BEST PRACTICE

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Liverpool Care Pathway • Oxycodone and opioid misuse • Vitamin D

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In the aftermath of a catastrophe

The Christchurch earthquake, February 2011

An interview with Dr Chris Leathart, GP, Christchurch and a member of the bpac^{nz} Clinical Advisory Group.

On Tuesday 22 February, 2011 at 12.51 pm the lives of hundreds of thousands of Cantabrians were changed forever. This devastating and catastrophic event would have both immediate and long-lasting effects for thousands of people in New Zealand and around the world. Now three months on from the earthquake, we speak to Christchurch GP, Dr Chris Leathart about his experiences and observations of how Canterbury is coping.

On the day of the earthquake, Chris was consulting with patients in his Bishopdale practice, much like any other Tuesday. He had an elderly couple with him when the building started to shake violently. Luckily the practice did not sustain any significant damage and after ensuring his patients could get home safely, Chris continued with his work. Practice staff listened to the 1 o'clock news on the radio, when early reports were coming in. For the Bishopdale practice, business continued mostly as usual for the afternoon, staff largely unaware of the extent of the damage and graveness of the situation. Chris recalls listening to another news bulletin at 3 pm and feeling shocked by reports of fatalities and destruction in the city, especially to the Christ Church Cathedral.

"I thought…my god, if the spire has fallen off, this must be big…it was symbolic."

Bishopdale is located in the west of Christchurch, an area which escaped the worst of the damage. On the day of the earthquake, Chris did not see any patients with acute injuries, but told us that his colleagues from other parts of the city were kept busy with trauma cases. In the days immediately following the event, there was an increase in people, mainly elderly people, presenting with chest pain. Interestingly, there are anecdotal reports that presentations at the hospital emergency department and After-hours Surgery decreased in the 24 hours following the earthquake, and continue to remain lower than expected.

"People seem reluctant to travel into the city…they feel that they don't want to waste the hospital's time and that their emergency is not important enough."

This decrease in patient numbers is not being mirrored in general practice. Since the February earthquake, attendances at general practices have risen dramatically (other than in some Eastern suburbs where many people

have moved out). This is in part due to many practices being unable to operate because of damage or access restrictions, creating displaced patients that must find new GPs and practices that are still able to take enrolments. This places extra pressure on general practice staff and resources are stretched to cover. Chris is concerned that "doctor stress" may become a significant factor and he notes that the Medical Protection Society, in conjunction with the New Zealand College of Clinical Psychologists and Pegasus Health, is offering free counselling for general practice staff in Christchurch.

The pervading medical issue in the aftermath of the earthquake is psychological stress. Chris separates those experiencing stress into three categories; children, especially those aged under ten years, who are traumatised by aftershocks and frightened to sleep in their own beds; elderly people (particularly women) and those living alone, who are frightened and anxious; and people with pre-existing mental health problems. Chris has observed that alcohol consumption among patients has increased, along with associated problems such as domestic conflicts and violence.

While the aftershocks continue and much of the city is still in a state of disrepair, it is difficult to reassure patients that the worst is over. Psychology and counselling services are available across Christchurch and a website set up by the Christchurch City Council and Environment Canterbury has some resources suitable for patients. Chris has avoided medicating children and adults who are experiencing stress, but has prescribed some elderly patients a short-term course of zopiclone and lorazepam – combinations of which are no doubt being frequently prescribed across the city. Not surprisingly, the status of many people with pre-existing mental health conditions has worsened, although Chris has not seen an increase in new occurrences of clinical depression.

For many people who have experienced a traumatic and ongoing event such as the Christchurch earthquake, life is regarded as precarious. It becomes challenging to convince people to focus on long-term health goals when their immediate mortality is more of a concern. Chris has noticed a reluctance among many patients to take on board advice about smoking cessation, healthy eating and exercise. Ex-smokers have relapsed and taken up smoking again and prescription of smoking cessation medicines is down, although not through lack of offering advice.

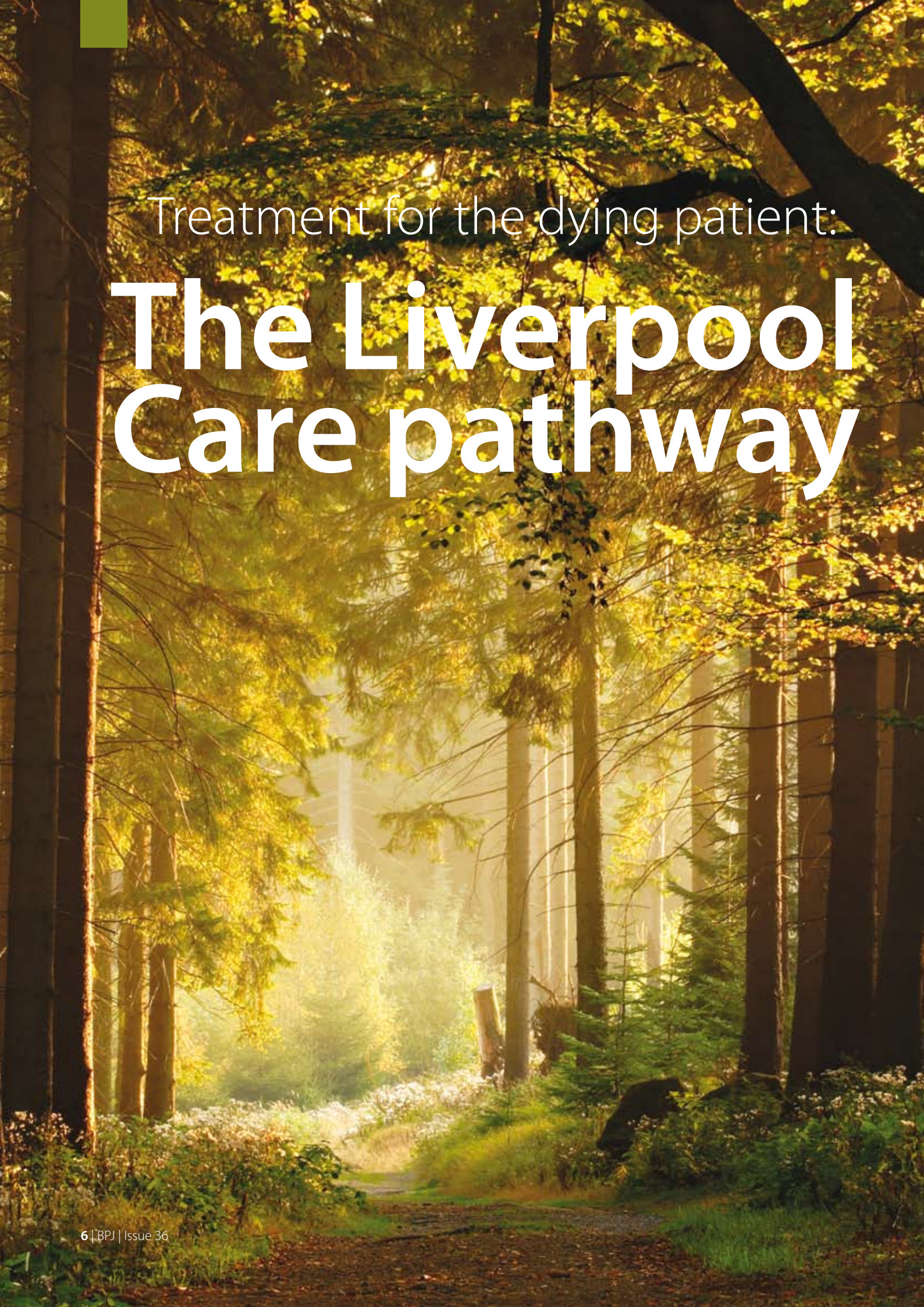
"People are generally not looking after themselves as well...there is less interest in general health issues."

The anticipated increase in the circulation of infectious diseases in Christchurch, particularly gastroenteritis, did not eventuate. However, there is an increase in respiratory illness, which is likely to worsen over the next few months as people experience winter in sub-standard housing. Many houses are leaking, cracked or without heating and those with sound houses may find that they are now facing an overcrowded environment with relatives and friends "bunking in". The dust created as a result of the earthquake debris has been reported to have caused exacerbations in people with asthma and COPD.

As time goes on, the people of Christchurch are continually faced with new challenges. In Chris's experience, some of those who were the most affected in the earthquake, through loss of loved ones, homes or employment, are coping the best, having been in the darkest place and finding the strength to pull through. The people who were not as directly affected seem to be struggling the most now, worried about what might happen and the uncertainty of how they would deal with it.

The Canterbury spirit is strong and the resilience of its people is remarkable. But there is no doubt that life in Christchurch is difficult and people are feeling insecure. There is real concern that this chaotic lifestyle is not sustainable in the long term and that soon people will crash from the sheer exhaustion of living in this broken city.

Our gratitude and support goes out to Chris and the hundreds of other dedicated general practice staff in Christchurch looking after their people.



Treatment for the dying patient:

The Liverpool Care pathway

Key Concepts

- The Liverpool Care Pathway (LCP) is used to manage care in the last days and hours of a person's life, irrespective of diagnosis or setting
- The decision to place a patient on the LCP requires skilled judgement and is made once all reversible causes of a patient's condition have been eliminated
- The LCP promotes communication to explain the care strategy and to satisfy the spiritual and emotional needs of the patient and their family
- A secondary goal of the LCP is to expand knowledge relating to the process of dying
- Following training and registration, practices are able to use the LCP under the umbrella of registered DHBs, hospices, residential care facilities or hospitals
- Clinicians can be trained to use the LCP in under one hour
- The principles of the LCP are widely considered a model of excellence in caring for the dying and clinicians unable to access the LCP can still be guided by its principles

Studying death and caring for the dying

New Zealand's population is ageing. People aged over 65 years are projected to make up over one quarter of New Zealand's population in the 2030s, compared to 12% in 2005.[1] Residential care facilities and general practices are increasingly required to provide hospice type care. However, research into dying is complicated and providing evidence based guidance for care in the final days of a person's life is difficult. It is unethical to provide terminally ill patients with potentially differing standards of care, and bereaved relatives' experiences can be traumatic, making data analysis difficult.[2] Compared to other areas, care for the dying has a relatively small literature base. The death of a "loved one" can be the most difficult period family and friends will encounter. The way a person dies lives on in the memories of those left behind. In the United Kingdom, only 16% of cancer deaths, and less than 5% of non-cancer deaths,* occur in hospices. Most deaths occur in hospitals and residential care facilities (57%) and private homes (15%), therefore health professionals working in these settings also require training in end of life care.[3] In New Zealand, the Liverpool Care Pathway for the Dying Patient (LCP) has been selected by the Ministry of Health as the best means of providing quality, evidence-based, end-of-life care, and training to the people providing it.

*New Zealand statistics not available.

What is the Liverpool Care Pathway?

A care pathway, also known as a care map, is an increasingly common tool used to standardise and manage the quality of healthcare. The concept began in the mid 1980s and has evolved to mean a multidisciplinary, evidence-based document, for a specific patient group, with a predictable outcome. Generally, a care pathway is a document held at the bedside that maps what treatment has been received and where treatment will likely lead. The Liverpool Care Pathway (LCP or the Pathway) was developed in the 1990s, as a collaboration between the Royal Liverpool University Hospital and Marie Curie Palliative Care Institute in Liverpool. The idea was to transfer the hospice model of excellence in care of the dying to other care settings. An advantage of the LCP over other palliative care pathways, is that it evolves as evidence changes and feeds back upon itself through self-auditing.[4] The LCP also has a strong focus on training and education.

National LCP registrations

As of March 2011 (latest data):

- LCP projects are registered across 19 of the 20 DHBs
- 81% of inpatient hospices are registered to use LCP
- 40% of hospitals* are registered to use LCP
- 28% of residential care facilities are registered to use LCP

*As defined by New Zealand certified list of health care providers

In November 2008 the National LCP Office (New Zealand) was established at Arohanui Hospice (New Plymouth), New Zealand's first LCP collaborating centre, with funding from the Ministry of Health, and support from the LCP Central Office (United Kingdom). The National Office's goal is the promotion and co-ordination of sustainable implementation of the LCP across all DHBs in New Zealand.[5] In 2006 there were 12 sites in New Zealand registered to use LCP, as of March 2011 there were 278 (see sidebar).

How do practices use LCP?

Registration is compulsory in order to use the Pathway, as the LCP document is copyrighted to ensure the "goals of care" remain intact. Registration is free and can be completed on-line with the advice and support of the National Office.

There are two registration options available for practices wishing to use the Pathway:

1. Register as a stand-alone LCP project.
2. Register as part of an existing project such as a residential care home, specialist hospital palliative care team, or hospice.

To register as a stand-alone project, in order to use the LCP in a patient's home, a practice would need to nominate a LCP facilitator to attend a single training day in Christchurch, Wellington or Auckland. Using a train-the-trainers model, the LCP facilitator then instructs the other practice staff. Education and training would also include other health care providers involved in patient care, e.g. district nursing teams, community pharmacists. Training can be completed in under one hour. There are currently no individual practices in New Zealand registered as stand-alone LCP projects.

A simpler option may be for practices to register as part of an existing project, e.g. a locally registered hospice. This would involve a previously trained facilitator spending a few hours with staff members who will be using the

Pathway. The practice would then be covered by the parent institution's registration. This second option is likely to be the most time and cost effective.

Like any tool, the Pathway is only as good as the people using it, therefore at least 80% of all staff using the Pathway, must be trained.[4]

The most successful example of LCP implementation in New Zealand is Mid-Central DHB, where the LCP can be used in the hospice, hospitals, residential care settings and in the community (i.e. patients' homes) across the entire DHB region under a single LCP project based from Arohanui Hospice. This means any GP operating in Mid-Central DHB, once trained, can place a patient on the Pathway. In the Mid-Central DHB, 87% of GPs have received Pathway training as part of this palliative care partnership.[6] It is the goal of the National Office to promote this level of primary care engagement across all DHBs within New Zealand.

For practices in DHBs other than Mid-Central, that wish to use the Pathway, it is advised that the National Office be contacted. National Office can provide information on previously registered hospices, residential care facilities, hospitals and also discuss registrations options with any interested parties.

For further information, and online enrolment, visit the National LCP Office website at: **www.lcpnz.org.nz**

How does the LCP work?

The LCP starts once a patient's condition deteriorates and a multidisciplinary team agrees the patient is in the last days, or hours of their life. It is crucial that the team exercises expert judgement when making this decision.[8] The team, at a minimum, must include a doctor and a nurse. The team will have been previously trained in the LCP and through it will be linked to a specialist palliative care unit who are available to provide 24 hour advice. Following assessment, and consultation with the patient and relatives, the Pathway is initiated with regular assessments and a formal team review every three days for those patients still on

Advance Care Planning

"Advanced care planning" is the term used for a voluntary dialogue a person may have with their caregivers regarding their illness, prognosis, or any other concerns they might have. Discussions are documented and notes can be used to look after a person's best interests if they lose the ability to make decisions themselves. For example, a patient may make an advance directive such as choosing not to be resuscitated in the case of heart failure.

Advanced care planning occurs before an expected deterioration in health status and generally well before the LCP is considered. In New Zealand there is no standardised format for performing care planning and no requirement to submit forms to a central agency. Advance Care planning does not replace the LCP, but rather it reinforces the need for good communication between the patient and their caregivers.[7]

the Pathway. Approximately 3% of patients will improve on the Pathway and the goals of care may need to revised in some cases.[8] A patient may come off the Pathway at any time.

The LCP document provides comprehensive symptom control guidelines for the management of the five main end-of-life symptoms (pain, restlessness/agitation, respiratory tract secretions, nausea/vomiting, and dyspnoea) and takes into account local availability of medicines and clinical preference.

The LCP requires all stages of the care process to be documented. Documentation allows for auditing, bench marking and for the continued evolution of care guidelines. The LCP National Office, in conjunction with the Ministry of Health, regularly collates information from LCP projects. Version 12 of the LCP document is currently in use. Ultimately it is expected this process will improve what is known about the process of dying.

What are the principles of the LCP?

The decision to initiate the LCP is driven by the clinician and other members of the team. There are three parts to the Pathway:

1. Initial assessment
2. Ongoing assessment
3. Care after death

Initial Assessment

The initial focus is communication, firstly with the patient, and secondly with family and friends. Any barriers to communication are removed, where possible, e.g. providing a translator, and discussions held relating to issues such as:

- Does the patient know they are dying?
- Do they have any wishes, feelings or beliefs they need to discuss?
- Are there people that need to be contacted?
- Does the patient have any specific spiritual requirements?
- Do they, or their whānau, have any cultural requirements?
- Have they considered organ donation, or burial versus cremation?

Taking into account the patient's individual requirements, a care plan is created with medicines prescribed pre-emptively on an as needed basis. Particular emphasis is placed on safe prescribing to neither hasten nor postpone death when alleviating the symptoms of:

- Pain
- Agitation/restlessness
- Respiratory tract secretions
- Nausea/vomiting
- Dyspnoea

Any equipment which may be required, such as a syringe driver, or oxygen support are assembled pre-emptively. The team, when constructing the care plan, also considers interventions such as hydration, clinically assisted nutrition, blood tests and IV antibiotics and whether or not a non-resuscitation order is in place. The Pathway is not prescriptive and is individualised in response to each patient's needs.

Ongoing assessment

The focus is to ensure patient comfort. LCP symptom management algorithms are provided to manage the five common symptoms listed previously. The patient's condition is assessed and recorded in the Pathway document, at a minimum of every four hours (or at the time of a visit if in the patient's home). Assessments can be made by any member of the team within their scope of practice. The document contains reminders to assess specific aspects such as skin condition, continence and hygiene.

The Pathway recommends that food and fluid consumption should be maintained for as long as can be tolerated and that supply of artificial nutrition and hydration should be considered on a case by case basis.

The psychological and spiritual welfare of the patient is assisted through listening and responding where appropriate. The option of having karakia, or prayers, should be offered. The specialist palliative care unit is available at any stage in support of the patient and the bedside team. Attention is also paid to the bedside environment, in order to ensure that the patient can easily access anything they might need, and that family and friends can visit in comfort.

Care after death

Following death, the body (tūpāpaku), is handled with respect to any previously expressed wishes. Policies are followed regarding personal possessions and any spiritual and cultural requirements, such as a blessing room are provided for the family.

It is explained to relatives what they need to do next, e.g. contacting a funeral director, and written documentation along with emotional support is given to assist in coping with the bereavement. If required, the need for a post-mortem is also discussed.

Does the LCP work?

The LCP has been implemented to varying degrees in over 20 countries.[9] In the United Kingdom, the LCP has been identified as a preferred option, by the NHS, to provide high quality care and support during the last days of life, while ensuring staff caring for dying patients are properly trained.[10,11] However, adoption of the LCP did result in some initial media debate. A number of palliative care and geriatrics specialists were concerned that the LCP was advocating deep sedation and that dying patients would receive no fluid hydration.[12] The LCP does not promote deep sedation and the Pathway has since been revised (Version 12,December 2009), to include daily assessment of the need for clinical hydration and nutrition.[8]

Despite the increasing acceptance of LCP as a potential gold standard, the extent to which it improves the care and quality of life for dying patients has not yet been thoroughly investigated. The preliminary results of non-randomised, qualitative and quantitative studies suggest that the LCP can significantly improve the quality of end of life care. A multi-centre study, conducted in the United Kingdom,[13] found that following the LCP introduction:

- The degree to which care during the dying phase was documented increased
- According to nurses and relatives, the burden of most symptoms was reduced
- The total symptom burden was significantly reduced

The first randomised study, currently underway in Italy,[9] is hoped to provide sound evidence as to the effectiveness of the LCP in improving care quality.

Patients should only start on the LCP when death is expected in the following few hours or days. Knowing death is imminent requires skilled judgement. Assuming the initial diagnosis is correct, it is highly unlikely that placing a patient on the LCP will reduce the standard of care they receive. The question remains, as to what extent the LCP benefit patients that are already receiving high quality end of life care, however, it can still provide a strong support framework.

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Liverpool Care Pathway case studies

Scenario 1

Your patient, Bob Daniels:*

- A retired, 73-year-old farmer
- Registered with your practice for 30 years, widowed several years ago
- End-stage heart failure secondary to ischaemic heart disease
- On maximum tolerated medicines for heart failure
- Currently an in-patient following admission for increasing breathlessness

The prognosis: The hospital registrar advises you that Bob's condition will continue to deteriorate and he is not expected to last more than a few days. The patient is fully aware that he is dying.

The family: His daughter, Karen, a registered nurse has arrived to be with her father. Bob wants to die at home. Karen agrees to assist, however, she is concerned that she may need specialist palliative support to manage her father's distress caused by his breathlessness.

Your network: Eighteen months previously you had a training session with a district nurse, who is the LCP facilitator in your region. Your practice, along with others in the region, has an existing relationship with the hospice. After consultation with the district nurse, both you and Karen are confident that quality care can be provided.

What do you do? You are sent a copy of the community LCP document from the hospice. With the district nurse and Karen, you construct a care plan with prescriptions for oxygen, anxiolytics and opiates to be used on an as required (prn) basis. The district nurse agrees to visit Bob daily and you will phone every morning and evening. At Bob's request, Karen contacts several of his friends and neighbours. The LCP document is held at the bedside allowing each member of the team to record visits and make notes. You also update Bob's medical record at the practice with brief notes from your phone calls.

What happens? After 48 hours Karen phones, clearly upset. She reports that Bob's condition has worsened. Later that morning, you visit and find Bob distressed and breathless with Karen not coping well. You rule out urinary retention and spiritual distress as guided by the Pathway, then choose to administer anxiolytics and phone the hospice for guidance on how best to counsel Karen. That evening Karen reports that her father appears much more comfortable. The following morning you are told that Bob died during the night.

Conclusion: In this example, it is unlikely that the LCP has significantly improved the quality of any clinical decisions that have been made. However, it has provided a strong support framework that has given the daughter the confidence to follow her father's final wishes. Through good communication, encouraged by the LCP, the final concerns of the patient have been addressed, allowing him to die in peace.

Scenario 2

Your patient Isla Coddington:*

- A 77 year old woman with metastatic breast cancer
- Lives at a residential care facility
- Has been bed bound for the past month due to her deteriorating condition
- Anorexic and nauseous

The prognosis: Several weeks ago, Isla's oncologist advised her family that given her increasing symptoms and the advanced state of the cancer, her life expectancy was weeks or days.

The family: Isla's husband died several years ago and her two children live nearby. They visit regularly but are worried that their mother is suffering.

*Fictional names

Your network: The residential care facility has recently registered to use the LCP, however, you are not familiar with the details of the Pathway. After spending half an hour reviewing the LCP process and viewing the LCP document you are more confident.

What do you do? At a meeting with Isla's family and the charge nurse, you explain that their mother will be cared for according to the Pathway. This appears to alleviate their concerns. In conjunction with the charge nurse you create a care plan that includes cyclizine (50 mg sub-cutaneously every eight hours) for her nausea. As suggested by the LCP you pre-emptively prescribe morphine (2.5 mg, four hourly) sub-cutaneously for pain or dyspnoea should the patient require it, with instructions to increase the dose if necessary. You also prescribe an anxiolytic in case of agitation and an anticholinergic in case Isla develops respiratory tract secretions.

What happens? Two days later the charge nurse phones. Isla's situation has deteriorated, however, with the prescribed medication she appears comfortable and is still able to talk with her family.

After three days you meet with the charge nurse, carers and family as agreed in the care plan. The family mentions that Isla briefly complained of pain, however, this was quickly relieved by increasing the morphine dose. Upon reassessment you find that Isla is dehydrated and that this may be causing discomfort. After discussion with Isla's family you ask for a sub-cutaneous infusion of saline to be arranged. The next day you are told that Isla died during the night.

Conclusion: The principle benefit of the LCP was to assure family members that their mother would receive the best possible care. This allowed the family to focus their last days on their relationship with their mother. You were confident that the residential care nurses had clear guidance from the care plan and were not required to intervene. The pre-emptive prescribing of morphine allowed for pain control without delay and discomfort to the patient.

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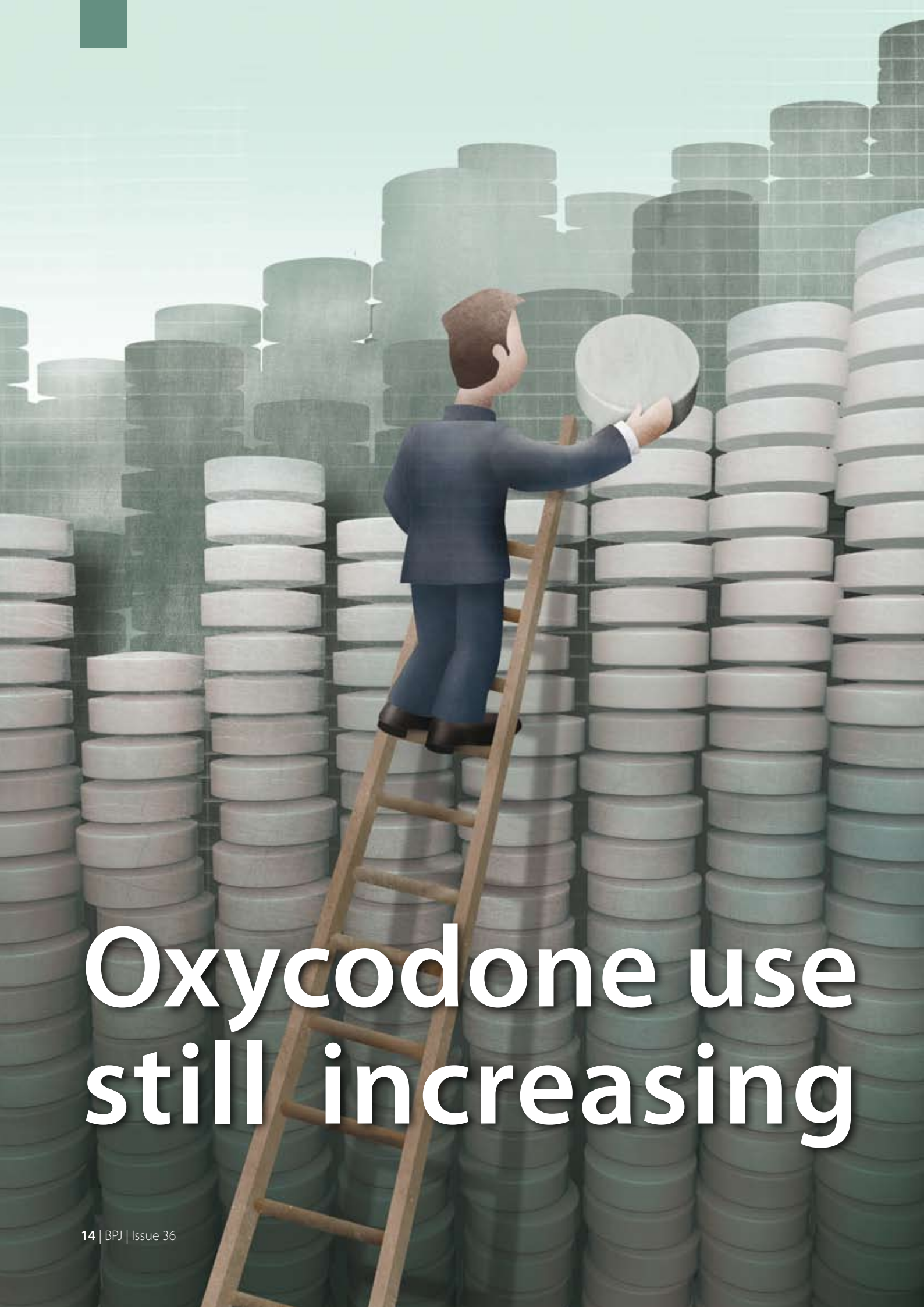

Oxycodone use still increasing

In BPJ 24 (Nov, 2009) we reported that oxycodone use in New Zealand had been steadily rising. Latest pharmaceutical dispensing data suggest that oxycodone prescriptions are still rapidly increasing, and now exceed morphine, which is the preferred first-line option for severe pain (Figure 1, over page). This is a serious concern given the significant problems with oxycodone misuse now being experienced in other countries.

Oxycodone is often commenced in secondary care and continued once patients are discharged. Prescribers must ensure that oxycodone use is appropriate and justified and that they are not inadvertently worsening misuse and addiction problems in the community.

Oxycodone is a strong opioid for severe pain

From its name, oxycodone is often perceived as being similar to codeine, an opioid for mild to moderate pain, but in fact oxycodone is an opioid for severe pain, like morphine. Strong opioids are positioned at step three on the WHO analgesic ladder (Figure 2, over page) and they are indicated in moderate to severe pain.

Use oxycodone only when morphine is not tolerated

If a patient requires a medicine at step three on the analgesic ladder, morphine is the first-line treatment. Oxycodone has no better analgesic efficacy than morphine but is significantly more expensive. Total expenditure on oxycodone increased by more than $1 million in 2010 (from $4,043,812 in 2009 to $5,167,500 in 2010). Morphine expenditure remained fairly stable increasing from $3,075,217 in 2009 to $3,235,862 in 2010.*

* Based on cost data from pharmaceutical dispensings in the Pharmaceutical Data Warehouse

Key concepts

- Oxycodone use is rapidly increasing in New Zealand
- Oxycodone is a strong opioid, used to treat moderate to severe pain. It is no more effective than morphine but is considerably more expensive.
- Morphine is the first-line treatment for moderate to severe pain and oxycodone should only be used if morphine is not tolerated or not suitable – other options may include fentanyl or methadone, depending on individual patient circumstances
- Strong opioids should be used at the lowest effective dose for the shortest possible time, and stepped down when pain resolves
- Use of strong opioids for long-term, non-malignant pain should only be considered if other treatment or analgesia options are not suitable or have not controlled pain adequately
- Patients who are prescribed opioids for long periods, especially if the dose is escalating and the pain is worsening, should be regularly assessed (for a different diagnosis or worsening of the condition) or consider referral to a specialist pain clinic
- Strong opioids have a significant potential for misuse and they should be prescribed with caution in people with a history of addictive or risk-taking behaviour

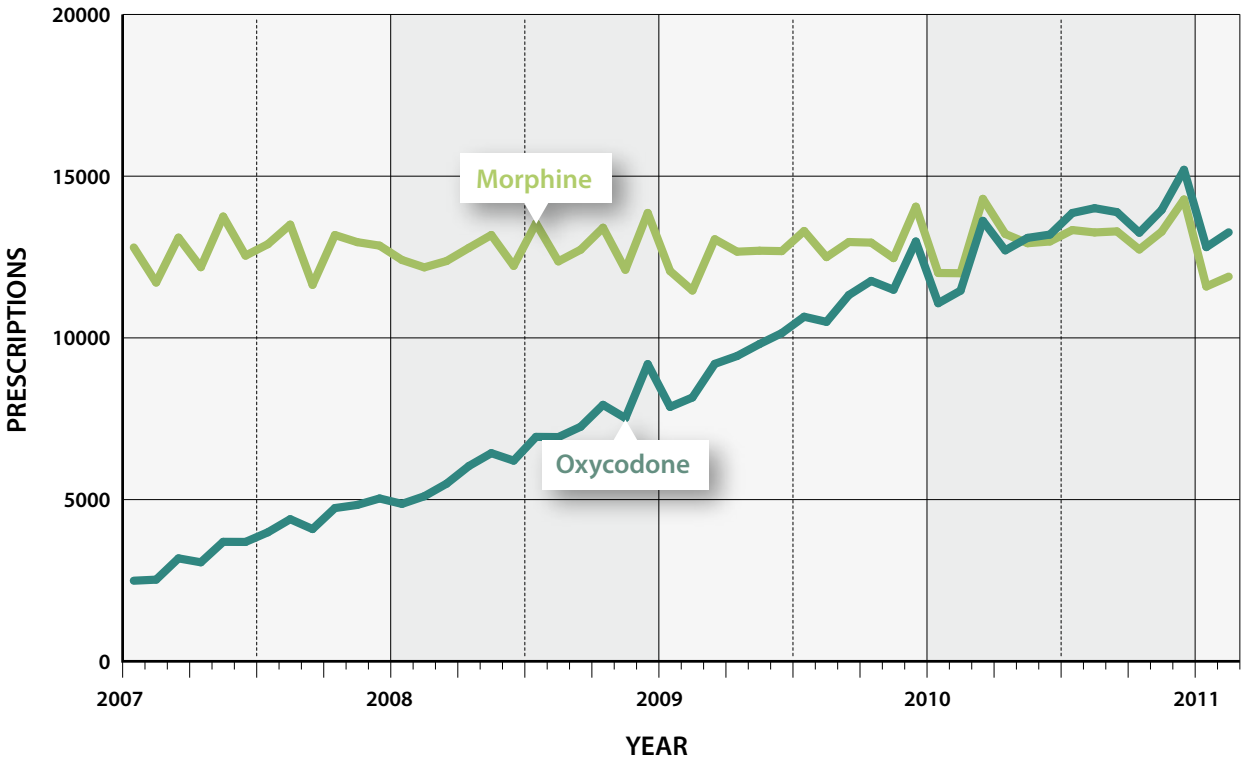

Figure 1: Number of dispensed prescriptions for oxycodone and morphine, per month, 2007 – 2010
(excluding injections forms of both medicines)

Oxycodone should only be considered for moderate to severe pain if morphine is not tolerated or not suitable. Like morphine, oxycodone has active metabolites that accumulate in renal impairment. It should therefore be used with caution in patients with renal impairment, or a renal safer opioid such as fentanyl or methadone should be considered instead.[1]

Fentanyl patches can be considered for people with moderate to severe chronic pain and stable opioid requirements, who experience intolerable adverse effects to morphine, or are unable to take oral medication. Care must be taken in selecting the appropriate dose when converting from oral opioids. Seek advice if uncertain.

Methadone (oral tablets) can be considered for people with severe, complex pain that is uncontrolled with morphine, or if adverse effects experienced with morphine are intolerable. Again, care must be taken when selecting an appropriate dose and monitoring is required due to the long half-life and tendency for drug accumulation. Ask for advice if unfamiliar with its use.

For more information see; "Pharmacological management of chronic pain" BPJ 16 (Sep, 2008) and "Methadone – safe and effective use for chronic pain" BPJ 18 (Dec 2008).

Increased fracture risk in elderly people

All opioids affect the central nervous system. This can be a significant issue in elderly people, especially if they are dehydrated, have significant co-morbidities or renal impairment. Careful dose titration is required to avoid adverse effects such as hallucinations, confusion and other cognitive impairment, which contributes to the risk of falls and subsequent injury. Oxycodone, morphine and fentanyl have all been associated with increased risk of fracture in elderly people.[1]

No consensus on role in chronic pain management

The role of oxycodone, along with other strong opioids, in the treatment of chronic, non-malignant pain is controversial. Long-term use of opioids is associated with adverse effects such as addiction, tolerance and hyperalgesia (increased sensitivity to pain).[2] Long-term use of opioids, especially higher doses, is also associated with immunosuppression, although the mechanism for this is not fully understood and may be related to the pain condition itself.[1]

A recent systematic review concluded that the adverse effects associated with the long-term use of opioids in osteoarthritis outweighs the benefit.[3] While another review found little evidence for the use of opioids for chronic back pain.[4] The benefit for neuropathic pain has only been demonstrated in the short term.[2]

There is evidence that the long-term use of high doses of opioids (equivalent to 200 mg morphine) in patients with non-malignant pain is strongly associated with an increased risk of death.[5] Other contributing factors include concurrent use of benzodiazepines, more than one opioid and alcohol.[5]

Use of opioids for long-term non-malignant pain should only be considered if other treatment or analgesia options are not suitable or have not controlled pain adequately. The difficulty is in selecting an appropriate alternative medicine for long-term pain if an opioid is not used. Non-opioid pain relief for moderate to severe pain may include; antidepressants, anticonvulsants, antiarrythmics, steroids or muscle relaxants.

Patients who are prescribed opioids for long periods, especially if the dose is escalating and the pain is

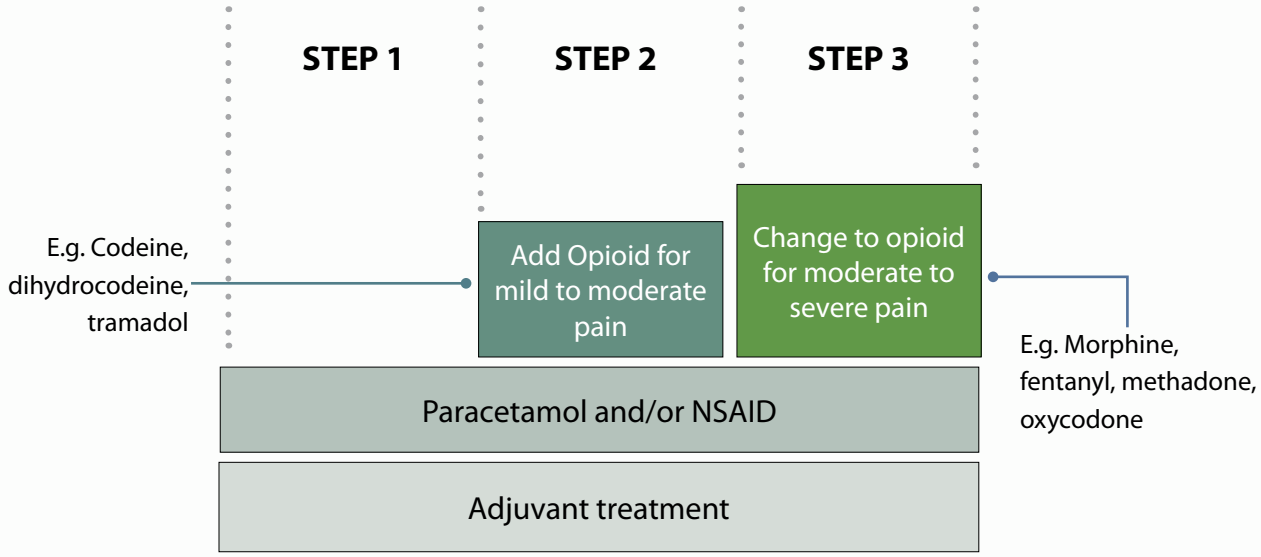

Figure 2: WHO analgesic ladder

worsening, should be regularly assessed (for a different diagnosis or worsening of the condition) or referred to a specialist pain clinic.

Best Practice Tip: Consider the psychosocial factors that may influence the nature and intensity of pain, especially chronic pain. Experience of pain can induce or exacerbate depression and anxiety, influence social interaction, prevent work and impair relationships. Ensure these aspects of pain are acknowledged and appropriately managed where possible.

Potential for misuse and addiction

Oxycodone has become one of the most problematic misused opioids in the United States.[6] In Canada there has also been a significant rise in the number of people seeking treatment for oxycodone addiction.[7] In New Zealand, there is anecdotal evidence of an increase in prescription medicine dependence,[8] however, it is unknown to what extent oxycodone is implicated.

The potential for addiction and misuse of oxycodone is comparable to morphine.[9] However, it is unlikely for a person with no previous history of addictive or risk-taking behaviour to develop an addiction or misuse problem when using opioids. One study found that approximately 3% of people who take opioids for chronic non-cancer pain develop misuse or addiction problems and 11% develop "aberrant drug-related behaviours" such as aggressively requesting medicines, self-directed dose escalation or inappropriate use of the medicine, e.g. injecting. However, when removing people with a history of drug misuse or addiction, these numbers reduce to 0.2% and 0.6% respectively.[10]

In susceptible people, physical and psychological dependence to opioids can develop within a relatively short period of continuous use (two to ten days).[15]

Prescribers should be alert for signs of addiction or misuse including:

- Escalating dose requirements
- Refusal to try alternative non-opioid analgesia or other pain treatments
- Early refills
- Frequent reports of lost or stolen medicine
- Inconsistent symptoms
- Physical signs of addiction, such as constricted pupils, itching, dry mouth, difficulty concentrating or withdrawal, such as dilated pupils, increased heart rate, hypertension, diarrhoea, muscle cramps, frequent yawning, rhinorrhoea, lacrimation

Prescribing oxycodone

If the clinical decision to use oxycodone is made, the following prescribing points may be helpful.

Opioid-naive patient

The usual oral starting dose in opioid-naive patients for severe pain is:

- 5 mg oxycodone, every four to six hours, increased as necessary according to response (OxyNorm is the current funded immediate release brand)
- Oxycodone may then be given orally as a modified release preparation (OxyContin is the current funded controlled release brand), every 12 hours once the 24 hour opioid requirement has been established[11]

N.B. Modified release preparations of any opioid must not be halved, chewed, crushed or dissolved as this may lead to a rapid release of the drug and potential overdose. Lower starting and maintenance doses are recommended in people with poor renal and hepatic function and in elderly people as they may be more sensitive to adverse effects.[11,12] eGFR should also be monitored if oxycodone (or any opioid) is used long-term.[1]

Changing from morphine

Changing from morphine to another strong opioid such as oxycodone, due to intolerable adverse effects, should be a more common scenario than beginning with oxycodone as the strong opioid for pain relief.

When changing from morphine to oxycodone, use the equivalent morphine dose. The potency ratio is approximately 1.5:1 to 2:1, i.e. 10 mg oxycodone is equivalent to 15 to 20 mg oral morphine.[11]

Remember the ABC's – antiemetic, breakthrough dose, constipation

As with other opioids, oxycodone is associated with adverse effects such as drowsiness, dizziness, hypotension and respiratory depression. Nausea, vomiting and constipation are common, affecting up to 60% of patients taking opioids. Tolerance to nausea and vomiting usually occurs within the first week of treatment, but constipation can persist for the entire course.[13]

Constipation

- Prescribe a combination stimulant plus softener laxative, e.g. docusate sodium with sennosides, and advise the patient to increase fluids and fibre intake.

In cases where constipation is unable to be effectively managed, consider switching to fentanyl patches (if chronic pain and stable opioid requirements) as fentanyl is associated with less constipation than either oxycodone or morphine.[1]

Nausea

- Prescribe an antiemetic, e.g. metoclopramide or haloperidol, if nausea is intolerable.

Slow dose titration can also help to reduce the incidence of nausea and vomiting.[1]

Breakthrough pain

- Prescribe an extra dose of short-acting oxycodone for breakthrough pain at 1/6th of the 24 hour dose

For example, if the regular dose is OxyContin 30 mg, twice daily (60 mg in 24 hours), then prescribe OxyNorm 10 mg with instructions to take a maximum of one extra dose, two to four hourly (depending on clinical condition), for pain which is not controlled by the regular regimen. If three or more extra doses are needed within 24 hours, this would be an indication that a review of pain control is required.

Stepping down dose

Regularly check pain levels with the patient. When the pain diminishes, step-down the dose of oxycodone, replace with alternative milder analgesia weaker opioid, such as codeine or paracetamol, if required, and then cease analgesia.

Interactions with other medicines

As with all opioids, when oxycodone is used with other sedating medicines, drugs or alcohol, there is additive depression of the central nervous system, including respiratory depression. Careful consideration should be given to concurrent prescription of benzodiazepines with strong opioids such as oxycodone.

Oxycodone is partly metabolised by CYP3A4 and CYP2D6 enzymes. Concomitant use with other medicines and substances which inhibit theses enzymes will theoretically result in an enhanced effect of oxycodone and potentially fatal respiratory depression. CYP3A4 and CYP2D6 inhibitors, such as fluoxetine, erythromycin, azole antifungals and grapefruit juice, should be used with caution or avoided in patients taking oxycodone.[11, 14, 15]

In contrast, St John's wort is a CYP3A4 enzyme inducer, especially with prolonged use.[16] Concurrent use of St John's wort with oxycodone may result in a reduced analgesic effect, therefore this combination should be avoided.

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The fear of enabling

MISUSE OF PRESCRIPTION OPIOIDS:
How to distinguish pain from drug-seeking behaviour

Steve's story – a true account of prescription medicine misuse

Eight years ago, Steve, a 43-year-old technician, injured his back during a strenuous session lifting weights at the gym. Later on that evening, in serious pain, Steve called an ambulance and was transported to hospital. At the emergency department, Steve was given a dose of morphine and told he had a stress fracture in the lumbar region of his spine. He was given a prescription for 50 mg tramadol and 5 mg diazepam, twice daily, and sent home with instructions to rest in bed. Almost immediately, Steve decided to double the dose of both the tramadol and diazepam "to take the edge off the pain". The pain eventually resolved and Steve returned to full activities.

Several years later Steve injured his back again while carrying wood. He went to his GP who suspected the injury was a slipped disc and prescribed 50 mg tramadol, twice daily, as specifically requested by Steve. The GP also referred Steve for a diagnostic scan.

The next day Steve returned to his GP, as he claimed that the tramadol was not effective for his pain, and requested something stronger. The GP prescribed 20 mg oxycodone, twice daily. Again, Steve decided to adjust the dose himself and he increased to 60 mg oxycodone per day and then to 80 mg per day. During this time Steve saw a neurosurgeon who advised him that surgery was not required. Although his back pain slowly improved, Steve continued to take 80 mg oxycodone for several months, receiving repeat prescriptions from his GP. Steve was also concurrently taking diazepam. At this point, Steve admits to becoming dependent on the benzodiazepine and required assistance from his GP to withdraw. He continued to intermittently take oxycodone doses throughout this time and hoarded supplies to use in the future. Steve also returned to the gym to lift weights, despite advice against this from the neurosurgeon.

Last year Steve was planning an overseas holiday and was concerned about pain he may potentially experience. His original GP had left so he visited a new

GP and convinced her to prescribe him oxycodone as he said that was the only analgesic that worked for his pain and that other opioids made him feel nauseous. Steve again hoarded pills from this prescription and took doses whenever he felt the need. He continues to push himself with weight lifting, and when asked if his experiences have changed the way he views pain he says; "I have definitely changed my perception of opioids, I know now that I would always go for something strong and go in at the maximum dose".

Is Steve's behaviour worrying or is this a normal response to pain?

It is possible that Steve's aberrant behaviour, i.e. modifying the dose and medicine-hoarding, was a result of under-treated pain. However, Steve's addiction to benzodiazepines and somewhat manipulative behaviour with his doctors suggests that oxycodone addiction or general drug seeking behaviour has played a role.

On further investigation into Steve's history, he reveals that he has previously taken steroids and admits to a cavalier approach to drug-taking – perhaps in part explaining his willingness to increase medicine doses, without fear of adverse effects. Steve also reveals a history of mental health issues and use of antidepressants.

What lessons can be learnt from Steve's story?

- Drug seekers can be of any age, ethnicity, occupation or education level
- A history of addictive or risk-taking behaviour should be a red-flag when prescribing strong opioids for pain relief
- Prescribe the lowest effective dose for the shortest possible time and regularly enquire about pain levels
- Prescribe the right opioid for the right level of pain
- Step-down the dose or type of opioid as the pain subsides
- Apply caution when prescribing benzodiazepines concurrently with strong opioids

Reports that misuse of prescription opioids is increasing

There is growing concern among New Zealand health professionals about the perceived increase in misuse of prescription opioids – especially oxycodone. Many GPs have become reluctant to prescribe these medicines and fear that with each prescription, they are contributing to a rising drug problem.

A considerable proportion of the use of oxycodone appears to stem from discharge prescriptions from secondary care which may then be continued by GPs. There is no published evidence of an oxycodone misuse epidemic in New Zealand, but prescription numbers are increasing at a significant rate each year. In the 2007/08 New Zealand alcohol and drug use survey, it was reported that 3.6% of adults (aged 16 to 64 years) had used an opiate for recreational purposes at some stage of their life. The most common type of opiate used was prescription analgesics such as morphine or oxycodone.[1] In the latest report from the Illicit Drug Monitoring System (IDMS), it is confirmed that the main source of illicit opioids in New Zealand is "street morphine", sourced from pharmaceutical prescriptions.[2] "Homebake heroin", made from codeine, is also popular among drug users. Pharmaceutical opioids are obtained by theft of supplies from pharmacies, forging or altering prescriptions, deception or manipulation of prescribers, "doctor shopping", "pharmacy hopping" and using legitimate prescriptions belonging to others.[2] The level of use of street morphine has remained stable between 2008 and 2009.[2] However, in the latest IDMS publication, it was reported that oxycodone misuse was an emerging trend.[2] The percentage of injecting drug users that used oxycodone increased from 9% in 2008 to 18% in 2009.

There is more evidence of the growing problem of oxycodone misuse in other countries, where oxycodone has been available for longer. Americans represent 4.6% of the global population, yet they consume 80% of the opioid supplies.[3] Retail sales of oxycodone in the United States increased by 866% between 1997 and 2007.[3] As a

result, reports of prescription opioid misuse, overdose and unintentional deaths have risen steadily.[3] In a survey of non-medical users of prescription opioids, 18% obtained the medicine from their own doctor and 56% obtained it from a friend or relative – of which 84% obtained the prescription from their doctor.

Misuse of oxycodone has been identified as a major health issue in Canada. In a study based in a large addiction centre in Toronto, it was found that the number of admissions related to controlled-release oxycodone increased significantly from 4% of the total admissions for opioid addiction to 55% four years later.[4] The majority of these addictions were sourced through prescriptions from doctors.[4]

1. Do not fear prescribing opioids when use is justified

Most people with chronic pain, who are treated long-term with opioids, will not develop an addiction to the medicine. Addiction occurs as the result of two factors; the pharmacological properties of opioids that cause them to become addictive and the psychological, social and physiological factors of a person which predisposes them to addiction.[5]

It was estimated, in an evidence-based review of multiple studies, that 3% of people who take opioids for chronic non-malignant pain develop misuse or addiction problems and 11% develop "aberrant drug-related behaviours" such as aggressively requesting medicines, self-directed dose escalation or inappropriate use of the medicine, e.g. injecting. However, after removing people with history of drug misuse or addiction, these numbers reduce to 0.2% and 0.6% respectively.[6]

A history of serious mental illness, including major depressive disorder, is also associated with a higher likelihood of illicit drug use or substance dependence.[3]

These findings suggest that if there is appropriate screening of patients for addictive behaviours and risk for substance misuse prior to prescription, the risk of opioid misuse and addiction is very low.

There is good evidence for the use of opioids in short-term relief of acute pain, but less evidence of their effectiveness in long-term treatment of non-malignant pain. Opioids should be used at the appropriate strength (i.e. following the WHO analgesic ladder), for the shortest possible time and stepped down when the pain resolves. Use in chronic, non-malignant pain should only be considered if the patient has not responded to other treatment or analgesia options.

2. Do not under-treat pain

Behaviours such as dose escalation, medicine hoarding and medicine sharing are suggestive of opioid addiction. However, in some cases, these behaviours occur as a result of under-treatment of pain and ineffective pain coping strategies – termed pseudo-addiction. In contrast to addiction, the behaviours resolve when adequate pain relief is prescribed.[7]

Patients whose reports of pain are not accepted, may resort to behaviours which raise suspicion of opioid misuse.[7] The difference between people with genuine pain and people with opioid misuse problems are that the latter group use opioids in the absence of pain or in an attempt to alter their mood or reduce symptoms other than pain.[7]

It is important to prescribe medicine for breakthrough pain in addition to the usual daily opioid dose and regularly enquire about pain levels, and adjust the dose accordingly, whether the pain is increasing or decreasing.

3. Be vigilant for drug-seeking behaviour

Pain is not always obvious and prescribers must rely on a subjective report from the patient about the level of pain they are experiencing. This makes it easier for people with ulterior motives to gain access to pain medicines such as morphine or oxycodone.

Drug-seekers do not fit any particular stereotype but there are some behavioural aspects which may help to identify them, such as:[8,9]

- Requesting a specific medicine and refusing all other suggestions – the patient may claim that other medications do not work, they have an allergy to them, a high tolerance to drugs or report losing prescriptions
- Inconsistent symptoms that do not match objective evidence or physical examination
- Manipulating behaviour which may include comparing one doctor's treatment opinions against another's, offering bribes or making threats
- Assertive personality, often demanding immediate action
- Unusual knowledge of medications and symptoms or evasive and vague answers to history questions
- Reluctance to provide personal information such as address or name of regular doctor
- Use of multiple doctors
- Presenting near closing time without an appointment
- Reporting a recent move into the area, making validation with a previous practitioner difficult
- Signs and symptoms of intoxication or withdrawal

If you suspect that a patient is seeking opioids for reasons other than legitimate pain relief, some suggested strategies are:[9]

- Outright refusal to prescribe
- Prescribing for a limited time, e.g. two to three days
- Supervised daily dosing
- Prescribing a medicine appropriate for the reported symptoms but different from the one requested by the patient
- Seeking a second opinion from a colleague

For further information see: "Prescription drug misuse", BPJ 16 (Sep, 2008).

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Vitamin D supplementation: Navigating the debate

Key concepts

- There is no evidence to support blanket supplementation with vitamin D for the total population
- Severe vitamin D deficiency is a serious health concern, however, there is only weak evidence that mild deficiency is clinically significant
- Vitamin D testing is expensive and there is no consensus on the optimal vitamin D serum level. Monitoring vitamin D levels is also considered unnecessary.
- The best way to increase vitamin D levels for the general population is short (non-burning) bouts of sunlight exposure to 20% of the body (i.e. arms and legs)
- Supplementation can be recommended for asymptomatic people, who are at high-risk of vitamin D deficiency, without the need for serum testing
- Vitamin D toxicity is rare and requires excessive and prolonged supplementation, however, emerging data suggest possible adverse effects associated with sustained high levels

Vitamin D: why all the confusion?

Vitamin D is required by everyone to regulate the body's calcium balance. This homeostasis is achieved by influencing calcium absorption, mainly in the small intestine. Vitamin D is important for bone mineralisation and general muscle and bone health. Severe deficiency can result in hypocalcaemic seizures and weak or misshapen bones – rickets in children, osteomalacia and osteoporosis in adults.[1] Normally, vitamin D is produced in the skin following exposure to UVB which then becomes metabolically active following reactions in the liver and kidney.

Despite vitamin D being essential for maintaining good health, there is disagreement as to what the optimal level of vitamin D is, as international recommendations vary. This has lead to uncertainty in exactly how to interpret serum levels when individuals are tested. In recent years low vitamin D levels have been associated with a host of non-musculoskeletal conditions, such as cancer, autoimmune diseases, diabetes, multiple sclerosis and heart disease, although studies often produce mixed results.[1, 2] Consequently, a number of groups have begun advocating blanket supplementation as a form of catch-all prophylaxis. Requests by patients to have vitamin D levels assessed are also increasing despite a lack of evidence that vitamin D improves any non-musculoskeletal outcomes.[3]

With sufficient exposure to UVB in sunlight, a healthy person can synthesise all of their vitamin D requirements in their skin. However, the amount of sunlight a person is exposed to is determined by factors such as season, latitude, clothing, mobility, occupation and personal behaviour. Dark skin pigmentation also reduces the amount of vitamin D that can be produced, which can result in up to a six-fold slower production rate.[4] Individuals within communities may display wide variations in circulating levels of vitamin D. Therefore, unless severe deficiency is suspected, testing serum levels is not recommended and clinical decisions regarding supplementation can usually be made by assessing individual risk factors.

How much vitamin D are we getting in New Zealand?

In New Zealand, vitamin D serum levels are lowest during winter. Studies have shown that females have lower vitamin D levels than males, Māori have lower levels than Europeans and levels in Pacific peoples are lower still. People with darker skin pigmentation, e.g., Africans and Indians, are likely to have even lower levels. Obese people also have lower levels of vitamin D than non-obese people.[5, 6]

Generally accepted guidelines for assessing vitamin D serum levels in New Zealand are shown in Table 1. There

is contention as to the significance of levels between 100 and 150 nmol/L. These levels have previously been considered to be in the normal range, however, recent studies are beginning to demonstrate adverse effects in people with vitamin D levels > 100 nmol/L.

Table 1: Recommended vitamin D levels[7]

Vitamin D serum concentration	Vitamin D status
<25 nmol/L	Moderate to severe deficiency
25–50 nmol/L	Mild deficiency/insufficiency
50–100 nmol/L	Optimal range
>100–150 nmol/L	Associations with adverse effects
>250 nmol/L	Vitamin D toxicity

It is estimated that almost half of the population in New Zealand have mean vitamin D levels below 50 nmol/L. However, only 3 – 4 % are thought to have levels lower than 17.5 nmol/L – classified as severe deficiency.[8, 9]

Vitamin D deficiency in a clinical setting

Severe vitamin D deficiency is associated with various diseases, such as osteomalacia and rickets. Deficiency is also associated with secondary hyperparathyroidism – low levels of vitamin D in turn cause low levels of calcium and the parathyroid hormone compensates for this calcium deficiency by stimulating renal conversion of active vitamin D.[10]

Vitamin D has been associated in the literature with several other diseases, such as multiple sclerosis, cardiovascular disease, diabetes and cancer, but there is no evidence of a causal role (see sidebar).

Bone disease

Moderate to severe vitamin D deficiency can cause inadequate bone mineralisation resulting in bone softening. The most common examples of this are osteomalacia in adults and rickets in children.[1]

Increased risk of falls in elderly people

Elderly people, particularly those in residential care, are exposed to less sunshine and have a reduced ability to synthesise vitamin D. Insufficiency decreases muscle strength and increases the risk of falls.[3] Some studies have shown that vitamin D supplementation decreases the number of falls experienced by elderly people in residential care who are vitamin D deficient, and decreases the number of hip fractures when combined with calcium supplementation.[11, 12] However, supplementation should be combined with regular medicine review and a programme of exercise for maximum benefit.[13] All elderly people can be safely prescribed vitamin D supplementation, without prior testing, unless they are known to be hypercalcaemic, or taking other medicines which influence calcium levels such as alfacalcidol, calcitriol or calciptriol (which is applied topically to treat psoriasis).[14]

Foetal development and infant bone growth

Maternal vitamin D is necessary for foetal development. Infants born to vitamin D deficient mothers are at risk of rickets, limb pain, bone fracture or hypocalcaemic seizures. The Australian and New Zealand College of Obstetricians has recommended supplementation for pregnant or breast-feeding women considered to be at risk of deficiency.[15]

Kidney disease

Vitamin D undergoes several metabolic reactions, in the liver and kidney, in order to produce active forms of the molecule. In patients with chronic kidney disease, or in patients on dialysis or following kidney transplantation, reductions in the activity of renal enzymes magnify any vitamin D deficiency. Supplementation has been shown to reduce proteinuria,[16] and some studies have shown improved bone mineralisation and reduced fracture risk when combined with standard therapies.[17] Calcitriol rather

than cholecalciferol is the preferred treatment for vitamin D deficiency in chronic kidney disease, as it does not require renal metabolism to become active.

Preventing vitamin D deficiency

The best way to prevent vitamin D deficiency in the general population is to increase exposure to direct sunlight. This can be further enhanced by increasing the amount of vitamin D rich food that is eaten.

Sunlight is the primary source of vitamin D

Approximately 90% of the body's vitamin D requirements can be synthesised by way of the skin, with adequate exposure to sunlight.[1, 18, 22] Increasing a person's exposure to sunlight should therefore be first-line treatment of suspected deficiency. N.B. the exposure must be to be to direct sunlight, as UVB does not pass through glass.

Sunlight intensity varies with latitude and topography, therefore sunlight exposure requirements differ throughout the country and individual judgement is required. It is agreed that shorter, more frequent exposure periods are better than long periods of exposure and that the time spent in direct sunlight should be less than the time taken to redden and burn the skin.[1]

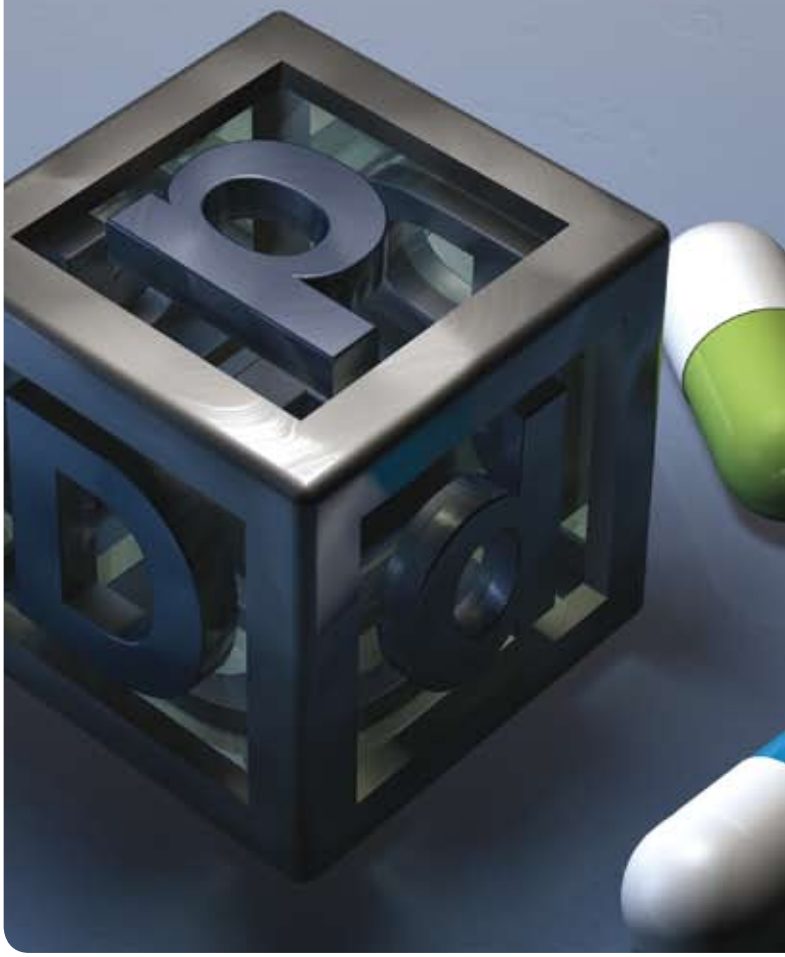
Some people may be concerned at apparent conflicting health messages regarding skin cancer and vitamin D. The amount of skin exposed to the sun should not be excessive – approximately 20% skin exposure is sufficient. Wearing shorts and a tee shirt equates to approximately 33% body exposure. There is evidence that sunscreen reduces rather than stops vitamin D production, therefore advising frequent, short (non-burning), bursts of direct sunlight with sunscreen application as required, is still consistent with the SunSmart "slip, slop, slap" message.[1]

Table 2 shows approximate sunshine exposure times for regions in New Zealand, however, sunshine levels vary greatly with seasons, across regions and even across the same region on consecutive days.

Unsubstantiated claims for vitamin D

There is no evidence that vitamin D has a causal role in the following diseases and conditions:

- Cardiovascular disease - supplementation does not reduce prevalence or improve outcomes[1, 18]
- Cancer – no therapeutic effect demonstrated[9]
- Multiple sclerosis – no proven causal link
- Diabetes – no proven causal link[1, 18]
- Cystic fibrosis – No evidence supplementation improves disease state[19]
- Epilepsy – does not reduce seizures[20]
- Chronic pain – does not relieve symptoms[21]
- Immunity – no evidence that supplementation strengthens the immune system or reduces autoimmune responses[9]



Synthesised vitamin D is stored in body fat, however, this reserve is unable to prevent serum levels dropping over winter.[1, 18, 23] The clinical significance of this seasonal variation is unknown, but it is experienced in all temperate climates. During winter, sun exposure is more difficult, especially in colder regions of the country. Actions, such as rolling up sleeves when outside on warmer days, can assist in boosting vitamin D levels.

The Ministry of Health does not recommend the use of sunbeds to increase vitamin D levels due to the significantly increased risk of melanoma.[8]

Table 2: Recommended daily sun exposure for vitamin D production for people with fair skin*[7]

Region	**Dec–Jan** (summer) at 10 am or 2 pm	**July–Aug** (winter) 10 am or 2 pm	**July–Aug** (winter) Midday
Auckland	6–8 min	30–47 min	24 min
Christchurch	6–9 min	49–97 min	40 min

* Exposure times for highly pigmented skin are three to four times greater

Diet can boost vitamin D levels

Diet is a minor source of vitamin D in comparison to sunlight. Supplementation through diet alone is unlikely to provide adequate vitamin D in order to satisfy daily requirements.[18, 22] Most people only derive 2.5 µg (100IU) of vitamin D per day from food, which is less than the New Zealand guidelines for vitamin D intake (Table 3).[8, 18]

However, during winter months, diet can be an important source of vitamin D and increased intake of vitamin D rich foods should be combined with sensible amounts of sun exposure.

The flesh of oily fish, e.g. salmon, and fish liver oils are the best dietary sources of vitamin D. Vitamin D content of common vitamin D rich foods is as follows:[25]

- 1 Tablespoon of cod liver oil = 34 µg*
- 100 g Salmon = 15 µg
- 100 g cooked mackerel = 11 µg
- 100 g canned tuna = 5 µg
- 250 mL fortified milk = 3 µg
- 100 g cooked beef or liver = 1.5 µg
- 1 tablespoon fortified margarine = 1.5 µg
- 1 cup fortified cereal = 1 µg
- 1 egg yolk = 1 µg

* Limit ingestion to avoid excessive levels of vitamin D

There is no mandatory vitamin D fortification of food products in New Zealand. However, most margarines in New Zealand are sourced from Australia, where fortification with vitamin D is mandatory. In New Zealand, vitamin D may be added voluntarily to milk and milk-based products, formulated beverages and some legume and cereal products.

N.B. Sufficient dietary intake of calcium is also recommended in association with vitamin D intake.

Table 3: New Zealand guidelines for daily vitamin D intake*

Age (years)	Vitamin D (µg per day)	Vitamin D (IU per day)
0–50	5	200
51–70	10	400
70+	15	600

* The US Institute of Medicine has recently updated its guidelines and recommends greater daily intake of vitamin D, compared to New Zealand guidelines.[24]

Table 4: Groups at-risk of vitamin D deficiency where supplementation may be considered

Risk group	Rationale for supplementation
Elderly people (> 70 years)	Age related decline in vitamin D levels – possibly due to decreased skin thickness resulting in decreased ability to synthesise vitamin D.[27] Elderly people may be less mobile, have a reduced calorific intake and impaired kidney function. Consider supplementing on a case by case basis, depending on lifestyle and circumstances. Supplementation recommended for those in residential care or house-bound.
People with hip fracture – past or present	A marker for osteoporosis. Patients may benefit from supplementation.[7]
Dark-skinned people	Require up to six times more sunlight to synthesise the same amount of vitamin D as lighter-skinned people.[4] Supplementation recommended.
People who rarely go outdoors, e.g. night shift workers, or have their skin covered for long periods due to cultural or occupational reasons	Unable to synthesise vitamin D as skin is not exposed to UVB. Supplementation recommended for people who are veiled. For others consider on a case by case basis depending on circumstances.
Infants who are exclusively breast feeding, if their mothers are vitamin D deficient or at risk	An infant's vitamin D status reflects that of the mother (see sidebar). Supplementation recommended.
People who are diet deficient, e.g. vegans	Most fruits and vegetables do not contain vitamin D. Risk is increased when sunshine exposure is low during winter. Consider supplementation only if other risk factors.
People who are obese	Generally have lower serum levels – possibly because vitamin D is held in adipose tissue (and therefore not in circulation) and less UVB exposure due to more time spent indoors.[28] Consider supplementation only if other risk factors.
People taking medicines that affect vitamin D levels, such as rifampicin and anticonvulsants	These medicines increase vitamin D metabolism. Consider supplementation only if other risk factors.
People with fat malabsorption conditions, e.g. coeliac disease	Vitamin D is present in the fat of food. Consider supplementation only if other risk factors.

N.B. People belonging to more than one risk group have an even higher risk of deficiency.

What about Māori and Pacific peoples?

It is recognised that dark skin pigmentation correlates with decreased rates of vitamin D production.[4] The extent to which this affects the health of Māori and Pacific people is unknown. New Zealand based studies have shown that Māori and Pacific peoples have lower levels of vitamin D than European New Zealanders.[5, 6] However, Pacific adults have higher bone mineral content and lower fracture rates than European New Zealanders.[5]

A pragmatic approach to assessing the risk of vitamin D deficiency is best. It is likely that the darker the skin pigmentation of an individual, the more sunlight they will require to maintain an adequate level of vitamin D, particularly during winter.[4] Healthy people, regardless of their skin pigmentation, who regularly participate in outdoor activity and eat a balanced diet are unlikely to require vitamin D supplementation. However, people with darker skin that are also part of another at-risk group, e.g. shift workers, may benefit from vitamin D supplementation.

The issue of dietary compliance also needs to be considered. It is easier to take a pill once a month, than it is to cook fish several times a week. However, if an entire family can make a shift towards a healthier diet, then this is more beneficial to general health and wellbeing.

Best Practice Tip: It is a good idea to find out about a person's eating habits when considering supplementation. How much oily fish are they eating, and do they even like fish? Some people will be able to increase their vitamin D intake by eating more fish and less red meat, while others do not have a preference for seafood.

To supplement, or not to supplement?

There is no evidence to support blanket vitamin D supplementation of the New Zealand population.[1] Evidence is beginning to emerge that high levels of vitamin D, which may result from unnecessary supplementation of people with adequate levels to begin with, are associated with adverse effects.

Vitamin D supplements should be only prescribed to people at-risk of vitamin D deficiency (Table 4) and people with known low serum levels, when they are:

- Unable to increase their exposure to direct sunlight
- Unable to modify their diet to include more vitamin D rich foods

Serum testing of vitamin D levels is not required before prescribing supplementation, unless severe deficiency is suspected, e.g. clinical signs and symptoms. Testing is expensive and likely to return a sub-optimal vitamin D level (if deficiency already suspected). In comparison supplementation is inexpensive and highly unlikely to cause toxicity when used at recommended levels.[26]

For further information see: "Vitamin D testing in primary care", bpac^{nz} (Jan, 2007).

People at risk of becoming vitamin D deficient, where supplementation may be considered, are listed in Table 4 (Page 31). It is reasonable to routinely supplement:

- Elderly people who are institutionalised or house bound
- People who are veiled
- People with very dark skin who receive little direct sunlight
- Infants who are exclusively breastfed from mothers at risk of deficiency

Supplementation with cholecalciferol

In New Zealand, for at risk people, the recommended vitamin D supplement is cholecalciferol (fully funded) – a form of vitamin D also known as vitamin D3. Supplementation begins with a loading dose of two 1.25 mg tablets taken immediately, then one tablet monthly thereafter.[8] In cases of severe deficiency (where serum levels have been tested) an increased loading dose of one 1.25 mg tablet, every day, for ten days may be prescribed.[7]

Summary of supplementation regimen:

Month 1: One dose of 2 × 1.25 mg cholecalciferol

Or if severe deficiency, 1 × 1.25mg cholecalciferol daily for ten days

Month 2: Continue with 1 × 1.25 mg cholecalciferol every month

Patients with severe renal impairment, who require vitamin D supplementation, should be prescribed hydroxylated derivatives of vitamin D such as alfacalcidol and calcitriol. Doses of these medicines vary from patient to patient and require careful monitoring of serum calcium levels to prevent hypercalcaemia. These patients are most likely to be treated in secondary care.

Monitoring vitamin D levels is unnecessary

The value of monitoring vitamin D levels is limited by the uncertainty surrounding the interpretation of results.

Treating vitamin D deficiency in infants

Vitamin D is required for normal bone growth in infants and is present at low levels in breast milk. The World Health Organisation recommends exclusive breast feeding of infants until age six months (with mixed breastfeeding continuing until at least age one year). Since breast milk is initially an infant's sole source of nutrition, it is important that mothers receive adequate vitamin D through sunlight and vitamin D rich foods.

In New Zealand, infants born to mothers who are vitamin D deficient, or at risk of being deficient, are most vulnerable to vitamin D deficiency. The Australian and New Zealand College of Obstetricians recommends supplementation of these infants.[15] In other countries including Canada, the United Kingdom, the United States, France, the Netherlands and Germany, vitamin D supplementation in all exclusively breastfed infants is common practice.

GPs should prescribe supplements (10 µg/day, 400 IU), to all breast fed infants at high-risk of vitamin D deficiency, e.g. mothers who are dark skinned or veiled. Vitadol C liquid (fully funded) contains 400 IU vitamin D per ten drops (along with vitamins A and C), therefore prescribe 10 drops per day with feeds.

Infant milk formula is fortified with 5 mcg/L vitamin D, therefore deficiency is less likely to be a problem in infants fed milk formula, who are unable to breast fed.

For infants with symptoms of vitamin D deficiency, such as bone pain or deformation, tetany, delayed motor development and dental development issues, refer immediately for specialist assessment and treatment.

In addition, vitamin D assays are significantly more expensive than vitamin D supplements, which are safe at recommended doses. Some laboratories in New Zealand are now restricting testing to people with symptoms of vitamin D deficiency and this practice is likely to become more widespread.

Vitamin D toxicity

Vitamin D toxicity cannot occur as a result of excessive sun exposure, as sunlight limits the body's production, causing vitamin D to break-down before it reaches toxic levels.[29] However, vitamin D obtained from foods and supplements is not naturally regulated. Vitamin D toxicity can occur following several months of excessive and prolonged supplementation.[24] Monthly supplementation with 1.25 mg cholecalciferol is safe. However, as some over-the-counter products contain significant levels of vitamin D, e.g. cod liver oil, vitamin D and multi-vitamin supplements, it is possible people may unknowingly be taking too much.

Vitamin D toxicity is mainly due to the effects of hypercalcaemia and is associated with headaches and gastrointestinal disturbance. Kidney stones, kidney failure and cardiac arrhythmias have also been reported. Growth restriction in children can occur when toxic levels are reached.[8, 13]

People who are particularly sensitive to changes in calcium balance due to vitamin D include individuals with:

- Hyperparathyroidism
- Chronic kidney failure

Vitamin D toxicity is treated by ceasing supplementation immediately and reducing calcium intake. If severe hypercalcemia (>3.0 mmol/L) is present then IV saline with calcitonin and a bisphosphonate may be administered in a hospital setting.

Most reports in the literature focus on acute toxicity and few studies have been conducted assessing long-term elevated exposure to vitamin D. However, preliminary evidence suggests there may be adverse effects from long-term supplementation at levels lower than that which causes acute toxicity. For example, a recent study found that single annual, high-dose supplementation (500 000 IU) resulted in an increased risk of falls and fractures in elderly people.[30] Further studies are required to confirm this effect, however, there is a growing body of evidence contradicting the "more is better" view promoted by some groups. Vitamin D supplementation should only be prescribed to those who require it.

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Patient safety incident reporting

In March 2010 bpac[nz] launched the Patient Safety Incident Reporting System for primary care. Since then, a steady stream of reports has been flowing in and the incident database is growing.

A patient safety incident can be defined as:

- A clinical or administrative incident or issue, which could have, or did, lead to harm for one or more patients, identified as something to be avoided in the future

This includes incidents that you were directly involved in, that you witnessed or that were prevented before they occurred.

The bpac[nz] Patient Safety Incident Reporting System is designed to be used by all people working in primary care, e.g. general practitioners, practice nurses, pharmacists, administrators. Reports are completely anonymous and independent of any disciplinary body.

Reports can be made online at: **www.bpac.org.nz/safety**

Even if you are not making a report, you are encouraged to review reports by others and provide feedback on the incident and your thoughts on how it could have been prevented.

Some recent reports

"Lung tumour failed to be followed up due to lack of communication between providers"

Patient seen at After Hours clinic with suspected chest infection. After Hours GP ordered a chest x-ray. Results were sent to the After Hours clinic, pulmonary nodule noted in results by radiologist, with follow-up suggested. After Hours Clinical Leader relayed results via a note to the patients named GP. However, named GP had not seen patient for ten years and presumed that the After Hours doctor who ordered the chest x-ray was taking responsibility for follow-up. Patient subsequently enrolled with a new GP, who assumed that the previous GP had actioned the follow-up. Patient presented to the new GP one year later with persistent cough. The GP ordered a chest x-ray which showed a large lung tumour.

This report highlights several issues:

- All four GPs involved made the incorrect assumption that someone else was responsible for the care of the patient
- None of the practitioners made contact to confirm that the necessary follow-up had taken place
- Administrative/clinical staff did not confirm that the patients details were up to date

...and lessons that can be learned:

- Never assume that someone else is taking

responsibility for a patient's care – make telephone contact to confirm who is arranging patient follow-up

- Confirm with the patient that they attended the follow up appointment or received the follow-up investigations
- When a new patient enrols at the practice, make a time to go through their previous notes with them and question them about any past medical history and the outcome of any events

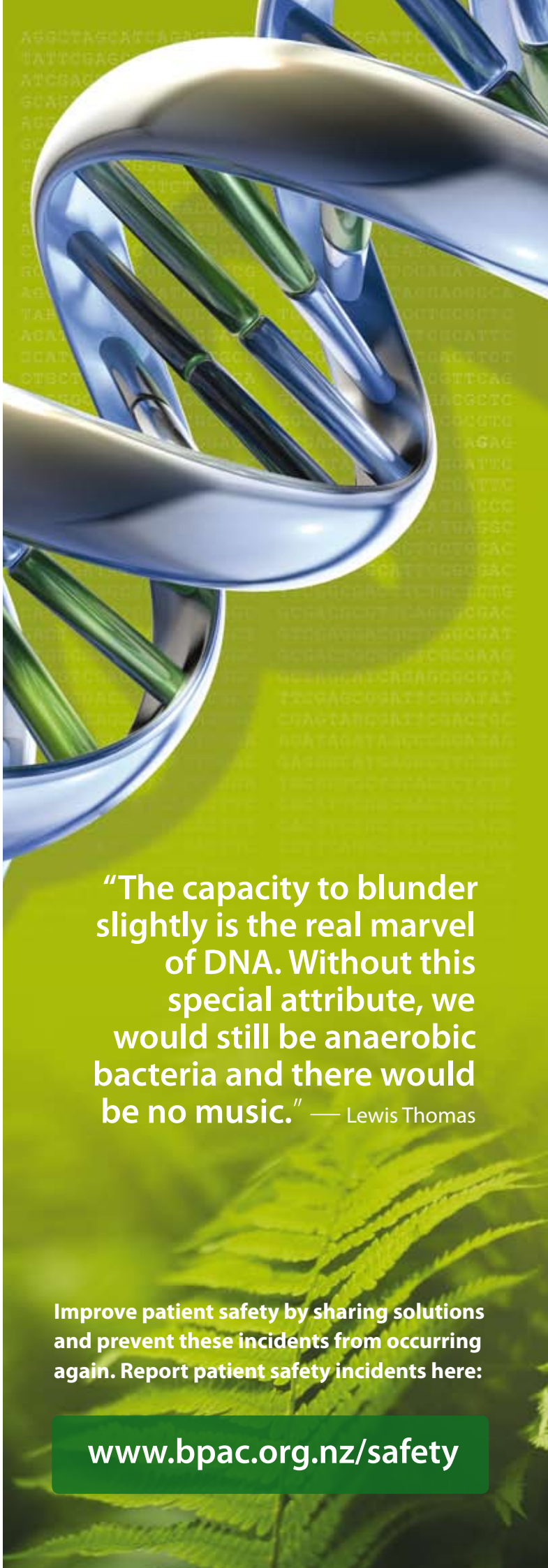
"Ceftriaxone diluted incorrectly causing seizures"

An eight month old child presented to a rural practice with suspected meningitis. After consulting with a paediatrician, the GP decided to administer IV ceftriaxone while awaiting the ambulance. The practice nurse assisting the GP was asked to prepare the IV solution and in error, diluted the ceftriaxone in 2% xylocaine solution (based on the IM protocol for giving ceftriaxone). The GP did not check the dilutent (which should have been sterile water for IV administration) and administered 7 mL of the solution. Shortly after, the infant experienced two tonic-clonic seizures. The child was airlifted to hospital and fully recovered.

Following discussion of this event, the practice staff decided on the following points:

- Clearer instructions regarding doses and administration of emergency drugs would be obtained and kept in an emergency drug folder at the practice
- The doctor administering or prescribing a drug in an emergency setting is responsible for checking the dose and administering the drug
- The practice aims to develop a culture where GPs and nurses dealing with emergencies could ask for help from colleagues

This report is an excellent example of how a practice can learn from an incident and make changes to prevent the incident from occurring again in the future.



Introducing the Health Quality & Safety Commission

The Health Quality & Safety Commission was established in November 2010, with an expectation from the Government that it would lead quality and safety improvements in the health sector.

The aim of the Commission is to work with clinicians and health managers to support and encourage quality and safety improvements, to identify areas where improvements can take place, and to drive change.

The Health Quality & Safety Commission is a clinically-focused Crown Entity, determined to make a real difference to consumers' experience of health care. It is led by clinicians and other professionals with expertise in health quality and safety. The Chief Executive is Dr Janice Wilson, a psychiatrist, former manager of mental health services, and former Deputy Director-General of the Population Health Directorate at the Ministry of Health. The Chair of the Board is Professor Alan Merry, a practising cardiac anaesthetist and chronic pain specialist, and he chairs the Quality and Safety Committee of the World Federation of Societies of Anaesthesiologists.

Others members of the Commission's Board include:

- Dr Peter Foley, a GP in Hawkes Bay and former chair of the New Zealand Medical Association
- Shelley Frost, a registered nurse with extensive experience in primary health care, and the director of nursing at Pegasus Health
- Dr David Galler, an intensive care specialist at Middlemore Hospital, and previously the Ministry of Health's principal medical advisor
- Dr Peter Jansen, a GP and a senior medical advisor to ACC
- Geraint Martin, CEO of Counties Manukau DHB
- Anthea Penny, a qualified health professional, an experienced chief executive in New Zealand's health sector and a management consultant

The priorities of the Health Quality & Safety Commission are to ensure systems and processes are in place to enable the safest and highest quality care, to use proven innovation, and to encourage learning from mistakes so they do not happen to others. The Commission is focusing on:

- Consumer engagement and participation
- Supporting improvement and innovation
- Reportable events, including serious and sentinel events
- Infection prevention and control
- Medicine safety (including medicine reconciliation)
- Evaluation and reporting on the quality and safety of the system

New Zealand's four mortality review committees are also now operating under the umbrella of the Health Quality & Safety Commission. The committees are; the Child and Youth Mortality Review Committee the Perinatal and Maternal Mortality Review Committee the Perioperative Mortality Review Committee and the Family Violence Death Review Committee

The Commission is currently developing programmes of work for each of its priority areas, forming groups to draw on the clinical expertise in the sector, and building

HEALTH QUALITY & SAFETY COMMISSION NEW ZEALAND

Kupu Taurangi Hauora o Aotearoa

relationships with key agencies and organisations. As part of that, the Commission is investigating how it can engage effectively with all clinicians and health managers.

Many people are familiar with the Health Quality & Safety Commission in relation to the annual serious and sentinel events report. This report details the errors and mishaps that have occurred in New Zealand's hospitals in the previous 12 months, e.g. falls, medication errors, delays in treatment. The report focuses solely on hospitals and the systems and processes which District Health Boards have in place to prevent patient harm.

However, the Commission is equally concerned with quality and safety issues within primary care. As general practitioners, practice nurses, community pharmacists and other health professionals, the systems in place for managing treatment and the accompanying risks have a direct bearing on the quality and safety of the health experience for patients.

New Zealand has an excellent health system but there is no room for complacency. Significant numbers of people are harmed in the course of receiving treatment, and much of this harm is preventable.

We can definitely do better.

The challenge for primary care is to deliver coordinated, high quality treatment across a wide range of institutional, professional and clinical configurations to provide patients with a seamless journey through the healthcare system.

We still have a way to go to make that journey seamless. The processes for identifying and managing clinical risk and improving performance are variable, and we lack a single plan of action for quality improvement in primary care. In our sometimes complicated funding and organisational structures, quality procedures can be viewed as an imposition in clinicians' busy professional lives, and we would all benefit from a quality framework that enables integration of performance management with quality initiatives and education programmes. There is jostling for funding, which runs the risk of pitting initiatives against each other instead of viewing them as part of the overall quality landscape.

There is also a challenge for primary care – as for secondary care – to involve the public, as consumers and potential consumers, in designing and reviewing better systems of delivering health care. There are some excellent quality initiatives underway, such as Cornerstone and Patients First, and primary care clinicians are to be congratulated for developing and engaging with these programmes.

The message to us all is that there is room for improvement – and the Health Quality & Safety Commission looks forward to your continued active involvement in making our health system better.

www.hqsc.govt.nz

Ischaemic cardiovascular disease

What are the PHO performance programme indicators and how are they best achieved?

The PHO Performance Programme

The PHO Performance Programme was established to reduce disparities and improve health outcomes for all people using primary healthcare services in New Zealand. A number of priority health areas have been identified and performance indicators created which can be measured against ideal targets. Incentives, in the form of financial payment to the PHO, encourage performance. For most of the indicators, the closer the PHO is to achieving the target, the greater the proportion of the payment is made. Performance indicators may change from year to year and some indicators are provided for information only and do not qualify for a payment. Table 1 lists the indicators that are currently funded.

PHO performance indicator for ischaemic cardiovascular disease

Indicator definition

The PHO performance indicator and target for ischaemic cardiovascular disease is: **For 90% of enrolled patients aged between 30 and 79 years with ischaemic cardiovascular disease, to have been identified and coded within their patient notes.**

The denominator for this indicator (i.e. what the results are compared against) is the estimated prevalence

Table 1: Funded PHO Performance Indicators for the period commencing 1 January, 2011

Chronic conditions	Cervical cancer screening Breast cancer screening **Ischaemic cardiovascular disease detection** Cardiovascular disease risk assessment Diabetes detection Diabetes follow-up after detection Smoking status
Infectious disease	Influenza vaccine in people aged over 65 years Age appropriate vaccinations for children aged two years
Financial	GP referred laboratory expenditure GP referred pharmaceutical expenditure

of ischaemic cardiovascular disease within the PHO population. This is calculated by adjusting the national prevalence of ischaemic cardiovascular disease to the age, gender and ethnicity variables of the PHO population.

This indicator makes up a total of 9% of a PHO's performance payment (3% for achieving the target in the total population and 6% for achieving the target in the high needs population).*

* High needs is defined as Māori and Pacific peoples and people living in New Zealand Deprivation Decile 9 or 10 socioeconomic areas (most deprived)

What is defined as ischaemic cardiovascular disease?

For the purpose of the indicator, ischaemic cardiovascular disease is defined as a medical diagnosis, either current or in the past, of one or more of the following conditions:

- **Ischaemic heart disease** – acute coronary syndrome, angina, percutaneous coronary intervention (PCI), coronary arterial bypass graft (CABG), myocardial infarction
- **Peripheral vascular disease** – atherosclerosis, aortic aneurysm
- **Cerebrovascular disease** – stroke and transient ischaemic attack (TIA)

N.B. Cardiac failure is not included as an indicator due to variable access to diagnostic testing. In addition, not all cardiac failure is caused by ischaemic heart disease.

How should a diagnosis of ischaemic cardiovascular disease be recorded?

The diagnosis of ischaemic cardiovascular disease needs to be recorded in a way that is retrievable. This means that an appropriate read code should be entered on the electronic patient record in the practice management system (PMS).

A G3 Read code detects all coded current and past cases of ischaemic heart disease. A computerised search using G3 automatically captures all lower codes such as G30 for myocardial infarction and G33 for angina. Cardiac procedures such as bypass surgery or angioplasty are listed under Read code 79 (although the patient should also have an existing G3 root code for the condition that required them to undergo the procedure).

A G6 Read code detects all coded current and past cases of cerebrovascular disease, but does not differentiate between atherosclerotic disease and cerebral haemorrhage. A G70-73 Read code detects all coded current and past cases of peripheral vascular disease. In these two cases, specified Read codes are excluded from counting towards the PHO Performance Programme target (Table 2).

The use of the code G70 relates to the Read term atherosclerosis, which in itself provides little clinical context. To record the presence of peripheral vascular disease we suggest the use of the G73z code. This covers the performance programme definition and provides better clinical context for clinicians.

For a list of all Read codes that are identified for the PHO Performance Programme see "Code Mappings for data transfer specification and clinical performance indicator data format standard document." pages 17-27, available from: **www.dhbnz.org.nz/Site/SIG/pho/Technical-Documents.aspx**

Any qualifying Read code matched to a qualifying patient will be counted, regardless of when it was recorded. Previously, some PMS' had an arbitrary ten-year look-back cut-off built into their queries but this limit has now been removed. The PMS error will have adversely affected the levels reported by the PHO Performance Programme prior to April 2011 when the patch was released.

Table 2: Read codes for ischaemic cardiovascular disease for the PHO Performance Programme

Description	Root Read code	Excluded codes
Ischaemic heart disease	G3...	
Heart failure	G58..	
Heart disease (not otherwise specified)	G5y..	
Cerebrovascular disease: Cerebral arterial occlusion Transient cerebral ischaemia	G6... G64.. G65..	G60.. G61.. G62.. G669. G6731 G674. G675. G676.
Atherosclerosis	G70..	
Aortic aneurysm	G71..	G717.
Other aneurysm	G72..	
Other peripheral vascular disease	G73..	G730. G731. G73y2 G73y4 G73y5 G73y6 G73y7 G73y8 G73yZ
Cardiac procedures	792..	
Endarterectomy carotid artery	7A204	

Ways to optimise coding for ischaemic CVD coding within the practice

To decide which approach to ischaemic cardiovascular disease coding is best for your practice, first consider who within the practice might have the skills and time available to review the various sources where information concerning ischaemic CVD can be retrieved.

Sources include:

1. Letters from secondary care, e.g. outpatient clinics, surgical operation notes, inpatient admission letters.
2. Previous medical records (usually in the form of paper-based patient notes), especially from patients that are newly registered with the practice.
3. Audits on medicines that suggest a diagnosis of ischaemic cardiovascular disease such as: anti-anginals (glyceryl trinitrate, isosorbide, nicorandil and perhexiline), dipyridamole and clopidogrel. N.B. Some medicines such as warfarin, aspirin or statins would not be appropriate for this audit as they may be used for conditions others than ischaemic cardiovascular disease, e.g. primary prevention of cardiovascular disease, atrial fibrillation.

Read codes can be added to patient notes within the PMS, at the time of the consultation. When relevant letters from secondary care arrive at the practice, Read codes can be entered directly by the GP reviewing the letter, or by highlighting or underlining any keywords on the letter for another staff member to enter the code.

Check Read codes whenever doing a repeat prescription, and if the code is not there, add it to the list of classifications. When adding a classification it is useful to tick both “long-term” and “add to patient history” on the classifications template in the PMS (if available). This will assist when writing referral letters in the future.

Establish policies within the practice to ensure consistency, accuracy and completeness of disease classification recording and clinical event coding.

Missing medical history?

Some patients have little or no recorded medical history, e.g. they may have immigrated to New Zealand or spent some time out of New Zealand, or their old notes (or parts of their record) may have become "lost" when transferring from one practice to another. When asking these patients about their previous medical history, it may be useful to enquire specifically about whether they have ever had a heart attack, stroke, "mini-stroke" or any heart surgery as these are terms that most people are familiar with.

Also consider opportunistically asking this same question of any patients aged over 50 years, to potentially identify ischaemic cardiovascular disease that is not recorded on the medical record held in primary care.

What are the benefits of coding ischaemic cardiovascular disease?

The main benefit of identifying and coding patients with ischaemic cardiovascular disease is in creating the best opportunity for secondary prevention.

Another important benefit is patient safety – it is easy for other doctors in the practice and locums to know what health problems the patient has when their primary doctor is absent. Accurate coding also ensures that any referral includes this information, which is particularly important if referring the patient for a surgical intervention.

General Practice disease registers – CVD

Consistent coding across general practice enables the development of disease registers. Disease registers group together long-term medical conditions with similar precursor risk factors and secondary preventative measures. Registers can be used to help to plan and organise preventative programmes and appropriate care, monitor the health of the practice population, facilitate audit and review clinical practice.

It is important to understand the difference between disease codes and health event codes. For example, a patient with an inferiolateral myocardial infarct could have the following codes:

Ischaemic heart disease	G3.00	Disease classification Code
Acute inferolateral infarction	G302.00	Health event code

The G3 code should be linked to consultations where this specific disease area has been covered. This ensures that the overriding disease class code remains at the top of the classification list in the PMS.

Resource:

DHBNZ. PHO Performance programme. Indicator definitions. Version 5. Available from: **www.dhbnz.org.nz/Site/SIG/pho/Operational-Documents.aspx**

Your Heart forecast™

The Your Heart Forecast tool can now be launched from *bestpractice* and is automatically populated from data extracted from the practice management system and/or entered by the clinician in *bestpractice*.

The tool shows patients:

- Their current risk (where they are now)
- How it relates to a peer with ideal risk factor control and same CVD risk (their cardiovascular age)
- What would happen to their risk as they get older and made no changes (their heart forecast)
- What would happen to their risk if they made healthy lifestyle changes, for example, stopped smoking.

The Your Heart Forecast tool was designed by Drs Sue Wells and Andrew Kerr, at the University of Auckland, and supported by the Heart Foundation, to help doctors communicate cardiovascular risk.

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Dabigatran to be listed in 2011

What is dabigatran?

Dabigatran is an oral direct thrombin inhibitor anticoagulant that is now approved in New Zealand for the prevention of stroke in patients with atrial fibrillation and for short-term use to prevent thromboembolism after hip or knee replacement surgery. It therefore provides an alternative to warfarin or enoxaparin (Clexane) for these indications. Dabigatran (Pradaxa) will be listed on the Pharmaceutical Schedule, without restriction. The listing date will be confirmed in the next few months.

What is dabigatran used for

At this stage, dabigatran looks promising as a new anticoagulant medicine. Studies show that it is as effective as warfarin for preventing stroke in patients with atrial fibrillation and as effective as enoxaparin for prophylaxis of thromboembolism after hip and knee surgery, with similar rates of bleeding.[1, 2, 3] For some patients dabigatran may be a more convenient option, especially compared to warfarin, because it does not require intensive laboratory monitoring. In addition, other advantages of dabigatran include:[4,5]

- A more rapid onset of action – patients are fully anti-coagulated within 36 hours
- A more rapid return to normal coagulation after discontinuation (48 hours)
- A wider therapeutic window with a more predictable effect on coagulation irrespective of age, ethnicity and weight (warfarin often has an unpredictable effect, individual variation and a narrow therapeutic window)
- A fixed daily dose is taken unlike the variable dose often required for warfarin. However, for stroke prevention patients should be aware that it is a twice daily dose.
- A lower interaction rate with other medicines and with food when compared to warfarin

However, despite these potential advantages, dabigatran should still be used cautiously because it is a new medicine and its use in clinical practice is not well known in New Zealand. Clinical experience and data on longer term safety is lacking. For example, although dabigatran was approved for use in Canada in 2008 for the prevention of thromboembolism, it has only as recently as October 2010 been approved for stroke prevention in patients with atrial fibrillation.[6] Similarly, dabigatran has been approved for use in the USA for stroke prevention since October 2010.[7] An increased risk of a rare adverse event has not been ruled out. Although not altering the conclusions of the study, re-evaluation of the database for the RE-LY trial, has identified 81 new events that included four patients with clinical myocardial infarction (MI), 28 patients with silent MI and 69 further events of major haemorrhage.[8]

Further information on dabigatran will appear in a future edition of Best Practice Journal.

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New recommendations advise that the majority of broad-spectrum antibiotics do not affect the contraceptive effectiveness of the combined oral contraceptive

International recommendations now advise that the majority of broad-spectrum antibiotics do not affect the contraceptive effectiveness of the combined oral contraceptive.[1,2] No change in advice has as yet been announced in New Zealand.

The implication of the new recommendations is that women taking a combined oral contraceptive, who require treatment with an antibiotic for three weeks or less,* no longer need to use additional precautions to prevent pregnancy. However, women should still be advised about the importance of correct contraceptive practice during periods of illness, e.g. if vomiting or diarrhoea occur.

This change in advice **does not** apply:

- To every antibiotic – patients taking antibiotics that induce liver enzymes, e.g. rifampicin and rifabutin, DO require additional precautions (see sidebar)
- If an antibiotic causes vomiting or diarrhoea – patients should be advised to follow the "seven day rule"

* Gastroinstestinal flora was believed to recover sufficiently after three weeks of antibiotic treatment (unless a new antibiotic was prescribed) so that additional contraceptive precautions were not required.[2]

Background to the changes

It has been standard practice for many years for doctors to advise patients who are taking a combined oral contraceptive that antibiotics affect its efficacy and that they must observe the '"seven day rule" when taking antibiotics. The "seven day rule" refers to advice to use other methods of contraception, e.g. condoms, or to abstain from sexual intercourse, for the duration of antibiotic treatment and the following seven days.

The theory supporting this approach was based on the potential for antibiotics to reduce the gastrointestinal flora

Contraceptive hormone metabolism

The contraceptive hormones, ethinyloestradiol and progestogen, when taken orally are absorbed from the small intestine. Absorption may be affected indirectly by medicines that cause vomiting or severe diarrhoea and medicines that alter gastric pH or gut transit. The hormones then undergo extensive first-pass metabolism in the small bowel mucosa and liver before reaching the systemic circulation.

Ethinyloestradiol is metabolised in the mucosa of the small intestine and in the liver. As much as 60% of orally administered ethinyloestradiol undergoes first-pass metabolism and thus only 40% is bioavailable. The bioavailability of progestogens varies.

Microsomal enzymes involved in the metabolism of contraceptive hormones and other drugs are found in the liver and intestinal mucosal cells. The oestrogen component, ethinyloestradiol, of the combined oral contraceptive is metabolised in the liver and conjugated with glucuronide to form inactive conjugates. These conjugates are water soluble and can be excreted in the bile. Under normal gut flora conditions, enzymatic activity of the gastrointestinal bacteria cleave this conjugate and free up oestrogen, which can then be reabsorbed (enterohepatic recycling).[2]

Cytochrome P-450 is the most important family of enzymes in drug metabolism and CYP3A4 is the major subtype found in adult hepatocytes and intestinal mucosal cells. If cytochrome P-450 enzymes or glucuronidation are induced the metabolism of ethinyloestradiol is increased, resulting in reduced levels of ethinyloestradiol and progestogens, potentially reducing their clinical effect. It takes 28 days for enzyme activity to return to normal after cessation of an enzyme inducing drug.[2,4]

responsible for increasing the reabsorption of oestrogens from the gastrointestinal tract (see sidebar). A reduction in gastrointestinal flora, could therefore result in a reduction in circulating hormone levels required for effective contraception.[3] However, the validity of this theory has been debated by specialists in women's health as there is no evidence that confirms this potential interaction.[1,2,3]

In 2009, the World Health Organisation, changed its recommendation to state that most broad spectrum antibiotics do not affect the contraceptive effectiveness of combined oral contraceptives and that no restriction on use is required when using these medicines at the same time.[1] This recommendation was adopted by the Centers for Disease Control and Prevention in the United States in 2010. In January 2011, the Faculty of Sexual and Reproductive Healthcare in the United Kingdom also changed its advice in support of this recommendation and the latest edition of the British National Formulary (BNF) includes this updated advice.[2,4]

Evidence for the change in advice

There is a lack of evidence that antibiotic use reduces the efficacy of the combined oral contraceptive.[2] Studies have not shown a decrease in the levels of ethinyloestradiol or any effect on gonadotrophin concentration with antibiotic use.[2]

A recent case-crossover study showed no association between contraceptive failure and antibiotic use in women taking combined oral contraceptives.[3] Although the authors state that an increase in risk of contraceptive failure cannot be ruled out due to limitations of the study design, they conclude that antibiotics have a limited effect on the metabolism of the combined oral contraceptive.

Other studies, that indirectly support the lack of a causal relationship between antibiotic use and contraceptive failure, include evidence that:[1,2]

- Combined oral contraceptive efficacy is not reduced in women who have had a colectomy and ileostomy, and therefore have no enterohepatic circulation of ethinyloestradiol.
- Reports of pregnancies in women taking antibiotics have included women taking high doses of a combined oral contraceptive, e.g. containing 30 µg or more of ethinyloestradiol. Low dose combined oral contraceptives containing 20 µg ethinyloestradiol are effective contraceptive agents so it seems unlikely that the theoretical small reduction in ethinyloestradiol concentration resulting from reduced enterohepatic circulation would be the cause of contraceptive failure in women taking higher doses.
- Reports of pregnancies have occurred in women taking erythromycin and fluconazole which actually increase levels of ethinyloestradiol.
- Study results may be confounded by other reasons for contraceptive failure, e.g. missed pills, antibiotic induced vomiting and diarrhoea.

Contraceptive advice for women using enzyme inducing antibiotics

The BNF recommends that an alternative method of contraception is always required for women using combined oral contraceptives and rifampicin or rifabutin.[4]

Induction of cytochrome P-450 enzymes explains the proven interaction with theses antibiotics,[2] which are potent enzyme inducing drugs.

If rifampicin or rifabutin is required (either short or long-term) the recommended strategy is for the woman to change to an alternative method of contraception that is not affected by enzyme inducers.[2,4] Options include injectable or implantable progestogens, an intrauterine contraceptive device or a levonorgestrel intrauterine system. If an enzyme inducer is required short term (i.e. less than two months) a practical solution would be to

temporarily stop the combined oral contraceptive and administer a one-off depot medroxyprogesterone acetate (DMPA) injection to cover the treatment course and the following 28 days.

A less favoured approach is to increase the dose of the combined oral contraceptive to give 50 µg or more of ethinyloestradiol to account for the increased metabolism and also recommending the use of condoms as an additional precaution.[5] This combination may be considered as an option if the enzyme inducing medicine is for short-term use (< two months) but is not recommended if the enzyme inducer is required for a longer term. Women taking an enzyme inducing medicine must continue to take a higher dose of combined oral contraceptive and use additional precautions for the time they are taking an enzyme inducer and for four weeks after finishing the course.[2,4]

For further information about other important drug interactions with combined oral contraceptives see: "Combined oral contraceptive: issues for current users" BPJ 12 (Apr 2008).

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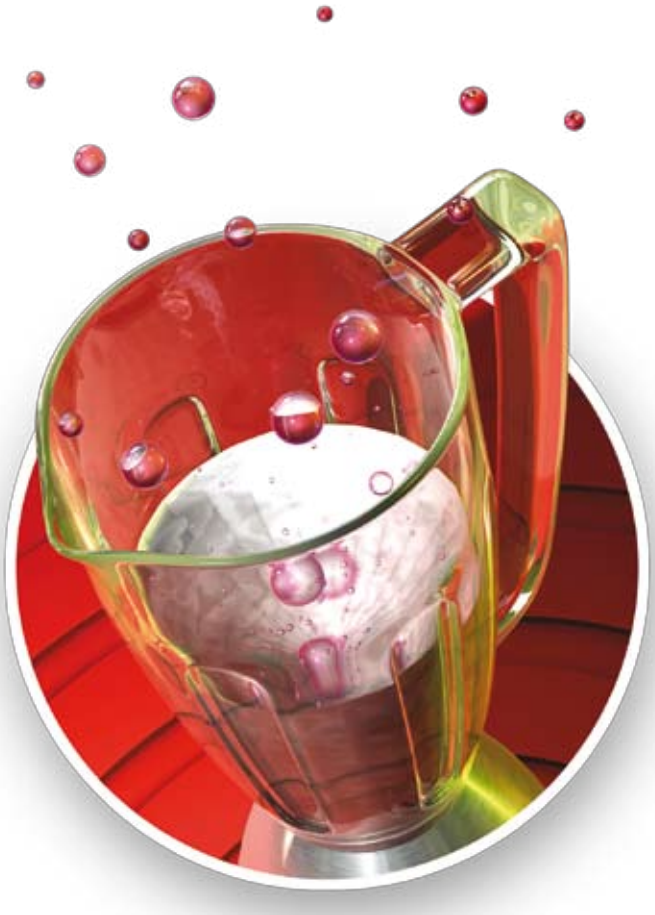
Did you see "Prescription kitchen"?

On 5 May, 2011 bpac[nz], in conjunction with PHARMAC and Mobile Surgical Services, participated in a live interactive television show about nutritional supplements and special foods, broadcast on Sky TV. The show was hosted by Ian Fraser and the panellists included GPs, dietitians, paediatricians and geriatricians. The main topics of discussion were the management of cows' milk allergy in infants and the place of oral nutritional supplements in elderly people.

If you missed the show, you can download it from the bpac[nz] website (follow the link from the home page): **www.bpac.org.nz**

A handbook on Special Foods in support of this programme has now been published. A CME quiz, based on material from the show, can also be completed online: **www.bpac.org.nz**



Serotonin syndrome and smoking cessation medicines

Dear Editor,
Could I please have some clarification regarding the interaction of Zyban and Champix with other antidepressants (SSRIs and venlafaxine in particular)? I am starting to hear reports of serotonin syndrome and ICU admissions.

Dr Amy Kempthorne, GP
Auckland

Bupropion (Zyban) is used as a smoking cessation medicine in New Zealand. It is also used in other countries to treat major depressive order. Bupropion is a dopamine-noradrenaline reuptake inhibitor, which increases the concentrations of noradrenaline (norepinephrine) and dopamine in the body.

Serotonin syndrome occurs when there is excessive serotonergic activity in the body, most often due to concurrent or excessive administration of medicines that affect serotonin levels. The syndrome is characterised by rapid onset of a triad of symptoms that can be life threatening:

- Cognitive: headache, agitation, confusion, hallucinations, coma
- Autonomic: shivering, sweating, hypertension, tachycardia, nausea, diarrhoea
- Somatic: muscle twitching, tremor

Although rare, there have been several reports of bupropion associated serotonin syndrome.[1,2] Bupropion itself has no serotonergic activity,[3] however, it does inhibit hepatic enzyme P450 CYP2D6, the same enzyme that metabolises antidepressants such as fluoxetine, paroxetine, amitriptyline and venlafaxine. This effect may result in elevated serum levels of these antidepressants in individuals who are already poor metabolisers, due to genetic polymorphisms in the CYP2D6 gene, thereby increasing the risk of developing serotonin syndrome.

Regardless of the risk of serotonin syndrome, bupropion should be prescribed with caution to people concurrently taking antidepressants due to the risk of seizures. Bupropion lowers the seizure threshold and is contraindicated in people with seizure disorders, eating disorders, those withdrawing from alcohol or benzodiazepines and people taking monoamine oxidase inhibitors. Extreme caution is advised when patients are concurrently taking other medicines which lower the seizure threshold such as antidepressants, antipsychotics, insulin or other hypoglycaemic agents, sedating antihistamines, anorectics, tramadol, systemic steroids and quinolones.[4]

Varenicline (Champix) is a smoking cessation medicine which acts as a partial agonist of the nicotinic acetylcholine receptor. This medicine is not an antidepressant and it has no serotonergic activity. Varenicline is not significantly metabolised and is largely excreted in the urine. Since varenicline does not affect the cytochrome P450 CYP pathway, it is unable to increase serotonin levels by influencing metabolism of antidepressant medicines.[5] It is unlikely that varenicline has any effect on serotonin release, or reuptake, and there are no published reports of varenicline induced serotonin syndrome.

Some patients using varenicline have reported adverse effects including depression and suicidal thoughts, and use may exacerbate underlying psychiatric conditions. Care should be taken when prescribing varenicline to patients with a history of mental illness, even if they are not currently being treated. Patients should be advised of this risk and the need to report any symptoms. Varenicline is currently being monitored by the Intensive Medicines Monitoring Programme (IMMP) and more information about its adverse effects may become available in the future.

For further information see: "Smoking cessation – pharmacological therapy", BPJ 20 (Apr, 2009)

"Snippets: Suicidal thoughts and behaviours associated with varenicline use", BPJ 13 (May 2008).

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The evidence for breast screening

Dear Editor,

I enjoyed reading your article "Increasing the uptake of breast screening", BPJ 33 (Feb, 2011). Many general practices spend considerable time, effort and money attempting to do just that. Much of that effort takes the form of personalised invitations and face to face attempts at persuading women, who are often rather sceptical of the prospect of undergoing a sometimes uncomfortable procedure. We owe it to these women to ensure that we have our facts straight and can deliver them in an understandable way.

A good start is ensuring that all are in agreement that mammography does not prevent breast cancer. This point is made quite clearly at the start of the article but is worth repeating as misleading slip-ups can occur when a message is being repeated on many occasions to different people. Later in the article the authors fall prey to this error themselves when they incorrectly suggest that women with a breast cancer gene can "...reduce their risk of developing breast cancer with options including more frequent screening and starting (mammography) at a younger age".

*We do know that mammograms can detect a breast cancer before it is symptomatic, although this in itself does not mean that the person will survive the breast cancer. This is where the statistics can begin to deceive. The authors state the relative risk reduction (of death from breast cancer) for woman undergoing regular mammography as 25% to 30%. If a thousand women are screened with mammograms for ten years two will die from breast cancer instead of three (the figure for the unscreened population). A general practice of say 2000 patients might have 350 eligible women and would need to run a 100% uptake rate mammogram programme with no drop-outs for thirty years to prevent one of these women from dying from breast cancer. Because abnormal results are quite frequent, and 90% of those are false positives, by the time these woman have completed all their free mammograms half of them will have had one or more positive results and undergone further investigation to discover that they do not have breast cancer.**

* *Elmore J, Barton M, Moceri V, E=et al. Ten-year risk of false positive screening mammograms and clinical breast examinations. N Engl J Med 1998; 338(16):1089-96.*

My point is not to attempt to address the good versus harm debate, but simply to ask if women are being given the opportunity to make an informed decision for themselves? The most informative of Breastscreen Aotearoa's various multilingual information leaflets (HE1801) mentions the existence of false negatives and false positives but quotes no figures at all in terms of either relative or absolute risk reduction. It, therefore, falls to clinical staff to answer patient's questions and we better be sure we have our facts right.

Dr Kerr Wright, GP
Auckland

To allow women to make informed decisions about breast screening, general practitioners and practice nurses need to be able to discuss with their patients the pros and cons of screening and to understand how New Zealand guidelines are arrived at.

The aim of any cancer screening programme is to ensure that nobody with cancer goes undetected. As a result, some people will be called back for a secondary examination due to suspicious or indeterminate results, but in the majority of cases, cancer is not confirmed in these patients, i.e. a false positive. The harm (i.e. anxiety) associated with false positive results needs to be weighed up with the benefits of screening.

The National Screening Unit recommendations aim to reduce the amount of breast cancer false positives by targeting women in the age range of 45 to 69 years with biannual breast screening, because:

- Breast cancer rates are significantly elevated in this age group
- Biannual testing provides 70 to 99% of the benefits of annual testing[1]

Screening more frequently, or screening of a wider cohort is not performed because:

- Detection of breast cancer by mammogram is more difficult in younger women due to denser tissue and false positives are more common
- Annual testing significantly increases the number of false positives[2]

It is generally accepted that the relative risk reduction for international breast screening programmes with a 70% participation rate is 20–30%.[3, 4] What makes the relative risk reduction meaningful is the incidence of breast cancer. Each year approximately 2300 New Zealand women develop breast cancer and 630 will die from it. This makes breast cancer the leading cause of cancer death for women aged 45 to 69.[5] Applying a 25% risk reduction to a New Zealand setting means that if no screening were to occur at all, then each year approximately 840 women would die, i.e. 210 more than if screening did occur.

The absolute risk reduction is calculated by determining the risk of dying from breast cancer and applying the relative risk reduction to this figure, if breast screening occurs. For example, if the risk of dying from breast cancer in a 60 year old woman in the next ten years was 9 in 1000, then screening would reduce this risk by 20–30%. This means that a woman in this age group now has a 6 to 7 in 1000 chance of dying from breast cancer if she has biannual breast screening. As the absolute risk of dying from breast cancer decreases with age, younger women derive less benefit from the relative risk reduction achieved from breast screening.

However, perhaps a more important statistic is the number of women that need to be screened to prevent one death. A meta-analysis, published in the United States, of six trials among women aged 50 to 59 years and two trials among women aged 60 to 69, calculated that the number of women needed to be screened by mammography, every two years, to prevent one death, was 1339.[1] In New Zealand, the uptake of breast screening among eligible women (i.e. aged 45 to 69 years) is approximately 67%,[6] equating to over 450 000 women screened every two years.

Although the New Zealand breast screening programme undoubtedly prevents deaths, the trade off is the anxiety of false positives and the discomfort and potential pain of the procedures required for screening and investigation. Through informed discussion with their GP and practice nurse, every woman should have the right to make her own decision on whether she undergoes breast screening.

N.B. The correspondent is correct in stating that mammography does not prevent breast cancer from occurring, it enables detection of tumours that can then be treated to prevent the cancer developing and therefore to reduce the risk of death. Mammography does not

detect all tumours and the two year interval between screening means that some fast-growing tumours, which are associated with a higher risk of mortality, may not be detected.

We value your feedback. Write to us at: Correspondence, PO Box 6032, Dunedin or email: editor@bpac.org.nz

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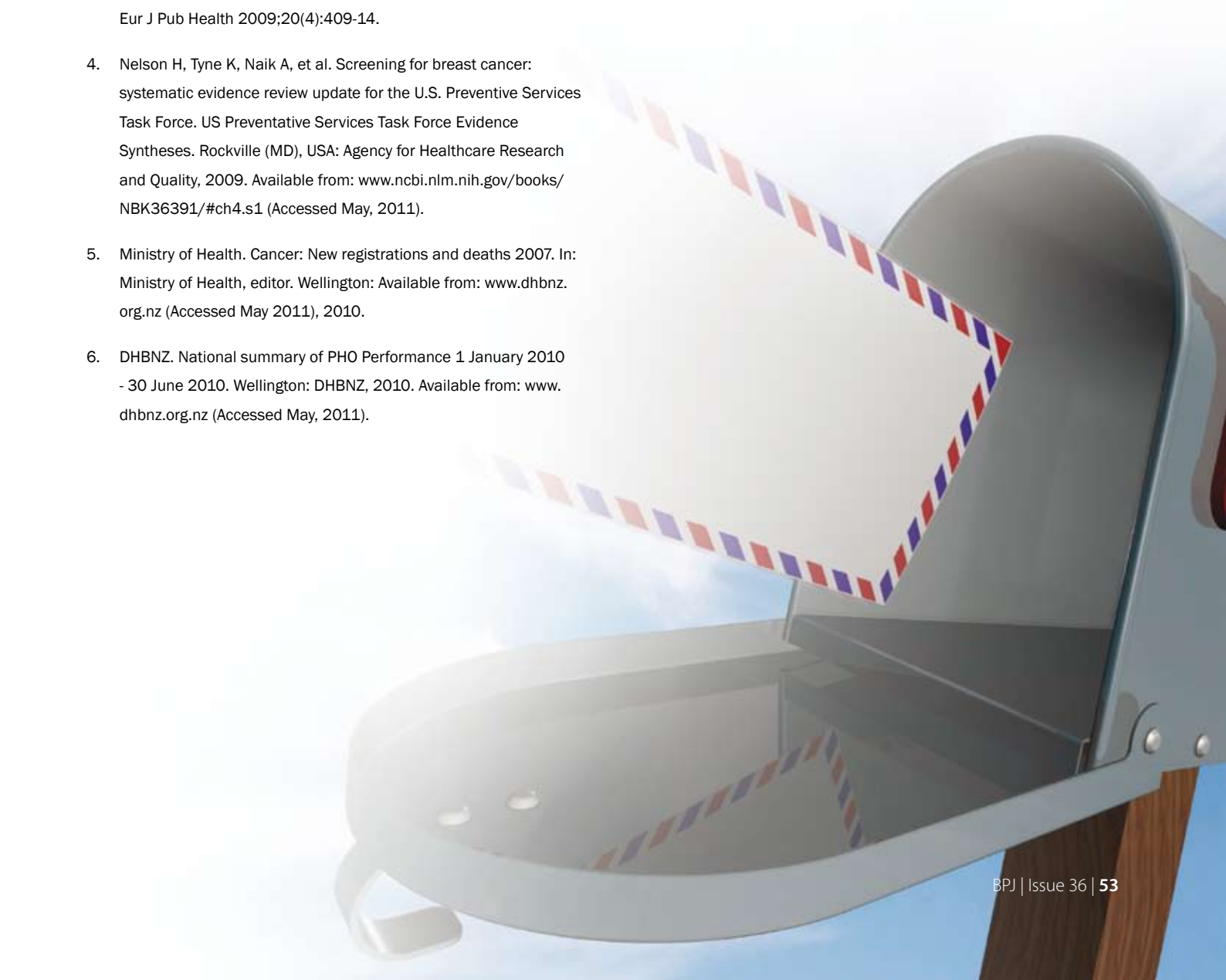

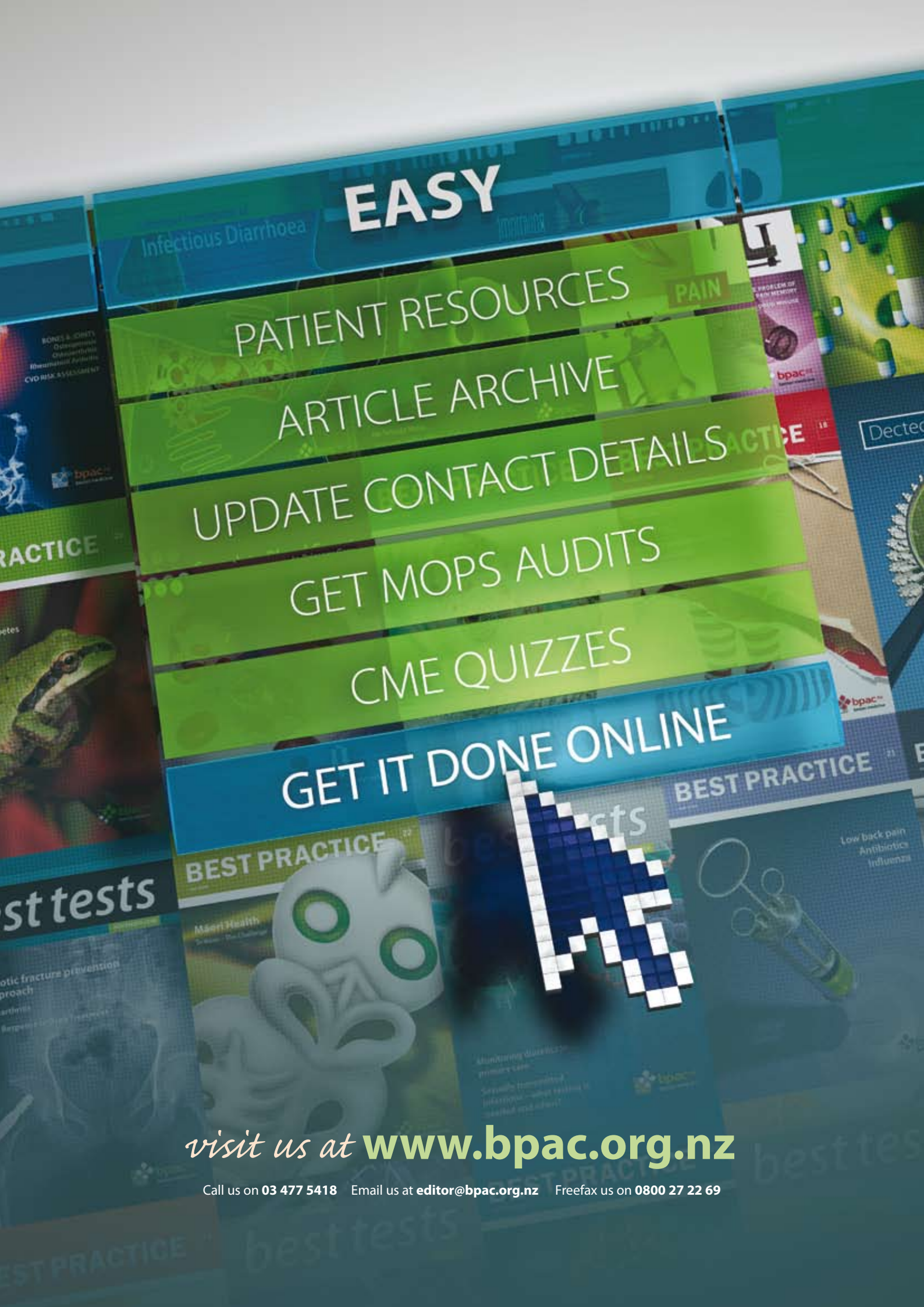
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