Tuberculosis, Hepatitis C, & HIV/AIDS
Considerations for Mental Health & Substance Abuse Professionals

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OBJECTIVES

- Identify methods of infection and transmission.
- Identify modalities of treatment and care.
- Understand cultural impact on spread of infectious diseases.
- Identify community resources for testing and treatment.
TUBERCULOSIS
Tuberculosis: Overview

- Bacterial infection

- Most often found in lungs, but can spread through lymph nodes and bloodstream to any organ.

- Two types: Latent & Active

- Active TB bacteria cause tissue death in the infected organs, which can be fatal.

- Vaccine available, but with variable effectiveness
TUBERCULOSIS: THEN & NOW

Then…
- Prior to the Industrial Revolution: Vampires?
- 19th century: Romantics & artists
- Early 20th century: Caused by masturbation?
- Mid 20th century: We can fight it with meds!
- Late 20th century: We’ve beat it!
Tuberculosis: Then & Now

- ...but now it’s making a comeback.

- Someone in the world is newly infected with TB every second.
  - But... infection rates are slowly decreasing worldwide.

- Medication-resistant strains of the bacteria have emerged.
  - Treatable with lengthy, expensive chemotherapy.
  - Extensively drug-resistant (XDR) TB strains are appearing
Reported TB Cases
United States, 1982–2010*

*Updated as of July 21, 2011
TB Morbidity
United States, 2005–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>Rate*</th>
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<tbody>
<tr>
<td>2005</td>
<td>14,068</td>
<td>4.8</td>
</tr>
<tr>
<td>2006</td>
<td>13,732</td>
<td>4.6</td>
</tr>
<tr>
<td>2007</td>
<td>13,286</td>
<td>4.4</td>
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<td>2008</td>
<td>12,905</td>
<td>4.2</td>
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<tr>
<td>2009</td>
<td>11,537</td>
<td>3.8</td>
</tr>
<tr>
<td>2010</td>
<td>11,182</td>
<td>3.6</td>
</tr>
</tbody>
</table>

*Cases per 100,000. Updated as of July 21, 2011
TB Case Rates,* United States, 2010

Cases per 100,000.

<3.6 (2010 national average)

*D.C.

>3.6

*Cases per 100,000.
TB Case Rates* by Age Group
United States, 1993–2010

* Updated as of July 21, 2011
Reported TB Cases by Age Group, United States, 2010

- < 15 yrs (6%)
- 15-24 yrs (11%)
- 25-44 yrs (33%)
- 45-64 yrs (31%)
- ≥65 yrs (20%)
Reported TB Cases by Race/Ethnicity*
United States, 2010

Black or African American (24%)
Hispanic or Latino (30%)
Asian (28%)
White (16%)
American Indian or Alaska Native (1%)
Native Hawaiian or Other Pacific Islander (1%)

*All races are non-Hispanic. Persons reporting two or more races accounted for less than 1% of all cases.
**Tuberculosis: Symptoms**

- **Latent**
  - TB bacteria is in the body, but immune system is able to keep it from becoming active.
  - Cannot spread Latent TB to others.
  - Latent TB can develop into active TB.

- **Active**
  - TB bacteria are growing and causing symptoms. If lungs are infected with active TB, the disease can be easily spread.
Tuberculosis: Symptoms

- **Latent**: No symptoms

- **Active**:
  - Cough that brings up thick, cloudy, and sometimes bloody mucus from the lungs (called sputum) for more than 2 weeks.
  - Tiredness and weight loss
  - Night sweats and a fever.
  - A rapid heartbeat.
  - Swelling in the neck (when lymph nodes in the neck are infected).
  - Shortness of breath and chest pain (in rare cases).
Tuberculosis: Diagnosis

- Tuberculin skin test
  - Only indicates presence of bacteria, not latent/active status

- Pulmonary TB:
  - Chest X-Ray
  - Mucus (sputum) sample from lungs

- Extrapulmonary TB:
  - Tissue biopsy
  - CT or MRI scan
TUBERCULIN SKIN TEST

http://medicalpicturesinfo.com/tuberculosis-skin-test/
Doctors compare lung x-rays of a patient with TB (left) and a healthy patient (right).

http://www.clinicaladvisor.com/tuberculosis/slideshow/192/
TUBERCULOSIS OF THE SKIN

http://duhs.com/TB/images/module6 клиp_image00210.gif

http://www.your-doctor.net/dermatology_atlas/rwx/rwx/Tuberculosis_verrucosa_cutis.jpg
EXTRAPULMONARY TUBERCULOSIS

Tuberculosis of Bovine Uterus
http://www.cfsph.iastate.edu/DiseaseInfo/ImageDB/TUB/TUB_004.jpg

Tuberculosis of the Kidneys
TUBERCULOSIS: TRANSMISSION

- TB bacteria are airborne and thus fairly contagious
- Requires more than a single, social contact with an infected person
- Only 10% of people infected with TB develop active TB; 90% of infections remain latent
  - 50% of active cases are eventually fatal
  - Both Active & Latent infections require medication treatment
- If untreated, each actively infected person will infect an average of 10-15 people annually.
TUBERCULOSIS: RISK FACTORS

- Have HIV or another illness that weakens their immune system.
- Have close contact with someone who has active TB, such as living in the same house as someone who is infected with TB.
- Care for a patient who has active TB, such as doctors or nurses.
- Live or work in crowded places such as prisons, nursing homes, or homeless shelters, where other people may have active TB.
- Have poor access to health care, such as homeless people and migrant farm workers.
- Abuse drugs or alcohol.
- Travel to or were born in places where untreated TB is common, such as Latin America, Africa, Asia, Eastern Europe, and Russia.
TUBERCULOSIS: TREATMENT

- **Latent:**
  - One antibiotic taken for 9 months

- **Active:**
  - Multiple (usually 4) antibiotics taken for at least 6 months

- **Importance of medication adherence!**
  - MDR-TB treatments
PROGRESSIVE APPEARANCE OF TUBERCULOSIS IN LUNG CAVITIES

http://aspergillusblog.blogspot.com/2011/12/people-die-as-aspergillosis-is.html
TUBERCULOSIS: WORLDWIDE

- One-third of the world’s population is currently infected with the TB bacteria.
  - Highest new infection rate: Africa
  - Most new infections: Southeast Asia

- In 2011, 8.7 million people fell ill with TB and 1.4 million died from TB.

- TB is considered to be one of the “Diseases of Poverty,” along with HIV/AIDS and malaria.

Estimated TB incidence rates, 2010

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TUBERCULOSIS ON THE DECLINE

- The world is on track to achieve the Millennium Development Goal to reverse the spread of TB by 2015.

- The TB death rate dropped 41% between 1990 and 2011.

Tuberculosis & HIV/AIDS

- Tuberculosis is an AIDS defining illness.
- Tuberculosis is a leading killer of people living with HIV causing one quarter of all deaths.

“When you find TB, test for HIV, When you find HIV, test for TB.”
FOR MORE INFORMATION ON TB

- **Oklahoma State Department of Health**
  1000 NE 10th Street, Room 608
  Oklahoma City, OK 73117-1299
  Tel: 405-271-4060
  Fax: 405-271-6680

- **Centers for Disease Control & Prevention**
  [www.cdc.gov/tb](http://www.cdc.gov/tb)
HEPATITIS C: OVERVIEW

- Hepatitis C
  - Viral infection caused by contact with infected blood:
    - Mother-child infection rare, but possible
    - Also spread through sexual contact

- Two subtypes:
  - Acute (first 6 months of infection)
  - Chronic

- Can lead to permanent liver damage, cirrhosis, liver cancer, and liver failure.

- Often undiagnosed until some liver damage has already occurred.
HEPATITIS C: SYMPTOMS & DIAGNOSIS

- Feeling very tired
- Upset stomach
- Stomach pain
- Fever
- Yellowish skin and/or eyes
- Dark urine
- Light-colored stools

- The only way to know if you have Hepatitis C is to have a blood test.
Hepatitis C: Transmission

- Transmitted through the sharing of needles or other equipment to inject drugs.
- Passed through contact with infected blood (tattoos, needlestick injuries) and unscreened blood transfusions.
- Can also be transmitted sexually and mother to baby during pregnancy.
Hepatitis C: Risk Factors

- Compromised/diminished immune system
- Injection drug use (55%)
- Exposure to infected sexual partner or multiple partners (20%)
- Occupational, hemodialysis, household, perinatal (10%)
**PROGRESSION OF HCV**

For every 100 people infected with the hepatitis C virus:

- 75-85 will develop chronic HCV infection
- 60-70 will go on to develop chronic liver disease
- 5-20 will go on to develop cirrhosis over 20-30 years
- 1-5 will die from cirrhosis or liver cancer
LONG-TERM EFFECTS OF HCV

Severe liver damage can lead to:

- Problems with blood clotting
- Swelling stomach and ankles
- Not being able to think clearly
- Liver failure

The only treatment for liver failure is liver transplant.
LONG-TERM EFFECTS OF HCV: EDEMA
Long-term effects of HCV: Jaundice & Ascites
HEPATITIS C: TREATMENT

- Interferon & Ribavirin
  - 48 weeks (discontinued if no response after 12 weeks)

- Injected intramuscularly, intravenously or subcutaneously

- Daily, weekly or three times a week

- Goal: Sustained Virologic Response (SVR)
  - 89% in mono-infection achieve SVR
  - 30% in HCV/HIV co-infection achieve SVR
INTERFERON: SIDE EFFECTS

- Flu-like symptoms
- Nausea
- Diarrhea
- Injection-site reaction
- Neuropsychiatric disorders
  - Depression, Suicide
  - Mood lability
  - “Brain Fog”
**INTERFERON SIDE EFFECTS: DEPRESSION**

- Assess before starting treatment
- Stabilize on antidepressant before treatment
- Establish care with counselor, psychiatrist, primary care giver before treatment
- Immediate evaluation if suicidal. May need to discontinue HCV treatment.
170-200 Million (M) Carriers Worldwide

- United States: 3-4 M
- Americas: 12-15 M
- Western Europe: 5 M
- Eastern Europe: 10 M
- Africa: 30-40 M
- Southeast Asia: 30-35 M
- Far East Asia: 60 M
- Australia: 0.2 M

HEPATITIS C IN THE UNITED STATES

- 3.7 million infected in U.S.
- 25,000-35,000 new infections per year
- 8,000-10,000 deaths from HCV annually
- HCV-related deaths and liver transplants projected to triple in next decade
Figure 4.1. Reported and adjusted* number of acute hepatitis C cases — United States, 1992–2009

* Adjusted for underreporting.
Note: 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)
Figure 4.3. Incidence of acute hepatitis C*, by sex — United States, 1992–2009

* 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)
PREVALENCE OF HEPATITIS C IN SELECTED SUBGROUPS IN THE UNITED STATES

- Injection drug users: 52-90%
- Hemophiliacs: 60-85%
- HIV-infected individuals: 30-40%
- Incarcerated HIV-infected: 50%
- MSM: 4-8%

NIH Consensus Development Conference Panel Statement Management of Hepatitis C, 2002
HEPATITIS C IN OKLAHOMA

- There are no dedicated Hepatitis C clinics in Oklahoma.
- An estimated 80,000 Oklahomans are infected with chronic HCV.
- State and federal funding for HCV in Oklahoma totals only approximately $120,000.
Hepatitis C Resources

- Janet Wilson, RN  
  Adult Viral Hepatitis Prevention Coordinator  
  Oklahoma Dept of Health HIV/STD Service  
  1000 NE 10th Street, Room 609  
  Oklahoma City, OK 73104  
  (405) 271-9444 x56625

- Oklahoma Transplant Center at OU Medical Center  
  940 NE 13th Street  
  Oklahoma City, OK 73104  
  (405) 271-7498  
  outransplant.com

- County health departments
HIV/AIDS
HIV vs AIDS: OVERVIEW

- Viral infection
- **Human Immunodeficiency Virus**
- Virus infects and destroys a certain type of white blood cell (CD4+).
- Not the same as AIDS!
- Definitions:
  - CD4+ cells / CD4+ count
  - Viral Load (VL)
HIV vs AIDS: What is AIDS?

- **Acquired Immune Deficiency Syndrome**
  - Final stage of HIV infection
  - Over time (especially if left untreated), HIV will eventually weaken the immune system so much that the person will become sick with types of infections known as opportunistic infections.

- Considered to have AIDS when:
  - CD4+ count is below 200 (or less than 15% of total lymphocytes)
  - Has one or more opportunistic infections
**Some Opportunistic Infections**

<table>
<thead>
<tr>
<th>Fungal Infections</th>
<th>Viral Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidiasis (oral and esophageal) (e.g. thrush)</td>
<td>CMV</td>
</tr>
<tr>
<td>Cryptococcus</td>
<td>Herpes (longer than 1 month)</td>
</tr>
<tr>
<td>Histoplasmosis</td>
<td>Hepatitis</td>
</tr>
<tr>
<td><strong>Bacterial Infections</strong></td>
<td><strong>Epstein Barr</strong></td>
</tr>
<tr>
<td>MAC</td>
<td>Genital Wart</td>
</tr>
<tr>
<td>Tuberculosis (TB)</td>
<td>Molluscum</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td><strong>Parasitic Infections</strong></td>
</tr>
<tr>
<td><strong>Pneumonias</strong></td>
<td>Toxoplasmosis</td>
</tr>
<tr>
<td>Bacterial</td>
<td>Cryptosporidium</td>
</tr>
<tr>
<td>Pneumocystis carinii (PCP)</td>
<td>Isosporiasis</td>
</tr>
<tr>
<td><strong>Wasting Syndrome</strong></td>
<td><strong>Cancers</strong></td>
</tr>
<tr>
<td></td>
<td>Kaposi’s Sarcoma (KS)</td>
</tr>
<tr>
<td></td>
<td>Lymphoma</td>
</tr>
</tbody>
</table>
CANDIDIASIS (THRUSH)
Kaposi’s Sarcoma
History of the AIDS Epidemic in the USA

- June, 1981: 5 young gay men in Los Angeles with Pneumocystis carinii pneumonia reported
- 26 gay men with Kaposi’s sarcoma and/or PCP reported several weeks later
- Similar syndrome reported in injection drug users
HISTORY OF AIDS

- 1982: CDC notes similar syndrome in hemophiliacs and Haitians
- New disease is called gay-related immunodeficiency syndrome
- September, 1982: CDC publishes case definition using the term “AIDS”
HISTORY OF AIDS

- 1983: human immunodeficiency virus first isolated in France
- 1984: HIV linked to AIDS
- 1986: HIV-2 discovered in west Africa
THE EARLY EPIDEMIC

• Late 1981: 100 cases reported to CDC
• Early 1983: 1,000 cases
• Late 1980’s: all states report cases
• 1989: 100,000 cases
• 1995: 500,000 cases
Adults and children estimated to be living with HIV | 2009

Total: 33.3 million [31.4 million – 35.3 million]
Estimated number of adults and children newly infected with HIV | 2009

North America 70 000 [44 000 - 130 000]
Caribbean 17 000 [13 000 - 21 000]
Central & South America 92 000 [70 000 - 120 000]

Middle East & North Africa 75 000 [61 000 - 92 000]

Sub-Saharan Africa 1.8 million [1.6 million - 2.0 million]

Western & Central Europe 31 000 [23 000 - 40 000]
Eastern Europe & Central Asia 130 000 [110 000 - 150 000]

East Asia 82 000 [48 000 - 140 000]
South & South-East Asia 270 000 [240 000 - 320 000]

Oceania 4500 [3400 - 6000]

Total: 2.6 million [2.3 million - 2.8 million]
HIV estimated prevalence among population aged 15–49 years (%), 1990

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Data Source: UNAIDS/World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

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Data Source: UNAIDS/World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

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Rates of Adults and Adolescents Living with a Diagnosis of HIV Infection, Year-end 2009—46 States and 5 U.S. Dependent Areas

N = 800,784

Total Rate = 327.6
Rates per 100,000 population

- <100.0
- 100.0 – 199.9
- 200.0 – 299.9
- ≥300.0

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.
Numbers of AIDS Diagnoses among Adults and Adolescents, by Race/Ethnicity and Year of Diagnosis, 1985–2010—United States and 6 U.S. Dependent Areas

Note. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.

* Hispanics/Latinos can be of any race.
* Includes Asian/Pacific Islander legacy cases.
Diagnoses of HIV Infection among Adults and Adolescents, by Sex and Race/Ethnicity, 2010—46 States and 5 U.S. Dependent Areas

**Males**
- N = 37,910
- American Indian/Alaska Native: 24%
- Asian: 2%
- Black/African American: 41%
- Multiple races: <1%

**Females**
- N = 10,168
- Hispanic/Latino: 17%
- Native Hawaiian/other Pacific Islander: 1%
- White: 62%
- Multiple races: <1%

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. *Hispanics/Latinos can be of any race.*
Diagnoses of HIV Infection among Adults and Adolescents, by Sex and Transmission Category, 2010—46 States and 5 U.S. Dependent Areas

Males
N=37,910
77%
- Male-to-male sexual contact: 7%
- Injection drug use (IDU): 4%
- Male-to-male sexual contact and IDU: <1%
- Other: 12%

Females
N=10,168
86%
- Heterosexual contact: 14%
- Other: <1%
- Other: <1%

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 and missing risk-factor information, but not for incomplete reporting.

*a Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
b Other includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.
Oklahoma

- 300 cases diagnosed in Oklahoma in 2010
- 8,462 cumulative cases of HIV/AIDS at the end of 2010 (AIDS: 5,449; HIV: 3,013)
- Oklahoma ranks 20th for the number of persons living with HIV/AIDS
- Oklahoma ranks 25th for number of new diagnoses
HIV/AIDS Prevalence in Oklahoma by Age Group as of 2009

Age at Diagnosis

Unknown <13 13-19 20-29 30-39 40-49 50-59 60+
Number of Cases
0 200 400 600 800 1000 1200 1400 1600 1800 2000
HIV: TRANSMISSION

- Primarily transmitted 3 ways:
  - Unprotected anal and vaginal intercourse
  - Injecting drugs with contaminated needles and/or equipment
  - Infected mother to infant
HIV: Myths about Transmission

- Casual contact (hugging, shaking hands)
- Coughing/sneezing
- Sharing food or utensils
- Dry kissing
- Donating blood
- Mosquito or other insect bites
HIV: Risk Factors

- Injecting drugs or steroids, during which equipment (such as needles, syringes, cotton, water) and blood were shared with others.
- Having unprotected vaginal, anal, or oral sex (that is, sex without using condoms) with men who have sex with men, multiple partners, or anonymous partners.
- Exchanging sex for drugs or money.
- Being diagnose with, or been treated for, hepatitis, tuberculosis (TB), or a sexually transmitted disease (STD) such as syphilis.
- Having received a blood transfusion or clotting factor during 1978–1985.

- Have had unprotected sex with someone who has any of the risk factors listed above.
HIV: Symptoms

- HIV infection is symptomatic in 40%-90% of cases.
  - Symptoms appear 2-4 weeks after exposure
  - Illness is non-specific and mononucleosis-like
  - Clinical illness lasts 1-4 weeks

- Because people may not go to the doctor for symptoms, HIV often goes undiagnosed until the person develops an opportunistic infection.
Why is HIV Testing so important?

Of the 1+ million HIV-infected persons in the U.S., 21% are unaware of their status.
HIV: Testing

Who should be tested?

- CDC recommends routine screening for everyone aged 13-64 years in all healthcare settings.
- Healthcare settings include:
  - Emergency departments
  - Urgent care clinics
  - Primary care settings
  - Inpatient services
  - Corrections health-care facilities
  - TB clinics
  - STD clinics
  - Substance use clinics
  - Public health clinics
  - Community clinics
HIV: TESTING

- At least annually for all persons at high risk of HIV infection:
  - Injection-drug users (IDUs)
  - Sex partners of IDUs
  - Persons who exchange sex for money or drugs
  - Sex partners of HIV infected
  - Men who have sex with men (MSM)
  - Heterosexuals who themselves or their sex partners have had >1 sex partner since last HIV test

- Before new sexual relationship
HIV: TESTING

- Traditional Testing (blood draw)
  - Blood is drawn, sent to the lab
  - Results in approx 2 weeks
  - Highly accurate

- Rapid Testing (finger stick or oral swab)
  - Can be completed virtually anywhere, thus reducing number of people who do not receive their results.
  - Small sample is taken
  - Results in 20 minutes
  - Highly accurate negative; preliminary positive
HIV: TESTING

- If rapid test is preliminary positive…
  - Retest
  - Blood draw for confirmation

- Each blood draw sample has 3 tests run on it prior to confirming a positive result.
HIV: Treatment

- HAART (Highly-Active Anti-Retroviral Therapy)
  - Often consists of combination of several medications
  - Adherence is very important!
    - Viral mutations & development of resistance
  - Side effects can be very difficult, such as
    - Chronic diarrhea
    - Nausea
    - Abnormal distribution of body fat

- If AIDS, additional treatment may be necessary to address OIs and/or other health problems.
GUIDELINES FOR ANTIRETROVIRAL THERAPY

- CDC recommends beginning ART:
  - Have had AIDS-defining illness or CD4 < 350
  - CD4 between 350 and 500
  - Regardless of CD4 if also have HBV & need Tx

- If CD4 > 500, the panel is divided.
HIV: Antiretroviral Classes

- Nucleoside reverse transcriptase inhibitors (NRTI)
- Non-nucleoside reverse transcriptase inhibitors (NNRTI)
- Protease inhibitors
- Fusion inhibitors
- Integrase inhibitors
- Entry inhibitors
HIV: Limits to Treatment

- Adherence issues
  - Access to care
  - Cost
  - Side effects
  - Multiple pills a day

- Transmittal of resistance
HIV: CONTRIBUTING FACTORS

- Negative variables
  - Poverty
  - Abuse
  - Incarceration
  - Drugs

- Culture

- Lack of comprehensive sex education
POVERTY

- **2012 Federal Poverty Level:** $11,170 for a single person
- **5,952 Kids homeless in OK** (Daily Oklahoman: 3/11/09)
- **444,035 Oklahomans received food stamps in Feb 2009**
  - An increase of 6.4% from a year earlier. (Daily Oklahoman: 3/17/09)
- In 2007 the Salvation Army provided assistance to 121,000 Oklahomans; that figure jumped to 125,977 in 2008 (Daily Oklahoman: 1/8/09)
- **1192 unduplicated clients surveyed in the IDI in 2011:**
  - 611 had incomes at or below the Federal Poverty Level above (51%).
  - 216 at or below 200% of Federal Poverty Level
  - 294 unknown
RESOURCES

OU Health Sciences Center
*Infectious Diseases Institute*
711 Stanton L. Young Blvd., Suite 430
Oklahoma City, OK 73104
(405) 271-6434

OSU College of Osteopathic Medicine
*Houston Parke Clinic*
635 West 11th
Tulsa, OK 74127
(918) 382-5058