

# **HIV / AIDS Comprehensive**

## **Objectives**

By the end of this course, the clinician will be able to identify at risk populations for HIV/AIDS.

Clinician will demonstrate comprehension of new testing recommendations for HIV

Clinician will be able to recognize new health concerns in HIV patients

Identify and understand about bloodborne pathogens

## **Introduction**

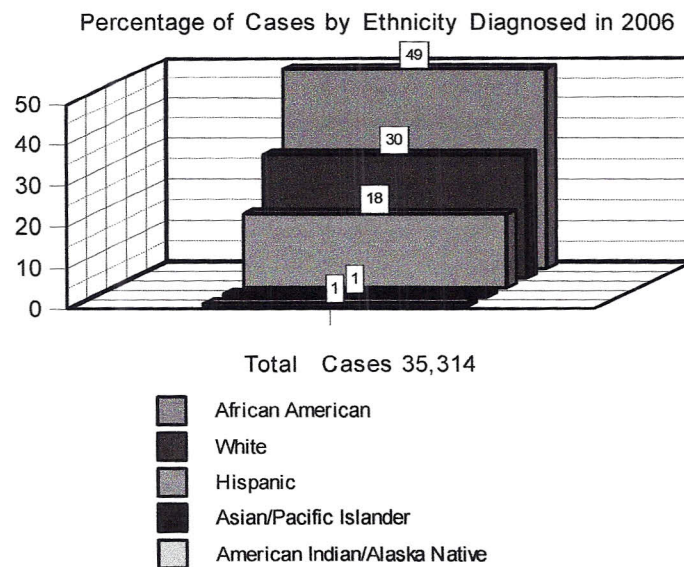
The history of AIDS in the United States goes back to approximately 1969, when it was thought that the disease was introduced to the US by a Haitian immigrant. In the early part of the 1980's, larger city doctors began seeing a type of cancer in young men that usually is restricted to older men of Mediterranean origin. What is now known as Kaposi's sarcoma was then coined as 'Gay Cancer' and added to the stigma of Homosexuality in the United States. However, cases in young children, women, and person's having blood transfusions began to occur and the symptoms were not limited to skin cancers, but also included specific types of pneumonia. In 1982, the CDC renamed the syndrome AIDS.

With the advanced strides made in medical treatment, persons with HIV are living longer. In New York City, where an estimated 100,000 persons are estimated to be living with the virus, over 30 percent of those are over fifty years of age. With medical advances that allow HIV patients to live longer, comes another set of realities as these patients are presented with compounding diagnoses never before encountered in this patient population and physicians are presented with

the overwhelming task of attempting to manage the increased pathological burden in these patients.

While fewer people are dying of HIV, the numbers of infected persons are reaching epidemic proportions. In 2003, and estimated 1,039,000 to 1,185,000 persons in the United States were estimated to be living with HIV/AIDS and 24-27% of these persons were **totally unaware** that they were infected with the disease. This means that almost one fourth of over one million persons remain untreated and undiagnosed; and potentially are unknowingly spreading the disease to others.

Men still account for the greater number of HIV/AIDS cases present in the United States. In 2006, men accounted for three fourths of all cases diagnosed in the 33 states having confidential name based reporting.



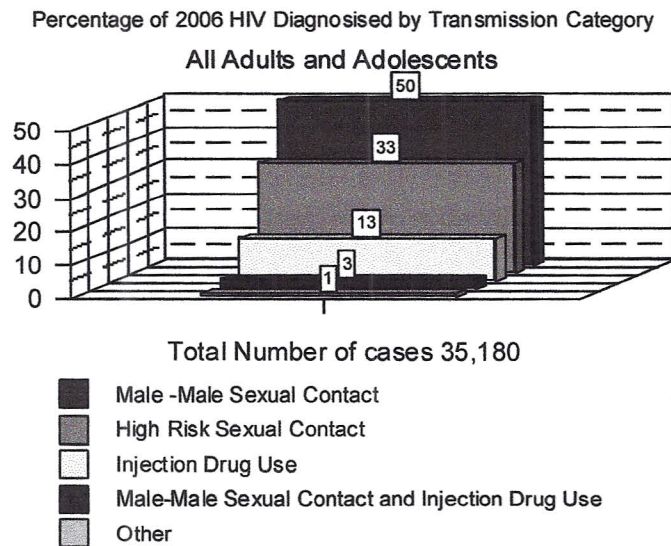
Data Based on the 33 states having confidential name based reporting

In 2006, the number of new HIV/AIDS diagnoses is highest in the transmission category of men having sex with men (MSM). However, the rate of heterosexual high risk transmission among all groups is rapidly growing and is the most important factor in women being infected with the disease, even when IV drug use is present. These results were obtained after a 10-year study by the National Institute on Drug Abuse. The CDC categorizes the heterosexual transmission of HIV into two groups: primary and secondary. Primary transmission is defined as sexual contact with a partner with known risk factors for HIV transmission. Secondary transmission is contact with an HIV positive partner not known to be at risk for HIV. In 2001, more men reported sexual contact with a partner with risk factors for primary transmission for HIV while

persons reporting secondary transmission were more likely to be women. Since 1988, the number of heterosexual mediated HIV/AIDS cases has continued to increase, changing the face of AIDS from a primarily high-risk behavior disease to an increasingly generalized sexually transmitted entity. This is of particular concern in the medical community, because many heterosexual persons are still having a false sense of security about HIV/AIDS transmission and are engaging in unprotected sexual activity with very little knowledge about their risk.

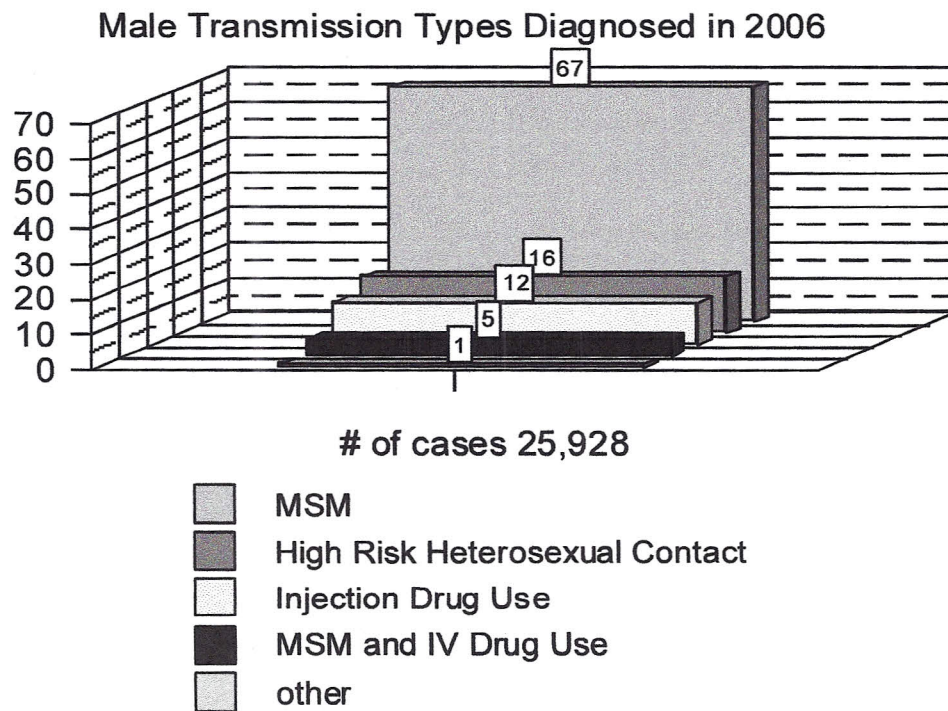
When the country was first introduced to HIV/AIDS, it was bombarded with information on the nightly news and in the media, leading to almost paranoia about the disease. However, in recent years media attention to the problem has diminished, leaving education about the disease largely in the hands on the medical and scientific community. This is bad news for persons not receiving routine health care services. This factor enhances the false sense of security in the heterosexual community regarding the risk of acquiring HIV. Additionally, it has been over 20 years since the public began receiving the reports of HIV/AIDS and a new generation is now in their late teens and early twenties and is engaging in sexual activity without the benefit of the early knowledge of HIV/AIDS that came with the initial media onslaught.

This data is backed up by the 2006 CDC report on HIV diagnoses by transmission category. Roughly, 83% of all cases diagnosed in 2006 were due to Heterosexual and MSM sexual contact. Total cases linked to injection drug abuse made up only 16% of all diagnosed HIV cases.



The rates of sexually acquired HIV/AIDS accounts for the majority of diagnosed cases in males in 2006. Male sexually acquired HIV diagnosis in 2006 accounted for 83% of all male cases compared to 80% of all female cases. When looking at actual case count figures, male sexual behaviors account for 3

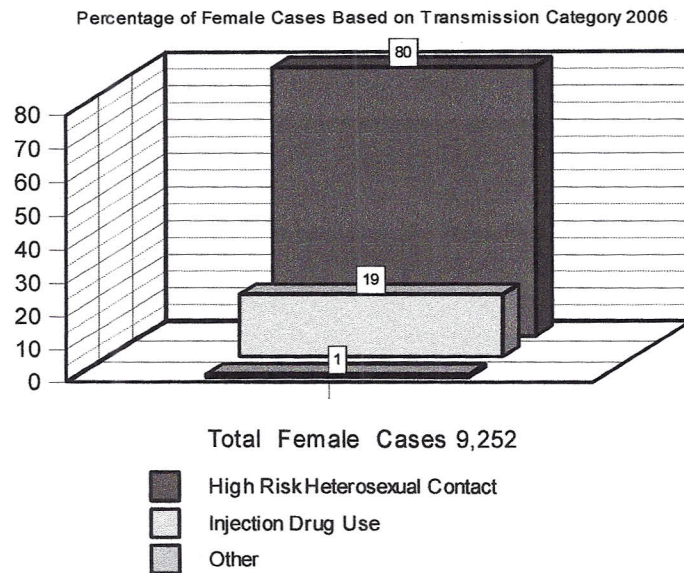
times more diagnoses of HIV/AIDS than do female sexual behaviors. Males were slightly more likely to have an HIV diagnosis related to IV drug use (17%), than females were in 2006 (19%). These figures look deceptive at first; but when you divide the percentages by actual number of cases, male IV drug use accounts for almost 3 times more HIV cases than females. For men, homosexual contact remains the primary risk behavior associated with HIV/AIDS diagnosis in the United States. The prevalence of unprotected anal sex among homosexual males has been shown to be more of a risk than vaginal intercourse. In fact, among heterosexual individual who practice unprotected anal sex on at least an occasional basis have higher percentages of HIV/AIDS than do heterosexuals who practice unprotected vaginal intercourse.



Several studies have been conducted to determine why men seem to be more at risk for HIV infection than women. One study of uncircumcised men found that the cells on the inner side of the foreskin contained high numbers of cells that are targeted by HIV. Men also tend to have more sexual partners than women do and are more likely to engage in risky sexual behaviors. Social pressures of masculine ideals may play a role as well by overtly discouraging condom use and having discussions about sexual risk with their partner before engaging in intercourse.

Researchers are also finding out that genetic differences may play a role in why some people are more susceptible to HIV. A protein called CCL3L1, which blocks the AIDS virus, is found in varying amounts in individuals. Persons with

more copies than average of this protein have been found to be less susceptible to HIV, while persons with fewer copies have been found to be more susceptible.

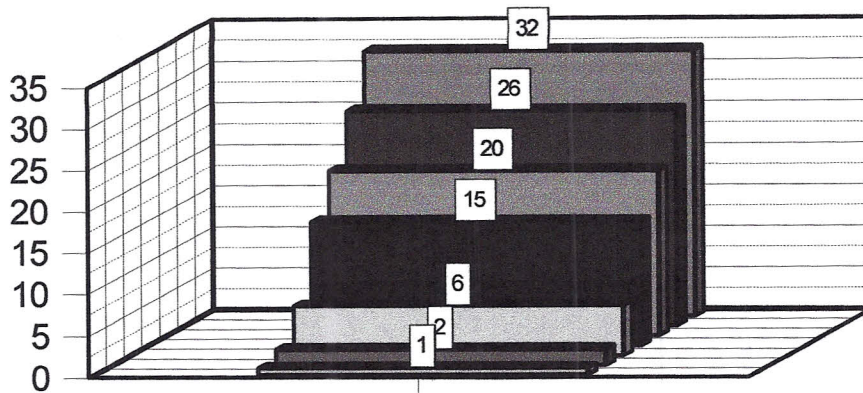


In women, factors for susceptibility have been found to be related biology. The vaginal tissue gives a greater surface area for exposure to the HIV virus from sexual fluids. Diminished vaginal lubrication, which can lead to breaks in the vaginal mucosa during intercourse, can also be a factor. In addition, cervical ectopy can increase the risk of contracting chlamydia, which can increase the risk of acquiring HIV infection. Cervical ectopy is a common condition and occurs when the regular squamous cells of the cervix become replaced by more fragile, thinner tissue in the cervical tract.

For women, the largest transmission category is high-risk heterosexual contact, which accounts for 80% of all the female cases of HIV diagnosed among the areas with confidential name based reporting in 2006. Injection drug use still carries approximately one fifth of the case diagnoses and remains a significant number among females.

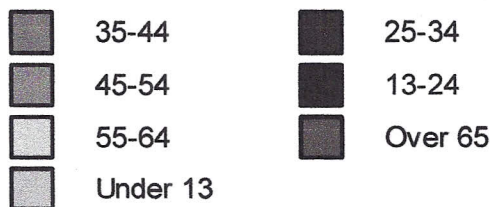
Persons aged 25 to 54 account for 75% of all the cases of HIV diagnosed in 2006. Persons over fifty that are living with HIV/AIDS has steadily been increasing in recent years, and account for approximately 25% of persons that were living with the disease in 2005 and 15% of all the new diagnoses for that year. The largest age group within this category were persons aged 35 to 44 who accounted for 32 percent of all the diagnosed cases. Surprisingly the age group 13 to 24 accounted for only 15% of the cases that were diagnosed in 2006, by numbers that amounts to almost 5,300 cases.

Percentage of Cases by Age Diagnosed in 2006



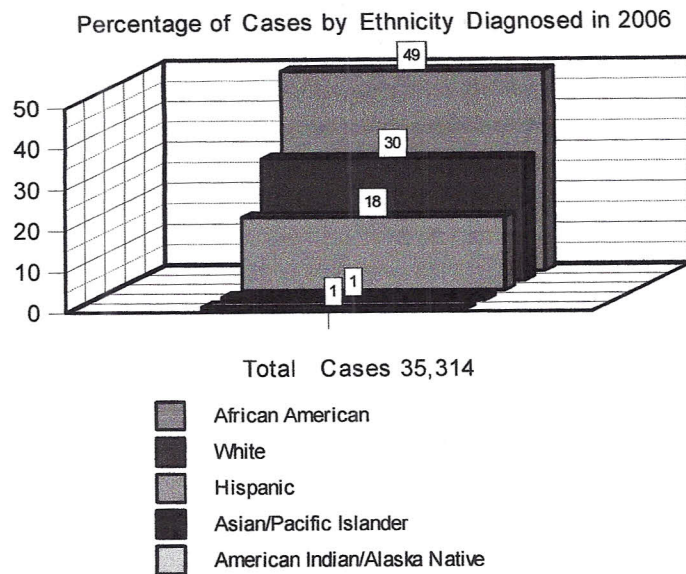
Total Cases 35,314

AGE



HIV/AIDS is now becoming a growing concern for mature adults; however, they may think themselves immune to the risk. Risk factors for this age group are the same as for any other. A recent survey of sexual behavior among older adults showed that 73% of persons aged 57–64 had had sex during the past year, as had 53% of those aged 65–74 and 26% of those aged 75–85. The numbers of mature adults is expected to continue to climb well into the next decades, meaning that the numbers of mature adults with HIV/AIDS will also increase.

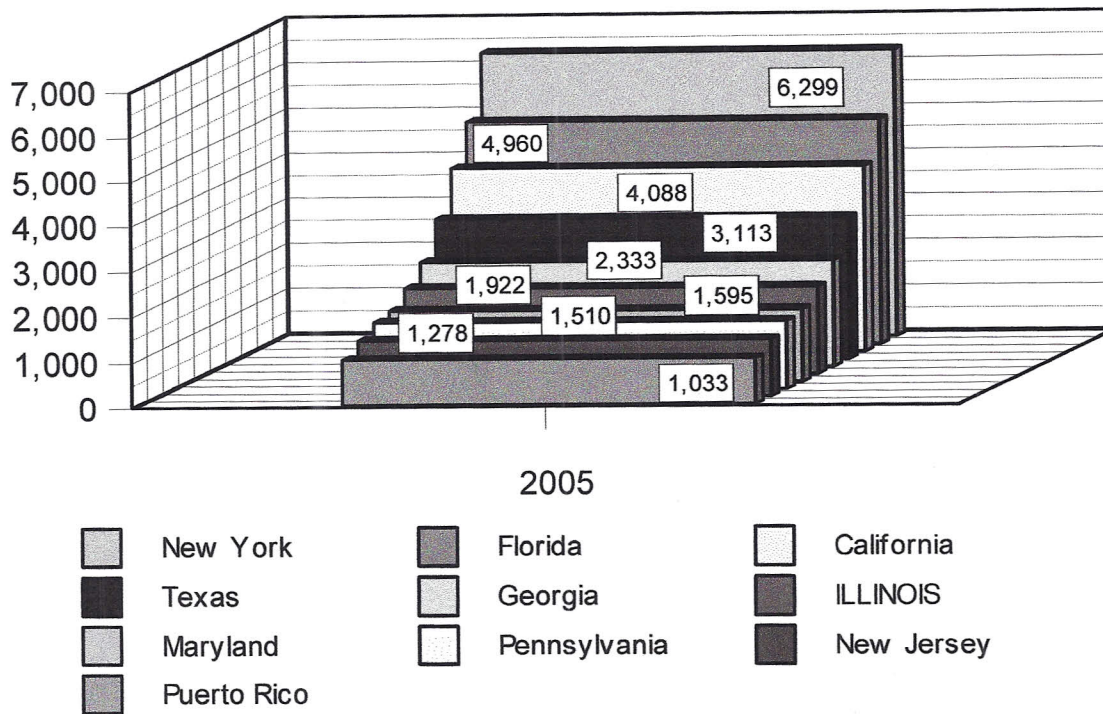
Increased attention needs to be aimed at this age group by the medical community when assessing HIV/AIDS risk. This age group often is not comfortable discussing preventative measures if they are engaging in sexual activity after a long-term relationship has ended. In addition, we must overcome our own stereotypes in thinking that the elderly are not sexually active. The healthcare community must take a proactive approach in initiating discussions about healthy sexual activity with mature adults; they are not likely to be the ones to take the first steps. There is great opportunity for health care workers to apprise these adults of risks and make them aware of the need for HIV/AIDS prevention.



HIV is growing among ethnic populations at an alarming rate. Almost fifty percent of the HIV cases diagnosed in 2006 were to African Americans and the number of cases among Latinos/Hispanics is growing in alarming numbers. Ethnic groups are hit harder not because of their ethnicity, but because of the barriers that they face. The barriers can be poverty, STD's and social stigmas. Ethnic groups also face more limited access to health care and may also be less educated, leading then to difficulties in understanding the limited amounts of accurate HIV information that they come in contact with. For ethnic groups, the risk factors for HIV are the same as other groups, and having any type of STD increases the chances of contracting HIV. In the Latino/Hispanic ethnic group, HIV is the fourth leading cause of death. Since these groups may not encounter health professionals on a regular basis, risk factors need to be assessed at any medical encounter, which the patient has and educational information or referral resources be provided.

Regional differences can also exist in how risk is perceived by the patient. In areas where HIV is more prevalent, patients and healthcare worker are more likely to be aware of the potential for infection. Patients may also harbor false perceptions of the prevalence of HIV in their area, increasing a false sense of security regarding their risk of contracting the disease. Areas that have shown to have the highest high numbers of HIV cases are New York, Florida, California, Texas, Georgia, Illinois, Maryland, Pennsylvania, New Jersey, and Puerto Rico.

## States with Highest Number of HIV Cases

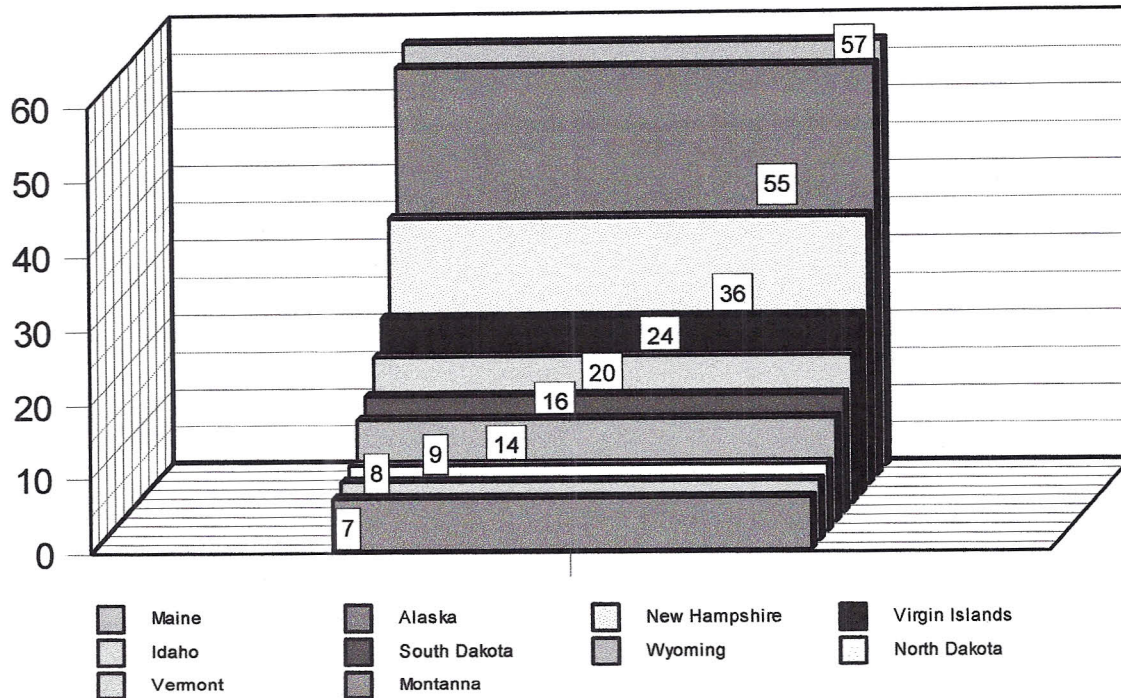


States having the fewest number of HIV cases in descending order are: Maine, Alaska, New Hampshire, Virgin Islands, Idaho, South Dakota, Wyoming, North Dakota, Vermont, and Montana. The differences in the highest and lowest numbers most likely are relevant to the population concentration in the individual areas. States having the highest number of cases tend to have the highest concentration of metropolitan areas with major US cities, while the areas with fewer cases tend to be less populated and more rural in nature. Patients may not know that they live in a high risk area and are more likely to come into contact with the HIV virus than their more isolated and rural counterparts, and therefore do not perceive the level of danger associated with their risky sexual behaviors.



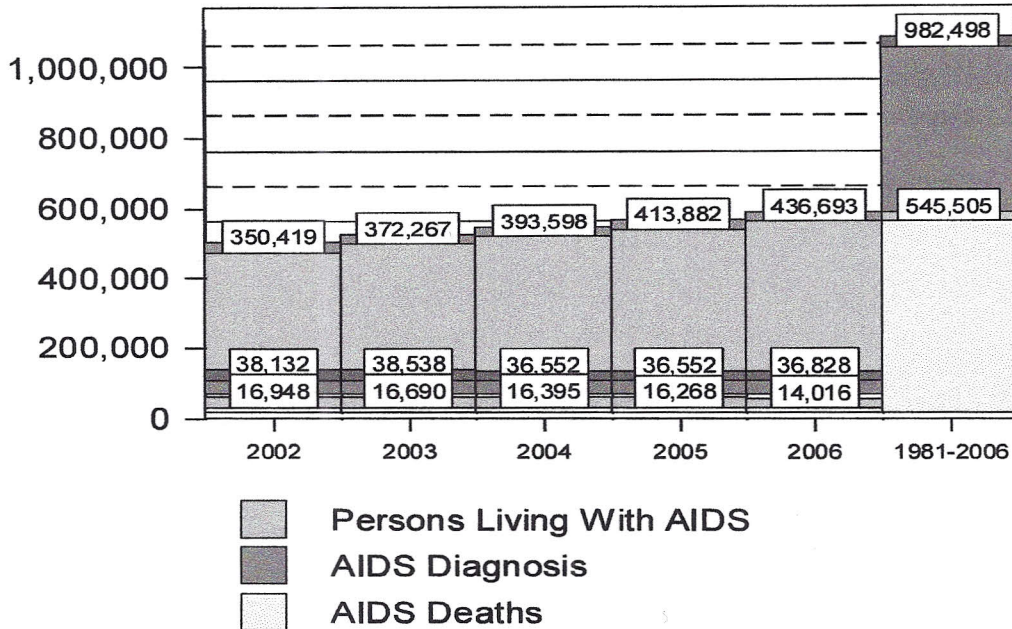
## States with Lowest Number of HIV Cases

7/2004 to 6/2005



As the numbers of AIDS diagnoses yearly continue to climb, the number of deaths per year stayed at a steady rate between the years 2002-2005 and dropped slightly in 2006. Not enough data is available yet to determine if this trend is going to continue, but it does reflect the achievements that have been made in treating the disease. Persons are now living longer, more viable lives with the diagnosis of HIV. AIDS has already claimed over one-half million lives since 1981. The battle does not lie in treating the disease, but detecting it and especially detecting it in the early stages of the illness, before the ravages of the disease have destroyed the body. The routine screening of blood donors has virtually eliminated blood transfusions as a means of transmission of HIV. Perinatal transmission has decreased to around 2% due to routine HIV testing during pregnancy combined with management practices for HIV positive mothers. The institution of these procedures proved the value of the screening process in the fight against HIV. However, routine screening to prevent sexual transmission had not been undertaken. This fact, in part, has led to new recommendations by the Centers for Disease Control regarding HIV testing.

## Number of AIDS Diagnoses, Deaths, and People Living with Aids 2002-2006



### New Recommendations for HIV Testing

The CDC has recommended the routine screening of all patients aged 13-64 years in all healthcare settings unless their infection rate has been documented to be less than 0.1 percent. If no prevalence data is available, the institution should initiate routine testing until data yields determine positive results of less than 1 case per 1,000 cases screened. At this level of prevalence, routine screening is no longer warranted.

All patients beginning treatment for TB should be routinely screened for HIV infection.

Patients that seek treatment for STD, including treatment at STD clinics, should be routinely screened at each new patient complaint visit regardless of known or suspected risk status.

Guidelines for repeat screenings include the screening on all high-risk individuals on an annual basis. High risk individuals include: MSM or heterosexual persons who themselves or whose sex partners have had more than one sex partner since their most recent HIV test, injection-drug users and their sex partners, persons who exchange sex for money or drugs, and sex partners of HIV-infected persons. Health care personnel should encourage all patients and their partners to be tested before forming a new sexual relationship. Repeat screening for individuals not at high risk should be at the discretion of the clinician. If any occupational blood or body fluid exposure occurs and HIV test results are not

readily available, then the patient should be informed and testing should be completed at the time of the exposure. Under the new guidelines, a separate consent is not required for HIV testing. The consent is incorporated into the general consent for medical care. Patients should be informed orally or in writing that testing will be performed unless they opt out. The patient should be afforded the opportunity to decline testing and information should be provided about the meaning of positive and negative test results as well as information about HIV infection. Informational materials that are written in the patient's native language should be provided and the materials should be written as to be readily understood. Persons should be available to assist with translation services as necessary. If a patient declines testing, the decision should be documented in the medical record. Patients should not be tested without their knowledge, and testing must be voluntary and without coercion. The recommendations have not changed regarding testing in non-clinical settings such as community based centers or mobile testing facilities.

## **Growing Health Concerns Amid HIV Infected Populations**

### **Metabolic Syndrome**

Combination antiretroviral therapy (ART) has significantly decreased the mortality and morbidity of HIV and led to improved quality of life for its victims. However, concerns are now being raised about some of the long-term effects of the drugs and potential toxicities. Metabolic Syndrome, which is defined by the National Cholesterol Education Program as the presence of three or more of the following: abdominal obesity, hypertriglyceridemia, low HDL cholesterol, high blood pressure, and high fasting glucose, has become linked to the use of protease inhibitors, in particular stavudine and lopinavir/ritonavir when individual antiretroviral drugs were analyzed in HIV patients. This is of particular concern because of the increased risk of cardiovascular disease. A 2006 study by Massachusetts General Hospital found that exercise manages symptoms of metabolic syndrome. As many as 45 percent of HIV patients have this condition, which raises the risk of diabetes and heart disease. Metabolic syndrome is characterized as increased resistance to insulin, alterations in blood lipid levels, and increased blood pressure.

Also noted among patients with HIV and Metabolic syndrome are changes in the fat distribution within the body. Lipodystrophy is defined by the presence of peripheral lipoatrophy (diminished fat deposits in the face, arms, legs, buttocks, and prominent veins), central lipohypertrophy (increased fat deposits in the abdomen, breasts, dorsocervical region), and mixed lipodystrophy. "As detailed in the ATP III report, participants with three or more of the following criteria were defined as having the metabolic syndrome: waist circumference >102 cm in men and >88 cm in women; triglycerides  $\geq$ 150 mg/dl (1.69 mmol/l); HDL cholesterol <40 mg/dl (1.04 mmol/l) in men and <50 mg/dl (1.29 mmol/l) in women; blood

pressure  $\geq 130/85$  mmHg; and fasting glucose  $\geq 110$  mg/dl (6.1 mmol/l). Individuals met criteria for high blood pressure or high fasting glucose concentration if they were currently on antihypertensive or oral hypoglycemic therapies, respectively." (Jerico, et. Al, 2005). The association of metabolic syndrome with protease inhibitors indicates that increased clinical diligence is necessary to prevent diabetes and heart disease as virtually all the components of metabolic syndrome consist of modifiable risk factors.

### **Hyperlactatemia and Lactic Acidosis**

Nucleoside reverse transcriptase inhibitors (NRTIs) have had a long association with hyperlactatemia and lactic acidosis. Lactic acidemia refers to the increased presence of plasma lactate without changes in blood pH, where lactic acidosis consists of increased plasma lactate with metabolic acidosis. The spectrum of lactic acidosis is quite variable with minimal symptoms including symptomatic hyperlactatemia with hepatic steatosis (fatty liver), to intermittent or chronic low-grade hyperlactatemia without acidosis, steatosis, or symptoms to fulminant multiorgan dysfunction characterized by severe acidosis and hemodynamic instability. Patients with lactate levels above 90mg/dl have an overall mortality rate of 80%. Generally, the first line treatment is to withhold antivirals until they can safely be reintroduced. It is desirable to withdraw therapy in all patients with lactic levels above 90 and in symptomatic persons with levels over 45. Other therapies are limited to those that are supportive in nature. All patients taking antiviral medication regimens need to be made aware of the potential and symptoms of lactic acidosis, especially after infection and to seek medical care at once if symptoms develop.

### **Bone Disease**

#### **Osteonecrosis, osteopenia, and osteoporosis**

Osteonecrosis is the death of bone tissue as a result of diminished blood flow. The destruction of bone most often occurs near the joint and affects the hip and shoulder joints, the knee joint and bones of the hand and wrist. Osteonecrosis affects patients predominantly with advanced HIV, and males between the ages of 20 and 50 years. Most of the patients also have at least one risk factor present from the non-HIV infected populations including: use of systemic corticosteroids, alcohol abuse, hyperlipidemia (particularly hypertriglyceridemia), hypercoagulable states, hemoglobinopathies, autoimmune disorders, pancreatitis, pregnancy, bearing heavy weight, trauma, and osteomyelitis. While there is no evidence that Osteonecrosis is directly linked to ART therapy, many HIV infected patients do have to take steroid medications. These medications should be used in the lowest effective dose and for the shortest length of time

possible. Surgical intervention to replace the affected joint is the only viable treatment available.

Osteopenia is the demineralization of bone and osteoporosis is the advancement of osteopenia to the point that bone fractures have occurred or are likely to occur with minimal trauma or stress to the bone. Osteopenia and osteoporosis occur at higher rates in patients on ART therapy than in the general population. Patients on heavy ART regimens demonstrate high levels of alkaline phosphate and osteocalcin, and some patients on protease inhibitors may show diminished growth of new bone; but the definite role of ART therapy in osteopenia is not yet determined. Lifestyle modifications are at this point the best course of therapy and include increase in weight-bearing exercise, weight loss, and smoking cessation, Dietary modification to include calcium rich foods equivalent to 1,500mgs of calcium per day and Vitamin D 400-1,000 IU per day.

### **Tuberculosis**

Tuberculosis, or TB, has in itself become a worldwide epidemic. In 2005, TB killed an estimated 1.6 million people. It is estimated that worldwide 195,000 of these individuals were infected with HIV. Why is TB so important among the HIV population? TB is the number one killer of persons infected with HIV and is the cause of death in one third of the individuals with fully involved AIDS. When someone becomes infected with the TB pathogen, it is much more likely that they will become ill with TB if they also are immunocompromised from HIV. Having HIV makes it much more likely that persons infected with TB will spread much more of the TB bacteria, resulting in more cases of latent TB and more TB cases in the general population. Being infected with TB and HIV at the same time results in a likelihood that is 800 times greater that the TB pathogen will become active within the body. Persons with HIV are at greater risk for infection and malignancy because of the weakened state of the immune system. TB in HIV infected persons is harder to diagnose and progresses at a faster rate than persons without TB. TB infection is much more likely to be fatal in persons with positive HIV status, and appears earlier in the course of HIV infection than other opportunistic infections. TB is the only HIV associated infection that poses a risk to HIV negative individuals. Since TB occurs so early in the course of HIV infection, it is also wise for the clinician to investigate cases of TB infection for HIV coinfection. The medication INH can be used to prevent TB infected individuals from progressing to active TB, and can be used to treat current TB infections. HIV infected persons who have latent TB should be treated with INH therapy.

### **Renal Failure**

The renal manifestations of HIV disease are quite diverse and may include: HIV associated nephropathy (HIVAN), HIV immune complex disease, ART or antibiotic associated renal damage, renal disease associated with microthrombi, and renal damage associated with comorbid diagnoses such as diabetes or amyloidosis related to heroin use, and Hepatitis C related glomerular basement membrane disease.

Although renal biopsy is performed only in rare instances, it is the only way of confirming HIVAN. Any person with HIV who has significant urinary protein, hematuria, or diminished renal function, especially African Americans, should have a renal biopsy performed. Studies have shown that African Americans with HIV have the same risk of End Stage Renal Disease as the entire general diabetic population. Renal biopsy in HIV is essential to determining the cellular pathology of the disease and for use as a tool to guide the treatment regimen.

The typical presentation of renal disease in an HIV infected individual is marked by significant urinary protein, rapidly declining renal function with poorly controlled HIV infection, diminished CD4 counts and elevated HIV RNA. Significant edema and high blood pressure are typically absent. Enlargement of the kidneys is usually noted on abdominal ultrasound.

The presence of HIVAN is classified as an absolute indicator for ART therapy without regard to the CD4 count. The kidney is able to be a reservoir for the HIV virus even though serum viral loads remain undetectable. HIVAN can progress from renal insufficiency to fully involved renal failure within a few weeks or months.

ART has been shown to cause dramatic reversal of HIVAN and is now a first line treatment in the course of the disease. ACE inhibitors and angiotensin II receptor blockade drugs have demonstrated the ability to delay the progression of renal insufficiency in the HIV population and are considered a sound medical choice in the treatment of HIVAN. For patients that are experiencing rapid decline in renal function despite the application of ART therapy, steroids may be used without significant increased risk of infection. The use of steroids has shown to diminish urinary protein excretion in patients afflicted with HIVAN and is considered a second line medical therapy.

When HIVAN ESRD first became recognized in the early 1980's the lifespan of these patients from the start of dialysis was three months. Since the arrival of ART the lifespan of HIVAN affected patients on dialysis approximates that of the general ESRD population. The patient should be referred for AV fistula creation if hemodialysis is chosen as a mode of therapy as problems associated with AV grafts, such as infection and thrombus, are magnified in the HIV population. Kidney transplant is a viable treatment option for HIVAN patients with well controlled HIV infection as long term renal graft survival rates differ little from the general population. However, there is a slightly higher rate of rejection episodes

in the post transplant period. HIV does not progress with the immunosuppression that a renal transplant requires as might first be assumed. Referral to a transplant surgeon should be made when the glomerular filtration rate falls below 25ml/min.

## **Bloodborne Pathogens**

The bloodborne pathogens act of 1991 is to limit the exposure of the healthcare worker to blood and body fluids that could potentially cause occupational disease. The standards cover all employees who could reasonably be expected to come into contact with blood or other body fluids during the course of their job activities.

Employers are required to implement an Exposure Control Plan that makes Universal Precautions mandatory and treats all blood and body fluids as infectious with the exception of sweat. This plan centralizes hand hygiene and the use of Personal Protective Equipment (PPE) as protection against blood and body fluid infection. PPE includes gowns, gloves, masks, goggles and resuscitation bags. These materials must be available to the employee at no charge.

Also part of the standard are measures to prevent needle sticks and blood splashing, and to ensure the appropriate packaging and handling of body fluid specimens and to label the specimens and waste with biohazardous labeling before shipping or waste removal. The standard also requires methods for the disposal of contaminated sharps and the container used for such disposal.

Another rule of the standard allows for the vaccination, within 10 days of employment, of all healthcare workers at no charge, against Hepatitis B if they have occupational exposure to blood. For employees that have an exposure, post-exposure evaluation and followup such as laboratory evaluation, counseling, and prophylaxis are made available to the employee

Common pathogens transmitted by bloodborne exposure include Hepatitis B, Hepatitis C, and HIV.

## **Hepatitis C Virus (HCV)**

Hepatitis C can be transmitted to healthcare workers by accidental needle sticks, cuts, or blood splashed onto the conjunctiva. Following percutaneous injury the infection rate is only 1.8%. One thousand health care workers are infected on an annual basis and Hepatitis C is the number one cause of liver transplantation in the United States.

Hepatitis C is considered more lethal than Hepatitis B because there is no preventative vaccine for the illness. Hepatitis C can lead to liver failure and liver transplant. Often patients with Hepatitis C have HIV as well and both viruses can be acquired with one exposure of the health care worker. HCV is usually treated with interferon injections, but the medication is expensive, side effects are many, and the disease often returns when the treatment is stopped. It is not recommended that healthcare workers who have an exposure to HCV be treated by prophylaxis with interferon preparations.

## **HIV**

The likelihood of HIV infection after percutaneous injury is 0.3%. However, if the patient has severe advanced disease, the needle was used in an artery or vein prior to exposure and the needle is visibly contaminated with blood, then the risk is increased.

For healthcare workers who are exposed to HIV, then post-exposure prophylaxis is recommended with HIV specific medications to prevent seroconversion. A two-drug regimen must be used and continued for at least 4 weeks of therapy. The medications can cause side effects and are often discontinued by the worker due to the side effects, before the 4-week time interval is up (CDC, 2003).

## **Hepatitis B Virus (HBV)**

Hepatitis B virus is a highly infectious and transmissible virus. Between 6 and 62% of all needle stick exposures result in transmission of the hepatitis B virus. Vaccination of healthcare workers has dramatically reduced the incidence to occupational transmission of hepatitis B, however, not all workers who have the potential for blood exposure have been vaccinated against the virus.

If you receive a blood exposure, wash cuts and needle sticks with soap and water. There is no scientific evidence that squeezing the wound or using antiseptics or bleach on the wound will prevent inoculation with bacteria or a virus. If the exposure is to the mouth, nose, or skin flush those areas immediately with water. For splashes to the eye, irrigate the eyes with clean water, saline, or sterile irrigation solution. You should report the exposure to the department that handles occupational events such as employee health, infection control, or occupational health. Prompt reporting is essential, as some measures may need to be taken to prevent infection within the first 24 hours if deemed appropriated to the situation.

The CDC reports that 385,000 hospital workers receive sharps injuries each year. These statistics prompted the requirement that all healthcare facilities have



in place a plan to prevent needle stick injuries and that the plan is updated at least annually. This plan must be made accessible to employees, and education regarding the standards must be done as each employee is hired and at yearly intervals thereafter.

Employers are required to implement improved engineering controls to prevent the occurrence of needle sticks when feasible, such as needless systems, or needle shield devices. Employees should avoid the use of needles where safer controls have been instituted. Avoid recapping needles, if needles must be recapped, use the one-handed scoop technique. Never bend or break needles under any circumstance.

Dispose of sharps appropriately in designated sharps containers, which display the red sticker with the biohazard symbol. Never pick up broken glass with your hands, always use a dust pan and brush or other approved method as designated by your facility and dispose of it in a puncture proof container.

Sharps containers are required to be rigid, leak proof and puncture resistant at the bottom and around the sides. The containers must be placed in areas close to where the devices are to be used, maintained in an upright position and not allowed to become overly full. A sharps container is considered full when it is filled to  $\frac{3}{4}$  of its capacity, and should be closed and placed in the appropriate area for disposal.

When the containers are removed from the area, they must be closed immediately prior to moving, and placed in a secondary container if leaking. The secondary container must be closeable and able to contain the entire contents during shipping, handling, and transport. The secondary container must also be labeled or color-coded correctly.

Eating, drinking, applying cosmetics, or lip balm is prohibited in areas where contamination with blood or body fluids is likely to occur. In addition, no food or drink is to be kept in refrigerators or at workstations where contamination with body substances is likely.

All procedures involving blood or other body substances shall be performed in a manner to reduce the likelihood of splashing or spattering of droplets.

### **Chemical and Blood Spills**

The employer is responsible for maintaining a safe working environment for all employees. Blood or chemical spills can represent a hazard and have the potential for employee injury.

When a spill occurs certain factors must be evaluated:

- The location of the spill
- The size of the spill
- The characteristics of the substance involved
- The type of equipment needed to contain the spill

Supplies that may be needed to contain a spill may include:

- Neutralizers
- Absorbents such as sand or commercial solidifying agents
- Scoops, pans, or shovels
- Covered containers for disposal of clean-up waste

In the event of a spill the following priorities assessed and appropriate action(s) taken:

- Contamination of any employees or persons
- Notification of persons in immediate spill area.
- In the event of flammable spill, electrical devices should be turned off
- Containment of spill

Absorbent material should be poured around the area of the spill. The additional absorbent is placed in the center of the spill. The spill is then cleaned from the outer area, moving the contents toward the center. Proper protective equipment should be used during cleanup of the spill. The area of the spill should be ventilated if necessary. Cleanup of chemical spills should only be undertaken by personnel having the knowledge to safely contain and cleanup the spill. Some chemicals can present a greater hazard if improper clean up is attempted.

Spill kits for blood and chemicals should be placed in convenient areas within the facility. All personnel must be trained in the use of spill kits and that training must be documented. Written policies must also be in place for dealing with spills and the storage of chemicals.

## **PPE**

Personal protective equipment shall be provided to the employee at no cost in the appropriate sizes. PPE is considered appropriate if it does not allow the passage of potentially infectious substances to the employees works clothes, street clothes, undergarments or skin, eyes, mouth, or mucous membranes under normal circumstances and for normal durations of use. Hypoallergenic gloves, glove liners, powderless gloves or alternatives shall be provided for employees who are allergic to the gloves normally provided. The employer shall also clean, launder, or dispose of personal protective equipment at no cost to the employee.

If garments become soiled with blood or body fluids, the garments should be removed as soon as reasonably feasible to do so. All PPE should be removed

before the employee leaves the immediate work area. When PPE is removed it shall be placed in the proper designated area for disposal, cleaning, storage, or decontamination.

When gloves become contaminated, they should be replaced as soon as it is feasible. They should also be promptly replaced if they become torn, punctured, or their ability to effectively act as a barrier is lost. When using gloves, remember to use the correct size. Gloves that are loose, floppy, and too big pose a hazard to the patient and the employee as they obscure the nurse's view during procedures and can be potentially caught in equipment posing an injury risk to the hands.

Standards state that the employer shall provide handwashing stations for employees. If hand-washing facilities are not feasible then the employer is required to provide waterless antiseptic hand gel and clean towels. When using hand gel, hands should be washed with soap and water as soon as is reasonably possible. Hand washing should occur as soon as possible after the removal of gloves or other PPE.

When it is anticipated that blood or body fluid spattering or splashing is likely and it is reasonable to assume that contact with the eyes, face, or mucous membranes could occur, the employee shall wear a chin length face shield or a combination of mask and eye protection. The eye protection must have wraparound shields to protect the eyes from the sides.

Gowns, aprons, clinical jackets or other suitable protection shall be worn over the clothing when it can reasonable be expected that blood or body substance contact is likely to occur. Surgical hoods or caps and shoe covers should also be worn when it is likely that gross contamination could feasibly occur.

The employee health department is most frequently responsible for the training and documentation of training on the proper use of Personal Protective Equipment (PPE). Since the employer is required to have documentation that the employee received and understood the training given, the employee health department should define clear objectives for the training and ensure that the content and testing of the training revolves around the objectives. Elements for PPE training should include:

When to wear PPE

How to properly put on, apply, wear, and dispose of PPE

When the use of PPE is necessary

Limitations of PPE

Care and Maintenance of PPE

## **Environmental**

All equipment shall be cleaned after use with an approved disinfectant per hospital policy after contact with blood or body fluids. Contaminated work surfaces shall be cleaned as soon as possible after the procedure is completed or as soon as is feasible if it is contaminated with blood or body substances. Work surfaces shall be cleaned at the end of every shift if there is possibility of contamination since the last cleaning.

Protective coverings of plastic or other materials shall be replaced as soon as possible when they become contaminated by potentially infectious material or at the end of the shift if they become contaminated during the shift.

Any pails, bins, or storage receptacles that are not designed to be disposable will be routinely inspected and removed for cleaning and decontamination when visible contamination is detected.

Laundry must not be sorted or rinsed in patient care areas. Contaminated laundry must be placed in red bags or in bags labeled with the biohazard symbol unless the facility uses Universal precautions in the handling of all soiled linens.

## **Conclusion**

Despite the fact that numbers of new HIV cases are climbing, patients are living longer with HIV/AIDS since the arrival of ART. This presents new challenges for clinicians as patients are living with more comorbid diseases. Clinicians will have to be more knowledgeable in managing the complex health problems in this patient population as well as more proactive with regard to prevention and patient teaching. Through early identification and intervention, many of the problems presented here can be drastically reduced.

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1. The term "gay cancer" initially referred to which disease?
  - A.  Rectal sarcoma
  - B.  Kaposi's sarcoma
  - C.  Osteosarcoma
  - D.  Malignant melanoma
2. Which demographic group has more HIV diagnoses?
  - A.  Men
  - B.  Caucasians
  - C.  Middle Class
  - D.  People living in rural areas
3. What percentage of persons infect with HIV are totally unaware that they have the disease? (Approximate)
  - A.  12 percent
  - B.  33 percent
  - C.  54 percent
  - D.  25 percent
4. Primary transmission is defined as:
  - A.  becoming infected with HIV through a needlestick.
  - B.  becoming HIV positive after having sex with someone with no known risk factors.
  - C.  becoming HIV positive after having sex with someone with known risk factors.
  - D.  becoming HIV positive after using IV drugs.
5. What percentage of cases diagnosed in 2006 were related to some type of sexual contact?
  - A.  83 percent
  - B.  99 percent
  - C.  16 percent
  - D.  25 percent

6. Which age group had the most cases of HIV diagnosed in 2006?
- A.  75 - 80 years
  - B.  40 - 55 years
  - C.  15 - 30 years
  - D.  24 - 54 years
7. Which ethnic group was diagnosed with the most cases of HIV in 2006?
- A.  Caucasian
  - B.  American Indian
  - C.  African American
  - D.  Hispanic
8. Which state has the highest number of HIV cases?
- A.  New York
  - B.  Iowa
  - C.  Florida
  - D.  California
9. Which state has the fewest number of HIV cases?
- A.  North Dakota
  - B.  Montana
  - C.  Alaska
  - D.  US Virgin Islands
10. Routine screening of HIV should be conducted at all medical facilities until their screening results show:
- A.  Fewer than 11 cases per 1000
  - B.  Fewer than 1 case per 100
  - C.  Fewer than 1 case per 1000
  - D.  Fewer than 11 cases per 100
11. Identify the condition(s) linked with metabolic syndrome:
- A.  Hypertension
  - B.  Abdominal obesity
  - C.  Elevated triglycerides
  - D.  All of the above

12. Metabolic syndrome has been linked as a consequence of what medication?

- A.  Protease inhibitors
- B.  Ace inhibitors
- C.  Insulin
- D.  Statin medications

13. Which medications are associated with hyperlactemia and lactic acidosis?

- A.  Protease inhibitors
- B.  NRTIs
- C.  Ace inhibitors
- D.  INH

14. The mortality rate in patients with lactate levels above 90mg/dl is:

- A.  50 percent
- B.  100 percent
- C.  15 percent
- D.  90 percent

15. Referral to a transplant surgeon should be made when renal function in an individual with HIV falls to:

- A.  GFR of 10 ml / min
- B.  GFR of 25 ml / min
- C.  GFR of 45 ml / min
- D.  GFR of 60 ml / min

16. The preferred vascular access for dialysis patients with HIV is:

- A.  PD catheter
- B.  Central venous catheter
- C.  AV graft
- D.  AV fistula

17. Which symptoms are typically absent in HIV renal failure?

- A.  Nausea and vomiting
- B.  Urinary retention
- C.  Edema and Hypertension
- D.  Hematuria



18. What is the number one killer of persons with HIV?

- A.  Renal failure
- B.  Tuberculosis
- C.  Lactic Acidosis
- D.  Bone Disease

19. What is the best clinical course of therapy in HIV bone disease?

- A.  ART
- B.  Steroids
- C.  Lifestyle changes
- D.  NSAIDs

20. Osteonecrosis is the death of bone tissue as a result of:

- A.  Renal failure
- B.  Dialysis
- C.  Lack of Calcium
- D.  Lack of blood flow

21. Which disease spurred the Bloodborne Pathogens act?

- A.  TB
- B.  Hepatitis C
- C.  HIV
- D.  Hepatitis B

22. Which of the following is not considered an infectious body fluid under universal precautions?

- A.  tears
- B.  saliva
- C.  sweat
- D.  urine

23. A sharps container should be replaced when?

- A.  It is filled to overflowing.
- B.  When it is half full.
- C.  When it is 3/4 full.
- D.  When it is 2/3 full.

24. What is the best method for picking up broken glass?

- A.  Use your hands.
- B.  Use a dustpan or scoop.
- C.  Vacuum cleaner.
- D.  Call house keeping to clean it up.

25. The likelihood of HIV infection after percutaneous injury is:

- A.  0.1 percent
- B.  0.2 percent
- C.  0.3 percent
- D.  0.4 percent

26. Which of the following is not an example of PPE?

- A.  Gown
- B.  The employee's uniform.
- C.  Goggles or face shield.
- D.  Gloves

27. Between 26 and 28% of all needle stick exposures result in transmission of the hepatitis B virus.

- A.  True
- B.  False

28. There is no scientific evidence that squeezing the wound or using antiseptics or bleach on the wound will prevent inoculation with bacteria or a virus.

- A.  True
- B.  False

29. No food or drink is to be kept in refrigerators or at workstations where contamination with body substances is likely.

- A.  True
- B.  False

30. Patients are living longer with HIV/AIDS since the arrival of ART.

- A.  True
- B.  False