DIABETES – LIFESTYLE TO INSULIN | MENTAL HEALTH PROBLEMS IN YOUNG PEOPLE | HEALTH APPS

Best Practice

www.bpac.org.nz

Issue 72 December 2015

Travel consultation essentials

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ACKNOWLEDGEMENT
We would like to acknowledge the following people for their guidance and expertise in developing this edition:

Dr Sue Bagshaw, Christchurch
Dr Theresa Fleming, Auckland
Dr Steven Miller, Auckland
Dr Marc Shaw, Auckland
Dr Jenny Visser, Wellington
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Best Practice

Issue 72 December 2015

Best Practice Journal (BPJ)
ISSN 1177-5645 (Print)
ISSN 2253-1947 (Online)

BPJ is published and owned by bpac^{nz} Ltd
Level 8, 10 George Street, Dunedin, New Zealand.

Bpac^{nz} Ltd is an independent organisation that promotes health care interventions which meet patients' needs and are evidence based, cost effective and suitable for the New Zealand context.

We develop and distribute evidence based resources which describe, facilitate and help overcome the barriers to best practice.

Bpac^{nz} Ltd is currently funded through a contract with PHARMAC.

Bpac^{nz} Ltd has six shareholders: Procare Health, South Link Health, General Practice NZ, the University of Otago, Pegasus and The Royal New Zealand College of General Practitioners

Printed in New Zealand on paper sourced from well-managed sustainable forests using mineral oil free, soy-based vegetable inks

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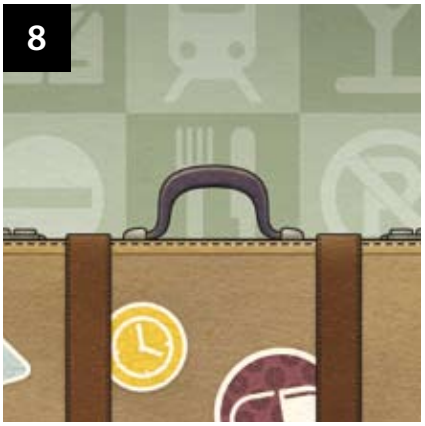

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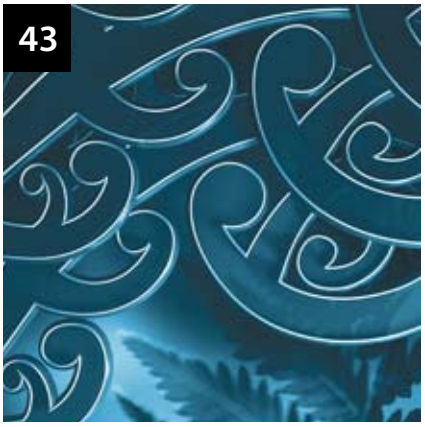

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Personal technology for health: **curiosity or clinically useful?**

There are approximately 165,000 health "apps" currently on the market for mobile phone users. A health app is an application that runs on a smart phone to provide information, advice and feedback on health, fitness or wellbeing. While this could provide useful motivation for lifestyle change for some, a major drawback of most health apps is that the content and design has no input from medical professionals, and therefore could result in detrimental health effects for some users, depending on how much they rely on the app. If a patient asks for advice about using a health app, or is already using an app, there are some key points that clinicians can work through with the patient to ensure that they are making the best decisions for their health and wellbeing.

Personal technologies for health include mobile phone apps, pedometers and activity and fitness trackers (e.g. watches). Many of these technologies are focused on healthy lifestyle and fitness, but there are also apps which are designed to help patients manage specific medical conditions, e.g. diabetes and asthma.

Health apps aimed at patients have generally been designed to fulfil one or more of the following functions:[1]

- Increase accessibility to health information
- Track health information, e.g. diet and physical activity
- Link to social media, e.g. sharing and comparing running times
- Provide entertainment for health purposes, e.g. carbohydrate counting games for people with diabetes
- Perform calculations and analyses, e.g. calculating insulin doses or analysing an image of a skin lesion

The common thread of these technologies is that they provide users with health information and advice, monitoring of health goals and behaviour reinforcement. The questions that arise for clinicians are whether the information these technologies provide is reliable and whether using them improves patient outcomes or if they could actually cause harm.

Weighing up the potential benefits and harms of health apps

When designed to meet a clinical need and properly assessed in appropriate trials, health apps and devices have the potential to deliver benefits to patients and clinicians and alter the way healthcare is delivered. The problem is that not many apps have evidence of clinical robustness.

The design and introduction of health apps has primarily been driven by developers (sometimes pharmaceutical companies) who have seen a market opportunity, rather than by clinicians with a desire to improve patient health or the functioning of the health system.

Independent assessments of health apps have found that:[2, 3]

- The majority of apps have no evidence of involvement of health professionals, universities or patient organisations in their development
- The information content of most apps does not align well with current evidence
- Many apps offer the potential for harm by providing erroneous information or acting as unapproved medical devices

Research into the quality and content of health apps for people with specific medical conditions has almost universally concluded that most perform poorly across a range of assessments; examples include poor quality apps for asthma, diabetes self-management, estimation of cardiovascular risk and scoring of disease activity for patients with rheumatological conditions.[2, 3]

Even well made apps may have content or features which are not entirely suitable for users in New Zealand (or any other country outside of the target market), such as advice based on international guidelines which recommends medicines or treatments that are not available.

Various commentators have suggested that some form of app curation or approval by recognised clinical authorities is needed.[2, 3] However, at present a very limited range of such lists are available (see: "Where can I find good apps?", Page 6).

Potential benefits of health apps include:[2, 3]

- May provide understandable health information for patients with low health literacy
- May reduce barriers for patients in rural and remote areas
- May empower patients to take responsibility for their health care
- May be more cost-effective than face-to-face consultation
- May result in positive lifestyle changes, e.g. weight loss, increased fitness

Potential adverse effects and limitations of health apps include:[2, 3]

- May be misused or misunderstood by patients with limited technology skills or low health literacy
- May discourage patients from seeking face-to-face health assessment when necessary
- May result in a missed diagnosis through false reassurance or inaccurate measurements
- The single focus of apps may mean patients miss other health concerns
- May cause obsessive focus on health or fitness; which may also result in unnecessary use of health resources
- Financial cost to the patient
- Lack of research on efficacy and robustness of information
- Lack of regulation
- Issues around the confidentiality and privacy of the information provided to the app

Poorly designed apps have the potential to cause harm

Some apps may provide incorrect advice or measurements which are unreliable, resulting in a potential risk to a patient's health. For example, one of the top ten downloaded apps in 2014 claimed to be able to measure blood pressure via a phone's camera and microphone. There is no evidence of whether this is actually possible, or accurate, and a disclaimer appears in the fine print that the app is for entertainment purposes only.[4]

Similar disclaimers are found on popular apps for self-diagnosis. Patients who rely on a health app for self-diagnosis may be falsely reassured by an inaccurate assessment. For example, a melanoma detection app was found to have only 10% sensitivity to detect biopsy-proven melanomas.[2] Conversely, if a patient is "diagnosed" with a condition that they do not have through use of an app, this is likely to result in increased anxiety and distress, as well as the cost of any unnecessary consultation with a clinician.

A systematic review of 46 apps for calculating insulin dose found that 67% risked making an inappropriate dosing recommendation.[2] Similarly, a systematic review of apps for asthma management found that one-third contained incorrect information about using an inhaler.[2]

Health apps can reinforce illness behaviour

Too much involvement in health apps may result in some patients becoming obsessive about their health and unduly focused on detecting illness. Some patients with chronic health problems who use an app may not be able to "switch off" and are constantly reminded of their condition. In patients with type 2 diabetes, there is evidence that too many reminders in the form of self-monitoring of blood glucose levels can have adverse psychological effects, including feelings of guilt, futility and not being in control.[5]

Health apps may even directly cause harm. In 2014, the FDA advised against the use of apps and associated devices which allow expectant mothers to monitor fetal heartbeat using Doppler ultrasound, due to the unclear risks of excessive ultrasound exposure.[6]

How effective are weight loss and fitness apps and devices?

Among the hundreds of health conditions that are the focus of a health app, apps that target weight loss, improving dietary intake and increasing physical activity levels are some of the most popular. There have been few studies into the efficacy of apps designed for these purposes. Those that have been done have often included components such as text-message support and follow-up from a dietitian or counsellor. Systematic reviews of these studies suggest some people lose weight and improve lifestyle behaviours with the use of an app, but evidence is mixed.[7, 8] It is uncertain whether patients using an app alone would achieve the same results as seen in clinical trials.[7, 8]

A randomised controlled trial in Auckland into the effect of apps for improving fitness in young, inactive people found no overall improvement in participants' fitness after using an app.[9] Some participants did not like the apps and hardly used them (reasons given included lack of time, lack of interest and finding the app tedious to operate), whereas others found them beneficial and reported that they would keep using them after the study and thought they would help them achieve fitness goals.[9]

Most weight loss and fitness apps incorporate a limited range of strategies for producing behavioural change, e.g. how to read nutrition labels, relapse prevention, developing a regular pattern of eating, time management and stress reduction.[10, 11] Therefore, patients may not learn the same skills and derive the same benefit as they would if they were able to see a dietitian or health professional trained in assisting patients with weight loss.

Pedometers (step counters) are one of the earliest forms of wearable health technology and have been the most thoroughly assessed. A meta-analysis of pedometer use for weight loss, that included nine clinical trials with a total of 307 overweight individuals, found that on average, use of a pedometer for 16 weeks resulted in a mean weight loss of 1.27 kg (95% CI: 0.70 – 1.85 kg).[12] The longer people used a pedometer, the greater the degree of their weight loss; the longest study of pedometer use lasted for one year and resulted in an average increase of 1,800 steps per day and 3.7 kg weight loss.[12]

Some apps may function as unapproved medical devices

Due to their functionality, some apps available to New Zealand consumers fall under the definition of a medical device, despite not having appropriate approval in New Zealand for this. Patients should be advised to use these apps with caution as the reliability and validity of their functions are unclear.

A medical device includes any device, instrument, apparatus, appliance, or other article that is intended to be used in, on, or for humans for a therapeutic purpose. Medical devices sold in New Zealand must be labelled with the manufacturer or the manufacturer's distributor in New Zealand. Most apps are developed overseas and it is unlikely developers will seek specific regulatory approval for a small market like New Zealand. Apps produced in the United Kingdom or United States which function as medical devices should have approval from the Medicines and Healthcare Products Regulatory Agency (UK) or Food and Drug Administration (United States).

Examples of apps which could meet the definition of a medical device include those that:

- Use extra attachments to perform a function which would usually be done by a medical device, e.g. apps which use ECG leads to display a heart rhythm, or attach to a blood glucose sensor to guide insulin dosing
- Use built-in functions of the phone to perform tasks that could be done by a medical device, e.g. apps which analyse an image of a skin lesion or apps emitting sounds to provide hearing tests
- Work in with an existing medical device, e.g. apps used to calibrate or control a cochlear implant, control the inflation and deflation of a blood pressure cuff or connect to an insulin pump

Where can I find good apps?

There are a small number of online directories and studies which have independently assessed health apps. For example:

Weight loss and smoking cessation apps assessment, 2015
Medical students and researchers from the University of Otago, Wellington evaluated 60 weight loss and 60 smoking cessation apps. The apps, which were developed in various countries, were evaluated according to how well they aligned with smoking cessation and weight management advice from the Ministry of Health, their cultural appropriateness for Māori and other features such as engagement and usability. The highest rated weight loss and smoking cessation apps for Android and iOS (Apple) operating systems were:

	Smoking cessation	Weight loss*
iOS	Quit Now: My QuitBuddy (Australian National Preventive Health Agency)	Calorie Counter and Food Diary by MyNetDiary (MyNetDiary Inc.)
Android	My Quit Smoking Coach (Andreas Jopp)	Noom Coach: Weight Loss Plan (Noom Inc.)

* N.B. bar code scanners in these weight loss apps do not work in New Zealand

For further information, including other high scoring apps, see: **www.otago.ac.nz/wellington/otago119763..pdf**

www.vimeo.com/133304804

Apps for patients with diabetes
James Nuttall, a dietitian at the Auckland Diabetes Centre, has researched apps for patients with diabetes, including their relevance to patients in New Zealand. He discusses the pros and cons of five popular diabetes apps in an article in Diabetes New Zealand magazine.

N.B. apps involving insulin dosing calculators are often associated with errors and these measurements should be used with caution.[2]

See: **www.diabetes.org.nz/__data/assets/pdf_file/0018/12708/diabetes_autumm_2015_which_diabetes_app.pdf**

iMedicalApps
This is a United States-based site, where apps are independently reviewed by clinicians, medical trainees and technical advisors. The Cochrane Collaboration lists iMedicalApps as a trusted, evidence-based website.

See: **www.imedicalapps.com**

National Health Service (NHS), UK
The NHS website lists apps which may help patients with smoking cessation, improving and tracking dietary intake, increasing exercise and moderating their alcohol intake. It is unclear what criteria have been used as the basis for assessing these apps.

See: **www.nhs.uk/conditions/nhs-health-check/pages/tools-and-technology-that-can-help.aspx**

www.nhs.uk/Tools/Pages/Toolslibrary.aspx?Tag=Downloads+and+widgets

MyHealthApps
This is an online directory of apps, based on the European Directory of Health Apps, printed in 2012. Apps are nominated and reviewed by patient or consumer groups. Information about the developers, their funding, contact details and whether medical professionals were involved in the app's development must be in the public domain for the app to be listed.

See: **www.myhealthapps.net**

Although this amount of weight loss may seem small, in the United States Diabetes Prevention Program overweight participants had a 55% reduction in the risk of developing type 2 diabetes over three years with a weight loss of 5 kg (equivalent to 5.3% of their initial body weight).[13]

Fitness trackers and activity monitors typically include a pedometer with additional functions such as heart rate or sleep monitoring, and are usually worn on the wrist. There may also be a supporting website where users can view their information and receive motivational, dietary or exercise advice and share information on social networks. There is currently little evidence that activity trackers are more effective in achieving weight loss or increasing activity than a simple pedometer. For example, one study of overweight postmenopausal women (average age 60 years) found that a pedometer provided the same benefits (increased activity levels) as a more expensive activity tracker.[14] Current research suggests that sleep tracking functions on activity monitors are not able to identify waking accurately and consequently overestimate the time spent asleep.[15]

Questions to discuss with patients considering using apps

1. **Who are the developers?** Has the app been developed by an independent company, e.g. a respected patient organisation or medical authority, or a company with an "ulterior motive", e.g. a pharmaceutical company who manufacturers a medicine related to the topic of the app.
2. **Where did they get their information?** Check if the app lists where the information provided comes from, whether the source is appropriate, e.g. a clinical practice guideline, and whether it is regularly updated.
3. **Is the app content and advice suitable for New Zealand?** Information related to investigation and treatment of the health condition covered by the app may not be appropriate, or align well with New Zealand guidelines, if apps are designed for an overseas market.
4. **Is there a disclaimer?** e.g. "for entertainment purposes only".
5. **Does the app record patient data?** e. g. food intake, an exercise log, location data or health information. Is the patient comfortable with the level of privacy and security of their information? Is this information used to target advertisements to the user?
6. **Does the app take physiological measurements?** Ensure the patient knows that these measurements may not be accurate and should not be relied upon.
7. **How is the patient proposing to use the app?** Advise patients not to make any treatment decisions or alter the dosing or frequency of their medicines on the basis of apps.
8. **Is it all a bit too much?** Consider whether the app may be causing harm, such as obsessive fixation on body weight or food intake, or "disease mongering" behaviour.

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Travel consultation essentials:

for departures and arrivals

Travel consultations involve assessing the risks that may occur during a journey and helping the traveller minimise them. This may include education, planning, vaccination, prophylaxis and as-required medicines. If the patient is taking medicines for a long-term condition ensure that they will have enough for the duration of the journey and are confident in making any dose adjustments that might be required due to changes in time zones. Treatment for overseas visitors to New Zealand can be complicated by eligibility issues for subsidised healthcare and a lack of medical history.

Key practice points

- The first goal of a travel consultation is to establish the risks the traveller is likely to be exposed to
- Advance planning, education, vaccinations, malaria prophylaxis and as-required medicines are the key tools for reducing travel-associated adverse events
- Patients with long-term conditions should be provided with sufficient medicines to cover the time that they will be away and a letter outlining their medical history
- Patients taking certain long-term medicines, e.g. insulin or warfarin, who are crossing multiple time zones may need advice to temporarily adjust their treatment

Consulting with people before they travel

People who require pre-travel medical advice should visit either a general practice or travel medicine clinic ideally at least six to eight weeks before departure to manage travel-associated risks and plan any vaccination schedule. However, there is still much that can be done to facilitate safe journeys for people who present shortly before leaving. Asking patients about potential future travel encourages them to plan in advance.

The pre-travel checklist

The objectives of the first travel consultation are to:[1]

1. Establish the traveller's itinerary and assess any risks that they may be exposed to
2. Provide education to minimise risk and self-manage transient illness
3. Determine any need for vaccinations, malaria prophylaxis and as-required medicines

The following factors determine what should be addressed in a travel consultation:[1]

- Date of departure, length of stay and areas to be visited, e.g. rural or urban
- Activities likely to be undertaken
- Accommodation, e.g. hotel, backpackers, camping, staying with locals, cruise ship
- Immunisation history
- Relevant medical history, including previous and current conditions, medicines and allergies
- Any safety or security issues, e.g. weather or conflict
- Prior travel experience, e.g. previous high altitude exposure

Remind travellers that their insurance needs to cover pre-existing conditions and any activities that may be planned, e.g. riding a motor scooter. Policies should be checked for exclusions and to ensure they contain a medical evacuation clause if repatriation to New Zealand is required. Supplementary insurance will be required to cover pregnancy-related complications, including pre-term birth (See: "Travelling during pregnancy", Page 10).[1] Online access to medical records via a patient portal can be beneficial if patients do require medical attention while overseas.

Safetravel is a government website that provides up-to-date information for travellers leaving New Zealand, available from: **www.safetravel.govt.nz**

Assessing a person's fitness to fly

As a rule, people with unstable medical conditions should not fly,[2] and caution is required when considering travel to destinations at altitude. A person with a condition such as cardiopulmonary disease may experience an exacerbation

due to decreased barometric pressure and partial pressure of oxygen.[2] The duration of the flight is also relevant when assessing a person's fitness to fly.[2]

International airlines have medical units that can be contacted to determine if a passenger requires a medical certificate to travel.[2] Conditions where this may be appropriate include:

- Cardiovascular disease, e.g. unstable angina or congestive heart failure, recent myocardial infarction or a history of venous thromboembolism (VTE)
- Respiratory conditions, e.g. unstable asthma or advanced chronic obstructive pulmonary disease
- Neurological conditions, e.g. recent transient ischemic attack, seizure or neurosurgery
- Unstable psychiatric illness

People with communicable diseases, such as measles and varicella, are not permitted to fly while they are infectious.[2]

Air New Zealand may require a medical fitness for air travel form (MEDA) to be submitted to their Aviation Medicine Unit for passengers with a major health condition. A MEDA is required to take medical equipment such as oxygen or continuous positive airway pressure (CPAP) machines on board a plane.

Air New Zealand provides guidance on the submission of MEDA forms, available from: **www.airnewzealand.co.nz/assets/PDFs/meda-part-3-doctor-guidelines.pdf**

Travelling during pregnancy

Most airlines will allow women with an uncomplicated pregnancy to fly until 36 weeks gestation; later travel may be possible with medical clearance.[1] Evidence of the expected date of delivery may be required.[1] Women with a multiple pregnancy are advised not to fly after 32 weeks gestation.[2] Most cruise ships restrict travel for passengers beyond 28 weeks gestation, some as early as 24 weeks.[1] Pregnant women travelling by sea may be asked to provide a letter indicating that they are fit to sail and their expected date of delivery.

Advice for people travelling with medicines

Essential medicines should be transported in their original packaging in carry-on luggage, rather than in the cargo-hold where they may freeze or be lost. Liquid medicines over 100 mL may be permitted into the flight cabin if the passenger has documentation showing the need for the medicine to be taken during the flight. Otherwise quantities over 100 mL will need to be put in smaller containers; pharmacies should be able to supply appropriately labelled containers. People travelling with prescription medicines should carry two letters; one for customs listing the diagnosis and treatment regimen and a second for health professionals that also includes their medical history and any other relevant information, e.g. allergies and intolerances.

If a person requiring a prescription medicine will be away for a period longer than the maximum amount that can be dispensed to them, they will need to arrange to see a health provider in their country of destination to receive a prescription for additional medicines.

Precautions for people with insulin-dependent diabetes

People with insulin-dependent diabetes should have a letter stating their need to carry pens or syringes, and carry sufficient quantities of insulin and blood glucose test strips.[3] Individual urine ketone testing kits and several glucagon hypokits are recommended; these can be prescribed or purchased from pharmacies.[3]

Travelling across time zones may affect insulin dosing; discussion with the patient's medical advisor or an diabetologist or diabetes nurse prior to travel is helpful if there is uncertainty. Mild hypoglycaemic symptoms may be masked by disrupted sleep; testing blood glucose levels every four to six hours assists in the timing of meals and insulin administration.[1] Advise patients that their blood glucose levels may run higher than usual while travelling, but that this is acceptable provided these elevated levels (e.g. up to 16-20 mmol/L) do not persist for more than 24 hours;[3] this will also help to prevent hypoglycaemia.[4] Those with insulin-dependent diabetes should wear an alert bracelet and learn how to say key phrases, such as "I have diabetes", in the language(s) of the countries they will be visiting.[3]

Recommendations for travellers taking insulin include:[3, 4]

- Try to maintain regular meal times and medicine dosing while travelling
- Carry an accessible supply of carbohydrates (e.g. jelly beans, glucose tablets and muesli bars) to cover gaps in food service on the plane or delays in airports
- In-flight meals provided for people with diabetes can be low in carbohydrates and may not be appropriate for those at risk of hypoglycaemia
- After arrival, switch to local time. The next dose of intermediate-acting or pre-mixed insulin may need to be adjusted depending on the amount of time since the last dose. When flying to the east, a reduced dose may be appropriate to account for a shorter day and when flying to the west, more insulin may be needed.

- Basal-bolus insulin regimens, i.e. once daily long-acting insulin and post-prandial short-acting insulin, do not need adjustment and patients can keep taking long-acting insulin every 24 hours and bolus insulin after meals
- Insulin pumps only need to have the time on the pump changed to the local time.[4] Ensure the safety plug (used to waterproof the pump) is not in the pump during flight as this can lead to incorrect dosing following changes in air pressure.

Information for travellers with insulin-dependent diabetes is available from: **www.diabetes.org.nz/living_well_with_diabetes/living_with_type_1_diabetes/travelling**

People taking warfarin may need to adjust their doses

People taking warfarin need to adjust the timing of their dosing if they are travelling across six or more time zones, i.e. six or more hours difference in time from their departure city.[5] The dose can be delayed by two hours per day after arrival until warfarin is being taken at a more convenient time.[5]

Travel causes changes to routines which may mean INR monitoring needs to be more frequent. Point-of-care INR testing may be available from a pharmacy in the country of destination or a health provider could be contacted in advance to arrange testing. Self-monitoring of INR levels is an option for people who are able to purchase a device and testing strips. Patients taking warfarin should be advised to seek medical assistance if they experience unusual bleeding or bruising.

Contraception advice while travelling

Travel can cause disruption to oral contraceptive dosing; if pills are missed the routine advice applies (see below) and an alternative method of contraception should be used if there are concerns. If a woman taking a combined oral contraceptive misses two or more active pills in the first or last week of her cycle or more than eight active pills during other weeks, she will need to use the seven-day rule to maintain contraceptive coverage.[6] Progesterone-only contraceptive pills need to be taken within the same three-hour window (12 hours for desogestrel) to be effective.[7]

Women taking contraceptives pills may wish to adjust their dosing regimen prior to departure to account for the new time zone. For example, after finishing her placebo pills a woman may begin the next active cycle of pills at the time in New Zealand that corresponds to the time she plans to be taking each dose when she arrives at her destination, e.g. 10 am in New Zealand and 10 pm in England. Alternatively in this example, she may begin taking the pill an hour earlier each day, 12 days before departure (one day for every hour of time difference).[8] The usual schedule (at the destination time) can then be recommenced on arrival.

Family planning provides information on how to manage missed contraceptive pills, available from: **www.familyplanning.org.nz/media/172505/instruction-pad-coc-pill-sept-2014.pdf**

Travelling with opioids and other controlled medicines

International law allows people prescribed narcotics (e.g. opioids) or psychotropic medicines, i.e. medicines which act on the central nervous system (e.g. antipsychotics, antidepressants, anxiolytics, sedatives), to carry one month's supply across international borders for personal use.[9] However, there are substantial differences between how countries enforce this policy. Some countries have stricter controls and others are more lenient; Japan and the United Arab Emirates are known to be stricter than most.[9] People needing to carry more than one month's supply of these medicines into another country can contact the Ministry of Foreign Affairs (see below) to determine if they are able to do so. A consultation with a health professional at the patient's destination may need to be arranged to ensure a continuing supply of medicines.

The dispensing rules for medicines in New Zealand do not necessarily match the laws governing transportation of medicines between countries. For example, zopiclone can be dispensed in 90-day lots in New Zealand, but some countries may only allow travellers to enter with one month's supply.

The transportation of opioids and their derivatives, e.g. codeine and morphine, is controlled by the 1961 Narcotics Convention and travellers carrying these medicines should always have a letter from a doctor.[9] The person's name on their passport must match the name on any documentation provided by a doctor.

The International Narcotics Control Board has information on international agreements governing the transportation of medicines across borders, available from: **www.incb.org/incb/index.html**

When travelling to a country with strict drug laws, e.g. Indonesia or Thailand, or if there is uncertainty regarding the legality of a medicine in another country, further information can be requested via the Ministry of Foreign Affairs' website: **www.mfat.govt.nz/Embassies/2-Foreign-representatives-to-NZ/Diplomatic-and-Consular-List.php**

Table 1: Summary of vaccination recommendations prior to international travel[7, 10–13]

Vaccination	Recommendation	Adult schedule	Comments
Influenza	For travellers who did not receive a vaccination during the previous autumn or winter	One dose given annually. The 2016 southern hemisphere influenza vaccine will provide protection against: ■ A/California/7/2009 (H1N1)-like virus ■ A/Hong Kong/4801/2014 (H3N2)-like virus ■ B/Brisbane/60/2008-like virus	If arriving in the northern hemisphere winter and there are differences between southern and northern strains of influenza, advise purchasing a vaccine on arrival
Hepatitis A	For travellers to countries with elevated rates of infection, e.g. the Pacific Islands (except Hawaii), Africa, Asia (except Japan), Eastern Europe, the Middle East, South and Central America, Mexico and Greenland	Two doses at zero and six to 12 months (last dose may be given on return)	Available in monovalent formulations or in combination with either a hepatitis B or typhoid vaccine
Hepatitis B	For travellers to areas where it is endemic, e.g. Asia, or for travellers to the Pacific Islands who are at an increased risk of exposure	Three doses at zero, one and six months (last dose may be given on return)	Available in monovalent formulations or in combination with hepatitis A. Added to the New Zealand immunisation schedule in 1988.
Meningococcal	Required by Saudi Arabian authorities for people making the pilgrimage to Mecca, and recommended for travellers to sub-Saharan Africa. Backpackers, students in halls of residence, healthcare workers and long-term expatriate travellers (especially children) may benefit	One dose	The quadrivalent meningococcal conjugate vaccine (MCV4-D - Menactra) is recommended for travellers
Typhoid	May be considered for travellers at increased risk due to destination or occupation	People continually exposed to typhoid require booster doses every three years to maintain immunity	Available in monovalent formulations and in combination with hepatitis A vaccines. Protects against *Salmonella typhi* but not paratyphoid causing organisms.
Varicella	For travellers without a prior history of chickenpox	Two doses	Provides long-term, but probably not life-long immunity
Rabies	Depends on disease prevalence at destination and activities. Consider for high risk situations, e.g. veterinarians or staying in rural location. Wash all mammalian bites with soap immediately.	Five intramuscular injections over 28 days, with immunity occurring after 30 days. A course of three intradermal injections may be offered at travel clinics.	Vaccination does not prevent the disease developing but it does reduce the urgency and the complexity of post-exposure treatment
Cholera	Vaccination may be beneficial for people travelling to areas where there are known outbreaks or for people who would be severely affected by infection, e.g. those with inflammatory bowel disease	Two doses given at least one week apart; if more than six weeks between doses the schedule should be repeated	An oral formulation that provides protection against *Vibrio cholera* and the toxin the bacteria produces

Vaccination recommendations for travellers

Guidance on vaccination depends on the region the person will be travelling in, their immunisation status, general health and the length of time until departure. Six to eight weeks may be required to complete some vaccination schedules. When discussing vaccinations the lifetime risk of disease exposure should be considered, rather than the risk due to a single trip. Travel consultations are an opportunity to ensure that all routine vaccinations are up to date, e.g. the MMR vaccine. Vaccinations given to reduce the risk of travel-associated illnesses are not subsidised in New Zealand. Table 1 provides a summary of key vaccination recommendations for travellers prior to departure.

The United States Centers for Disease Control and Prevention (CDC) provides destination-specific vaccination advice for travellers and health professionals, available from: www.cdc.gov/travel/destinations/list

Booster vaccinations may be appropriate for some patients

A combined tetanus and diphtheria (Td) booster is recommended for most travellers if it is more than ten years since their last dose.[11] Following immunisation with the tetanus, diphtheria and pertussis (Tdap) vaccine at age 11 years, combined tetanus and diphtheria booster doses are recommended and subsidised at ages 45 and 65 years[11] Diphtheria is endemic in Africa, Latin America, Asia the Middle East and parts of Europe.[11] A single dose of Tdap to boost pertussis immunity may be preferable to the Td booster for travellers to areas where pertussis incidence is high, particularly healthcare workers with regular exposure to infants, if it is more than ten years since their last dose.[11] Pregnant women are eligible for a subsidised Tdap vaccine between 28 – 38 weeks gestation.

A one-off IPV booster vaccination to increase immunity against poliomyelitis is recommended for adult travellers to countries where poliomyelitis is endemic, if more than ten years have passed since their adolescent dose.[11] The spread of poliomyelitis has been declared a Public Health Emergency of International Concern by the World Health Organisation (WHO).[14] The fluctuating spread of poliomyelitis is closely monitored and recent outbreaks have been reported in Afghanistan and Pakistan.[14] Some authorities may require proof of vaccination against poliomyelitis from travellers who have visited these countries.[14]

The latest international recommendations regarding poliomyelitis are available from: **www.polioeradication.org/Keycountries.aspx**

Additional vaccinations that may be recommended

Consultation with a travel medicine clinician is recommended for people with a high risk of infection, e.g. disaster relief workers or those who will be living for extended periods in areas with reduced sanitation. Additional recommended vaccinations may include: Japanese encephalitis, yellow fever and Bacille Calmette-Guérin (BCG) vaccine to protect against tuberculosis.

Maintaining good health while travelling

Travel places added stress on people who are unwell, and long-term conditions need to be well managed before departure. Table 2 (over page) provides a summary of considerations for travellers with specific conditions. Travellers are recommended to check that their insurance is appropriate, e.g. coverage for neonatal care for a pregnant woman or treatment for complications in a traveller with cancer.

Avoiding insect-borne infection

The best way to prevent insect-borne infectious diseases, e.g. malaria, zika, chikungunya or dengue fever, is to avoid insect bites. Areas with stagnant water are a risk factor for mosquito bites. Recommendations for travellers in regions with high levels of insect-borne disease include:[7]

- Wear trousers and long-sleeves
- Hang mosquito nets infused with permethrin
- Use sprays containing 20–50% diethyltoluamide (DEET); apply after sunscreen
- Take malaria prophylaxis; recommendations vary depending on destination

The New Zealand Formulary provides country-specific recommendations for malaria prophylaxis, available from: **http://nzf.org.nz/nzf_70212**

The risk of venous thromboembolism is increased during air travel

All forms of travel involving immobility lasting more than four hours are associated with an increased risk of VTE.[2] This is because popliteal venous return is reduced by approximately 40% due to compression of the lower leg veins.[15] Risk factors for VTE for airplane passengers are shown in Table 3 (over page).

Periodic walking and calf muscle stretching during travel is recommended as it may reduce the likelihood of VTE in people with risk factors.[16] Graduated compression stockings providing

Table 2: A summary of considerations for travellers with specific health conditions[1, 3]

Condition	Pre-travel advice and comments
Cardiovascular disease	■ Discuss management of dehydration and volume overload; doses of diuretics may need to be temporarily reduced ■ Minimise the risk of VTE ■ Pack sublingual glyceryl trinitrate spray in a carry-on bag ■ Consider management of INR for patients taking warfarin ■ Consider if supplemental oxygen is required ■ Carry a pacemaker card if appropriate ■ A copy of a recent ECG may be helpful for some patients
Diabetes	■ Assess the risk of hypoglycaemia and plan accordingly, e.g. carrying carbohydrates ■ If taking insulin, discuss the need for dose adjustments (Page 10) ■ Wear comfortable shoes, change socks regularly and inspect feet for blisters ■ Consider the need for anti-emetic, anti-diarrhoeal and anti-fungal medicines
Pregnancy	■ If travelling during the third trimester, ensure there is a medical facility at the destination that is able to perform caesarean sections and provide neonatal care ■ Frequent movement, loose clothing and comfortable shoes are especially important for pregnant women ■ Seatbelts should be worn low, just above the pelvis; diagonal shoulder straps are preferable ■ Air conditioned rooms are recommended as air pollution or a hot climate increases the risk of respiratory problems or heat stroke
Respiratory disease	■ Pack a reliever inhaler and spacer in both carry-on and checked-in luggage ■ Be prepared for exacerbations of COPD or asthma; prescriptions for short courses of antibiotics and oral corticosteroids to be taken as required may be appropriate ■ Consider if supplemental oxygen is required for patients with COPD
Gastrointestinal conditions, including recent abdominal surgery	■ Emphasise the importance of consuming safe food and water ■ Consider an anti-motility medicine and prophylactic antibiotics for traveller's diarrhoea and give clear guidance if prescribed (see opposite) ■ Hypoxia during air travel may be associated with exacerbations of inflammatory bowel disease ■ Travellers with a colostomy bag may have increased output during air travel
Cancer	■ Emphasise the importance of food and water safety ■ Avoid dehydration ■ Minimise the risk of VTE and consider if compression stockings are appropriate ■ Wear loose clothing to prevent worsening lymphoedema ■ Check to see if any medicines are restricted in country of destination, e.g. analgesics (Page 11)

Table 3: Risk factors for venous thromboembolism (VTE) in airplane passengers[15, 16]

High risk factors	Moderate risk factors
■ Previous VTE	■ Combined oral contraceptive use
■ Recent surgery or trauma	■ Obesity
■ Congestive heart failure	■ Pregnancy
■ Active cancer	■ Inherited conditions that predispose to VTE, e.g. Factor V Leiden thrombophilia
■ Flights more than 10 000 km	■ Older age
■ Prolonged immobility	■ Varicose veins
■ Multiple moderate risk factors	■ Short or tall stature

15 to 30 mmHg of pressure at the ankle are recommended for people with risk factors for VTE who are flying long distances;[16] leg measurements should be taken to ensure that the stocking is correctly fitted and providing the right amount of pressure. There is no evidence that aspirin protects against VTE,[15] and anticoagulants are generally not recommended.[16] People with a previous history of VTE, active cancer or recent surgery (especially orthopaedic surgery of the lower limbs), may benefit from low molecular weight heparin,[15] e.g. enoxaparin, 40 mg subcutaneously, on the morning of the flight and the following day.[7] In other countries, newer anticoagulants, e.g. rivaroxaban and apixaban, are taken by travellers for the prevention of VTE, although this is not currently a licensed indication for these medicines in New Zealand.

Reducing the symptoms of jetlag

People with jetlag often experience daytime fatigue and sleep disturbance, as well as reduced cognitive function, dizziness, weakness and irritability.[17] Adequate fluid intake and avoidance of caffeine and alcohol are recommended for travellers in transit.

There is evidence that immediate-release melatonin (unsubsidised) can reduce jetlag.[17] Melatonin appears to provide greater benefit for patients travelling across five or more time zones, particularly in an easterly direction.[17] Doses should be taken in the late afternoon or evening at the destination,[17] and are often repeated for several days. Exposure to bright light in the morning may help adjustment to the new time zone.[17] Taking melatonin prior to departure is not recommended.

For further information see: "Melatonin: is it worth losing any sleep over?", BPJ 69 (Aug, 2015).

Self-managing traveller's diarrhoea

Diarrhoea may affect up to half of all travellers,[10] depending on the time of year and destination. An unclean water supply, eating from street stalls and activities such as camping during summer are risk factors. Immunisation has a very limited role in protecting against traveller's diarrhoea. An oral cholera vaccine is available that provides 80 – 85% protection for at least six months for the small number of travellers who may be at risk.[12]

Fluid and electrolyte replacement is essential for treating gastrointestinal infections.[18] An oral rehydration solution can be made by adding six level teaspoons of sugar and half a level teaspoon of salt to one litre of bottled water.[19] Antibiotics and loperamide can be prescribed for travellers likely to be at an increased risk to take with them, although for this purpose they are unsubsidised. Advise patients to only use antibiotics if absolutely necessary and not to use them to treat mild diarrhoea, as this can result in infections of multi-drug resistant bacteria.[20]

For mild watery diarrhoea, oral rehydration is the key management strategy. Treatment with loperamide may be considered for the short-term control of symptoms,[10] e.g. loperamide, initially 4 mg, followed by 2 mg after each loose stool, to a maximum of 16 mg, daily.[7] However, there is a theoretical risk that this may increase the length of time that the pathogen is present and therefore the duration of the illness. Loperamide is contraindicated in children aged under 12 years.[7]

For moderate to severe diarrhoea or mild diarrhoea that does not improve after 24 hours, oral rehydration should be continued, and loperamide considered in combination with antibiotics to provide more rapid relief and shorten the symptom duration.[10] Ciprofloxacin, 1000 mg taken immediately, is likely to improve symptoms.[18] Azithromycin is an alternative in areas with high rates of fluoroquinolone resistance, e.g. 500 – 1000 mg, immediately.[10]

Consulting with people who are visiting New Zealand

A person's eligibility for subsidised healthcare in New Zealand is determined by their:

- Citizenship
- Country of permanent residence
- Age
- Partner's nationality
- Duration of stay in New Zealand

The Ministry of Health provides FAQs on the eligibility criteria for people living overseas to access to health services in New Zealand, available from: **www.health.govt.nz/new-zealand-health-system/eligibility-publicly-funded-health-services**

Enquires about healthcare eligibility can be made to the Ministry of Health by phone: **0800 855 151** (option 2) or email: **eligibility@moh.govt.nz**

Investigating febrile illness in overseas travellers

Febrile illness in a patient who has recently visited a country with a high incidence of infectious disease is a potential red-flag.[21] Establish the immune status of the patient and their possible exposure to infectious disease. If there is a high suspicion of an infectious disease, there should be a low threshold for contacting a medical officer of health or infectious diseases specialist; precautions should be taken to minimise the risk of transmission.[21] Table 4 is a summary of conditions that it may be appropriate to consider when investigating febrile illness in a patient who has recently travelled overseas.

Table 4: Potential causes of febrile illness following recent overseas travel

Condition	Symptoms	Incubation period	Comments
Malaria[22]	Fever, chills, sweats, myalgia, headache, nausea and vomiting, malaise.	Seven to 30 days	A blood test is required to confirm a diagnosis of malaria.
Middle East Respiratory Syndrome-coronavirus (MERS-CoV)[23]	Limited data available; at hospital admission: fever, chills/rigors, headache, non-productive cough, dyspnoea and myalgia. Also, coryza, nausea, vomiting, diarrhoea and abdominal pain, dizziness, sputum production.	Five days (ranges from two to 14 days)	To confirm a diagnosis collect sputum samples from lower and upper respiratory tract to measure viral load and a blood sample for serology. The median time from onset to hospitalisation is four days. Pneumonia may rapidly progress.
Zika virus*[24]	Fever (37.8 – 38.5°C), arthralgia (notably of small joints of hands and feet) with possible swelling, myalgia, headache and retro-ocular pain, conjunctivitis, cutaneous maculopapular rash. Post-infective fatigue is common.	Three to 12 days	This is an emerging disease with cases confirmed or suspected in French Polynesia, New Caledonia, the Cook Islands and Easter Island. Spread through *Aedes* mosquito bites. One in five people infected with zika virus become ill. Virus may be detected in blood within five days of onset, antibody testing two to three weeks after onset used to confirm a diagnosis.
Dengue fever*[25]	Acute onset of high fever. Also, frontal headache, retro-orbital pain, myalgias, arthralgias, haemorrhage, rash. However, a high number of infections are asymptomatic, especially in children.	Three to 14 days	Spread through *Aedes* mosquito bites. Febrile seizures and dehydration may be a concern. Avoid aspirin and non-steroidal anti-inflammatory drugs due to the risk of haemorrhage. Viral RNA can be detected in blood within five days of onset, otherwise antibody testing at least six days after onset to confirm a diagnosis.
Chikungunya fever*[26]	Most often acute onset of fever (often > 39°C), bilateral and symmetrical polyarthralgia. Also, headache, myalgia, arthritis, conjunctivitis, nausea and vomiting, or maculopapular rash.	Three to seven days (ranges from one to 12 days)	Mainly spread through *Aedes* mosquito bites. Viral RNA may be identified in serum in first eight days of infection. Antibody testing during convalescence used to definitively exclude viral infection.
Acute HIV infection[27]	Fever, fatigue, myalgia, arthralgia, erythematous maculopapular rash and headache. Symptoms may persist for two to four weeks.	One to four weeks	Viral load testing used to confirm diagnosis as antibody testing is often negative during acute phase infection.

* There has been a recent increase in confirmed cases of Zika, Dengue and Chikungunya in the Pacific Islands[28]

The CDC provides information on common causes of fever by geographic area and incubation periods of infectious diseases, available from: **www.cdc.gov/travel/yellowbook/2016/post-travel-evaluation/fever-in-returned-travelers**

The World Health Organisation provides annual data on all countries where malaria is endemic, available from: **www.who.int/malaria/publications/country-profiles/en/**

All visitors to New Zealand will receive essential acute care

In New Zealand, anyone who requires acute treatment will receive it.[29] Individual DHBs are responsible for determining which services are acute and which are elective.[29] In general, acute care is treatment without which:[29]

- The patient will die
- The patient's condition could deteriorate and become life threatening or significantly debilitating
- It is not possible to tell if a patient's condition is potentially life threatening or significantly debilitating

Citizens of Australia and the United Kingdom are provided with the same funded access to urgent healthcare (but not primary care consultations) as New Zealand citizens; as are New Zealand citizens travelling to Australia or the United Kingdom.

ACC covers citizens, residents and visitors

The Accident Compensation Corporation (ACC) covers treatment due to accidents for all visitors to New Zealand, if their claim is accepted.[29] New Zealand residents injured overseas, who have been overseas for six months or less, are covered for treatment received upon return to New Zealand, if their claim is accepted.

Further information about ACC eligibility is available from: **www.acc.co.nz**

Access to funded primary care consultations

In general, most visitors to New Zealand will not meet Primary Health Organisations (PHO) enrolment requirements and will be required to pay the "casual" rate for primary care consultations. Visitors to New Zealand will also be charged a non-PHO co-payment when medicines are dispensed.

A PHO enrolment checklist is available from: **www.health.govt.nz/system/files/documents/pages/pho-enrolment-checklist.pdf**

Prescribing to patients who are visiting New Zealand

Visitors to New Zealand may run out of medicines or lose them while travelling. When this occurs it can be difficult for practitioners to comply with good prescribing practice if they do not have access to the patient's medical records or a letter from their clinician, and investigations are limited by time and cost.

Follow-up visits are not always possible. Practical steps should be taken to ensure there is continuity of care. For example, give the patient a printed copy of their consultation notes or organise a follow-up consultation in another centre if their itinerary is known.

If the medicine that the patient normally takes is available in New Zealand it can be prescribed in the usual manner, and when the prescription is dispensed they will pay either the non-subsidised cost of the medicine or a co-payment if they are eligible for subsidised care. If the medicine that the patient normally takes is unavailable a similar medicine can be prescribed or the doctor treating the patient in their home country contacted to discuss an alternative. The cost of unsubsidised medicines can be discussed with a pharmacist; costs may vary between pharmacies.

A database containing information on medicines used in 185 countries is available from: **www.drugs.com/international**

For further reading about travel medicine, see: ìProviding medical advice to travellersî, BPJ 41 (Dec, 2011).

Acknowledgement: Thank you to **Associate Professor Marc Shaw**, School of Public Health, James Cook University, Townsville, Australia and Medical Director Worldwise Travellers Health Centres, New Zealand and **Dr Jenny Visser**, Senior Lecturer and Course Convener, Travel Medicine, University of Otago, Wellington and Senior Medical Advisor, Travel Doctor, Wellington for expert review of this article.

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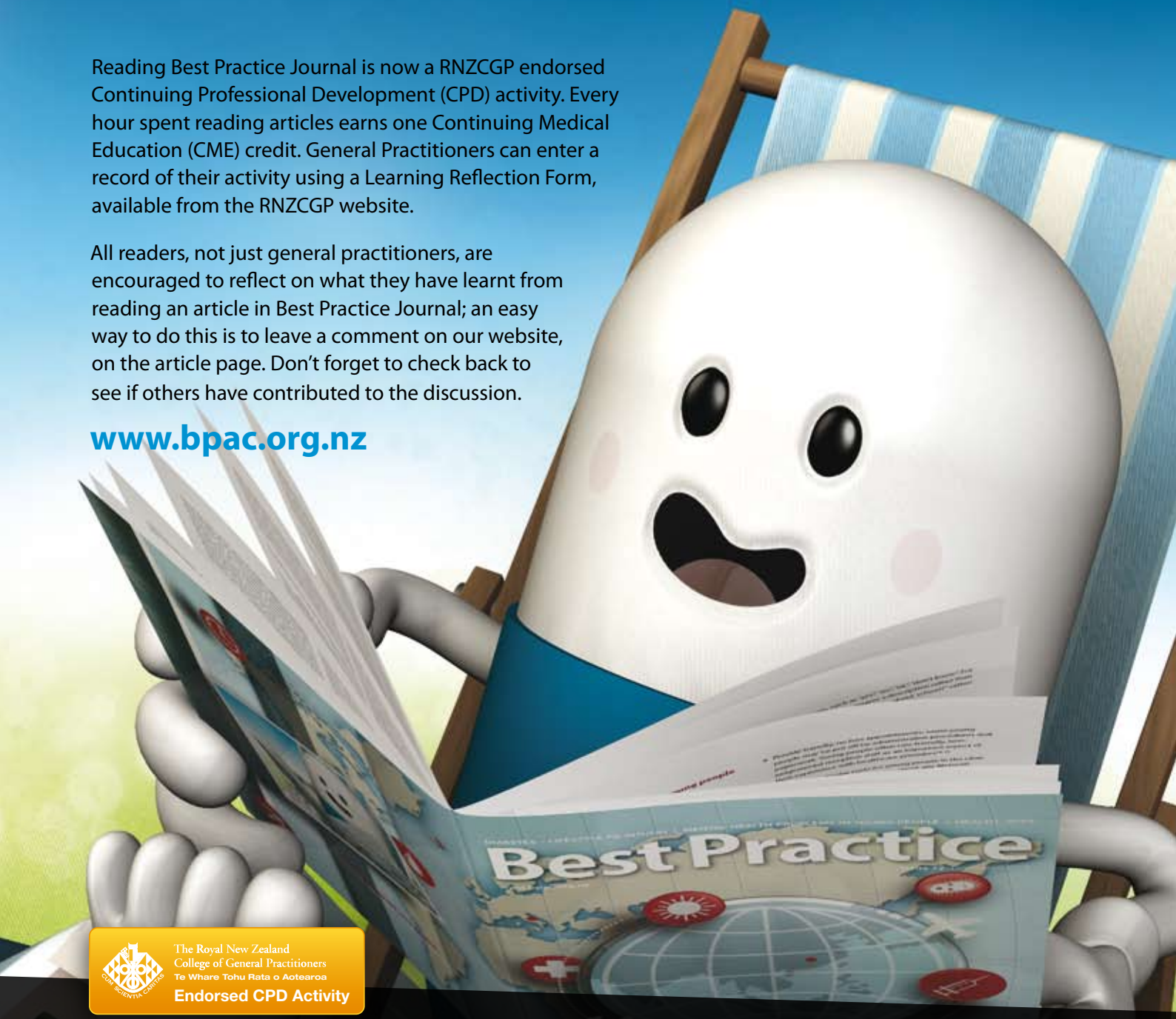

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Managing frequently encountered mental health problems in young people: **non-pharmacological strategies**

Young people experience a variety of mental health conditions. For patients with mild to moderate depression and anxiety, a stepped care approach is recommended where non-pharmacological treatments are trialled first, usually in primary care. Primary care is also often the first point of contact for young people with other mental health issues, such as eating disorders, self-harm, substance misuse or bullying. Approaches such as building strength and resiliency, and encouraging positive relationships and a healthy lifestyle can assist all young people to maintain good psychological health. Other strategies, such as, structured problem solving, motivational interviewing, self-help and online resources, can be offered where appropriate.

This is the second article in a series covering young people's mental health. The previous article focused on identifying mental health issues. The third article in the series will look at the role of medicines in the treatment of mental health problems in young people.

For any young person with mental health concerns identified in primary care, the first step is to establish whether treatment in a general practice setting is appropriate, or whether the young person is a risk to themselves or others and should be referred to specialised services in secondary care. Through the Prime Minister's Youth Mental Health Project, DHB funding of primary mental health services is available for all young people aged 12 – 19 years, including extended general practitioner or practice nurse consultations, brief intervention counselling, group therapy or individual care; contact your local DHB for more information. In some areas, funding may be available from a local PHO or DHB to cover the cost of extended appointments for people aged over 19 years.

For the previous article in this series, see: "Addressing mental health and wellbeing in young people", BPJ 71 (Oct, 2015).

Part 1: The initial approach to young people with mental health issues in primary care

Key practice points:

- Young people who represent a threat to themselves or others should be referred to secondary care services
- A strengths-based approach is useful to both prevent and treat mental health issues in young people and can form a part of every consultation
- Approaches such as structured problem solving or referral to online resources can be helpful for young people with a range of mental health issues

The key steps in investigating mental health concerns in most young people are:

- Discussing the problem(s) and identifying any underlying causes, precipitating factors or events which have led the young person to experience the problem at this time
- Assessing the young person's circumstances, home or living environment and available sources of support from family or friends

This may include providing a "listening ear" and emotional support, helping the young person to define their problems and offering them suggestions for addressing these problems.

Adopting a strengths-based approach is a strategy that can help all young people facing psychological difficulties (see: "Building resilience", Page 23).

Try to involve the young person's family/whānau as much as possible (with the patient's consent), bearing in mind that this may not be appropriate if family/whānau issues are the cause of the problem. Utilise local resources and support services, such as youth clinics, community health workers and Pukenga Atawhai (specialist Māori mental health workers).

If young people represent a threat to themselves or others, they should be referred to a specialised mental health service (see over page). The use of a screening questionnaire, such as the Ask Suicide-Screening Questions (ASQ), PHQ-9, Substances and Choices Scale (SACS) or *bestpractice* decision support tools for suicide risk and depression can assist in identifying young people in need of urgent or immediate assistance.

For further information and links to screening questionnaires, see:
www.bpac.org.nz/BPJ/2015/October/wellbeing.aspx
www.bpac.org.nz/BPJ/2010/January/assessment.aspx

When to urgently refer to secondary care mental health services

Immediate referral

Red flags: Patients should be seen the same day by a secondary care mental health service if they have:[1,2]

- Serious suicidal intent
- Psychotic symptoms
- Severe self-neglect

Assessing suicidal intent

Determining whether a patient's suicidal ideation and planning is serious can be difficult. There is no clear diagnostic threshold for when ideation may result in a suicide attempt and a young person's state of mind may change rapidly. People who report suicidal intent should be treated as being in a state of potential emergency until clinicians are convinced otherwise.[3] Aspects to consider include:[1]

- Their intent and whether they have a definite plan
- Their access to a means to commit suicide
- The lethality of likely means; the highest fatality rates occur in attempts with firearms, hanging and poisoning with pesticides[4]
- Whether they know someone (e.g. a friend or relative) who has committed suicide
- Whether they report hopelessness
- A history of acting impulsively
- The presence of other mental or physical illness, chronic pain or alcohol use
- Possible psychosocial triggers, such as relationship break-ups or family conflict and past history of coping with these situations
- The level of protective factors in the young person's life, in particular a lack of strong family relationships or community support (although be aware that supportive family/whānau networks are not fully protective against young people committing suicide)

Where there is uncertainty, consult with the local Child and Adolescent Mental Health or Emergency Psychiatric Services.

Semi-urgent referral

Referral with the intent that the patient will be seen by a secondary care mental health service within seven to ten days at the latest is recommended if young people without red flags have:[1]

- Severe depression or profound hopelessness
- Functional impairment which leaves them unable to do most daily activities
- Substance use disorder
- Suspected bipolar disorder
- Other serious mental health disorders, e.g. eating disorders
- A lack of improvement in symptoms despite treatment in primary care

Clinicians should make a plan for interim follow-up of people referred semi-urgently to secondary care for mental health reasons in case the situation becomes urgent. Assess the support immediately available to the young person, e.g. family, friends, and ensure that they understand not to wait for the appointment if circumstances deteriorate.

N.B. local referral pathways to secondary care mental health services and resource availability may differ.

Building resilience: A positive step for all youth

A strengths-based approach is useful to both prevent and treat mental health issues, and therefore can form a part of every consultation with a young person. This takes into account the person's circumstances and personal characteristics, e.g. aspects of their family environment, social circles and wider community connections, to encourage resiliency and promote wellbeing. This may be particularly useful for Māori and Pacific young people where traditional models of wellbeing, such as Te Whare Tapa Whā or Fonofale, have a focus on collectivism rather than individualism.[1] The strengths and interests of the young person can be used to promote resilience by encouraging engagement in activities which provide a sense of belonging and contribution, e.g. a sport or cultural group or club related to their hobbies.

Factors which help young people maintain a good state of emotional wellbeing include:[1, 5]

- Family dynamics – warm caring relationships, such as parents who express affection but set clear boundaries with reasonable consequences and negotiate boundaries as competency grows; participating in family activities such as eating meals and talking together
- Out of school/work interests – engaging in extra-curricular and social activities such as sport, drama or music
- Peers – good friendships and healthy romantic relationships
- School environment – feeling connected to school and believing that the school has their best interests at heart
- Confidence and coping – feeling that they can cope with whatever comes their way
- Culture and faith – greater connection to their culture, engaging in cultural and religious activities

For further information on assessing a young person's strengths, see: **www.bpac.org.nz/BPJ/2015/October/wellbeing.aspx**

For further information on Māori and Pacific models of health, see:

www.health.govt.nz/our-work/populations/maori-health/maori-health-models

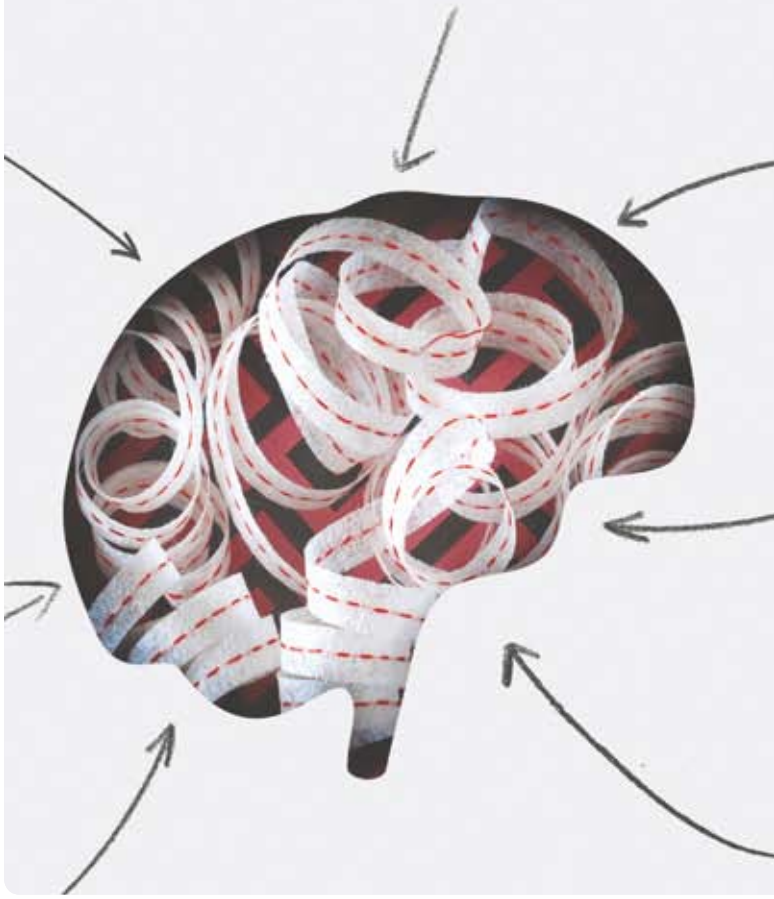
www.health.govt.nz/publication/pacific-peoples-and-mental-health-paper-pacific-health-and-disability-action-plan-review

Young people with long-term conditions are more vulnerable to mental health problems

Young people with long-term health conditions have higher rates of depressive symptoms than healthy peers. Young people living with chronic pain or with visible differences in appearance, such as cleft lip and palate, appear to be most at risk, but those with other conditions such as asthma, diabetes, epilepsy and cancer also experience higher rates of mental health issues.[9]

Clinicians can encourage or facilitate contact with a support organisation or peers who have the same condition. Engaging in education and disease management workshops can help young people manage their condition, communicate problems more effectively and learn coping skills.

Parents and caregivers may also benefit from participation in these groups, as well as engaging in problem solving or cognitive behavioural therapy. This is also likely to have a positive flow-on effect on the young person's wellbeing.[10]



Healthy living, healthy thinking

A healthy lifestyle can help strengthen a young person's resilience to adversity.[6,7] Poor sleep is associated with increased levels of anxiety and depression, increased vulnerability to stress, and it can affect academic performance and decrease school or work attendance.[6] Low levels of physical activity and an unhealthy diet are also associated with depression in young people.[7]

Getting a good night's sleep, eating a balanced diet and participating in regular exercise and social activities are simple steps young people can take to positively influence their psychological wellbeing. Dedicated "time off" may also be important for some young people, e.g. high academic or sporting achievers.

Factors which could help a young person sleep better and improve their mood include:[8]

- Regular exercise
- Relaxation techniques, such as progressive muscle relaxation or mindfulness
- Going to bed around the same time each day
- Avoiding caffeine and energy drinks in the afternoon or evening
- Avoiding alcohol in the evenings and reducing any nicotine intake (although acute smoking cessation can disrupt sleep)
- Not using the computer, video games or mobile phone near bedtime
- Reducing noise in the bedroom or moving to a quieter room, if possible

For further advice for patients on how to get a good night's sleep, see: **www.bpac.org.nz/BPJ/2008/June/insomnia.aspx#treating**

Structured problem solving in general practice

Structured problem solving is a treatment strategy which incorporates principles of cognitive behavioural therapy (CBT – see: "What is cognitive behavioural therapy?", opposite) but does not require specialised training to conduct, and is well suited to general practice. Structured problem solving reduces depression symptoms, is better than no treatment and compares favourably with other forms of psychosocial therapy when delivered in primary care.[11] A limited number of studies suggest it is also useful for patients with anxiety symptoms.[11,12]

Structured problem solving: How do I go about it?[12]

1. **Work with the patient to identify their problems.** For example, a young person with depression may be under stress with exams, had a falling out with parents after an argument, had a friend move away and have begun using alcohol and drugs to make themselves feel better. Overwhelmed by their situation they may not identify each of these as distinct issues or may feel they cannot control any of these problems.
2. **Identify which aspects of problems are within the young person's ability to change.** For example, exam dates cannot be changed but strategies for dealing with stress and thoughts about success or failure can be addressed. Addressing one issue may resolve or alleviate other related problems.
3. **Have the young person propose a goal for this problem.** A useful mnemonic is to make sure the goal is SMART: Specific (to the problem), Measurable (outcomes can be easily assessed), Achievable (the young person can do this themselves or with little extra support), Relevant (the goal relates back to the problem) and Timely (achievable within a useful timeframe). In the example, a goal of cutting alcohol and drug use and finding more positive ways to respond to the stressful situation achieves all of the SMART requirements.
4. **Brainstorm ideas with the young person that they could put into action to address the problem.** For example, the young person could write a letter to their parents to re-establish communication, expressing how they feel, anything they wish would have happened differently, and how they would like things to be, without the pressure of saying it in person. It is important that the young person take the lead role in proposing ideas to develop their own problem solving skills.[1]
5. **Assess the proposed ideas.** Go over the strengths and weaknesses of each idea, and jointly select one or more to move ahead with.
6. **Put the idea into action and follow up.** Come up with a plan with the young person for following through with the idea and an appropriate time frame to see if their goal has been achieved.

For more mature young people, structured problem solving is something they could work through on their own as a form of self-help, e.g.: **www.depression.org.nz/waythrough/self+help/problem+solving**

Online self-delivered CBT resources

Online CBT resources (e-therapy) are most appropriate for young people with depression and anxiety, but may also be useful to teach coping skills to any young person experiencing mental health difficulties.[16]

Randomised controlled trials in young people with mild to moderate depression and anxiety show e-therapy is a beneficial treatment option compared to no treatment or treatment as usual in general practice, but is probably not as effective as face-to-face CBT.[17] A recent randomised controlled trial in the United Kingdom in adults aged 18 years and over with mild to moderate depression suggests e-therapy is no better than usual care for patients taking antidepressants and that adherence may be an issue.[18]

E-therapy is most likely to be useful as an additional treatment option to assist young patients where there are long wait times for face-to-face counselling. This aligns well with the views of young people in New Zealand who report a high acceptability of e-therapy and consider it could be used in addition to other therapy, or as something they can work through prior to seeing a counsellor or therapist.[19, 20] Clinicians should keep in mind that internet-based resources or tools may not be suitable for some people due to access, privacy or language barriers.

Directing young people to e-therapy resources

1. Ask if they have already used e-therapy resources; young people with ongoing symptoms despite e-therapy may require a different approach, such as face-to-face or group therapy
2. Demonstrate an e-therapy website; this can increase acceptance
3. Set a goal of completing a few modules and follow up with the patient in a week or two to see if they are using the resource and finding it useful, or if they would prefer face-to-face therapy

The Goodfellow Unit offers a free one hour course for practitioners to learn about e-therapy, and its place in clinical practice:

www.goodfellowunit.org/courses/e-therapy-youth-depression

E-therapy resources in New Zealand

SPARX (Smart, Positive, Active, Realistic, X-factor thoughts) – www.sparx.org.nz

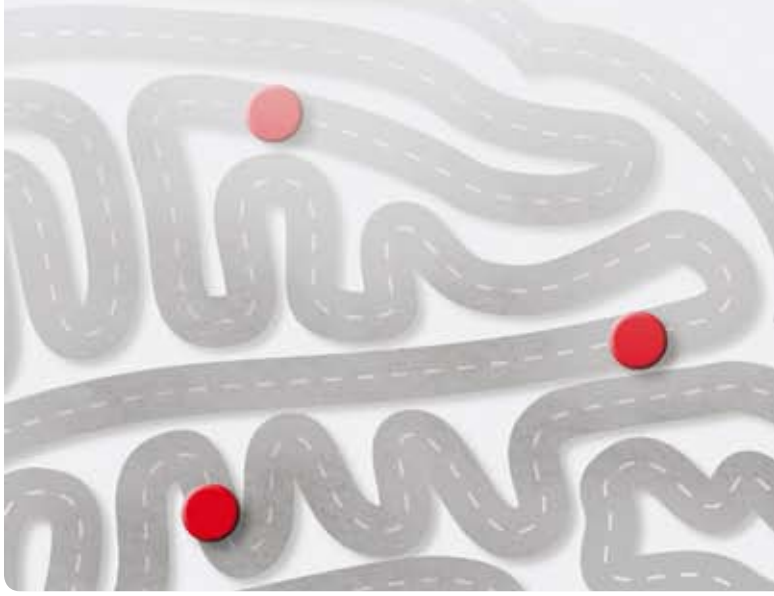
SPARX is an online e-therapy tool developed by researchers at the University of Auckland, and funded by the Prime Minister's

What is cognitive behavioural therapy (CBT)?

CBT is form of psychological therapy aimed at helping people be aware of how their thoughts affect their behaviour.[13] This begins with the patient identifying specific problems or difficult situations they face. They are then guided to examine how they think, feel and act in response to those problems or situations and recognise if their thinking is unhelpful or if they act in ways which make them feel worse. For example, CBT can help a patient with depression identify and question a self-critical or upsetting thought, replace it with a more helpful way of thinking and see how this change affects how they act and feel.[13]

As a face-to-face therapy, CBT is conducted by a trained therapist. Many clinicians in primary care use aspects of CBT principles during their normal clinical work, such as examining a patient's beliefs about problems they have and encouraging them to see things from a different perspective. The principles of CBT have also been adapted to other forms of delivery, including CBT-based online resources.

CBT can be applied to a wide range of health issues including anxiety, depression, insomnia and addiction. Young people with anxiety have better outcomes with CBT delivered by a therapist than if they receive no treatment and comparable outcomes compared to other forms of psychological therapy.[14] Randomised controlled trials suggest CBT delivered by a therapist may not be quite as effective as fluoxetine for treating young people with depression, but is safer.[15]



Youth Mental Health Project. It is primarily aimed at high school-aged students. SPARX takes the form of an interactive game, designed to assist young people to learn skills to cope with feeling "down" or stressed. It has been assessed in clinical trials involving young people aged 12 to 19 years with mild to moderate depression.[20, 21]

The game contains seven modules (played as levels – each taking 20-40 minutes to complete) to deliver content and teach strategies usually incorporated into CBT programmes.[20] In a randomised controlled trial, 60% of young people using SPARX completed the entire course content.[20] SPARX does not require a formal referral to access; users must register with a username and password.

Beating the Blues – www.beatingtheblues.co.nz
This site was developed with funding from the Ministry of Health, and delivers online psychotherapy for patients with depression and anxiety. Beating the Blues is aimed at adults and therefore may be a suitable option for more mature young people for whom SPARX may not be as appropriate. General practitioners must refer patients to the site via ManageMyHealth; instructions on how to do this are provided on the Beating the Blues website. It is free for people aged over 18 years in New Zealand. The site offers eight courses of approximately 50 minutes each and clinicians are able to check patient progress. Beating the Blues is supported by a randomised controlled trial conducted in primary care involving patients with depression and anxiety.[22]

For further information on referring patients to Beating the Blues, see: **www.managemyhealth.co.nz/content/Help/default.aspx**

Other e-therapy resources may be available via funding from local PHOs or DHBs, e.g. BRAVE-Online in Canterbury.

Useful resources for young people and their families/whānau

For young people:

Counselling and youth mental health services – www.werrycentre.org.nz/service/locations?tid=168
A directory of local mental health services for young people.

The Lowdown – https://thelowdown.co.nz
A website designed to help young people recognise and understand depression and anxiety. It offers information, videos of other young people talking about their experiences, advice for building resiliency and places to get help.

Youthline – www.youthline.co.nz
Online support and advice for young people, also offered by telephone (0800 376 633), free text (234) or email (talk@youthline.co.nz).

Lifeline and Kidsline – www.lifeline.org.nz
24-hour phone counselling for young people aged under 18 years (0800 543 754) and adults (0800 543 354).

Skylight – http://skylight.org.nz
Resources to support young people who are grieving.

MoodGYM – https://moodgym.anu.edu.au
A free online CBT course developed and delivered by the Australian National University, aimed at assisting people with depression and anxiety. The course has been translated into Chinese, Dutch and Scandinavian languages.

For parents, caregivers, whānau and friends of a young person with mental health issues:

Common ground – www.commonground.org.nz
This website is part of the Prime Minister's Youth Mental Health Project, and is aimed at family members, friends and other people who are supporting a young person with mental health issues.

Mental Health Foundation of Aoteoroa – www.mentalhealth.org.nz
Information on mental health issues and services in New Zealand.

Family support and counselling is also available from a number of non-governmental organisations, such as Family Works (**http://familyworks.org.nz/**) and Barnados (**www.barnardos.org.nz**)

Part 2: Non-pharmacological approaches to specific mental health issues

Depression, anxiety, self-harm, bullying, eating disorders and substance misuse are some of the most frequently encountered mental health problems in young people. While many of these conditions may require referral and some potentially involve pharmacological treatment, "triage" of the problem can be commenced in primary care and non-pharmacological strategies trialled unless the severity of the condition warrants more intensive immediate treatment.

Depression

Key practice points:

- Assess the severity of the young person's depression and risk of suicide
- Initial treatment in primary care is appropriate for young people with mild to moderate depression
- Referral to secondary care services is required if symptoms are severe or do not improve after initial treatment

Symptoms and signs of depression in young people include:[1]

- Irritable mood or persistent sadness
- Loss of interest in activities they enjoy
- Loss of energy
- Feelings of worthlessness or inappropriate guilt
- Recurrent thoughts of death or suicide
- Sleeping problems (insomnia or oversleeping)
- Difficulty concentrating
- Psychomotor agitation or retardation
- Changes in appetite or body weight

The number and severity of symptoms determines whether depression is classified as mild, moderate or severe.[23] Young people with several, e.g. five or more, of the above symptoms, where the symptoms are marked or distressing, meet the criteria for severe depression and should be referred to secondary care services.[1, 23] Asking patients how they see their life next month or next year can be useful to assess how hopeful they are about their future.

Young people with fewer, less severe symptoms, e.g. four or less, can be treated in primary care with the intention of reducing symptom severity with the least intrusive intervention.[1] A stepped care approach involves initial diagnosis, determining an appropriate treatment with input from the patient, review of progress and escalation of treatment if symptoms do not improve.

Psychological therapy is recommended for all patients with depression; there is no clear evidence that one particular form of therapy is better than others.[1, 24] Encourage the young person to reduce or eliminate any recreational drug or alcohol use, discuss strategies for improving sleep, exercise and nutrition (Page 24) and explore their strengths and resiliency (Page 23). Clinicians can consider extended appointments with a young person to conduct structured problem solving (Page 24). Other treatment options include referral to a counsellor or youth worker, the use of self-help and internet resources (Page 25) or referral to an appropriately trained health professional for CBT sessions or family therapy.

A plan should be set up for monitoring and follow-up. Two-weekly follow up, either face-to-face or by telephone, is recommended for initial management of most young people with mild to moderate depression. A face-to-face reassessment is recommended within two to four weeks of the initial consultation.[1]

For young people who report:[1]

- An improvement in two to four weeks' time – continue treatment with monitoring every one to two months until remission of symptoms and return to normal function
- A deterioration in symptoms in two to four weeks' time - intensification of treatment is necessary (see below)
- No improvement after six to eight weeks – referral to secondary mental health services is advised

Intensification of treatment can include an escalation in the form of psychological therapy being used, e.g. to face-to-face meetings with a counsellor or therapist, or referral to secondary care. The use of an antidepressant medicine may also be considered in some circumstances.

The appropriate use of antidepressant medicines in young people will be discussed in the next article in the series.

Anxiety

Key practice points:

- Initial treatment in primary care is appropriate for young people with mild to moderate anxiety disorders
- For patients with severe anxiety, referral to secondary care is recommended

The most common anxiety disorders in young people are generalised anxiety disorder, separation anxiety, social anxiety and panic disorder. Young people with generalised anxiety disorder may report excessive worry, difficulty concentrating or sleeping, restlessness or irritability. Separation anxiety may manifest as a refusal to go to school or work, but differs from truancy as parents or caregivers are likely to be aware of the situation and the young person may be well behaved in other respects. People with social anxiety disorder may avoid social situations or only get through them with difficulty, affecting their studies, work or relationships. Panic disorder is associated with recurrent episodes of fear, increased heart rate and palpitations, sweating, dry mouth or other physiological symptoms, where these responses are not appropriate for the situation.[1]

Initial treatment in primary care involves determining the specific symptoms the young person experiences, how long these symptoms have been occurring, particular situations which are feared or avoided, safety-seeking behaviours and how they feel or what they do building up to an event they think will cause anxiety.

Brief practical advice for young people with anxiety disorders includes:

- Avoiding "catastrophising" and challenging negative thoughts – encourage patients to reappraise negative thoughts such as "things will go badly" or "in social situations people will know I am anxious" and challenge these with a question or alternative frame of mind, such as "how often do things actually go badly? Most of the time things probably go well or okay" or "people will not be able to see how you feel, or will be too interested in something else to notice."
- Reassuring patients with panic disorder that they are not in physical danger during these episodes and that the symptoms will pass. Emphasise to patients that trying to fight or control symptoms may make the sense of anxiety worse; instead to try to focus on something else during the episode until symptoms subside[25]
- Relaxation for generalised anxiety disorder – exercise, listening to music or specific relaxation exercises such as focusing on progressively relaxing different muscle groups[26]

Self-help, such as referral to printed or online resources, may be useful for young people with generalised anxiety and panic disorders; this could include SPARX or Beating the Blues (Page 25).[26] This can be followed by referral to an appropriate health professional for CBT if the patient's symptoms do not improve.

For further information on diagnosis and treatment of generalised anxiety disorder in adults, see: **www.bpac.org.nz/BPJ/2009/December/anxiety.aspx**

Self-harm

Key practice points:

- Assess suicide risk
- Aim to exclude any psychiatric disorders and to identify the underlying reasons for engaging in self-harm, rather than only trying to stop the harming behaviour

Patients presenting with self-harm behaviour should be referred to secondary care if they are assessed as being at serious risk of suicide (Page 22). Young people may self-harm without any clear suicidal intent, e.g. by cutting, burning, hitting or slamming into solid objects, as a way of coping with emotional distress. However, even in the absence of obvious suicidal intent, young people who repeatedly self-harm are at an increased risk of suicide and may have other untreated mental health disorders, such as depression.[5]

Self-harm can arise from a wide variety of causes, including psychological distress, but may also be a desire to fit in with peers who are self-harming. Often the self-harm can be a form of emotional regulation in response to overwhelming feelings or situations in an attempt to relieve tension and provide distraction. Ask the young person to explain their feelings and understanding of their behaviour in their own words to identify underlying reasons for the self-harm, e.g. "What was going through your head when you were doing it?".[27] Discuss the dangers of self-harm with the young person and work with them to address underlying causes.[27] A key aspect of management is to reinforce other positive ways of coping and regulating emotions.

Bullying and social isolation

Key practice points:

- Ensure that an appropriate authority has been made aware of the bullying so that action can be taken to prevent it
- Take steps to promote self-esteem and resiliency
- Ask young people presenting with mental health issues about their experiences of bullying as this may be an ongoing contributor to the problem

Ask young people being bullied if a person in authority, e.g. at a school or workplace, has been made aware of the bullying. If not, encourage them or their parents or caregivers to raise the issue. The Ministry of Education guidelines recommend that young people who present for medical attention for injuries or mental health concerns due to bullying should be referred to the police after their injuries have been treated.[28] This also includes young people with mental health issues arising from cyber-bullying.

Encourage young people to focus on their strengths and help them build self-esteem as a means of counteracting the negative influence of bullying (Page 23). Young people who identify as LGBTI (lesbian, gay, bisexual, transgender or intersex) are at greater risk of being bullied and can be reassured that their problems arise from social norms, not that there is anything wrong with them. Assess for the presence of other psychological symptoms, such as depression and anxiety, in young people experiencing bullying or social isolation. Local anti-bullying initiatives and peer support programmes are available in some areas.

Young people who identify as LGBTI can find support from organisations such as Rainbow Youth: **www.ry.org.nz** or LGBTI groups at a local university

Netsafe provides guidance and steps that families can take to address cyber-bullying, available from: **www.netsafe.org.nz**

Drug and alcohol misuse

Key practice point:

- Counselling and behavioural therapies are the first-line treatment for young people with alcohol and substance misuse

The use of alcohol, marijuana and other drugs is common among young people in New Zealand. Young people who may benefit from assistance are those reporting excessive use, dependence or associated harms such as arguments about use with family or friends, physical altercations, injury while under the influence or problems with the justice system.[30, 31] Ask the young person their reasons for drug and alcohol use as this can inform treatment approaches, i.e. did they start using it "for fun" but now their use is problematic, or do they see it as a way of cheering themselves up, calming down to deal with anxiety or means of escaping problems for a while?

Brief interventions in primary care, such as motivational interviewing, may be helpful for patients with alcohol or substance use problems. Motivational interviewing involves discussing the young person's reasons for using alcohol or substances, offering support and encouragement to help them feel they are capable of decreasing intake and reducing their ambivalence to change. Discuss peer pressure, stress or particular psychosocial triggers which could be contributing to a young person's misuse. Advise them to avoid scenarios likely to lead to drug or alcohol use and work with them to develop alternative strategies for coping with triggers, such as encouraging another activity they enjoy as a way of relaxing. Goal setting, e.g. an initial goal of not drinking or using drugs for one week, may assist young people to cut down their use.[29, 30]

The alcohol and drug helpline (0800 787 797) can provide phone support to young people, and local counselling and treatment services can be found at: **www.addictionshelp.org.nz/Services/Home.**

For further information on the detection and management of alcohol, drug and substance use in young people, see:

www.bpac.org.nz/BPJ/2015/October/wellbeing.aspx

www.bpac.org.nz/BPJ/2012/february/substanceMisuse.aspx

www.bpac.org.nz/magazine/2010/june/docs/addiction_all_screening_tools_web.pdf

Eating disorders

Key practice points:

- Eating disorders can occur in people of any age or gender, but are more likely to occur in young people and females
- Consider investigations for medical consequences
- Referral to an appropriate secondary care or local support service is recommended

People with anorexia nervosa, bulimia nervosa and binge eating disorder have disturbances of eating behaviours resulting from concerns about food, eating and body image. Eating disorders may be a form of self-harm or a way for young people to exert control in their lives. The estimated prevalence of eating disorders ranges from < 1% – 3%, with the peak onset during adolescence (age 10 – 19 years) and early adulthood.[31] People with eating disorders may be of any body weight or gender; females and people who engage in pursuits which have a focus on body weight or image, however, are at greater risk, e.g. competitive gymnastics or modelling.[31] Factors such as exposure to media where thinness is presented as desirable increases the risks of developing an eating disorder, but genetic and other hereditary factors are also involved.[31]

Symptoms and signs of eating disorders are not always apparent. There are, however, some distinguishing features, e.g. patients engaging in self-induced vomiting may have signs of roughness on the knuckle of their index finger, loss of tooth enamel or enlargement of parotid glands, depending on the duration and severity of purging behaviour.[31] Young people with eating disorders are likely to have other mental health issues such as anxiety, depression or self-harming behaviours; rates of mental health co-morbidities range from 55% – 96% in different samples of patients with anorexia nervosa.[31] Guidelines recommend a multidisciplinary approach to assist patients with nutritional, psychological and medical support, and may include family therapy.[31]

There are a diverse range of factors which influence the development of eating disorders and attempting to identify the cause during an initial assessment is not recommended. Young people with eating disorders are likely to be extremely nervous during an initial consultation. They may be fearful of the existence or extent of their eating disorder being uncovered and of treatment aimed at making them gain weight. Treatment priorities in primary care are to engage with the patient and ensure they are medically stable. Reversing the effects of the eating disorder and psychological treatment are undertaken in secondary care.[31] Specialist regional treatment centres for eating disorders are located in Auckland, Wellington and Christchurch; patients can be referred from around the country.

For further information on assessing medical stability of patients with eating disorders, see: **www.starship.org.nz/for-health-professionals/starship-clinical-guidelines/a/anorexia/**

For further information on patient and family support, see: **www.ed.org.nz**

A list of eating disorder liaison officers across District Health Boards is available at: **www.ed.org.nz/index.asp?pageID=2145862942**

Acknowledgement: Thank you to **Dr Sue Bagshaw**, Senior Medical Officer Youth Health, Director of the Collaborative for Research and Training in Youth Health and Development Trust, Senior Lecturer, Paediatrics, University of Otago, Christchurch, **Dr Theresa Fleming**, Senior Lecturer, Psychological Medicine and Paediatrics, Chair of the Adolescent Health Research Group, School of Medicine, University of Auckland and **Rebecca Zonneveld**, Nurse Practitioner, Evolve Wellington Youth Service, Lecturer, Graduate School of Nursing, Midwifery and Health, Victoria University for expert review of this article.

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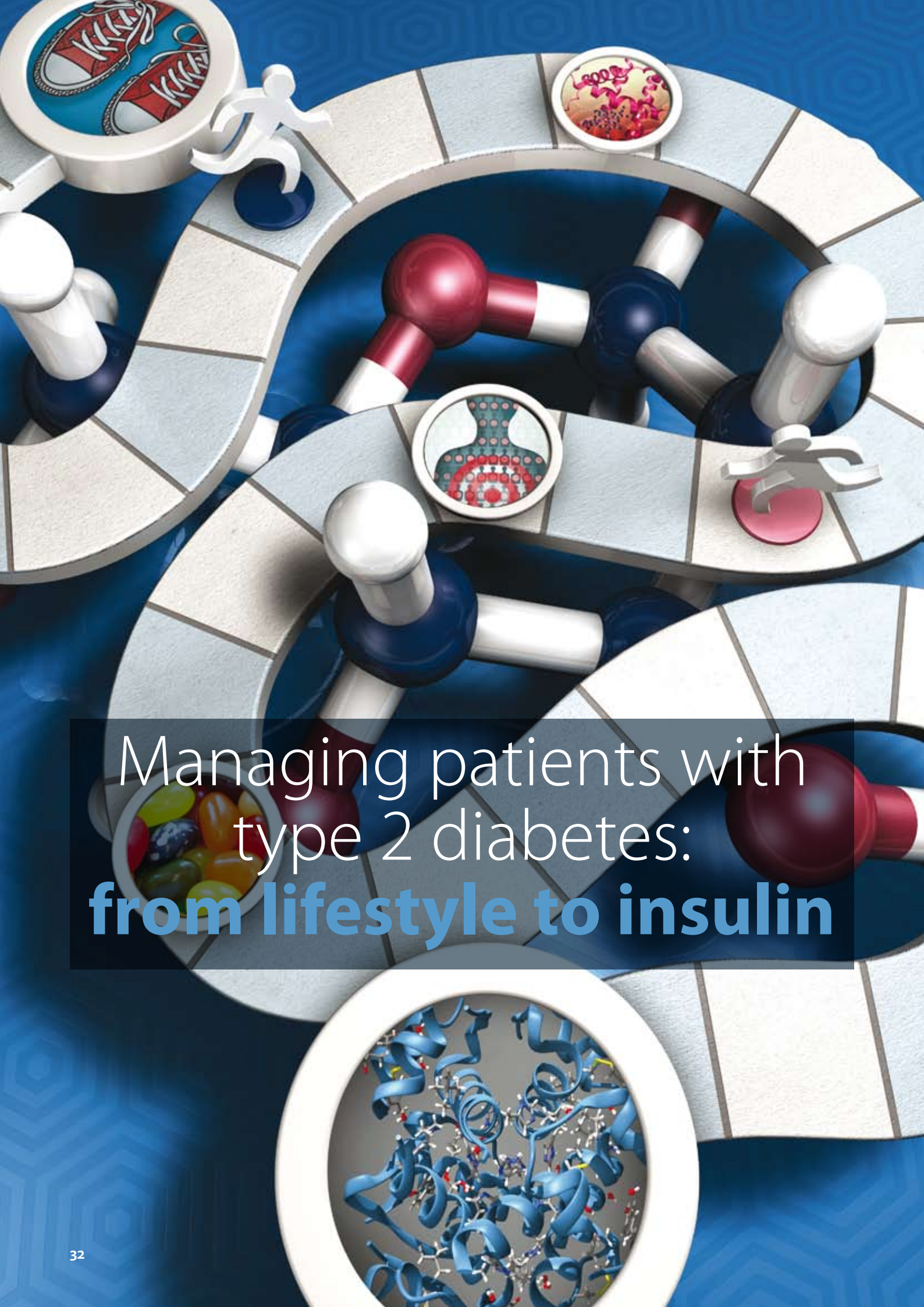

Managing patients with type 2 diabetes: **from lifestyle to insulin**

The management of type 2 diabetes is multi-faceted. Following diagnosis, patients require education to self-manage their condition and make lifestyle changes. Glycaemic targets need to be selected that are appropriate for the individual. Management should be regularly reviewed with timely offers of treatment intensification, including initiation of insulin. However, good glycaemic control is only one factor that influences outcomes in people with type 2 diabetes. Recent evidence has reiterated the benefits of managing cardiovascular risk factors in patients with type 2 diabetes.

Key practice points

- Emphasise the importance of lifestyle change as the foundation of all treatments for type 2 diabetes and ensure all patients have access to self-management education
- Glycaemic targets should be negotiated individually with patients using shared-decision making
- Management of type 2 diabetes requires regular review and timely intensification of treatment, including insulin initiation if appropriate
- Isophane is the recommended first-line insulin; initiation is managed in primary care
- Glycaemic control should always be managed in parallel with other cardiovascular risk factors

Diabetes management essentials

The number of people in New Zealand with diabetes is expected to double in the next 20 years, if current trends continue.[1] It is estimated that there are now 242 000 people in New Zealand with type 1 or type 2 diabetes, and a further 500 000 people with pre-diabetes (HbA_{1c} 41– 49 mmol/mol).[1] Overall, 6% of the adult population in New Zealand has been diagnosed with diabetes including Pacific peoples (9%), Māori (7%), Asian (6%) and people aged over 65 years (>10%).[2] There are also a substantial number of undiagnosed people in New Zealand with type 2 diabetes. A sample of over 4700 people found higher rates of undiagnosed diabetes in Pacific peoples (6.4%), compared with Māori (2.2%) and New Zealand European and Others (1.5%).[3]

A focus on Māori and Pacific peoples

Māori and Pacific peoples with diabetes are likely to benefit from more intensive management as they often have poor glycaemic control and may develop cardiovascular disease and renal damage more rapidly than New Zealand Europeans.[4] A review of almost 30 000 patients attending annual diabetes checks in New Zealand found the average HbA_{1c} was 68.6 mmol/mol for Pacific patients, 64.9 mmol/mol for Māori patients and 54.9 mmol/mol for New Zealand European patients.[4]

Information and statistics on diabetes care for individual DHBs is available from the Health Quality and Safety Commission's Atlas of Healthcare Variation, see: **www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/diabetes/**

Management always begins with lifestyle

A healthy lifestyle is the foundation of treatment for all people with type 2 diabetes.[5] Weight reduction is effective for reducing blood pressure and improving lipid profile.[6] Patients can be encouraged to reduce their intake of saturated fat and trans fats and increase dietary fibre, e.g. whole grains.[6] A reduced portion size at meals may be appropriate for some people.

If agreed lifestyle goals are not achieved discussions should be initiated to help overcome barriers to change, regardless of diabetes duration or type of medicine being taken. If a patient has successfully made lifestyle changes but their glycaemic control is inadequate, the possibility of more intensive lifestyle changes may be discussed.

Patient education is part of diabetes management

Often people who have lived with diabetes for many years have a poor understanding of their condition.[7] Despite type 2 diabetes being a progressive disease some people may believe it will eventually "go away".[7] If a patient is able to achieve ongoing glycaemic control below the diagnostic threshold for diabetes they are considered to be in remission, rather than cured (see: "Diabetes remission can be achieved with very low calorie diets", Page 34).

Diabetes remission can be achieved with very low calorie diets

Diabetes remission is defined as glycaemic control below the diagnostic threshold for type 2 diabetes without the need for pharmacological or ongoing surgical treatment, e.g. repeated replacements of gastrointestinal devices.[10] The term remission acknowledges that people diagnosed with type 2 diabetes who have exceptional glycaemic control remain at risk of relapse due to aberrant physiology and/or genetic predisposition.[10] Diabetes remission can be achieved following bariatric surgery or significant weight loss.[10]

Emerging data shows that people with diabetes who consume very low calorie diets are able to achieve large reductions in HbA_{1c}, body weight and cardiovascular risk, at least in the short term.[11] These diets involve severe calorie restriction, e.g. eating less than 3350 kJ (800 calories) per day; this is difficult to achieve and sustain, and studies have reported drop-out rates as high as one-third.[11] Severe restrictions on calorie intake are only appropriate for highly motivated patients who are overweight. It is recommended that input from a dietitian and medical supervision be arranged before patients are initiated on very low calorie diets.

To date, studies investigating very low calorie diets have involved relatively small sample sizes and follow-up has been limited, therefore the long-term effectiveness of these diets is unknown. Patients who consume very low calorie diets require ongoing maintenance strategies to manage their weight. A systematic review of 17 studies found an average reduction in HbA_{1c} of approximately 15 mmol/mol, although variability between studies was high.[11] Patients lost an average of 13.2 kg and all studies reported significant reductions in systolic and diastolic blood pressure and total cholesterol.[11]

Further information is available from: **www.nhs.uk/Livewell/loseweight/Pages/very-low-calorie-diets.aspx**

Structured diabetes education is recognised in New Zealand as a critical aspect of treatment.[8] The goal is to enable the patient to take an active role in their own care.[8] The cultural needs of the patient and their family/whānau are important when considering education programmes.[8] Programmes that deliver education in face-to-face sessions are more likely to be effective, and those that offer ≥ 11 hours of contact have been shown to improve glycaemic control.[9]

Diabetes New Zealand has local branches throughout the country that provide a variety of services. For further information, see: **www.diabetes.org.nz/about_us/local_branches**

Glycaemic targets need to be individualised

Reducing hyperglycaemia decreases the onset and progression of microvascular complications such as retinopathy, nephropathy and neuropathy.[12] An HbA_{1c} target of 50 – 55 mmol/mol can be explained as the "speed-limit" for patients, i.e. measurements above this level are increasingly unsafe.[5] However, glycaemic targets need to take into account diabetes duration, the presence of co-morbidities, life expectancy, social circumstances and the personal beliefs and priorities of the patient.[12] This flexible approach acknowledges the importance of quality of life and maintenance of function, rather than focusing purely on glycaemic control.

In older people or those living alone, a less intensive target may be appropriate if there is a high risk of hypoglycaemia. Intensive blood glucose control can be harmful to older people with co-morbidities. For example, in people with diabetes and an average age over 60 years and concurrent cardiovascular disease or elevated cardiovascular risk, a glycaemic target of < 42 mmol/mol for more than three years was found to increase mortality.[13]

Conversely, the longer life expectancy of a younger person means a more stringent target may be appropriate due to the increased duration of exposure to hyperglycaemia. Glycaemic targets should be periodically reviewed and may need to be adjusted in response to changes in circumstance such as planning a pregnancy or becoming pregnant, a new medical condition or a change in social situation, e.g. living alone.

For further information see: "Getting to know patients with type 2 diabetes and poor glycaemic control: One size does not fit all", BPJ 58 (Feb, 2014) and "Monitoring diabetes before, during and after pregnancy", BT (Jul, 2015).

Intensifying diabetes treatment with oral medicines

Despite receiving treatment, many people with type 2 diabetes spend long periods with poorly controlled blood glucose. Regular review is therefore essential for improving glycaemic control in all patients with diabetes. Treatment adherence should be assessed in patients who are unable to meet glycaemic targets. Treatment intensification is encouraged in patients who are adherent with their medicines, but unable to meet targets. In general, intensification is appropriate if the patient's HbA_{1c} levels do not meet, or closely approach, an agreed target within three months.[5, 12]

Metformin remains the first-line medicine

Metformin remains the first-line pharmacological treatment for patients with type 2 diabetes because it is safe, effective, does not cause weight gain and provides patients with additional cardiovascular benefits.[5] There is a low threshold for initiation and metformin should be added at, or soon after, diagnosis for all patients with type 2 diabetes, unless there are contraindications (see below).[12] New Zealand guidelines recommend trialling lifestyle modification for three months in asymptomatic patients before beginning treatment with metformin.[5] In practice, however, metformin may often be initiated at diagnosis. International guidance increasingly suggests that patients with markedly elevated HbA_{1c} levels at diagnosis, e.g. ≥ 75 mmol/mol, should be initiated on multiple anti-diabetic medicines.[12] This approach to treatment may become more common in the future.

Metformin decreases glucose production by the liver and increases peripheral utilisation of glucose. Lactic acidosis can be expected to occur in one in every 10 000 patients taking metformin; a similar risk to other oral anti-diabetic medicines.[14] Metformin is contraindicated in patients with significant renal impairment.[15] The dose should be reviewed in patients with an eGFR < 45 mL/min/1.73m^2 and metformin is generally avoided in patients with an eGFR < 30 mL/min/1.73m^2.[15]

Patients taking metformin may experience gastrointestinal adverse effects which can be minimised with a low initial dose and slow titration, often to 1.5 – 2 g daily, in divided doses; the maximum daily dose is 3 g, in divided doses.[15] In patients with gastrointestinal adverse effects, a low dose of metformin is preferable to withdrawing treatment completely. Treatment should be temporarily withdrawn if the patient becomes dehydrated, acutely unwell or displays signs of ketoacidosis.[15]

For metformin dosing refer to the New Zealand Formulary (NZF): **www.nzf.org.nz/nzf_3715**

Adding a sulfonylurea

A sulfonylurea can be added to metformin for patients who have not reached an agreed HbA_{1c} target with metformin alone.[5] This class of medicine is most effective in people who have had type 2 diabetes for less than five years;[16] a lack of response may indicate a loss of functional pancreatic beta-cells. Sulfonylureas are contraindicated in patients with ketoacidosis or acute porphyria.[15]

Caution is required if a sulfonylurea is prescribed to an older patient or a patient with reduced renal function, due to the risk of hypoglycaemia.[15] Weight-gain is a common adverse effect of treatment with sulfonylureas.[15]

There are three sulfonylureas available in New Zealand: glipizide, gliclazide and glibenclamide. Glipizide and gliclazide are shorter-acting and are the preferred medicines.

For sulfonylurea dosing refer to the NZF: **www.nzf.org.nz/nzf_3691**

Acarbose is an alternative first-line treatment

Acarbose can be used as a first-line treatment for patients with type 2 diabetes where metformin or a sulfonylurea are contraindicated or not tolerated, or as an adjunctive treatment for patients taking metformin, a sulfonylurea or insulin.[5, 17] However, despite being safe, acarbose is not widely used as it is only mildly effective and is associated with significant gastrointestinal adverse effects (see below).[12] Acarbose reduces the amount of glucose absorbed in the small intestine by blocking the α-glucosidase enzyme, which breaks down complex carbohydrates into glucose.[16]

Acarbose is contraindicated in patients with inflammatory bowel disease, colonic ulceration, predisposition to, or history of, intestinal obstruction, large hernias or gastrointestinal disorders with malabsorption.[15] It should be avoided in patients with an eGFR < 25 mL/min/1.73m^2 or severe hepatic impairment.[15]

Acarbose tablets should be chewed with the first mouthful of food or swallowed whole with a drink immediately before eating.[15] Gastrointestinal adverse effects, e.g. flatulence and diarrhoea, are common, especially when sucrose or sucrose-containing foods are consumed.[15]

For acarbose dosing, refer to the NZF: **www.nzf.org.nz/nzf_3727**

Pioglitazone is an alternative to standard treatments

Pioglitazone may be appropriate when treatment with metformin and a sulfonylurea is not tolerated or contraindicated, or if an alternative to insulin is required, e.g. the patient would prefer trialling another oral medicine before initiating insulin.[5] Pioglitazone may also be used in combination with metformin and a sulfonylurea, or as an adjunctive treatment with metformin in patients who require escalating doses of insulin (see below).[12]

Pioglitazone, and other thiazolidinediones, bind to nuclear receptors in insulin sensitive tissues leading to a reduction in insulin resistance and improvements in glucose and lipid metabolism.[16] Medicines in this class are considered to be insulin sensitisers, like metformin, and do not cause hypoglycaemia.[12] The use of a thiazolidinedione can cause significant weight gain, peripheral oedema and the risk of heart failure is increased.[12] There is also an increased risk of bone fracture, particularly in post-menopausal females taking pioglitazone.[15] Despite the adverse effects, pioglitazone may be beneficial in patients for whom there is a limited number of treatment options. If pioglitazone is prescribed in combination with insulin low doses are recommended, with close monitoring for adverse effects.[12]

Pioglitazone is contraindicated in patients with a history of heart failure, non-investigated macroscopic haematuria or bladder cancer (see: "Pioglitazone and bladder cancer').[15] Patients taking a sulfonylurea or insulin may need dose adjustments after beginning treatment with pioglitazone due to an increased risk of hypoglycaemia associated with combination treatment.[15] Liver function testing is recommended before beginning treatment and periodically thereafter.[15] Advise patients to contact a health professional immediately if they develop symptoms suggestive of liver toxicity, i.e. nausea, vomiting, abdominal pain, fatigue, dark urine or jaundice.[15]

For pioglitazone dosing, refer to the NZF: **www.nzf.org.nz/nzf_3735**

Pioglitazone and bladder cancer: the controversy and the risk

Concerns that pioglitazone use is associated with an increased incidence of bladder cancer were first raised during preclinical trials in the 1990s.[18] A meta-analysis including five randomised controlled trials and 13 observational studies found a modest, but clinically significant, increase in the risk of bladder cancer; the larger the cumulative dose and the longer the duration of treatment, the greater the risk.[19] In 2011, the United States Food and Drug Administration (FDA) announced that labels for pioglitazone-containing medicines must include a warning that use for more than one year may be associated with an increased risk of bladder cancer.[20]

In contrast, a more recent study not included in the previous meta-analysis, with at least ten years follow-up, found that in more than 34 000 patients, treatment with pioglitazone was **not** associated with an increased risk of bladder, lung, endometrium, colon, rectum or kidney cancer, non-Hodgkin's lymphoma or melanoma.[21] The authors did note a 41% increased risk of pancreatic cancer and a 13% increased risk of prostate cancer associated with pioglitazone use.[21] However, other anti-diabetic medicines were also associated with an increased risk of pancreatic cancer suggesting reverse causality, i.e. that diabetes may increase the risk of pancreatic cancer.[21]

Due to the uncertainty surrounding pioglitazone and cancer risk it is helpful to take a pragmatic view. Bladder cancer is relatively uncommon and the absolute risk to patients due to pioglitazone exposure is likely to be small. The study that did find an association between pioglitazone treatment and bladder cancer calculated the number needed to harm (NNH) for one additional person to develop bladder cancer after more than two years cumulative treatment to be more than 1400.[19] The contraindication of previous or active bladder cancer means that patients at the highest risk will not be exposed to treatment with pioglitazone.

Newer anti-diabetic medicines that are approved but not subsidised

Incretin-modulating medicines act on incretins, which are intestinal hormones that control the post-prandial production of insulin and glucagon.[22] There are three incretin-modulating medicines approved for use, but not subsidised, in New Zealand:

- Exenatide is a GLP-1 agonist which increases postprandial insulin release and decreases glucagon secretion; given subcutaneously
- Sitagliptin and saxagliptin are oral DPP-IV inhibitors which block the enzyme which degrades incretins, thereby increasing the levels of endogenous hormones

Both DPP-IV inhibitors and GLP-1 agonists have a marked glucose-lowering effect that reduces post-prandial hyperglycaemia with no additional risk of hypoglycaemia.[16] Unlike sulfonylureas and thiazolidinediones, DPP-IV inhibitors do not cause weight gain and patients taking GLP-1 agonists can be expected to lose weight.[12] DPP-IV inhibitors and GLP-1 agonists are generally well tolerated and have relatively few adverse effects.

Due to concerns about pancreatitis and pancreatic cancer, the FDA and the European Medicines Agency conducted extensive independent reviews on the safety of medicines which interact with incretins. It was concluded that there was "no compelling evidence" of an increased risk of pancreatitis or pancreatic cancer in patients taking incretin-based medicines.[22] However, pancreatitis is still considered to be a risk associated with the use of these medicines until proven otherwise.[22] A recent review of three trials involving DPP-IV inhibitors in treating people with type 2 diabetes concluded that they lowered HbA_{1c} by 3.3 – 8.8 mmol/mol, but did not modify cardiovascular disease or mortality.[23] However, the follow-up periods in these studies ranged from 1.5 – 3 years which may not have been long enough to detect changes in cardiovascular outcomes.

The sodium-glucose co-transporter 2 (SGLT2) inhibitors are a new class of glucose lowering medicine. In New Zealand, dapagliflozin and canagliflozin are approved for use, but not subsidised. They are indicated as a first-line treatment for patients with type 2 diabetes who cannot tolerate metformin, or as an adjunctive treatment with metformin, sulfonylurea and/or insulin.[15]

The SGLT2 inhibitors have an HbA_{1c} lowering effect similar to other oral diabetes medicines.[12] These medicines are generally well tolerated and improve glycaemic control by reducing glucose absorption and increasing urinary glucose excretion by up to 80 g per day.[12] Due to their novel mechanism of action, SGLT2 inhibitors do not increase the risk of hypoglycaemia and they are effective in people with reduced pancreatic beta-cell function; although there is an increase in the risk of genital yeast infections,[12] as well as urinary tract infections.

Clinical trials have found that treatment with SGLT2 inhibitors is associated with reductions in HbA_{1c} of 5.5 – 11 mmol/mol, compared with placebo.[12] Patients can expect to lose 2 kg over six to 12 months of treatment and reduce systolic blood pressure by 2 – 4 mmHg and diastolic blood pressure by 1 – 2 mmHg.[12] A recent study of over 7000 patients found that the addition of a SGLT2 inhibitor (empagliflozin) to standard care for a median of 2.6 years resulted in significantly lower rates of death from cardiovascular causes, hospitalisation due to heart failure and all-cause mortality, compared with the addition of a placebo.[24] This study was discontinued early due to the cardiovascular benefits of treatment with empagliflozin. Similar cardiovascular outcomes studies are yet to report their findings, but it appears SGLT2 inhibitors will have an increasing role in the treatment of type 2 diabetes in the future.

Initiating insulin treatment

Insulin has a greater blood glucose lowering ability than any other hypoglycaemic medicine and it is eventually required by many people with type 2 diabetes.[16] However, a reluctance to initiate, by both patients and clinicians, often delays treatment.[16] Initiation of insulin in primary care should be considered for any patients with HbA_{1c} persistently greater than their individualised target (especially HbA_{1c} > 65 mmol/mol), despite optimal oral treatment,[5] particularly if they have signs such as ketonuria and weight loss.[16] Following initiation, insulin doses need to be titrated to optimise treatment.

Selecting an insulin regimen

The patient's blood glucose pattern, as determined by self-monitoring, is used to select an insulin treatment regimen.[5]

Isophane, once daily, at night: This regimen is appropriate for patients with high fasting blood glucose levels in the morning that either decrease or stay constant as the day progresses.[5] A recommended starting dose is 10 units of isophane, before bed.[5]

Isophane, once daily, before breakfast: This regimen is appropriate for patients with acceptable fasting blood glucose levels in the morning that rise throughout the day.[5] A recommended starting dose is 10 units of isophane, each morning.[5]

Isophane, twice daily: This regimen may be considered if the patient has high blood glucose levels during the day and at night, or if they are markedly hyperglycaemic.[5] A recommended starting dose is 6 – 10 units of isophane, morning and night.[5]

New Zealand guidelines recommend that treatment with a sulfonylurea be withdrawn in patients taking twice daily isophane.[5] However, in practice metformin and sulfonylureas are generally continued throughout treatment with basal insulin, such as isophane. When insulin therapy is intensified to include a short-acting insulin (e.g. with meals) sulfonylureas are withdrawn.

Some international guidance recommends that insulin treatment begin with a long-acting form. In reality there is little difference in efficacy between long and intermediate-acting forms of insulin.[25] Long-acting forms of insulin, e.g. glargine, may be appropriate if hypoglycaemia is a concern.[5] Pre-mixed insulins may be considered for patients who are unable to meet HbA_{1c} targets with isophane and have elevated post-prandial blood glucose levels.[5] Biphasic insulin lispro and insulin aspart pre-mixes are preferred by some clinicians to biphasic isophane pre-mixes due to a reduced risk of hypoglycaemia. The transition from basal insulin to pre-mixed insulin can be managed in primary care, although discussion with a diabetologist or diabetes nurse is recommended for practitioners who are not experienced with the process.

Managing hypoglycaemia

Before insulin is initiated, ensure that patients know the symptoms of hypoglycaemia, e.g. shaking, sweating, blurred vision, light-headedness, loss of concentration. Hypoglycaemia usually begins when blood glucose is < 4 mmol/L.[26]

If symptoms occur, advise the patient to check their blood glucose level (if possible) to confirm that this is the cause of their symptoms. Patients with hypoglycaemia can be advised to:[26]

- Eat one serving of a quick-acting carbohydrate, e.g. seven to eight jellybeans or three teaspoons of glucose powder dissolved in water
- Check blood glucose level after ten minutes – if it is still < 4 mmol/L, eat another serving of quick-acting carbohydrate
- Once blood glucose level is > 4 mmol/L, eat a snack such as three or four crackers, or a small tub of low-fat yoghurt, or a meal if it is the appropriate time of day

If a patient has recurrent episodes of hypoglycaemia, despite lowering the dose, consider contacting a diabetologist or a diabetes nurse for further management advice.[5]

Titrating insulin dosing

The initial insulin dose is a starting point. The dose should be titrated until the agreed glycaemic level is reached or hypoglycaemia limits further increases.[5] Advise patients to maintain a regular intake of food during this process. Three consecutive blood glucose measurements are used to titrate insulin dosing, the timing of which depends on the regimen: once daily, at night – measure blood glucose pre-breakfast (fasting); once daily, before breakfast – measure blood glucose pre-evening meal; twice daily – measure blood glucose either pre-breakfast or pre-evening meal.[5]

Generally the patient's blood glucose levels are reviewed every two to four days, depending on their response. Ideally, patients will be able to self-adjust insulin doses and follow-up should be arranged to ensure that this is occurring.[5] Contact with the patient in the days immediately following insulin initiation is important to support treatment and improve outcomes. The frequency of self-monitoring of blood glucose can be reduced once the insulin regimen is established.

For further information, see: "Initiating insulin for people with type 2 diabetes", BPJ 42 (Feb, 2012).

Diabetes New Zealand provides patient information for managing hypoglycaemia, available from: **www.diabetes.org.nz/living_well_with_diabetes/living_with_type_1_diabetes/low_blood_glucose_hypo**

Managing risk factors with regular follow-up

People with type 2 diabetes are three times more likely to die of a cardiovascular event compared with the general population.[27] While good glycaemic control improves microvascular outcomes, it does not appear to improve cardiovascular outcomes to the same extent.[6] Therefore glycaemic control is part of a wider suite of interventions for patients with type 2 diabetes, including smoking cessation, blood pressure control, lipid management and, if appropriate, antiplatelet treatment.[12] A study found that in patients with type 2 diabetes and microalbuminuria the risk of cardiovascular and microvascular events was reduced by approximately one-half with an intensive management strategy focusing on multiple risk factors, compared to conventional care.[28]

The importance of treating hypertension

Between 70% and 80% of people with type 2 diabetes have hypertension.[6] People with diabetes are particularly susceptible to blood pressure-related complications; a systolic blood pressure > 120 mmHg in combination with diabetes predicts long-term end-stage kidney disease.[29] Controlling blood pressure in patients with diabetes decreases the risk of myocardial infarction, heart failure, stroke and all-cause-mortality, nephropathy and other microvascular complications.[6]

Recently the benefits of blood pressure control in patients with type 2 diabetes have been quantified. A meta-analysis including more than 100 000 people with type 2 diabetes and hypertension, found that each 10 mmHg drop in systolic blood pressure was associated with a significantly lower risk of mortality, cardiovascular events, coronary heart disease and stroke.[30] However, the optimal range when managing blood pressure in people with type 2 diabetes is narrow; systolic blood pressure < 120 mmHg is associated with an increased risk of hypotension, falls and cardiac dysrhythmias.[31]

Treating hypertension improves microvascular outcomes

Controlling hypertension in people with type 2 diabetes is associated with reduced diabetic retinopathy and albuminuria.[30] A Cochrane review found that reducing blood pressure had a protective effect against diabetic retinopathy that lasted for four to five years.[32] However, there was less evidence supporting the use of antihypertensives as a treatment for existing retinopathy.[32]

For further information, see: "Hypertension in adults: The silent killer", BPJ 54 (2013).

Angiotensin converting enzyme (ACE) inhibitors are first-line

Pharmacological treatment is recommended for all patients with type 2 diabetes with a blood pressure consistently > 130/80 mmHg for three months, despite changes in lifestyle.[5]

An ACE inhibitor is the preferred antihypertensive for patients with type 2 diabetes; an angiotensin II receptor blocker (ARB) is recommended if an ACE inhibitor is not tolerated.[5]

Annual reviews of kidney function

The albumin:creatinine ratio (ACR) of patients with type 2 diabetes should be measured at least annually and more frequently for Māori, Pacific and South Asian peoples.[5] Microalbuminuria is the earliest sign of chronic kidney disease (CKD) in people with diabetes and requires prompt treatment.[5]

Treat albuminuria to reduce cardiovascular risk

Preserving renal function is a crucial part of diabetes care. Blood

Living Well with Diabetes: a strategic plan from the Ministry of Health

In October, 2015, the Ministry of Health released its "Living Well with Diabetes" vision. The objective is to ensure that people with diabetes, or at risk of developing type 2 diabetes, are living well and have access to high-quality patient-centred heath services.[36]

The plan identifies six priority areas:[36]

1. To ensure health services are based on evidence and to test and evaluate interventions to find out what works best in New Zealand
2. Prevention and early intervention, including mental health needs, to reduce the burden of diabetes
3. Reducing disparities in health outcomes due to diabetes
4. Providing patient-centred health services
5. Providing sustainable and consistent health services across New Zealand
6. Achieving effective self-management of diabetes, including the provision of technology-enabled tools

Within the plan are measures created to track progress in improving health outcomes for people with diabetes against a two-year baseline from 2013 – 2014.

Further information is available from: **www.health.govt.nz/publication/living-well-diabetes**

pressure control is the cornerstone of treatment for people with reduced renal function. Management of cardiovascular risk factors needs to be intensive in patients with type 2 diabetes and microalbuminuria. The five-year cardiovascular risk of a patient with diabetes and an ACR ≥ 30 mg/mmol is assumed to be > 20%.[33]

For further information see: "The detection and management of patients with chronic kidney disease", BPJ 66 (Feb, 2015).

Managing cholesterol in patients with type 2 diabetes

People with type 2 diabetes often have elevated serum triglycerides, decreased HDL cholesterol levels and LDL cholesterol levels that vary from elevated to normal.[6] In patients with type 2 diabetes LDL particles may be more prone to plaque formation.[6]

Consider initiating a statin for patients with a five-year cardiovascular risk of >10%;[33] the benefits of statin treatment increase as the patient's cardiovascular risk increase.

Making foot checks a habit

Encourage patients with type 2 diabetes to inspect their feet regularly or ask a family member to do so. The patient's feet should be assessed at least once a year, or every three months if they are at high risk of foot complications.[5] Risk factors for foot disease in people with diabetes include:[5]

- Presence of callus
- Peripheral vascular disease
- Peripheral neuropathy
- Previous amputation
- Previous ulceration
- Joint deformity
- Visual/mobility problems

Retinopathy testing at least every two years

Patients with type 2 diabetes require retinal testing at least every two years.[5] Testing is performed more frequently if the patient has been diagnosed with retinopathy, depending on the severity.[5]

Assess mental health and wellbeing

Health professionals should be vigilant for mental health problems in patients with type 2 diabetes. Depression is reportedly twice as common, compared with people in the

general population and there is a bidirectional relationship between the conditions, i.e. type 2 diabetes increases the risk of depression and depression increases the risk of type 2 diabetes.[34] Patients may experience anxiety when they are diagnosed with diabetes or when complications occur.[34] Only one-third of patients with type 2 diabetes and a co-existing mental health disorder are reported to receive treatment for this.[34]

Poor mental health makes it more likely that patients will not adhere to treatment or attend consultations, increasing their risk of diabetes-related complications and reducing quality of life.[34]

Consider using a depression screening tool such as the Patient Health Questionnaire (PHQ)-2:[35]

"Over the last two weeks, how often have you been bothered by either of the following problems?":

- Little interest or pleasure in doing things
- Feeling down, depressed, or hopeless

Not at all = 0 points, several days = 1 point, more than half the days = 2 points, nearly every day = 3 points. A combined score ≥3 across the two questions indicates depression.[35]

The importance of assessing mental health and wellbeing is highlighted in the recent Living Well with Diabetes strategic plan from the Ministry of Health.

For further reading, see: "Improving glycaemic control in people with type 2 diabetes: Expanding the primary care toolbox", BPJ 53 (Jun, 2013).

Acknowledgement: Thank you to **Dr Steven Miller**, Endocrinologist and Diabetes Specialist, Waitemata DHB for expert review of this article.

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Using the NZF Interactions Checker

The New Zealand Formulary (NZF) contains a function that identifies potential drug interactions and their clinical significance. The Interactions Checker allows a user to search for potential interactions between any number of medicines, and between medicines and some other substances that are known to significantly interact, e.g. ethanol, tobacco, grapefruit and some complementary and Chinese herbal medicines.

The NZF Interactions Checker is located at the top of each page of the NZF online, beneath the blue NZF banner and beside the "Search NZF" box at the top of the screen. The Interactions and the Search NZF boxes are either grey or white depending on which is "active" (white) at the time (Figure 1).

To use the Interactions Checker, click on the "Interactions" box. A brief explanation of the Interactions Checker will then appear. A search box at the top of the page is labelled "Enter medicines". Type the first few letters of a generic or brand name and select the medicine you want from the drop down box that appears. Search for potential interactions by adding medicines to the search box one by one. If only one medicine is chosen, a list of all the known interactions of that medicine will appear. There is no maximum number of medicines that can be entered into the Interactions Checker each time a query is performed.

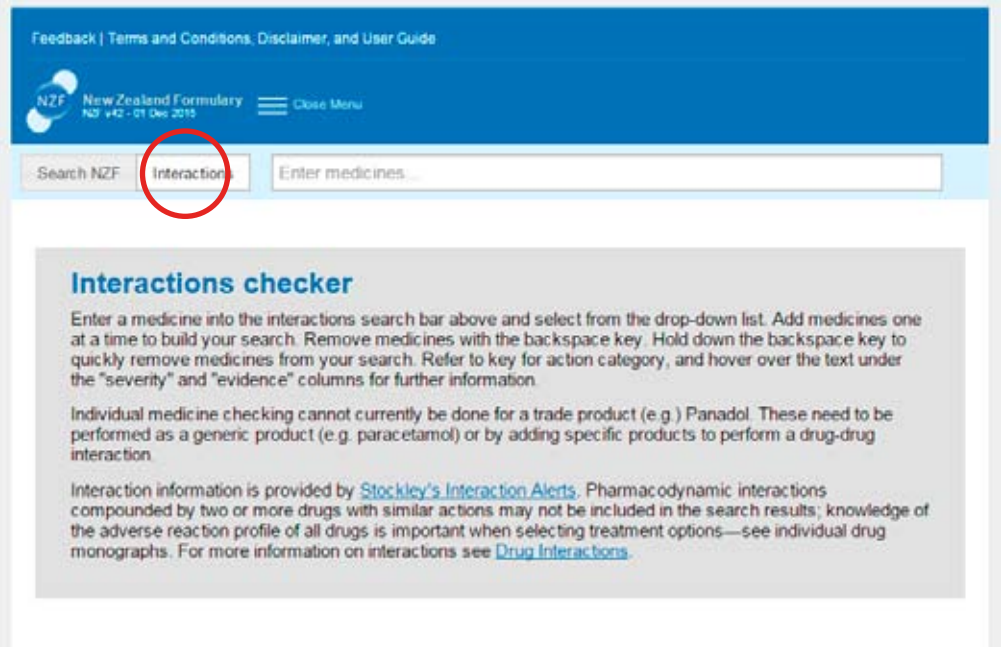

Figure 1: Interactions search box shown in NZF online.

The results of the interactions search are displayed in a table format, with the most clinically significant interactions appearing at the top of the table (Figures 2 and 3).

The results table displays:

1. The sets of medicines that interact, from the list that has been entered
2. A brief explanation of the mechanism for an interaction, if known
3. The interactions identified in order of decreasing clinical significance, with a colour-coded square to indicate what action is required: red = Avoid, orange = Adjust, gold = Monitor, green = Information (for less significant interactions that require monitoring depending on patient characteristics), white = No action
4. Specific advice on what action to take, e.g. avoid combination, alter dose(s), monitor for adverse effects, monitor for reduced effect, monitor plasma concentration
5. Expected severity of the interaction if adjustments to treatment are not made
6. The level of evidence for the combination being deemed to be a drug interaction and for identifying the interaction's clinical importance: Extensive evidence, Formal study, Case reports, Theoretical evidence

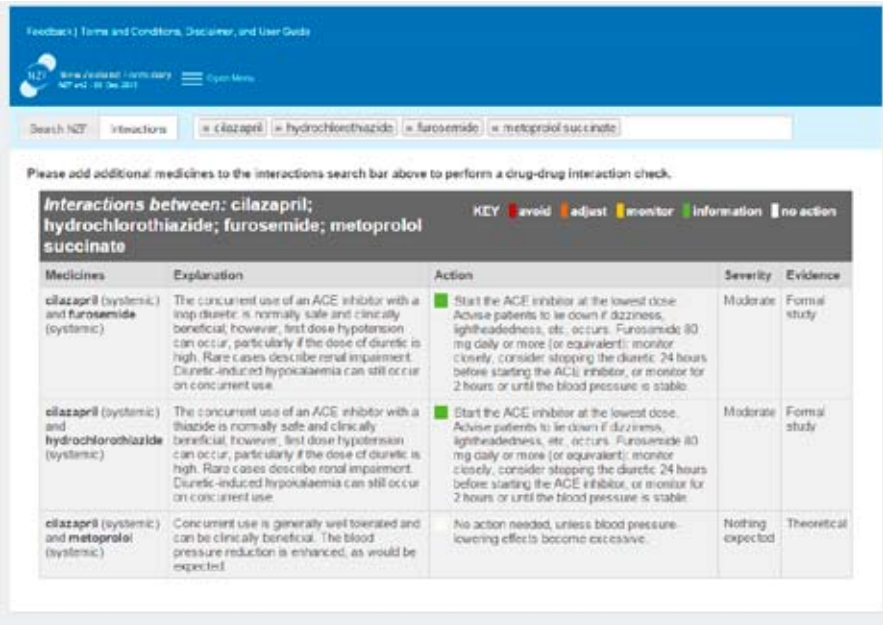

Figure 2: Example of interactions table of results for four selected medicines

Figure 3: Example of interactions table of results for one medicine and two interacting substances. N.B. the search term "ethanol" must be used, rather than alcohol, when entering substances in the interactions checker. "Tobacco" is the correct search term for identifying interactions between medicines and smoking.

The drug interactions information in the NZF Interactions Checker is provided by "Stockley's Interaction Alerts" which is a United Kingdom source of interactions information that is easily applied and relevant to clinical decision making in New Zealand. Stockley's Interaction Alerts holds interaction information on all medicines that appear in the NZF.

The NZF Interactions Checker does not include opposing or additive pharmacodynamic effects in the definition of an interaction. Clinicians therefore need to be alert for opposing or additive pharmacological or adverse effects between medicines that may not be identified as an interaction by the NZF Interactions Checker.

Examples of such combinations of medicines that are not identified as significant drug interactions in the NZF Interactions Checker include:

- An oral non-selective beta-blocker such as carvedilol, labetalol or propranolol and an inhaled beta-1 receptor agonist such as salbutamol, which should not be taken together as their effects oppose each other
- Omeprazole, a proton-pump inhibitor, and ranitidine, a histamine-2 receptor antagonist, are both indicated for the treatment of gastric ulceration but do not usually provide additional benefit if used together

Additional interactions information appears in each individual NZF drug monograph under the heading "Interactions". There are links to both the drug interaction summaries from the British National Formulary and to the Stockley's Interaction Alerts information that appears in the NZF interactions checker (Figure 4). Occasionally supplementary statements are also included in this section.

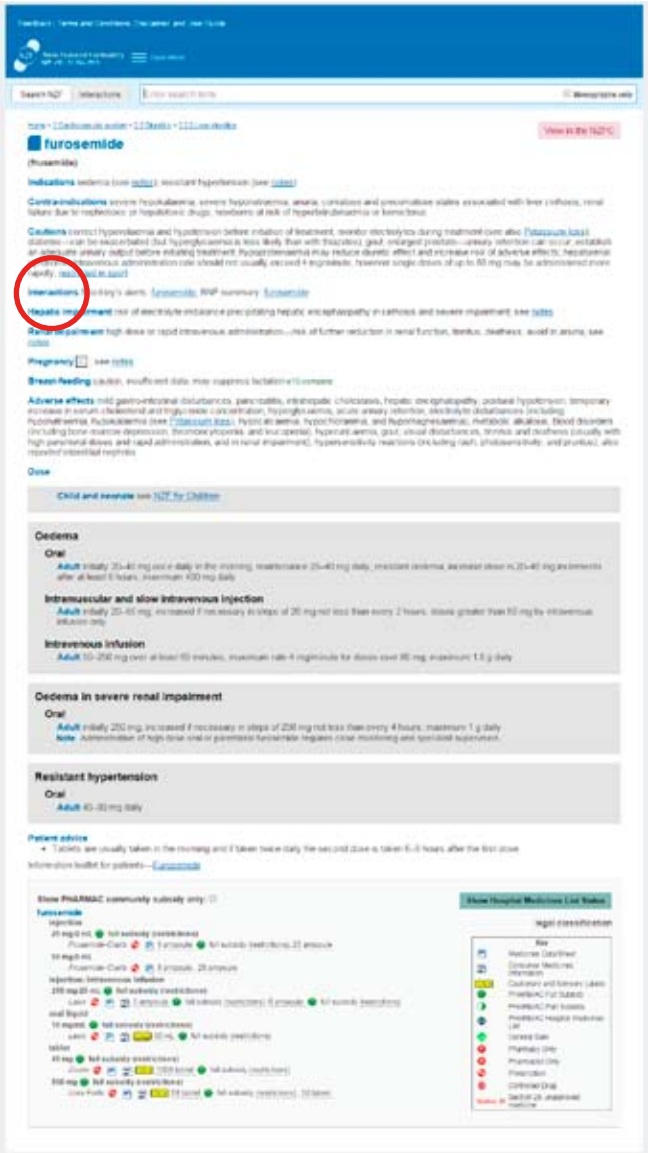

Figure 4: Example of a drug monograph, showing the location of links to interactions information

To try out the NZF Interactions Checker, visit:
www.nzf.org.nz

The role of confirmatory HbA_{1c} testing in diagnosing type 2 diabetes

Dear Editor,

A small, but I think important point, regarding the diagnosis of type 2 diabetes as per the BPJ monograph [article] *from February, 2012, "The new role of HbA_{1c} in diagnosing type 2 diabetes"* [BPJ 42, Feb, 2012]. *My issue is with Table 2 and explanatory text; I assume this is referenced to Table 3 from the New Zealand Guidelines Group (NZGG) publication "Management of Type 2 Diabetes".*

Table 2 in the BPJ article states that for persons without symptoms but with an HbA_{1c} ≥ 50mmol/mol (or fasting plasma glucose ≥ 7.0 mmol/L), the test should be repeated in not less than 3 months. That is NOT what the NZGG document states, it simply says to do a repeat measurement (no time frame stated); NZGG gives a 3-6 month time-frame for repeat testing ONLY where HbA_{1c} and fasting blood glucose results are discordant.

I recently had a non-symptomatic patient with an HbA_{1c} of 63 mmol/mol. He clearly has diabetes and waiting 3 months to do another test is to waste valuable time getting him assessed and treated, but that is what following the BPJ guideline would recommend.

The NZGG guideline for this patient would be to simply repeat the test forthwith, or do a fasting blood glucose (though at a level of 63, this would be a formality).

By and large I find the BPJ stuff extremely helpful, and congratulate your team on the quality, and especially the relevance to New Zealand practice.

***Dr Phil Dashfield**, General Practitioner*
Wellington

Response from bpac^{nz} editorial team:

The short answer, as Dr Dashfield points out, is that there is unlikely to be any benefit in waiting three months to confirm a diagnosis of type 2 diabetes for this patient. The recommendation to wait three months before performing a confirmatory HbA_{1c} test was intended as guidance for clinicians managing patients with glycaemic levels closer to the diagnostic threshold.

The NZGG guidelines and the NZSDD position statement both recommend repeat HbA_{1c} testing for asymptomatic patients with an HbA_{1c} ≥ 50 mmol/mol. Confirmatory testing for asymptomatic patients is recommended because an inaccurate diagnosis of type 2 diabetes could result in a patient receiving unnecessary treatment, potentially reducing their quality of life. Neither the NZGG nor NZSDD documents specify a timeframe within which confirmatory HbA_{1c} testing should be performed.

The article in BPJ recommended three months between HbA_{1c} tests in asymptomatic patients to allow the effects of any lifestyle changes the patient may make to be apparent on retesting. While it was not specifically stated, this advice was intended to apply to patients with a borderline HbA_{1c} result for the diagnosis of type 2 diabetes. Waiting three months for a confirmatory test was recommended because HbA_{1c} testing quantifies the number of haemoglobin molecules in erythrocytes with glucose attached to the N-terminal of the haemoglobin beta chain.[3] The lifespan of an erythrocyte is approximately 120 days.[4] The HbA_{1c} value therefore represents the mean level of glucose in the blood that erythrocytes have been exposed to in the past two to three months.[3] Lifestyle change is the foundation of all treatments for type 2 diabetes and motivated patients with borderline HbA_{1c} results may be able to achieve sufficient glycaemic control before undergoing a confirmatory test to avoid a diagnosis of type 2 diabetes; although they would remain at high risk of developing diabetes. As metformin is initiated at, or soon after, diagnosis the period of time between these two tests is an opportunity to assess the effects of lifestyle on glycaemic control in patients with borderline results before a diagnosis is confirmed.

There are also a number of reasons, other than diabetes, why a patient's HbA_{1c} levels may be elevated. A three-month timeframe between testing does not exclude all of these, although it does reduce the likelihood of a false-positive test result. A patient's HbA_{1c} levels may be elevated due to:[5, 6]

- Reduced erythropoiesis, caused by iron deficiency anaemia or vitamin B12 deficiency
- Excessive alcohol consumption or chronic kidney disease which can increase the intracellular acidity of erythrocytes
- Splenectomy, which may increase red blood cell lifespan
- Haemoglobinopathies, which can cause HbA_{1c} results to overestimate blood glucose levels
- Large doses of aspirin or long-term opioid use

Best Practice Journal aims to provide practical guidance for New Zealand health professionals working in primary care, rather than rigid guidelines. Guidance published in BPJ should not override clinical judgement and individual patients may need to be managed differently, depending on the clinical context. Dr Dashfield is correct in that in the case he provides for us, there is good reason to perform the confirmatory HbA_{1c} test immediately with a view to initiating pharmacological treatment as soon as the diagnosis is confirmed.

For further information see:

www.bpac.org.nz/BPJ/2012/February/hbA1c.aspx

www.nzgg.org.nz/guidelines/0036/ACF4758.pdf

www.nzssd.org.nz (click "Position Statements" in the menu bar, select "NZSSD position statement on the diagnosis of, and screening for, type 2 diabetes")

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The difficulties of accessing echocardiography in patients with heart failure

Dear Editor,

The practicalities of this are challenging – getting an echo is nigh on impossible for me through the public system. It seems the difference in management between HF-REF and HF-PEF is the use of diltiazem and verapamil – bad in HF-REF and good in HF-PEF. This is interesting but for me difficult in practice because the diagnosis is not easy in the absence of an echo. Comments please.

General Practitioner

Online comment

This question was recently posted online in response to an article "Identifying patients with heart failure in primary care", BPJ 50 (Feb, 2013). This article was also accompanied in the same journal by "Managing patients with heart failure in primary care".

Response from bpac^{nz} editorial team:

Accessing echocardiography can be difficult due to resource limitations, and criteria for publically funded echocardiography vary throughout the country. It is difficult to clinically distinguish between heart failure with reduced ejection fraction (HF-REF) and heart failure with preserved ejection fraction (HF-PEF) in the absence of an echocardiogram. There appear to have been no clear clinical diagnostic criteria developed to diagnose HF-PEF since the bpac^{nz} heart failure articles were published in Best Practice Journal (BPJ) in 2011.[1]

The BPJ article "Identifying patients with heart failure in primary care", included information on the utility of a number of primary care investigations for patients with heart failure; none of these, however, can accurately differentiate between HF-REF and HF-PEF. A clinical decision rule developed to help guide decisions about the need for echocardiography was also included in the article, although it does not necessarily help to predict HF-PEF. Clinical features that are known to be associated with a higher risk of HF-PEF include older age, female gender, atrial fibrillation, hypertension, a higher BMI and a lower incidence of coronary artery or valvular disease.[2]

Initially the management of both types of heart failure is similar – using diuretics to reduce fluid overload and therefore to relieve the patient's symptoms. However, further management is now often determined by the specific type of heart failure and, as the correspondent correctly points out, there are differing roles for rate-limiting calcium channel blockers such as diltiazem and verapamil.

The steps for managing a patient with HF-REF are:

1. Start with a diuretic
2. Add an ACE inhibitor and beta-blocker
3. Add spironolactone if still symptomatic – monitor renal function and electrolytes
4. Add an angiotensin-II receptor blocker (ARB), digoxin and anticoagulants as appropriate. Continue to closely monitor renal function and electrolytes
5. Avoid rate-limiting calcium channel blockers such as diltiazem and verapamil as they can impair left ventricular function

The steps for managing a patient with HF-PEF are similar but patients may be more "brittle" and fluid balance control can be more challenging:

1. Start with a diuretic
2. Add a beta-blocker
3. Add an ACE inhibitor if blood pressure control is required
4. Add digoxin if the patient is in atrial fibrillation
5. Consider the use of a rate-limiting calcium channel blocker, e.g. diltiazem or verapamil instead of a beta-blocker as there is some evidence these medicines may improve the condition of patients with HF-PEF

Best Practice Journal aims to provide "best practice" guidance based on current evidence and expert opinion. We appreciate there are times when this is not achievable given resource limitations and a more pragmatic solution has to be sought. The majority of patients with suspected heart failure, who do not need acute care, can have their initial treatment initiated in primary care. Their need for echocardiography or a cardiology assessment can then be determined by the likely underlying cause of the heart failure, their range of co-morbidities and their response to treatment.

For further information, see: "Identifying patients with heart failure in primary care" and "Managing patients with heart failure in primary care", BPJ 50 (Feb, 2013), available from: **www.bpac.org.nz**

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Best practice for the administration of intramuscular injections: is drawing back necessary or not?

Dear Editor,

I am doing some research into best practice for administration of intramuscular (IM) injections. When administering childhood vaccines we are told not to draw back, which is different from the advice I received when I trained as a nurse. After asking colleagues who have worked in different clinical settings I have received a number of conflicting replies regarding the need to draw back during IM injections. Can you advise best practice for this?

Practice Nurse
Dunedin

Response from bpac^{nz} editorial team

The practice of drawing or pulling back on the plunger of a syringe (also known as aspirating) while performing an intramuscular (IM) injection is used to avoid accidental intravenous (IV) injection. The risk to a patient of accidental IV administration varies according to the substance being injected.

A useful rule of thumb is that drawing back is:

- Not necessary for vaccinations,
- Necessary for passive immunisation with immunoglobulins
- Likely to improve patient safety for IM injections of medicines.

For the IM administration of vaccines drawing back is usually not necessary.[1] The Immunisation Handbook (New Zealand), Centres for Disease Control (United States), Department of Health (United Kingdom) and World Health Organisation all recommend that IM vaccinations should be made into the deltoid or vastus lateralis muscles.[1–4] As large blood vessels are not located near the recommended injection sites, drawing back before the injections of most vaccines is not needed, as long as the correct site and needle is used.[2, 3]

For the IM administration of immunoglobulins used for passive immunisation, drawing back is recommended as anaphylactic reactions, which although rare, are more likely to occur following IV administration.[1] These products include immunoglobulins derived from donated blood, such as Rh(D) immunoglobulin, hepatitis B immunoglobulin, tetanus immunoglobulin, zoster immunoglobulin and human normal immunoglobulin for IM administration.[1]

For the IM administration of medicines, clinical judgement should be used when deciding whether to draw back, taking into account:

- The risk to the patient if the medicine were to be accidentally administered IV
- The site of injection, which will influence the chance of injecting into a blood vessel

For medicines administered by IM injection where IV administration may cause significant adverse effects drawing back should reduce the risk of harm and improve patient safety. Examples of medicines used in primary care which could cause serious adverse effects if an IM injection is delivered IV

include preparations with oily liquids or suspended particles, such as long-acting antipsychotic or steroid depot injections. Oil-based injections may cause pulmonary oil embolism when injected intravenously, with symptoms such as acute onset cough and respiratory distress.[5, 6] Accidental IV administration of a depot IM olanzapine injection may cause post-injection delirium/sedation syndrome due to acute exposure to high doses.[7]

The potential for injection into a major blood vessel is higher with an intended IM injection in the dorsogluteal area. The risk of sciatic nerve damage or accidental subcutaneous injection in this area is also increased. Between 2005 and 2008, eight claims for sciatic nerve injury following a dorsogluteal IM injection were made to ACC, six of which occurred in a general practice setting.[8] Even with correct injection technique many IM injections into the dorsogluteal region result in subcutaneous administration due to variable subcutaneous tissue thickness between people.[3, 9] This can result in delayed uptake of the medicine, tissue irritation or the development of granulomas.[10]

The ventrogluteal injection site (also known as gluteal triangle) is an alternative site suitable for injections of up to 3 mL in adults. It is associated with less risk of accidental IV injection, avoids the sciatic nerve and there is also a more consistent depth of subcutaneous tissue between individuals than the dorsogluteal site, resulting in a safer, more consistent IM administration.[8, 11]

Other key practice points for performing an IM injection include:

- Injections should be given at a 90° angle with the surrounding skin stretched, either between fingers or using the Z-track technique, described below[2]
- If drawing back is performed, a five to ten second wait time is recommended to check for blood entry into the syringe[9]
- The Z-track injection technique helps prevent seepage of the injected fluid out through the injection track:[12]
  - Use a free hand to pull the skin sideways two to three centimetres prior to injecting
  - Perform the injection and withdraw the needle
  - Release the skin so that the needle track through the skin is offset away from the track through the underlying tissue

Guides to identifying the ventrogluteal IM injection site and using the Z-track injection technique are available from:

http://thenursepath.com/2014/04/23/the-ventrogluteal-im-injection-site/

https://vimeo.com/73862611

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