check

Independent learning program for GPs

Unit 504 April 2014

Infections

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Published by

The Royal Australian College of General Practitioners
100 Wellington Parade
East Melbourne, Victoria 3002, Australia
Telephone 03 8699 0414
Facsimile 03 8699 0400
www.racgp.org.au

ABN 34 000 223 807
ISSN 0812-9630

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Infections

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The five domains of general practice

- Communication skills and the patient-doctor relationship
- Applied professional knowledge and skills
- Population health and the context of general practice
- Professional and ethical role
- Organisational and legal dimensions

RACGP

Many illnesses arise from infection by pathogens, such as bacteria or viruses, causing a wide range of signs and symptoms, which may require very specific and targeted therapies and management.

Bacterial infections can be treated with antibiotics, but these agents provide no benefit for viral infections. Education programs in recent years have focused on reducing inappropriate antibiotic prescribing and creating an awareness of antibiotic resistance.[1]

Immunisation is an important public health initiative for prevention of bacterial and viral infections. In Australia vaccination programs are in place for various target groups and in 2009, for example, 75% of Australians aged 65 years and older were vaccinated against seasonal influenza.[2]

Surveillance and notification of infections, as well as contact tracing, are important public health initiatives, allowing for better health planning and responses to critical situations (eg pandemics).

This unit of *check* will consider a range of common infections of relevance to general practice. The unit will also consider important issues such as antimicrobial resistance, immunisation and notification of reportable diseases.

LEARNING OUTCOMES

At the end of this activity, participants will be able to:

- summarise the GP's roles and responsibilities in the identification and management of patients with tuberculosis
- explain current guideline management options for asymptomatic bacteriuria
- list initial tests and possible follow-up tests for those suspected of being infected with hepatitis B
- outline key considerations in the management of people with community acquired pneumonia
- identify signs and symptoms that may be suggestive of a urinary tract infection in babies/children of different ages and the elderly
- describe the importance of contact tracing for sexually transmissible infections and ways that contact tracing can be undertaken.

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GUIDE TO ABBREVIATIONS AND ACRONYMS IN THIS UNIT OF *CHECK*

ACAPS	Australian CAP study	ESR	erythrocyte sedimentation rate	NAAT	nucleic acid amplification test
AFB	acid-fast bacilli	FBE	full blood examination	PCR	polymerase chain reaction
ALT	alanine transaminase	ECG	electrocardiogram	RPM	respirations per minute
Anti-HBs	hepatitis B surface antibody	HAV	hepatitis A virus	STI	sexually transmissible infection
Anti-HBc	hepatitis B core antibody	HBsAg	hepatitis B surface antigen	TB	tuberculosis
ASHM	Australian Society of HIV Medicine	HBV	hepatitis B virus	TIA	transient ischaemic attack
BPM	beats per minute	HCC	hepatocellular cancer	UEC	urea, electrolyte and creatinine
CAP	community acquired pneumonia	HCV	hepatits C virus	UTI	urinary tract infection
CHB	chronic hepatitis B	HDV	hepatitis D virus	VUR	vesicoureteral reflux
COPD	chronic obstructive pulmonary disease	HIV	human immunodeficiency virus		
		INR	international normalised ratio		
CRP	C-reactive protein	LFT	liver function test		
CrCl	creatinine clearance	LTBI	latent tuberculosis infection		
EBV	Epstein-Barr virus	MSM	men who have sex with men		

CASE 1

SANJIV HAS A COUGH

Sanjiv, 31 years of age, emigrated from India 18 months ago. You met his wife when she brought their young children, aged 2 and 4 years, for vaccinations last year. Sanjiv tells you that he has had a productive cough for the past 4 weeks and feels tired and run down.

QUESTION 1

What questions will you ask Sanjiv about his cough to help clarify the likely diagnosis?

FURTHER INFORMATION

Sanjiv tells you that he had been well prior to this illness. He lost 2–3 kg over the past month and has had intermittent subjective fevers but has not had any haemoptysis. He smokes 3–4 cigarettes per day and currently takes no medications.

QUESTION 2

What are the most important diagnoses to consider for Sanjiv? What tests will you perform?

FURTHER INFORMATION

Sanjiv is concerned when you discuss tuberculosis (TB) as a possible diagnosis. He says that he was tested for TB when he came to Australia and the test was negative. He asks how he could have contracted TB in Australia.

QUESTION 3

How will you answer Sanjiv?

FURTHER INFORMATION

Sanjiv's test results are shown below.

- Sputum microscopy, culture and sensitivity: leukocytes ++, upper respiratory tract flora
- Sputum Ziehl-Neelson stain: AFB (acid-fast bacilli) seen ++
- Sputum AFB culture: pending

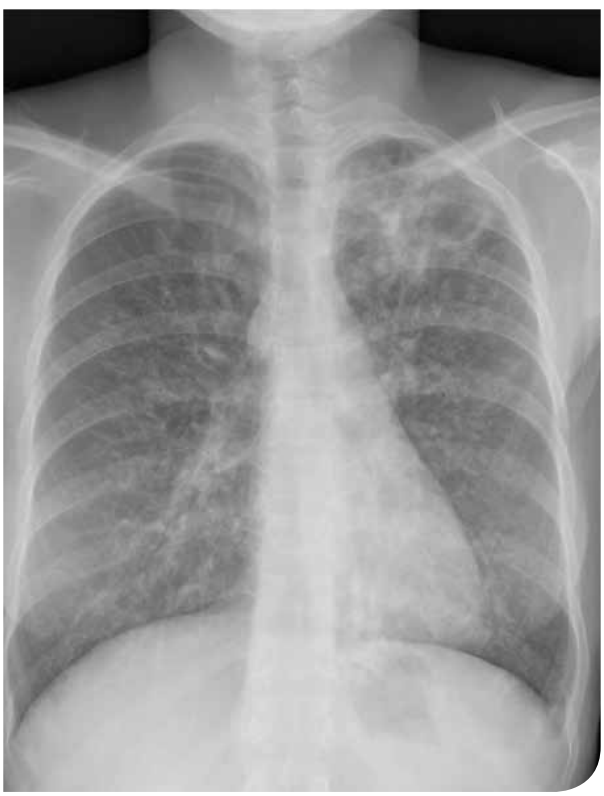

Figure 1. Chest X-ray

QUESTION 4

What do these test results mean? What are your next steps in managing Sanjiv?

FURTHER INFORMATION

Sanjiv is worried about his family's exposure to TB because of his illness. He asks if you can test his family to see if they have been infected, and whether anything can be done to stop them becoming sick.

QUESTION 5

How will you respond? How should his family be managed?

CASE 1 ANSWERS

ANSWER 1

Sanjiv has already mentioned that the cough is productive and has persisted for 4 weeks, which makes common differential diagnoses such as viral respiratory infections (eg acute bronchitis) less likely. Associated features, such as the presence of fever, weight loss or coughing up blood (haemoptysis), may help to further clarify the diagnosis. A past medical history should be taken, including smoking history, current medication use and previous respiratory infections. Exposure to sick contacts, animals and any occupational exposures should also be assessed.

ANSWER 2

Given a history of productive cough of more than 3 weeks and emigration from India, TB is the most important and likely diagnosis to consider. Although uncommon in Australian-born individuals, TB should be considered in high-risk groups, including immigrants from high-prevalence areas (eg Afghanistan, South-East Asian countries, Papua New Guinea, the African continent and the Russian Federation) presenting with TB-related symptoms.[1,2]

The development of TB in a person exposed to it has been described as a two-step process. Rapid progression to TB occurs within 2 years of infection in approximately 5% of people[3] and, overall, 10–15% of infected people will develop active TB at some stage later in life.[4]

Differential diagnosis should include pertussis infection; however, this is less likely to be associated with prolonged sputum production and weight loss. Other causes of prolonged productive cough and weight loss, such as lung cancer, are less likely given his age and ethnicity, but should still be considered in a diagnostic assessment. Symptoms of TB may include a cough of 3 weeks duration or longer, chest pain, haemoptysis or sputum, weakness/fatigue, lack of appetite and weight loss, chills, fever and night sweats.[5] Haemoptysis may be present in TB but is frequently absent and does not exclude the diagnosis.[6] Smoking increases the risk of lung cancer but it also roughly doubles the risk of TB.[7]

In the first instance, Sanjiv should have a chest X-ray. Sputum testing should be ordered for acid-fast bacilli (AFB) microscopy and culture. A new polymerase chain reaction (PCR) test is now also available, which some experts recommend.[8–10] Three early morning sputum samples should be collected on three separate days to maximise sensitivity.[8–10]

Testing for latent tuberculosis infection (LTBI) using, for example, the tuberculin skin test or interferon-gamma release assay, should not be performed in this setting as it may provide false negative results in active disease.[11]

ANSWER 3

In many countries there is a considerable stigma associated with TB and there may be a reluctance to consider this diagnosis. Sanjiv would have had a chest X-ray during his immigration screening process as that is a requirement for most immigrants.[12] The screening program is intended primarily to identify people with evidence of active TB, which Sanjiv apparently did not have when he was screened. However, people exposed to TB before migration may contract LTBI, which is frequently found in people with normal chest X-rays. About 20% of immigrants from the Indian subcontinent have LTBI but many will have no recollection of a specific exposure.[13] LTBI is asymptomatic but may be reactivated many years after migration.[14] Sanjiv, therefore, is much more likely to have contracted LTBI in India rather than a more recent exposure in Australia.

ANSWER 4

Sanjiv's chest X-ray shows left upper lobe pneumonia with cavitation, which is typical for reactivated TB. His sputum smear is positive for AFB, which is consistent with TB. Other AFB could include non-tuberculous mycobacteria or nocardia, both of which are less likely to be the cause of this illness. Sputum cultures for TB can take up to 4–6 weeks to grow, so you should not wait for the results before initiating further management. The new PCR test provides results within a day; however, the validity of these tests is under review by national expert groups.[7]

Guidelines recommend that people with TB should be managed in close consultation with appropriately trained specialists.[1] It would be appropriate at this time to refer Sanjiv to a hospital-based infectious diseases or respiratory service. He should be admitted to hospital for further assessment and isolation, given the risk of TB transmission. He would most likely be started on TB therapy as an inpatient and have further laboratory tests for confirmation of TB, such as TB PCR on sputum. Identification of drug susceptibility will be performed when cultures are positive.[15]

Each state or territory department of health requires notification of the confirmed diagnosis and treatment plan.[1] In Sanjiv's case, the notification would be most appropriately done in hospital after his diagnosis is confirmed.

ANSWER 5

Close household contacts are at risk of contracting TB, and treatment is available to prevent progress to TB disease (most commonly with isoniazid). Children under the age of 5 years are at a much higher risk of rapid progression to active disease, including TB meningitis. Tests for LTBI, including the interferon-gamma release assay and tuberculin skin test, can be performed. Responsibility for conducting such testing lies with the Department of Health, which will undertake a contact tracing exercise after each diagnosis of TB. Sanjiv and his family should be counselled regarding the benefits of screening and encouraged to participate in screening. They should be advised that treatment to prevent TB disease is available for any family member likely to have been infected.[16]

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CASE 2

FLORENCE IS VERY QUIET AND WITHDRAWN

Florence is 88 years of age and you see her regularly when visiting the local nursing home. She is very quiet, forgetful and withdrawn. The staff tell you that she has been like this for the past 48 hours. Last night she was very agitated and was unable to sleep. Florence has a past history of a transient ischaemic attacks (TIAs), mild cognitive decline, renal dysfunction, hypertension and occasional urinary incontinence.

QUESTION 1

What could be causing Florence's behavioural change? How would you assess her?

FURTHER INFORMATION

Florence does not recognise you and doesn't want to talk. However, she doesn't object to your examination. She has a temperature of 37.5°C. Her ears, throat and chest are clear but she has some mild lower abdominal discomfort. You ask the staff to collect a urine sample as part of her organic screen, which they obtain later that day. A dipstick is positive for leucocytes, nitrates and blood, and a culture grows *Escherichia coli,* 10^8 units/mL.

QUESTION 2

What is the diagnosis?

QUESTION 3

How would you treat Florence?

FURTHER INFORMATION

Florence's fever, abdominal symptoms and delirium improve but a few months later she is unwell again with pneumonia that requires hospital admission. Her incontinence worsens and she is discharged with an indwelling catheter for administration of antibiotics at the nursing home. The staff notice that her urine in the bag is cloudy and do a dipstick test, which shows leucocytes and nitrates; however, Florence feels well.

QUESTION 4

What could be causing leucocytes and nitrates to appear in her urine?

QUESTION 5

What criteria might you use to determine if Florence needs treatment?

CASE 2 ANSWERS

ANSWER 1

Florence is showing signs of delirium (withdrawal, insomnia and restlessness). Delirium is characterised by a rapid onset of cognitive and behavioural changes, and fluctuating symptoms. It may have a short duration (days–weeks); however, symptoms may persist for several months.[1] Delirium can have various multiple causes, such as infection, metabolic disorders, pain, dehydration, drug effects, urinary retention or cancer.

Assessment should include a through history of the recent behavioural changes, medication review, organic screen of urea, electrolyte and creatinine (UEC), full blood examination (FBE), erythrocyte sedimentation rate (ESR), vitamin B12, folate, urinalysis and chest X-ray.[1] Additional tests or investigation (eg ECG) may be considered depending on the results of the initial assessment.

ANSWER 2

Florence has a urinary tract infection (UTI), which is the most likely cause of her delirium. Diagnosis of bacterial UTIs is made on the basis of presenting symptoms and is confirmed by the presence of significant uropathogenic bacteria in the urine.[2]

UTIs are common in the elderly. The incidence increases with age and is more prevalent in elderly people in residential care than those still living at home.[3] UTIs in the elderly can be complicated as they often occur on a background of functional and structural abnormalities of the genitourinary system as well as comorbidities. Compared with younger patients, UTIs in the elderly often have more serious consequences, such as delirium, dehydration, urosepsis, hospitalisation or even death.[3]

ANSWER 3

The recommended oral antibiotic regimen for adult non-pregnant women include:

- trimethoprim 300 mg daily for 3 days
- cephalexin 500 mg 12-hourly for 5 days
- amoxicillin and clavulanate 500+125 mg 12-hourly for 5 days.

Another option is nitrofurantoin 100 mg 12-hourly for 5 days but it should not be used in those with renal impairment because of the inability to achieve necessary concentrations in the urine and the possibility of toxic levels in the plasma.[4]

Note that urine alkalinising agents will not interfere with the efficacy of antimicrobial medication and may help relieve the discomfort associated with UTI symptoms. The exception is use of nitrofurantoin with alkalinising agents, where the rate of nitrofurantoin excretion may be increased.[2] Alkalinising agents should not be used for those with a creatinine clearance (CrCl) of <30 mL/minute.[5]

Guidelines support recommending that patients have a high fluid intake and complete bladder emptying to assist antimicrobial therapy.[4]

Elderly patients are at a higher risk of drug interactions and adverse effects. A 2008 Cochrane review of studies investigating antibiotics in older women reviewed 15 studies comparing short and longer-term antibiotics.[6] It found that short-course treatment (3–6 days) was sufficient for treating uncomplicated UTIs in elderly women and had fewer adverse effects, but concluded more studies were needed in the older age group and in the community.[6]

ANSWER 4

As Florence is well and has no pain or change in mental state, the most likely cause is asymptomatic bacteriuria, which is very common in the elderly population. Studies have found a prevalence of asymptomatic bacteriuria of 15–50% among people in residential care.[7] The prevalence is more common with the use of urinary catheters and external urine collection, as well as in patients with cognitive impairment and urinary and faecal incontinence.[7]

Catheterisation allows for the formation of a biofilm between the catheter and urethral mucosa.[8] A biofilm is the aggregation of microorganisms that form a structure on solid surfaces. The greatest risk factor for catheter-associated UTI is duration of catheterisation.[9]

ANSWER 5

Current guidelines do not recommended screening for asymptomatic bacteriuria in the elderly;[2,10] however, there are times when patients may have physical, mental or behavioural changes and a screen for infection may be required.

Asymptomatic bacteriuria should not be treated with antimicrobial therapy, as treatment has been implicated in the emergence of more resistant organisms. Criteria have been recommended to help establish if there is a need for initiating antibiotics in older patients in long-term care with indwelling catheters. These criteria include the presence of fever >37.9°C or 1.5°C above baseline temperature, new abdominal or pelvic tenderness, rigors without obvious cause, or new onset of delirium.[5,11] Samples for culture should always be taken through a newly inserted catheter.[12]

Catheters should be replaced before commencing antibiotic therapy in symptomatic catheterised patients if a catheter has been in situ for more than 1 week. Catheters that have been in use for more than 2 weeks should be changed to try to achieve a quicker resolution of symptoms and to prevent UTI recurrence.[8] The optimal method of decreasing catheter-associated UTIs is to reduce indwelling catheter use and remove catheters as soon as they are no longer clinically necessary.[12]

Current Australian guidelines do not support routine use of prophylactic antibiotics at the time of catheter placement, change or removal.[12]

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CASE 3

MICHAEL HAS A NEW PARTNER

Michael, a Nigerian aged 24 years, arrived in Australia 3 years ago on a student visa. He has been experiencing tiredness, loss of appetite and a general sense of feeling run down. He is fluent in English and does not require an interpreter when he sees you.

After history taking and examination, you discover that he has a new female partner and that neither Michael nor his partner has ever been screened for viral infections. Following appropriate counselling, you offer testing for bloodborne viral infections and sexually transmissible infections (STIs) as part of the health screening. You obtain his consent for testing. He has no significant history or family history.

QUESTION 1

What tests would you order?

FURTHER INFORMATION

Michael returns to your practice 2 weeks later for his results. The results of Michael's hepatitis B serology are:

- HBsAg positive
- anti-HBs negative
- anti HBc positive.

His other screening tests are negative.

QUESTION 2

What is your interpretation of his hepatitis B results?

QUESTION 3

What information about his condition will you give Michael?

QUESTION 4

What further tests will you arrange for Michael?

FURTHER INFORMATION

Michael's results are as follows:

- HBV DNA 1600 IU/mL
- HBeAg negative and anti-HBe positive
- ALT 45 IU/L
- OTHER LFTs normal
- Ultrasound and AFP normal
- anti-hepatitis A positive
- anti-hepatitis D positive.

Michael sees you 2 weeks later for his results. He is anxious and upset as his new relationship nearly ended after he disclosed his CHB status. He is concerned about the diagnosis and especially worried after you mentioned he required ongoing screening for liver cancer.

On more detailed physical examination he has no signs of liver disease and is at a healthy weight (BMI 23 m^2/kg).

QUESTION 5

What phase of infection is he in?

QUESTION 6

What is the significance of the positive HAV and HDV serology tests?

QUESTION 7

In light of his abnormal ALT, are there any other tests that would assist with assessing his liver?

CASE 3 ANSWERS

ANSWER 1

Screening on request or opportunistically is important for the detection of STIs. This is particularly so in the case of STIs that are likely to be of public health significance but often present asymptomatically in the early stages of infection or may be largely asymptomatic (eg chlamydia).[1]

Having a sexual health check-up is recommended when changing sexual partners or starting a new relationship, as in Michael's case. Provision of appropriate counselling and obtaining consent from patients is necessary.[1,2]

Appropriate tests to order for Michael as part of an asymptomatic sexual health screen include:[1]

- hepatitis B surface antigen (HBsAg)
- hepatitis B surface antibody (anti-HBs)
- hepatitis B core antibody (anti-HBc)
- human immunodeficiency virus antibody (HIV Ab)
- syphillis serology
- chlamydia and gonorrhoea PCR from urine.

Hepatitis C antibody testing is not usually performed unless risk factors are present. Risk factors for HCV include a history of injecting drug use, incarceration, blood transfusions, tattoos or skin piercing and countries with a high prevalence.[3]

ANSWER 2

Michael's results are consistent with a diagnosis of chronic hepatitis B (CHB).[1]

The prevalence of CHB in Australia is about 1% and has increased in the last decade.[4] A higher prevalence of over 8% is reported for those born in endemic areas overseas. Higher rates are also observed in certain groups within Australia. For example, the estimated prevalence is about 3–4% for Aboriginal and Torres Straight Islander peoples, people who have injected drugs and men who have sex with men (MSM).[4–6]

In Australia 56% of people with CHB are estimated to be undiagnosed.[4] Although CHB is most often asymptomatic, it can lead to serious liver disease (eg cancer or cirrhosis) in 15–20% of people if the disease is not well managed.[7]

Given current Australian treatment patterns, it has been predicted that by 2017 there will be a 2–3-fold increase in liver cancer and death due to CHB.[8]

ANSWER 3

Michael most likely acquired the infection perinatally or in early childhood. The biggest burden of disease for CHB is borne by those infected at birth or as children.[5] Pregnant women with hepatitis B virus (HBV) should be referred to a specialist and considered for treatment to reduce the risk of transmission to the baby.[4]

People living with CHB need lifelong medical follow up; support is available through hepatitis organisations and, in some states, multicultural health organisations. Michael should be given information about preventing transmission of HBV, and educated around the need for lifelong monitoring and possible treatment to prevent advancing liver disease and hepatocellular cancer (HCC).

Michael's new partner should be offered testing and vaccination if susceptible. Vaccination is available free of charge through most state or territory health departments. His family members and household contacts should also consider being tested.[9]

Michael needs further tests to determine the phase of his CHB infection, and screening for HCC or liver cancer.

ANSWER 4

The following additional tests should be arranged for Michael:[9]

- HBV DNA level (also called the HBV DNA viral load)
- hepatitis B e antigen and antibody (HBeAg and anti-HBe)
- full blood examination (FBE)
- liver function tests (LFTs)
- prothrombin time (INR)
- alpha-fetoprotein
- hepatitis D virus (HDV) antibody
- hepatitis A virus (HAV) antibody
- liver ultrasound.

All patients should be tested at diagnosis to determine the phase of infection and to check for evidence of liver inflammation or cirrhosis.[10]

HBV is a cause of HCC and patients who are at greater risk of developing liver cancer should be enrolled in liver cancer surveillance and have 6-monthly ultrasound and tests for alpha-fetoprotein (see *Table 1*). Liver cancer surveillance can be provided by the GP or by the specialist. Lesions that are suspicious for HCC require further imaging (eg quadruple phase CT) and discussion with specialty services such as multidisciplinary hepatoma clinics. Liver cancer surveillance is recommended for all people of African descent over 20 years of age living with CHB.[11]

Table 1. Factors associated with increased rates of cirrhosis and/or HCC[12]

- Older age (longer duration of infection)
- Habitual alcohol consumption
- Co-infection with HCV, HDV or HIV
- Carcinogens such as aflatoxin and tobacco
- Male gender
- Family history of HCC
- History of reversion from anti-HBe to HBeAg
- Presence of cirrhosis
- HBV genotype C
- Core promoter mutation

Routine surveillance for liver cancer in CHB has been shown to improve survival in patients and the evidence also indicates that such surveillance is cost-effective.[13–15]

Everyone with CHB requires regular monitoring, the frequency of which will be determined by the patient's individual circumstances (eg phase of disease, damage present). As a minimum, an annual review that includes LFTs, and HBV DNA viral load should be undertaken.[9] Medicare funds annual HBV DNA testing for people positive for HBsAg.[16] HCC surveillance with liver ultrasound every 6 months is also recommended for those at increased risk.[9] The above tests could be incorporated into a chronic diseases management plan (see Resources for doctors).

ANSWER 5

On the basis of his viral load, Michael is in phase 3 (see Natural history of CHB infection[17]for details of CHB phases). However, he does have a raised ALT, which may indicate liver inflammation or damage, either from his HBV infection or another cause.

ANSWER 6

The positive HAV antibody test indicates that he is immune to HAV and does not need to be offered immunisation.[1,10]

A positive antibody test for HDV indicates past or current HDV infection, which increases the risk of HCC. Further testing (HDV RNA PCR) is required to indicate whether Michael has co-infection with the HDV, but the results can be unreliable or difficult to interpret and specialist advice should be obtained.[1,10]

ANSWER 7

Michael should have a further assessment of his liver for evidence of fibrosis or cirrhosis. Transient elastography can be performed in several hospitals and outreach services in Australia; it is now more commonly used than liver biopsy. Evaluation for other causes of liver disease is also necessary.

HDV, sometimes called hepatitis delta, relies on HBV infection to replicate. The prevalence of HDV varies widely between populations but is estimated to affect about 5% of the 218 000[4] people living with HBV infection in Australia.[18] In non-endemic countries such as Australia, HBV/HDV co-infection was previously more commonly associated with injecting drug use although the epidemiology is changing as migration from areas of higher HDV prevalence increases and country of birth becomes an increasingly important determinant.

A positive HDV antibody test should be followed up by HDV RNA PCR testing, which is available at a limited number of laboratories; it is advisable to check for availability and charges.[18]

HBV/HDV co-infection requires specialist management as outcomes are worse than mono-infection and there are special treatment considerations.

RESOURCES FOR PATIENTS

- Hepatitis Australia. Available at www.hepatitisaustralia.com

RESOURCES FOR DOCTORS

- Australasian Society for HIV Medicine. Testing portal: Diagnostic strategies (section 2.2). Further information regarding testing for HBV. testingportal.ashm.org.au
- Australasian Society for HIV Medicine. Decision-making in HBV. Available at http://www.ashm.org.au/images/Publications/DecisionMakingTools/HBV_DecisionMaking_PRINT_May13.pdf
- Victorian Infectious Diseases Reference Laboratory for the Cancer Council. www.hepbhelp.org.au

RESOURCES FOR PATIENTS AND DOCTORS

- Victorian Hepatitis B Alliance information for doctors, community workers, family and friends, and people with hepatitis B. vhba.org.au/
- A plain English educational tool for working with Culturally and Linguistically Diverse communities. www.svhm.org.au/gp/clinics/Pages/Gastroenterology.aspx

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CASE 4

CHRIS BECOMES MORE SHORT OF BREATH

Chris, aged 71 years, comes to see you because he has had a cough and shortness of breath for the past 2 weeks. His cough is productive of purulent sputum. He has also been feeling more tired than usual and has not been able to do any gardening. Mary, Chris' wife, states that he has been having some 'temperatures' and has not been his usual self.

QUESTION 1

What questions would you ask about the history of the presenting complaint and Chris's past medical history?

QUESTION 2

What are some possible causes for Chris's acute respiratory symptoms?

FURTHER INFORMATION

Chris has classic symptoms of community acquired pneumonia (CAP). On further questioning, Chris tells you he has smoked cigarettes (approximately 1 pack per day) since the age of 17 years. His past medical history is significant for COPD and alcohol abuse. He was also treated with azithromycin, a macrolide antibiotic, for sinusitis 8 weeks before his current presentation.

QUESTION 3

Why is his past medical history and recent antibiotic use significant?

FURTHER INFORMATION

On examination, you note that Chris was unwell, sweaty and flushed. He was febrile at 38.5°C, tachycardic at 110 beats per minute (bpm) and tachypnoeic at 28 respirations per minute (rpm). His saturations in room air were 96%. Chest auscultation revealed coarse crepitations on the right side. An impaired percussion note over the affected lobe was elicited.

QUESTION 4

What are some other features of the clinical examination suggestive of CAP? What are some red flags for severe illness?

QUESTION 5

What further investigations would you order?

FURTHER INFORMATION

A chest X-ray showed patchy alveolar shadowing in the right mid and lower zones. Blood tests showed a significant inflammatory response: CRP 337 mg/L raised white cell count and neutrophilia. A diagnosis of CAP was made. His renal function was normal.

QUESTION 6

What are the common organisms responsible for CAP?

QUESTION 7

What treatment and duration of treatment would you recommend for Chris?

FURTHER INFORMATION

Chris's temperature was reduced within 3 days of therapy. However, 3 weeks later, he returns as he continues to have a cough and experiences fatigue.

QUESTION 8

How would you approach this situation?

QUESTION 9

How can a recurrence of CAP be prevented**?**

CASE 4 ANSWERS

ANSWER 1

Important questions to ask regarding the history of the presenting complaint include:

- Was the onset sudden or gradual?
- How long have symptoms been present (days, weeks or months)?
- What is the course of symptoms (have they been worsening or slowly resolving)?
- Is there any haemoptysis?
- Is there any pleuritic chest pain?
- Are there other symptoms such as weight loss, malaise or night sweats, which could suggest an alternative diagnosis such as tuberculosis or malignancy?

You should elicit the following information about Chris's past medical history:

- existing medical conditions or comorbidities such as asthma or chronic obstructive pulmonary disease (COPD) that may worsen outcome(s)
- history of heart failure
- history of immunosuppression
- smoking status (particularly if Chris has a hoarse voice or, in particular, any haemoptysis)
- whether he has an elevated risk of thromboembolic disease.

ANSWER 2

Table 1 outlines possible causes for Chris's acute respiratory symptoms, all of which should be considered in a differential diagnosis.

Table 1: Causes of acute respiratory symptoms

Common causes
• Viral upper respiratory tract infection • Acute bronchitis • CAP • Exacerbation of airways diseases (eg asthma, COPD and bronchiectasis) • Non-respiratory conditions (especially heart failure)
Rarer but important causes
• Non-infectious respiratory conditions (eg neoplasm, pulmonary embolus, interstitial lung disease, hypersensitivity pneumonitis, sarcoidosis) • Other pneumonias (eg tuberculosis, eosinophilic, aspiration, nosocomial, immunosuppressed) • Right middle lobe syndrome • Churg-Strauss syndrome

A patient presenting with cough (either productive or non-productive), pleuritic chest pain, shortness of breath, temperature >38°C and crackles on auscultation shows classic signs and symptoms of community acquired pneumonia (CAP).[1,2] CAP is a potentially serious illness and may be associated with considerable mortality and morbidity, especially in elderly patients and/or those with major comorbidities.[3]

ANSWER 3

CAP refers to pneumonia occurring in community-dwelling people. That is, people who have not been in hospital or have been in hospital less than 48 hours.[4]

The classical presentation of CAP in clinical practice is often altered by the use of antibiotics, pre-existing lower respiratory tract disease, such as COPD and bronchiectasis, and the age of the patient.[5]

The classic symptoms of pneumonia are often absent in the elderly.[6] Non-specific symptoms, such as headache, diarrhoea, loss of mental clarity, somnolence or frank confusion, are also found commonly in elderly patients with pneumonia.[1,2] Fever is less common in older patients compared to younger patients.[2] These symptoms may be a manifestation of the pneumonia itself or of deterioration of pre-existing renal impairment or congestive cardiac failure.[7] It is important to be aware that as confusion may be the only presenting symptom in elderly patients with CAP, this can lead to delayed administration of antibiotics.[8]

ANSWER 4

Table 2 summarises examination findings for CAP and red flags for severe illness. The presence of red flags indicates severe CAP, which requires hospital admission for specialist care.[1]

Table 2. Examination findings in CAP and red flags for severe illness

Examination findings in CAP[9]
• Increased work of breathing such as use of accessory muscles of respiration • Decreased lung expansion • Dull percussion note • Bronchial breath sounds • Increased vocal resonance • Localised crepitations
Red flags for severe illness on clinical examination[1]
• Respiratory rate >30/min, • Systolic blood pressure <90 mmHg, • SaO_2 <92% • Acute confusion • Multi-lobar involvement on chest X-ray • pH <7.35

In older adults, an assessment for the presence of delirium is also required.[10] This can often be suspected through initial history taking and can be supported by a reduced mini mental state examination. Although not reliable in differentiating cognitive impairment from delirium, a score of less than 25 is associated with poorer outcome in CAP.[1]

ANSWER 5

A chest X-ray is required for an accurate diagnosis; the presence of a new infiltrate is considered the gold standard when clinical features are supportive.[1–3] The site of the pneumonia with relevance to the cardiac and mediastinal borders can be identified by the silhouette sign – an intra thoracic lesion touching the heart border or diaphragm will obliterate that border on the chest X-ray. A lesion not anatomically contiguous will not obliterate that border. Additionally, specific findings such as the presence of cavitation should prompt consideration of a specific aetiology. In this case, the presence of tuberculosis, malignancy, aspiration or *Staphylococcus aureus* infection should be considered.[12]

CAP involving more than one lobe and the presence of a pleural effusion may be associated with more severe disease.[13] Up to 40% of CAP can be accompanied by a typically small, uncomplicated parapneumonic effusion[14] but this can progress to a complicated and infected parapneumonic effusion and, eventually, empyema.

Microbiological tests are not usually helpful in diagnosing CAP as they typically offer a low yield.[4] Since empirical antibiotics work well, identifying a pathogen is not helpful nor does it exclude the presence of atypical pathogen.[15] However, failure of the sputum purulence to clear and a requirement for repeated courses of antibiotics should prompt a sputum sample being sent for culture. This is particularly important in patients with chronic respiratory disease as colonisation with organisms such as *Pseudomonas* that do not respond to conventional antibiotics is not uncommon.[16]

Blood tests to consider include:

- leukocytosis (white blood cell count between 15 000/mm^3 and 30 000/mm^3) with a leftward shift
- C-reactive protein (CRP) to monitor progression
- liver function tests as liver function may be deranged in infections with atypical organisms
- electrolytes as an imbalance that may be seen is hyponatraemia, thought to be caused by excess anti-diuretic hormone produced by the diseased lungs.[17]

Other tests to consider include:[1]

- blood culture
- sputum culture for microscopy, culture and sensitivity
- arterial blood gas to assess gas exchange
- serology for mycoplasma, legionella, chlamydia, influenzae and parainfluenzae. A serological diagnosis occurs if there is a 4-fold increase in titre between acute and convalescent phase of illness
- urinary antigen for legionella
- nasal swabs for influenza and nasopharyngeal aspirate.

Obtaining these tests, however, should never delay administration of antimicrobial therapy on an empirical basis because timely administration is critical for a good outcome.[4]

ANSWER 6

The most common bacterial organism associated with CAP is *Streptococcus pneumoniae*, which is responsible for most severe illnesses and death, especially in the elderly. Other bacteria include *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae* and *Legionella* species. *Haemophilus influenzae* is responsible for less than 5% of CAP cases and is seen mainly in people with COPD.[4]

In the prospective Australian CAP Study (ACAPS), a cause for CAP was identified in 46% of patients. The most frequent causative agents were respiratory viruses (15%), *S. pneumoniae* (14%) and *Mycoplasma pneumoniae* (9%).[18]

Typical pneumonia is caused by bacteria such as *S. pneumonia*, which is the most common organism in all settings. Atypical pneumonia is caused by the influenza virus, mycoplasma, chlamydia, legionella, adenovirus or other unidentified microorganism.[1] The patient's age is the main differentiating factor between typical and atypical pneumonia: young adults are more prone to atypical causes and very young and older persons are more predisposed to typical causes.[19] In atypical pneumonia, the chest X-ray abnormalities are often disproportionate to the pulmonary symptoms, and sputum analysis may reveal numerous leukocytes and no organisms.[20]

Some specific groups have a broader range of possible aetiological agents. These include people at risk of aspiration[21] (eg from stroke or Parkinson's disease and drug and alcohol abuse), patients taking immunosuppressive agents (eg for rheumatoid arthritis) or with underlying immune disorders (eg from HIV[22], haematological malignancies and immune deficiencies), recent hospital inpatients, travellers from tropical Australia and overseas. Early specialist advice to consider a broader range of aetiological agents and tailored management is recommended.

ANSWER 7

Therapy regimens are stratified into mild, moderate or severe. Patients with mild CAP can be treated as outpatients, but those with moderate or severe CAP require hospitalisation.[23]

Penicillins remain the cornerstone of CAP management. Gentamicin is added to provide Gram-negative cover for sicker patients in non-tropical areas. In tropical areas, carbapenem is used instead of penicillin.[23]

Most patients with mild CAP can be managed without hospitalisation or use of intravenous antibiotics. Occasionally, patients may be given intravenous benzylpenicillin if they present at an emergency department. Outpatients should receive treatment with antibiotics for 5–7 days, depending on the clinical response. Current Australian guidelines recommend the following:[18]

- amoxycillin 1 g orally, 8-hourly for 5–7 days (in rural and remote areas, where orally administered antibiotics may not be possible, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin until significant improvement has occurred; 5 days therapy is usually needed.)

or (if *M. pneumoniae*, *C. pneumoniae* or *Legionella* is suspected)

- doxycycline 200 mg orally, for the first dose, then 100 mg daily for a further 5 days

or

- clarithromycin 250 mg orally, 12-hourly for 5–7 days.[24]

Where there is penicillin hypersensitivity, use doxycycline or clarithromycin. Note that current guidelines report relatively high rates of doxycycline and clarithromycin resistance by some strains of *S. pneumoniae* in some areas.[24]

Guidelines emphasise clinical review of the patient within 24–48 hours.

If no improvement occurs by 48 hours, or a patient review by 48 hours is not possible, dual therapy with amoxycillin plus either doxycycline or clarithromycin could be considered.[24]

If clinical treatment fails, switching to an alternative drug could be considered.[24]

ANSWER 8

Despite an initial good response from antimicrobial therapy with resolution of fever and acute morbidity, it is very common for patients to experience prolonged cough and malaise. Patients should be informed that symptoms might last for a prolonged period.

Worsening of clinical status despite adequate antibiotic therapy should trigger a reassessment of the original clinical impression. First, the diagnosis of infection must be questioned (*Table 3*). Organisms with inherent (eg fungi, mycobacteria, *P. jirovecI*) or acquired (*P. aeruginosa*) resistance to drugs commonly used for pneumonia therapy must also be considered. A secondary infection, such as post-influenza *S. aureus* pneumonia, might prove resistant to initial therapy. Finally, immunodeficiency (eg HIV, haematological malignancy) or anatomical derangement (eg COPD, bronchiectasis, neoplasm) can alter the clinical course of pneumonia and treatment.

A follow-up chest X-ray may be useful to identify complications of pneumonia or a possible new diagnosis given that Chris is a smoker. It should be noted that a chest X-ray may remain abnormal for weeks even in the presence of successful treatment.

Table 3. Complications of pneumonia

- Empyema
- Parapneumonic effusion
- Abscess
- Metastatic infection
- Nosocomial superinfection
- Cavitation

ANSWER 9

Seeking to reduce any risk factors that may increase the chances of developing CAP in patients who have had CAP previously can help to reduce the likelihood of CAP recurrences. Specific preventive measures include:

- encouraging smoking cessation
- administering both pneumococcal and influenza vaccines in a timely manner
- reducing the effect of comorbidities (eg controlling congestive heart failure and hyperglycaemia, managing swallowing disorders)[6]
- providing education about respiratory hygiene[6]

Immunisation against influenza and increasingly resistant pneumococci is important in preventing pneumonia, particularly in immunocompromised and older adults. The RACGP *Guidelines for preventative activities in general practice* recommends that patients aged ≥65 years should receive the annual influenza vaccination in the pre-flu season months.[25] These guidelines also recommend a one-off dose of pneumococcal polysaccharide vaccination (23vPPV) for the prevention of invasive pneumococcal disease in older people, except for those who have a condition that predisposes them to an increased risk of invasive pneumococcal disease.[26] The Centre for Disease Control and Prevention recommends that consideration for vaccination be made for residents of extended-care facilities and patients who have chronic heart and lung disorders, chronic metabolic diseases (including diabetes mellitus), renal dysfunction, haemoglobinopathies or immunosuppression.[27]

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CASE 5

CHARLIE HAS A FEVER

Charlie is 2 years of age and has had a fever of 39°C for 2 days. His mother brings him to see you. She tells you he is not eating his solids and that his urine has a strong smell to it.

QUESTION 1

How would you approach history taking and examination?

FURTHER INFORMATION

Charlie is alert but appears miserable. He is adequately hydrated. His ears, nose and throat are normal and his chest is clear. He seems a little uncomfortable when you palpate his abdomen. He has no rash.

QUESTION 2

What is the possible diagnosis?

QUESTION 3

Which tests might you perform? What advice would you give his mother?

FURTHER INFORMATION

Charlie's mother manages to obtain a good urine sample and Charlie's urine dipstick shows white cells and nitrates. The sample is sent for culture and shows an *Escherichia coli* growth of 10^8 units/mL. This is Charlie's first UTI.

QUESTION 4

How would you manage Charlie's UTI?

FURTHER INFORMATION

Charlie responds well to the antibiotics; however, he has two more confirmed UTIs over the next 3 months.

QUESTION 5

What would be your management strategy now?

CASE 5 ANSWERS

ANSWER 1

Feverish illness in children is common. However, the cause of fever can be a diagnostic challenge. In most cases the cause is usually viral but fever can also be the presenting feature of a serious bacterial infection. For children presenting with fever, observation of their behaviour and responses is an important aspect of assessment.

History and examination should be targeted to look for red flags associated with serious infections and should include assessment of hydration, ear, nose, throat, chest and abdomen examination, skin colour, presence of skin rashes, activity levels, respiratory rate, heart rate, neck or joint stiffness or other localising signs.[1]

ANSWER 2

With a fever, abdominal discomfort and offensive urine, it is likely that Charlie has a urinary tract infection (UTI) but gastroenteritis or non-specific viral illness are also possible differential diagnoses. Clinical symptoms and signs of a UTI depend on the age of the child (*Table 1*).

Table 1. Signs and symptoms of UTI by age group[1]

Age group	Symptoms and signs		
	< Most common to least common >		
<3 months	Fever Vomiting Lethargy Irritability	Poor feeding Failure to thrive	Abdominal pain Jaundice Haematuria Offensive urine
>3 months pre-verbal	Fever	Abdominal pain Loin tenderness Vomiting Poor feeding	Lethargy Irritability Haematuria Offensive urine Failure to thrive
>3 months verbal	Fever Dysuria	Dysfunctional voiding Incontinence when previously dry Abdominal pain Loin tenderness	Fever Malaise Vomiting Haematuria Offensive urine Cloudy urine

ANSWER 3

Children presenting with an unexplained fever of ≥38°C or symptoms and signs of a UTI should have a urine sample tested within the first 24 hours.[1] Obtaining an uncontaminated sample can prove difficult in younger children. Pads placed in nappies and urine bags have been shown to have high rates of false positives. Catheter and suprapubic aspirate samples have less contamination,[2] but a clean catch technique is non-invasive and useful in the community setting.

A clean catch urine sample is the recommend method for urine collection in children, who are not able to provide a urine sample on request.[1,3] To perform a clean catch, parents should be advised to wash the genitalia with water and then leave the child exposed. Using a sterile urine container they need to catch the mid-part of the urine stream or leave the child exposed with their legs in a frog leg posture and use a dish between their legs to catch the urine flow.[3]

Urinary dipstick tests have poor sensitivity and specificity, and should be used for screening only. Dipstick analysis is most useful at predicting a UTI when both nitrates and leucocyte esterase are positive, but false positives occur frequently so a urine culture is always required if a UTI is suspected.[4] Therapeutic guidelines[5] recommend performing a urine culture in all children presenting with a UTI prior to the administration of antibiotics. Empirical treatment of a UTI is acceptable while awaiting the culture results.[5]

ANSWER 4

Children under 6 months of age with a suspected UTI or any child who is severely unwell should be referred for a paediatric specialist review.[1,3] Children over 12 months who have a mild UTI and are suitable for oral medication can be treated with:

- amoxycillin and clavulanate 22.5+3.2 mg/kg up to 875+125 mg 12-hourly for 5 days or
- cephalexin 12.5 mg/kg (500 mg max) 6-hourly for 5 days or
- trimethoprim 4 mg/kg up to 150 mg, 12-hourly for 5 days or
- (if trimethoprim liquid formulation is not available) trimethoprim and sulphamethoxazole 4+20 mg/kg up to 160+800 mg, 12-hourly for 5 days.[5]

For children, a follow-up culture should be performed at least 48 hours after cessation of antibiotic therapy.[5]

Recent guidelines have suggested a change to the follow-up of first UTIs.[1,6] Previously, it was strongly recommend that children with a UTI have an ultrasound to identify vesicoureteral reflux (VUR). There is now evidence that most children with a first UTI will have a normal ultrasound.[6] It has also been found there is no difference in the treatment effect of prophylactic antibiotics in children with reflux compared with those not using prophylactic antibiotics and so routinely evaluating VUR in children at low risk is no longer recommended.[7]

Children <6 months should have an ultrasound within 6 weeks of contracting a UTI, but for children ≥6 months, a routine ultrasound is no longer recommended during the acute infection stage unless there are signs of an atypical UTI. Atypical UTIs are complicated by septicaemia, poor urine flow, abdominal mass, raised creatinine, failure to respond within 48 hours to a suitable antibiotic or infection with non-*Escherichia coli* organisms. If an ultrasound is abnormal, then paediatric opinion and further imaging are recommended.[1]

ANSWER 5

About 20% of children who have had one UTI experience symptomatic recurrence.[4] Each recurrence should be treated promptly with antibiotics. Antibiotic treatment of each episode is

guided by culture, sensitivities and clinical response. Charlie will also require an ultrasound within 6 weeks of his UTI to investigate the cause of the recurrence, as well as screening for structural abnormalities.[1]

The role of prophylaxis for recurrent UTI in children is unclear. A Cochrane review found that long-term antibiotics seem to reduce the risk of repeated symptomatic UTIs in susceptible children but the benefit is small and must be considered together with the increased risk of microbial resistance.[10] Specialist advice should be sought when contemplating prophylaxis for recurrent UTI in children.[5]

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RESOURCES FOR PATIENTS

- Better Health Channel. Urinary tract infections (UTI). Fact sheet currently being reviewed. Available at www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Urinary_tract_infections [Accessed 3 February 2014].

CASE 6

HEATH'S RASH

Heath, aged 20 years, moved to Sydney last year from a small country town to study engineering. Heath has been sick for the past week and yesterday he developed a rash. He has been at home and comes to see you as you have been the family GP for 20 years. Heath tells you that he started to get a sore throat, fevers and muscle aches about a week ago. Paracetamol helped a little initially, but now he just feels awful. Heath says the rash started yesterday.

You examine Heath and note a fine, pink rash mostly over his torso, sparing his soles and palms. His throat is red, but no exudate is seen. He has tender cervical lymph nodes and also lymph nodes in his axilla and groin. There is no hepatosplenomegaly.

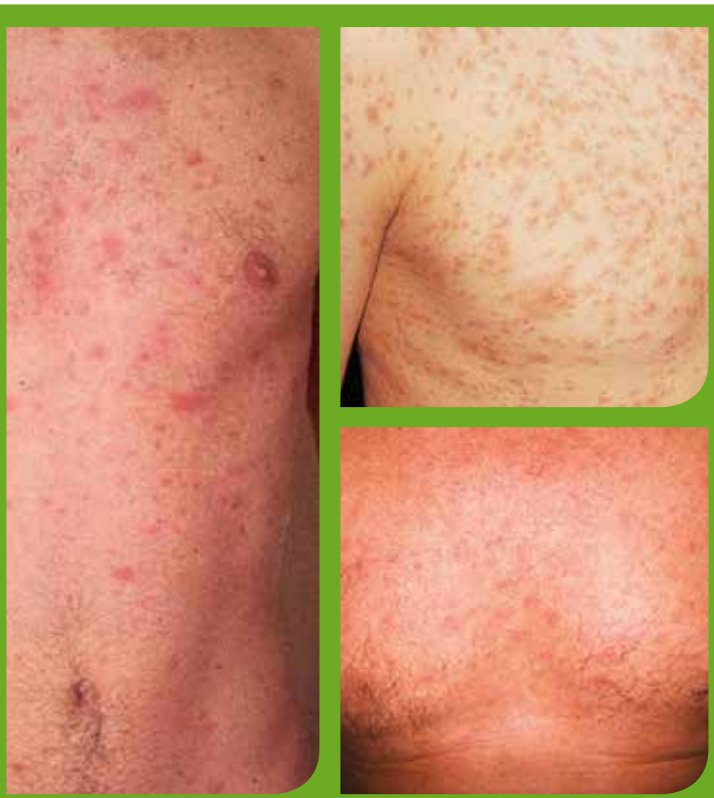

Figure 1a–c: Illustration of HIV seroconversion rash in different individuals

QUESTION 1

What is the differential diagnosis?

QUESTION 2

What tests would you order for Heath?

FURTHER INFORMATION

Heath looks relieved and says that he thinks he is gay, but hasn't told any of his friends or family. He has had some casual male sexual partners whom he met on Grindr and at dance parties. He has oral and anal sex and most of the time he uses condoms. He does not inject drugs but has used some ecstasy. Over the past few months, he has spent a considerable amount of time with one man, Josh, and they have started to have unprotected sex. Their last unprotected anal sexual intercourse was 2 days ago. Heath says that Josh told him he had been 'tested and is clean'. Heath tells you he has never had a sexual health screen.

QUESTION 3

What do you need to discuss with a patient when you order an HIV test?

QUESTION 4

What would you do next?

QUESTION 5

What will you discuss with Heath?

QUESTION 6

What other tests need to be performed now?

FURTHER INFORMATON

Heath seems shocked when you give him his HIV-positive result. You allow him some time to digest the information and advise him that people with HIV have normal lifespans with treatment (there are handouts for patients on the ASHM website).

He says that Josh drove up from Sydney yesterday and is waiting in the car. You ask him if he would like Josh to join the consultation. Heath looks relieved and says yes. Heath says it is ok to tell Josh his result.

QUESTION 7

What will you discuss with Heath and Josh?

CASE 6 ANSWERS

ANSWER 1

The differential diagnosis for Heath's rash could include the following:[1]

- Epstein-Barr virus (EBV)
- HIV seroconversion illness
- secondary syphillis
- acute hepatitis A or B
- parvovirus
- influenza
- cytomegalovirus
- toxoplasmosis
- pityriasis rosea
- viral exanthema (eg measles).

You are keen to exclude sexually transmissible infections (STIs), so you decide to take a brief sexual health history (refer to STI testing tool[1]). You ask Heath if he has a regular sexual partner. When he says no, you ask him whether he has had any casual sexual partners. He looks a bit uncertain and asks why you need to know this. You explain that his symptoms might be related to an STI and that you are just trying to determine if he is at risk. You reassure him that the consultation is confidential.

ANSWER 2

In planning testing for Heath at this time, testing recommendations for men who have sex with men (MSM) need to be considered. Heath qualifies for the annual MSM screening on the basis of having had sex with another man in the previous year. The following tests would be appropriate for Heath at this time:[2]

- full blood count (FBC)
- urea, electrolytes, creatinine (UEC)
- liver function tests (LFT)
- hepatitis A and B
- human immunodeficiency virus (HIV) antibody (Ab) –Ag
- gonorrhoea nucleic acid amplification test (NAAT)/culture (pharyngeal swab)
- gonorrhoea NAAT/culture and chlamydia NAAT (anal swab)
- chlamydia NAAT (first void urine, which is defined as the initial part of the urine stream, not the first urine of the day and not midstream urine)
- syphilis.

ANSWER 3

There is no longer a requirement for extensive pre-test counselling when contemplating HIV testing for a patient. However, some pre-test discussion is important.[3] As with any pathology test, explain to the person why the test is being done and how they will get the results. In this instance, because Heath is at high risk of a positive result, you ask him to make an appointment in a few days to give him the results.

The following day you receive a phone call from the lab: the preliminary HIV test is positive. The confirmatory western blot will take a few more days. Syphilis, hepatitis A, B and C and the other tests of the MSM screen are negative.

ANSWER 4

As you are based in a small, country town, you could call the sexual heath clinic in the regional town a few hours away and speak with a sexual health nurse.

In some jurisdictions, you will receive a phone call from a sexual health physician, who will talk you through the test results and advise you on what to do next. They may refer you to the Australasian Society of HIV Medicine (ASHM) website,[4] which contains several useful resources. On their advice, you ask your receptionist to change Heath's appointment to a long one at the end of your afternoon surgery.

ANSWER 5

The following points are appropriate and useful areas of discussion to have with Heath at this time and at future visits:

- The HIV Ab/Ag results are unconfirmed but likely to be true positive given the assessment (further confirmation will follow in the next week with the western blot result).
- What does a positive result mean?
- A discussion about test limitations and window periods for infection.
- Check Heath's understanding of HIV.
- Does he have any supports and who they are?
- Who will he tell about his HIV test result? Advise him to think carefully about this.
- The need for contact tracing of sexual partners, including Josh (refer to the Contact Tracing Tool[5]).
- Discuss the legal requirement in your state or territory to take all reasonable precautions to prevent transmission or to disclose his HIV status to sexual partners prior to sex.

People who have been recently diagnosed usually start treatment early, for their own benefit and to prevent transmission to others. You could reassure Heath that there is something he can do to manage his infection and that modern treatments have minimal side effects, are easy to take and are highly effective.

Contact tracing is a very important feature of good clinical practice in the management of patients diagnosed with STIs and tuberculosis, and forms the basis of control of these infections at the population level.[6] It may prevent re-infection in a given patient but also decreases the rate of STI transmission in the broader population. When discussing an STI diagnosis with a patient, GPs have a medicolegal responsibility to initiate a discussion with the patient about contact tracing. GPs should encourage patients to notify their contacts and provide support for this, for example, making use of the Let Them Know website (see Resouces for patients). Discussions and action plans should be documented in the patient's notes.[5]

Contact tracing can be performed through patient-initiated referral or via provider-initiated referral. Contact with past partners may be made by phone, sms, email, letter or in person. Briefly:

- **Patient-initiated referral** – the patient assumes responsibility for notifying contacts; GPs need to provide advice and guidance on what information should be provided to partners.
- **Provider-initiated referral** – healthcare professionals assume responsibility for notifying partners; in this model the GP, the GP's delegate (eg nurse) or another health agency informs the patient's contacts; the GP needs to obtain consent from the patient; the contact can be anonymous or not, depending on the wishes of the patient.[5]

The *Australasian Contact Tracing Manual* (see Resources for doctors) provides information on how far back to trace partners. Timeline recommendations are dependent on the nature of the infection. For HIV infection, current guidelines recommend starting with recent sexual or needle-sharing partners. The outer limit is the time of onset of risk behaviour or the last known negative HIV test result.[6] It would be appropriate to consider provider referral in HIV cases, given the higher morbidity experienced with this infection.[5]

Note that patients also need to contact trace partners with whom they have used a condom, as condoms do not offer equal protection against all STIs and need to be used carefully at all times, including

during foreplay and oral sex. Many STIs have no symptoms and previous partners may be inadvertently transmitting infection, not knowing that they are infected.[5]

ANSWER 6

As advised by the sexual health physician, additional tests that could be considered at this time include:

- a repeat HIV test
- a CD4 count and viral load
- viral resistance testing
- HLAB5701 testing for Abacavir hypersensitivity
- baseline toxoplasmosis IgG and cytomegalovirus IgG.3.

With regards to viral resistance testing, it was estimated in 2008 that 10–15% of HIV infections in Australia were due to a virus resistant to one or more classes of anti-retroviral treatments.[3]

ANSWER 7

It is important to encourage Josh to be tested (he had a STI screen at a sexual health clinic in Sydney a few years ago). Other points that could be raised in a joint discussion include:

- discussing the importance of avoiding sex or using condoms until Josh's results are available
- referring Heath to an HIV specialist in the regional centre
- providing Heath and Josh with HIV information sheets from the ASHM website or another appropriate source
- providing supportive counselling and/or referral for counselling (waiting for results can be a heightened period of anxiety).

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6. Australasian Society of HIV Medicine. Australasian Contact Tracing Manual. Available at ctm.ashm.org.au/Default.asp?PublicationID=6&sectionID=692 [Accessed 10 February 2014]

RESOURCES FOR PATIENTS

- Provides a range of useful patient STI fact sheets targeted to the public sector. www.stipu.nsw.gov.au/page/Public_Sector_Resources/STI_Fact_Sheets/
- Offers the option of notifying contacts via email, SMS or letter. Provides information on STIs and practical tips for patients. www.letthemknow.org.au.
- Website for MSM: provides information about STIs and offers the option of notifying contacts via email or SMS. www.thedramadownunder.info.
- Website for Aboriginal People: STI information, how & where to access STI Testing. Offers the option of notifying contacts anonymously via email or SMS. www.bettertoknow.org.au

RESOURCES FOR DOCTORS

- STI Clinical Management. This website provides a range of useful printable tools and guidelines for use in general practice. Available at www.stipu.nsw.gov.au/page/General_Practice_Resources/STI_Clinical_Management_2/
- Australasian Society of HIV Medicine (ASHM). ASHM is the peak Australasian organisation supporting the HIV, viral hepatitis and sexual health workforce. Available at www.ashm.org.au/default.asp?active_page_id=1
- Australasian Contact Tracing Manual. This provides information on how far back to trace, patient handouts, sample letters for clinicians and case studies. Available at ctm.ashm.org.au/Default.asp?PublicationID=6&sectionID=692
- Contact tracing interview video. mshc.org.au/healthpro/OnlineEducation/Videos/PartnerNotification/tabid/514/Default.aspx.
- STI Contact Tracing Tool for General Practice 2011.

INFECTIONS

In order to qualify for 6 Category 2 points for the QI&CPD activity associated with this unit:

- read and complete the unit of *check* in hard copy or online at the *gplearning* website at http://gplearning.racgp.org.au
- log into the *gplearning* website at http://gplearning.racgp.org.au and answer the following 10 multiple choice questions (MCQs) online
- complete the online evaluation.

If you are not an RACGP member, please contact the *gplearning* helpdesk on 1800 284 789 to register in the first instance. You will be provided with a username and password that will enable you access to the test.

The expected time to complete this activity is 3 hours.

Do not send answers to the MCQs into the *check* office. This activity can only be completed online at http://gplearning.racgp.org.au

If you have any queries or technical issues accessing the test online, please contact the *gplearning* helpdesk on 1800 284 789.

FOR A FULL LIST OF ABBREVIATIONS AND ACRONYMS USED IN THESE QUESTIONS PLEASE GO TO PAGE 3.
FOR EACH QUESTION BELOW SELECT ONE OPTION ONLY.

QUESTION 1

Tuberculosis (TB) is rare in Australia but should always be considered as a possible diagnosis in people known to be from high-risk groups who present with symptoms suggestive of TB. Which of the following statements about the prevalence of TB is the most CORRECT?

A. High prevalence areas include Pakistan and Thailand.

B. High prevalence areas include Afghanistan, Bangladesh, India and the African continent.

C. High prevalence areas include Indonesia, Papua New Guinea and the Russian Federation.

D. A, B and C are correct.

E. A, B and C are incorrect.

QUESTION 2

Betty is 91 years of age and lives with her widowed daughter who is 62 years of age. Her daughter brought Betty to see you on a Monday morning to discuss their 'bad' weekend. Betty was unusually quiet and withdrawn over the weekend. Her daughter says that she has been restless, disorientated and terribly confused. She has had a low fever for which Betty has been taking paracetamol. Betty had poor sleep last night and there has been no improvement in her mental wellbeing today. Betty has a past history of hypertension and minor depression and recently she was diagnosed with mild cognitive impairment (MMSE 24). Your physical examination and a dipstick urinalysis indicate that Betty has a UTI. Which is the most CORRECT statement below?

A. Betty has signs of delirium, most likely due to her underlying UTI, and she should be prescribed trimethoprim 300 mg daily for 10 days.

B. Betty has signs of delirium, most likely due to her underlying UTI, and she should be prescribed trimethoprim 300 mg daily for 5 days.

C. Betty has signs of delirium, most likely due to her underlying UTI, and she should be prescribed cephalexin 500 mg 12-hourly for 10 days.

D. Betty has signs of delirium, most likely due to her underlying UTI, and she should be prescribed trimethoprim 300 mg daily for 3 days.

E. Betty has signs of delirium, most likely due to her underlying UTI, and she should be prescribed cephalexin 500 mg daily for 5 days.

QUESTION 3

Jennifer has been married to Anwar, who is originally from Somalia, for three years. They have just returned from overseas sabbatical overseas, working at the United Nations, and would like to start having a family. Jennifer has come to see you to request a pre-pregnancy health check. During the discussion she agrees to investigations including testing for blood-borne viral infections and sexually transmissible infections (STIs), as well as other appropriate tests (eg rubella titres). Which of the following statements is CORRECT?

A. Jennifer should be tested for HIV, chlamydia, syphilis and gonorrhoea.

B. Jennifer should be tested for HIV, hepatitis B and C, chlamydia, syphilis and gonorrhoea.

C. Jennifer should be tested for HIV, hepatitis C, chlamydia, syphilis and gonorrhoea.

D. Jennifer should be tested for HIV, hepatitis B, chlamydia, syphilis and gonorrhoea.

E. Jennifer should be tested for HIV, hepatitis A, B, C and D, chlamydia, syphilis and gonorrhoea.

QUESTION 4

Mabel, a pensioner aged 76 years, presents describing increased fatigue over several weeks and an irritating new-onset productive cough. She has not been able to get on with things and she feels foggy. She claims that she has had shortness of breath and chest discomfort/pain. She says she hasn't had a fever but that she has had 'shaking chills'. On examination her temperature is normal. She is currently being treated for hypertension and takes paracetamol occasionally for osteoarthritis. She has been a light smoker all her life. She had acute bronchitis this time last year and is worried that she has bronchitis again. Which one of the following statements is CORRECT?

A. Mabel has acute bronchitis and, as most bronchitis is viral in nature, she does not require antibiotics.

B. While the differential diagnosis for the presenting case should consider acute bronchitis and other respiratory conditions such as CAP, given her past history of bronchitis and presenting symptoms acute bronchitis is the most likely cause of Mable's illness.

C. The absence of fever excludes a diagnosis of CAP in Mable.

D. If Mabel reported night sweats and/or significant weight loss in addition to her current symptoms, bronchitis and CAP would still be likely diagnoses.

E. Mabel has some of the classic signs and symptoms of CAP, making bronchitis less likely, and should have antibiotics prescribed for her and a chest X-ray to confirm the diagnosis.

QUESTION 5

Lexie is a usually a boisterous, toilet-trained child aged 3.5 years. She presents with her mother who describes that Lexie has not been herself these past 2 days. She has been irritable and feverish on and off, and wet her pants yesterday. She has also indicated that it hurts to 'wee'. On examination, Lexie has a fever of 39.3ºC and complains of lower abdominal pain on palpitation. There are no other significant findings. Which of the following statements is CORRECT?

A. Lexie probably has a UTI; a urine sample should be taken for culture and empirical treatment with trimethoprim 4 mg/kg up to 150 mg, 6-hourly for 5 days could be commenced.

B. Lexie probably has a UTI; a urine sample should be taken for dipstick assessment and a sample should be sent for culture; empirical treatment with trimethoprim 4 mg/kg up to 150 mg, 12-hourly for 5 days could be commenced.

C. Lexie probably has a UTI; a urine sample should be taken for dipstick assessment and empirical treatment with trimethoprim 4 mg/kg up to 150 mg 12-hourly for 5 days could be commenced.

D. Lexie probably has a UTI; a urine sample should be taken for dipstick analysis and empirical treatment with trimethoprim 4 mg/kg up to 150 mg 6-hourly for 10 days could be commenced.

E. Lexie probably has a UTI, a urine sample should be taken for dipstick analysis and empirical treatment with trimethoprim 4 mg/kg up to 150 mg 12-hourly for 10 days could be commenced.

QUESTION 6

Within Australia hepatitis B is more prevalent in Aboriginal and Torres Straight Islander peoples, people who have injected drugs and in men who have sex with men. Which ONE of the following results is consistent with a diagnosis of chronic hepatitis B?

A. Hepatitis B surface antigen (HBsAg) negative; hepatitis B core antibody (anti-HBc) negative; hepatitis B surface antibody (anti-HBs) positive.

B. HBsAg negative; anti-HBc negative; hepatitis B surface antibody (anti-HBs) negative.

C. HBsAg negative; anti-HBc positive; anti-HBs negative.

D. HBsAg positive; anti-HBc negative; anti-HBs negative.

E. HBsAg positive; anti-HBc positive; anti-HBs negative.

QUESTION 7

Asymptomatic bacteriuria occurs frequently in the elderly and patients with urinary catheters. Which of the following statements about asymptomatic bacteriuria is CORRECT?

A. The prevalence of asymptomatic bacteriuria is reasonably high (15–50 %) among residential care residents.

B. The prevalence of asymptomatic bacteriuria is more common in people with severe cognitive impairment.

C. Asymptomatic bacteriuria should never be treated with antimicrobial therapy, as treatment has been implicated in the emergence of more resistant organisms.

D. Statements A and B.

E. Statements A, B and C.

QUESTION 8

In youngsters presenting with fever, correctly identifying the cause of fever and linking it to a UTI may prove challenging. Which one of the following statements is the most CORRECT?

A. A 5-month-old baby with fever (≥39.40ºC), vomiting and poor feeding has a UTI and a urine sample should be collected using the clean catch technique for testing.

B. A 5-month-old baby with fever (≥39.40ºC), vomiting and poor feeding probably does not have a UTI.

C. A 5-month-old baby with fever (≥39.40ºC), vomiting and poor feeding could have a UTI and should be referred for paediatric specialist review.

D. A 5-month-old baby with fever (≥39.40ºC), vomiting and poor feeding should be reviewed in 24 hours and treated with paracetamol.

E. A 5-month-old baby with fever (≥39.40ºC), vomiting and poor feeding should be treated empirically with oral antibiotics for a UTI while awaiting culture results.

QUESTION 9

Which of the statements is the most CORRECT regarding the management of CAP in community settings?

A. Amoxycillin 1 g orally, 8-hourly for 5–7 days and, in certain situations, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin.

B. Amoxycillin 1 g orally, 6-hourly for 3–5 days and, in certain situations, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin.

C. Amoxycillin 1 g orally, 8-hourly for 7–10 days and, in certain situations, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin.

D. Amoxycillin 1 g orally, 12-hourly for 5–7 days and, in certain situations, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin.

E. Amoxycillin 1 g orally, 6-hourly for 5–7 days and, in certain situations, procaine penicillin 1.5 g daily, intramuscular, can be substituted for amoxycillin.

QUESTION 10

Joseph, aged 36 years, is a single, bisexual musician, who is sexually active. He has had several male and female sexual partners over the past few months. He presented with a history of non-specific symptoms including fever and malaise. Following discussion, Joseph agreed to undergo the annual screening recommended for men who have sex with men. As a consequence of this testing Joseph was diagnosed as being HIV-positive. Which of the following statements is the most CORRECT with regards to the next steps that should be taken?

A. Contact tracing should be discussed and an agreement reached as to how this will be undertaken.

B. Contact tracing should be discussed and an agreement reached as to how this will be undertaken, as well as any legal requirement in his state or territory to take all reasonable precautions to prevent transmission and/or to disclose his HIV status to sexual partners prior to sex; discussions should be documented.

C. Joseph should be retested to confirm the diagnosis; contact tracing should be discussed as well as any legal requirement in his state or territory to take all reasonable precautions to prevent transmission and/or to disclose his HIV status to sexual partners prior to sex.

D. Joseph should be retested to confirm the diagnosis; contact tracing should be discussed and an agreement reached as to how this will be undertaken; discussions should be documented.

E. Contact tracing should be discussed and an agreement reached as to how this will be undertaken, as well as any legal requirement in his state or territory to take all reasonable precautions to prevent transmission and/or to disclose his HIV status to sexual partners prior to sex.

check

Independent learning program for GPs