CONTAGIOUS AND SEXUALLY TRANSMITTED DISEASES

FOR HEALTH CARE FOR THE HOMELESS PROVIDERS

Deborah Borne, MD, MSW
What about you?

Slides will be available on www.nhchc.org
Goals

- Review screening recommendations for: HIV, Chlamydia, Gonorrhea, Syphilis and Hepatitis C
- Understand treatment recommendations and recourses
- Share innovative prevention strategies for HCH programs
- Understand priority Adult immunizations for HCH clients
Who is making these recommendations...

- U.S. Preventive Services Task Force (USPSTF)  
  http://www.uspreventiveservicestaskforce.org/

- Centers for Disease Control and Prevention  
  http://www.cdc.gov/

- Health Care for the Homeless Clinician's Network Prevention Task force  
  http://www.nhchc.org/network.html
Common Contagious Diseases and STDs

- Bacterial diseases-STD
  - Chlamydia (CT)
  - Gonorrhea (GC)
  - Syphilis

- Viral diseases
  - Hepatitis C
  - HIV
For Each Disease

- Epidemiology
- Screening recommendations
  - Tests
- Treatment Recommendations—where to get the information
- Things we can do.....
What IS Screening????

- **Screening testing**
  - Looking for disease which gives no symptoms
  - Most effective when done for
    - a common disease
    - bad consequences
    - use a highly accurate, non-invasive, inexpensive test

- **Accuracy of screening is dependent on:**
  - Prevalence of disease in the population
  - Sensitivity and specificity of test used

- **Diagnostic testing**
  - Looking for the cause of abnormal signs, symptoms, etc
Partner Treatment

Expedited Partner Therapy (EPT) is the clinical practice of treating the sex partners of patients diagnosed with chlamydia or gonorrhea by providing prescriptions or medications to the patient to take to his/her partner without the health care provider first examining the partner.

Why medical providers can’t do it alone: It takes a team!

- Patients need to get tested and they need follow up after testing.

- May be weeks between getting a test done and having all the information necessary to interpret the test result.
HIV

0.4% Of general population

3.4% of the Individuals Experiencing Homelessness
Diagnoses of HIV infection, 2009 - 40 states and 5 U.S. dependent areas
N = 42,959

Notes: Data include persons with a diagnosis of HIV infection regardless of the stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.

Number
- 0 - 100
- 101 - 500
- 501 - 1,300
- 1,301 - 6,120

Confidential name-based HIV infection reporting not implemented by January 2006
Data classed using quartiles
Rates of Diagnoses of HIV Infection among Adults and Adolescents, 2009—40 states and 5 U.S. Dependent Areas

N=42,793

Total Rate = 21.1

Rates per 100,000 population

- <10.0
- 10.0 – 19.9
- 20.0 – 29.9
- ≥30.0

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.
AIDS diagnoses, 2009 - United States and 5 U.S. dependent areas
N = 34,993

Notes: All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.
Health Disparity and HIV

Estimated Rate of New HIV Infections, 2009, by Gender and Race/Ethnicity

- **Male**
  - Black: 103.9
  - Hispanic: 39.9
  - White: 15.9

- **Female**
  - Black: 39.7
  - Hispanic: 11.8
  - White: 2.6

Estimated New HIV Infections, 2009, by Transmission Category

- MSM: 61%
- Heterosexual: 27%
- MSM-IDU: 3%
- IDU: 9%

Spatial Distribution of Mean Community Viral Load by Neighborhood in SF, 2005-2008

A new way to look at community health and HIV
CDC Recommendations: HIV Screening

- HIV screening for patients ages 13 to 64 in all health care settings after the patient is notified that testing will be performed unless the patient declines (opt-out screening).
  - Unless: prevalence of undiagnosed HIV infection in their patients has been documented to be <0.1%.

- In the absence of existing data for HIV prevalence, health-care providers should initiate voluntary HIV screening until they establish that the diagnostic yield is <1 per 1,000 patients screened, at which point such screening is no longer warranted.
CDC Recommendations: Consent

- Screening should be incorporated into the general consent for medical care; separate **written** consent is not recommended.

- Prevention counseling should not be **required** with HIV diagnostic testing or as part of HIV screening programs in Healthcare settings.
Current Status of Legislation to Change HIV Testing Laws in the United States

No legislative restrictions at time of 2006 CDC recommendations

Legislation enacted to reduce or eliminate prior restrictions

Legislation introduced to remove requirement for a separate consent but not enacted or decision pending

Restrictive legislation at time of CDC recommendations and no subsequent proposal to change legislation


Top 10 HIV Clinical Developments of 2008
CDC Recommendations: Syndemics and Testing

- All patients initiating **treatment for TB** should be screened routinely for HIV infection.

- All patients seeking treatment for STDs, including all patients attending STD clinics, should be screened routinely for HIV during each visit for a new complaint, regardless of whether the patient is known or suspected to have specific behavior risks for HIV infection.
CDC Recommendations: Interval For HIV Testing

- HIV testing of people at high risk for HIV infection at least once a year.

- Persons likely to be at high risk include injection-drug users and their sex partners, persons who exchange sex for money or drugs, sex partners of HIV-infected persons, and MSM or heterosexual persons who themselves or whose sex partners have had more than one sex partner since their most recent HIV test.
‘typical’ primary HIV-1 infection

- **HIV-1 p24 antigen**
- **HIV proviral DNA**
- **HIV antibodies**
- **HIV viral load**

**Diagram Key**
- **'window' period**
- **Symptoms**

**Time following infection**
- 0 weeks
- 1 week
- 2 weeks
- 3 weeks
- 4 weeks
- 5 weeks
- 6 weeks
- 7 weeks
- 8 weeks
- 9 weeks
- 10 weeks

**Years**
- 2
- 4
- 6
- 8
- 10

**Legend**
- **1° infection**
Current HIV technologies: Detection of antibodies

- Screening tests
  - Enzyme immunosorbent assays (EIAs)
  - Simple/rapid immuno-diagnostics assays

- Confirmatory or supplemental tests
  - Western blot (WB)
  - Line immunoassays (LIAs)

- Alternatives to confirmatory tests
  - Repetitive EIA or rapid assays
<table>
<thead>
<tr>
<th>TEST</th>
<th>SPECIMAN</th>
<th>CLIA</th>
<th>COST per device</th>
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<td>$18.50</td>
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</tbody>
</table>
National HIV-AIDS Strategy: Work together to.....

- Test
- Linkage, Engagement, and Retention
- Treatment
- Adherence
- Substance use treatment
- Housing

- National In+Care
  http://www.incarecampaign.org/
Treatment Resources

http://nccc.ucsf.edu/home

- HIV Treatment Guidelines
  http://www.aidsinfo.nih.gov/guidelines/

HIV Prevention: KEY POINTS

- Rates of HIV higher in homeless population than the general population
- Highest rates with young African American MSM
- CDC 2006 recommendations: test everyone in their lifetime, and repeat yearly for high risk.
- Know consent laws for opt out in your state
- National AIDS Strategy: work together to test, treat, engage, house
Estimated 3 million new cases in U.S. annually

Most frequently reported disease in U.S.

Direct and indirect annual costs total approximately $2.4 billion
Note: The total rate of chlamydia for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 293.6 per 100,000 population.
Chlamydia—Positivity Among Women Aged 15–24 Years Tested in Family Planning Clinics, by State, Infertility Prevention Project, United States and Outlying Areas, 2009
Incidence is highest among sexually active adolescents and young adults
Transmission

- Transmission is **sexual** or **vertical**
- Highly transmissible
- Incubation period 7-21 days
- Significant asymptomatic reservoir
- Re-infection is common
Clinical Syndromes Caused by *C. trachomatis*

<table>
<thead>
<tr>
<th>Men</th>
<th>Local Infection</th>
<th>Complication</th>
<th>Sequelae</th>
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<td>Conjunctivitis</td>
<td>Epididymitis</td>
<td>Infertility (rare)</td>
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<td>Urethritis</td>
<td>Reiter’s syndrome (rare)</td>
<td>Chronic arthritis (rare)</td>
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<td>Proctitis</td>
<td></td>
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<tr>
<td>Women</td>
<td>Conjunctivitis</td>
<td>Endometritis</td>
<td>Infertility</td>
</tr>
<tr>
<td></td>
<td>Urethritis</td>
<td>Salpingitis</td>
<td>Ectopic pregnancy</td>
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<td>Cervicitis</td>
<td>Perihepatitis</td>
<td>Chronic pelvic pain</td>
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<td></td>
<td>Proctitis</td>
<td>Reiter’s syndrome (rare)</td>
<td>Chronic arthritis (rare)</td>
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<tr>
<td>Infants</td>
<td>Conjunctivitis</td>
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<td>Rare, if any</td>
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<td>Pneumononitis</td>
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<td></td>
<td>Rhinitis</td>
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Chlamydia Infection
Clinical Manifestations
Why Screen for Chlamydia?

- Screening can reduce the incidence of PID by more than 50%.
- Cost effective
  - CDC estimates that “for every dollar spent on chlamydia screening, we could save $12”
- Most infections are asymptomatic.
- Screening decreases the prevalence of infection in the population and reduces the transmission of disease.
Chlamydia Screening Recommendations

- All sexually active women under 25 years and under
  - Initial screen
  - Repeat annually, Consider repeat with new or multiple sex partners
  - Repeat 2-3 months after an infection
- CDC -- older women with risk factors for chlamydial infections (those who have a new sex partner or multiple sex partners).
- Pregnant women at the first prenatal visit.
  - third trimester: women aged <25 years and those at increased risk for chlamydia
What about chlamydia screening among men?

- Obvious source of transmission
- Urine-based testing advantage
- Unpublished cost effectiveness analysis demonstrate community and future partner benefits
- Limited data on prevalence & outcomes
- No guidelines available
- MSM and TG at high risk
Testing Technologies

- **Culture**
  - Historically the “gold standard”
  - Not easily Available

- **Non-culture tests**
  - Nucleic Acid Amplification Tests (NAATs) ****
  - Non-Amplification Tests
  - Can detect *N. gonorrhoeae* in the same specimen
Nucleic Acid Amplification Tests (NAATs)

- FDA cleared for:
  - All NAATs
    - urethral swabs from men
    - cervical swabs
    - Urine from Women and men ***
  - Certain NAATs
    - vaginal swabs ****

- Non-FDA cleared for:
  - rectal
  - pharyngeal
  (some laboratories have met regulatory requirements)
TESTS take Home

- Heterosexual men-Urine
- Women-Vaginal Swab
- MSM- Rectal and Pharyngeal
Treatment of Uncomplicated Genital Chlamydial Infections

**CDC-recommended regimens**
- Azithromycin 1 g orally in a single dose, OR
- Doxycycline 100 mg orally twice daily for 7 days

**Alternative regimens**
- Erythromycin base 500 mg orally QID x 7 days,
- Erythromycin ethylsuccinate 800 mg PO 4 QID x 7 days,
- Ofloxacin 300 mg orally twice a day for 7 days
- Levofloxacin 500 mg orally once a day for 7 days
Chlamydia Reinfection Rates

Whittington et al. 2001; Fortenberry et al. 1999; Blythe et al. 1992
Chlamydia Partner Management

- Partners with contact during the 60 days preceding the diagnosis should be evaluated, tested and treated.
- Most important risk factor for re-infection is an untreated partner.
- Repeat CT infections place women at greater risk for PID and infertility than first infection.
Repeat Testing after Treatment

- **Pregnant women**
  - Repeat testing 3 weeks after completion of recommended therapy

- **Non-pregnant women**
  - Test of cure not recommended:
    - Unless compliance is in question, symptoms persist, or re-infection is suspected
  - Repeat testing 3-4 months after treatment
    - especially adolescents due to high prevalence of repeated infection
  - Screen at next health care visit
Chlamydia: KEY POINTS

• Most common bacterial (curable) STD in the U.S.
• Most cases in women and men give no symptoms
• All sexually active women 25 y.o.a. and younger should be tested at least annually
• High re-infection rate:
  • Treat partners!
  • Re-test 3 month
PLEASE, TAKE A SEXUAL HISTORY
Gonorrhea

- Most common in young adults and adolescents
- CT co-infection of GC cases remains at about 40%
- Resistance to medication is a spreading problem
- High Correlation with HIV infection
Gonorrhea—Rates by State, United States and Outlying Areas, 2009

[Map showing gonorrhea rates by state, with rates ranging from ≤19.0 to >100.0 per 100,000 population.]
Gonorrhea—Rates by Age and Sex, United States, 2009

Most common in young adults and adolescents
Gonococcal Isolate Surveillance Project (GISP)—Percentage of Neisseria gonorrhoeae Isolates with Resistance or Intermediate Resistance to Ciprofloxacin, 1990–2009
Risk Factors

- Multiple or new sex partners or inconsistent condom use
- Urban residence in areas with disease prevalence
- Adolescents, females particularly
- Lower socio-economic status
- Use of drugs
- Exchange of sex for drugs or money
Transmission

- Efficiently transmitted by:
  - Male to female via semen
  - Female to male urethra
  - Rectal intercourse
  - Fellatio (pharyngeal infection)
  - Peri-natal transmission (mother to infant)

- Gonorrhea associated with increased transmission of and susceptibility to HIV infection
Gonorrhea Infections
Clinical Manifestations
Gonococcal ophthalmia
Disseminated gonorrhea - skin lesion
Gonorrhea Screening

USPSTF: Sexually active women
- < 25
- Previous GC/C or STD
- Commercial sex work
- New or Multiple Partner
- Drug use
- Inconsistent Condom
Gonorrhea Screening Recommendations

- Targeted screening: consider in
  - Populations with prevalence of 1-2% or more
  - MSM
  - High-risk women
    - Young age
    - New or multiple partners
    - Pregnant women

No Screening men and women at low risk
Diagnostic Methods

- Culture tests
- Non-culture tests
  - Amplified tests (NAATs)
    - Polymerase chain reaction (PCR) (Roche Amplicor)
    - Transcription-mediated amplification (TMA) (Gen-Probe Aptima)
    - Strand displacement amplification (SDA) (Becton-Dickinson BD ProbeTec ET)
  - Non-amplified tests
    - DNA probe (Gen-Probe PACE 2, Digene Hybrid Capture II)
  - Gram stain
Gonorrhea treatment:
Pharyngeal or Anogenital

Dual treatment regardless of CT results

Ceftriaxone
250 Mg IM x 1

Azythromycin 1 gram x 1
or
Doxycycline 100 mg PO
BID x 7 days

Re-Test 3 Months after treatment
Monitor for treatment failure
Gonorrhea treatment: Anogenital only - Dual treatment regardless of CT results

- Cefixime 400 mg PO x 1
- Azythromycin 1 gram x 1 or Doxycycline 100 mg PO BID x 7 days

or

Single-dose injectable cephalosporin regimens

Re-Test 3 Months after treatment
Monitor for treatment failure
Gonorrhea treatment: 
Alternative Anogenital only

- **Cefpodoxime** 400 mg PO x 1
- **Cepfuroxime** 1 gram PO x 1

or

- **Azythromycin** 1 gram x 1 or **Doxycycline** 100 mg PO BID x 7 days
GC Partner Management

- Partners with contact during the 60 days preceding the diagnosis should be evaluated, tested and treated.

- If no sex partners in previous 60 days, treat the most recent partner.
Gonorrhea: KEY POINTS

- Second most common bacterial (curable) STD in the U.S.
- Concentrations of infection in MSM in urban areas
- Resistance to medications is a spreading problem
  - Dual Treatment
  - Re-test 3 months
- High Correlation with HIV infection
PLEASE,
TAKE A SEXUAL HISTORY
Syphilis

‘Know Syphilis in all its manifestations and relations, and all things clinical will be added unto you’

-Sir William Osler, 1987
Syphilis

- Spirochete
- Transmission): direct contact (sexual)
  - Highest risk in early syphilis
  - 1/3 exposed in early syphilis
- 28 U.S. counties account for 50% of the reported cases
- Local outbreaks centered in urban areas among MSM
Primary and Secondary Syphilis—Rates by State, United States and Outlying Areas, 2009

NOTE: The total rate of primary and secondary syphilis for the United States and outlying areas (Guam, Puerto Rico, and Virgin Islands) was 4.6 per 100,000 population.
Primary and Secondary Syphilis—Rates by County, United States, 2009

NOTE: In 2009, a total of 2,194 (69.9%) of 3,141 counties in the United States reported no cases of primary and secondary syphilis.
Primary and Secondary Syphilis—Rates by Age and Sex, United States, 2009

Men 15-54

<table>
<thead>
<tr>
<th>Age</th>
<th>Rate (per 100,000 population)</th>
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<td>10-14</td>
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<tr>
<td>15-19</td>
<td>3.3</td>
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<td>25-29</td>
<td>3.6</td>
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<tr>
<td>30-34</td>
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<td>35-39</td>
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<tr>
<td>40-44</td>
<td>1.6</td>
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<tr>
<td>45-54</td>
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<tr>
<td>55-64</td>
<td>0.2</td>
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<tr>
<td>65+</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>1.4</td>
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Total rate for men 15-54 is 7.8 per 100,000 population.
Primary and Secondary Syphilis—Reported Cases* by Stage, Sex, and Sexual Behavior, United States, 2009

<table>
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<tr>
<th>Cases</th>
<th>MSW†</th>
<th>Women</th>
<th>MSM†</th>
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<tr>
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<td>1,000</td>
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<tr>
<td>Secondary</td>
<td>1,000</td>
<td>1,000</td>
<td>5,000</td>
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</tbody>
</table>

* Of the reported male cases of primary and secondary syphilis, 20% were missing sex of sex partner information.
† MSW = men who have sex with women only; MSM = men who have sex with men.
Primary and Secondary Syphilis—Reported Cases* by Sex, Sexual Behavior, and Race/Ethnicity, † United States, 2009

<table>
<thead>
<tr>
<th></th>
<th>MSW‡</th>
<th>Women</th>
<th>MSM‡</th>
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<tr>
<td>Blacks</td>
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<td>Whites</td>
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<td>Hispanics</td>
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<td></td>
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<tr>
<td>Other</td>
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</table>

* Of the reported male cases of primary and secondary syphilis, 20% were missing sex of sex partner information; 1.7% of reported male cases with sex of sex partner data were missing race/ethnicity data.
† No imputation was done for race/ethnicity.
‡ MSW = men who have sex with women only; MSM = men who have sex with men.
Incubation
~3 weeks

Primary Syphilis
2-6 weeks duration
2-12 weeks post contact (ave 6)

Secondary Syphilis
2-6 weeks

Latent Syphilis
4 wks-30 yrs

Tertiary Syphilis
Rash of Secondary Syphilis

Photo: Dr. Joseph Engelman, San Francisco City Clinic

STD Atlas, 1997
Secondary Syphilis
Other Symptoms
Neurosyphilis

- Can occur at any stage of infection
- Asymptomatic invasion of CSF very common

Early:
- Meningitis
- Uveitis
- Cranial nerve dysfunction

Late:
- Tabes dorsalis
- General paralysis
Testing for syphilis

- Can examine a swab from a chancre, if present

- Blood tests
  - First, Non-treponemal test
    - VDRL or RPR
  - Confirmed with treponemal test

- Reverse sequencing becoming more common
  - First, treponemal test
  - Follow up with titer from a non-treponemal test
All Syphilis TESTS may stay positive for years

Percent of Persons Reactive with Serologic Tests for Syphilis
The earlier you diagnose syphilis, the easier it is to treat it
Early syphilis, and early latent:

- Penicillin G benzathinine 2.4 Units IM once
- If PCN allergic: Doxycycline 100 mg po BID x 14 days (not prgenent)
Treatment and response to therapy

- **FOUR Fold Decrease** in Non-Treponemal test (RPR or VDRL) titers in 6-12 months depending on stage
- Follow-up Serology 3, 6, 12 months

- Check for any new onset primary, secondary or neurosyphilis during follow-up.

Re-infection can occur!
Late latent, Syphilis: Treatment

- Penicillin G benzathinine 2.4 Units IM every week x 3 weeks

And

- Doxycycline 100 mg po BID x 28 days (not pregnant)
Take Home Points

- Syphilis is increasing, especially among young, black men.
- Syphilis does not go away without treatment, and may result in symptoms decades after the initial infection.
- Interpretation of test results is complex
  - 2 or 3 tests performed in sequence over days to weeks
  - combined with a thorough patient history and physical exam.
  - Four fold drop of RPR/VDRL
Estimated 3.2 million people with chronic HCV infection

Estimate that hepatitis C is responsible for well over 10,000 deaths per year

Often asymptomatic in the early stages.

Becomes chronic in 85% of people exposed to it.

* Until 1995, acute hepatitis C was reported as “acute hepatitis, non-A /non-B.”

Source: National Notifiable Diseases Surveillance System (NNDSS)

* Until 1995, acute hepatitis C was reported as “acute hepatitis, non-A /non-B.”

Source: National Notifiable Diseases Surveillance System (NNDSS)
Hepatitis C Screening

Health Care for the Homeless Clinician’s Network

- Adult and Homeless youth should be offered HCV testing.

- Frequency of repeat testing to be determined by local epidemiological data
Who Should be Screened?

Based on increased risk for infection

- Ever injected illegal drugs
- Received clotting factors made before 1987
- Received blood/organs before July 1992
- Ever on chronic hemodialysis
- Evidence of liver disease
- HIV-positive
Many HCV positive patients are asymptomatic.

Some of the most commonly reported symptoms are:

- Fatigue
- Muscle / joint pain
- Headache
- Anorexia
- Right Upper Quadrant Pain

These symptoms are not exclusive to HCV infection alone.
**Natural History of HCV**

**Initial HCV Infection**
- **Acute Phase**
  - Elevated Enzyme Levels

**Six Months Post Infection**
- Naturally Clear Virus
- Normal Enzyme Levels
- **15%**

**Six Months Post Infection**
- Chronic Hepatitis C Inflammation
- **85%**
  - 80% Slow or No Progression To Fibrosis

**Liver Failure**
- Possible Liver Transplant and/or Death*
  - Cirrhosis Death of Liver Cells
  - Compensated
  - Decompensated
  - **20%**

- **Liver Cancer**
  - 4% per year
Hepatitis C Testing

- Screening assay (EIA or CIA) for anti-HCV antibody

- Verification by an additional, more specific assay (nucleic acid testing (NAT) for HCV RNA)
  - Recombinant Immunoblot Assay (RIBA)
  - Qualitative HCV RNA
  - Quantitative HCV RNA

- HCV Genotype
Hepatitis C Treatment

• Primary goal of treatment is to eradicate the virus

• Additional goals
  Slow disease progression
  Minimize risk of liver cancer
  Improve liver damage
  Enhance quality of life
  Prevent transmission of virus
  Reduce extra-hepatic manifestations
Treatment:

- Age of the patient
- General state of health
- Risk of cirrhosis
- Likelihood of response
- Other medical conditions that may decrease life expectancy or contraindicate the use of interferon or ribavirin.
- Patients with moderate/severe necro-inflammation and/or fibrosis should be treated.
Hepatitis C Treatment

- Different Population Groups
- Different Genotypes
- Different medications
The Good news: New drugs are here!

- Multiple new classes of oral agents
- An all oral, highly effective, interferon sparing regimen is a very real possibility
- Improved response for both treatment naïve and treatment
The Less Good News...

- All of these drug are in development at once so it can be really complicated
- Treatment regimens, algorithms, and stopping rules have become more complex
- Most of these drugs and combinations have not yet been studies in HIV-HCV coinfection so challenging to navigate appropriate use in ART-treated patients
Ways to Slow Progression

- NO ALCOHOL
- Heart healthy diet
- Moderate exercise
- Vaccinate for HAV & HBV
- Prudent use of all medications (prescription and over the counter)

Source: NIH Consensus Conference
Adult Immunization

Adult Immunization Strategies
HCH Clinician's Network recommendations:
Pneumovax, Influenza, Hepatitis B
### Recommended Adult Immunization Schedule

**UNITED STATES - 2011**

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

#### Figure 1. Recommended adult immunization schedule, by vaccine and age group

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>AGE GROUP</th>
<th>19–26 years</th>
<th>27–49 years</th>
<th>50–59 years</th>
<th>60–64 years</th>
<th>&gt;65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza1.*</td>
<td></td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)2.*</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella3.*</td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)4.*</td>
<td>3 doses (females)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster5</td>
<td>3 doses (females)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)6.*</td>
<td>1 or 2 doses</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)7,8</td>
<td>1 or 2 doses</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal9.*</td>
<td></td>
<td>1 or more doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A10.*</td>
<td>3 doses</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B11.*</td>
<td>3 doses</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Covered by the Vaccine Injury Compensation Program.*

For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of previous infection) _Recommended if some other risk factor is present (e.g., based on medical, occupational, lifestyle, or other indications)_.

No recommendation

---

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filling a VAERS report are available at [http://www.vaers.hhs.gov](http://www.vaers.hhs.gov) or by telephone, 800-822-7967. Information on how to file a Vaccine Injury Compensation Program claim is available at [http://www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation) or by telephone, 800-338-2382. Information about filling a claim for vaccine injury is available through the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20001; telephone, 202-357-6400. Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination also is available at [http://www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 24 hours a day, 7 days a week.
Figure 2. Vaccines that might be indicated for adults based on medical and other indications

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>VACCINE</th>
<th>PREGNANCY</th>
<th>IMMUNOCOMPROMISING CONDITIONS (excluding human immunodeficiency virus [HIV])</th>
<th>HIV INFECTION</th>
<th>CD4+ T LYMPHOCE COUNT</th>
<th>DIABETES, HEART DISEASE, CHRONIC LUNG DISEASE, CHRONIC ALCOHOLISM</th>
<th>ASPLENIA (INCLUDING ELECTIVE SPHENECTOMY) AND PERSISTENT COMPLEMENT COMPONENT DEFICIENCIES</th>
<th>CHRONIC LIVER DISEASE</th>
<th>KIDNEY FAILURE, END-STAGE RENAL DISEASE, RECEIVERSHIP OF BLOOD TRANSFUSIONS</th>
<th>HEALTHCARE PERSONNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza1,*</td>
<td>TIV annually</td>
<td>1 dose TIV or LAIV annually</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)2,*</td>
<td>Td</td>
<td>Contraindicated</td>
<td>2 doses</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella3,*</td>
<td>Contraindicated</td>
<td>2 doses</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)4,*</td>
<td>Contraindicated</td>
<td>2 doses</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster5</td>
<td>Contraindicated</td>
<td>1 dose</td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)6,*</td>
<td>Contraindicated</td>
<td>1 or 2 doses</td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
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<td>Pneumococcal (polysaccharide)7,8</td>
<td>1 or 2 doses</td>
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<td></td>
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<td></td>
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<td>1 or more doses</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hepatitis A10,*</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B11,*</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Covered by the Vaccine Injury Compensation Program.

For all persons in this category who meet the age requirements and who lack evidence of immunity (i.e., lack documentation of vaccination or have no evidence of previous infection).

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of February 4, 2011. For all vaccines being recommended on the adult immunization schedule, a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine’s other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers’ package inserts and the complete statements from the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/pubs/acip-recs.htm).

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention’s (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Obstetricians and Gynecologists (ACOG), and the American College of Physicians (ACP).
Influenza Vaccination Recommendation

- Annual influenza vaccination is recommended for every person in the United States 6 months of age and older

- Make a special effort to vaccinate persons at increased risk of complications of influenza and their close contacts
  - persons with underlying medical illnesses
  - persons 65 years of age and older
  - pregnant women
  - children younger than 2 years of age

MMWR 2010;59 (in press)
Inactivated Influenza Vaccine
Contraindications and Precautions

- Severe allergic reaction to a vaccine component or following a prior dose
- Moderate or severe acute illness
- History of Guillain-Barre’s syndrome within 6 weeks following a previous dose of influenza vaccine
Adult Immunization

Pneumococcal
Annual Burden of Pneumococcal Disease in the United States

- More than 40,000 invasive infections
- More than 4,500 deaths
- Incidence of pneumococcal disease rises steadily with increasing age
- Drug resistant strains of pneumococcus are becoming more common

http://www.cdc.gov/abcs/reports-findings/surv-reports.html
Pneumococcal Polysaccharide Vaccine

- 60% to 70% efficacy against invasive disease
- Duration of immunity at least 6 years
- Schedule 1 dose
- Selective revaccination (at least 5 years after the first dose)
Pneumococcal Polysaccharide Vaccine Recommendations

- Adults 65 years of age and older
- Adults of any age with a normal immune system who have chronic illness
  - cardiovascular disease
  - pulmonary disease
  - diabetes
  - alcoholism, cirrhosis
  - asthma
  - cigarette smoking
Pneumococcal Polysaccharide Vaccine
Revaccination Recommendations

- Routine revaccination of immunocompetent persons is NOT recommended.
- Revaccination is recommended for persons at highest risk of serious pneumococcal infection.

- Revaccinate once
- 5 years or longer after first dose (interval applies to persons of all ages)

MMWR 1997;46(RR-8)
Adult Immunization
Hepatitis B
Hepatitis B Vaccine

- Composition: Recombinant HBsAg
- Efficacy: 95% (Range, 80%-100%)
- Duration of Immunity: 20 years or more
- Schedule: 3 Doses

Double dose for immunodeficient patients
Booster doses not routinely recommended
## Hepatitis B

### Adolescent and Adult Schedule

<table>
<thead>
<tr>
<th>Dose</th>
<th>Usual Interval</th>
<th>Minimum Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary 1</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Primary 2</td>
<td>1 month</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Primary 3</td>
<td>5 months</td>
<td>8 weeks</td>
</tr>
</tbody>
</table>

Third dose must be separated from first dose by at least 16 weeks.
Prevaccination Serologic Testing

- Not indicated before routine vaccination of infants or children

- Recommended for
  - all persons born in Africa, Asia, the Pacific Islands, and other regions with HBsAg prevalence of 8% or higher
  - household, sex, and needle-sharing contacts of HBsAg-positive persons
  - HIV-infected persons

- Consider for
  - Groups with high risk of HBV infection (MSM, IDU, incarcerated persons)
Postvaccination Serologic Testing

- Not routinely recommended

- Recommended for:
  - Infants born to HBsAg+ women
  - Hemodialysis patients
  - Immunodeficient persons
  - Sex partners of persons with chronic HBV infection
  - Certain healthcare personnel
Management of Nonresponse to Hepatitis B Vaccine

- Complete a second series of three doses

- Should be given on the usual schedule of 0, 1 and 6 months

- Retest 1-2 months after completing the second series
One of the most important reasons adults identify for not receiving a vaccine is the lack of a provider recommendation for the vaccine.
Interventions to Improve Adult Vaccination Coverage

- Client reminder and recall systems
- Provider reminder and recall systems
  - computer notification
  - flow sheet or checklist
  - flagging medical record with sticker or stamp
- Assessment and feedback for providers
Interventions to Improve Adult Vaccination Coverage

- Standing orders
  - allow nonphysician personnel to prescribe or deliver vaccines using a protocol
- Reducing out-of-pocket costs for patients
- Expanding access
  - increasing or changing hours when immunization services are offered
  - “express lane” for immunizations
Interventions to Improve Adult Vaccination Coverage

- Screen for vaccine indications
- Recommend the vaccines
- Make the vaccines available in the office
- Patient reminder and recall
- Standing order system
National Center for Immunization and Respiratory Diseases
Contact Information

- **Telephone**      (800) CDC-INFO
- **Email**      nipinfo@cdc.gov
- **Website**      http://www.cdc.gov/vaccines/

- **Broadcast Updates and Resources**
  - **Web Page**      http://www.cdc.gov/vaccines/ed/webcasts.htm
Resources

- National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
  http://www.cdc.gov/nchhstp/About.htm

- http://www.healthypeople.gov

Resources

- The American Association for the Study of Liver Diseases
TB Resources

- Frances Curry National TB Center
  - [http://www.sftbc.org/](http://www.sftbc.org/)
Deborah.Borne@sfdph.org
Hepatitis B
Hepatitis B Virus Infection

- More than 350 million chronically infected worldwide
- Established cause of chronic hepatitis and cirrhosis
- Human carcinogen—cause of up to 80% of hepatocellular carcinomas
- More than 600,000 deaths worldwide in 2002
Hepatitis B Complications

- Fulminant hepatitis
- Hospitalization
- Cirrhosis
- Hepatocellular carcinoma
- Death
Risk of Chronic HBV Carriage by Age of Infection

- Carrier risk (%)
- Age of infection:
  - Birth
  - 1-6 mo
  - 7-12 mo
  - 1-4 yrs
  - 5+ yrs

The graph shows a downward trend in carrier risk with increasing age of infection.

 Carrier risk (%) vs. Age of infection

[Graph showing the risk of chronic HBV carriage by age of infection, with carrier risk decreasing significantly from birth to 5+ years.]
HBV Disease Burden in the United States

- **Prevaccine era**
  - estimated 300,000 persons infected annually, including 24,000 infants and children

- **2005**
  - estimated 51,000 infections
Risk Factors for Hepatitis B

- Unknown (16%)
- Other (5%)
- IDU (16%)
- MSM (24%)
- Heterosexual, multiple partners (39%)
Hepatitis B Virus Infection by Duration of High-Risk Behavior

- IV drug user
- Homosexual men
- HCWs
- Heterosexual

Percent infected vs. Years at Risk
Strategy to Eliminate Hepatitis B Virus Transmission—United States

- Prevent perinatal HBV transmission
- Routine vaccination of all infants
- Vaccination of children in high-risk groups
- Vaccination of adolescents
- Vaccination of adults in high-risk groups
Adults at Risk for HBV Infection

- Percutaneous or mucosal exposure to blood
  - current or recent IDU
  - household contacts of HBsAg-positive persons
  - residents and staff of facilities for developmentally disabled persons
  - healthcare and public safety workers with risk for exposure to blood or blood-contaminated body fluids
  - persons with end-stage renal disease
Other groups
- international travelers to regions with high or intermediate levels (HBsAg prevalence of 2% or higher) of endemic HBV infection
- persons with HIV infection
TB

The Next to Go

Fight Tuberculosis!

Red Cross Christmas Seal Campaign
Rate* of tuberculosis (TB) cases, by state/area --- United States, 2010

[Map of the United States showing varying rates of TB cases across states, with color coding for rate categories: >4.05, 2.0-4.0, <2.0.]
Number and rate* of tuberculosis (TB) cases among U.S.-born and foreign-born persons, by year United States, 1993--2010
TB Screening - UPSTF/CDC/ HCH

- Spent time with person known or suspected TB, HIV infected or other immune weakening condition that puts them at high risk for active TB
- Symptoms of active TB
- Country Where Tb is very common (Latin America, Caribbean, Africa, Asia, eastern Europe)
- Live some place in US where TB is common: Homeless shelter, migrant farm camp, prison, jail.
- Inject Illegal drugs
## Symptoms of Active TB Disease

<table>
<thead>
<tr>
<th>Systemic Symptoms</th>
<th>Pulmonary Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>Coughing (duration of ≥ 3 weeks)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Chest pain (when breathing or coughing)</td>
</tr>
<tr>
<td>Fever</td>
<td>Hemoptysis</td>
</tr>
<tr>
<td>Night sweats</td>
<td></td>
</tr>
<tr>
<td>Chills</td>
<td></td>
</tr>
</tbody>
</table>
Latent TB Infection (LTBI)

LTBI is the presence of *M. tuberculosis* organisms (tubercle bacilli) without symptoms or radiographic evidence of active TB disease.
Reading the Tuberculin Skin Test (TST)

- Measure reaction in 48 to 72 hours
- Measure induration, not erythema (redness)
- Record reaction in millimeters, not “negative” or “positive”
- Ensure trained health care professional measures and interprets the TST (PPD)
Interpreting Tuberculin Skin Test Reactions

<table>
<thead>
<tr>
<th>5 mm or greater</th>
<th>10 mm or greater</th>
<th>15 mm or greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV positive persons</td>
<td>Immigrants from high-prevalence areas</td>
<td>No known risk factors</td>
</tr>
<tr>
<td>Recent contacts of persons with active tuberculosis</td>
<td>Injection drug users</td>
<td></td>
</tr>
<tr>
<td>Fibrotic changes on chest radiograph, consistent with tuberculosis</td>
<td>Residents and employees* of high-risk congregate settings</td>
<td></td>
</tr>
<tr>
<td>Patients with organ transplants and other immunosuppressed patients</td>
<td>Personnel in mycobacteriology laboratories</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persons with clinical conditions that place them at high risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children: &lt;4 years of age; all exposed to adults at high-risk</td>
<td></td>
</tr>
</tbody>
</table>

(Note: the CDC discourages testing of people at low risk for infection.)
Quanti-FERON®-TB Gold

- Blood assay for *M. tuberculosis* > Interferon γ release assay
- *In vitro* test using whole blood specimen for the diagnosis of TB infection, whether latent or active
- Does not distinguish between latent TB infection or TB disease
# QFT and TST

<table>
<thead>
<tr>
<th>QFT</th>
<th>TST</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>in vitro</em> test</td>
<td><em>in vivo</em> test</td>
</tr>
<tr>
<td>Specific antigens</td>
<td>Less specific PPD</td>
</tr>
<tr>
<td>No boosting</td>
<td>Boosting</td>
</tr>
<tr>
<td>1 patient visit</td>
<td>2 patient visits</td>
</tr>
<tr>
<td>Lab variability</td>
<td>Inter-reader variability</td>
</tr>
<tr>
<td>Results possible in 1 day</td>
<td>Results in 2-3 days</td>
</tr>
<tr>
<td>Requires phlebotomy</td>
<td>No phlebotomy required</td>
</tr>
<tr>
<td>Includes + control</td>
<td>No + control</td>
</tr>
</tbody>
</table>
Flow Chart for Latent TB Infection (LTBI) in Primary Care

Patient with risk factors for LTBI

TST (PPD)

- Negative
  - No treatment; Document status in medical record

- Positive
  - History/HIV risk, physical exam, chest x-ray
    - Normal
      - Candidate for LTBI Treatment
    - Abnormal
      - Refer to TB clinic for evaluation of active TB
        - Positive
          - Treatment of active TB by TB clinic
        - Negative
          - Refer to TB clinic for evaluation of active TB

Note: Evaluate patient for LTBI testing and treatment regardless of BCG status

Rule out active TB disease before treatment for LTBI is started
Who Should be Treated for Latent TB Infection (LTBI)?

Anyone who has been diagnosed with latent TB infection is a candidate for treatment, if they also fulfill the following criteria:

- Willing and able to complete a full course of therapy
- Available to be monitored during the full course of treatment
- No medical contraindications such as active liver disease

(Note: careful assessment to rule out the possibility of active TB disease is always necessary before treatment for LTBI is started.)
### Preferred Regimen

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Frequency</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid (INH)</td>
<td>300 mg</td>
<td>Daily</td>
<td>9 months</td>
</tr>
</tbody>
</table>

A minimum of 270 doses must be administered within 12 months.
## Alternative Regimens for LTBI

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Frequency</th>
<th>Duration</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid</td>
<td>900 mg</td>
<td>Twice weekly</td>
<td>9 months</td>
<td>DOT</td>
</tr>
<tr>
<td>Isoniazid</td>
<td>300 mg</td>
<td>Daily</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td>Isoniazid</td>
<td>900 mg</td>
<td>Twice weekly</td>
<td>6 months</td>
<td>DOT</td>
</tr>
<tr>
<td>Rifampin</td>
<td>600 mg</td>
<td>Daily</td>
<td>4 months</td>
<td></td>
</tr>
</tbody>
</table>
Monitoring of Patients on Treatment for LTBI

- Baseline and monthly laboratory testing *not needed* except for patients with:
  - HIV infection
  - Pregnancy or within 3 months post-partum
  - History of liver disease/heavy alcohol use
  - Patient on chemotherapy

- Evaluate patients monthly for:
  - Adherence to treatment
  - Symptoms of hepatitis (fatigue, weight loss, nausea, vomiting, jaundice)
Treatment of Patients
35 Years of Age and Older

- The CDC changed its guideline in 2000 and now encourages treatment of LTBI in all age groups
- Use clinical judgment in treating older patients

Non-Treponemal Tests –
Some Causes of False Positive Reactions

- Autoimmune Disease (like lupus)
- Malaria
- Recent immunization
- Skin diseases
- Tuberculosis
- IV Drug abuse
- Viral infections
- An illness with a fever
- Pregnancy
- HIV
- Other STDs
- Multiple blood transfusions
- Leprosy
- Old age