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PEER REVIEWED FEATURE
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HIV infection as a chronic disease

Optimising outcomes

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Provided they receive regular care, the life expectancy of patients newly diagnosed with HIV infection in the developed world can approach that of the general population. For most people this will mean lifelong daily medication with a combination of antiretroviral drugs.

Key points

- **The rate of new HIV infections is increasing so all practitioners need to consider 'could this be HIV?'**
- **Life expectancy for people living with HIV infection can approach that of the general population.**
- **Current management focuses on treating HIV as a chronic disease.**
- **Most patients need lifelong treatment with antiretroviral therapy (ART).**
- **Improvements in ART mean that patients can expect a simple regimen with few or no side effects.**
- **Guidelines for preventive care of other health problems are similar to those for the general population.**

The success of antiretroviral therapy (ART) has transformed human immunodeficiency virus (HIV) infection into a manageable chronic disease. The life expectancy for a patient newly diagnosed with HIV infection in the developed world can approach that of the general population provided they receive regular care. For most people this will mean lifelong daily medication with a combination of antiretroviral drugs. This article reviews the long-term monitoring and management of people with HIV infection and discusses the role of the GP in this care.

WHO HAS HIV IN AUSTRALIA?

More than 25,000 people are living with HIV in Australia, with approximately 1250 new infections per year.[1] In 2012, the average age of people newly diagnosed with HIV infection was 37 years, and about 86% were male; most infections are in men who have sex with men (MSM).[2] The number of new infections has been steadily increasing since 1999, and the rate of HIV diagnosis in 2012 was 5.4 per 100,000 population (Figure 1).[1] The cumulative total of cases of HIV infection reported in Australia to the end of September 2012 is 32,578, and 10,859 of these progressed to acquired immunodeficiency syndrome (AIDS), with 6852 deaths.[2]

Many patients who became infected with HIV in the 1980s have survived and are now ageing and presenting with increasing comorbidities that require comprehensive care from a range of practitioners.

WHAT ARE THE MAJOR CAUSES OF MORTALITY?

With improved treatment (antiretroviral therapy [ART]), fewer patients living with HIV are experiencing AIDS and related mortality. For more

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than a decade, people living with HIV in Australia have been more likely to die of a non-HIV-related condition than to die of AIDS. Increasing proportions of patients are experiencing other health problems associated with ageing, including malignancy and cardiovascular disease. Given the high prevalence of co-infection with hepatitis B and C viruses, there is ongoing morbidity and mortality from chronic liver disease. The changing nature of mortality in a large cohort of people living with HIV in Australia and Europe is shown in Figure 2.[3]

WHO CARES FOR PEOPLE WITH HIV?

About half of all people living with HIV in Australia are managed predominantly by GPs with experience and additional training in HIV infection and the other half are managed in immunology/infectious disease clinics or sexual health clinics.[4] GPs generally diagnose or look after people living with HIV in shared care arrangements with specialist colleagues.

The long-term care of people living with HIV should follow standard guidelines for the general population as detailed by national guidelines such as the RACGP Red Book.[5] Specific recommendations for ART are detailed in Australian and European guidelines.[6,7]

COULD IT BE HIV?

Early diagnosis of HIV infection is important so that patients can be offered timely monitoring and treatment. Other benefits of early diagnosis include contact tracing and counselling to reduce transmission (e.g. promoting the use of condoms). About 20% of patients in Australia continue to be diagnosed 'late', with a CD4 (T helper cell) count below 200 x 10^6 cells/L (normal range, 500 to 1500 x 10^6 cells/L), which indicates severe immune deficiency. CD4 lymphocytes are the major component of the immune system damaged by HIV infection as they are the host cells for the virus.

Course of HIV infection

About 70% of patients will have a primary HIV or 'seroconversion' illness within one to six weeks of becoming infected with HIV. This illness, which usually lasts about four to 14 days, can resemble glandular fever or rubella but it can also be very nonspecific. HIV infection should be considered in any patient as part of the differential diagnosis for febrile or presumed viral infections, particularly in people from at-risk groups such as MSM or immigrants from or visitors to countries with a high prevalence of HIV infection.

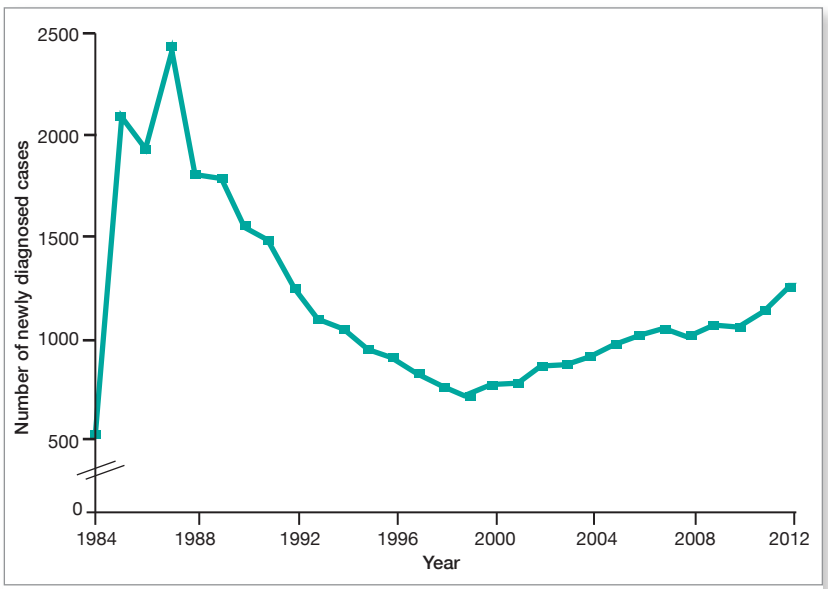

Figure 1. New diagnoses of HIV infection in Australia, 1984-2012.[1]
Courtesy of the Kirby Institute, The University of New South Wales, Sydney.

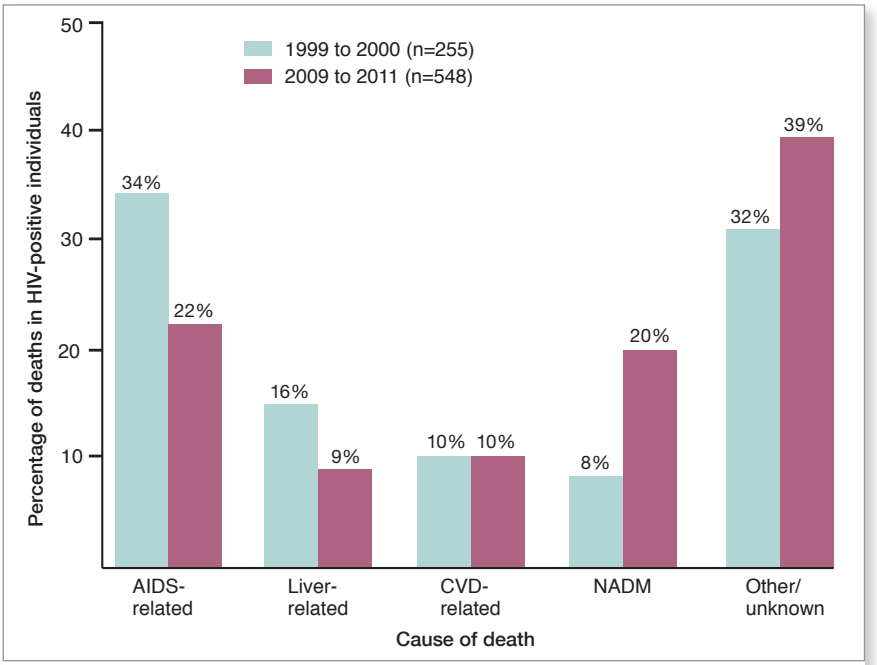

Figure 2. Changing causes of death in HIV infection over time (the D:A:D cohort).[3]

ABBREVIATIONS: AIDS = acquired immunodeficiency syndrome; CVD = cardiovascular disease; HIV = human immunodeficiency virus; NADM = non-AIDS defining malignancy.

Following the primary illness, most people will enter a relatively asymptomatic phase lasting for several years. Over time, mild then more severe immune compromise will develop. This will be marked by the presence of conditions such as oral thrush, diarrhoea, weight loss, recurrent respiratory infections and skin conditions, including shingles, seborrhoeic dermatitis and folliculitis (Figure 3).[8] CD4 lymphocyte counts will generally drop by about 60 to 80 x 10^6 cells/L per year from an average normal level of approximately 800 x 10^6 cells/L to below the normal lower limit of 500 x 10^6 cells/L. At levels below 200 x 10^6 cells/L, patients will become increasing vulnerable to AIDS-defining conditions such as *Pneumocystis jiroveci* pneumonia (PJP, previously called *Pneumocystis carinii* pneumonia, or PCP). The various stages of HIV infection are shown in Figure 4.[8]

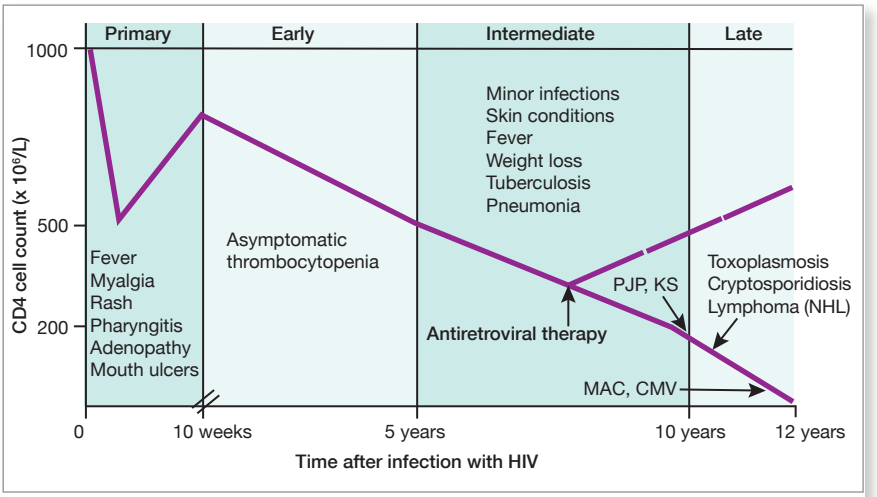

Figure 4. The natural history of HIV infection.[8]

ABBREVIATIONS: CMV = cytomegalovirus; HIV = human immunodeficiency virus; KS = Kaposi's sarcoma; MAC = *Mycobacterium avium* complex; NHL = non-Hodgkin's lymphoma; PJP = *Pneumocystis jirovecii* pneumonia.

Courtesy of the Australasian Society for HIV Medicine (ASHM).

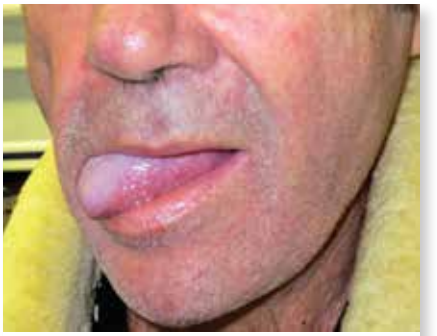

Figure 3. Seborrhoeic dermatitis and oral thrush.

HIV testing

Testing for HIV infection should be performed after appropriate informed consent has been obtained. Current fourth generation combined antibody/antigen tests (HIV antibody and HIV p24 antigen) are very sensitive and specific but must always be followed with a confirmatory reference test if they are positive.[9] Additional testing should be ordered if there is concern about possible primary HIV illness – the local pathology laboratory should be consulted. Common tests are listed in Table 1.

The window period for HIV testing is officially stated to be three months from the time of exposure but most patients will have a positive antibody/antigen test by six weeks after infection. Making a new diagnosis of HIV can be a very distressing time for the patient as well as for their treating doctor. Expert advice following a new HIV diagnosis can be obtained online as well as by phone from local specialist clinics or from the Australasian Society for HIV Medicine (www.ashm.org.au).

STARTING ANTIRETROVIRAL THERAPY

Current Australian guidelines recommend starting ART if symptoms develop or if the

TABLE 1. COMMONLY USED TESTS IN HIV MANAGEMENT

Test	Consideration
HIV antibody test	Standard screening test, usually as a combination HIV antibody/antigen test
HIV point of care test (HIV rapid test)	Saliva or blood test that can be performed at the clinic with a result in 10 to 20 minutes. Reactive tests are not diagnostic and must be confirmed with conventional laboratory testing
HIV Western blot	Confirmatory diagnostic test for HIV infection. Detects HIV antibodies
HIV p24 antigen	High during HIV primary infection
CD4 lymphocyte count	Marker of immune function: > 500 x 10^6 cells/L is normal, < 500 x 10^6 cells/L indicates immune deficiency, < 200 x 10^6 cells/L indicates severe immune deficiency
HIV RNA (viral load)	Marker of HIV in plasma, expressed as HIV copies/mL; high levels prior to treatment, should be very low or 'undetectable' on treatment
HIV genotypic drug resistance assay	Test performed prior to treatment and when resistance to antiretroviral therapy is suspected

1. ANTIRETROVIRAL AGENTS AVAILABLE IN AUSTRALIA*

NRTI/NtRTIs
- Abacavir (Ziagen)
- Didanosine (Videx)
- Emtricitabine (Emtriva)
- Lamivudine (3TC, Lamivudine Alphapharm, Lamivudine RBX)
- Stavudine (Zerit)
- Tenofovir (Viread)
- Zidovudine (Retrovir)
- Abacavir/lamivudine (Kivexa)
- Emtricitabine/tenofovir (Truvada)
- Lamivudine/zidovudine (Combivir, Lamivudine + Zidovudine Alphapharm)
- Abacavir/lamivudine/zidovudine (Trizivir)

NNRTIs
- Efavirenz (Stocrin, Efavirenz Alphapharm†, Sevelon†)
- Etravirine (Intelence)
- Nevirapine (Viramune, Nevirapine Alphapharm, Nevirapine RBX)
- Rilpivirine (Edurant)

Protease inhibitors
- Atazanavir (Reyataz)
- Darunavir (Prezista)
- Fosamprenavir (Telzir)
- Indinavir (Crixivan)
- Ritonavir (Norvir)
- Saquinavir (Invirase)
- Tipranavir (Aptivus)
- Lopinavir/ritonavir (Kaletra)

Entry inhibitors
- Enfuvirtide (Fuzeon)
- Maraviroc (Celsentri)

Integrase inhibitors
- Dolutegravir (Tivicay†)
- Raltegravir (Isentress)

Combinations of classes
- Tenofovir/emtricitabine/efavirenz (Atripla)
- Tenofovir/emtricitabine/rilpivirine (Eviplera)
- Tenofovir/emtricitabine/elvitegravir/cobicistat (Stribild†)‡

ABBREVIATIONS: NNRTI = non-nucleoside reverse transcriptase inhibitor; NRTI = nucleoside reverse transcriptase inhibitor; NtRTI = nucleotide reverse transcriptase inhibitor

*Available in February 2014. All but those indicated by † are available on the PBS (Section 100).
† Not available on the PBS.
‡ Elvitegravir is an integrase inhibitor; cobicistat is a pharmacokinetic enhancer.

CD4 count falls below 500 cells x 10^6/L. Treatment is also recommended in special situations such as pregnancy.[6]

There is ongoing debate about the best time to start treatment, with some international guidelines recommending that all patients should be commenced on treatment from the time of diagnosis even with normal CD4 counts. The greatly reduced risk of transmission of HIV to sexual partners is an additional consideration.

Before commencing treatment, all patients should have some baseline investigations performed. These are similar to those recommended for regular monitoring with the addition of an HIV genotype resistance test. Screening for tuberculosis and other infectious diseases should be considered.

There are now more than 20 antiretroviral agents available in Australia in five major classes (Box 1). These agents work at different stages of the viral life cycle to suppress viral replication. Although the particular agents have changed, the general principles of effective therapy were established in the mid-1990s; this is that the patient needs to take a combination of three medications that together result in durable suppression of HIV replication. Modern combination ART most commonly consists of a 'backbone' of two nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs/NtRTIs) and a third agent that is chosen from another class. The third agent may be a non-nucleoside reverse transcriptase inhibitor (NNRTI), a protease inhibitor (PI) or an integrase inhibitor. Note that if a PI is used it will often be combined with a low dose of ritonavir, which is a pharmacokinetic enhancer (boosting agent) of other PIs that allows once daily dosing.

The currently recommended first-line funded ART combinations are shown in Table 2. The development of new agents and regimens is rapid in HIV medicine and guidelines are updated regularly to reflect advances.

The choice of medication will involve

discussion about potential side effects, drug interactions, dosing requirements (e.g. timing, food restrictions), other health problems, the potential for pregnancy and patient preference. As with other chronic health problems no 'perfect drug' exists; however, patients can now expect few side effects and convenient dosing – very important issues for medication that will need to be taken long term. Once started, medications should be taken indefinitely.

A change in treatment may be required for reasons such as side effects, the development of resistance to first-line treatment or in special situations such as pregnancy. Advice from experienced practitioners should be sought in these situations.

TABLE 2. RECOMMENDED FIRST-LINE REGIMENS FOR HIV TREATMENT (AUSTRALIA)

First-line treatment (trade name)	Comments
Efavirenz/tenofovir/emtricitabine (Atripla)	One tablet daily, on an empty stomach; avoid in pregnancy
Atazanavir (Reyataz), ritonavir (Norvir), emtricitabine/tenofovir (Truvada)	One tablet of each daily with food; avoid with proton pump inhibitors
Raltegravir (Isentress), emtricitabine/tenofovir (Truvada)	Three tablets daily (raltegravir is dosed twice daily)

MONITORING ANTIRETROVIRAL THERAPY

Patients require close monitoring in the first few months of treatment with ART. Side effects are most likely at this time and medication may need to be modified. With antiretroviral treatment, the level of HIV in the blood (the HIV viral load) will generally become 'undetectable' after three months, i.e. the HIV RNA level is less than the limit of detectability used by the pathology laboratory, which is now less than 20 to 40 copies/mL. Suppression of viral replication will be associated with reduced CD4 cell loss and recovery of the CD4 count. CD4 count recovery is a much slower process lasting several years, and the rate of recovery varies significantly among patients. Once the patient is stable on treatment with an undetectable HIV viral load, the frequency of HIV monitoring can be reduced to every three to six months.

Persistence of a detectable HIV viral load or an increase in viral load after

TABLE 3. RECOMMENDED PERIODIC MONITORING AND PREVENTIVE HEALTH ACTIVITIES FOR PATIENTS WITH HIV INFECTION

Feature	Monitoring/preventive activity
HIV-specific	
History, examination	Every 3 to 6 months
CD4, HIV viral load	Every 3 to 6 months
Drug interactions	Check all current medicines at every visit
Adherence	Assess adherence at every visit
Side effects	Review side effects at every visit
Co-infections and vaccinations	
Hepatitis A	Vaccination (two-dose schedule) if at risk
Hepatitis B	Vaccination (three-dose schedule) all patients, unless immune or chronic infection
Hepatitis C	Check at baseline, annual check if at risk
Influenza	Annual vaccination
Pneumococcal	Vaccination, revaccination is complex – see guidelines
Tetanus/pertussis	Vaccination every 10 years
Sexually transmitted infections	Screening depends on risk group – for MSM, 3- to 12-monthly screens
Human papillomavirus disease	Vaccination (three-dose schedule; not funded for adults)
Opportunistic infections	Antibiotic prophylaxis if CD4 < 200 x 10^6 cells/L, complex regimen – see guidelines
Lifestyle	
Smoking	Opportunistic screening and counselling
Weight	Check weight, BMI, waist circumference every 6 to 24 months
Nutrition	Review every 6 to 24 months
Physical activity	Review every 2 years
Alcohol intake	Review every 2 years

(Continued on next page)

starting treatment may represent the emergence of resistant HIV and virological treatment failure. This most often results from adherence difficulties. Intermittent low levels of detectable virus (up to 200 copies/mL), called 'virologic blips', may occur without indicating the development of resistance.

Monitoring visits will involve a targeted history, examination and pathology testing. As well as HIV viral load and CD4 count, full blood count, liver function tests and urea, creatinine and electrolytes levels should be checked. Investigations such as measurement of fasting glucose and lipid levels and urinalysis should be performed every 12 months. The recommended periodic monitoring is listed in Table 3. Some specialist HIV services do not address non-HIV issues such as sexually transmitted infection (STI) screening and Pap smears: it may be assumed that the GP is attending to these issues. GPs should expect to be sent copies of investigations results.

Patient education and support

Patient education and support should be provided at every monitoring visit.

Adherence

Adherence should be assessed at every monitoring visit. Older HIV medications were very demanding in their dosing requirements, requiring greater than 95% adherence to maintain HIV control.[6] Newer medications have longer half-lives and are more 'forgiving', but high levels of adherence are still needed. Adherence can be enquired about with permissive questions such as: 'Many people have trouble taking their medications every day, have you had any difficulties recently?' The use of simple adherence aids such as pill boxes may be helpful.

Side effects

Side effects should also be reviewed at each visit. Many patients may be experiencing significant side effects but may not report these unless asked specifically. The presence of side effects is associated with reduced adherence and poorer quality of life. Again general questions should be asked, followed by more specific questions targeted at common side effects associated with particular regimens (e.g. presence of diarrhoea, sleep disturbance or mood changes).

Drug interactions

Drug interactions should be considered at each regular visit including prescribed and over-the-counter medications, supplements and recreational drugs. Some common interactions between antiretroviral drugs and other agents

(including recreational drugs) are shown in Table 4.

Interactions can be complex as commonly used antiretroviral drugs can induce or inhibit hepatic drug metabolism. The new combination medication, Stribild, now available in Australia, includes cobicistat, a pharmacokinetic enhancer, as well as tenofovir, emtricitabine and elvitegravir. Cobicistat has similar drug interactions to the widely used protease inhibitor ritonavir as both inhibit the CYP3A4-mediated hepatic metabolism of many agents. Detailed support can be obtained from online reference tools such the University of Liverpool's website www.hiv-druginteractions.org.

PREVENTING OTHER INFECTIOUS DISEASES

Historically most patients with HIV infection experienced life-threatening infections such as PJP. People with a low CD4 cell count of less than 200 x 10^6 cells/L remain vulnerable to serious infections. This group needs to continue with appropriate antibiotic prophylaxis, most commonly sulfamethoxazole/trimethoprim (the usual dose is two tablets of the double strength formulation twice a week). Most patients in regular care will have a CD4 count above 200 x 10^6 cells/L so will not require antibiotic prophylaxis.

Vaccination is less effective for individuals with severe immune suppression (CD4 count below 200 x 10^6 cells/L).[10] All patients should be screened for hepatitis A, B and C (Table 3). Susceptible patients should receive vaccination for hepatitis A and B.[11] The levels of antibodies against the hepatitis B surface antigen (anti-HBs) should be checked and patients revaccinated to maintain an anti-HBs level above 10 mIU/mL (i.e. a seroprotective level). Sexual transmission of hepatitis C can occur between HIV-positive MSM, and these patients should have annual hepatitis C virus antibody tests, as should others at risk, such as people who inject drugs. Early referral of HIV-positive patients newly infected with hepatitis C virus to a hepatitis treatment centre for assessment should be considered. Chronic hepatitis B can be treated with commonly used ART so this would influence the choice of regimens.

Respiratory infections are more common in this patient group. All patients with HIV infection should have annual influenza vaccinations and periodic pneumococcal vaccinations (Table 3).

Many HIV-positive people travel and will need to consider travel-related vaccinations. In general, vaccination of such patients is safe with all inactivated vaccines and some live attenuated vaccines (MMR and varicella vaccines). However,

TABLE 3. RECOMMENDED PERIODIC MONITORING AND PREVENTIVE HEALTH ACTIVITIES FOR PATIENTS WITH HIV INFECTION *(continued)*

Feature	Monitoring/preventive activity
Cardiovascular/metabolic	
Cardiovascular risk calculation	Calculate absolute risk every 2 years
Blood pressure	Check every 6 to 24 months
Lipids	Check fasting every year
Glucose	Check fasting every year
Renal	Check eGFR every 3 to 6 months if taking ART, every 6 to 12 months if no ART. Perform urinalysis at baseline and every 6 to 12 months if taking ART
Liver	LFT every 3 to 6 months if taking ART, every 6 to 12 months if no ART
Osteoporosis	Assess for risk factors every 12 months in women > 45 years, men > 50 years; consider BMD measurement
Cancer screening	
Cervical (female)	Pap smear every year
Breast (female)	Mammogram every 2 years if aged 50 to 69 years
Colon	FOBT every 2 years if aged 50 to 75 years, or colonoscopy every 5 years if high risk – see guidelines
Psychosocial	
Depression, mental illness	Opportunistic screening
Drug use	Opportunistic screening
Sexual/reproductive	Opportunistic screening
Housing, financial situation, social support	Opportunistic screening
Other prevention	
Dental health	Referral for regular dental care
Glaucoma/vision	Referral if at risk (e.g. family history) or low CD4 count

ABBREVIATIONS: ART = antiretroviral therapy; BMD = bone mineral density; BMI = body mass index; eGFR = estimated glomerular filtration rate; FOBT = faecal occult blood test; HIV = human immunodeficiency virus; LFT = liver function tests; MSM = men who have sex with men.

TABLE 4. COMMON INTERACTIONS BETWEEN ANTIRETROVIRAL DRUGS AND OTHER DRUGS*

Drug class	Interaction with antiretroviral drug†	Comment
Antiarrhythmics, e.g. amiodarone	↑ with PIs, cobicistat	Avoid coadministration
Antihypertensives: • calcium channel blockers • beta-blockers	 • ↑ with PIs, cobicistat; ↓ with NNRTIs • ↑ with cobicistat	 • Dose adjustment • Dose adjustment
Anticonvulsants: carbamazepine, phenobarbital, phenytoin	↓ dolutegravir, elvitegravir, etravirine, lopinavir, rilpivirine	Avoid coadministration; take care when administering with other PIs
Acid-lowering drugs: • proton pump inhibitors • H_2-receptor antagonists • antacids	 • ↓ atazanavir, rilpivirine • ↓ atazanavir, rilpivirine • ↓ atazanavir, dolutegravir, elvitegravir, rilpivirine	 • Avoid coadministration • Complex dosing, see guidelines • Take at different times
Antidepressants, most	↑ with PIs, cobicistat	Start with low dose and titrate carefully
Benzodiazepines: midazolam, triazolam	↑ with most ART drugs	Avoid coadministration
Bronchodilator: salmeterol	↑ with PIs, cobicistat	Avoid coadministration
Corticosteroids: inhaled or intranasal fluticasone, budesonide	↑↑ with ritonavir, cobicistat. Can result in adrenal insufficiency, including Cushing's syndrome	Avoid coadministration; use beclomethasone instead
Corticosteroids: systemic, including articular injections	Complex, risk of ↓ ART drugs and ↑↑ corticosteroid	Use together with care; prednisone is safest
Gout: colchicine	↑ with PIs, cobicistat	Reduce colchicine dose
Hormonal contraceptives	↓ with PIs, NNRTIs, cobicistat	Complex – consult guidelines
Lipid lowering: • simvastatin, lovastatin • atorvastatin, rosavastatin	 • ↑↑ with PIs, cobicistat • ↑ with PIs cobicistat	 • Avoid, use other statins • Use low dose
Migraine: ergotamine	↑ with most ART drugs	Avoid coadministration
Narcotics: • methadone • buprenorphine	 • ↓ with nevirapine, efavirenz • ↑ with atazanavir (unboosted)	 • May need methadone dose increase • Avoid coadministration
PDE5 inhibitors e.g. sildenafil	↑ with PIs, cobicistat	Start with low dose of PDE5 inhibitor
Stimulants such as MDMA (ecstasy)	↑ with ritonavir, cobicistat	Warn patients of the risk
St John's wort	↓ level of many ART drugs	Avoid coadministration

ABBREVIATIONS: ART = antiretroviral therapy; MDMA = 3,4-methylenedioxy-N-methylamphetamine; NNRTI = non-nucleoside reverse transcriptase inhibitor; PDE5 = phosphodiesterase type 5; PI = protease inhibitor.

* Does not include interactions with other antiretroviral drugs or more specialised drugs such as those used to treat tuberculosis or hepatitis C.

† ↑ with/ ↓ with = other drug level increased/decreased when coadministered with named ART drug; ↑/↓ = named ART drug level increased/decreased when coadministered with other drug; ↑↑ = greatly increased level.

vaccination with BCG, oral polio and oral typhoid vaccines is contraindicated. Yellow fever vaccination can be given if significant risk exists, provided the CD4 cell count is above 200 x 10^6 cells/L.

Vaccination for human papillomavirus is safe and immunogenic in HIV-positive people but is currently not funded (Table 3).

STIs should be screened for as recommended in current guidelines.[12] All MSM are advised to have three- to 12-monthly checks for STIs, including gonorrhoea, chlamydia and syphilis (Table 3). Other groups of HIV-positive patients should be screened opportunistically.

LIFESTYLE FACTORS

Modifiable risk factors are very important in this population. Smoking in particular is more prevalent and has been shown to be associated with multiple complications including pneumonia, lung cancer and cardiovascular disease.[13]

Approaches to monitoring and interventions are similar to those for the general population, and are listed in Table 3. Motivational interviewing and other lifestyle interventions such as 'Smoking, Nutrition, Alcohol and Physical activity (SNAP)' provide a useful framework for patient counselling.[14]

SCREENING FOR CARDIOVASCULAR AND METABOLIC DISEASE

Cardiovascular disease is more common in people living with HIV. Risk factors such as smoking are more prevalent but HIV itself appears to increase the risk of ischaemic heart disease (IHD) by about 75%.[15] Patients should have their absolute cardiovascular risk calculated using a tool such as the Australian calculator at www.cvdcheck.org.au.

Diabetes, hyperlipidaemia and abnormal fat distribution (lipodystrophy) are also more common. The causes of these comorbidities are complex and involve the effects of the virus as well as side effects from some antiretroviral medications.[16]

All patients require monitoring in line with standard guidelines for screening for cardiovascular and metabolic disease (Table 3). Blood pressure and weight should be checked regularly, and fasting lipids and glucose levels should be measured at least annually. ART may need to be switched to reduce metabolic complications if they are thought to be medication-related. This can be a complex decision as it is still most important to maintain good control over the HIV infection. Treatment is generally similar to that in the general population, with the exception that certain medications (e.g. simvastatin) should be avoided, as indicated in Table 4.

Fat wasting (lipoatrophy) and fat accumulation make up the lipodystrophy syndrome (Figure 5). This is now rare with modern treatment but is of great concern for patients who were treated with older regimens. Lipoatrophy can be partly corrected with the use of fillers such as poly-L-lactic acid but is best avoided by switching to newer ART agents.

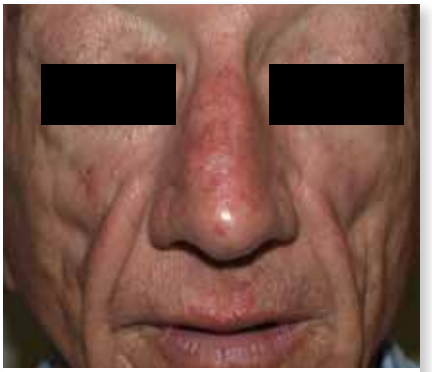

Figure 5. Lipoatrophy.

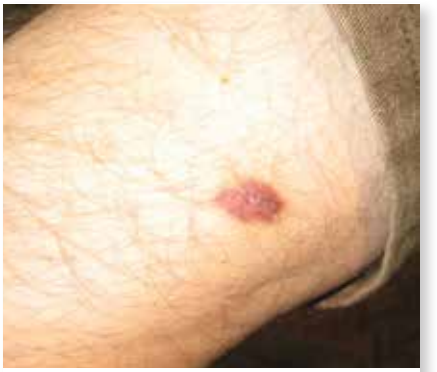

Figure 6. Kaposi's sarcoma.

MONITORING RENAL, LIVER AND BONE DISEASE

As with metabolic disorders there is a complex relationship between HIV infection, comorbidities (such as viral hepatitis) and ART in the pathogenesis of renal, liver and bone disease.

Renal function should be monitored regularly, especially when starting new medications (Table 3). Urea, creatinine and electrolyte levels should be measured every three to six months, and urinalysis performed annually. Potentially nephrotoxic medications such as tenofovir need more intense monitoring. Signs of renal toxicity, such as a decline in estimated glomerular filtration rate, proteinuria or renal calculi, may require a change in therapy.

Liver function should also be checked regularly, and especially when starting ART and in the presence of other causes of liver disease (Table 3). Most antiretroviral medications can cause hepatotoxicity.

Osteoporosis is more prevalent in people with HIV infection than in the general population. Monitoring and treatment remains similar to that in the general population (Table 3).

SCREENING FOR MALIGNANCIES

The incidence of some malignancies is much higher in the presence of HIV infection. These are cancers related to co-infections such as with human

2. GENERAL PRACTICE CARE OF PATIENTS LIVING WITH HIV

The authors of this article have cared for HIV-infected patients in the general practice setting over many years and encourage all GPs with patients diagnosed with HIV infection to recognise the important role they play in the ongoing care of these patients.

Your pre-existing relationship with your patient is an important support as patients face the challenges a diagnosis of HIV can bring. Screening for STIs, vaccination and treatment for cardiovascular, mental health and other medical issues can all be undertaken in general practice, as described in this article. Good communication between GPs and specialists is necessary for optimal patient care in all chronic conditions, including HIV.

For doctors keen to learn more about HIV care, the Australasian Society for HIV Medicine offers regular GP education events that attract RACGP QI&CPD points. Contact can be made via the website www.ashm.org.au.

3. CASE HISTORY: GENERAL PRACTICE CARE OF AN HIV-POSITIVE MAN

Steve is a 50-year-old man who has been attending your general practice for 12 years. He was diagnosed HIV-positive eight years ago. After three years he started HIV therapy under the care of an infectious diseases specialist at the local outpatient clinic. His HIV viral load has remained undetectable and a recent CD4 cell count is 660 x 10^6 cells/L (the specialist copies you in on all results).

Steve continues to see you for episodic care. Three years ago you noted his blood pressure was elevated at 172/96 mmHg. After investigation you started him on an ACE inhibitor. His lipid profile is normal but he has struggled to stop smoking.

Two months ago he presented with shortness of breath at the gym. Examination, ECG and chest x-ray gave normal results and spirometry showed slightly reduced FEV_1 and FVC only. Given his risk factors for ischaemic heart disease you referred him for a stress echocardiogram, which was abnormal. An urgent angiogram found narrowing of the left anterior descending artery that responded well to stenting. He is now back at the gym and has finally stopped smoking. You are now also managing his ischaemic heart disease with statins, aspirin and clopidogrel.

papillomavirus, hepatitis B and C viruses, Epstein-Barr virus and human herpes virus 8. For this reason, annual Pap smears are advised for female patients (Table 3).

Many common cancers (such as breast, bowel and prostate cancers), however, are no more frequent in this population so no changes in standard cancer screening are indicated apart from more frequent Pap smears (Table 3). Vigilance is needed for the detection of new skin lesions that could be Kaposi's sarcoma. These are often nonspecific and therefore require biopsy (Figure 6).

Anal cancer is also much more common in those with HIV infection, but there is no agreed screening test. Any anal symptoms, including rectal bleeding, pain or lumps, should be promptly investigated.

MONITORING FOR DEPRESSION AND PSYCHOSOCIAL PROBLEMS

Depression is very common in men infected with HIV, with a prevalence of about 30%.[17] Assessment of mood can be performed opportunistically (Table 3). People living with HIV also frequently experience discrimination and occupational, housing and financial disadvantage. Referral to a psychologist or peer support worker can be helpful.

Neurocognitive impairment is also more common in this population, but screening is controversial. Consider specialist referral if patients report symptoms such as memory loss, poor concentration or other cognitive difficulties.

ROLE OF THE GP

As with other chronic medical conditions, the primary care doctor can play a pivotal role in the care of patients infected with HIV, as both a provider of routine care and co-ordinator of referral to specialist care. Many patients are mainly managed by GPs with training in the care of patients with HIV infection and accredited to prescribe HIV ART drugs.

Patients living with HIV will require differing levels of engagement with specialist care depending on their particular circumstances. When patients are newly diagnosed or considering treatment for the first time, specialist input is necessary. If patients have complex comorbidities engagement with several specialists is common. However, many HIV-positive patients are stable and doing well on ART, and choose to visit specialists every six to 12 months and to access most of their care in general practice.

Advice on GP education about HIV care is provided in Box 2, and a case history illustrating the general practice care of an HIV-positive man who has sex with men is presented in Box 3.

SUMMARY

Long, healthy lives for patients living with HIV must rank as one of the greatest achievements of modern medicine. Ensuring the best outcomes requires attention to the care of the whole person. In general, patient care follows standard guidelines, with the complications of HIV infection being largely prevented by long-term treatment with antiretroviral drugs. This therapy requires regular monitoring and support to maintain high levels of adherence, the control of side effects and the prevention of drug interactions. A cure for HIV is the ultimate goal but until it is achieved good care requires a supportive partnership between patient and doctor. MT

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A list of references is included in the website version (www.medicinetoday.com.au) and the iPad app version of this article.

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HIV infection as a chronic disease

Optimising outcomes

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