MEDICAL COMPLICATIONS OF ADDICTION

CSAM Addiction Board Review Course 2014

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Disclosure

No relevant financial relationship with commercial interests

Case

- A 46-year old female user of black tar heroin presents with a 2-week history of flu--like illness and 4 days of slurred speech, difficulty swallowing, and shortness of breath.
- On the day of admission, she starts seeing double and collapses on the sidewalk.
- Exam is significant for atrophic punched-out scars on legs, left buttock abscess, diplopia, facial and proximal weakness, and bulbar dysfunction. Reflexes are depressed. Sensory and cognitive functions are preserved.
- She is HIV negative, anti-HCV positive.

The medical consequences of addiction may be due to different mechanisms. Using the framework below, which most likely explains this patient's presentation?

A. Drug-specific effects
B. Routes of drug administration
C. Drug contamination
D. Behaviors associated with substance use
E. Co-occurring mental illness

Objectives

1. List the urgent needle-related illnesses and other serious medical complications that occur in people who use drugs (PWUD)
2. Describe the prevention and treatment of viral hepatitis and HIV disease in PWUD
3. Describe how to screen for the public health-related reportable infections seen more frequently in PWUD

NEEDLE-INDUCED ILLNESS OR INJURIES

URGENT: infections, intravascular reactions

Less Urgent: cutaneous reactions, scarring

Needle-Related Injuries

1. **Infections**: bacterial, fungal, viral
2. **Intravascular reactions**: venous thrombosis, arterial insufficiency
3. **Cutaneous reactions**: fresh tracks, foreign body granuloma (e.g. talc, cotton fiber)
4. **Scars**: linear tracks, punctate scars from skin popping

Source: Gordon, et al. N Engl J Med 2005; 353:1945-1954

1. Needle-related infections

a) Skin and soft tissue infections (SSTI)

Local: cellulitis, abscess, lymphangitis, septic phlebitis, thrombophlebitis

b) Systemic infections

Infection of vascular endothelium, most commonly heart valves (endocarditis); epidural abscess; osteomyelitis

c) Transmission of infectious agents

HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV)

Source: Wolff K, Johnson RA, Suurmond D. 2009. http://www.accessmedicine.com/content.aspx?aID=5191953

a) Skin and soft tissue infections

Local SSTI: cellulitis, abscess, lymphangitis, septic thrombophlebitis

- Most common organisms are commensals:
  - **β-hemolytic, Group A streptococcus (GAS)**
  - **Staphylococcus aureus (MSSA, MRSA)**
- Less common
  - Enteric organisms, anaerobes, *Clostrida sp,* oral flora, fungi (*Candida albicans*), polymicrobial infections

Source: Wolff K, Johnson RA, Suurmond D. 2009.

Soft-tissue abscess and tracks

Provided courtesy of Robert Gwizdala in N Engl J Med 2005; 353:1945-1954

Risk factors for abscesses

- Skin popping or muscling (SQ or IM)
- Booting = repeated flushing and pulling back on plunger while injecting
- Speedballs = heroin + cocaine mixtures
- More frequent injections
- Untreated HIV disease
- Non-sterile needles
- Poor skin hygiene/preparation for injection

Source: Gordon, et al. N Engl J Med 2005; 353:1945-1954

Clinical presentation

Abscess

- Local indurated, warm, red, tender nodule; eventually fluctuant
- Main treatment: incision and drainage (I&D)

Cellulitis

- Spreading superficial red, warm, tense skin
- Untreated: may lead to systemic sepsis or osteomyelitis
- Treatment: antibiotics

Diagnosis?

Empiric outpatient treatment of cellulitis

Common Pathogens	Drug(s) of First Choice	Comments
β-hemolytic streptococci (common) S. aureus (less common)	Cephalexin 500 mg po qid -or- Amoxicillin 500 mg po tid -or- Clindamycin 300 mg po tid	• If no response to beta-lactam, add TMP/SMX or doxycycline to cover MRSA • Clindamycin covers both GAS and community-acquired MRSA. Some isolates may be resistant; always refer to local hospital antibiogram • Cellulitis with abscess: treat for complicated abscess (next slide) • Duration: 7-10 days

Source: http://idmp.ucsf.edu/

Empiric outpatient treatment of abscess

Common Pathogens	Drug(s) of First Choice	Comments
S. aureus	Uncomplicated I&D, no antibiotics Complicated I&D, plus: TMP/SMX 1-2 DS tabs po bid -or- Doxycycline 100 mg po bid	Give antibiotics for a complicated abscess: • Abscess is large (>5 cm) or incompletely drained • Significant surrounding cellulitis • Systemic signs and symptoms of infection • Immunocompromised patient • Duration: 7-10 days

Source: http://idmp.ucsf.edu/

Diagnosis?

Source: http://bioweb.uwlax.edu/bio203/s2007/falk_pete/

Necrotizing fasciitis

Flesh-eating bacteria

Deep infection, progressive destruction of muscle fascia & overlying subcutaneous fat

Type I: polymicrobial

- Anaerobes (e.g. clostridia)
- Facultative anaerobic streptococci (non-GAS)
- Enterobacteriaceae (e.g. E coli)

Type II: group A Strep (GAS)

- GAS and other β-hemolytic strep in combination with often CA-MRSA
- *Photo: Streptococcus pyogenes*

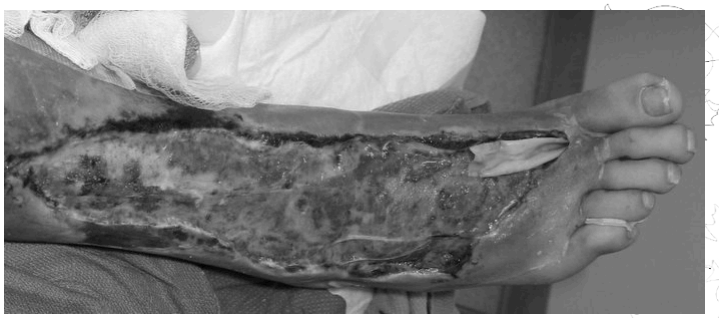
Source: Stevens, et al. (2012) www.uptodate.com

Clinical presentation & course

- Erythema without sharp margins; swollen, warm, shiny; exquisitely tender, subcutaneous gas
- **Progresses rapidly: red-purple → blue-gray patches, bullae, gangrene (3-5 days)**
- High fever, systemic toxicity in advanced infection
- Marked edema, swelling → compartment syndrome, myonecrosis
- Early surgical intervention: debridement, fasciotomy
- IV antibiotics: pip-tazo (anaerobes), clinda + PCN for GAS
- High mortality, case-fatality rate 24%

Source: Stevens, et al. (2012) www.uptodate.com

Open debridement



Source: http://hardinmd.lib.uiowa.edu/dermatlas/necrotizing.html

b) Needle-related systemic bacterial infections

- **Vascular endothelium**
  - Infective endocarditis
  - Infected (mycotic) arterial aneurysm
  - Septic thrombophlebitis
- **Epidural abscess or disciitis**
- **Osteomyelitis**
- **Sepsis**

Seek an endovascular source in any PWID presenting with fever

Infective endocarditis

Bacteremia with endocardial involvement

Mycotic aneurysm

Localized dilation of an artery due to infectious destruction of the vessel wall

Septic thrombophlebitis

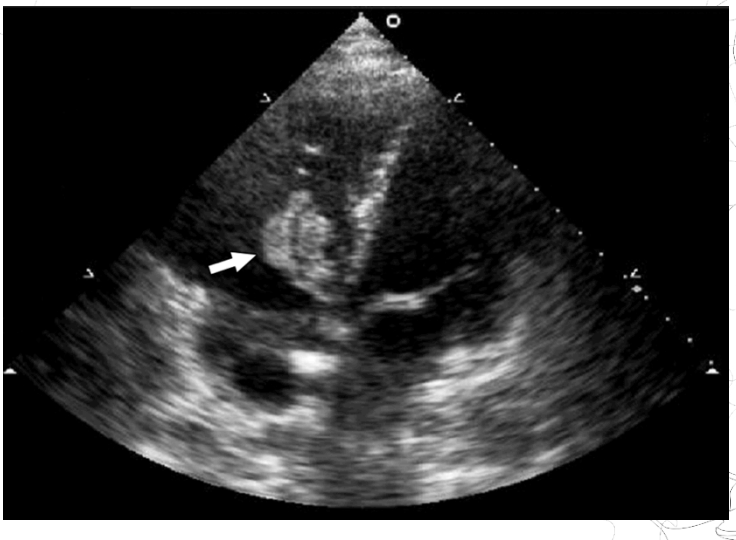
Venous thrombosis associated with inflammation in the setting of bacteremia

Infective endocarditis (IE)

- High prevalence in febrile PWID, 10-15%
- Right-sided (70% tricuspid), 6% mortality
- Predisposing risk factors:
  - Colonization with CA-MRSA, prior IE, cocaine injection, ≥daily injection, untreated HIV
- Most common pathogens:
  - S. aureus → streptococci and enterococci → fungi and gram-negative bacilli, rarely polymicrobial

Sources: 2002;16:273-95 2002;185:1761-6
J Clin Epidemiol 1996;49:1149-54; *Ann Int Med* 1992;117:560-6; *Ann Int Med* 1987;106:833-6

Tricuspid valve vegetation in IE



Source: Fellah L et al. *AJR* 2007;189:W228-W230

AJR

Clinical presentation & course

- Fever, dyspnea, pleuritic chest pain, cough
- Murmur may be absent
- Complications:
  - Abscess, fistula, septic emboli to distal sites (lung), pericarditis, annular abscess, heart failure, valve rupture, death
  - Left sided complications: brain and splenic septic embolization (more common with cocaine)

Suspicion for IE requires hospital admission

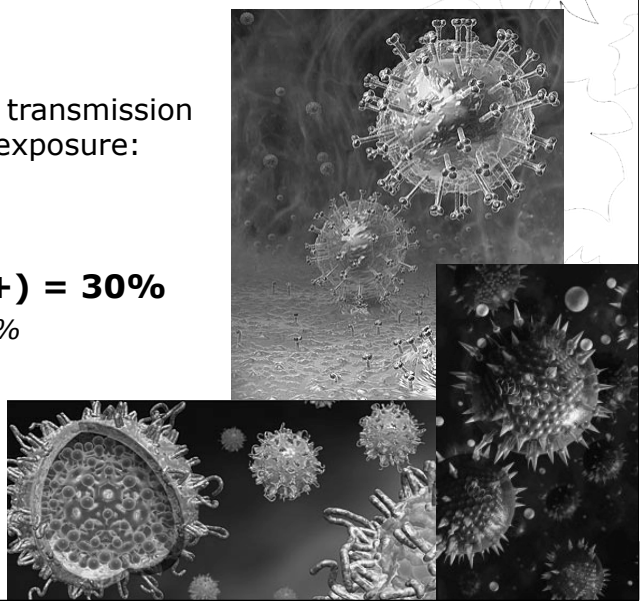
- 3 sets of blood cultures to detect bacteremia
- Early empiric IV vancomycin to cover *S aureus* (MSSA, MRSA), streptococci, enterococci
- TTE is 88-94% sensitive in PWID
- 4-6 weeks IV antibiotics in confirmed cases based on in vitro susceptibility
- Early consultation with cardiac surgeon for possible valve replacement

c) Needle-related viral infections

The Rule of 3's

Likelihood of virus transmission from needle stick exposure:

- **HIV = 0.3%**
- **HCV = 3%**
- **HBV (HBsAg+) = 30%**
  - *HBeAg+ = 60%*
  - *Got vaccine?*



Estimated Per-Act Probability of Acquiring HIV from an Infected Source, by Exposure Act

Type of Exposure	Risk per 10,000 exposures
Parenteral	
Blood Transfusion	9,250
Needle-sharing for injecting drugs	**63**
Percutaneous (needle stick)	23
Sexual	
Receptive anal intercourse	138
Insertive anal intercourse	11
Receptive penile-vaginal intercourse	8
Insertive penile-vaginal intercourse	4
Receptive or insertive oral intercourse	Low
Other	
Biting, spitting, throwing body fluids	negligible
Sharing sex toys	negligible

Source: CDC HIV Transmission Risk; http://www.cdc.gov/hiv/law/transmission.htm

Non-occupational Post-Exposure Prophylaxis

- **HIV**: <72 hrs after exposure to blood or other potentially infectious body fluids from a known HIV+ or high risk source
- **HBV**: recombinant vaccine series; HBIG within 7 days of unknown or known HBsAg+ source
- **HCV**: no PEP, but now effective treatment

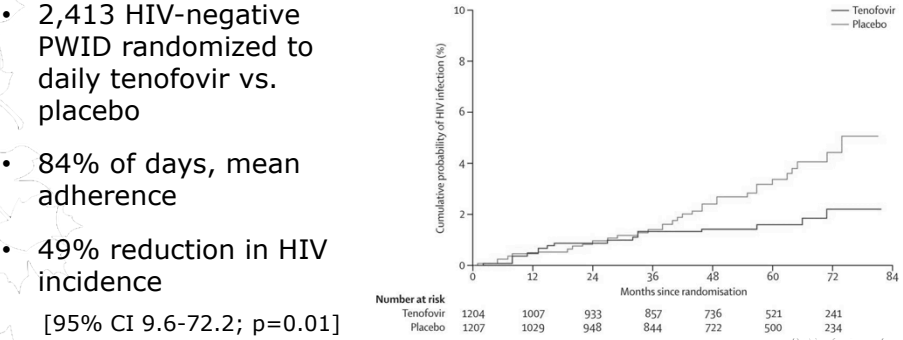
Get free expert consultation at www.nccc.ucsf.edu
(888) 448-4911

Sources: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5402a1.htm
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6210a1.htm

Pre-exposure prophylaxis (PREP) for PWID

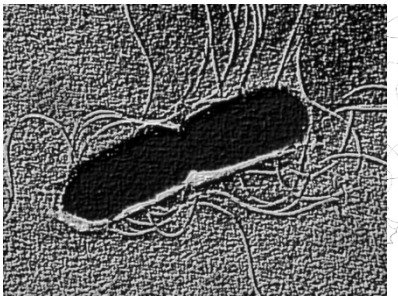
- 2,413 HIV-negative PWID randomized to daily tenofovir vs. placebo
- 84% of days, mean adherence
- 49% reduction in HIV incidence

  [95% CI 9.6-72.2; p=0.01]



- Monthly HIV testing, individual counseling, quarterly blood safety monitoring, condoms, and methadone treatment.

Source: Choopanya K et al. *The Lancet*. 2013;381(9883):2083-90

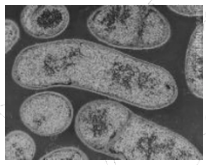


ILLNESS CAUSED BY DRUG CONTAMINANTS

Clostridial spores in black tar heroin

Levamisole-adulterated cocaine

Clostridia species



Spores widely distributed in soil

Unique association with black tar heroin on the West Coast, 75% cases

- **Wound botulism** *Clostridium botulinum*
- **Tetanus** *Clostridium tetani*
- **Necrotizing soft-tissue infections** variety of clostridia, including *C. sordellii*

Source: Kimura, et al. Clin Infect Dis. 2004 May;38(9):e87-91.

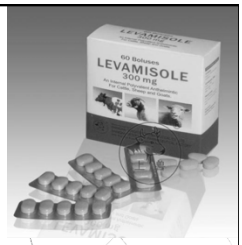
Wound botulism

Source: Sam AH, Beynon HL. N Engl J Med 2010;363:2444-2444.

Pathogenesis & presentation

- Botulinum toxin irreversibly disrupts acetylcholine release at peripheral cholinergic synapses
- Acute descending paralysis, autonomic and cranial nerve involvement → **dysarthria, dysphagia, dyspnea, diplopia**
- May require intubation
- Toxin produced in situ until infection eliminated from wound
- Treatment: antidote, aggressive debridement

Levamisole



- Cocaine adulterant in US since 2003
- Antihelminthic and immunomodulatory agent
- May enhance noradrenergic transmission and partially metabolize into an amphetamine-like compound
- 73% of cocaine seized by DEA, 2010
- 88% of cocaine-positive urine samples at SFGH

Sources: Larocque, et al. *Clinical Toxicology* 2012 50(4): 231-241.
Lynch et al. *J Anal Toxicol* 2011; 35:176–178.

Auto-immune mediated consequences of levamisole-adulterated cocaine

3 syndromes (all ↑ pANCA)

- Neutropenia
- Cutaneous retiform purpura (thrombotic)
- Pauci-immune crescentic glomerulonephritis

Treatment: discontinue offending agent

Symptoms recur after re-exposure in 27%

Sources: Larocque, et al. *Clinical Toxicology* 2012 **50**(4): 231-241.
Graf, J. (2012) *Personal communication.*

Toxic cutaneous effects of levamisole

Source: Muirhead TT, Eide MJ. N Engl J Med 2011;364:e52.

DRUG-SPECIFIC EFFECTS

overdose, endocrine, renal : opioids

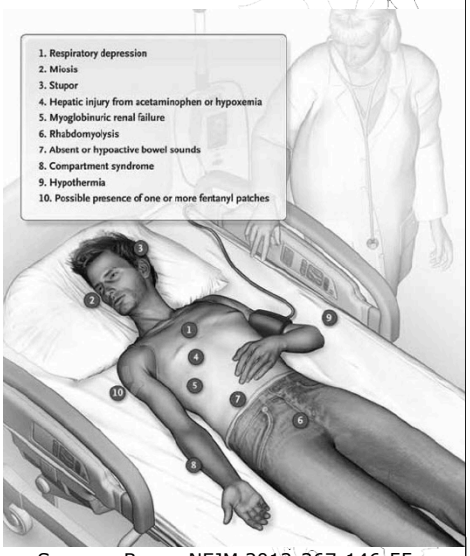
cardiac, neurologic, renal, psychoses : stimulants

gastrointestinal, neurological, cancer : alcohol

chronic lung disease, cancer : tobacco

Opioid analgesic overdose

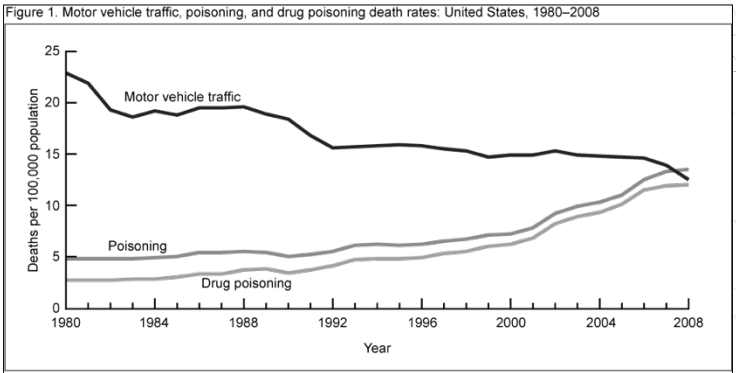
- Classic toxidrome: **apnea, stupor, miosis**
- Sine qua non: **respiratory depression**
- Toxic effects in multiple organ systems
- Prolonged intoxication by disruption of normal pharmacokinetics
- Duration of action of different opioid formulations varies – ***patches***



Source: Boyer, NEJM 2012;367:146-55

Poisoning is the leading cause of death from injuries in the U.S.

Figure 1. Motor vehicle traffic, poisoning, and drug poisoning death rates: United States, 1980–2008



NOTE: In 1999, the *International Classification of Diseases, Tenth Revision (ICD–10)* replaced the previous revision of the ICD (ICD–9). This resulted in approximately 5% fewer deaths being classified as motor-vehicle traffic–related deaths and 2% more deaths being classified as poisoning-related deaths. Therefore, death rates for 1998 and earlier are not directly comparable with those computed after 1998. Access data table for Figure 1 at http://www.cdc.gov/nchs/data/databriefs/db81_tables.pdf#1.
SOURCE: CDC/NCHS, National Vital Statistics System.

Source: Warner, et al. Drug poisoning deaths in the United States, 1980–2008. NCHS data brief, no 81. Hyattsville, MD: National Center for Health Statistics. 2011.

Community-based opioid overdose prevention

- 188 overdose prevention programs surveyed between 1996-2010:
  - 53,000+ lay persons trained for naloxone distribution
  - 10,000+ overdose reversals reported
- Naloxone distributed in harm reduction, syringe programs, and substance use treatment programs
- Primary care providers, mental health, and pain clinics are becoming additional sites for naloxone distribution.

Sources: Wheeler E, Davidson PJ, Jones TS, et al. (CDC): *MMWR Morb Mortal Wkly Rep*. 2012;61(6):101–105. http://www.bu.edu/aodhealth/issues/issue_may12/kunins_wheeler.html

Stimulant-specific Drug Effects

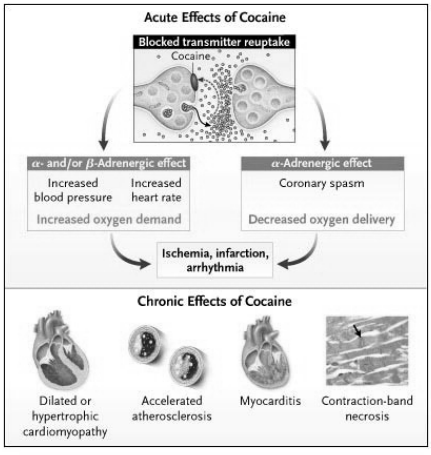
Neurological

- Formication, excoriations, seizures, tremor

Cardiovascular overstimulation

- Severe hypertension, arrhythmias, acute coronary syndromes, sudden death, stroke
- Cardiomyopathy, pulmonary hypertension

Selected acute and chronic effects of cocaine on the heart



Kloner RA, Rezkalla SH. N Engl J Med 2003;348:487-488

Other direct effects of some stimulants

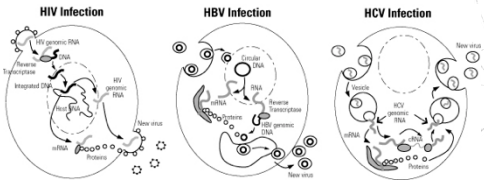
Renal failure

- Muscle compression, rhabdomyolysis, acute renal failure, severe hyponatremia

Psychiatric

- Euphoria, dysphoria, paranoid psychoses, depression

Sexual dysfunction



MANAGEMENT OF HIV, HCV, HBV in PWUD

HIV: screen, link, retain, treat, advocate

HCV: screen, evaluate, monitor/treat, advocate

HBV: screen, evaluate, immunize, monitor/treat, advocate

Hepatitis C virus infection
The silent epidemic

Most common blood-borne infection in U.S., 3.2 million people

- 70-90% PWID; ~30% <age 30

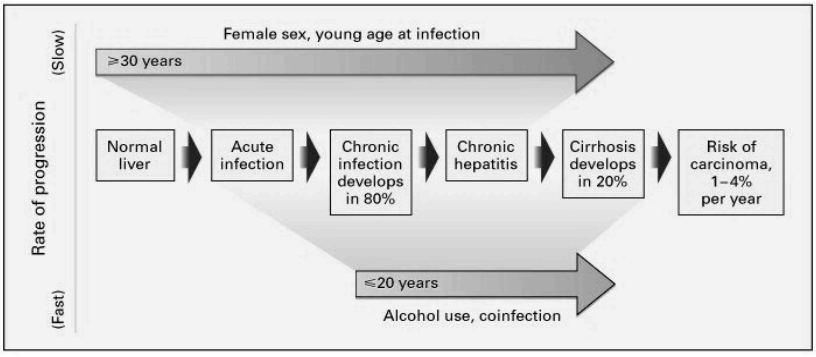
40-60% of chronic liver disease

- >50% of incident hepatocellular carcinoma
- Leading indication for liver transplantation

Annual mortality increased >50%, 1999-2007

- HCV-related deaths now outpace deaths due to HIV

The natural history of HCV infection and its variability from person to person



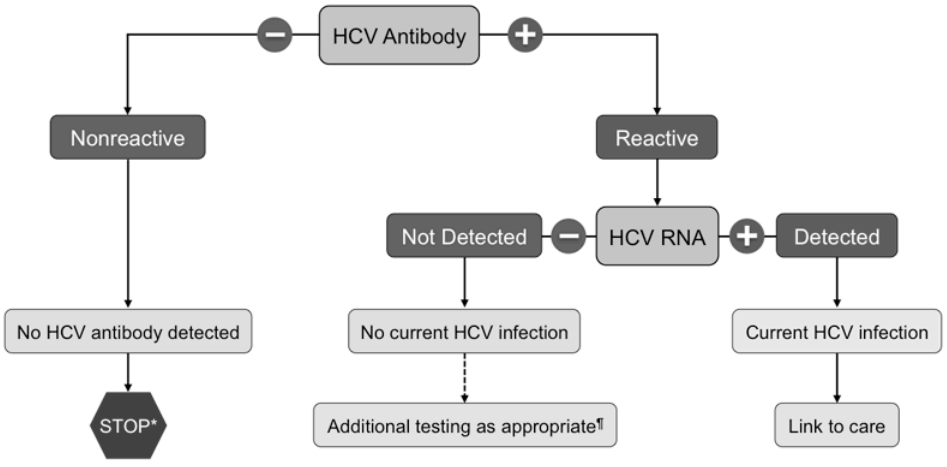
Source: Lauer GM, Walker BD. N Engl J Med 2001;345:41-52.

Extra-hepatic manifestations of HCV infection

Attributed to the body's immune response to HCV infection:

- **Diabetes mellitus -** 3x more common
- **Glomerulonephritis**
- **Essential mixed cryoglobulinemia**
- **Porphyria cutanea tarda**
- **Non-Hodgkins lymphoma** may occur more frequently

Recommended Testing Sequence for Identifying Current HCV Infection



* For persons who might have been exposed to HCV within the past 6 months, testing for HCV RNA or follow-up testing for HCV antibody is recommended. For persons who are immunocompromised, testing for HCV RNA can be considered.

¶To differentiate past, resolved HCV infection from biologic false positivity for HCV antibody, testing with another HCV antibody assay can be considered. Repeat HCV RNA testing if the person tested is suspected to have had HCV exposure within the past 6 months or has clinical evidence of HCV disease, or if there is concern regarding the handling or storage of the test specimen.

Source: http://www.hepatitisc.uw.edu/go/screening-diagnosis/diagnostic-testing

Living with hepatitis C

Liver protective advice

- Reduce or discontinue alcohol
- Limit acetaminophen and other hepatoxins
- Immunize against A and B if susceptible

Transmission issues

- Do not donate blood, tissue, semen

Medical treatment

- Monitor liver health, evaluate for chronic liver disease
- High cure rates, expensive new medications in 2014

Transplant issues

- Most lists require negative UDS
- Patients will need your advocacy
- Post-transplant support

2002 NIH consensus guidelines on HCV treatment

- HCV management of PWID is enhanced by linkage to drug treatment programs
- Promotion of collaboration between HCV experts and providers specializing in substance abuse treatment
- Active injecting drug use is not a contraindication to HCV treatment.
- PWID should be considered on a case-by-case basis.

Source: http://consensus.nih.gov/2002/2002hepatitisc2002116html.htm

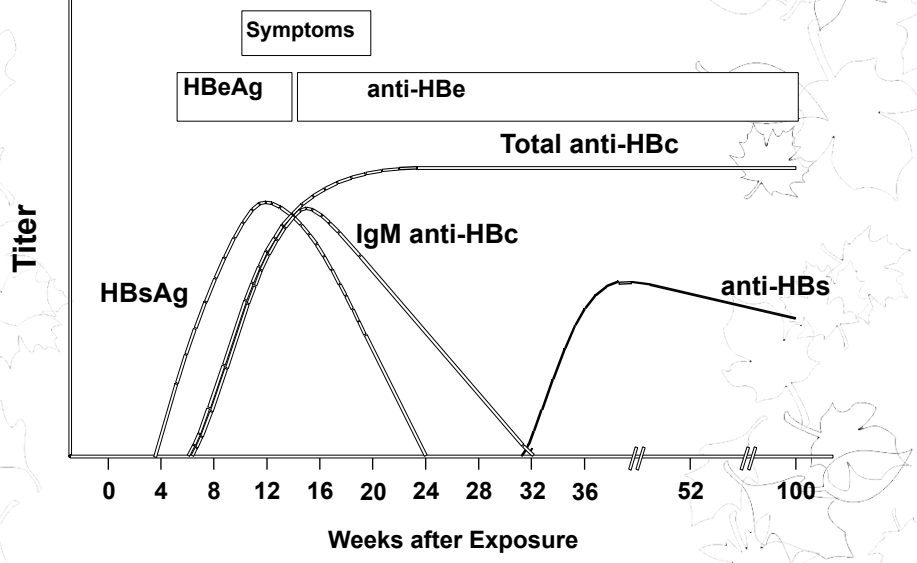
HEPATITIS B : EPIDEMIOLOGY

Estimated prevalence of HBV infection by risk population

Population	Chronically infected with HBV*	Ever infected with HBV**
	%	%
General U.S. population	0.3 (95% CI : 0.2–0.4)	4.8% (95% CI: 4.2%-5.5%)
Persons who inject drugs	3 – 6	20 – 70
Men who have sex with men	1 – 3	10 – 40
Persons living with HIV	4 –17	24 – 76
Sexual contacts of persons with HBsAg+	3.5 – 9	25 – 59
Household contacts of persons with HBsAg+	3 – 20	15 – 60

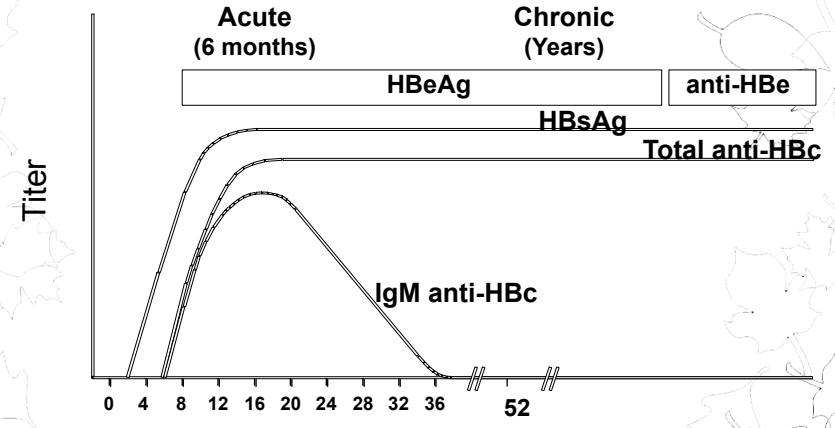
Source: Population estimates from the American Community Survey, US Census Bureau, 2006, and Bureau of Justice Statistics, 2007.

Acute HBV infection with recovery
Typical serologic course, 85-90%



Progression to chronic HBV infection

Typical serologic course, 5-10%



CHRONIC HEPATITIS B: TREATMENT

FDA-approved agents for treating chronic HBV

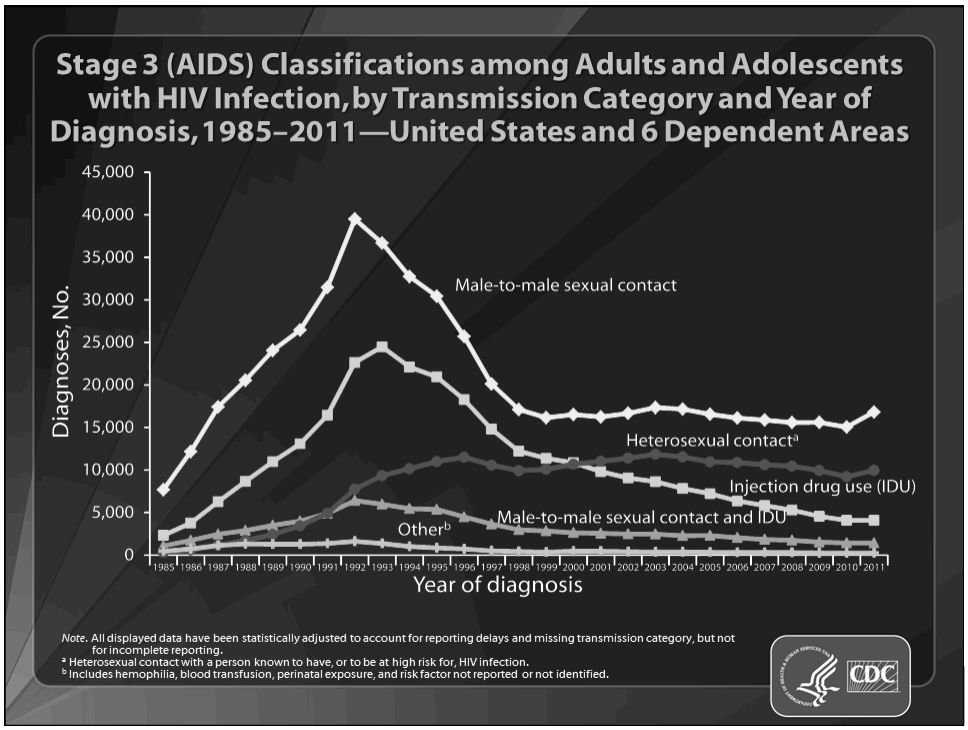
Medication	Dose
Interferon alfa-2b	5 million IU sq once daily or 10 million IU sq 3x/week
Peg-interferon alfa-2a	180 mcg sq once weekly
Lamivudine (3TC)	100 mg PO once daily 300 mg PO once daily for HIV-infected
Adefovir (ADV)	10 mg PO once daily
Entecavir (ETV)	0.5 mg PO once daily (treatment-naïve) 1 mg PO once daily (3TC resistant)
Telbivudine (LdT)	600 mg PO once daily
Tenofovir (TDF)	300 mg PO once daily

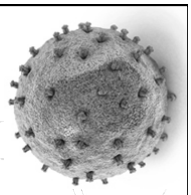
Abbreviations: IU = international units; sq = subcutaneously; qd = once daily; bid = twice daily

HIV Fast Facts

- More than 1.1 million people living with HIV in the U.S.
- 1 in 6 (16%) are unaware of their infection
- MSM, particularly young, black MSM, are most severely affected
- By race, blacks/African Americans face the most severe burden of HIV

Source: http://www.cdc.gov/hiv/resources/factsheets/us.htm





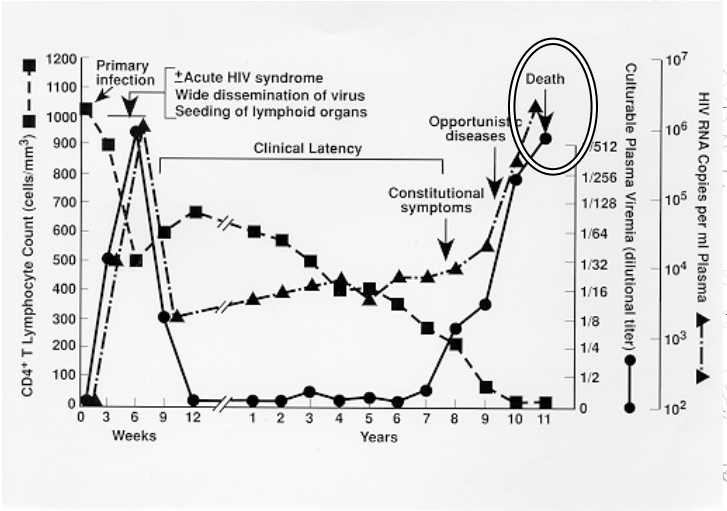
HIV testing

1. **Enzyme immunoassay** for HIV-1/2 Abs with HIV-1 Western blot (WB) or immunofluorescence assay (IFA) for confirmation
2. **Oral Fluid HIV test** identifies HIV-1 Abs from oral mucosal transudate specimen
3. **Rapid HIV tests** (blood or OMT) identify HIV-1/2 Abs in 10-30"; require WB/IFA confirmation
4. **Fourth generation assay** identifies HIV-1 p24 Ag and HIV-1/2 Abs for (7 days) earlier detection

Misdiagnoses of HIV infection by plasma viral load testing alone—do not use without expert advice

Sources: CDC; Ann Intern Med. 1999;130:37-39.

Typical course of untreated HIV infection



Source: Fauci A S et al. Ann Intern Med 1996;124:654-663

Treatment in 2014

Antiretroviral treatment (ART) that is less toxic, fewer pills

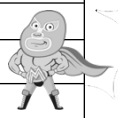
Test and treat* :: *universal ART* :: *treatment as prevention

Goals of HIV care:

- To improve individual health outcomes
- To fully restore health and prolong life in a manner indistinguishable from HIV-uninfected persons
- To lower community viral load and HIV transmission to achieve an "AIDS-free generation"

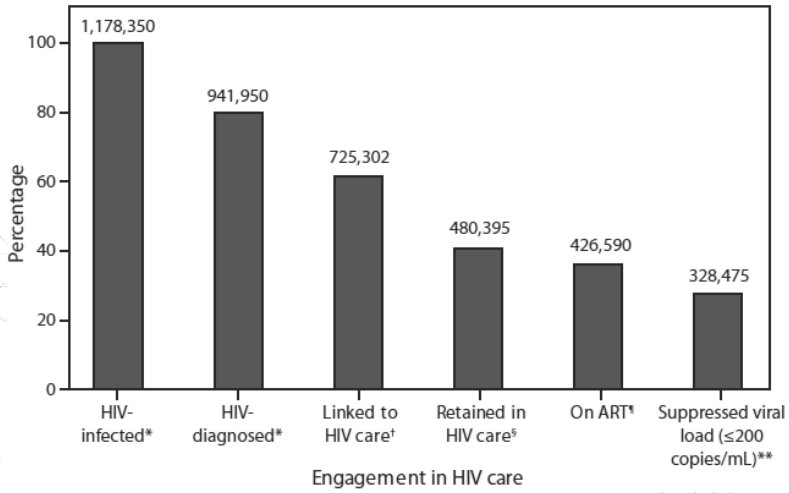
Clinically significant interactions

ANTIRETROVIRAL	METHADONE	BUPRENORPHINE
Nucleoside RTI		
Zidovudine	↑ zidovudine	none
Non-nucleoside RTIs		
Efavirenz	↓ methadone	none
Nevirapine	↓ methadone	none
Protease Inhibitors		
Ritonavir	↑ methadone	↑ bup
Lopinavit/ritonavir	↓ methadone	None
Atazanavir/ritonavir	None	↑ bup
Darunavir	↓ methadone	unknown



Source: McCance-Katz, et al. (2010). *American Journal on Addictions*, 19: 4–16

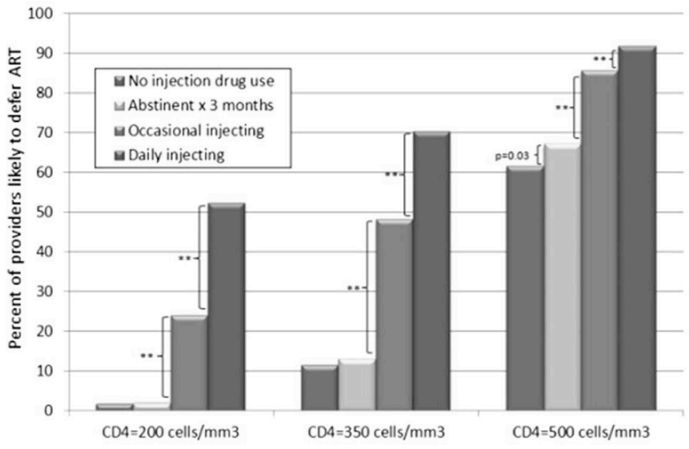
Number and percentage of HIV-infected persons engaged in selected stages of the continuum of HIV care



MMWR December 2, 2011 / 60(47);1618-1623

IDU HIV+ Are Much Less Likely to Receive HAART

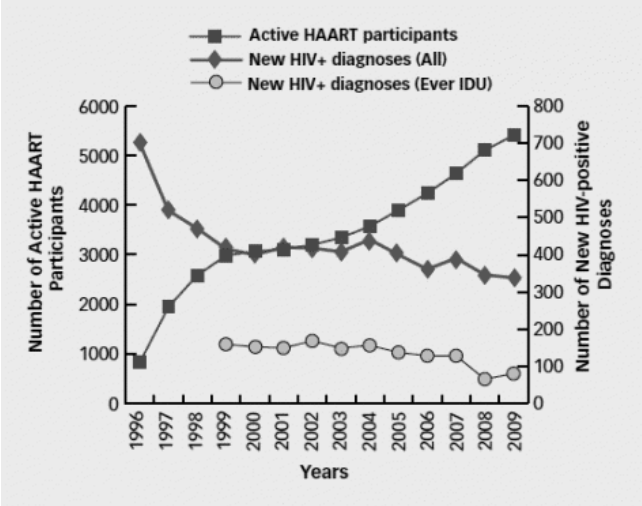
Percentage Of Providers Who Would Defer ART By CD4+ Count and Injection Drug Use Status



Physicians are reluctant to treat IDU with ART owing to alleged poor compliance.

Westergaard RP et al., J Int AIDS Soc 2012; 15:10.

Treatment expansion parallels drop in new HIV cases among IDU



Montaner, et al. (2010). Lancet 376(9740):532–539.

PUBLIC HEALTH-RELATED REPORTABLE INFECTIONS IN PERSONS WHO USE DRUGS

Treponema pallidum **: syphilis**

Mycobacterium tuberculosis **: TB**

Syphilis:

Syphilis

- Sexual or vertical transmission
- Most contagious to sex partners during primary and secondary stages
- Recent increases in new infections in young MSM
  - Disinhibiting role of alcohol, amphetamine, serosorting, prevention fatigue
- Overlapping clinical stages guide treatment and follow up

Source: Ann Intern Med. 2 August 2011;155(3):192-193

Stages of syphilis

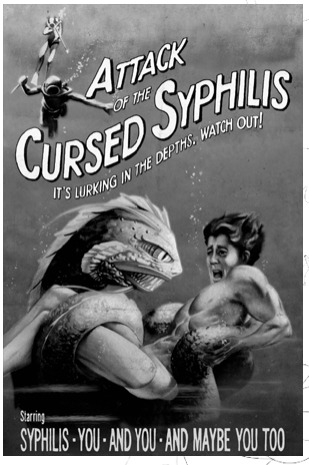
First few years	• No signs and symptoms are observed
Primary stage	•Sore/chancre found in genital area; inner part of vagina in women, penis for men •Chancres do not result in pain and will disappear without treatment
Secondary stage	•Skin rash - rough, red or reddish brown spots on palms of hands and bottoms of feet. •Mucous membrane lesions throughout body without ichiness •Fever, sore throat, headache, swollen gland, weight loss, muscle ache, fatigue
Tertiary stage	• Blood vessels, cardiac, nerve system problems • Damaged internal organs • Death cases
Latent stage	•Symptoms disappear for 1-20 years •Diagnosis through blood testing •Relapse symptoms

Serologic Tests for Syphilis

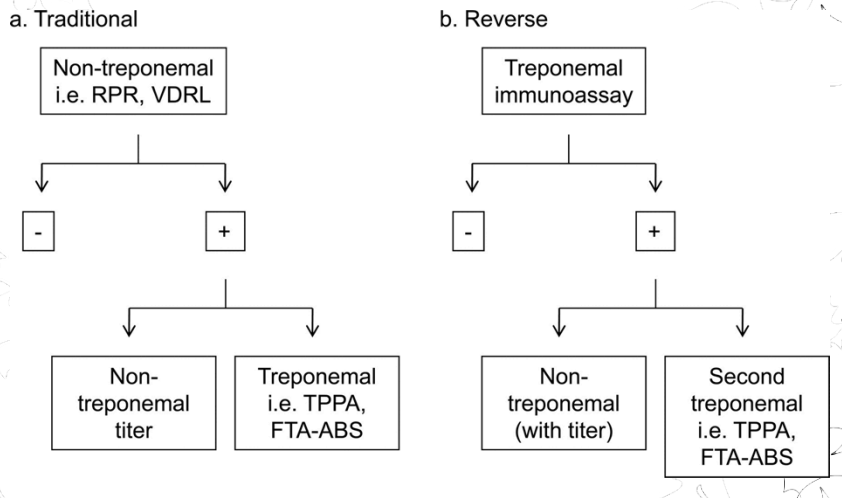
Two types of tests:

1. Treponemal (qualitative)
2. Nontreponemal (qualitative and quantitative)

The use of only one type of test is insufficient for diagnosis.



Syphilis testing algorithms



Loeffelholz M J , Binnicker M J J. Clin. Microbiol. 2012;50:2-6 Journal of Clinical Microbiology

Penicillin G is preferred for treating all stages of syphilis

Table 2: Recommended Treatment for Syphilis, by Stage[a]

Stage	Treatment	Dose
Early latent	Benzathine penicillin G	2.4 million units IM x 1
Late latent or unknown duration	Benzathine penicillin G	2.4 million units IM x 3, given at weekly intervals (assuming neurosyphilis has been ruled out)
Primary	Benzathine penicillin G	2.4 million units IM x 1
Secondary	Benzathine penicillin G	2.4 million units IM x 1
Tertiary	Benzathine penicillin G	2.4 million units IM x 3, given at weekly intervals
Neurosyphilis	Aqueous crystalline penicillin G	3–4 million units IV every 4 hours or a continuous infusion, for a total dose of 18–24 million units per day for 10–14 days

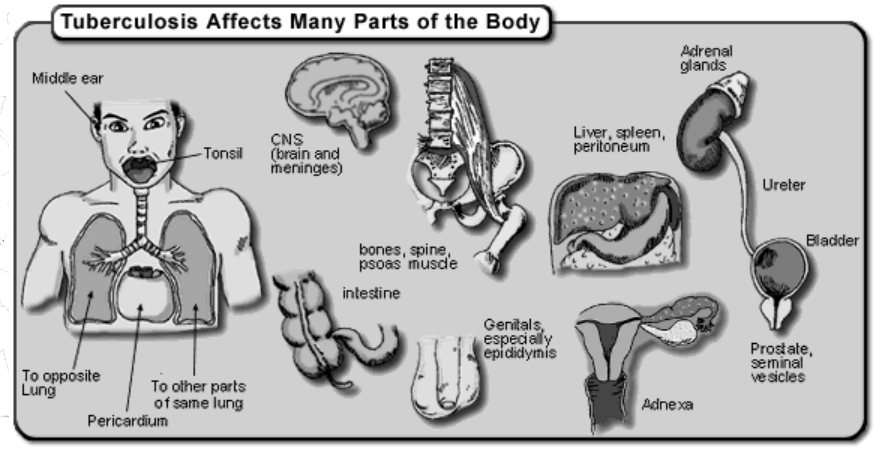
[a]*MMWR Recomm Rep* 2006; 55(RR-11):1.

IM, intramuscular; IV, intravenous

Journal WATCH

Sources: www.aids-clinical-care.jwatch.org. CDC (2010). "Sexually transmitted diseases treatment guidelines, 2010." MMWR. Recomm Rep 59(RR-12): 1-110.

Mycobacterium tuberculosis



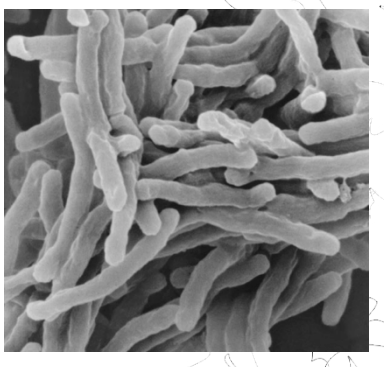
Pulmonary tuberculosis

- Crowded living conditions – homeless shelters, crack houses, shooting galleries
- Delays in diagnoses
- Poor adherence to treatment
- Shot-gunning crack cocaine
- Atypical presentation of TB in PLWH and drug use
- ***PWID more likely to progress from LTBI to TB disease***

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, December 2011

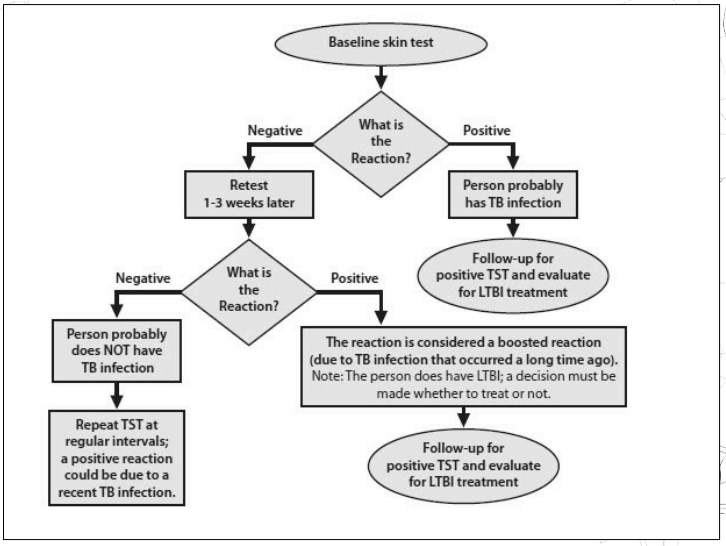
Two testing methods available for the detection of *MTb* infection

1. Mantoux tuberculin skin test (TST)
2. Interferon-gamma release assays (IGRA)



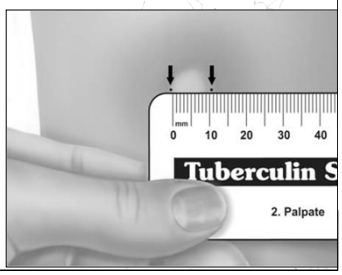
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, December 2011

Two-step TST Testing - 2



Reading the TST

- Measure reaction in 48 to 72 hours
- Measure **induration** not erythema
- Record reaction in **millimeters** not "negative" or "positive"
- Ensure trained health care professional measures and interprets the TST



National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, December 2011

Selected TST interpretations

≥ 5 mm induration

- Persons with HIV or other immunosuppression
- Close contacts to an infectious TB case

≥ 10 mm induration

- Injection drug users
- Residents or employees of congregate settings

≥ 15 mm induration

- Persons with no known risk factors for TB

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, December 2011

Interferon-Gamma Release Assays (IGRAs)

Whole-blood test used to detect *MTb* infection

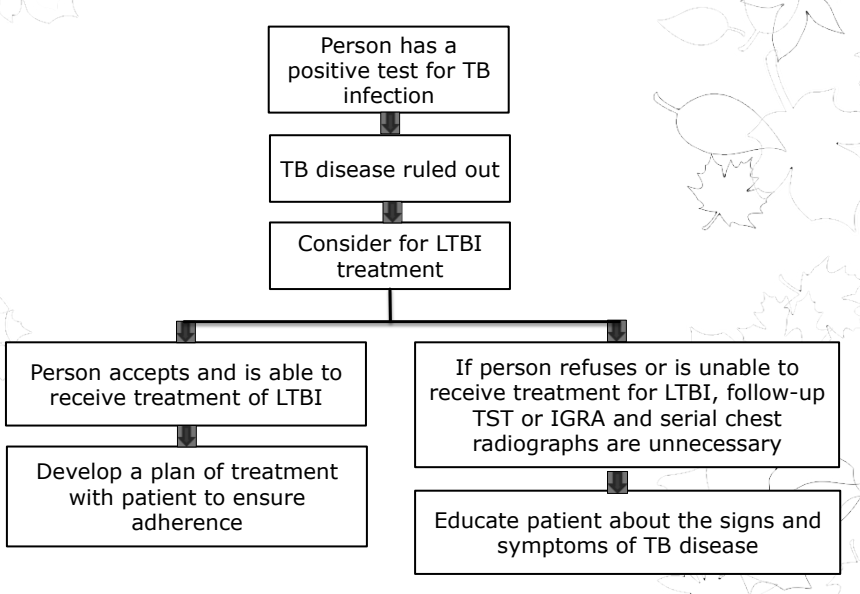
Two FDA-approved IGRAs available in U.S.

Advantages:

- Single patient visit to test; results in 24 hrs
- Does not boost responses measured by subsequent tests
- Prior BCG vaccination does not cause false-positive IGRA test result

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, December 2011

Evaluation of positive TB test



Treatment Regimens for LTBI

Drug(s)	Duration	Interval	Minimum Doses
Isoniazid	9 months	Daily	270
		Twice weekly	76
	6 months	Daily	180
		Twice weekly	52
Isoniazid & Rifapentine	3 months	Once weekly	12
Rifampin	4 months	Daily	120

Note: Rifampin (RIF) and Pyrazinamide (PZA) should not be offered to persons with LTBI. RIF and PZA should continue to be administered in multidrug regimens for the treatment of persons with TB disease.

Treatment regimens for culture-positive TB

Initial Phase

2 months - INH, RIF, PZA, EMB daily (56 doses, within 8 weeks)

Continuation Phase

Options:

1) 4 months - INH, RIF daily (126 doses, within 18 weeks)
2) 4 months - INH, RIF twice / week (36 doses, within 18 weeks)
3) 7 months - INH, RIF daily (217 doses, within 31 weeks)*
4) 7 months - INH, RIF twice / week (62 doses, within 31 weeks)*

* Continuation phase increased to 7 months if initial chest x-ray shows cavitation and specimen collected at end of initial phase (2 months) is culture positive

Source: http://www.cdc.gov/tb/publications/slidesets/treatment_guidelines/2003/treat23.htm

Summary: medical complications of addiction

- Persons who use drugs experience a variety of serious medical complications and typically have worse prognoses.
- Some urgent problems need be considered and addressed at initial contact.
- Many complications have a large public health impact, if not detected or treated.
- Chronic consequences may last a lifetime and require your ongoing management and patient advocacy.

Case

- A 46-year old female user of black tar heroin presents with a 2-week history of flu--like illness and 4 days of slurred speech, difficulty swallowing, and shortness of breath.
- On the day of admission, she starts seeing double and collapses on the sidewalk.
- Exam is significant for atrophic punched-out scars on legs, left buttock abscess, diplopia, facial and proximal weakness, and bulbar dysfunction. Reflexes are depressed. Sensory and cognitive functions are preserved.
- She is HIV negative, anti-HCV positive.

Source: Merrison, et al. *BMJ* 2002;325:1020–1

The medical consequences of addiction may be due to different mechanisms. Using the framework below, which most likely explains this patient's presentation?

A. Drug-specific effects
B. Routes of drug administration
C. Drug contamination
D. Behaviors associated with substance use
E. Co-occurring mental illness

The answer is C.

The patient has wound botulism, which is caused by contamination of black tar heroin with the spores of *C. botulinum.*


Thank you

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