

# Causal analysis and treatment protocols for sexually transmitted infections, HIV/AIDS and opportunistic infections

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## 1. Sexually transmitted infections

**Table 1.1** Causes of sexually transmitted diseases (by significance)

	Direct (normally clinical)	Indirect (diet, exercise, alcohol)	Distant (sociopolitical, economic, empowerment, gender, literacy, etc.)
	<ul style="list-style-type: none"> <li>Sexual—unprotected sex with casual partners or HIV-infected person</li> <li>Ignorance about STDs</li> </ul>	<ul style="list-style-type: none"> <li>Practice of risky sexual behaviour</li> <li>Alcohol or other substance use</li> <li>Social stigma associated with risky sexual behaviours, sexually transmitted diseases and 'at-risk' subpopulations</li> </ul>	<ul style="list-style-type: none"> <li>Migration—single male member migration</li> <li>Poverty</li> <li>Natural calamities such as famine and earthquake</li> <li>Low empowerment as seen among 'at-risk' subpopulations</li> <li>Social taboo on discussions on sexuality</li> <li>Low coverage of quality life skills' education to adolescents in and out of school</li> </ul>
Interaction with other causes	<i>(by descending order of proportionate morbidity)</i>		
STDs	<ul style="list-style-type: none"> <li>Enhance the risk of acquisition/transmission of HIV infection by two- to ten-fold</li> <li>Generally a higher risk of transmission is associated with ulcerative diseases               <ol style="list-style-type: none"> <li>Genital ulcer disease                   <ul style="list-style-type: none"> <li>Herpes genitalis</li> <li>Chancroid</li> <li>Syphilis</li> <li>Lymphogranuloma venereum</li> <li>Granuloma inguinale</li> </ul> </li> <li>Genital discharge syndrome                   <ul style="list-style-type: none"> <li>Trichomoniasis</li> <li>Chlamydial urethritis</li> <li>Gonorrhoea</li> </ul> </li> <li>Genital warts</li> <li>Reproductive tract infections</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Poor treatment-seeking behaviour including delayed treatment-seeking, incomplete treatment for STDs, low acceptability of STD clinics, etc.</li> <li>Poor health-seeking behaviour among 'at-risk' subpopulations</li> <li>Low access to quality risk reduction counselling</li> <li>Low acceptability/awareness about syndromic management guidelines among health care providers</li> </ul>	<ul style="list-style-type: none"> <li>Receptive sexual partners—females as well as males (in men having sex with men)</li> <li>Low coverage of quality targeted interventions among 'at-risk' subpopulations</li> <li>Poor control over unqualified traditionally accepted practitioners for treatment of STDs</li> <li>Poor coordination between the private and public sectors</li> </ul>
Transfusion-associated HIV infection			
1. Interacting diseases	<ul style="list-style-type: none"> <li>Haemophilia</li> <li>Thalassaemia</li> <li>Postpartum haemorrhage</li> </ul>	<ul style="list-style-type: none"> <li>Practice of providing plasma</li> <li>Lack of wide availability of HIV-tested blood products</li> <li>Rarely, non-adherence to rational use of blood</li> </ul>	
2. Injecting drug use		<ul style="list-style-type: none"> <li>Peer pressure</li> <li>Low adherence to biosafety precautions</li> </ul>	<ul style="list-style-type: none"> <li>Unemployment</li> <li>Poverty</li> <li>Social instability</li> </ul>
3. Occupational exposure		<ul style="list-style-type: none"> <li>Ignorance about postexposure prophylaxis</li> <li>Access to postexposure prophylaxis drugs</li> </ul>	<ul style="list-style-type: none"> <li>Low availability of protective equipment at the workplace</li> </ul>
MTCT	<ul style="list-style-type: none"> <li>Pregnancy when a woman recently acquires HIV</li> <li>Breastfeeding</li> </ul>	<ul style="list-style-type: none"> <li>Vaginal delivery</li> <li>Ignorance about MTCT</li> <li>Lack of access to HIV testing and counselling</li> </ul>	

STD: sexually transmitted disease; MTCT: mother-to-child transmission

**Table 1.2** Interventions (by significance) for the management of sexually transmitted diseases

Outcome		Non-medical interventions/prevention			
		Medical interventions		Prioritized (targeted) interventions	Subpopulations
STDs	Syndromic management of STDs (at all levels of health care) <sup>1</sup>	Aetiological management (not favoured as it leads to missed opportunities)	Establishment of STD surveillance to assess the pattern and proportionate morbidity of STDs and drug-resistance profile to suitably modify choice of drugs in the syndromic approach	<ul style="list-style-type: none"> <li>Generic package of prioritized intervention that includes               <ol style="list-style-type: none"> <li>Management of STDs using the syndromic approach</li> <li>Peer-based education on STDs/HIV/AIDS</li> <li>Promotion and distribution of condoms</li> <li>Empowerment of socially challenged groups</li> <li>Creation of an enabling environment</li> </ol> </li> <li>Life-skills' education that includes peer-based approaches to create enabling environment and empowerment</li> </ul>	<ul style="list-style-type: none"> <li>Sex workers</li> <li>Men who have sex with men</li> <li>Truckers</li> <li>Migrant subpopulations</li> <li>Adolescents</li> </ul>
Transfusion-associated HIV infection	Rational use of blood and blood products	NA	NA	Promote rational use of blood/blood products	<ul style="list-style-type: none"> <li>Promote voluntary blood donation</li> <li>Intensify self-deferral strategy</li> <li>Treat potential causes of anaemia aggressively</li> </ul>
Injecting drug use-associated HIV	NA	NA	NA	Intensify and saturate with targeted interventions aiming at harm reduction, such as needle exchange, harm-reduction strategies, enabling environment, using peer-based approaches	
Occupational exposure	Provide anti-retrovirals on needle-stick exposure	<ul style="list-style-type: none"> <li>Establishment of national needle-stick registry</li> <li>Provide combination ART for 4 weeks</li> </ul>	NA	<ul style="list-style-type: none"> <li>Periodic biosafety training</li> <li>Initiate needle-stick audit</li> <li>Access to post-exposure prophylaxis</li> <li>Counselling</li> </ul>	
Mother-to-child transmission of HIV	Antiretroviral/s for PMTCT	Counselling on infant feeding practices	NA	<ul style="list-style-type: none"> <li>Enhance access to HIV testing and counselling</li> <li>Peer-based interventions for exclusive breastfeeding</li> </ul>	

STD: sexually transmitted disease; AIDS: acquired immunodeficiency syndrome; PMTCT: prevention of mother-to-child transmission; ART: antiretroviral therapy

<sup>1</sup>National AIDS Control Organization (NACO). *Simplified STI/RTI treatment guidelines*. New Delhi: Government of India; 1998.

**Table 1.3** Standard treatment protocols for the management of conditions occurring due to sexually transmitted diseases

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
Genital ulcer disease (syndromic approach)	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> <li>About 20 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>RPR/VDRL (at all levels of health care)</li> <li>Dark-ground microscopy (up to the district level)</li> <li>Tzanck preparation (at the tertiary level)</li> </ul>	<ul style="list-style-type: none"> <li>Inj. benzathine penicillin 2.4 MU IM × 2 + erythromycin 500 mg qid × 14 days</li> <li>If the lesions look like herpes genitalis, give acyclovir 200 mg 5 times/day × 7 days</li> <li>OR famciclovir 250 mg bd × 7 days</li> </ul>	Not required
Genital discharge syndrome	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> </ul>	<ul style="list-style-type: none"> <li>Not needed at the PHC level</li> </ul>	<ul style="list-style-type: none"> <li>Use norfloxacin 800 mg stat</li> <li>OR</li> </ul>	Not needed

(Cont.)

**Table 1.3 (cont.)** Standard treatment protocols for the management of conditions occurring due to sexually transmitted diseases

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
	<ul style="list-style-type: none"> <li>About 20–30 minutes per consultation of a counsellor</li> <li>About 20 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>Gram stain</li> <li>Wet mount (up to the district level)</li> </ul>	Inj. ceftriaxone 250 mg IM stat + Cap. doxycycline 100 mg bd × 7 days	
Vaginal discharge	<ul style="list-style-type: none"> <li>About 15 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> <li>About 20 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>Per speculum examination</li> <li>Gram stain</li> <li>Wet mount</li> </ul>	<ul style="list-style-type: none"> <li>E/o cervicitis</li> <li>norfloxacin 800 mg stat</li> <li>+ doxycycline 100 mg bd × 7 days</li> <li>+ metronidazole 200 mg tds × 7 days</li> <li>E/o vaginal infection alone; treated as candidial; give fluconazole 150 mg stat</li> </ul>	Not needed
Inguinal bubo	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> </ul>	Clinical diagnosis	Use doxycycline 100 mg bd × 14 days OR erythromycin 500 mg qid for 1 day OR tetracycline 500 mg qid × 14 days	
Lower abdominal pain among women (pelvic inflammatory disease)	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> <li>About 20 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>Clinical diagnosis</li> <li>Gram stain</li> <li>Wet mount</li> </ul>	Inj. ceftriaxone 250 mg IM + doxycycline 100 mg bd × 7 days + metronidazole 200 mg tds or 400 mg bd × 14 days	
Swelling of the scrotum	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> </ul>	Clinical diagnosis	Inj. ceftriaxone 250 mg stat + doxycycline 100 mg bd × 7 days	Not needed
Ophthalmia neonatorum	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a paediatrician</li> <li>About 20 minutes of a laboratory technician</li> </ul>		Inj. ceftriaxone 50 mg/kg, maximum dose: 125 mg stat	Not necessary
Post-exposure prophylaxis	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> </ul>	<ul style="list-style-type: none"> <li>HIV ELISA of patient as well as the provider at the base-line and at 3 months (up to the district level)</li> <li>HIV-1 DNA PCR at a tertiary health care centre</li> </ul>	Within 15 minutes to 4 hours (ideally) or 24 hours minimally, provide: zidovudine 300 mg bd + lamivudine 150 mg bd + indinavir 800 mg tds for 4 weeks <sup>1</sup>	Not necessary
Prevention of mother-to-child transmission	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 20–30 minutes per consultation of a counsellor</li> </ul>	<ul style="list-style-type: none"> <li>HIV ELISA of pregnant woman (up to the district level)</li> <li>HIV-1 DNA PCR of the baby at 2 and 4 months in a non-breastfed baby or one month after stopping breast milk (available only in select tertiary care centres)</li> </ul>	<ul style="list-style-type: none"> <li>Currently, NACO provides nevirapine 200 mg one tablet during labour and single dose of nevirapine 2 mg/kg of body weight of baby within 72 hours of birth.<sup>2</sup> However, in view of the reports of emergence of nevirapine-resistant mutations in mothers that preclude the use of a nevirapine-based regimen, WHO recommends the use of zidovudine 300 mg bd + lamivudine 150 mg bd for at least a week after birth to the mother</li> <li>Elective caesarean section</li> </ul>	Hospitalization for an average of 5 days if the mother undergoes elective caesarean section additionally

RPR: rapid plasma reagin; VDRL: Venereal Disease Research Laboratory; Inj.: injection; ELISA: enzyme-linked immunosorbent assay; PCR: polymerase chain reaction

<sup>1</sup>NACO. *Specialist training and reference module*. New Delhi; Government of India; 2002.

<sup>2</sup>Guay LA, Musoko P, Fleming T, *et al*. Intrapartum and neonatal single dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomised trial. *Lancet* 1999;**354**:705–8.

## 2. HIV/AIDS

**Table 2.1** Interventions (by significance) for the treatment of advanced HIV disease (CD4 count <200 cells/cmm)

Medical interventions	Non-medical interventions/prevention		
	Exercise	Nutrition	Others
<ul style="list-style-type: none"> <li>• Chemoprophylaxis against opportunistic infections (at all levels of health care)</li> <li>• Treatment of opportunistic infections if they occur (at all levels of health care)</li> <li>• Antiretroviral therapy (only up to the district level)</li> </ul>	NA	Green leafy vegetables, good food hygiene, potable water	Psychosocial support

**Table 2.2** Standard treatment protocol for the management of advanced HIV disease

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
Advanced HIV disease (acquired immunodeficiency syndrome)	<ul style="list-style-type: none"> <li>• About 15 minutes per consultation of a physician</li> <li>• About 30 minutes per consultation of a counsellor</li> <li>• About 15 minutes per consultation of a nurse and laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>• Specific tests               <ol style="list-style-type: none"> <li>1. CD4/CD8 counts every 6 months (at tertiary and district levels only)</li> <li>2. Plasma viral load (not recommended currently due to high cost)</li> </ol> </li> <li>• Supportive tests               <ol style="list-style-type: none"> <li>1. Routine haemogram (at all levels) at every visit</li> <li>2. Liver function tests                   <ul style="list-style-type: none"> <li>—ALT</li> <li>—AST</li> <li>—Alkaline phosphate (up to the district level; initially 14 days after initiating ART and later symptom-directed)</li> </ul> </li> <li>3. Chest X-ray to rule out TB before initiating ART at all levels of care and later symptom-directed</li> <li>4. Test the sputum for the presence of AFB to rule out TB before initiating ART at all levels of care and later symptom-directed</li> <li>5. USG of the abdomen wherever required</li> <li>6. ELISA or PCR for HCV at a tertiary care centre among injecting drug users or transfusion-transmitted HIV</li> <li>7. ESR at all levels—symptom-driven</li> </ol> </li> </ul>	Chemoprophylaxis <ul style="list-style-type: none"> <li>• All patients whose CD4 count is &lt;200 cells/cmm or those having a history of any AIDS-defining illness in the past receive co-trimoxazole double strength tablet once a day</li> <li>OR</li> <li>(if sensitive to sulpha drugs) dapsone 100 mg od until the CD4 count increases beyond 350 cells/cmm after initiating ART (given at all levels of health care)</li> <li>• ART (given up to the district level)</li> <li>• Those who do not have concurrent TB and whose haemoglobin level is above 8 g% are given zidovudine 300 mg bd + lamivudine 150 mg bd + nevirapine 200 mg od for 14 days. If the patient does not develop any severe skin rash or hepatotoxicity, provide a fixed-drug combination of: zidovudine 300 mg bd + lamivudine 150 mg bd + nevirapine 200 mg bd until the patient develops signs of immunological/clinical failure (generally a patient takes about 2.5 years to develop failure)</li> <li>• In case the haemoglobin level is &lt;8 g%, substitute zidovudine with stavudine 30/40 mg bd depending on the body weight of the patient (30 mg if the weight is &lt;60 kg)</li> <li>• If the patient has concurrent TB, to avoid drug–drug interaction between nevirapine and rifampicin, give efavirenz 800 mg od in place</li> </ul>	NA

(Cont.)

**Table 2.2** (cont.) Standard treatment protocol for the management of advanced HIV disease

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
			of nevirapine in the regimen described above <i>Note:</i> The efavirenz-based regimen is more potent and the response is durable. However, it costs three times more than the nevirapine-based regimen	
Treatment failure (salvage regimen)	<ul style="list-style-type: none"> <li>About 15 minutes per consultation of a physician</li> <li>About 15 minutes per consultation of a counsellor</li> <li>About 15 minutes per consultation of a nurse and laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>Specific tests               <ol style="list-style-type: none"> <li>CD4/CD8 counts every 6 months (at tertiary and district levels only)</li> <li>Plasma viral load (not recommended currently due to high cost)</li> </ol> </li> <li>Supportive tests               <ol style="list-style-type: none"> <li>Routine haemogram (at all levels) at every visit</li> <li>Liver function tests                   <ul style="list-style-type: none"> <li>—ALT</li> <li>—AST</li> <li>—Alkaline phosphate (up to the district level; symptom-directed)</li> </ul> </li> <li>Chest X-ray (symptom-driven, at all levels of care)</li> <li>Test the sputum for the presence of AFB to rule out TB (symptom-driven, at all levels of care)</li> <li>USG of the abdomen wherever required</li> <li>ESR at all levels (symptom-driven)</li> <li>Other tests are driven by the symptoms with which the patient presents</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Antiretroviral drugs selected for salvage therapy are initiation regimen-specific</li> <li>Though there are 20 different antiretroviral drugs, the most widely accepted regimen for salvage is as follows: abacavir 300 mg bd + didanosine EC 250/400 mg od (weight &lt;60 kg—250 mg) + indinavir 800 mg bd + ritonavir 100 mg bd (IDV/rtv)</li> <li>In place of IDV/rtv, nelfinavir 1250 mg bd or lopinavir 400 mg bd + ritonavir 100 mg bd (LPV/rtv) can also be used</li> <li>About 30% of patients may fail after 3 years. After failure, antiretroviral medicines may be chosen for treatment based on the prior treatment pattern</li> </ul>	NA Admission would not be required to initiate therapy and thereafter. However, depending on the opportunistic infection that the patient may develop as a sign of treatment failure, one may require hospitalization

ALT: alanine transaminase; AST: aspartate transaminase; ART: antiretroviral therapy; AFB: acid-fast bacilli; USG: ultrasonography; HCV: hepatitis C virus; ESR: erythrocyte sedimentation rate; TB: tuberculosis; ELISA: enzyme-linked immunosorbent assay; PCR: polymerase chain reaction

**Table 2.3** Some complications of antiretroviral therapy, and personnel, tests and drugs required for their treatment

Complication	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay	Advice
Lipodystrophy	About 15 minutes in a directed examination	<ul style="list-style-type: none"> <li>Waist–hip ratio (at all levels of care)</li> <li>USG of the abdomen (up to the district level)</li> <li>Dual-energy X-ray absorptiometry (DEXA) (available at select tertiary-level centres)</li> </ul>	<ul style="list-style-type: none"> <li>Change the NRTI or PI</li> <li>Continue metformin 500 mg bd</li> <li>Restorative surgery</li> </ul>	Not required	Low fat diet
Lactic acidosis	About 10–15 minutes in a directed examination	<ul style="list-style-type: none"> <li>Anion gap (available at select tertiary care centres)</li> <li>Lactic acid level (available at select tertiary care centres)</li> </ul>	<ul style="list-style-type: none"> <li>Stop NRTIs and NNRTIs if severe renal failure</li> <li>Hydration</li> <li>Use riboflavin 50 mg/day till improvement</li> </ul>	Potentially a fatal disorder. Requires hospitalization for weeks depending on the severity of lactic acidosis	

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**Table 2.3** (cont.) Some complications of antiretroviral therapy

Complication	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay	Advice
Hyperlipidaemia	About 10–15 minutes in a directed examination	Lipid profile (at tertiary care centres)	<ul style="list-style-type: none"> <li>Change the PIs to NRTIs/ NNRTIs</li> <li>Use atorvastatin 10 mg/day OR pravastatin 20 mg/day OR fenofibrate 54–160 mg qid OR gemfibrozil 600 mg bd</li> </ul>		
Insulin resistance		<ul style="list-style-type: none"> <li>No standardized methods</li> <li>Frequent fasting blood glucose levels while receiving PIs</li> </ul>	Use metformin depending on the blood sugar level	Not reported	Dietary advise

USG: ultrasonography; NRTI: nucleoside reverse transcriptase inhibitor; NNRTI: non-nucleoside reverse transcriptase inhibitor

## Bibliography

- Bartlett JG, Gallant JE. *Medical management of HIV infection*. Baltimore, USA: Johns Hopkins University; 2003.
- DHSS guidelines for the use of antiretroviral agents in HIV-1 infected adults and adolescents. USA: Department of Health & Human Services; 10 November 2003.

## 3. Opportunistic infections

**Table 3.1** Interventions (by significance) for the management of opportunistic infections

Outcome	Medical interventions		Non-medical interventions/prevention		
	Primary chemoprophylaxis	Secondary chemoprophylaxis	Exercise	Nutrition	Other
Tuberculosis	Not advocated excepting to the close contacts of TB cases	Not advocated	NA	NA	NA
Candidiasis	Not required	Use fluconazole 150–200 mg od; once a week in patients with oesophageal candidiasis	NA	Non-spicy diet	NA
Herpes zoster	Not available	Not available	NA	NA	NA
Cryptosporidial diarrhoea	Not available	Not available	NA	NA	Potable water
Cryptococcal meningitis	Not available	Maintenance regimen with fluconazole 200–400 mg/day	NA	NA	Avoid contact with pigeon excreta (debatable)
<i>Pneumocystis carinii</i> pneumonia (PCP)	Use trimethoprim–sulphamethoxazole DS 1 od OR dapson 100 mg od	For life, unless CD4 counts increase beyond 200 cells/cmm for at least 3 months while receiving antiretroviral therapy (ART)	NA	NA	Do not share a hospital room with a person having PCP
Toxoplasmic encephalitis	Use trimethoprim–sulphamethoxazole DS 1 od OR dapson 50 mg od + pyrimethamine 50 mg/week + leucovorin 25 mg/week	For life, unless CD4 counts increase beyond 200 cells/cmm for at least 6 months while receiving ART	Do not eat raw or undercooked meat, particularly lamb, beef and pork	NA	Avoid handling litter and cat's excreta

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**Table 3.1** (cont.) Interventions (by significance) for the management of opportunistic infections

Outcome	Medical interventions		Non-medical interventions/prevention		
	Primary chemoprophylaxis	Secondary chemoprophylaxis	Exercise	Nutrition	Other
<i>Isospora belli</i> diarrhoea	Use trimethoprim–sulphamethoxazole DS 1 od	For life, unless CD4 counts increase beyond 200 cells/cmm for at least 3 months while receiving ART	NA	NA	Potable water
Cytomegalovirus disease (most often retinitis or oesophagitis)	Use ganciclovir 1 g tds	For life, unless CD4 counts increase beyond 150 cells/cmm for at least 3 months while receiving ART	NA	NA	NA
Herpes simplex infection	Not recommended	<ul style="list-style-type: none"> <li>Use acyclovir 400 mg bd OR famciclovir 250 mg bd up to 2 years (safety data available only up to 2 years)</li> <li>Treatment with antiretroviral drugs is effective in reducing recurrences</li> </ul>	NA	NA	NA
Progressive multifocal leucoencephalopathy (PML)	NA	NA	NA	NA	NA
Hepatitis B	HBV vaccine to those who are not infected with hepatitis B virus	NA	NA	NA	Practise safe sex
Hepatitis C	NA	NA	NA	NA	Injection safety, especially needle exchange programme among IDUs
Cancer of the cervix	NA	NA	NA	NA	Cauterize genital warts in females and conduct yearly Pap smear examination of HIV-positive women
Pneumococcal pneumonia	Pneumococcal conjugate vaccine	NA	NA	NA	NA

NA: not applicable; IDU: injection drug user; Pap: Papanicolaou

**Table 3.2** Personnel, tests, drugs and duration of inpatient stay for opportunistic infections

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
Tuberculosis	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 15 minutes per consultation of a counsellor (currently not available at TB clinics)</li> </ul>	<ul style="list-style-type: none"> <li>Directed by symptoms/clinical suspicion</li> <li>Chest X-ray (up to the district level)</li> <li>Sputum for AFB (at all levels)</li> <li>USG of the abdomen (up to the district level)</li> <li>FNAC of lymph nodes (up to the district level)</li> <li>CSF examination (up to the district level)</li> <li>Ascitic fluid examination (up to the district level)</li> </ul>	<ul style="list-style-type: none"> <li>Chemoprophylaxis is not advisable excepting to close contacts of a TB case               <ul style="list-style-type: none"> <li>—Category 1: 2(EHRZ)<sub>3</sub> + 4(HR)<sub>3</sub></li> <li>—Category 2: 2(SEHRZ)<sub>3</sub> + 1(EHRZ)<sub>3</sub> + 5(HRE)<sub>3</sub></li> <li>—Category 3: 2(HRZ)<sub>3</sub> + 4(HR)<sub>3</sub></li> </ul> </li> <li>The maintenance phase may be prolonged in TB meningitis and extrapulmonary TB (depending on the response to treatment)</li> <li>Treatment to be provided at all levels of health care</li> </ul>	There are no publications reporting the number of days of hospitalization among HIV–TB patients in India

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**Table 3.2 (cont.)** Personnel, tests, drugs and duration of inpatient stay for opportunistic infections

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
Oropharyngeal candidiasis	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>On an average, a patient may develop candidiasis at least 5 times if she/he does not receive antiretroviral therapy</li> </ul>	<ul style="list-style-type: none"> <li>KOH/fresh mount preparation (up to the district level)</li> <li>Culture—Sabouraud agar (if drug-resistant species is expected) (only at the tertiary level)</li> <li>Rarely, endoscopy (only at the tertiary level)</li> </ul>	<ul style="list-style-type: none"> <li>Localized mucocutaneous candidiasis—fluconazole 150 mg od × 10–14 days</li> <li>Oesophageal candidiasis—fluconazole 150–200 mg × 10–14 days OR—itraconazole 100 mg od × 10–14 days OR—ketoconazole 200 mg bd × 10–14 days OR—amphotericin B (rarely)</li> </ul>	Hospitalization may not be required for candidiasis <i>per se</i>
Herpes zoster	<ul style="list-style-type: none"> <li>About 10 minutes for each consultation of a physician</li> <li>About 10 minutes for each consultation of a counsellor</li> </ul>	<ul style="list-style-type: none"> <li>Clinical diagnosis mostly</li> <li>Tzanck test (at the tertiary level)</li> </ul>	<ul style="list-style-type: none"> <li>Use famciclovir 500 mg tds × 7–10 days OR acyclovir 200 mg 5 times a day × 7–10 days OR valacyclovir 1 g tds × 7–10 days</li> <li>Use prednisolone or amitriptyline in case of severe neuralgia</li> </ul>	Mostly not required
Cryptosporidial diarrhoea	<ul style="list-style-type: none"> <li>About 10 minutes for each consultation of a physician</li> <li>About 10 minutes for each consultation of a counsellor</li> <li>About 15 minutes of a laboratory technician</li> </ul>	Stool: Modified Ziehl–Nielsen stain (can be done up to the district level)	<ul style="list-style-type: none"> <li>In advanced HIV disease, ART is the best treatment. However, in its absence, the patient can be given:—azithromycin 1200 mg × 2 days followed by 1200 mg/day for 27 days OR—nitazoxanide 500 mg bd for 2–3 weeks</li> <li>Oral rehydration (at all levels of care)</li> </ul>	<ul style="list-style-type: none"> <li>No Indian publication on the duration of hospitalization is available</li> <li>On an average, a patient spends about 2–3 days in hospital during each episode</li> <li>Episodes can be frequent in patients who are not receiving ART</li> </ul>
Cryptococcal meningitis	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 15 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>India ink preparation (up to the district level)</li> <li>Routine CSF examination (up to the district level)</li> <li>CSF: Cryptococcal antigen (up to the tertiary level)</li> <li>Serum cryptococcal antigen (up to the tertiary level)</li> </ul>	<ul style="list-style-type: none"> <li>Use amphotericin B 0.7 mg/kg/day IV with or without 5-flucytosine 100 mg/kg/day for 14 days followed by fluconazole 400 mg/day for 8 weeks</li> <li>This is followed by a maintenance regimen with fluconazole up to 200–400 mg/day</li> </ul>	Indian studies not available. However, on an average, 2 weeks of hospitalization are required
<i>Pneumocystis carinii</i> pneumonia	<ul style="list-style-type: none"> <li>About 10 minutes per consultation of a physician</li> <li>About 15 minutes of a laboratory technician</li> </ul>	<ul style="list-style-type: none"> <li>Chest X-ray (up to the district level)</li> <li>Induced sputum for silver methanamine stain or Giemsa (tertiary centres)</li> <li>Therapeutic trial with trimethoprim (TMP)/sulphamethoxazole (SMX) at any level of health care</li> </ul>	<ul style="list-style-type: none"> <li>Use trimethoprim–sulphamethoxazole (TMP 15 mg/kg/day, SMX 75 mg/kg/day) tds × 21 days OR primaquine 30 mg qid × 21 days + clindamycin 300–450 mg qid × 21 days</li> </ul>	<ul style="list-style-type: none"> <li>Lack of Indian data</li> <li>On an average, 7 days of hospitalization are needed</li> </ul>
Toxoplasmic encephalitis	About 10 minutes per consultation of a physician	<ul style="list-style-type: none"> <li>MRI (tertiary centres)</li> <li>Therapeutic trial at all levels of health care</li> </ul>	<ul style="list-style-type: none"> <li>Use pyrimethamine 200 mg loading dose, then 75 mg/day + leucovorin 10–20 mg/day + sulphadiazine 1–1.5 g qid × 3–6 weeks</li> </ul>	<ul style="list-style-type: none"> <li>Lack of Indian data on hospitalization</li> </ul>

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**Table 3.2 (cont.)** Personnel, tests, drugs and duration of inpatient stay for opportunistic infections

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
			<ul style="list-style-type: none"> <li>Maintenance regimen: Continue the above-mentioned drugs, if not receiving ART</li> </ul>	<ul style="list-style-type: none"> <li>On an average, 7 days of hospitalization</li> </ul>
Isospora belli diarrhoea	About 10 minutes per consultation of a physician	Stool microscopy—AFB stain (up to the district level)	Use trimethoprim—sulphamethoxazole DS tablet tds × 2–4 weeks	Generally hospitalization would not be required. However, the patient may be admitted for rehydration for a day or two.
Cytomegalovirus disease	15 minutes per consultation of a physician			<ul style="list-style-type: none"> <li>Indian data not available</li> <li>On an average hospitalisation for 3–6 weeks is required for each of these conditions</li> </ul>
CMV retinitis		Fundoscopy (up to the district level)	<ul style="list-style-type: none"> <li>Use foscarnet 90 mg/kg bd IV × 14–21 days</li> <li>OR</li> <li>ganciclovir 5 mg/kg IV bd × 14–21 days</li> <li>Maintenance with valganciclovir 900 mg/day</li> <li>However, the use of ART is known to be efficacious and cost-effective compared to others</li> </ul>	Not required
CMV oesophagitis or colitis		<ul style="list-style-type: none"> <li>Culture (not feasible)</li> <li>Diagnosis by exclusion</li> </ul>	<ul style="list-style-type: none"> <li>Use ganciclovir 5 mg/kg IV bd × 2–3 weeks</li> <li>OR</li> <li>foscarnet 60 mg/kg tds IV × 2–3 weeks</li> <li>Maintenance dose, if the patient is not put on ART</li> </ul>	Up to 3 weeks
CMV encephalitis/radiculomyelopathy		<ul style="list-style-type: none"> <li>CSF examination (up to district level)</li> <li>PCR (not available in the public sector)</li> </ul>	<ul style="list-style-type: none"> <li>Use ganciclovir 5 mg/kg IV bd + foscarnet 90 mg/kg bd IV for 3–6 weeks with maintenance</li> <li>However, ART effectively prevents further disease progression</li> </ul>	Up to 6 weeks
Herpes simplex infection	About 10 minutes per consultation of a physician	Tzanck test (tertiary care)	<ul style="list-style-type: none"> <li>Use acyclovir 400 mg tds × 7–10 days</li> <li>Use famciclovir 250–500 mg bd × 5–10 days</li> </ul>	Not required unless the patient has encephalitis
Progressive multifocal leuco-encephalopathy	About 15 minutes per consultation of a physician	<ul style="list-style-type: none"> <li>MRI (tertiary level)</li> <li>CSF examination (up to district level)</li> <li>PCR for JC virus (not available)</li> </ul>	<ul style="list-style-type: none"> <li>Preferred treatment is with antiretroviral therapy</li> <li>Interferon-alpha is costly and less effective</li> </ul>	<ul style="list-style-type: none"> <li>Indian data not available</li> <li>On an average, 1 week of hospitalization</li> </ul>
Hepatitis B	<ul style="list-style-type: none"> <li>About 5 minutes at the first consultation of a physician</li> <li>About 10 minutes at the first consultation with a counsellor</li> <li>Average time spent for testing and sera preparation is about 15 minutes of a laboratory</li> </ul>	<ul style="list-style-type: none"> <li>HBsAg test (available up to the district level)</li> <li>Anti-HBeAg (may be available at the tertiary level)</li> <li>Anti-HBc (may be available at the tertiary level)</li> <li>HBV DNA PCR (may be</li> </ul>	<ul style="list-style-type: none"> <li>Use lamivudine 100 mg od for one year</li> <li>Interferon alpha-2b—5 million units SC 3 times per week × 4 months is costly</li> <li>Administration of ART impacts HBV infection and is cost-effective</li> </ul>	No data

(Cont.)

**Table 3.2 (cont.)** Personnel, tests, drugs and duration of inpatient stay for opportunistic infections

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
Hepatitis C	<p>technician (tested in batches. However, varies by sophistication of the test)</p> <ul style="list-style-type: none"> <li>About 5 minutes at the first consultation of a physician</li> <li>About 10 minutes of first consultation with a counsellor</li> <li>Average time spent for testing and sera preparation is about 15 minutes of laboratory technician (tested in batches. Varies by sophistication of the test)</li> </ul>	<p>available at the tertiary level</p> <ul style="list-style-type: none"> <li>Liver function tests</li> <li>HCV EIA (tertiary care)</li> <li>HCV RNA testing (select tertiary care centres)</li> <li>Liver function tests</li> </ul>	<p>Interferon-alpha 3 million units 3 times a week + ribavirin 800–1200 mg/day for 48 weeks</p> <p>OR</p> <p>Pegylated interferon 1.5 µg/kg SC per week for 48 weeks</p>	Data not available
Non-Hodgkin lymphoma	<ul style="list-style-type: none"> <li>About 20 minutes in directed examination of a physician</li> <li>Laboratory technician and pathologist</li> </ul>	<ul style="list-style-type: none"> <li>Biopsy (up to the district level)</li> <li>CT scan (at the tertiary level)</li> <li>X-ray (up to the district level)</li> </ul>	<p>Standard cyclophosphamide, doxorubicin, adriamycin, vincristine, prednisolone (CHOP)</p> <p>OR</p> <p>methotrexate, bleomycin, doxorubicin, cyclophosphamide, vincristine, dexamethasone, G-CSF (M-BACOD)</p> <p>OR</p> <p>etoposide, prednisolone, vincristine, cyclophosphamide, doxorubicin (EPOCH)</p>	Variable on clinical presentation and stage
Cancer of the cervix		<ul style="list-style-type: none"> <li>Pre-invasive surgical options including hysterectomy</li> <li>If invasive, depending on the stage, radiation and chemotherapy are advocated</li> </ul>		
<b>Other common conditions in HIV-infected individuals</b>				
Wasting disease	<ul style="list-style-type: none"> <li>10 minutes in directed examination of a physician</li> <li>20 minutes per consultation of a nutritionist</li> </ul>	Generally clinical	<p>Use cyproheptidine 2–4 mg bd up to 2 weeks</p> <p>OR</p> <p>megestrol acetate 800 mg/day × 12 weeks</p> <p>OR</p> <p>dronabinol 2.5–10 mg bd</p>	Not required
Seborrhoeic dermatitis	About 5 minutes in directed consultation of a physician	Clinical	Use hydrocortisone (2.5%) locally + ketoconazole (2%) cream locally + tar-based shampoo	Not required
Thrombocytopenia	<ul style="list-style-type: none"> <li>10 minutes in directed consultation of a physician</li> <li>10 minutes of a laboratory technician</li> </ul>	Platelet count (up to the district level)	<p>Use prednisolone 40–60 mg per day in divided doses to be tapered off within 2 weeks</p> <p>OR</p> <p>IVIg 400 mg/kg/day on days 1, 2, 14 followed by every 2–4 weeks</p> <p>OR</p> <p>Splenectomy</p> <p>OR</p> <p>ART, blood or platelet transfusion</p>	Not reported but may need a day or two for transfusion
<i>Salmonella</i> infection	About 15 minutes in directed examination of a physician	Culture (up to the district level)	<p>Use ciprofloxacin 500–750 mg bd × 14 days</p> <p>OR</p> <p>ceftriaxime 2 g/day IV</p> <p>OR</p> <p>cefotaxime 4–8 g/day IV × 14 days</p>	Not available, but on an average 4–5 days
Bacterial pneumonias	About 15 minutes in directed examination of a physician	<ul style="list-style-type: none"> <li>X-ray (up to the district level)</li> </ul>	<p>Use ceftriaxime 2 g/day IV</p> <p>OR</p>	Up to 2 weeks

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**Table 3.2** (cont.) Personnel, tests, drugs and duration of inpatient stay for opportunistic infections

Condition	Personnel (units of time and type)	Tests (by type)	Drugs (dosage, type and time)	Inpatient stay
		<ul style="list-style-type: none"> <li>Blood culture (up to the district level)</li> <li>Sputum—Gram stain (up to the district level)</li> </ul>	cefotaxime 4–8 g/day IV × 2 weeks	
Aphthous ulcers	About 5 minutes in a given consultation of a physician	Clinical	Use prednisolone 5–10 mg bd × 5–7 days OR thalidomide 100–200 mg/day for about 4 weeks OR ART	Not required
Taenia cruris	About 5 minutes in directed consultation of a physician	Generally clinical diagnosis	Use fluconazole 150–200 mg once a week × 4 weeks + local miconazole application. Duration depends on the extent and sites involved	None

AFB: acid-fast bacilli; USG: ultrasonography; FNAC: fine-needle aspiration cytology; CSF: cerebrospinal fluid; MRI: magnetic resonance imaging; PCR: polymerase chain reaction; SC: subcutaneous; IVIG: intravenous immunoglobulin; G-CSF: granulocyte colony stimulating factor; CT: computerized tomography; EIA: enzyme immunoassay; HBV: hepatitis B virus; HCV: hepatitis C virus; ART: antiretroviral therapy

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