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The role of General Practice in the care of pregnant women

Contraception in early adolescence

Quinolones

Seasonal influenza and pneumococcal vaccines

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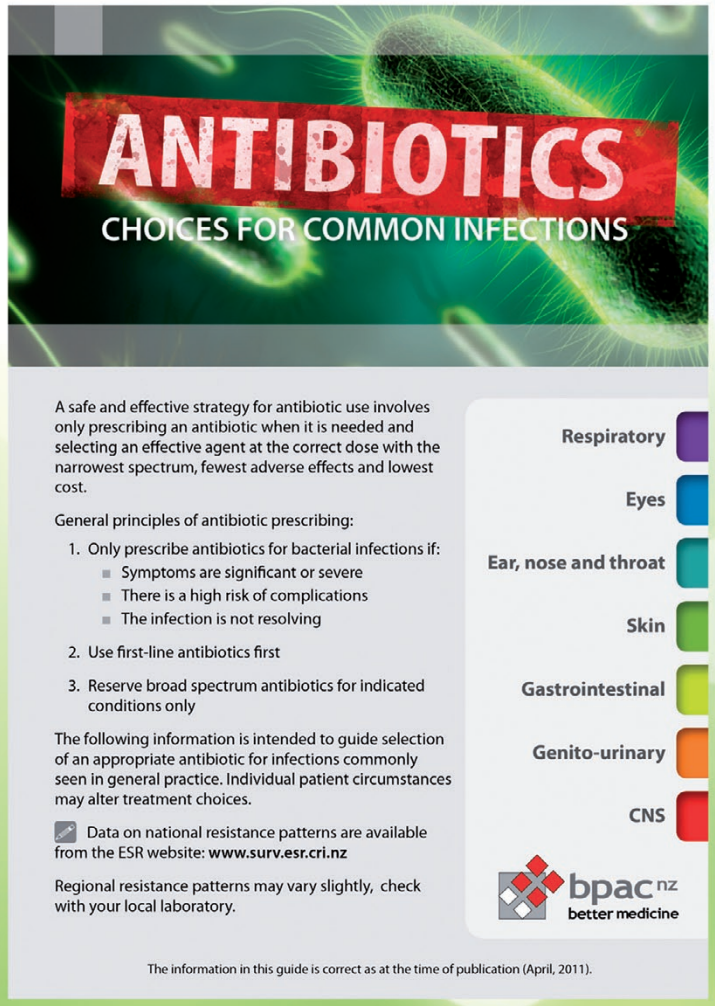

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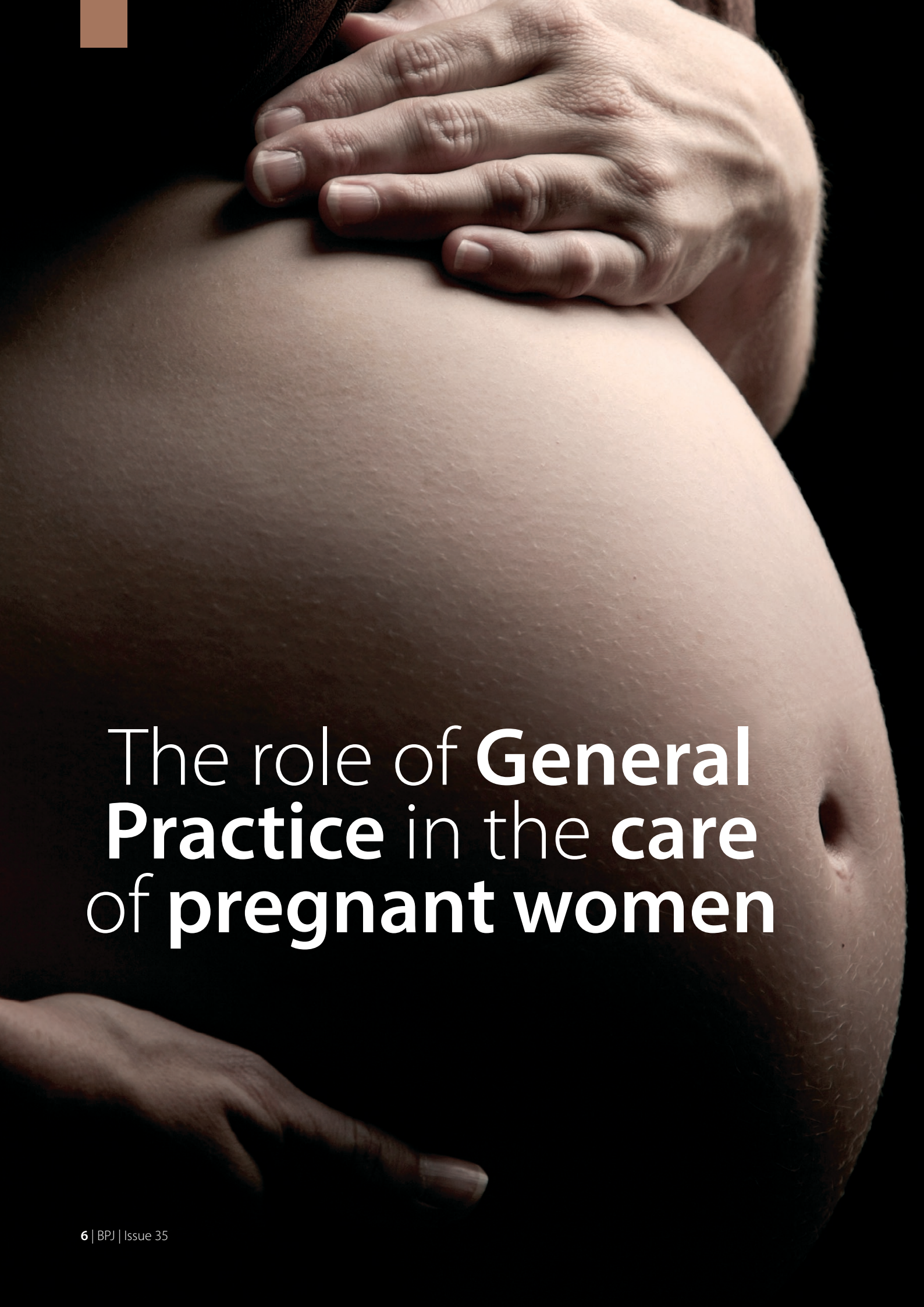


The role of **General Practice** in the **care** of **pregnant women**

THE MAJORITY OF LEAD MATERNITY CARERS (LMC) in New Zealand are now midwives. While most GPs in New Zealand no longer provide LMC services there is still a role for general practice in providing continuity of care for women with healthcare problems during pregnancy and effective pre- and post-natal care for patients in the practice.

There are both acute (see "Urinary tract infections in pregnancy", Page 20) and long-term (see "Continuing care for pregnant women with asthma", Page 15) conditions which may be managed in primary care by GPs, avoiding referral to secondary care. GPs, practice nurses and pharmacists play an important role in the provision of pre-conception information and care (see "Pre-conception care", Page 9) and often confirm the diagnosis of pregnancy for women. Primary care is also ideally placed to detect and provide early intervention for postnatal depression and to provide ongoing postnatal support to both mother and child, including information about immunisation.

Guidelines for referral during and after pregnancy

The Ministry of Health has developed guidelines to assist LMCs in appropriate referral for pregnant women who have long-term conditions or who develop acute problems during pregnancy and labour. This also includes the care of both mother and child after delivery.

The guidelines include a comprehensive list of medical and surgical conditions and guidance on the level of action required. The LMC will generally refer to an obstetrician or another specialist, e.g. psychiatrist or paediatrician. However, it is noted in the guidelines that referral to a woman's usual GP may be appropriate in some circumstances.[1]

Three referral levels are given:

Level 1 – The LMC **may recommend a specialist consultation**. Ongoing clinical responsibility should be determined by a discussion between the specialist, the LMC and the patient.

Level 2 – The LMC **must recommend a specialist consultation**. Ongoing clinical responsibility should be determined by a discussion between the specialist, the LMC and the patient.

Level 3 – The LMC **must recommend transfer of responsibility for care to a specialist**.

The referral level required will depend on the type and severity of the condition and the skills and experience of the LMC.

For example, applying these criteria to a pregnant woman with pre-existing asthma, referral recommendations would be:

Asthma severity	Referral recommendation
Mild	**Level 1:** consider recommending consultation with a specialist
Moderate (two courses of oral steroids over the last 12 months and on maintenance therapy)	**Level 2:** Recommend consultation with a specialist
Severe (hospitalisation for asthma in the last two years, history of intensive care admission, daily treatment with > 600 mcg fluticasone or > 1200 mcg budesonide or FEV1 <70% predicted in absence of acute attack)	**Level 3:** Recommend transfer of care to a specialist

In this example it may be more appropriate for a woman with mild asthma to be referred to her GP rather than an obstetrician or respiratory physician. However, care of a pregnant woman with severe asthma would require a multidisciplinary approach.

There are some conditions, such as hypertension or pre-existing diabetes, in which referral to secondary or tertiary hospital care is always recommended and it would not be appropriate for the woman to be referred solely to her GP.

Ministry of Health referral guidelines in maternity care are available from: **www.moh.govt.nz/moh.nsf/pagesmh/6257/$File/maternity-referral-guidelines-may07.pdf**

N.B. These guidelines are currently under review.

Best Practice Tip: Re-establish relationships with local providers of maternity care. One method of encouraging inter-professional collaboration and helping to ensure continuity of care is to write a "Dear LMC" letter for women early in pregnancy. This enables essential information, e.g. about long-term conditions, medication use and social aspects, to be shared. A team approach with effective communication between midwives, GPs and other healthcare providers is likely to provide best quality care.

Funding of primary maternity services in New Zealand

One of the main difficulties in encouraging General Practice to become more involved in the care of pregnant women is the fact that in most cases, these services will not be funded. The patient may be reluctant to pay for a visit to her GP when she can receive funded maternity care services elsewhere.

To qualify for funding for primary maternity services a woman must register with a LMC. Registration can occur as soon as a pregnancy is confirmed and until six weeks after delivery.

If a patient is uncertain if she is registered with a LMC, this can be confirmed by phoning the Sector Services Contact Centre on 0800 458 448

Primary maternity services include funding for:

- Lead maternity care
- Maternity non-LMC services
- Specialist medical maternity services

Maternity non-LMC services include consultations that are either additional to lead maternity care or those which are on a casual basis, e.g. woman on holiday in a different area who requires pregnancy care, pregnancy care prior to registration with a LMC. Only one non-LMC service fee can be claimed for the first trimester, per woman, per pregnancy.

Funding is not included for:

- A consultation regarding a potential pregnancy where the pregnancy test is negative
- A consultation for any medical condition unrelated to the pregnancy, including situations where the medical condition is exacerbated by pregnancy, e.g. asthma

In these situations the GP will normally charge a fee for the consultation.

For further information about maternity care services and funding in New Zealand, see Primary Maternity Services Notice 2007, Ministry of Health. Available from: **www.moh.govt.nz/moh.nsf/pagesmh/5845/$File/s88-primary-maternity-services-notice-gazetted-2007.doc**

N.B. This document is currently under review

ACKNOWLEDGEMENT Thank you to **Dr Helen Paterson**, Consultant in Obstetrics and Gynaecology, Senior Lecturer, Department of Women's and Children's Health, Dunedin School of Medicine, University of Otago for expert guidance in developing the following series of articles.

Pre-conception care in general practice

Integrating pre-conception care into general practice

Education to improve pre-conception health should be viewed as a routine part of primary care for all women of reproductive age. Many pregnancies are unplanned, so integration of pre-conception care into a general practice consultation can improve future pregnancy outcomes.

Some woman may consult specifically for pre-conception advice but in the majority of cases, the topic of pre-conception care is likely to arise opportunistically, e.g. at a consultation for a repeat prescription for contraception, a visit for a routine smear or a sexually transmitted infection (STI) check. Personal and cultural concepts of health, sexuality, fertility and pregnancy vary widely and therefore advice should be tailored specifically to the needs of the individual woman.

Ask about pregnancy risk or intent

Consider asking all women of reproductive age a single question about pregnancy risk or intent.[1] Encourage women to think about the right time and circumstances to consider pregnancy and prescribe effective contraception until this is desired. Provide education about modifiable risks during pregnancy such as smoking and alcohol intake and also provide education on how a pregnancy may be best achieved.

GPs and practice nurses should be aware of patients who, because of their obstetric or medical history, may have complications during pregnancy or delivery. The Ministry of Health Guidelines for referral in maternity care is a useful resource highlighting conditions which may require more complex management. This resource can be found at: **www.moh.govt.nz/moh.nsf/pagesmh/6257/$File/maternity-referral-guidelines-may07.pdf**

The pre-conception check

It is well established that the state of a woman's health has a direct effect on the health of the foetus. While population-level interventions exist, e.g. folic acid fortification of bread (although not yet implemented in New Zealand), targeted individual changes are needed to optimise the wellbeing of a woman and her child.

What is normal fertility?

Approximately 85% of couples should conceive after 12 months of unprotected intercourse during the fertile phase. Of the remaining couples, a further 50% will conceive over the next 36 months.[4]

Highest rates of pregnancy occur if couples have intercourse every one to two days during the fertile phase of the woman's menstrual cycle.[5] The fertile phase of the menstrual cycle begins approximately five to six days prior to ovulation and ends on the day of ovulation, although conception is more likely to occur if intercourse is timed within the three days prior to ovulation.[5] In a woman with a regular 28 day cycle, ovulation will usually occur on day 14 of the cycle (or 14 days before the expected date of the next menstrual period), so the best practical advice for couples is to have regular intercourse (every two to three days) starting at the end of menstruation, until about ten days before the woman's next menstrual period is due.

General guidance should be offered to all women of reproductive age because:

- It is estimated that 30–50% of pregnancies are unplanned[2]
- It is estimated that 51 per 1000 girls aged between 15 and 19 years become pregnant each year in New Zealand[3]
- Fertility begins to significantly decrease for women after age 35 years
- The risks during pregnancy for both mother and foetus rise after age 40 years

Women who have already had a child may need an update on pre-conception and pregnancy information that has changed, e.g. the use of iodine supplements in pregnancy.

Suggested format of a pre-conception consultation

A pre-conception discussion could include:

- An initial question about pregnancy risk or intent, i.e. do they wish to become pregnant, and when? Are they taking precautions to prevent the risk of becoming pregnant?
- A review of personal aspects of health that may have an impact on fertility and pregnancy, e.g. smoking cessation, alcohol and drug use, weight, diet, long-term conditions, medications, environmental exposures and psychosocial issues
- A review of current contraception

If the woman wishes to conceive, further actions could include:

- Discussion about the fertile phase of the menstrual cycle and optimal timing and frequency of intercourse (see sidebar "What is normal fertility")
- Prescription of folic acid – this is recommended at least four weeks before conception and for the first twelve weeks of pregnancy (see sidebar "Nutrition and supplements during early pregnancy")
- Checking of immunity status for rubella and varicella (chicken pox)

- Ensuring that cervical smears are up to date and considering if a STI check is required
- Checking that long-term medications are appropriate and safe
- Highlighting the issues regarding intake of caffeine, alcohol and other drugs and recommending avoidance
- Encouraging smoking cessation if applicable
- Discussing good nutrition, e.g. a well balanced diet which also optimises iron and calcium
- Giving general advice regarding personal health care and potential teratogens in early pregnancy such as avoiding x-rays and foods that may be contaminated with listeria (see sidebar "The risk of listeriosis during pregnancy")
- Giving advice about when and where to attend in early pregnancy

It is important to explain that conception may not be achieved immediately. In general, consider referral for evaluation of fertility for women aged under 35 years who have not conceived after 12 months and for women aged over 35 years who have not conceived after six months.[4]

Nutrition and supplements during early pregnancy

The importance of good maternal health during pregnancy is well accepted, however, it is equally important that nutritional status prior to pregnancy is optimised.

Folate reduces the risk of neural tube defects, therefore it is recommended that women planning a pregnancy should take a daily supplement of 800 mcg of folic acid.[6] N.B. 400 mcg folic acid is adequate but funded tablets are available in 800 mcg or 5 mg strengths. Folic acid is also available for over-the-counter purchase at pharmacies. Higher doses (5 mg/day) are recommended for women with a previous neural tube defect affected pregnancy, a family history of neural tube defects, women taking anticonvulsants and women with diabetes. Folic acid is recommended for at least four weeks before conception and 12 weeks after.[6] Supplementation can be continued throughout the pregnancy.

Iodine is recommended throughout pregnancy due to changes in thyroid function, which may result in cognitive impairment to the foetus. Unlike folic acid, it is not necessary to take iodine pre-conception. The Ministry of Health recommends that pregnant women should take 150 mcg of potassium iodide per day.[6] NeuroKare Iodine, which contains 268 mcg potassium iodate (equivalent to 150 mcg potassium iodide) is available for prescription or over-the-counter purchase at pharmacies.

Iron requirements during pregnancy increase substantially after the first trimester, but it is important to have adequate pre-conception iron stores. This can be achieved through diet (e.g. lean beef and lamb) or if iron deficient, iron supplementation.

Many women choose to take a **multi-vitamin** supplement for pre-conception and early pregnancy needs (e.g. Elevit). Recommend that they choose a pre-natal/pregnancy specific supplement which contains adequate amounts of folic acid (recommended daily intake [RDI] 400 mcg), iron (RDI 27 mg) and potassium iodide (RDI 220 mcg) and avoid excessive vitamin A (RDI 800 mcg/2667 IU, do not exceed 10 000 IU per day).

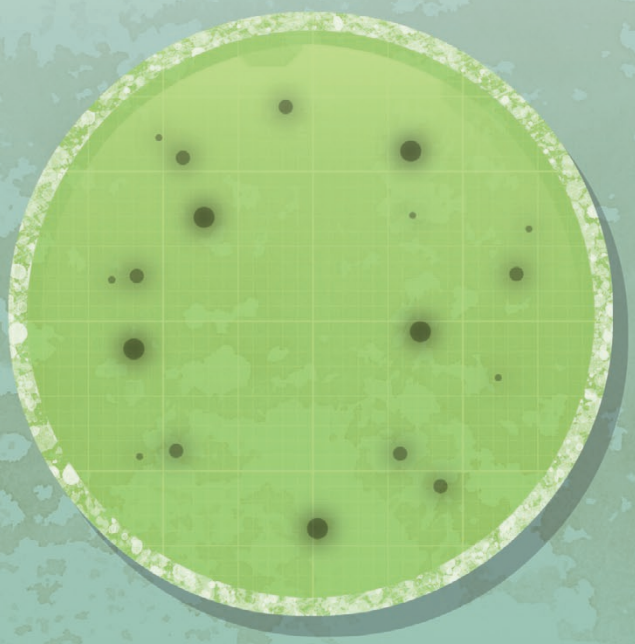
For further information see: "Nutrition and supplements during pregnancy", BPJ 18, (Dec, 2008).

The risk of listeriosis during pregnancy

Listeria monocytogenes is a common bacterial pathogen found in soil, water, plants, sewage and animal excrement. In most people infection with listeria does not result in illness or harm, however, for elderly and very young people, people who are immunocompromised and pregnant women, infection with listeria can be much more serious. Listeriosis during pregnancy can result in miscarriage, stillbirth or premature birth and newborn infants with listeriosis can develop bacteremia and meningitis.

To prevent listeriosis, advise pregnant women to:

- Thoroughly cook foods until piping hot and eat straight away
- Thoroughly wash uncooked foods such as fruits and vegetables before eating
- Avoid raw or cold pre-cooked seafood products (canned products are safe)
- Avoid "deli" foods such as ham, pre-cooked chicken, other cold meats, meat spreads and pre-prepared salads
- Avoid unpasteurised milk and soft cheeses and other products made from unpasteurised milk



Discuss the benefits of healthy lifestyle activities

Smoking cessation

Smoking during pregnancy is associated with placental abruption, miscarriage, premature birth and low birth weight.[7] Harmful chemicals in cigarette smoke restrict the supply of oxygen to the foetus, retarding growth and neuro-development. Premature birth is the leading cause of neonatal mortality and morbidity, and low birth weight is associated with health problems in adulthood such as cardiovascular disease, type 2 diabetes and obesity.[8]

All pregnant women, or those who wish to become pregnant, who smoke should be strongly encouraged to stop. Smoking cessation interventions in early pregnancy are successful in reducing the number of women who continue to smoke throughout pregnancy, and therefore reducing the number of smoking associated complications of pregnancy and birth.[9] For all people, smoking cessation can be challenging, however, pregnancy is an incentive for many women to spontaneously quit. It has been demonstrated that smoking cessation interventions in pregnancy do not increase stress and psychological symptoms for the woman.[9]

Smoking cessation interventions for pregnant women may include advice and counselling about quitting, motivational interviewing, encouraging the use of rewards for cessation and nicotine replacement therapy (NRT).[9] The New Zealand Smoking Cessation Guidelines state that it is appropriate for pregnant women to use NRT.[10] NRT is associated with a small potential risk to the foetus, but in comparison, smoking poses a much greater risk. Intermittent NRT, i.e. gum or lozenges, is preferable to patches in pregnant women. If a patch is used, the 16 hour patch is most appropriate. There is insufficient safety evidence to recommend the use of bupropion or nortriptyline to women who are pregnant and varenicline is contraindicated during pregnancy.[10]

Weight

There is evidence that women who are overweight or

underweight have reduced fertility due to an increase in anovulatory cycles, and increased complications of pregnancy.[4]

Women with BMIs of greater than 35 kg/m^2 have been found to have a two-fold increase in the time required to conceive.[11] A BMI greater than 27 kg/m^2 is associated with an increased risk of complications during pregnancy such as gestational diabetes, pregnancy associated hypertension, longer labour and a decreased rate of normal vaginal delivery.[12] In addition, maternal obesity can lead to an increased risk of complications such as stillbirth, pre-term birth and macrosomia (infant with excessive birth weight). An infant that is large for gestational age is more likely to have shoulder dystocia at delivery and also to be predisposed to obesity later in life.[12]

A low BMI (less than 17 to 18 kg/m^2) is associated with an increased risk of infertility (a four-fold increase in time to conception[11]) and with an increased risk of pre-term birth and intrauterine growth restriction.

Weigh patients routinely and encourage them to achieve an optimal pre-pregnancy weight in the BMI range of 20 to 25 kg/m^2.

Physical activity

Moderate physical activity should be encouraged, particularly for women with higher BMIs. It is also important to discuss the potential negative health consequences of over-exercise. There is some evidence that more than seven hours of strenuous aerobic exercise per week is associated with increased rates of anovulation and therefore a longer time to conceive.[4]

Pre-conception care for men

Pre-conception care is not just for women. Men can benefit too. Sperm production takes 74 to 78 days, therefore interventions or lifestyle changes should ideally be started three months prior to planning conception and continued until pregnancy is achieved.

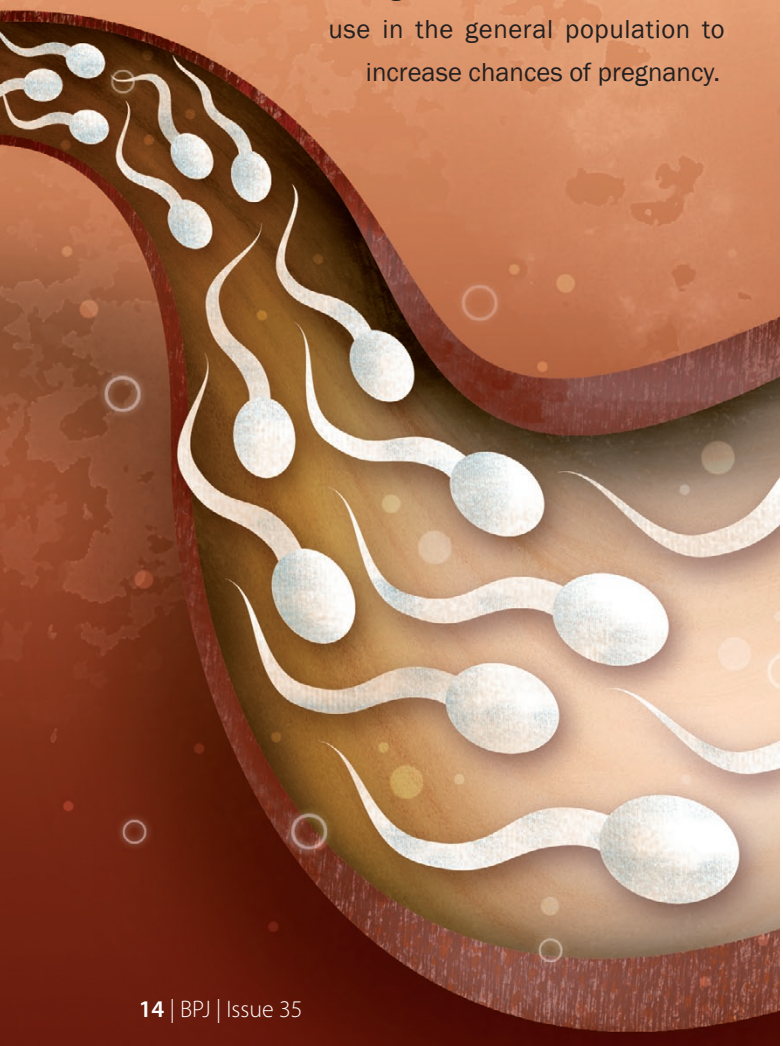
Pre-conception care for men could include advice about:[13]

- Maintaining a healthy weight – a BMI of greater than 29kg/m^2 may reduce sperm health
- Safe levels of alcohol intake – more than two standard drinks every day has been shown to reduce sperm quality
- Smoking cessation – smoking is known to reduce sperm count and motility and to increase the number of abnormal sperm
- Drug use – marijuana, cocaine and anabolic steroids have all been shown to reduce the number and quality of sperm
- Medications that may affect the quality and quantity of sperm, e.g. calcium channel blockers, corticosteroids, sulphasalazine, cimetidine
- Avoiding activities that increase the temperature of the testes, although there is limited evidence to support a direct effect on sperm quality, e.g. tight underwear, hot baths, laptops on knees[14]
- Optimising the number of ejaculations – optimal sperm quality (in number, morphology and motility) is highest when there is two to three days between ejaculations. Lower rates of pregnancy are found if the time interval between ejaculations is greater than three days.[4]
- Considering reducing workplace and recreational exposure to chemicals that may impair the quality of sperm such as pesticides and organic solvents in products such as paint strippers, degreasers and glues

Evidence that antioxidant supplements for men improve sperm health

Supplements containing antioxidants such as zinc, vitamin E, vitamin C, folate and carotenoids, e.g. Menevit, may promote sperm health by reducing oxidative stress. A recent Cochrane review of 34 trials (2876 couples) found that the use of an oral antioxidant supplement, by the male partner of couples undergoing fertility treatments, was associated with a statistically significant increase in the pregnancy rate and the live birth rate.[15] It should be noted, however, that the majority of the men in the trials were sub-fertile (i.e. low sperm count, decreased motility or abnormal morphology) and it is not known whether the same benefits would apply to men with normal fertility.

Antioxidant supplements could therefore be considered for sub-fertile men, but at this stage there is not enough evidence to advocate their use in the general population to increase chances of pregnancy.



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Continuing care for pregnant women with asthma

Asthma is the most common long-term medical condition encountered during pregnancy

It is estimated that 3–8% of pregnant women have asthma.[1,2] Most women with asthma have normal pregnancies and the risk of complications is small if the asthma is well-controlled.[3]

Pregnancy can affect the course of asthma

In general, during pregnancy the severity of asthma remains stable in one-third of women, worsens in one-third and improves in the remaining third. However, women with severe asthma are more likely to experience a worsening of symptoms than those with mild asthma.[3,4] Deterioration is most likely in the second and third trimesters.[3]

The most common cause of exacerbations of asthma during pregnancy are viral respiratory infections and non-adherence to inhaled corticosteroids.[4] A systematic review showed that pregnancy itself has no direct effect on FEV1.[5]

Asthma during labour

Acute asthma exacerbations during labour are relatively rare with 80–90% of women having no asthma symptoms during labour and delivery, possibly due to the endogenous steroid production.[3,4] If an exacerbation does occur, the patients normal asthma medication can be used and adjusted as required during this period.[4]

Poorly controlled asthma is associated with maternal and foetal complications

When asthma is well controlled during pregnancy, there is little or no increased risk of adverse maternal or foetal complications. Therefore, it is important to control asthma and minimise exacerbations by optimising treatment during pregnancy.

Compared to women without a history of asthma, women with asthma, particularly poorly controlled asthma, have been reported to have higher risks of several complications of pregnancy and delivery including, pre-eclampsia, haemorrhage, intrauterine growth restriction, pre-term delivery, low birth weight and increased perinatal mortality.[1, 3, 6]

Assess current asthma control in pregnant women

Clinical features used to assess current asthma control include (Table 1):[1]

- Frequency and severity of symptoms (including how symptoms interfere with sleep or normal activity)
- Frequency of use of short-acting beta-agonist for symptom control
- History of exacerbations requiring the use of oral corticosteroids

Table 1: Assessment of asthma control in pregnant women (adapted from Schatz, 2009[1])

	Well-controlled asthma	Asthma not well controlled	Very poorly controlled asthma
Frequency of symptoms	≤ 2 days/week	> 2 days/week	Throughout the day
Frequency of nocturnal symptoms	≤ 2 times/month	1-3 times/week	≥ 4 times/week
Interference with normal activity	None	Some	Extreme
Use of short-acting beta-agonist for symptom control	≤ 2 days/week	> 2 days/week	Several times/day
FEV1 or peak flow (expressed as the % of the predicted or personal best value)	> 80%	60-80%	< 60%
Exacerbations requiring use of oral corticosteroids	0–1 in past 12 months	≥ 2 in the past 12 months	

Manage pregnant women with asthma like any other person with asthma

Pregnant women with asthma should receive the same education and management as any patient with asthma. This includes:[7]

- A personalised plan to promptly manage signs of worsening asthma
- Education about correct inhaler technique
- Smoking cessation advice and support
- Advice about identifying and controlling or avoiding factors that may exacerbate symptoms, e.g. tobacco smoke

Medicines to treat asthma are generally safe during pregnancy

In general, medicines used to treat asthma are considered safe during pregnancy.[3] Appropriate use of medicines to treat asthma carries less risk to the mother and baby than poorly controlled asthma or severe asthma exacerbations.[1, 3]

Short- and long-acting beta-2 agonists can be used as normal during pregnancy

Studies have shown no significant association between the use of inhaled short-acting beta-2 agonists and foetal congenital malformations, pre-eclampsia, pre-term delivery or low birth weight.[1, 3] Salbutamol is the short-acting beta-2 agonist that has been most extensively studied in women during pregnancy.[2, 7]

Evidence for the safety of long-acting beta-2 agonists is limited, however, animal studies and a small number of human studies have not identified any major issues.[2] As is the case for anyone with asthma, long-acting beta-2 agonists should always be used in combination with inhaled corticosteroids.[4]

Inhaled corticosteroids can be used as normal during pregnancy

Inhaled corticosteroids are an integral part of the treatment of persistent asthma. Evidence suggests that:[4, 7]

Managing acute asthma in pregnancy

Severe acute attacks of asthma are dangerous for both the pregnant woman and the foetus and require immediate hospital care.

While waiting for the ambulance, a GP can:

- Keep the patient sitting as breathing may be more difficult in a pregnant woman when supine
- Give high flow oxygen to maintain an oxygen saturation of at least 95%[4] (even if there is no access to pulse oximetry)
- Closely monitor the woman for signs of deterioration, e.g. decreasing oxygen saturation, increasing tachycardia, decreasing respiratory effort and reduced chest sounds, increasing agitation, decreasing consciousness
- Check foetal heart rate
- Use the same medicines to manage asthma exacerbations in a pregnant woman as in other adults, e.g. inhaled beta-2 agonists, inhaled anticholinergic drugs and systemic corticosteroids.[1] In most circumstances give inhaled medicine via a spacer, however, in severe asthma consider the use of an oxygen-driven nebuliser to deliver beta-2 agonists.[3]
- Consider establishing intravenous (IV) access to allow for the delivery of medicines, e.g. IV corticosteroids if oral tablets are not able to be taken and IV fluids if required[3]

- Inhaled corticosteroids are safe in pregnancy and are not associated with an increased risk of congenital malformations or adverse perinatal outcomes
- Inhaled corticosteroids reduce the risk of asthma exacerbations and improve lung function during pregnancy
- Although most studies have involved budesonide, the inhaled corticosteroid that was successfully controlling asthma before pregnancy should be continued during pregnancy

Oral (systemic) corticosteroids should not be withheld because of pregnancy

Prednisone is mostly inactivated (88%) when it crosses the placenta, therefore foetal exposure is limited.[4, 8] However, the use of oral corticosteroids during the first trimester of pregnancy has been associated with a small risk of congenital malformations (primarily cleft palate).[2, 3] Some studies have also found an association between oral corticosteroid use and pre-eclampsia, pre-term labour and low birth weight. However, it is difficult to separate the effect of oral corticosteroid use and the effect of greater disease severity (i.e. requiring the use of systemic corticosteroids) on adverse pregnancy outcomes.[1, 2] In addition, many of the studies that have found these associations, involved pregnant women taking oral corticosteroids for conditions that require continuous use of oral corticosteroids, instead of the short courses that are usually used to treat asthma exacerbations.[3]

Regardless of these associations, the benefit to the mother and baby of using oral corticosteroids to treat a severe exacerbation justifies their use.[3]

Asthma medications can be used as normal during breastfeeding

Although data on the safety of asthma medications in breastfeeding is limited, in general, only small amounts enter breast milk and none are a contraindication to breastfeeding.[1] Women with asthma should be encouraged to breastfeed and continue to use their asthma medications as normal.[3]

Theophylline and cromoglycates can be used during pregnancy

Although not often used to treat asthma, no association has been found between theophylline or cromoglycates and congenital malformations or adverse perinatal outcomes. The therapeutic range for theophylline may be lower in pregnant women because protein binding decreases during pregnancy, resulting in increased free drug levels.[3]

Safety data for leukotriene receptor inhibitors in pregnancy is limited

Data from animal studies and limited human exposure has not identified any major issues in the use of leukotriene receptor inhibitors (e.g. montelukast) during pregnancy. However, it is recommended that they are not initiated during pregnancy.[9] It may be appropriate to continue leukotriene receptor inhibitors in women who have demonstrated significant benefit from their use prior to pregnancy.[3]

Pregnant women whose asthma is well-controlled should continue their usual medicine regimen

It is appropriate for pregnant women whose asthma is well-controlled to continue taking the medicines they were using prior to becoming pregnant. New Zealand Guidelines recommend considering stepping down therapy when asthma is well-controlled,[10] however, it may be more appropriate to maintain pregnant women on their current treatment to avoid the potential loss of control. Treatment can be stepped up for women whose asthma is not well controlled.[1]

Pregnant women with asthma should be reviewed regularly

Although the GP may not be involved in routine antenatal care visits, check that the woman is receiving regular review of their current symptoms, short-acting inhaler use

and peak expiratory flow monitoring (if applicable). Close co-operation between all health professionals caring for the pregnant patient is important to ensure the best asthma management.[11]

Women with poorly controlled asthma require multidisciplinary care involving an LMC, obstetrician and respiratory physician, including asthma education. Co-ordination of the woman's complex care needs may be facilitated by her GP.

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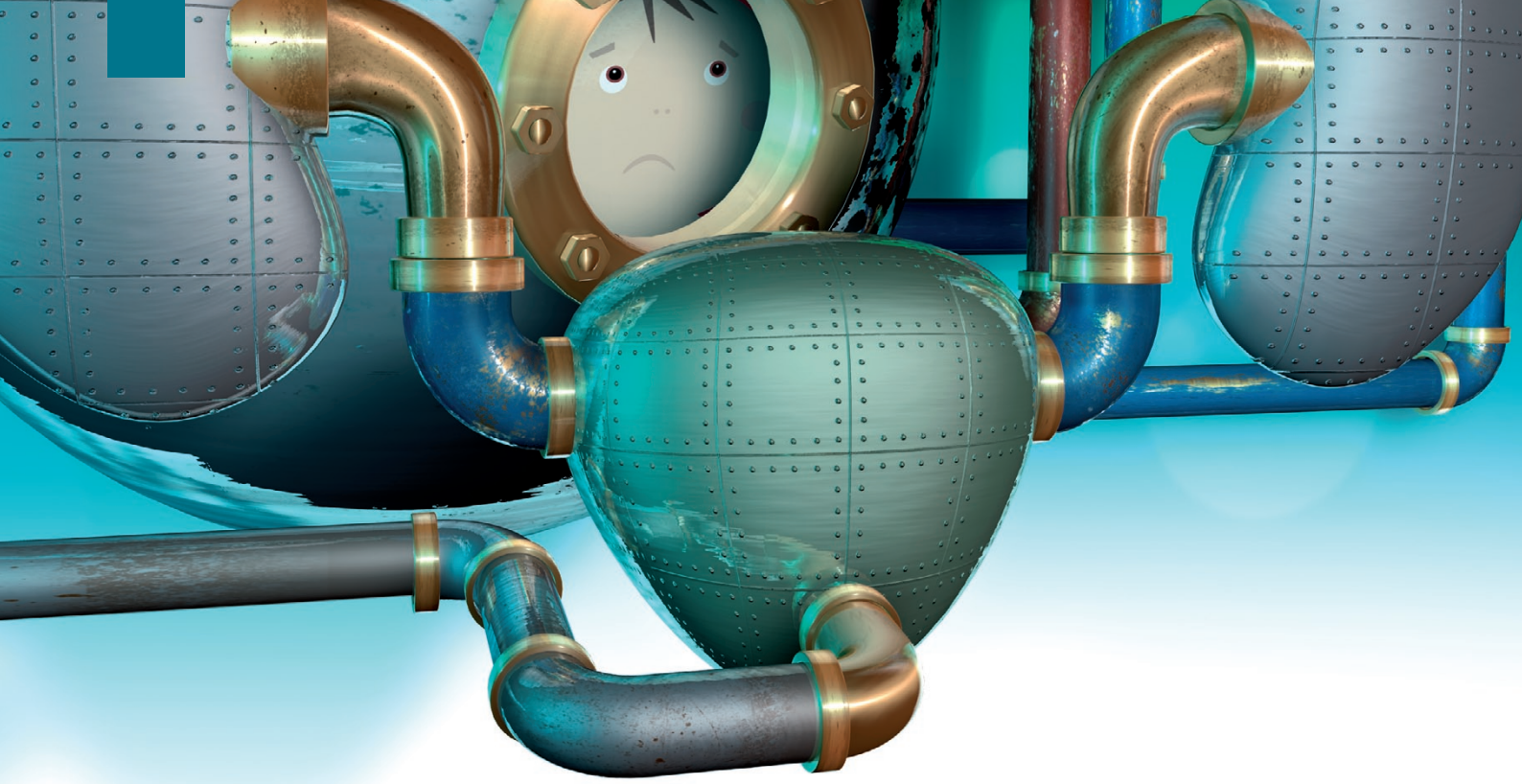


Managing **urinary tract infections** in pregnancy

Urinary tract infections (UTIs) occur commonly during pregnancy. UTIs include acute cystitis, pyelonephritis and asymptomatic bacteriuria (positive urine culture in an asymptomatic woman). Approximately 1–4 % of pregnant women experience acute cystitis and the incidence of asymptomatic bacteriuria during pregnancy ranges from 2–10 %.[1]

Many factors may contribute to the development of UTIs during pregnancy. One important factor is ureteral dilatation, thought to occur due to hormonal effects and mechanical compression from the growing uterus. Ureteral dilation can cause bacteria to spread from the bladder to the kidneys, increasing the risk of pyelonephritis.[2]

Acute cystitis in pregnancy

Women with acute cystitis commonly present with symptoms of dysuria, urgency and frequency, without evidence of systemic illness. However, these symptoms can be reported by pregnant women without acute cystitis.[3] A urine sample should be sent for culture and, in the case of a pregnant woman, empiric treatment is required while waiting for the results. Antibiotic choice should cover common pathogens and can be changed if required after the organism is identified and sensitivities are determined. The following are appropriate choices (in order of preference):

- Nitrofurantoin: 50 mg four times a day (avoid at 36+ weeks)
- Trimethoprim: 300 mg once a day (avoid in the first trimester)
- Cephalexin: 500 mg twice a day (500 mg tablets funded since September 1, 2010)

N.B. Amoxicillin is not suitable as an empiric therapy for acute cystitis but can be used if urine culture shows susceptibility.

A seven day treatment period is required to ensure eradication. Studies in non-pregnant women with acute cystitis show that treatment with antibiotics for three days is as effective as longer courses (e.g. seven to ten days), however, the risk of relapse is higher.[4] Recurrent

infections may have serious consequences for pregnant women therefore a longer course of antibiotics is used to avoid the higher rate of relapse with short courses.[4] A follow up urine culture can be requested one to two weeks after the antibiotic course has been completed to ensure eradication.

Paracetamol can be used to relieve pain associated with acute cystitis.[5] Other measures to relieve symptoms such as increasing fluid intake, urinary alkalinisation products and cranberry products are not recommended because evidence of their effectiveness is lacking and some products may interact with antibiotic treatment.[1]

Asymptomatic bacteriuria in pregnancy

Asymptomatic bacteriuria during pregnancy has been associated with an increased risk of pre-term delivery and low birth weight. In addition, if untreated, 20–40% of pregnant women with asymptomatic bacteriuria may develop pyelonephritis later in pregnancy.[6] Antibiotic treatment for asymptomatic bacteriuria is therefore indicated in pregnant women to reduce the risk of pyelonephritis.[3, 6]

A urine culture should be used to screen for asymptomatic bacteriuria at 12 to 16 weeks gestation.[3, 7] While some guidelines recommend a second urine culture to confirm bacteriuria prior to treatment,[7] in clinical practice it is common for only one culture to be done.[2]

It is recommended that all pregnant women who have confirmed asymptomatic bacteriuria are treated with antibiotics. The choice of antibiotic can be guided by the known sensitivities, in the following order of preference:[1, 8]

- Amoxicillin (if susceptible): 250 mg three times a day
- Nitrofurantoin: 50 mg four times a day (avoid at 36+ weeks)
- Trimethoprim: 300 mg once a day (avoid in the first trimester)
- Cephalexin: 500 mg twice a day (least preferred option)

All antibiotics should be given for seven days to ensure cure. A recent study found that a one day course of nitrofurantoin is less effective than a seven day course for treating asymptomatic bacteriuria in pregnant women.[9] A repeat culture one to two weeks after completing therapy is required to ensure eradication of bacteriuria. It is then recommended that urine cultures are repeated regularly until delivery.[1, 5] Women who do not have bacteriuria in the first screen (i.e. at 12 to 16 weeks gestation) do not need to have repeat urine cultures.[7]

Group B streptococcus: Even when treated, group B streptococcus bacteriuria is associated with heavy vaginal colonisation and therefore an increased risk of neonatal group B streptococcus disease.[5, 10] Pregnant women found to have group B streptococcus infection in the urine (>10^5 colony-forming units per mL of urine) should be treated at the time of diagnosis, with amoxicillin or cephalexin. Prophylaxis (usually with penicillin G) is given during delivery.

Recurrent infection

Women with recurrent UTIs during pregnancy may require antibiotic prophylaxis. If the UTIs are thought to be related to sexual intercourse, a postcoital (or bedtime) dose of nitrofurantoin 50 mg may be appropriate. Cephalexin 250 mg can also be used.[2]

Pyelonephritis in pregnancy

A diagnosis of acute pyelonephritis should be considered if a patient presents with systemic symptoms such as fever (> 38 °C), flank pain and nausea or vomiting. Symptoms of lower UTI such as frequency and dysuria may or may not be present.[2, 4] Pyelonephritis in pregnancy can have serious consequences such as maternal sepsis, pre-term labour and premature delivery and requires prompt and aggressive treatment.[4] Hospital admission and intravenous antibiotics are usually required. Intravenous antibiotics are usually continued until the patient has been afebrile for 48 hours. Oral antibiotics are then used for 10–14 days.[3]

Safety of antibiotic choices for UTIs

Nitrofurantoin

Nitrofurantoin been used extensively and is considered safe to use during pregnancy,[11] but not during delivery or when nearing term (i.e > 36 weeks). This is because of the possibility of haemolytic anaemia in the newborn, due to immature erythrocyte enzyme systems (glutathione instability).[12]

Nitrofurantoin has been shown to effectively treat asymptomatic bacteriuria, with one study finding a cure rate of 86% achieved with a seven day course.[6, 9] Nitrofurantoin attains therapeutic concentrations in the urine and is suitable for treating asymptomatic bacteriuria and acute cystitis, however, it is not appropriate for treating pyelonephritis because it does not achieve adequate tissue penetration.[13]

Trimethoprim

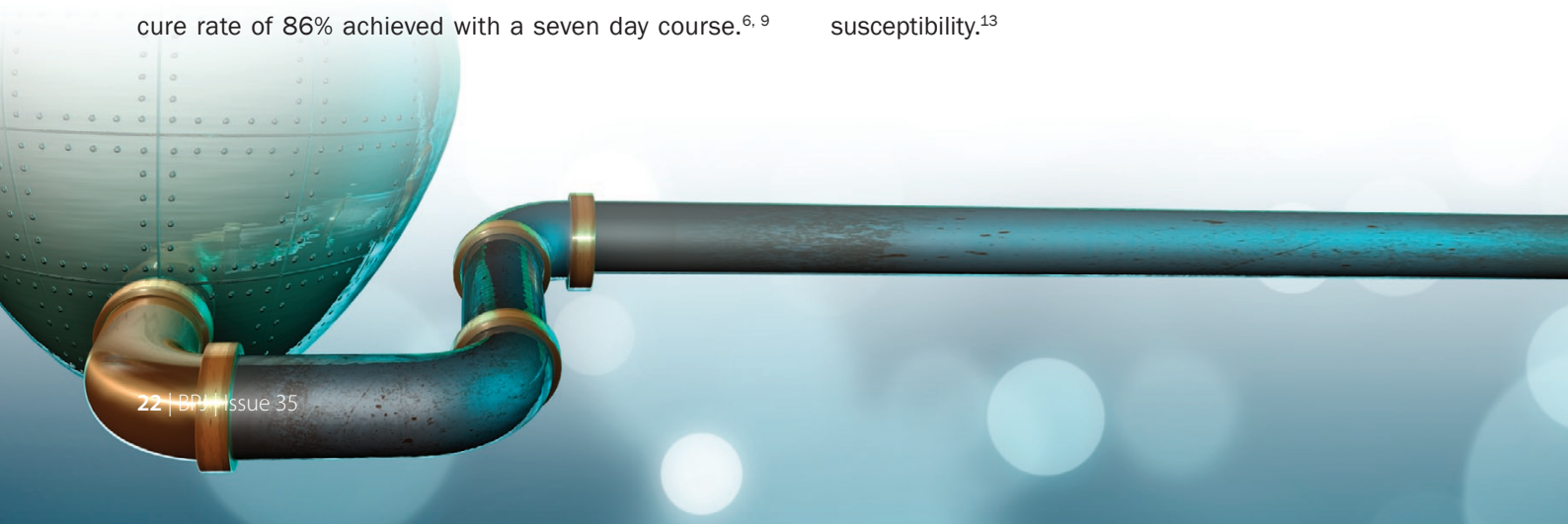
Although trimethoprim is commonly used to treat symptomatic UTIs, good evidence to support its use in pregnancy is lacking.[1] However, it is not thought to be teratogenic.[2] It is recommended that trimethoprim is avoided if possible in the first trimester because it is a folic acid antagonist and theoretically may increase the risk of neural tube defects.[13]

Cephalexin

Cephalosporins are considered safe to use in pregnancy.[11] However, the use of broad spectrum antibiotics (such as cephalosporins) should be avoided when a narrow spectrum antibiotic would be more appropriate.[8] There are concerns that broad spectrum antibiotics increase the risk of *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus* (MRSA) and resistant UTIs. *C. difficile* infection can be life-threatening in pregnant women, and there are case-reports of both maternal deaths and stillborn infants.[1]

Amoxicillin

All penicillins are considered safe to use during pregnancy, however, there is evidence that resistance to amoxicillin is higher than resistance to trimethoprim.[1] For this reason, amoxiciilin is not suitable as an empiric therapy for acute cystitis but can be used if urine culture shows susceptibility.[13]



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Contraception in early adolescence

Key concepts

- Advice about sexual health and contraception should be considered for all adolescents, including those aged as young as 12 or 13 years
- Contraceptive advice and treatment may be given to young adolescents when it is judged to be in their best medical interests, they understand the information and they are able to give informed consent
- Condoms plus one other method of contraception is recommended for young adolescents to protect against sexually transmitted infections and pregnancy
- All appropriate contraceptive options should be discussed and, provided there are no medical contraindications, patient choice encouraged

Identifying young adolescents who are sexually active

Many young people are having sex. New Zealand research found that approximately one-third of females reported sexual intercourse before the age of 16 years.[1] This research is now over ten years old and it is likely that an even larger proportion of girls are becoming sexually active at a young age.

A smaller study involving 654 Year 10 students (average age 14 years) in the Hawke's Bay region in 1998 found that nearly 40% reported having had sexual intercourse, with 12% first having sex at age 12 years or younger.[2] Māori students were nearly three times as likely as non-Māori students to be sexually active. Just over 20% of the students who were sexually active reported having more than five partners.[2]

These statistics emphasise the importance of considering sexual health and contraception for all adolescents, including those aged as young as 12 or 13 years. It can sometimes be difficult for clinicians to broach this subject and to be able to judge when a conversation about sex is appropriate when dealing with a young patient. In some cases, the patient will present asking for advice on contraception or sexually transmitted infections (STIs), but in the majority of cases, opportunistic intervention will be necessary.

Who is most likely to be sexually active at a younger age?

When considering which young adolescents to target for contraceptive intervention, the following predictors for early sexual activity may be helpful:[1]

- Use of alcohol
- Cigarette smoking
- Non-attendance at school
- Conduct disorder
- For girls: mother having her first child before age 20 years

Establish a rapport and encourage discussion

When providing advice about sexual health it is important to establish a rapport and allow sufficient time and support for the young person to make informed choices. Encourage discussion about the following topics:

- The emotional and physical implications of sexual activity, including the risks of pregnancy and sexually transmitted infections
- Whether the relationship is mutually agreed or whether there may be coercion or abuse
- Reinforce the confidentiality of the consultation but encourage the young person to discuss their sexual health with a parent, carer or trusted adult
- The need for any additional counselling or support

Assessing competency in young people

The Contraception, Sterilisation and Abortion Act (1977) allows people aged under 16 years to consent to their own medical treatment and to be given contraceptive information, services and prescriptions. In practice, contraceptive advice and treatment is given to young adolescents when it is judged to be in their best medical interests and they are able to give informed consent. The Fraser Guidelines can assist clinicians in making this decision.

The Fraser Guidelines refer to a legal case which considered whether a doctor should be able to give contraceptive advice or treatment to a person aged under 16 years, without parental consent.[3] Since this case in 1985, these guidelines have been widely used to assess if a young person has the maturity to make their own healthcare decisions and whether they also understand the implications of those decisions (known as "Gillick competency").

When considering discussing contraception with a young person, the clinician should be satisfied that:[3]

- The young person understands the advice being given
- The young person cannot be persuaded to involve parents/carers or allow the medical practitioner to do so on their behalf
- The young person is likely to begin, or continue having, sexual intercourse with or without contraception
- Unless the young person receives contraception, their physical or mental health (or both) is likely to suffer
- The young person's best interests require contraceptive advice, treatment or supplies to be given with or without parental consent

Age of sexual consent

The age of sexual consent in New Zealand is 16 years, i.e. it is an offence to have a sexual connection with a person aged under 16 years. It is also an offence for a person to have a sexual connection with somebody aged under 18 years if they are in a position of power or authority to that person or if they have a responsibility for their care or upbringing.[4]

Young adolescents who are similar in age are not usually prosecuted for having a consensual sexual relationship. Where there are issues of concern that may place the young person in physical or psychological danger, or if there is a significant age difference between the young person and their partner, the case should be discussed with a public health officer or child protection service.

Appropriate contraception for young adolescents

Young adolescents who are sexually active require contraception to prevent pregnancy but also protection to prevent acquisition of STIs. Young people are at increased risk of acquiring a STI, due to a number of factors including:

- **Physical and immunological immaturity.** In young girls, the lower genital tract is lined with columnar epithelium cells. During puberty these cells slowly regress into the endocervix. There is evidence that until they regress, the columnar epithelium cells that remain exposed on the exocervix are more susceptible to attachment and invasion by organisms responsible for STIs. In addition, adolescents are more immunologically immature than adults and therefore more likely to acquire an infection when exposed to an STI pathogen for the first time.[5]
- **Lack of use of barrier contraception.** This may be due to lack of knowledge, lack of access to condoms or a misperception that condoms are not required if other forms of contraception are being used
- **Age at first intercourse.** Initiating sexual activity at a younger age results in a longer period of exposure to transmissible pathogens and an increased number of partners
- **Co-existence of other risk behaviours** such as drug or alcohol misuse

Best Practice Tip: Young adolescent girls should be well informed about and have access to Human Papillomavirus (HPV) Vaccine. This vaccine helps to protect against HPV serotypes implicated in cervical cancer formation (types 16, 18) as well as those which can cause external genital warts (types 6 and 11).

Contraceptive choice: condoms plus one other method

There is no "one size fits all" solution when it comes to selecting contraception for young adolescents. However, the use of condoms plus one other form of contraception is likely to be the most appropriate regimen. All available methods of contraception should be discussed and, provided there are no medical contraindications, patient choice encouraged. It is more likely that a young patient will adhere to a treatment if they have been well-informed and have had input into the decision.

Table 1 lists pros, cons and contraindications for contraceptive options in young adolescents, which may be considered when making a treatment choice.

N.B. Hormonal methods of contraception are not appropriate for girls prior to menarche.

Condoms

Condoms are recommended, along with one other method, as the best form of contraception for young adolescents. Condoms alone (along with education on their use and the risks of STIs and pregnancy) may be appropriate for young adolescents who are sexually active infrequently or those who are not yet sexually active but wish to be prepared.

Condoms are fully subsidised on the pharmaceutical schedule. However, many young people may be too embarrassed to collect their prescription so practices are encouraged to keep a supply of condoms to give away (available on a Practitioner's Supply Order).

Combined oral contraceptive and progestogen-only pills

For many young adolescent girls, contraception means "going on the pill". This can be an effective form of contraception if used correctly, but may be inappropriate if there is any concern about compliance with treatment. Progestogen-only pills are associated with less adverse-effects and contraindications to use than combined oral contraceptives, but adherence to a strict dosing time-frame is necessary, therefore making this option less suitable for some young people.

Oral contraceptives are usually commenced on the first day of the next menstrual period. However, pills may be started at any time and some clinicians may prefer to advise an immediate start to ensure compliance. If the

Table 1: Pros, cons and contraindications for contraceptive options in young adolescents

Notes:

- This table relates to contraception in young adolescents - different pros, cons and contraindications may apply to older age groups
- Use of certain anticonvulsants decreases the effectiveness of COCs and progestogen-only contraception
- Female condoms (femidoms) and diaphragms are not generally considered as suitable options for young adolescents due to lack of availability or inaccurate use
- Natural family planning is an unsuitable contraceptive method for young adolescents
- For a complete list of World Health Organisation Medical Eligibility Criteria for contraceptive use, see: **www.who.int/reproductivehealth/publications/family_planning/9241562668index/en/index.html**

Condoms		
Pros	**Cons (and considerations)**	**Contraindications**
▪ If used correctly, provides protection from STIs ▪ Can be used for vaginal, anal and oral sex ▪ Easy to obtain (may be purchased by anyone, in a variety of retail locations, also funded on prescription) ▪ Easy to use ▪ No adverse effects (unless allergic to latex) ▪ May prevent cancer of the cervix (by protecting against HPV infection) ▪ Can be used with other forms of contraception	Contraceptive and STI protection can fail if condom slips, breaks or is used incorrectly	Latex allergy (use a latex free variety)
Combined oral contraceptive (COC)		
Pros	**Cons (and considerations)**	**Contraindications**
▪ If taken correctly is 99% effective in preventing pregnancy ▪ Regular withdrawal bleeds, usually lighter and less uncomfortable than normal menstrual period ▪ May reduce iron deficiency ▪ May reduce the future risk of endometrial and ovarian cancer ▪ Some COC types can improve acne ▪ Several brands fully funded	▪ Does not provide protection from STIs ▪ Must be taken daily (ideally at a similar time of day) to be effective ▪ Initial adverse effects may include; bleeding, nausea, breast tenderness, headaches, changes in mood and libido ▪ Increases risk of venous thromboembolism (VTE)	▪ History of migraine with aura ▪ Current or past history of VTE or known thrombogenic mutation (N.B. screening for this is not appropriate) ▪ Valvular and congenital heart disease ▪ BMI ≥ 40
Progestogen only pill (POP)		
Pros	**Cons (and considerations)**	**Contraindications**
▪ If taken correctly, Noriday (fully funded) or Microlut are 96-99% effective and Cerazette more than 99% effective in preventing pregnancy ▪ Serious adverse effects are extremely uncommon ▪ Decreased risk of ectopic pregnancy	▪ Does not provide protection from STIs ▪ Must be taken at the same time every day (increased risk of pregnancy if Noriday or Microlut taken more than three hours late or Cerazette taken more than 12 hours late) ▪ May cause irregular bleeding or spotting ▪ May cause adverse androgenic symptoms, e.g. acne, weight gain, mood changes	Generally not recommended if current VTE and not recommended to be continued if migraine with aura develops after initiation

Intrauterine contraceptive device (IUCD)		
Pros	**Cons (and considerations)**	**Contraindications**
▪ 99% effective in preventing pregnancy ▪ Can stay in place for five years or more ▪ Does not involve hormones (contains copper) ▪ Can be used to prevent pregnancy after unprotected sexual intercourse ▪ Fully funded (Multiload Cu-375)	▪ Does not provide protection from STIs ▪ Increased risk of pelvic infection during insertion (about 1%)[10] – prior screening for infection (and treatment) necessary ▪ May cause increased bleeding and cramping during a period ▪ May cause pain during insertion or removal ▪ Insertion may be difficult in young adolescents or those who have never had a vaginal examination ▪ Device more likely to be expelled in nulliparous women ▪ Risk of vasovagal or cervical shock	▪ Current chlamydia, gonorrhoea, purulent cervicitis or pelvic inflammatory disease N.B. use is not recommended if very high likelihood of exposure to gonorrhoea or chlamydia infection ▪ Unexplained vaginal bleeding ▪ Uterine cavity abnormality
Levonorgestrel Intrauterine System (LNG-IUS) – Mirena		
Pros	**Cons (and considerations)**	**Contraindications**
▪ > 99% effective in preventing pregnancy ▪ Can stay in place for five years ▪ After approximately one year, periods are lighter or absent	▪ Does not provide protection from STIs ▪ Currently unfunded unless specific criteria met, i.e. heavy menstrual periods and ferritin <16 mcg/L (approximate cost $300) ▪ Increased risk of pelvic infection during insertion –prior screening for infection (and treatment) necessary ▪ May cause adverse androgenic symptoms, e.g. acne, weight gain, mood changes ▪ May cause pain during insertion or removal ▪ Insertion may be difficult in young adolescents or those who have never had a vaginal examination ▪ Risk of vasovagal or cervical shock	▪ Current chlamydia, gonorrhoea, purulent cervicitis or pelvic inflammatory disease N.B. use is not recommended if very high likelihood of exposure to gonorrhoea or chlamydia infection ▪ Unexplained vaginal bleeding ▪ Uterine cavity abnormality Generally not recommended if current VTE and not recommended to be continued if migraine with aura develops after initiation
Long-acting implantable progestogen (reversible) contraceptives e.g. Jadelle, Implanon		
Pros	**Cons (and considerations)**	**Contraindications**
▪ >99% effective at preventing pregnancy ▪ Jadelle (2 rods) lasts up to five years (fully funded) ▪ Implanon (1 rod) lasts up to three years ▪ Can be removed at any time and the effects are fully reversible	▪ Does not provide protection from STIs ▪ Involves minor surgery (with local anaesthetic) to place or remove rod(s) under the skin of the upper arm ▪ Menstrual irregularities are frequently reported ▪ May cause adverse androgenic symptoms, e.g. acne, weight gain, mood changes ▪ Implanon is not funded (approximate cost $380), insertion and removal of Jadelle and Implanon may incur an additional cost	Generally not recommended if current VTE and not recommended to be continued if migraine with aura develops after insertion

Progestogen injectable: depot medroxyprogesterone acetate		
Pros	**Cons (and considerations)**	**Contraindications**
▪ Almost 99% effective in preventing pregnancy ▪ Lasts for 12 weeks ▪ Reduces the risk of endometrial cancer ▪ May decrease pre-menstrual syndrome ▪ May be useful for girls who have heavy or painful periods - amenorrhoea occurs in around half of all users in the first year ▪ Fully funded	▪ Does not provide protection from STIs ▪ Theoretical concern that optimal peak bone density not achieved in adolescents ▪ May initially cause irregular or prolonged bleeding (treated by using the COC for one month or having the next injection earlier) ▪ May cause adverse androgenic symptoms, e.g. acne, weight gain, mood changes ▪ Return to fertility after discontinuation delayed for six to eight months (but can be up to 18 months)	Current advice is to consider second-line in young adolescents, i.e. use only if other methods have been discussed and considered unsuitable (due to effects on bone density) Generally not recommended if current VTE and not recommended to be continued if migraine with aura develops after insertion.

"quick start" method is used, pregnancy should first be ruled out based on history of sexual activity in relation to the girl's menstrual cycle, or if history is unreliable, a urine pregnancy test. In some cases, use of the emergency contraceptive pill may be necessary (see over page).

Begin with a standard dose (30 mcg ethinyloestradiol) pill such as Levlen, Monofeme or Norimin (funded options). If adverse effects persist after three months of use, consider switching to a different brand. If monthly periods are not desired, active pills may be used continuously for twelve weeks, followed by one week of pill-free days.

To optimise adherence to oral contraceptives in young adolescents, the following three key points should be emphasised to the patient:[6]

1. When to start the pill
2. The importance of taking the pill at the same time each day – suggest setting a cell phone reminder or placing the pill packet by her toothbrush
3. Instructions to call the practice with any questions or problems, e.g. missed pill

 For further information about oral contraceptives, including solutions to adverse effects, see "Combined oral contraceptive: issues for current users", BPJ 12 (Apr, 2008).

Intrauterine contraceptive device (IUCD)

For many young adolescent girls, remembering to take a daily pill (or choosing to adhere to this regimen) is prone to error. A longer-term, "passive" option for contraception such as an intrauterine contraceptive device (IUCD) may be considered more appropriate in some circumstances. IUCDs are not recommended when there is a high likelihood of exposure to STIs (especially chlamydia and gonorrhoea).[7] This may be determined by unreliable use of condoms, multiple sexual partners or a partner with multiple sexual partners.

There are two types of IUCD – non-hormonal (containing copper) and hormonal (containing progestogen). The Multiload Cu 375 (active for five years) is currently the only funded non-hormonal IUCD. Mirena, a levonorgestrel-containing IUCD (active for five years), is only funded under Special Authority for women who have heavy menstrual bleeding, resulting in iron deficiency anaemia (unlikely in a young adolescent).

IUCDs are not often used by young adolescents, possibly due in part to reluctance of clinicians to offer this method of contraceptive to this age group. There may be concerns about the practicalities of inserting an IUCD in a non-mature woman, especially if the patient has never had a vaginal examination. IUCDs are safe to insert in younger adolescents, but before a decision is made, the procedure

should be carefully explained, including the possibility of discomfort or pain during the gynaecological examination and device insertion. In some cases, vasovagal or cervical shock can occur.

Swabs for infection should be taken prior to insertion of an IUCD. An IUCD should not be used if the patient has a current STI, pelvic inflammatory disease, purulent cervicitis or unexplained vaginal bleeding.[7]

Long-acting progestogen contraceptive implants

Another option for long-term, "passive" contraception is a progestogen-containing contraceptive implant which is inserted under the skin of the upper arm.

There are currently two contraceptive implants available in New Zealand – Jadelle and Implanon, although only Jadelle is funded. Jadelle (levonorgestrel) is a two rod implant system which lasts for five years. Implanon (etonogestrel) uses only one rod and is active for three years.

It is recommended that clinicians receive training before performing an insertion or removal of a contraceptive implant (contact the product manufacturer for training opportunities). The procedure involves the use of local anaesthetic at the implant site. Contraception is achieved after 24 hours.

Menstrual bleeding irregularities are common with use of a progestogen implant. This may include prolonged bleeding or spotting, heaving bleeding, no bleeding at all or a combination of these patterns. Approximately 14% of all women who use Jadelle discontinue it before five years due to intolerable menstrual irregularities.[8]

Progestogen implants are not thought to be associated with adverse effects on bone density.[7]

Use of emergency contraception in young people

Young adolescents should be encouraged to phone or visit their general practice or pharmacy as soon as possible if they have had problems with contraception, e.g. no contraception used or condom broke or slipped when sexual intercourse took place, vomiting or diarrhoea while taking the oral contraceptive pill, missed pills or missed DMPA injection.

If the history suggests that there may be a risk of pregnancy, use of the emergency contraceptive pill (ECP) should be discussed. The ECP is most effective if taken within 72 hours of unprotected sexual intercourse, but can be used up to five days after the incident. The ECP disrupts ovulation, thereby preventing pregnancy from occurring. It does not affect an established pregnancy or harm a developing embryo.[11]

The active ingredient in the ECP is levonorgestrel, which is a common constituent in oral contraceptive pills. The ECP is considered safe for use in adolescents.[12] Usually a single 1.5 mg tablet is taken, however, an additional dose may be required if vomiting occurs within three hours.[13] Concomitant use of liver enzyme inducing medicines (e.g. phenytoin, carbamazepine, St John's Wort) can reduce the efficacy of the ECP,[13] so an additional ECP dose is recommended (i.e. two tablets).

An alternative method of emergency contraception is the copper IUCD (Multiload Cu 375). It can be fitted up to five days after sexual intercourse, and is almost 100% effective. When the time of ovulation can be estimated, the IUCD can be inserted beyond five days after intercourse, as long as the insertion does not occur more than five days after ovulation. Prophylactic antibiotics (to cover chlamydia) should be given prior to IUCD insertion while waiting for the results of the vaginal/cervical culture.

Depot medroxyprogesterone acetate (DMPA) injection

Injectable progestogen is a medium-term contraceptive option that does not rely on daily pill-taking or insertion or implantation of devices. DMPA is, however, currently considered a second-line contraceptive option for young adolescents due to the theoretical risk that it prevents optimal peak bone mass from being achieved.

In 2004, the US Federal Drug Agency ruled that a "black box" warning must be added to depo-provera, advising against use for more than two years, due to its adverse effects on bone density. However, latest evidence suggests that this warning should be removed – research shows that bone density returns to normal within one to two years after discontinuation of DMPA in adolescent girls.[9] Current best practice is to consider DMPA for use in young adolescent girls (i.e. aged under 16 to 17 years, before peak bone mass is achieved) only if other contraceptive methods are unsuitable.

DMPA is often started during a menstrual period to ensure absence of pregnancy, but it may be started at any time if pregnancy can be ruled out. Injections need to be given every three months and the next appointment should be made at the time of the first injection, with a reminder sent out closer to the time.

For further information about discussing sexual health with patients and management of sexually transmitted infections see:

- "Let's talk about sex" BPJ 20 (April, 2009)
- "Treatment of sexually transmitted and other genital infections" BPJ 20 (April, 2009)
- "Sexually transmitted infections in New Zealand – what testing is needed and when?" Best Tests (March, 2009)

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Quinolone antibiotics – limit use

Key concepts

- There are very few situations in general practice where quinolones are considered first line treatment
- Ciprofloxacin may be used for acute pyelonephritis, severe travellers' diarrhoea, severe cases of salmonellosis and for gonorrhoea (if known to be sensitive)
- Ciprofloxacin should not be used in pneumococcal pneumonia as it does not cover *Streptococcus pneumoniae* adequately
- Norfloxacin can be considered as a second-line treatment in urinary tract infections, if other antibiotic treatment has failed or is not suitable
- Elderly people are at increased risk of experiencing adverse effects to quinolones. Adverse effects of the central nervous system, such as anxiety, restlessness and insomnia, are of particular concern
- Rare but serious adverse effects of quinolones include tendinitis, QT prolongation and photosensitivity

There are few indications for quinolones in General Practice

Fluoroquinolones (commonly referred to as quinolones) are a class of broad-spectrum antibiotics, often implicated in antimicrobial resistance. Quinolones available in New Zealand include:

- Ciprofloxacin (tablets and eye drops)
- Norfloxacin
- Moxifloxacin (specialist use only)

Indications in general practice

Quinolones should be reserved for serious bacterial infections, and used only when there is no practical alternative.

There are very few situations in general practice where a quinolone would be considered first-line treatment. Ciprofloxacin may be considered for the treatment of patients with pyelonephritis, travellers' diarrhoea, gonorrhoea (if sensitive) and severe cases of salmonella. Norfloxacin may be considered as a second-line option (after trimethoprim or nitrofurantoin) for recurrent UTI

or for people who have failed to respond to a first-line antibiotic treatment for UTI. N.B. quinolones should not be used in pregnant women.

Pharmaceutical dispensing data in New Zealand indicates that the use of ciprofloxacin is continuing to increase, along with consistently high levels of norfloxacin. This is of concern as community prescribing of quinolones significantly contributes to antimicrobial resistance.

See Quinolone Prescribing Report, bpac[nz] April 2011 and July 2010.

Ciprofloxacin should be used only when there is no alternative[1, 2, 3, 4, 5,]

Spectrum	Ciprofloxacin is active against Gram-negative bacteria including *Salmonella spp.*, *Shigella spp.*, *Campylobacter spp.*, *Neisseria spp.* and *Pseudomonas aeruginosa*. Ciprofloxacin has only moderate activity against Gram-positive bacteria such as *Streptococcus pneumoniae* and *Enterococcus faecalis.* Most anaerobic organisms are not susceptible.
Resistance	*Neisseria gonorrhoeae* resistance to quinolones increased from 6% in 2002 to almost 30% in 2009. Methicillin-resistant staphylococci are typically resistant to quinolones.
Uses in general practice	Acute pyelonephritis Travellers' diarrhoea – in moderate to severe cases. Gonorrhoea – only if isolate is known to be sensitive. Salmonellosis – antibiotics are not routinely required therefore only use for invasive or severe infection and in immunocompromised patients. Other indications include acute prostatitis, invasive pseudomonas infections, bone and joint infections and prophylaxis of meningococcal disease, when no alternative is available. Antibiotics are not routinely required for campylobacteriosis, but ciprofloxacin can be considered second-line if treatment with erythromycin has failed.
Inappropriate use	Should not be used for pneumococcal pneumonia. Repeated courses should be avoided in chronic prostatitis if bacterial involvement has not been confirmed, as chronic prostate pain is frequently not due to infection. Contraindicated during pregnancy and lactation.

Norfloxacin is a second-line treatment for urinary tract infections[1, 2, 3, 6]

Spectrum	Mainly active against Gram-negative pathogens
Resistance	Urinary isolates of *E. coli* resistant to quinolones have increased from 1.9% in 2002 to 7.7% in 2009. This varies with geographical location.
Uses in general practice	Norfloxacin may be considered for the treatment of urinary tract infections (UTI) in recurrent infections or where treatment with a first-line antibiotic has failed.
Inappropriate use	Not recommended as first-line treatment for urinary tract infections. It is not appropriate to use norfloxacin for upper urinary tract infections including pyelonephritis. Contraindicated during pregnancy and lactation.
Comments	Some DHBs have excluded norfloxacin from their formularies as it is no longer considered appropriate. Ciprofloxacin is more appropriate to use than norfloxacin if there is any suggestion of upper urinary tract involvement. The most appropriate antibiotic for the empiric treatment of uncomplicated UTI is either nitrofurantoin or trimethoprim.

Moxifloxacin is for specialist use only[1, 3, 4, 7]

Spectrum	Improved activity against Gram-positive and atypical pathogens, as well as anaerobes. Enterococci are likely to be intrinsically resistant.
Resistance	Moxifloxacin is a newer quinolone, developed due to resistance associated with other quinonlones. There is no current data on resistance.
Use	Many drug resistant *Streptococcus pneumoniae* isolates are susceptible to moxifloxacin.
Comments	Special authority criteria apply. QT interval prolongation may be more of a concern than with other commonly used quinolones. Moxifloxacin should not be considered active against *Pseudomonas aeruginosa* or methicillin-resistant *Staphylococcus aureus*.

Adverse effects associated with quinolones

Common adverse effects include dyspepsia, dizziness and rash

The most common adverse effects associated with quinolones include gastrointestinal and central nervous system (CNS) toxicity such as nausea, diarrhoea, abdominal pain, dyspepsia, dizziness, headache and insomnia. Rash is also a common adverse effect. Rare but clinically important adverse effects include QT interval prolongation, tendinitis and tendon rupture (see Page 36), disrupted glucose metabolism, seizures and photosensitivity.[3, 7]

Patients should be well informed so that they can prevent or minimise the impact of any adverse effects if they occur.

Advise patients to:

- Increase fluid intake to reduce the risk of crystalluria
- Apply sunscreen when outdoors to avoid a photosensitivity reaction
- Cease taking the quinolone if tendon pain or swelling occurs

Use quinolones with caution in older people and people with epilepsy

Many of the adverse effects associated with quinolones occur more frequently in people with pre-existing risk factors, or in certain at risk groups, including older people and those with epilepsy.

Older people

Quinolones should be used at the lowest effective dose in older people. Renal function declines consistently with age and quinolone doses need to be reduced accordingly to avoid adverse effects. For example, an appropriate dose for ciprofloxacin in renal impairment is 250–500 mg, twice daily, if eGFR is 30–60 mL/minute/1.73 m^2 or once daily, if eGFR is less than 30 mL/minute/1.73 m^2.[4]

Quinolones are most active against Gram-negative bacteria

Quinolones are very active against aerobic Gram-negative bacilli and cocci including *Enterobacteriaceae*, *Haemophilus influenzae, Moraxella catarrhalis* (*Branhamella catarrhalis*) and *Neisseria gonorrhoeae* and are also active against *Pseudomonas aeruginosa*. They are generally less active against Gram-positive organisms such as staphylococci and much less active against streptococci such as *Streptococcus pneumoniae*.[1] Quinolones are not effective against anaerobic organisms.

Adverse CNS effects are of particular concern in older people and may include anxiety, restlessness, nervousness, confusion, weakness, insomnia, euphoria, nightmares, hallucinations, psychosis and seizures.[3] Some of these signs and symptoms may be attributed to “old age”, so it is important to consider quinolone use when such symptoms are reported.[3] Factors that increase the risk of these adverse effects include the dose not being reduced in renal insufficiency, electrolyte imbalance and a history of seizures.[3]

People with epilepsy or a history of CNS disorders

As CNS effects may occur with quinolone use, they should be used with caution in people at increased risk of seizures, with CNS disorders or in those concurrently using medicines which may lower the seizure threshold, e.g. bupropion. The potential for seizures, although very rare, may be increased with concomitant NSAID treatment.[3, 4]

Other at risk groups

Care is also required with quinolone use in people with:[4]

- Diabetes - glucose levels may be altered
- Myasthenia gravis – symptoms may be exacerbated
- G6PD deficiency – increased risk of haemolytic anaemia

Quinolones are generally not used in children

Quinolones are not recommended for use in children and adolescents aged under 18 years as they are associated with adverse effects on cartilage and tendons.[3] There are some specific circumstances, such as pseudomonal infections associated with cystic fibrosis, where the short term use of ciprofloxacin may be justified in children.[4]

Tendinitis and tendon ruptures are a rare adverse effect

A number of toxicological studies have confirmed that quinolones damage cartilage fibres, which on rare occasions can result in tenditinits and tendon rupture. This can occur even after a single dose of quinolone and the effect can persist for months.[3, 7] Tendon rupture has been reported within 48 hours of starting treatment, however, cases have also been reported several months after stopping treatment.

The risk of tendonopathy is increased in people aged over 60 years, people using long-term corticosteroid treatment and people with chronic kidney disease.[3]

Although this adverse effect is rare (estimated incidence rate 0.14% to 0.4%),[7] it is important to remember that:[4]

- Quinolones are contraindicated in patients with a history of tendon disorders related to previous quinolone use
- If tendinitis is suspected, the quinolone should be discontinued immediately.

The future for quinolones

Despite increasing resistance and adverse effects, quinolones are still an important antimicrobial medicine. Research and development goals include identifying new quinolones with expanded coverage to bacterial pathogens such as MRSA and multi drug resistant tuberculosis, as well as improved pharmacokinetic and safety profiles.[1]

A restrictive approach to the use of quinolones is recommended. Ideally they should be reserved for serious, life-threatening or difficult-to-treat infections, when other antibiotics cannot be used due to allergy or intolerance, or when the pathogen is resistant to alternative antimicrobial agents.

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Increasing resistance to quinolones is concerning

Antimicrobial resistance to quinolones is prevalent in many geographic locations in New Zealand, and includes both Gram-negative and Gram-positive strains.[1]

Urinary tract infections: community prescribing impacts on resistance patterns

Acute uncomplicated cystitis is one of the most common indications for prescribing antibiotics in otherwise healthy women.[6] Antimicrobial resistance to uropathogens causing uncomplicated cystitis has increased over time.[4]

Uncomplicated cystitis and pyelonephritis is mainly caused by *E. coli* (75 to 95%), with occasional involvement of *Enterobacteriaceae*, such as *Proteus mirabilis* and *Klebsiella pneumoniae*, and *Staphylococcus saprophyticus*. Local antimicrobial susceptibility patterns of *E. coli* should be considered in empirical antibiotic selection.[6]

While quinolones are an effective treatment for acute cystitis, the pattern of increasing antimicrobial resistance threatens their long-term usefulness. The resistance level of urinary *E. coli* infections to quinolones is approaching 8% (Table 1).[2] There is also concern about the association between quinolone use and increased rates of MRSA infections.[6]

Although local antimicrobial resistance rates are often skewed by data obtained from infections treated in the hospital setting, which are more likely to be complicated infections, quinolone resistance is also linked to community prescribing practices and therefore restrictive use is important.

Gonorrhoea – ciprofloxacin resistance greater than for penicillin

Penicillin was originally used to treat gonorrhoea but increasing penicillin resistance meant that empiric treatment with ciprofloxacin became more favoured. Data collected by ESR in 2009 reveals that resistance levels of *N. Gonorrhoeae* to quinolones is approaching 30%.[2] This far exceeds the acceptable 5% resistance threshold for first-line therapy. The rate of penicillin resistance for the same time period was approximately 12%.[2] Ciprofloxacin resistance is now more prevalent than penicillin resistance in most areas of New Zealand, but local variations do occur. Ceftriaxone injection is advised for treating suspected gonorrhoea, unless susceptibility data is available.

See "Treatment of sexually transmitted and other genital infections, BPJ 20 (April, 2009).

Table 1: Antimicrobial resistance to urinary *E. Coli*: data from hospital and community laboratories (ESR, 2002, 2008, 2009)[2]

	Trimethoprim	Fluoroquinolone	Nitrofurantoin
2002	21.7%	1.9%	1.5%
2008	22.5%	4.2%	1.6%
2009	24.1%	7.7%	1.6%

Supporting the PHO Performance Programme

Seasonal influenza vaccination: CHANGES FOR 2011

Key concepts

- Two brands of influenza vaccination are available in 2011 - Fluarix may be given to adults and children aged over six months, Fluvax is recommended only for adults and children aged over nine years
- The seasonal influenza vaccine for 2011 contains strains identical to the previous year's vaccine, including Pandemic (H1N1) Influenza 09 strain (Swine Flu)
- People who were vaccinated in 2010 are still recommended to be vaccinated in 2011
- Similar eligibility criteria for free seasonal influenza vaccination apply in 2011, however vaccinations for all children are not funded this year (unless eligible under other criteria such as those with pre-existing conditions)
- Vaccine order forms require a separate order to be placed for vaccines for children aged under nine years and for adults and children aged over nine years

What's in the flu vaccine this year?

The seasonal influenza vaccination for 2011 contains the same strains that were in the 2010 vaccination (Stage Two):

- A/California/7/2009(H1N1)-like strain ("Swine flu")
- A/Perth/16/2009 (H3N2)-like strain
- B/Brisbane/60/2008-like strain

People vaccinated last year are still recommended to be vaccinated in 2011 as immunity diminishes over time.

Different vaccine brand recommended for children aged under nine years

There are two brands of influenza vaccine available in 2011:

Fluarix – approved for adults and children aged six months and over.

Fluvax – only recommended for use in adults and children aged nine years and over, also should not be given to any child with a history of febrile convulsion.

Therefore;

- For children aged between six months and nine years, use only Fluarix
- For all others, use either Fluarix or Fluvax

N.B. Vaccine order forms in 2011 require a separate order to be placed for vaccines for children aged under nine years and for adults and children aged over nine years.

Febrile reactions following Fluvax administration in New Zealand

In a sample of 23 general practices in New Zealand in 2010, it was found that fever occurred significantly more frequently within 24 hours of administration of Fluvax in children aged under five years, compared to Vaxigrip, the other vaccine brand available that year. Of the 104 vaccinations with Fluvax, 31% of children developed fever after the event. This compares to 11% of the 267 vaccinations with Vaxigrip. There were 16 occurrences of fever measured at 39°C or above and one febrile seizure with Fluvax, compared to no occurrences of either event in the children who received Vaxigrip. The authors of the study concluded that Fluvax was associated with unacceptably high rates of febrile reactions and that there has been insufficient safety evaluation of seasonal influenza safety in this population. They suggest that there should be active monitoring of a limited number of doses of seasonal influenza vaccine at the beginning of each influenza season.[1]

Fluvax brand associated with febrile convulsions in young children

In 2010, there was an increase in reports of fever and febrile convulsions associated with the Fluvax brand of influenza vaccination in the Southern Hemisphere (see sidebar). Fluvax brand is now not indicated for use in children aged under five years. Febrile reactions also appear to be more common in children aged between five and nine years, therefore use of Fluvax in this age group is not recommended.

It is stressed that these reports were only associated with the Fluvax brand and that children aged between six months and nine years can still be safely vaccinated using the alternative brand – Fluarix.

How many doses this year?

Children aged between six months and nine years:

- First ever influenza vaccine – two doses,* at least four weeks apart
- One dose received in 2010 – one or two doses,† at least four weeks apart
- Two doses received in 2010 – one dose

Adults and children aged over nine years: one dose

* Children require two doses when vaccinated for the first time because they are likely to be immunologically naive to influenza and therefore a better immune response is achieved after two exposures to the vaccine.

† The Ministry of Health recommends that children who had one dose of vaccine last year, require two doses this year, however there is no strong scientific data to support this position. Clinicians may use their judgement to decide whether a child requires an extra dose, e.g. children at high risk of influenza.

Who is eligible for free influenza vaccination?

1. Anyone aged 65 years or over
2. Anyone aged 65 years or under with one (or more) of the following medical conditions:
    - Cardiovascular and cerebrovascular disease (except hypertension or dyslipidaemia)
    - Chronic respiratory disease (except asthma not requiring regular preventive treatment)
    - Diabetes
    - Chronic renal disease
    - Cancer (except non-invasive basal or squamous cell carcinoma)
    - Other chronic conditions including; epilepsy, rheumatoid arthritis, autoimmune disease, immune suppression, HIV, cerebral palsy, multiple sclerosis, muscular dystrophy, children on long-term aspirin, congenital myopathy, haemoglobinopathies, hydrocephaly, motor neurone disease, myasthenia gravis, neuromuscular and CNS diseases, Parkinson's disease, sickle cell anaemia and transplant recipients.
3. Pregnant women

N.B. Eligibility criteria apply until July 31st 2011

For a full list of eligible conditions, visit: **www.influenza.org.nz/?t=887** or check with the Immunisation Advisory Centre, Ph **0800 466 863** or email **0800IMMUNE@auckland.ac.nz**

Who else should be vaccinated?

Although not subsidised, parents should be encouraged to have children aged between six months and five years vaccinated, especially if any of the following factors are present, which may increase the risk of complications from influenza:

- Māori or Pacific ethnicity
- Living in a low socioeconomic area, crowded household or exposed to second-hand cigarette smoke
- Recurrent medical presentations

Lead by example – get immunised

It is strongly recommended that all healthcare workers receive a seasonal influenza vaccine each year. This is not only for personal protection, but more importantly to protect vulnerable patients who may have a poor response to the influenza vaccine themselves and are at risk of complications from influenza.

Traditionally the uptake of influenza vaccine among healthcare workers is low. A 2006 editorial suggested that uptake among healthcare workers in New Zealand was between 20 to 40%, with the lowest coverage among nurses.[2] The major barrier to vaccination is perceived to be educational, i.e. a lack of personal concern about influenza and concern about adverse effects of the vaccine.

Some countries, e.g. the United States, are currently considering introducing mandatory influenza vaccine for healthcare workers in some areas. Unvaccinated workers are seen to be jeopardising public health and seasonal influenza vaccination is regarded as a safe, low-cost and effective method to greatly enhance patient safety.[3]

Other groups of people who should be strongly encouraged to have an influenza vaccine include teachers and childcare workers.

Best Practice Tip: Send a message strongly encouraging influenza vaccination to all staff in the workplace via email, intranet or a notice in the tea room or meeting areas. It is important that messages are endorsed by senior staff. If the observation period is a barrier to receiving the vaccine, consider using "I've been immunised" stickers to enable the staff member to keep working during the observation period.

Why get immunised?

Immunisation is the single most effective intervention to prevent the influenza virus. A lack of education about the risks of influenza and concerns about the safety and effectiveness of the vaccine is most likely the greatest barrier to immunisation. Improved communication to increase vaccine uptake is the key.

Convincing people to have the 2011 influenza vaccine may be more challenging than usual. The vaccine targets identical strains as those targeted by the stage two vaccine in 2010, and this may lead to people being less motivated to be vaccinated again. Despite much publicity surrounding "swine flu", rates of influenza in 2010 were still in the medium range compared to previous years. Widely reported adverse reactions in young children administered Fluvax in 2010 may also reduce patient confidence.

Take the opportunity to talk to all patients about whether influenza vaccine is appropriate for them. Target people who are at risk of complications of influenza, and those who are eligible to receive funded vaccination. Ensure that balanced and informative information about influenza vaccine is provided and that any barriers to vaccination are identified and addressed.

Remind healthcare professionals about their responsibilities to their patients and the importance of being vaccinated themselves.

Common myths and misconceptions about influenza vaccination

"It gives me a cold"

Influenza vaccination does not carry a risk of transmission of the common cold or influenza viruses.

The virus strains within the vaccine are subunit proteins, i.e. not live. The body's immune response to vaccination can result in symptoms such as fever, malaise and myalgia, but these are usually mild and of short duration. People are vaccinated at a time of year when other respiratory viruses are circulating and by chance, they may contract such a virus at a similar time.

"But I got vaccinated last year"

Each year, the seasonal influenza vaccine constituents are carefully selected based on the predicted strains for that year. In the Southern hemisphere, this prediction can be based on which strains were prevalent in the preceding Northern Hemisphere winter. For this reason, it is important to be vaccinated each year to cover against the particular strains represented in that year's vaccine.

However, perhaps the key reason to be vaccinated each year is that immunity lessens over time and those most at risk need maximum protection. Although the constituents in the 2011 vaccine are the same as last year, vaccination is still recommended. While healthy individuals are likely to have immunity lasting longer than a season it is difficult to predict with each individual how long immunity will last.

"It doesn't work"

It is still possible to contract influenza after being vaccinated. This is especially true for elderly people, those with chronic conditions that may impair immune responses and infants aged under two years. However, the severity of the illness and risk of hospitalisation is likely to be reduced in those who have been vaccinated. In some cases a person may have been exposed to the influenza virus prior to being vaccinated.

In healthy adults, influenza vaccine is approximately 80% effective in preventing influenza, provided that the vaccine and circulating virus strains are well matched.[4]

"My immune system is strong"

People who rarely contract viruses such as influenza or the common cold can be regarded as having a strong or healthy immune system. Vaccinations such as seasonal influenza vaccine enhance a healthy immune system and make people more resilient against illness.

"I prefer natural remedies such as echinacea and vitamin C"

There is no consistent evidence that natural remedies such as echinacea or vitamin C are clinically effective in reducing the occurrence or severity of influenza viruses.

"Vaccines contain mercury"

Both Fluvax and Fluarix are preservative free.

Historically, some vaccines contained thiomersal as a preservative. Thiomersal is a mercury derivative and there was some concern that exposure to mercury was associated with neurological deficits including autism. However, this association has now been invalidated by multiple epidemiological studies.

N.B. All vaccines on the current New Zealand immunisation schedule are thiomersal free.

Influenza activity in New Zealand in 2010

Influenza activity in New Zealand in 2010 has been classified in the low to medium range compared to the past 19 years of surveillance. There was a cumulative incidence of influenza of 947 cases per 100 000 people, which was the seventh lowest incidence recorded since 1992. Influenza activity started late in the season last year, with incidence peaking in late August. The highest rates of notification were seen in children aged under one year and high hospitalisation and notification rates were seen among Māori and Pacific peoples.[5]

Resources

An influenza resource kit from the National Influenza Strategy Group will be sent out to all practices before the influenza programme commences. This kit, along with other influenza-related resources, is also available to download or order from: **www.immune.org.nz/?t=890**

For further information about managing influenza, including the use of antiviral medicines, see "Diagnosing and managing influenza", BPJ 21 (Jun, 2009).

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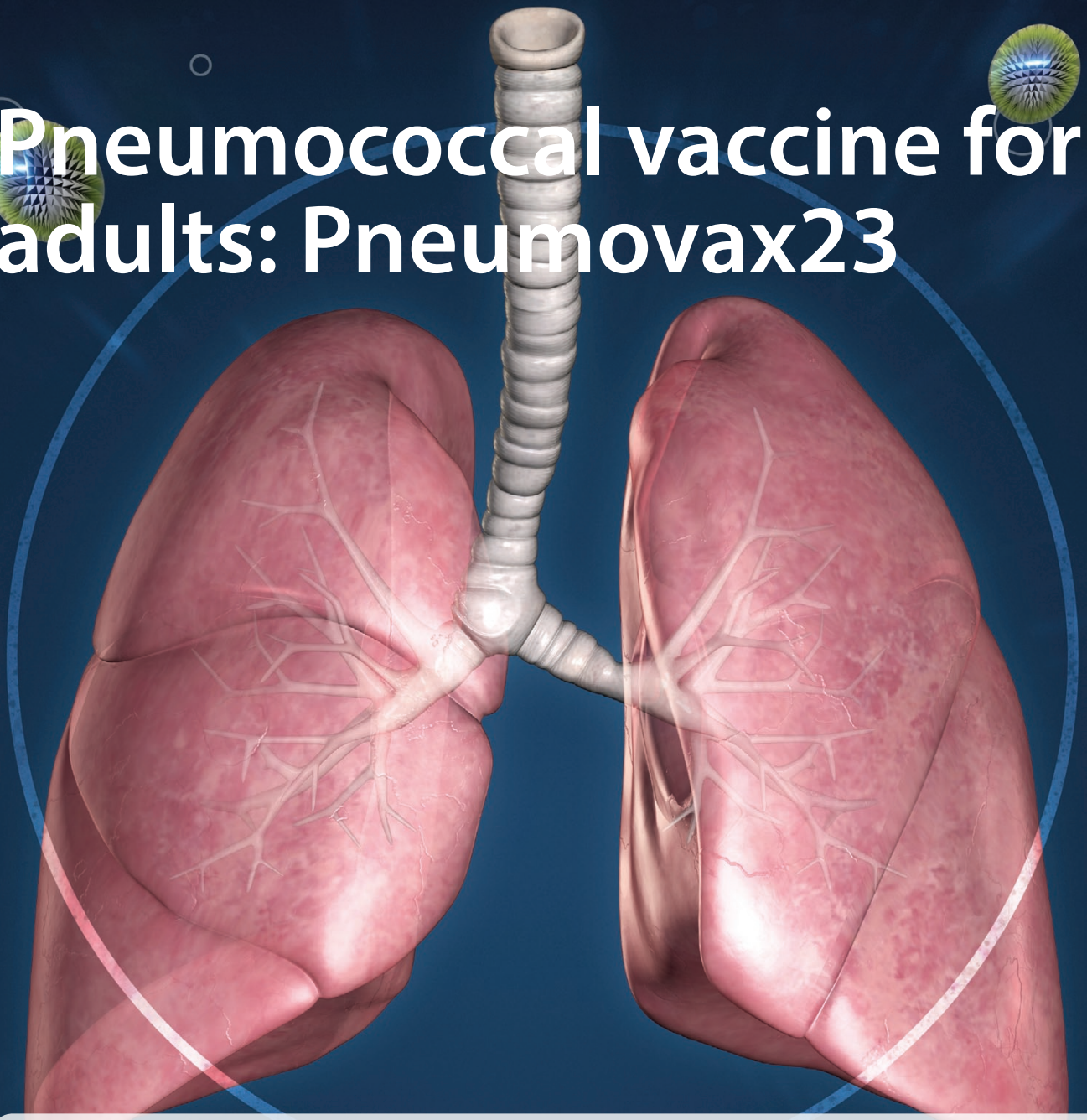
Pneumococcal vaccine for adults: Pneumovax23



Key concepts

- Invasive pneumococcal disease caused by *Streptococcus pneumoniae* can result in life-threatening pneumonia, meningitis and septicaemia
- Vaccination is the only method for preventing invasive pneumococcal disease
- Pneumovax23, a pneumococcal vaccine, is recommended (but not funded, except post-splenectomy) for all adults aged over 65 years, as well as people at increased risk of invasive pneumococcal disease due to co-morbidity or immunodeficiency
- A good opportunity to offer pneumococcal vaccination is prior to or during vaccination clinics for adults at high risk of seasonal influenza
- Pneumovax23 can be administered at the same time as the seasonal influenza vaccine

The threat of invasive pneumococcal disease

Streptococcus pneumoniae is a bacterium commonly found in the nose and throat. Most people carry these bacteria without ever developing invasive disease, but in some cases, transmission of the bacteria via respiratory secretions can lead to serious illness.

Pneumococcal infection is a frequent cause of respiratory illnesses such as otitis media, bronchitis and sinusitis. More serious illness can occur when *S. pneumoniae* invades normally sterile tissue, leading to pneumonia, meningitis, septicaemia and less frequently peritonitis, osteomyelitis and infective arthritis.[1]

Invasive pneumococcal disease, particularly pneumonia, is a significant cause of morbidity and mortality in New Zealand and worldwide. Those most at risk are young children, older adults (> 65 years) and people who are immunodeficient. Māori and Pacific peoples, particularly children, are also at higher risk of pneumococcal disease.

Of further concern is the increasing resistance of pneumococcal disease to antimicrobials and the rapid worldwide spread of resistant strains.[2] New Zealand has a high rate of antibiotic resistance among *S. pneumoniae* – penicillin, erythromycin and cefotaxime resistant strains are present.[3]

Vaccination is the only method for preventing invasive pneumococcal disease.

Different types of pneumococcal vaccine are available

There are over 90 different serotypes of *S. pneumoniae*, some of which more commonly affect children and others of which are more prevalent in adults. Several different pneumococcal vaccines are available (Table 1), targeting different strains.

Prevenar is a seven-valent, protein conjugate pneumococcal vaccine for children aged between six weeks to nine years. It has been part of the National Immunisation Schedule since 2008. This vaccine targets the seven most common strains of *S. pneumoniae* responsible for serious illness in children.

Synflorix is a new conjugate vaccine, which protects against ten serotypes of *S. pneumoniae*. It will replace Prevenar on the Immunisation Schedule in New Zealand in July 2011 for all children (see Page 48 "Pneumococcal vaccination in children").

Prevenar13 is another new conjugate vaccine which protects against 13 serotypes. It will be available only for children at high risk of pneumococcal disease (to use in these children instead of Synflorix).

Pneumovax23 is a 23-valent, polysaccharide vaccine, available for adults and high-risk children aged over two years (after receiving Prevenar or Prevenar13). Capsular polysaccharide vaccines such as Pneumovax23 are not used in young children as they induce antibodies via a mechanism that immature immune systems are unable to respond consistently to.[4]

Table 1: Summary of pneumococcal vaccine recommendations

Group	Current vaccine recommendation	Vaccine recommendation from July, 2011
Children	Prevenar	Synflorix
Children at high risk of pneumococcal disease	Prevenar + Pneumovax23 (after age two years)	Prevenar 13 + Pneumovax23 (after age two years)
Adults	Pneumovax23	Pneumovax23

Pneumovax23 for adults

Pneumovax23 vaccine contains antigens of 23 different serotypes of *S. pneumoniae*, which are responsible for more than 90% of cases of invasive pneumococcal disease.[2] This is the most appropriate and effective vaccine for adults.

Pneumovax23 is only funded for people pre- and post-splenectomy and in high-risk children aged two years or over. However, Pneumovax23 is recommended for adults at increased risk of invasive pneumococcal disease, i.e. people aged over 65 years, as well as people at increased risk due to co-morbidity or immunodeficiency.

How effective is the vaccine?

Pneumovax23 has an overall efficacy of 60–70% in adults, i.e. it will prevent pneumococcal illness in 60–70% of people who are vaccinated.[2] Efficacy is much higher in healthy populations but people who are immunodeficient or have chronic health conditions do not consistently develop immunity after vaccination.[2] The duration of effectiveness of Pneumovax23 in this group is also unclear.[5]

In adults aged over 65 years, Pneumovax23 appears to reduce the risk of pneumococcal bacteremia, but no benefit has been consistently demonstrated for protection against contracting non-bacteremic pneumococcal pneumonia.[6] However, a two-year study of older people with chronic lung disease found that vaccination prevented 43% of hospitalisations for pneumonia and 31% of deaths.[7] This suggests that while Pneumovax23 may not prevent pneumonia in older people, it may lessen the severity of the illness.

The Pneumovax23 vaccine has no significant effect on nasal carriage of *S. pneumoniae* in adults, therefore does not reduce spread to unvaccinated people, i.e. it has no herd immunity effect.[2]

N.B. Conjugate vaccinations such as Prevenar that are used in children do have a herd immunity effect and reduce transmission of pneumococcal disease to everybody.

Who should be vaccinated?

Consider vaccination with Pneumovax23 for the following people:[8]

- Aged 65 years or older
- Chronic cardiovascular disease, e.g. congestive heart failure, cardiomyopathies
- Chronic pulmonary disease, e.g. chronic obstructive pulmonary disease, asthma
- Diabetes, alcoholism, chronic liver disease (cirrhosis), or cerebrospinal fluid leaks
- Chronic renal failure or nephrotic syndrome
- Functional or anatomic asplenia, e.g. sickle cell disease, splenectomy
- Immunocompromising conditions or immunosuppressive treatment, e.g. HIV infection, congenital immunodeficiency, haematologic and solid tumors, treatment with alkylating agents, anti-metabolites, long-term systemic corticosteroids, radiation therapy, and organ or bone marrow transplantation
- Candidate for, or recipient of, cochlear implant

N.B. There is debate about some of these indications as there is currently limited evidence to support the routine use of pneumococcal vaccine in people with asthma[9] or for preventing infections in nephrotic syndrome.[10]

How to vaccinate

A good opportunity to discuss pneumococcal vaccination is prior to or during vaccination clinics for adults at high risk of seasonal influenza. Currently only adults pre- and post-splenectomy are eligible for funded Pneumovax23 (upon secondary care recommendation). Other adults must fund it themselves at a cost of approximately $55 - $75 (manufacturer's price of vaccine is $40).

Administering Pneumovax23

Contraindications:

- A history of a serious reaction (such as anaphylaxis)

after a previous dose or to a vaccine component (bovine protein, phenol).

Precautions:

- Moderate or severe acute illness with or without fever. It should be given to pregnant or lactating women only if clearly needed.[11]

Administration:

- Inject a single dose subcutaneously or intramuscularly to the deltoid (or lateral mid-thigh if preferred)
- It is safe to administer Pneumovax23 at the same time as seasonal influenza vaccine (but on different sites, e.g. right and left deltoid)

Frequency of administration

There is some debate over the frequency of administration of Pneumovax23 in adults, due to the lack of clarity surrounding its duration of effectiveness in some groups.

The general consensus is:

- People aged over 65 years require only one dose
- People aged under 65 years could consider a second dose at age 65 years (if five years or more have elapsed since the first vaccination)
- People with high risk conditions (i.e. immunodeficient or chronic co-morbidities), should receive a second dose three to five years later
- People who are post-splenectomy should receive a second dose three to five years later and a third dose when they are 65 years (or three to five years later than second dose if aged over 65 years)

ACKNOWLEDGEMENT Thank you to **Dr Nikki Turner**, Director, Immunisation Advisory Centre, Senior Lecturer, Division of General Practice and Primary Health Care, University of Auckland for expert guidance in developing this article.

Pneumococcal vaccine in children

Vaccination against pneumococcal disease is included on the National Immunisation Schedule, as young children are more susceptible to complications of pneumococcal disease. Currently children are vaccinated using the seven-valent vaccine Prevenar (i.e. covers seven strains of *S. pneumoniae* most commonly seen to cause illness in children). However, from July 2011, a new vaccine, Synflorix, will replace Prevenar on the schedule. Synflorix is a 10-valent conjugate vaccine, which provides cover for ten strains of *S. pneumoniae*.

Synflorix will be recommended for all infants, from age six weeks, as a three-dose series of vaccines, with an interval of at least one month between doses, and a booster dose at age 15 months (i.e. the same regimen as Prevenar).

Synflorix is not routinely recommended for children aged over five years. However, older children (aged 6-18 years) with an increased risk of pneumococcal disease (e.g. they are immunodeficient or having a cochlear implant), who have already received Prevenar when they were infants, can be given additional protection with either Synflorix or Pneumovax23.

Children aged under five years with certain chronic medical conditions may be eligible for the high-risk pneumococcal programme (Table 2). These children are recommended to receive Prevenar13, a thirteen-valent conjugate vaccine, instead of Synflorix or Prevenar. After the full childhood schedule of Prevenar13 has been completed, these children should also receive Pnemovax23 vaccination

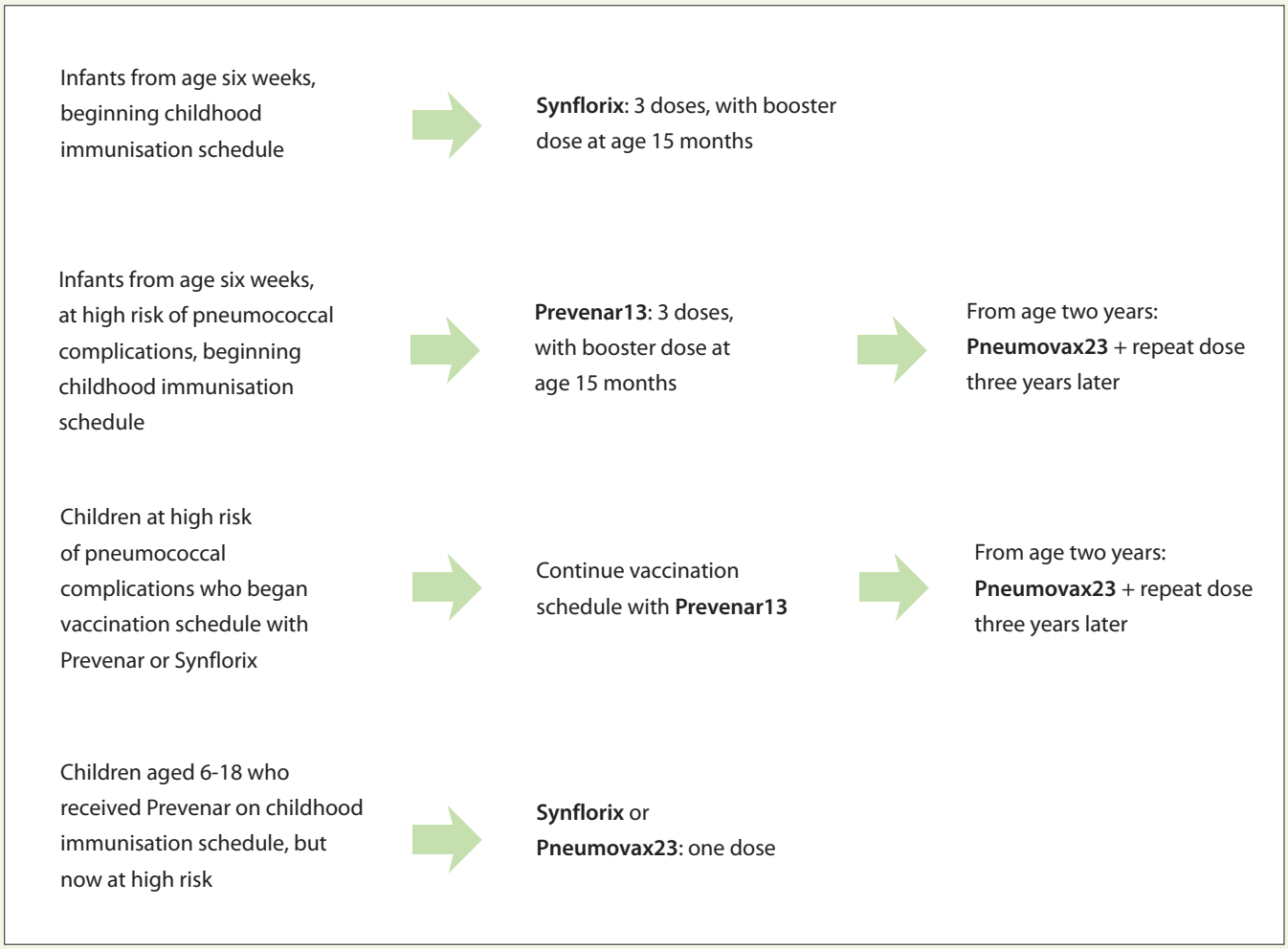


Figure 1: Summary of pneumococcal vaccine recommendations for children from July, 2011

when aged over two years, and at least eight weeks after the last dose of Prevenar13. A repeat dose of Pnemovax23 is recommended after three years.

N.B. If high-risk children have started on Prevenar or Synflorix, then they can complete the course with Prevenar13 followed by Pneumovax23

Table 2: Children eligible for high risk pneumococcal programme

Aged under five years with the following conditions:

- On immunosuppressive therapy or radiation therapy
- Primary immune deficiencies
- HIV
- Renal failure or nephrotic syndrome
- Organ transplants
- Cochlear implants or intracranial shunts
- Chronic CSF leaks
- On corticosteroid therapy for more than 2 weeks, at daily prednisone dose of ≥2 mg/kg or a total dose ≥ 20mg
- Pre-term infants, born at under 28 weeks gestation
- Chronic pulmonary disease (including asthma treated with high dose corticosteroid therapy)
- Cardiac disease with cyanosis or failure
- Insulin dependent diabetes
- Down's syndrome

Refer to the 2011 Immunisation Handbook for further information and guidelines on immunising high risk children. This Handbook is due to be released mid-year.

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Prescription labelling concerns

Dear Editor,

Over the Christmas period a patient of mine took a prescription I had written for simvastatin to a pharmacy where he was on holiday. He has since come back to show me the label that the pharmacy put on the box (transcribed as below).

> Avoid grapefruit and its juice
>
> 90 SIMVASTATIN 20 MG Tabs (ARRW)
>
> Take ONE tablet ONCE daily (best taken in the evening). We recommend taking Co Enzyme Q10 with this medication. Ask your pharmacist.

I myself made no reference to co-enzyme Q-10, that recommendation was inserted by the pharmacist.

I have two questions:

1. *What exactly is co-enzyme Q-10, and is it indeed a product that should be taken with simvastatin?*
2. *The co-enzyme Q-10 addition was made without my knowledge or permission. Has the pharmacist the right to do so, and where do I stand legally if the inserted information is incorrect?*

Dr Bill Daniels, GP
Auckland

Co-enzyme Q10 (also known as ubiquinone) assists in the production of energy within cells and helps protect cell membranes against oxidation. Approximately half of the body's co-enzyme Q10 is obtained from the diet. Supplementation of co-enzyme Q10 is used as a treatment for serious mitochondrial disorders and other metabolic syndromes, when people are unable to produce enough co-enzyme Q10.

The suggestion that co-enzyme Q10 should be used concurrently with statins is most likely based on evidence that statin treatment can lower circulating levels of co-enzyme Q10, but the clinical significance of this is uncertain. Intramuscular levels of co-enzyme Q10 are not affected by low-dose statin treatment, therefore the role of co-enzyme Q10 for the treatment of statin-induced myopathy would be questionable. There have also been suggestions in the literature that co-enzyme Q10 may be used as a treatment for hypertension. However, to date, no clear evidence exists that co-enzyme Q10 should be used to treat, or supplement medication taken for any of these conditions.[1,2]

For further information see"Upfront: The role of co-enzyme Q10 supplements in medical treatment", BPJ 8 (Sept, 2007).

In regards to the appropriateness of additions being made to prescription labels, the Pharmaceutical Society has responded; It supports additional labelling to prevent adverse reactions, and to ensure that medicines are taken in the most effective manner. However, in the present case, the Society considers the labelling to be advertising and misleading, as it implies the recommendation has been endorsed by the patient's doctor.

The Society also reminds Pharmacists that under their code of ethics: "Commercial interests shall not over ride their own professional judgement – obligation 4.4. And, that they may only promote a product as efficacious when there is creditable evidence of it being so – obligation 8.8."

If a prescription is modified without the prescriber's knowledge, they cannot be reasonably held accountable for any adverse consequences.

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Breast cancer gene testing funded

Dear Editor,
Your article, "Increasing the uptake of breast screening", BPJ 34 (Feb, 2011), states that BRCA (breast cancer gene) testing costs $2000-3000 and is not funded.

Providing the patient meets specific criteria the test is in fact funded.

Dr Jo Fleury, GP
Auckland

The statement made in the article "Increasing the uptake of breast screening", Page 38, The breast cancer gene, does require clarification. Referrals for genetic risk assessment and genetic counselling are funded in all DHBs. BRCA mutation testing is also offered (and funded) where, following risk assessment, the probability of a mutation being present is calculated to be 20% or higher. Risk assessment requires a three generation family history and tumour histology analysis of affected family members. If a familial mutation has not been previously identified, testing begins with affected family member DNA (in order to reduce false negatives) and can take up to six months.

Private laboratories do offer BRCA testing for people who do not meet funding criteria, however, the cost is $2000-$3000.

In a further clarification of this section of the article – it was mentioned that women who test positive for a breast cancer gene mutation can reduce their risk of developing breast cancer, with options including more frequent screening, hormonal therapy (tamoxifen) or prophylactic mastectomy or oophorectomy (removal of the ovaries). It was stated that oophorectomy reduces the risk of breast and ovarian cancer for people with BRCA2 mutations. However, the correct procedure is a salpingo-oophorectomy (removal of an ovary together with the fallopian tube) since the majority of BRCA-related ovarian cancers start in the fallopian tubes. In addition, this reduces the risk of breast and ovarian cancer for both BRCA1 and BRCA2 mutations.

Thank you to **Dr Caroline Lintott**, Senior Genetic Associate, Genetic Services, Christchurch for expert guidance in developing this answer.

Dyspepsia – PPIs, prokinetics and *H. Pylori* testing

Dear Editor,
I read with interest the guidance provided in Best Practice Journal on the management of dyspepsia and heartburn in general practice (BPJ 34, Feb 2011).

I note that much of this article also applies to the management of dyspepsia and heartburn in community pharmacy. I also note some variation in your advice from that provided in the New Zealand Guideline Group's best practice, evidence-based Management of Dyspepsia and Heartburn guideline (2004).

Most notably, bpac^{nz} advocates the use of a proton pump inhibitor (PPI) as first-line therapy in undifferentiated and functional dyspepsia, though the strength of evidence to support this approach is not immediately obvious. In contrast the NZGG guideline recommends treating according to symptoms, and recognises that undifferentiated and functional dyspepsia without symptoms of reflux may well respond better to a prokinetic agent, rather than an acid suppressant.

I'm conscious that the NZGG guideline and my knowledge of this area is somewhat dated and I'd be keen to learn of any advances in evidence to support PPI as a first-line therapy option in the management of undifferentiated and/or functional dyspepsia.

Andrew Orange, Pharmacist
Palmerston North

Dear Editor,

In the 2007 article about dyspepsia (BPJ 4, Apr 2007), the faecal antigen test for H.Pylori *was considered to have far better sensitivity and specificity than serology and was the recommended test but in the 2011 article (BPJ 34, Feb 2011) serology is preferred - why?*

Also in the 2007 article, for dyspepsia without heartburn the NNT for ranitidine was lower than the NNT for PPI, so why are you now recommending to use PPI as a first-line in patients with dyspepsia without heartburn?

Also could you please comment on the cardiac safety of domperidone and what to be aware of when prescribing this?

Dr Daniel Then, GP
Dunedin

Proton Pump Inhibitors (PPI)

In the article "Managing dyspepsia and heartburn in general practice – an update" (BPJ 34, Feb 2011) proton pump inhibitors (PPI) are recommended as first-line treatment in undifferentiated and functional dyspepsia, i.e. dyspepsia which has either not been investigated in a low risk patient, or dyspepsia that has been investigated with no underlying pathology found.

Since the New Zealand Guidelines Group guideline for the Management of dyspepsia and heartburn was published in 2004,[1] there has been an evidence based shift in practice that favours the use of PPIs as first-line therapy. This is because there is increasing evidence that PPIs are more effective in their ability to resolve the symptoms of dyspepsia than H2 receptor antagonists.[2,3,4,5,6] Although not expressed as NNTs, this evidence shows consistent statistically significant benefits for the empiric use of PPIs. The Cochrane reviews (and NNTs) quoted in the 2007 article have been withdrawn from publication because the conclusions have changed and an updated Cochrane review is awaited.[7] The availability of generic PPIs has also removed the previous cost benefit of H2 receptor antagonists.

The efficacy of prokinetic agents such as domperidone and metoclopromide has been debated in the recent literature.[5,8] Prokinetic agents are no longer recommended for first line therapy because of their potential for adverse effects and the evidence for their effectiveness is limited.[2,5,9,10]

Empiric treatment with PPIs in undifferentiated and functional dyspepsia therefore is favoured in evidence based guidelines that have been produced since the 2004 New Zealand guideline.[9,11,12] In addition, the use of PPIs as first line-therapy is only one step in the suggested approach for the treatment of undifferentiated dyspepsia given in the article. The suggested approach includes:

- The need to rule out the possibility of serious disease
- Consideration of the need for *H. pylori* testing
- Monitoring the response to empiric treatment so that other medicines or further investigations can be initiated if there is no response to PPI treatment

Serology or faecal antigen test?

Each of the available tests for *H. pylori* has advantages and disadvantages, hence the recommendation that the choice should be determined by the clinical setting. Carbon-13 urea breath test is the most accurate test but is not consistently available to general practice. Serology is more convenient to obtain for both the GP and patient and can determine whether the patient has been exposed to the infection. If infection is present and treatment is given, the faecal antigen test, which is able to detect active infection, can be used to test cure.

Testing for *H. pylori* is also best determined by the likely prevalence of *H. pylori* in the community. It is recommended to consider testing for *H.pylori* when there is a local

prevalence rate of greater than 30% (when serology tests are appropriate).

For further information about *H. pylori* testing, see "*Helicobactor pylori* testing: Serology and stool antigen testing" Best Tests (March, 2010).

Safety concerns with domperidone

Domperidone has been associated with rare reports of serious ventricular arrhythmia, QT prolongation and sudden cardiac death. In most cases, these events have occurred in patients who have had other cardiac risk factors, or in patients who received domperidone intraveneously.[7] The use of domperidone therefore should be avoided in patients who may be at increased risk of QT prolongation such as those with hypokalaemia, severe hypomagnesaemia or structural heart disease. It should also be used with caution in patients who are taking other drugs that may also cause QT prolongation, such as oral ketoconazole, fluconazole, erythromycin and amiodarone.[10]

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Erratum

The following text appeared in "Managing dyspepsia and heartburn in general practice" BPJ 34 (Feb, 2011):

> "Barrett's oesophagus is a complication of chronic GORD. It is a diagnosis made after endoscopy where normal cells lining the oesophagus (columnar epithelium) are found to be replaced by cells that usually line the gastric and intestinal mucosa (squamous epithelium)."

The correct text should read:

> "...It is a diagnosis made after endoscopy where normal cells lining the oesophagus (**squamous epithelium**) are found to be replaced by cells that usually line the gastric and intestinal mucosa (**columnar epithelium**)."

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


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