of each, but that physicians are unlikely to be inherently aware of patients' preferences.

Twenty interventions to increase patient participation during a consultation have been reviewed by Harrington et al. (2004) who could draw no clear conclusion on what types of interventions are effective and practical, or for which groups of patients such interventions work best.

Interventions to change clinical practices

There is an increasing body of evidence about the effectiveness of various methods for changing and improving clinical practices. Much of the evidence is systematically reviewed and published intermittently by the Cochrane Effective Practice and Care group. A protocol for a systematic review entitled "Interventions to improve the use of diagnostic tests" was published in 1996 (Van der Weijden et al., 1996) but the review itself, ambitious in scope, is yet to be conducted.

The majority of interventions to improve the management of simple acute low back pain involve implementation of guidelines.

Guideline implementation - generic evidence on interventions

On the specific topic of implementing guidelines, Grimshaw et al published a comprehensive review on the effectiveness of guideline dissemination and implementation strategies in an Health Technology Assessment (HTA) paper in 2004 (Grimshaw et al., 2004). This review

included 235 studies (reporting 309 comparisons) designed as randomised controlled trials, controlled trials, controlled before-and-after studies, or interrupted time series. The interventions reviewed, along with their reported effectiveness are shown in Table 1.

Overall, there was a median 10% improvement in care across studies, indicating that it is possible to change quality of care but that any expectations for dramatic improvements in clinical care through guideline implementation are likely to be unrealistic.

Patient-directed interventions

Grimshaw et al 2004 identified only seven controlled studies of patient-directed interventions which met the HTA criteria. Four of the studies were of patient reminders for preventive care which were usually effective. One study showed a positive effect of a health promotion unit for preventive care.

One study had mental health patients complete a questionnaire before their medical consultation about the specific things they felt their doctor could do to help them with stress. The questionnaire was given to the doctor. The study found that patients in this intervention group were more satisfied with the care they received, presumably because there was explicit understanding of expectations or needs between the doctors and patients (Brody, Lerman, Wolfson, & Caputo, 1990).

The final study was of intensive patient and/or physician diabetes education. In this study, patient education was effective in improving health outcomes, as was physician education. The improvements were most pronounced with both patient and physician education (Vinicor et al., 1987).

Table 1: Summary of the effectiveness of guideline implementation interventions
(Grimshaw et al., 2004)

Intervention	What does this mean? (EPOC definition – see Box 2 in HTA report)	Number of studies	Effectiveness
Distribution of educational materials	Distribution of published or printed recommendations for clinical care, including: clinical practice guidelines, audiovisual materials and electronic publications. The materials may have been delivered personally or through mass mailings.	18	"modest effect that may be short lived"
Educational meetings	Healthcare providers who have participated in conferences, lectures, workshops or traineeships.	3	"the effects, if any, are likely to be small"
Audit and feedback	Any summary of clinical performance of healthcare over a specified period. The summary may also have included recommendations for clinical action. The information may have been obtained from medical records, computerised databases or observations from patients.	10	"modest effect"
Reminders	Patient- or encounter-specific information, provided verbally, on paper or on a computer screen, which is designed or intended to prompt a health professional to recall information or to remind them to perform or avoid some action to aid individual patient care. Computer-aided decision support and drugs dosage are included.	38	"moderate effect"
Patient-mediated interventions/Patient-directed interventions	New clinical information (not previously available) collected directly from patients and given to the provider, e.g. depression scores from an instrument.	7	"moderate to large improvements", esp. reminding patients for preventive care
Multifaceted interventions	A combination of two or more interventions from the list above and/or financial, organisational, structural, or regulatory interventions	178	No relationship between the number of component interventions and the effects of multifaceted interventions

Guideline implementation - low back pain

Having looked at the generic evidence-base on guideline implementation, do specific studies on the implementation of low back pain guidelines yield similar conclusions? To address this question, a small selection of controlled studies using multi-faceted methods of different component interventions to implement low back pain guidelines were reviewed.

Freeborn et al. (1997) in the USA focussed on the use of diagnostic imaging (lumbar x-ray, CT scans and MRI scans) for low back pain in a primary care HMO setting. The intervention included mailing a locally developed low back pain guideline to physicians followed by one departmental meeting to “introduce and discuss” the guideline. Some months later, physicians were mailed feedback about their diagnostic imaging use in comparison with their (de-identified) colleagues and this was repeated at two more intervals. The control group received no intervention. Results showed no difference in imaging rates between the pre- and post-intervention period, nor any difference between the intervention and control groups of physicians.

Dey et al. (2004) in the UK focussed on GPs adherence to RCGP acute low back pain guidelines and referral for x-ray was an outcome included in this study. The intervention was an educational outreach visit about the guideline (which included a supply of written information for patients) and access to “back clinic” referrals for patients who didn't respond to conservative treatment within 6 weeks. The control group of practices did not receive education visits or direct access to the “back clinic”. Results showed no difference between the groups in referral for x-rays but the intervention group took advantage of the access to other services and referred significantly more patients for physiotherapy or educational programmes by the back pain unit

Engers et al. (2005) in The Netherlands focussed on GPs adherence to Dutch low back pain guidelines with a focus on patient-related barriers. The use of x-rays was not studied. The multi-faceted intervention included an intensive workshop on GP-patient communication skills about low back pain; provision of a half-page information card for patients; distribution of the guideline and other supporting written materials. The control group of GPs received no intervention. Results showed no difference between the intervention and control groups of GPs in the explanations and advice given to patients with low back pain although this area was the main focus of the intervention.

While these three studies took different approaches to implementing low back pain guidelines with varying degrees of the intensity of the interventions, all failed to show a significant change in clinical practices. While these are just select high-quality studies, they do illustrate the difficulty of overcoming the barriers – patient or clinician related – to appropriate use of diagnostic imaging for back pain in primary care.

Taking a different approach in an Emergency Department, Tracey et al. (1994) found that by requiring junior doctors to justify their reasons for ordering lumbar x-rays for back pain patients (that is, by indicating “red flags”), referrals for x-ray dropped from 78% to 27% over the study period. In this case, radiographers were the “gatekeepers” having been instructed not to accept referrals unless the request was appropriately justified.

Patient-directed interventions

Few studies were identified that took a patient-mediated approach to changing clinical practice in the area of inappropriate diagnostic imaging for low back pain.

In an extensively cited study, Deyo et al. (1987) randomised low back patients to two interventions – an x-ray at first presentation or education at first presentation with follow up x-ray at 3 weeks if their condition had not improved. At short term follow up, the education group were much less likely to believe that x-rays were necessary for low back pain. Nevertheless, 31% of the education group did go on to have an x-ray at a later time. It is worthy of note that the patient education in this study was provided by the researchers rather than the treating physician.

In recognition of the importance of patient information in the management of acute low back pain, some low back pain guidelines include information designed to be given to patients that include the message that an x-ray is unwarranted for uncomplicated acute low back pain. Examples include the 2-page NHMRC Acute Low Back Pain information sheet for consumers and the Ontario Guidelines Advisory Committee 1-page “Key Messages for the Patient with Uncomplicated Acute Low Back Pain”. These tools are presented in Appendix 1.

As an aid for doctors to give patients appropriate information in an active format, the Ontario Guidelines Advisory Committee have also produced a “Prescription for Acute Low Back Pain” (<http://gacguidelines.ca/article.pl?sid=04/02/24/1757206>).

Mass media campaigns

In the challenging arena of changing behaviour, Vidanapathirana et al (2005) argue that “mass media can be used to educate and raise awareness about a topic and can enhance appropriate utilization of health care services”.

A mass media intervention can be described as using media such as TV, radio, newspapers, books, the internet, billboards, posters, etc, to convey messages to thousands of people at a time (Egger, as cited in Vidanapathirana, Abramson, Forbes, & Fairley, 2005). When messages are conveyed using more than one medium, this is known as multimedia. Mass media can convey messages to a large part of the population, especially those who are difficult to reach through other channels. Mass media can be a relatively inexpensive way (compared to one-on-one interventions) of getting health messages out and have the potential to change beliefs and attitudes in large sections of the population simultaneously (Redman, as cited in Buchbinder, Jolley, & Wyatt, 2003; and in Sowden & Arblaster, 2000) This can create an environment where there is social support for the change, which makes the change more likely to be sustained (Buchbinder, Jolley, & Wyatt, 2003).

Mass media campaigns can also work to bring about change in more indirect ways. They may have an effect by influencing public opinion which can sometimes lead to legislative changes, or changes in health policy (Austin & Husted, 1998; Elder et al., 2004).

Grilli et al. (2002) describe the role of the mass media in the following way: “the mass media play several important functions in society, including providing information, entertainment, articulating and creating meaning, setting agendas for individual and societal discourse, and influencing behaviour” (Grilli, Freemantle, Minozzi, Domenighetti, & Finer, 2002). The mass

media have become a part of people's daily lives (Vidanapathirana, Abramson, Forbes, & Fairley, 2005) and have become the main source of health information for many people (Passalacqua et al., 1999).

Media advocacy has established itself as a recognised health promotion strategy, partly due to the impact of the World Health Organisation's Ottawa Charter for Health Promotion (Grilli, Freemantle, Minozzi, Domenighetti, & Finer, 2002). It has been used to change behaviour in both patients and healthcare providers, and to encourage efficient and effective use of healthcare services (Grilli, as cited in Buchbinder, Jolley, & Wyatt, 2003). The mass media has been used in the context of public health in an attempt to change behaviour in many areas, such as: physical activity, smoking, sun exposure, preventive asthma therapy, HIV screening and immunisation (Buchbinder, Jolley, & Wyatt, 2001b; Smith, Ferguson, McKenzie, Bauman, & Vita, 2002). Mass media campaigns have been shown to be effective in raising awareness, however, their effects on knowledge and behaviour are less clear (Smith, Ferguson, McKenzie, Bauman, & Vita, 2002). This could be because changes in knowledge and behaviour as a result of these types of interventions can be difficult to measure (Randolph & Viswanath, 2004). In Australia, areas in which media campaigns have been particularly successful in changing behaviour are in smoking and sun exposure (Pierce et al. and Hill et al., as cited in Buchbinder, Jolley, & Wyatt, 2003).

Mass media campaigns may be viewed by some as wasteful, broadcasting their messages to anyone and everyone rather than concentrating their efforts on a small group of high-risk people. However, it has been shown that change strategies aimed at the general population can have a greater effect than strategies targeted at high-risk groups (Buchbinder, Jolley, & Wyatt, 2001a). Campaigns aimed at the entire population are useful when the people who are in the high risk group are difficult to identify (Buchbinder, Jolley, & Wyatt, 2001a), and this is the case with acute low back pain as little is known about its causes (Buchbinder, Jolley, & Wyatt, 2003; Leboeuf-Yde, Lauritsen, & Lauritzen, 1997). A population approach can also be useful because of what Rose (as cited in Buchbinder, Jolley, & Wyatt, 2001a) called the 'prevention paradox'; which proposes that more benefit will be gained from a small change in risk for a whole population than from a large change in a small subgroup of a population. This is because people with a low to medium risk of developing a condition usually end up accounting for the majority of people who will eventually develop it (Rose, as cited in Buchbinder, Jolley, & Wyatt, 2003).

Another advantage of using a mass media approach is that it also has the potential to change the behaviour of health professionals both directly and through changes in patient attitudes as a result of the campaign (Buchbinder, Jolley, & Wyatt, 2003).

Mass media campaigns - generic evidence

There have been several systematic reviews through the Cochrane Collaboration on the effectiveness of mass media interventions. The most relevant review was conducted by Grilli et al. (2002) on the effect of mass media interventions on health services utilisation. This review looked at twenty studies (with variable methodological quality), of which nineteen concluded that mass media was effective, and this was confirmed by re-analysis of seven studies. This review concluded that "Despite the limited information about key aspects of mass media interventions and the poor quality of the available primary research there is evidence that these channels of communication may have an important role in influencing the use of health care interventions...those engaged in promoting better uptake of research information in clinical practice should consider mass media as one of the tools that may

encourage the use of effective services and discourage those of unproven effectiveness". The authors of this review noted that research needs to be done on the best way to construct media messages, and if and how mass media effects healthcare providers and the general public differently.

A comprehensive list of factors to consider in mass media campaigns is presented in Appendix 2.

Mass media campaigns - low back pain

The Victorian WorkCover Authority's 'Back Pain: Don't Take it Lying Down' was a population-based mass media campaign run in Victoria from 1997 to 1999. It was designed to alter population beliefs about back pain, influence medical management, and ultimately reduce disability and workers' compensation costs (Buchbinder, Jolley, & Wyatt, 2001a). The campaign was evaluated by Buchbinder and colleagues before, during, immediately after, and three years later by comparing the intervention state (Victoria) with a control state (New South Wales).

The campaign used a variety of media with television being the major medium in the form of advertisements aired during prime viewing time. Simple messages were based on the United Kingdom's "The Back Book" which is an evidence-based educational booklet for patients. The specific messages used in television commercials relevant to the use of x-rays were:

- "Do what doctors do. Stay active, stay at work", presented by an international back expert/ orthopaedic surgeon;
- "Don't rush off for an x-ray", presented by an international back expert/ orthopaedic surgeon;
- "X-rays don't show pain", presented by a rehabilitation specialist; and
- "Disc bulges and deterioration are normal x-ray findings", presented by an international back expert, and a general physician.

(Buchbinder, Jolley, & Wyatt, 2003)

The television commercials featured medical experts in fields related to back pain (general practice, physiotherapy, orthopaedic surgery, rheumatology, chiropractic therapy, sports and occupational medicine), and sporting and television celebrities. Each advertisement finished with an endorsement by relevant professional medical bodies (Buchbinder, Jolley, & Wyatt, 2003).

The initial evaluation of the campaign included telephone surveys of employed people in Victoria and New South Wales before and two and two and a half years after the campaign began. Postal surveys of GPs were also conducted before and two years after the campaign began. Population beliefs about back pain improved significantly between successive surveys (Buchbinder, Jolley, & Wyatt, 2001b) and these gains were sustained, although to a lesser degree, three years after the campaign had ceased (Buchbinder & Jolley, 2005). The campaign also changed the stated management of acute low back pain by GPs. At baseline Victorian GPs said they would order a lumbar x-ray in 32% of cases of acute low back pain and two years after the campaign began, this had dropped to 20%. There was no difference in the stated practice among the NSW GPs (Buchbinder, Jolley, & Wyatt, 2001a.)

Buchbinder et al (2003) attribute the success of the Victorian WorkCover Authority's back pain campaign to factors such as:

- The use of evidence-based information and a clear, direct approach for which they gave credit to the Back Book.
- The messages used simple language
- The messages were delivered by well known, positive role models as recommended by Redman et al. (as cited in Buchbinder, Jolley, & Wyatt, 2003.)
- The campaign had support and input from “virtually every professional body with a stake in back pain in Australia”.

In recognition of the success of the Victorian campaign, two other mass media campaigns taking a similar approach have been undertaken in Scotland and Alberta, Canada - Working Backs Scotland (www.workingbacksscotland.com) and Back@it (www.wcb.ab.ca/back@it) respectively.

Clearly, the Victorian WorkCover Authority mass media campaign showed that it is possible to change beliefs about back pain in the general population and among GPs (Buchbinder, Jolley, & Wyatt, 2001b). Whether a change in beliefs and stated management practice translated into real behavioural change (for example: patients remained active; fewer x-rays were ordered) remains unknown.

DISCUSSION

There is a clear gap between evidence and clinical practice when it comes to x-rays for acute low back pain. International consensus exists on guidelines for diagnostic imaging in the management of acute low back pain yet there is significant overuse of x-rays in the absence of "red flags" for this condition. Health care professionals have many reasons for referring patients for x-ray when it is unwarranted. Patient "demand" for an x-ray is a frequently cited reason although it appears that health care professionals overestimate patients' expectations in this regard. While many patients may believe in the value of an x-ray, patient satisfaction is more closely linked to the provision of good information, an adequate explanation of the problem and advice on how to manage it. The consequences of the overuse of x-rays for acute low back pain include financial burden to the health system, exposing patients unnecessarily to radiation, and reinforcing patients' beliefs that x-rays are useful for this condition.

Changing clinical practice to bring it in line with best available evidence is a complex and challenging endeavour. While there is a growing evidence base on the effectiveness of various types of interventions, there is little clear guidance on what interventions represent best value for money to improve particular evidence-practice gaps in care. There is, however, increasing recognition that tailoring interventions to the identified barriers to appropriate care may be the most appropriate method of choosing interventions. In the case of the inappropriate use of x-rays for low back pain, there are well documented barriers at the level of health care professionals as well as with patients. There is also an interaction between health professional and patient expectations in consultations about back pain. So in planning or choosing a type of intervention to reduce unnecessary diagnostic imaging for back pain, an intervention that targets both clinical and patient barriers, rather than either in isolation, would appear to be warranted.

In recognition of the importance of both clinical and patient factors, most low back pain guidelines and studies of implementing low back guidelines to improve clinical management

include patient information or education as a component. Nevertheless, several well designed controlled studies to implement low back guidelines in primary care settings have failed to show an improvement in the management of low back pain in terms of use of diagnostic imaging or advice to patients. There is scant high quality evidence on patient-mediated interventions in isolation, and on the effectiveness of educating low back patients about diagnostic imaging in particular.

Guideline implementation activities typically target health services or individual clinicians and therefore will reach only those patients with the condition of interest presenting to those providers. In contrast, mass media campaigns are an avenue for changing a population's attitudes and beliefs about aspects of health care and reach individuals at risk as well as those with the condition of interest. Another advantage of the mass media approach is that it can change the behaviour of health professionals both directly and through changes in patient attitudes as a result of the campaign. The Victorian WorkCover Authority's mass media campaign on back pain beliefs demonstrated this effect quite clearly with changes in beliefs in both the population at large and among general practitioners. The mass media intervention clearly fulfilled the need to address erroneous attitude and belief barriers at both the clinical and patient levels, and did so simultaneously.

A comparable issue to the overuse of x-rays for back pain is the overuse of antibiotics for viral upper respiratory tract infections (URTI). Interventions to reduce inappropriate antibiotic prescribing have received considerable attention and effort and there has been a steady decline in their use for the common cold over the past decade (NICS, 2003; NPS, 2005). The National Prescribing Service has long used a multi-pronged approach to reduce antibiotic use for URTI. Their interventions have included mailings to GPs along with feedback on their prescribing patterns, educational outreach programs for GPs, and a community directed mass media campaign "Common Colds Need Common Sense" (NPS 2005 and www.nps.org.au). In support, two recent publications highlight the synergy of approaching the problem at both the patient or community level and at the prescriber level. In South Australia, Dollman et al. (2005) used a combined multifaceted intervention which included a community campaign as well as health professional education (based on therapeutic guidelines) and a decision making tool (clinical scoring system for sore throat). This combined approach reduced antibiotic prescribing for URTI by 32% (Dollman, Leblanc, Stevens, O'Connor P, & Turnidge, 2005) and the intervention has been rolled out across the state. In the USA, a recent randomised controlled trial by Samore et al. (2005) showed that a community intervention campaign accompanied by a clinical decision support systems for clinicians was more effective at reducing antibiotic prescription rates compared to the community intervention alone.

Well thought out mass media campaigns and other interventions that are effective in bringing about change can work synergistically together (Donovan et al., as cited in Donovan & Carter, 2003; Task Force on Community Preventive Services, 2004). As well as enhancing the effects of the media messages, complementary interventions can also help sustain the impact of the media messages, and reinforce and facilitate the desired behavioural changes (Smith, Ferguson, McKenzie, Bauman, & Vita, 2002).

There are no neat, stand alone solutions for changing behaviour in health care. Clinical practice guidelines and their implementation have strengths and weaknesses, possibly dependent on the barriers to appropriate care. Patient-directed interventions are appealing where there are clear patient-related barriers but evidence as to the most appropriate and practical interventions is meagre. Where inappropriate care occurs as result of the

interaction between patients and their health care professionals, it would seem logical to target both groups in any intervention. Mass media campaigns can fulfil this requirement but their messages do not necessarily translate to altered behaviour without other forms of reinforcement.

CONCLUSION

The inappropriate use of diagnostic imaging in a representative condition, acute low back pain, is driven by both health care professionals and their patients. The availability of evidence-based guidelines and interventions to implement guidelines in clinical practice have typically failed to overcome the problem. A mass media campaign successfully changed beliefs about back pain in the community and changed the stated management practices of general practitioners. However whether these changes in beliefs and stated practices translated to changes in behaviour and subsequent outcomes, such as a reduction in unwarranted x-rays, remains unknown.

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APPENDIX 1 - EXAMPLES OF INFORMATION FOR PATIENTS



Acute Low Back Pain

→ A partnership approach to pain management

> What Is Acute Low Back Pain?

Acute low back pain is pain felt in the lower back that lasts for a short time (i.e. less than three months).

Most people have pain in their low back at some stage in their lives. In most cases, it will get better in several weeks; however, this varies from person to person. Acute low back pain may happen again over time.

> What Causes Acute Low Back Pain?

In around 95% of cases it is not possible to pinpoint the cause of the pain. However, it is not necessary to know the specific cause in order to manage the pain effectively.

It is rare for the pain to be caused by a serious medical problem.

> What Should I Do When I Have Acute Low Back Pain?

If your pain bothers you, it is important to see your health practitioner, to work with them to manage your pain, and to stay active.

1 See your health practitioner

A history and a physical examination are needed to assess for any serious medical conditions that may be associated with your pain, although these are rare.

Your practitioner can provide you with information about your pain once they have assessed you. Ask for an explanation if unfamiliar terms are used. Sometimes a diagram can be useful.

Additional investigations, such as xrays and blood tests, are not needed in the majority of cases of acute low back pain. They do not help with your pain or your ability to move your back.

It is normal to worry about the cause of your pain and the impact it may have on you. Talking to your health practitioner about your concerns can be helpful. You will usually find there is no serious cause and that there are ways to relieve your symptoms.

MAIN MESSAGES

- Work with your health practitioner to manage your pain and address your concerns
- Stay active

WHAT THE RESEARCH SAYS

A panel of experts recently reviewed the scientific studies on the effectiveness of treatments for acute low back pain and found that not all treatments have been studied in detail.

The findings of this review are published in the report *Evidence-Based Management of Acute Musculoskeletal Pain* available at www.nhmrc.gov.au. The results are summarised below.

Effective

Measures that are effective for relieving acute low back pain are: staying active (relieves pain better than resting in bed), having written information (it is

helpful to discuss written information with your health practitioner) and heat wrap therapy (a treatment not routinely available in Australia).

Mixed results*

There are mixed results from scientific studies on the use of muscle relaxants, anti-inflammatory drugs (NSAIDs) and spinal manipulation. Some studies show these measures relieve acute low back pain and some do not.

Inconclusive*

Studies on acupuncture, back exercises, back schools, bed rest, cognitive behavioural therapy, injection therapy and topical treatments for acute low

back pain have not tested these treatments against placebo.

No studies done*

There are no studies that have looked at: pain-relieving medication (analgesics), electromyographic biofeedback, lumbar supports, massage, multi-disciplinary rehabilitation in the workplace, traction and TENS for the treatment of acute low back pain.

* It is important to note that these findings do not mean that these measures will not help you; they indicate that more research is needed.



2 Work with your health practitioner to manage your pain

The goal is to help you find ways to manage your pain and return to your usual activities.

Most people find that their low back pain settles down over a short period of time as healing occurs. Pain-relieving measures may help you cope with your symptoms while nature takes its course.

There is a range of pain-relieving measures available. While there are few scientific studies proving their effectiveness, this does not mean that a particular measure will not help you (see [What the Research Says](#)).

When considering what measures to use for your pain, it is helpful to discuss the following points with your health practitioner:

- Your pain level and your concerns
- What measures are available to relieve acute low back pain (what they involve, how they work, their benefits and risks, their effectiveness)
- Your need for additional information

3 Stay active

Your pain may make it difficult to carry out your usual activities, and you may even want to rest completely.

However, it is important to resume normal activities as soon as possible. Staying active helps to prevent long-term problems.

You may need to use pain-relieving measures to help you gradually return to your usual activity level. If you are working, a programme of selected duties or reduced hours of work may be needed. This applies to work at home as well.

Follow-up visits

It is important to maintain contact with your health practitioner.

If the pain is not settling down or is getting worse, you may need further assessment.

Follow-up visits provide you with an opportunity to obtain more information. If you have any questions to ask your health practitioner, write them down and discuss them at your next visit.

The content of this information sheet is based on: Australian Acute Musculoskeletal Pain Guidelines Group (2003), *Evidence-Based Management of Acute Musculoskeletal Pain*, available at www.nhmrc.gov.au

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Further copies of this information sheet are available from: www.nhmrc.gov.au/



Key Messages For the Patient with Uncomplicated Acute* Low Back Pain...

- Most episodes of acute low back pain do not have a specific cause
- The pain will usually go away without any treatment in four to six weeks
- There is no need for X-rays.
- Exercising is the best way to heal back injury. Bed rest does not make a difference.

*Key Messages on Management of Acute Low Back Pain
developed by the Guidelines Advisory Committee in collaboration
with members of the Ontario Guideline Collaborative*

www.gacguidelines.ca



APPENDIX 2 - CONSIDERATIONS FOR MASS MEDIA CAMPAIGNS

Factors for success

Why do some mass media campaigns succeed and others fail? While there is a lack of formal research in this area, several authors have identified factors that they think may increase the likelihood of campaign success. These include:

Planning

- Careful planning (DeJong & Winsten, as cited in Austin & Husted, 1998; Elder et al., 2004)
- Well defined campaign goals (DeJong & Winsten, as cited in Austin & Husted, 1998)

Theoretical models

- Basing campaigns on sound social and cognitive models (Marcus et al., as cited in Donovan & Carter, 2003); or theoretical frameworks (Donovan & Carter, 2003)
- Incorporation of social marketing principles into campaigns (Marcus et al., as cited in Donovan & Carter, 2003)

Message construction

- Careful construction of messages taking into consideration the fact that people may be antagonistic or sceptical towards the proposed idea or behaviour because of pre-existing beliefs and attitudes (Donovan & Carter, 2003)
- Consideration of the sort of themes that might be likely to motivate the change in behaviour that you would like to bring about when constructing messages (Elder et al., 2004)
- The linking of messages to credible sources (Wilde, as cited in Smith, Ferguson, McKenzie, Bauman, & Vita, 2002)
- Careful targeting of messages for specific audiences (DeJong & Winsten, as cited in Austin & Husted, 1998), with the development of different targeted messages for different existing beliefs and attitudes (Donovan & Carter, 2003)
- Targeting of messages using behavioural theory (Flora et al., as cited in Smith, Ferguson, McKenzie, Bauman, & Vita, 2002)

Formative research or pre-testing

- There has been formative research to determine existing beliefs and attitudes of each target audience on the issue being addressed (Donovan & Carter, 2003)
- Messages have been pre-tested on the target audience (Novelli, as cited in Smith, Ferguson, McKenzie, Bauman, & Vita, 2002) and other audiences to ensure that they are understood correctly, there is minimal "counter-arguing" by the target audience, and that messages do not have any unforeseen negative effects on other audiences (Donovan & Carter, 2003; Elder et al., 2004)

An example of possible consequences of failing to pretest is a mass media campaign designed to encourage drinking in moderation as a way of preventing problems related to excess alcohol consumption. No pretesting was done, and a mid-campaign evaluation of public response found that people thought the ads were beer ads promoting the consumption of alcohol (Elder et al., 2004).

Exposure

- The target population has been exposed to, is aware of and understands the messages conveyed (Elder et al., 2004)

- The messages have been broadcast often enough, long enough and wide enough (Flay, as cited in Smith, Ferguson, McKenzie, Bauman, & Vita, 2002)
- The campaign is a long-term or sustained effort (DeJong & Winsted, as cited in Austin & Husted, 1998; Donovan & Carter, 2003)
- “With all else being equal, the more people who are reached by a message and the more frequently they hear it, the more likely they are to respond”. In order for there to be a significant impact on the population, 70-80% of the population need to be reached by that message, meaning 70-80% need to have been exposed sufficiently to the messages that they can recall them when prompted. It is estimated that people need to be exposed to messages that they notice at least three times to learn simple messages (Hornick, as cited in Donovan & Carter, 2003)

Multimedia or multifaceted

- Campaign messages are reinforced by other efforts (Donovan, Henley, Jalleh & Slater, as cited in Donovan & Carter, 2003; Elliot, and Lazarsfeld & Merton, as cited in Elder et al., 2004)
- A number of different communication channels have been used (Donovan & Carter, 2003)
- The campaign has been run in combination with other activities such as community activities (Marcus et al., as cited in Donovan & Carter, 2003) or high visibility enforcement (Elder et al., 2004)
- The intervention is comprehensive and coordinated (with other strategies aimed at both the target population and at the environmental level) (Donovan & Carter, 2003)
- Other efforts may include interventions such as regulatory changes, system changes, grassroots actions and other complementary media messages. However, it may be difficult to evaluate how much other approaches contribute to the success of mass media campaigns because “campaigns are seldom implemented or measured in a manner that allows for control of their effects” (Elder et al., 2004)

External conditions

- “the desired behaviour change requires little time, effort, financial or psychological cost;
- the related social norms are important and favour the desired change;
- there are clear and substantial benefits to the individual (that outweigh any costs);
- there are no major environmental inhibitors; and
- the individual’s attitudes are neutral or already mildly positive towards the behaviour” (Donovan & Carter, 2003).

Other

- The campaign stimulates interpersonal communication (Donovan & Carter, 2003.)
- The campaign has been implemented well (Elder et al., 2004)
- Paid campaigns have been used. These are more likely to be effective than public service announcements, because with paid campaigns there is control over timing and placement of messages so it is easier to ensure that the intended audience is exposed to the messages frequently enough (Elder et al., 2004)
- The messages are of a high production quality, as these may attract more attention from an audience and be more likely to have an emotional impact (Elder et al., 2004)
- Campaigns are “up to date, clever, and attract the attention of the public” (Buchbinder, Jolley, & Wyatt, 2003)

Reasons for failure

Mass media campaigns seem to fail for reasons such as: “the message has been poor, the targeting ineffective, the objectives unrealistic, or the evaluation inappropriate” (Egger et al. and Snyder & Hamilton, as cited in Donovan & Carter, 2003). It has also been argued that short-term media programs are rarely successful (DeJong & Winsten, as cited in Austin & Husted, 1998).

Deciding whether to undertake a mass media campaign based on the results of previous campaigns can be difficult because of what has been called the efficacy paradox (Tones, as cited in Elder et al., 2004). The premise of the efficacy paradox is that many programs are implemented poorly, often due to resource constraints that make it impossible to implement them under the conditions likely to give them the greatest chance of success (Elder et al., 2004). The lack of effect of such campaigns is not due to the ineffectiveness of mass media campaigns, but rather their poor implementation. This highlights the importance for campaign planners to make sure they have the necessary resources and a supportive environment before implementing mass media campaigns (Elder et al., 2004).

Health professionals often set unrealistic objectives for mass media campaigns, and judge the campaigns to be unsuccessful when these objectives are not met. Donovan and Carter (2003) give the following example of this: “it is unrealistic to expect that advertising alone could have a significant impact on a man’s violent behaviour. However, it can have a substantial influence on encouraging a violent man to seek help for his behaviour” (Donovan et al., as cited in Donovan & Carter, 2003).

Also, the threshold for important change may be much higher for health professionals than for other professions that use media to bring about change; “where commercial marketers are quite happy to achieve 2-3% shifts in market share, many health professionals consider such small changes a failure” (Donovan & Carter, 2003).

Commentary on fear campaigns

One way of trying to get a message across is by using fear or anxiety to prompt change. The effectiveness of fear-based campaigns is controversial. Some authors believe that desired changes in attitudes, intentions and beliefs are more likely to occur when the fear-provoking message also contains advice on how people can protect themselves (Elder et al., 2004). The effects of such campaigns may be different for different people, for example these types of campaigns may have more of an impact on people who did not realise that the problem being addressed was relevant to them. Or they may be more persuasive to people who are already behaving in the desired manner (Keller, as cited in Elder et al., 2004).

Sustainability

In order to sustain changes that have occurred as a result of a mass media campaign reminders, “top-up” campaigns or other strategies may be necessary (Grilli et al., and Buchbinder & Jolley, as cited in Buchbinder & Jolley, 2005). That is unless the all people with the capacity to change have already changed, in this case further campaigns would not

be likely to have much success. This is known as the 'ceiling effect' (Buchbinder & Jolley, 2005).

If social norms are changed, it is more likely that changes will be sustained – if not repeated campaigns in conjunction with policy, educational, and environmental strategies may be needed to bring about and maintain the desired behavioural changes (Buchbinder & Jolley, 2005).