Title: HIV on the Run

Susan Chesel-Bryan

Seminole High School

Key Questions: What is HIV? What is AIDS? What is a Retrovirus? How does the HIV virus replicate? How does HIV affect your immune system? What are the similarities/differences between HIV-1 and HIV-2? What are the social impacts of being HIV positive? How is HIV transmitted? What are several fallacies regarding HIV? What is a viral load? What is a protease inhibitor? What is the Omnibus AIDS Act?

Science Subject: Health Science II and Certified Nursing Assistant

Grade Level: 11th and 12th grade Honors

Science Concepts: SC.912.L.14.6 Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.

STUDENT LEARNING OBJECTIVES WITH STANDARDS:

15.0 Demonstrate knowledge of blood borne diseases, including HIV/AIDS. – The student will be able to:
   15.01 Recognize emerging diseases and disorders.
   15.02 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
   15.03 Identify "at risk" behaviors that promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
   15.04 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
   15.05 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
   15.06 Demonstrate knowledge of the legal aspects of HIV/AIDS, including testing.

This standard supports the following Next Generation Sunshine State Standards:

[SC.912.L.14.6,14.52; MA,.912.D.6.4.6.6;MA.912.P.2.1,2.3;HE.912.P.2.1; HE.912.B.1.4 ;HE.912.C.1.1, 1.5, 1.6, 1.7, 1.8, 2.2, 2.7, and 2.8]

Materials:

1. Classroom set of Dell computers  or use of portable computer lab from media center
2. Teachers copy of Viral Quest CD
3. AIDS - ELISA simulation kits from Flinn Scientific
4. Teacher’s san cruzer

Procedures and Discussion Questions with Time Estimates:
Week one:

1. Day one:
   a. Pass out pretest, ask students to write on the test. Please make sure their name is on it before collecting.
   b. Meet the microbe’s activity: divide the class into two even groups.
      i. Give every student in group A one of the strips labeled questions.
      ii. Give everyone in group B one of the strips labeled answers.
      iii. Allow the students to intermingle to match up the correct questions and answers.
      iv. Once students match up, have them go collect the plush microbe they think they are.
      v. You will check to see if they are correct looking inside of the plush microbes’ card, it should match their question/answer strips.
   c. After activity, ask students which of the microbes are the biggest threat to humans. Please utilize a round robin approach.
   d. Tell students to review notes nightly

2. Day two:
   a. Pass out worksheet “Virus notes”
   b. Put in the teacher’s copy CD of Viral Quest, pull up the power point “viruses”
   c. Have students complete the work sheet as you play the power point.
   d. Have students turn over the worksheet and answer the following questions
      i. What is the relationship between the immune system and viral infections?
      ii. How does this complicate finding a cure for AIDS?
   e. Tell students to review notes nightly

3. Day three:
   a. Pass out “Viral News “ worksheet
   b. Divide class into 5 equal groups and assign each group to a computer station.
   c. Assign each group 2 of the 10 websites provided. Each group is to fill in as much of the worksheet as possible from the 2 websites assigned to them only.
   d. After 10 minutes combine groups 1, 2, and 3 people from group 3. Combine group 4, 5, and remaining 3 people from group 3. Have them try to fill in the rest of the worksheet.
   e. After 10 minutes regroup by having group 1 and 5 change places.
   f. Tell students to review notes nightly
4. Day four:
   a. Insert teacher’s san cruzer into computer and open power point HIV
   b. Have students take notes, students will be quizzed daily on the previous
day’s lecture.
   c. Start at the evolution of HIV and stop at the end of the life cycle/replication
   of HIV.
   d. Tell students to review notes nightly

5. Day five:
   a. Pass out quiz one; allow 10 minutes for students to complete before
collecting.
   b. Start power point where you left off yesterday. Today go over fallacies,
myths, epidemiology and the transmission of HIV.
   c. Remind students of quiz tomorrow.

6. Day six:
   a. Pass out quiz two; allow 10 minutes for students to complete before
collecting.
   b. Start power point where you left off yesterday. Today go over prevention,
testing, and stages of HIV.
   c. Remind students of quiz tomorrow.

7. Day seven:
   a. Pass out quiz three; allow 10 minutes for students to complete before
collecting.
   b. Start power point where you left off yesterday. Today go over biochemistry
and legal issues of HIV.
   c. Remind students of quiz tomorrow

8. Day eight:
   a. Pass out quiz four; allow 10 minutes for students to complete before
collecting.
   b. Divide students into groups of two
   c. Give each group a set of instructions, a 96 well micropipette, 2 vials of
different colored water, one micropipette.
   d. Students are to read and follow directions to create a design in their wells.
   e. Assign students to watch “ELISA testing” with Linda Green at
http://cpet.ufl.edu/EIS/elisa/index.htm for homework.
   f. Tell students to review notes nightly

9. Day nine:
   a. Divide students into groups of 2-3.
b. Give each group an AIDS-ELISA simulation kit

c. Have students follow directions and complete the worksheet in the kit.

d. Remind students of test tomorrow.

10. Day ten:

a. Pass out post test

b. Students have the entire period to complete.

**Assessment Suggestions:**

1. 15.01 Recognize emerging diseases and disorders.
   a. Pre-test and Post-test
   b. Students used different types of media to learn about the social, cultural, and economical implications blood borne diseases.

2. 15.02 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
   d. Using Viral Quest students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.

3. 15.03 Identify "at risk" behaviors that promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes

4. 15.04 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes

5. 15.05 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
6. 15.06 Demonstrate knowledge of the legal aspects of HIV/AIDS, including testing.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
   d. Students completed an ELISA simulation in which they portrayed lab technicians and were able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence’s manual as a reference.
   e. Students could identify all six components of the AIDS OMNIBUS ACT.

RESOURCES/REFERENCES:

“The Evolution of HIV” lecture June 21, 2011 Emerging Pathogen Building Room 150. Dr. Marco Salemi, Associate Professor, Department of Pathology, Immunology, and Laboratory Medicine/Emerging Pathogens Institute.

“Biochemistry of HIV Drugs” lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Ben Dunn, Distinguished Professor, Department of Biochemistry and Molecular Biology.

“ELISA” lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Charles Lawrence, UF CPET Educational, Multimedia & Web Designer


HIV on the Run

Susan Chesel-Bryan
Seminole High School

Abstract: This action plan is designed to incorporate some of the biotechnical aspects of HIV that I have learned here at ICORE into my health class. This is a little daunting due to the fact that as health care professionals, we are always looking for the end product but sometimes we fail to understand or recognize how we got there. Each person has a unique role and rarely crosses that line. I want my students to cross that line and look for ways to collaborate. Health science II students will increase their knowledge of blood borne diseases, including HIV/AIDS by being provided excerpts from several different lectures I attended here at ICORE to try to understand the evolution of HIV, the biochemistry of HIV drugs, and the rational of using the ELISA for detection of antibody-antigen reactions. Students will also utilize Viral Quest as an additional tool for information to demonstrate the use of information technology tools.

Rationale: Health Science classes must be able demonstrate knowledge of blood borne diseases with particular attention to following all protocols for safety from the Occupations Safety and Health Administration and the Centers for Disease Control. The school’s agreement with several local hospitals, pharmacies, and nursing homes states that our students will meet the industries standards in all content relating to infection control and blood borne diseases, therefore my business partners demand that my students pass an examination on HIV/AIDS with an eighty five percent or higher in order to job shadow in their establishments.

Description of teaching unit with expected outcomes: This unit will require two weeks to complete beginning with a pretest followed by a teacher directed instruction on HIV, and several teacher/student directed lab activities.

Day 1: Pretest & Meeting the Microbes

Before the lesson: Students will understand the basic concepts of infection control. Students will know the differences between different types of microbes such as; bacteria, virus, rickettsia, fungi, and protozoa. They will be able to identify and follow Standard and Transmission-Based Precautions.

Pretest to access HIV background knowledge of students. We will then utilize the microbe equipment locker from CPET as an introduction to emerging pathogens in today’s society. Students will have either a question or an answer to a specific pathogen.

Assessment: Students will correctly match their questions and answers. After the activity students will physically arrange themselves in a line, with their microbes, according to the microbe’s threat level to humans. After their lineup we will have a round robin discussion on why these microbes are the biggest threats to us.
Day 2-3: Viral Quest Component Lessons two & three (available from Dr. Sadler, University of Florida College of Education)

Before the lesson: Students will be able to demonstrate basic computer skills and employ those skills to solve problems and make decisions while recognizing HIV as an emergent disease.

Assessment: Students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.

Day 4-7: PowerPoint Presentation on HIV

Power Point Presentation containing lecture information specific to HIV obtained from CPET professional development. Students will take daily notes.

Assessment will be done by daily quizzes on the previous day’s material.

Day 4: Material covered will include information from Dr. Marco Salemi’s presentation “The Evolution of HIV”. It will also include information on the prevalence of HIV, the life cycle of the virus and replication. Video showing the HIV life cycle will be utilized.

Day 5: Material covered will include information on epidemiology and the transmission of HIV. Video showing the US AIDS epidemic from 1981-1997 will be shown.

Day 6: Material covered will include information on prevention of HIV, testing for HIV, and the stages of HIV.

Day 7: Material covered will include information from Dr. Ben Dunn’s presentation “Biochemistry of HIV Drugs”. It will also include legal issues related to HIV.

Day 8: Micro-Pipetting by Coordinates Lab to learn proper use of biotechnical equipment.

Students will be given a set of instructions and a 96 well microplate. Students will read directions and accurately micro-pipette colored solutions into the 96 well microplate to make a rainbow.

Assessment: Successful following of directions and accurate Pipetting skills will result in a design recognizable on the microplate to students and teacher.

Day 9: ELISA Lab to apply theory application to practical application.

Before the lesson: Students will have watched “ELISA testing” with Linda Green at http://cpet.ufl.edu/EIS/elisa/index.htm the previous night for background knowledge.
Students will perform a simulated ELISA on patients for detection of the HIV-1 virus. Students will utilize the manual from Dr. Charles Lawrence of CPET to perform the lab.

Assessment: Students will portray lab technicians and will be able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence’s manual as a reference.

**Day 10: Post test.**

Assessment: Students will make an 85% or higher to demonstrate mastery of HIV content.

**Data Collection techniques/student assessments:**

- Pre and Post tests
- Quizzes
- Worksheets

**Use of equipment lockers:**

- Microbes
- Pipettes
- ELISA

**UF ICORE Connections:**

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Literature cited:

HIV prevalence map retrieved from:


Budget:

Flinn Scientific Aids Stimulation Kits FB1572

$51.25 x4=$205.00 +shipping & handling
HIV on the Run

Susan Chesel-Bryan

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Seminole High School

Abstract:

This action plan is designed to incorporate some of the biotechnical aspects of HIV that I have learned here at ICORE into my health class. This is a little daunting due to the fact that as health care professionals, we are always looking for the end product but sometimes we fail to understand or recognize how we got there. Each person has a unique role and rarely crosses that line. I want my students to cross that line and look for ways to collaborate. Health science II students will increase their knowledge of blood borne diseases, including HIV/AIDS by being provided excerpts from several different lectures I attended here at ICORE to try to understand the evolution of HIV, the biochemistry of HIV drugs, and the rationale of using ELISA for detection of antibody-antigen reactions. Students will also utilize Viral Quest as an additional tool for information and to demonstrate the use of information technology tools.

Rationale:

Health Science classes must be able demonstrate knowledge of blood borne diseases with particular attention to following all protocols for safety from the Occupations Safety and Health Administration and the Centers for Disease Control. My business partner, such as the local hospitals and doctor offices where my students job shadow, demand that my students pass an examination on HIV/AIDS with an eighty five percent or higher in order to enter their establishments.

Description of teaching unit with expected outcomes:

This unit will require two weeks to complete beginning with a pretest followed by a teacher directed instruction on HIV, and several teacher/student directed lab activities.

Day 1: Pretest & Meeting the Microbes:

Before the lesson:
Students already have basic knowledge about the five different types of microbes, since our program lays the foundation blocks in the ninth grade and we continue to build upon them on a yearly basis. They will be able to identify and follow Standard and Transmission-Based Precautions. Pretest to access HIV background knowledge of students before material presented. We will then utilize the microbe equipment locker from CPET as an introduction to emerging pathogens in today’s society.

Activity:
Students will be given either a question or an answer to a specific pathogen. Students will intermingle and match their questions and answers. Once students have matched their slips of paper they will
proceed to the pathogen station to pick up their microbe. After picking up their microbes, I will check to see if they are correct or not. If they are they get to sit down until everyone is completed, and if they are not they have to try again until they are correct.

Assessment:
Everyone is correctly matched up and able to participate in a round robin discussion about which of the microbes they have in their hands are the biggest threats to mankind in today’s society. After the discussion, students will be able to line up with those microbes that pose the biggest threat to mankind at the front of the line and those microbes that pose the least threat to mankind at the back of the line.

**Day 2-3: Viral Quest Component Lessons two & three**
(Available from Dr. Sadler’s team at the University of Florida’s College of Education)

Before the lesson:
Students will be able to demonstrate basic computer skills and employ those skills to solve problems and make decisions while recognizing HIV as an emergent disease.

Assessment:
Students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.

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Power Point Presentation containing lecture information specific to HIV obtained from CPET professional development. Each student will be given a copy of the power point on day 4. Students will follow along and take any additional notes as needed.

Assessment will be done by daily quizzes on the previous day’s material.

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Assessment:
Students will portray lab technicians and will be able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence’s manual as a reference.

Day 10: Post test
Assessment:
Students will make an 85% or higher to demonstrate mastery of HIV content in order to participate in job shadow.

Budget:
Flinn Scientific AIDS Stimulation Kits FB1572 @ $51.25 x 4 = $205.00 + $14.35 shipping& handling = $219.35
Micropipettes available on loan from CPET locker
ELISA simulation manual from Dr. Charles Lawrence at CPET
96 well microplates on loan from CPET locker
30 plush Giant Microbes on loan from CPET locker
### Lesson Title
HIV on the RUN

### Grade Span
11th and 12th grade Honors

### Content Emphasis
Health Science II and Certified Nursing Assistant

### Target Benchmarks

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### Author
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### Phone
407-320-5050
MATERIALS USED:

1. Classroom set of Dell computers or use of portable computer lab from media center
2. Teachers copy of Viral Quest CD
3. AIDS - ELISA simulation kits from Flinn Scientific

HIV/AIDS PRETEST

1. Where was the origin of HIV?
2. How many subtypes of HIV are there?
3. Who was patient zero in the United States?
4. What is the Omnibus AIDS Act?
5. How many stages of HIV are there?
6. How does an HIV virus replicate?
7. Which U.S. states have the highest percentage of new HIV infections?
8. Which race has the highest incidence of HIV infections?
9. What is the number one opportunistic infection of AIDS?
10. How can you find out someone’s HIV status?

Lesson 2 from Viral Quest:
Students will fill out pages 24-25 photocopied from Viral Quest Teacher Guide

Lesson 3 from Viral Quest:
Students will fill out pages 26-28 photocopied from Viral Quest Teacher Guide

Post Test

HIV/AIDS Test

Choose the **BEST** answer:

1. In the Early Acute Stage:
   a. There is a high level of HIV in the blood
   b. The infected person is very communicable
   c. There are no outward signs or symptoms of infection
   d. All of the above
   e. None of the above

2. Among adults, HIV is spread most commonly by:
   a. mother to infant before or during birth
   b. sharing of drug needles or syringes
c. sexual intercourse
d. breast milk

3. More than half of all new HIV infections occur among:
   a. whites
   b. blacks
   c. Hispanics
   d. Others

4. Which laboratory test is done to determine HIV seroconversion?
   a. Western Blot
   b. EIA
   c. Elisa
   d. Western Spot
   e. B or C

5. HIV is classified as a:
   a. Rhinovirus
   b. Retrovirus
   c. Ribonucleic virus
   d. Reverse virus

6. The final stage of HIV infection is called:
   a. Early Acute
   b. AIDS
   c. Lymphadenopathy Syndrome
   d. Latent-Asymptomatic

7. In which stage do signs and symptoms of HIV infection generally first begin to appear?
   a. Early Acute
   b. Latent-Asymptomatic
   c. Lymphadenopathy Syndrome
   d. AIDS

8. What is AIDS?
   a. The stage of HIV infection where the Tcell count reaches 200 or below.
   b. A group of symptoms that develop during the last stage of HIV infection.
Acquired Immune Deficiency Syndrome
All of the above
None of the above

9. Some body fluids and substances that are covered under Standard Precautions include:
   a. Blood and blood products
   b. Urine and feces
   c. Semen and vaginal secretions
   d. All of the above
   e. None of the above

10. In what year was GRID changed to AIDS:
    a. 1980
    b. 1981
    c. 1982
    d. 1983
    e.

11. The following is an example of high risk behavior:
    a. Unprotected sexual contact with multiple partners
    b. Sexual contact with someone who has HIV or might have HIV
    c. Sharing things such as needles or razors that can be contaminated with infected blood
    d. All of the above
    e. None of the above

True and False: Bubble “A” for true and “B” for false. If false, tell me WHY.

12. HIV virus can live on objects or surfaces for 10 minutes.
13. HIV virus can live in deceased patients for 24 hrs.
14. A spouse or parent can talk with the doctor to find out the results of the HIV test.
15. KS is the number one opportunistic infection of AIDS.
16. Sexual intercourse is not a possible route of transmission for HIV.
17. Mosquitoes and other vectors cannot transmit HIV.
18. Seroconversion is when your immune system starts to produce antibodies to HIV.

19. Donating blood cannot contain or transmit HIV.

20. HIV 1 and HIV 2 are the same identical virus.

Fill in the blank (Spelling counts):

21. What is the name of patient zero here in the United States?

22. Explain in detail (be specific) how the HIV virus reproduces.

23. In what year did the U.S. begin testing ALL blood for HIV 1 and HIV 2?

24. The Omnibus AIDS Act became law in what year?

25. Explain the 6 legal issues discussed in class regarding the Omnibus AIDS Act.

26. Explain what an “opportunistic infection” is.

27. What is a retrovirus?

28. How many subtypes does HIV-1 M have?

29. Where did the HIV virus come from?

30. How many groups does HIV-1 have?

31. Name the groups for question 30.
32. What is the difference between HIV 1 and HIV2?

33. What is the name of the enzyme the HIV virus uses to trick the host cells into making new HIV cells?
Blood borne Disease

• Spread by contact with blood or other bodily fluids.
• Can infect anyone no matter sexual preference
• People often can carry disease for years without showing symptoms.

HIV Groups

• HIV1 – has 4 groups: M, N, O, P These groups represent four separate introductions of SIV (simian immunodeficiency virus) into humans.
• Group M- More than 90% of HIV-1 infections belong to HIV-1 group M
AIDS

• ACQUIRED IMMUNE DEFICIENCY SYNDROME
• Caused by HIV virus
• HIV attacks immune system
• Time period between infection of HIV and manifestation of AIDS can be anywhere from 2-15 years, average 10.
• Antibodies can be detected within 3 months of infection, yet you can be healthy up to 10+ years.

What happens when HIV enters the body

• Retrovirus- only RNA, no DNA, needs host cell to reproduce
• HIV uses reverse transcriptase and a special enzyme, Protease, to fool the cell into believing that it is making part of itself.
• virus attaches itself to a T-CD4 lymphocyte
• T-cells( also called CD-4+) are specialized cells that stimulate the immune system and tell it to fight disease. They do not fight themselves.
What happens when HIV enters the body

- CD-4+ cells have “self” markers that identify them as belonging to your body.
- CD-4+ cells recognize these “non-self” agents and release special substances into your blood stream which signal your immune system to destroy the invaders.
- The B-cell is attracted to the scene by chemical warning signals from the T-cells and arrives to help.
- The B-cells attack the virus and form antibodies to it. These antibodies can destroy some of the free floating virus in the bloodstream

HIV Replication

- [http://www.google.com/url?sa=t&source=web&cd=2&sqi=2&ved=0CBwQtwIwAQ&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3FrO8MP3wMvqg&ei=3VIkTs_6OYGatwekqd2iAw&usg=AFQjCNZeZ--Z5MKzFdeejA_1Ycnh6w](http://www.google.com/url?sa=t&source=web&cd=2&sqi=2&ved=0CBwQtwIwAQ&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3FrO8MP3wMvqg&ei=3VIkTs_6OYGatwekqd2iAw&usg=AFQjCNZeZ--Z5MKzFdeejA_1Ycnh6w)
EPIDEMIOLOGY

• Different strains of HIV in different parts of the world make it difficult to treat
• Education has helped slow the spread of the disease in developed countries but poor nations don’t have the funds
• Brazil has the slowest growth worldwide due to the amount of money spent on prevention

FACTS & STATISTICS ABOUT HIV & AIDS

• CDC estimates that more than one million people are living with HIV in the United States.
• One in five (21%) of those people living with HIV is unaware of their infection.
• COST $5.00-$25.00 for blood test. AIDS.GOV lists all testing sites near you.
• 5,000 new HIV cases every 24 hrs
• 1 AIDS case every 18 seconds
FACTS & STATISTICS ABOUT HIV & AIDS

• One new HIV infection occurs every 6 seconds of every minute of everyday.

• Persons over the age of 50 account for 15% of all new HIV/AIDS diagnoses.

• The U.S budgets only 2 cents of every dollar to spend on HIV/AIDS research.

• HIV INFECTION:
  – 1:400 IN WORLD
  – 1:250 IN UNITED STATES
  – 1:100 IN FLORIDA
  – 1:40 IN DADE COUNTY

FACTS & STATISTICS ABOUT HIV & AIDS

• The top 5 states/provinces with the highest incidence of HIV/AIDS:
  1. New York
  2. California
  3. Florida
  4. Texas
  5. Washington D. C.

The top 5 cities were:
  1. Miami, FL
  2. New Orleans, LA
  3. Baton Rouge, LA
  4. Washington D.C.
  5. Baltimore, MD
Important dates

• HIV1- discovered ‘84
• HIV2- discovered ’86
• Testing for HIV1 antibodies in the U.S. blood supplies ‘85
• Testing for HIV1 & HIV2 antibodies in U.S. blood supplies ‘92

TRANSMISSION

• HIV can not live outside of the body
• HIV is easily killed by heat, dry air, & bleach
• HIV virus is seen in ALL body fluids including saliva, urine, tears, etc but IS PREDOMINATELY SPREAD BY 3 types of fluids: BLOOD, VAGINAL SECRECTIONS, SEMEN
BODY FLUIDS WHICH POSE AN INFECTIOUS RISK

- BLOOD
- CEREBRAL SPINAL FLUID
- SYNOVIAL FLUID
- VAGINAL SECRETIONS

Blood is the major cause of HIV transmission

- AMNIOTIC FLUID
- ANY FLUIDS CONTAINING BLOOD
- SEMEN

Protect yourself in the work setting!!!!

Most common routes of HIV transmission

- Percutaneous exposure

- Mucous membrane contact

- Being cut with an object that has an HIV containing body fluid on or in it.

- Non-intact skin contact with a body fluid that contains HIV.
How HIV is spread

• Tattoos/Piercings with infected needles
• Perinatal
  – During pregnancy
  – During birth
    • Every child born to an HIV infected mother will test positive for the antibody at birth. It takes 18 months for the mom’s antibodies to clear the child. To check child wait 18 months and do EIA or test for p-24.
  – While breastfeeding

PREVENTIONS

• NONSEXUAL TRANSMISSION
  1. NEEDLE USERS
     • DON’T SHARE NEEDLES
     • BLEACH WORKS
     • DRUG TREATMENT
  • Education
  • Lifestyle changes

• SEXUAL TRANSMISSION
  1. ABSTAIN
  2. MONOGAMY
  3. PROTECTION

• UNIVERSAL PRECAUTIONS
  – GLOVES, GOWNS, HANDWASHING
TERMS

• Antigen- A substance that the body recognizes as foreign including pathogens.

• Antibodies- Product created by the immune system to fight invading antigens.

TERMS

• Seroconversion- Change in the status of serum testing. Enough antibodies present, average time for conversion 6-8 weeks up to 6 months..

• Viral load: is a measurement of the amount of HIV in your blood. As HIV progresses, the amount of HIV in the blood—the viral load—increases.
Testing

• EIA- (Enzyme Immunoassay) or ELISA (Enzyme Linked Immune Sorbent Assay)
  — 1\textsuperscript{st} test done, least expensive
  — Tests for a retrovirus antibody
  — Used to detect a wide variety of antigens and antibodies, even hormones
  — Only shows you have been exposed to an infection
  — Takes 2-6 wks for enzymes to show. (Blood, oral fluids, or urine)
  — Window Period- time from exposure to HIV to when HIV antibodies appear in the blood.

Testing

• WESTERN BLOT- done after 2 positive EIA’S using the same blood sample. Tests for HIV antibody. Shows seroconversion, you are infected.
• If you have been exposed within last 6 wks it may not show up on test, repeat in 6 mths.
• Can have false + from allergies, mult. Births, recent flu shot
• Tests offered @ community health clinics free/low cost
• Results are kept confidential
Stages of HIV Infection

- **Stage 1: Early Acute**
  - Lasts about 18 months average
  - Normal CD4 cell count
  - Very high levels of HIV-1 virus in the blood
  - Very high levels of p-24 in blood (p-24 is an HIV antigen, which is released by the HIV-1 virus as it reproduces)
  - Infected person very communicable to others at this stage
  - No outward signs or symptoms of infection.
  - Unaware they are infected.

- **Stage 2: Latent-Asymptomatic**

- **Stage 3: LAS or Lymphadenopathy Syndrome**

- **Stage 4: AIDS**

**EARLY/ACUTE STAGE:**

- Lasts about 18 months average
- Normal CD4 cell count
- Very high levels of HIV-1 virus in the blood
- Very high levels of p-24 in blood (p-24 is an HIV antigen, which is released by the HIV-1 virus as it reproduces)
- Infected person very communicable to others at this stage
- No outward signs or symptoms of infection.
- Unaware they are infected.
Latent-Asymptomatic:

- Infected with HIV, but showing no outward physical symptoms.
- Lasts on average 7 ½ years.
- CD-4+’s declining due to HIV virus destroying them.
- Amount of virus in blood declining—because HIV survives and reproduces in the CD-4+ cells. Less cells means less HIV being produced and released.

Lymphadenopathy Syndrome

- “Pre-AIDS”
- HIV leaves blood, enters lymph system and destroys it.
- HIV destroys thymus gland.
- ARC (AIDS Related Complex) as virus weaken immune system feel tired, pain, fever, diarrhea, coughing, flu like symptoms, night sweats, swollen glands, weight loss.
- When most people seek medical attention.
AIDS

ONCE HERE REMAIN HERE.
– Very high levels of HIV in blood.
– Very communicable to others.
– Symptomatic
– T4 COUNT 200 or below (NORMAL 1000-1500)
– OPPORTUNISTIC INFECTIONS COMMON
– MAY DEVELOP MENTAL ILLNESS
– MAY DIE WITHIN MONTHS OR YEARS

OPPORTUNISTIC INFECTIONS

• Diseases or conditions that take advantage of the body’s lowered resistance to infection

• PNEUMONCYSTIC CARINII PNEUMONIA (PCP) the most common
KAPOSI SARCOMA- DEADLY SKIN CANCER, PURPLE BLOTCHES, SPREAD INTERNALLY

CANDIDIASIS- FUNGAL INFECTION OF THROAT, MOUTH, BLOODSTREAM
TREATMENTS

• MULTIPLE DRUGS IN COMBINATION- BLOCK GROWTH OF VIRUS AFTER ENTERS CD4 CELLS

• TREAT SECONDARY PROBLEMS THAT ARISE (OPPORTUNISTIC INFECTIONS)

• DR.'S TRACT CD4 COUNTS TO EVALUATE IMMUNE STATUS & THE RESULTS OF ANTIVIRAL DRUGS — COUNT LESS THAN 400 DRUGS ARE STARTED
TREATMENTS

• There are presently people with AIDS who, through the use of combination drug therapies and adopting healthy lifestyles (adequate sleep, exercise, proper diet), have an “undetectable” level of the virus in their blood. Magic Johnson is an example

OMNIBUS AIDS ACT 1988

— EMPLOYERS MAY NOT REQUIRE HIV TESTING AS A CONDITION FOR EMPLOYMENT- STRICTLY VOLUNTARY

— REQUIRES HCW TO TAKE HIV EDUCATION CLASSES TO RENEW LICENSE

— IMPOSES CRIMINAL SANCTIONS AGAINST PEOPLE INFECTED WITH HIV WHO ARE BELIEVED TO ENGAGE IN ACTIVITIES THAT PLACE THE PUBLIC AT RISK
OMNIBUS AIDS ACT 1988

– INSURANCE COMPANIES & HMO’S
  • ARE PERMITTED TO ASK IF YOU HAVE TESTED POSITIVE
  • ARE NOT PERMITTED TO ASK IF YOU HAVE EVER BEEN TESTED
– TEST RESULTS ARE CONFIDENTIAL (Florida law permits the release of HIV test results with a court order)

– REPORTING & DISCLOSURE
  • PRE/POST COUNSELING

Assessment Suggestions:

1. 15.01 Recognize emerging diseases and disorders.
   a. Pre-test and Post-test
   b. Students used different types of media to learn about the social, cultural, and economical implications blood borne diseases and to fill in worksheets.

2. 15.02 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
   d. Using Viral Quest students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.

3. 15.03 Identify "at risk" behaviors that promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
4. 15.04 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes

5. 15.05 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes

6. 15.06 Demonstrate knowledge of the legal aspects of HIV/AIDS, including testing.
   a. Pre-test and Post-test
   b. Take notes from power point
   c. Answer questions on daily quizzes
   d. Students completed an ELISA simulation in which they portrayed lab technicians and were able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence’s manual as a reference.
   e. Students could identify all six components of the AIDS OMNIBUS ACT.

RESOURCES/REFERENCES:

“The Evolution of HIV” lecture June 21, 2011 Emerging Pathogen Building Room 150. Dr. Marco Salemi, Associate Professor, Department of Pathology, Immunology, and Laboratory Medicine/Emerging Pathogens Institute.

“Biochemistry of HIV Drugs” lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Ben Dunn, Distinguished Professor, Department of Biochemistry and Molecular Biology.

“ELISA” lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Charles Lawrence, UF CPET Educational, Multimedia & Web Designer


