HIV Prevention Research Participant Guide

BE THE GENERATION
TO END THE AIDS EPIDEMIC

BE THE GENERATION

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INTRODUCTION

What Will We Do in This Workshop?

In this workshop, we will provide basic information about HIV prevention research in simple terms. We will present information, and you will be able to ask questions. We will also do activities together to help you remember what you learn. The objectives of this workshop are to:

- Provide a basic overview of HIV/AIDS.
- Describe clinical research.
- Describe community engagement.
- Define and describe HIV prevention tools and the latest in biomedical HIV prevention research.

This workshop is designed to give you an opportunity to:

- Apply the information you learn in activities and discussions.
- Ask questions about information you do not understand.
- Practice what you learn.

This Participant Guide includes information, facts, and space to write your own notes, as well as a glossary. The glossary includes many words, abbreviations, and definitions that may not be familiar to you.

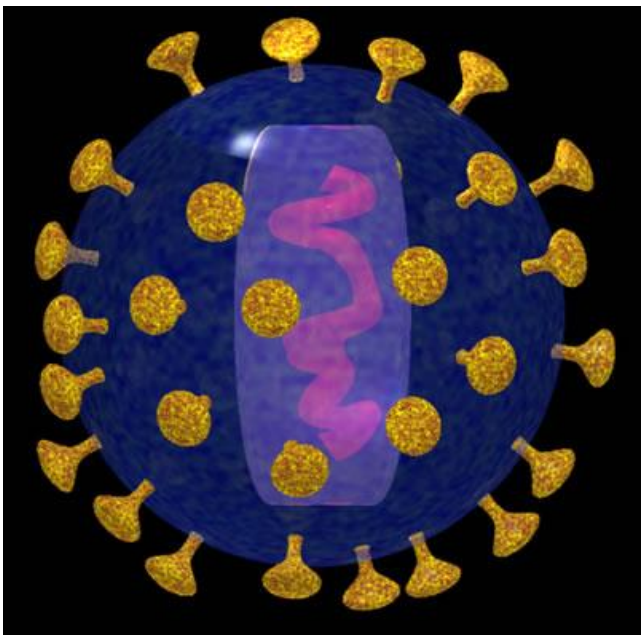
Notes

WHAT IS HIV/AIDS?

Objectives

In this session (What Is HIV/AIDS?), you will learn about:

- HIV and AIDS
- How HIV is transmitted
- How to prevent HIV transmission
- Activity: how HIV is transmitted
- The history of HIV/AIDS, including challenges and successes
- Supporting people with HIV/AIDS



The AIDS virus illustration, by Scott Camazine 2010©[1]

Introduction

HIV stands for Human Immunodeficiency Virus:

- It is a virus specific to humans.
- After it gets into your body, it makes you less able to fight infections.
- Anyone can have HIV.
- Due to a variety of factors (social, structural, geographical, biological, behavioral), some populations are more vulnerable to HIV than others.

AIDS stands for Acquired Immune Deficiency Syndrome:

- *Acquired* means you can get this illness if you have HIV.
- *Immunodeficiency* means a weakness in the body's system that fights diseases.
- *Syndrome* means a group of health problems that make up a disease.

AIDS is caused by a virus called HIV (Human Immunodeficiency Virus). If you contract HIV, your body will try to fight the infection. However, the challenging thing about HIV is that it attacks the same parts of the immune system that would normally fight the infection.

Description of HIV/AIDS

The human immunodeficiency virus, or HIV, is the virus that causes AIDS. When inside the body, HIV attacks and destroys the infection-fighting cytotoxic T-lymphocytes (T-cells), of the body's immune system. The immune system is the body's way to fight disease. Loss of T-cells makes it difficult for the immune system to fight infections.

A person who has HIV develops antibodies to fight the virus. A blood test for HIV looks for these antibodies. HIV tests can also look for HIV molecules called *antigens*. A test result that finds HIV antibodies and/or antigens in the blood is called an HIV positive result, meaning the virus is present.

Having HIV is not the same thing as having AIDS. AIDS develops over time as the HIV virus wears down the body's immune system and destroys the T-cells. A person can progress from having HIV to having an AIDS diagnosis when the body's immune system becomes highly compromised by the effects of the virus.[2] If HIV goes untreated, the time to an AIDS diagnosis varies, but it can often take around ten years.

People are diagnosed as having AIDS when their T-cell count is 200 or less. By comparison, CD4+ T-cell counts can vary in healthy persons but are usually between 700-1300 cells/mm^3.

There is currently no scalable cure for HIV/AIDS, but there are ways to help control the virus.

How HIV is Transmitted

HIV is found in blood and other bodily fluids (such as semen, vaginal fluids, and breast milk). HIV is not found in saliva or urine. HIV cannot live for long outside the body. To contract HIV, bodily fluid containing HIV must enter another person's body. The virus can enter the body through the bloodstream or by passing through delicate mucous membranes (such as inside the vagina, mouth, rectum, or urethra).

HIV can be transmitted:	• Through vaginal and anal sex • Through needles and syringes containing HIV • Perinatally (during pregnancy, labor, delivery, or breastfeeding) • Rarely through oral sex, blood transfusions, and other contact with blood containing HIV
HIV is NOT transmitted by:	• Kissing (unless both people have large, open, bleeding sores in their mouths) • Sneezing, coughing, shaking hands, or playing sports • Sharing drinking glasses, musical instruments, or kitchen utensils • Swimming pools, showers, or toilet seats • Insect bites • Injecting drugs with sterile works • Saliva

Remember, HIV does not reproduce outside a living person. It does not survive in open air.

Notes

What Is HIV Prevention Research?

HIV prevention research is designed to find safe and effective methods to prevent HIV and AIDS. These prevention methods include:

- Biomedical (medicines, vaccines, approaches, and tools to fight disease that include biological and medical characteristics)
- Behavioral (sex education, HIV testing, reducing partners, etc)

Because this research is conducted by scientists who develop and test prevention approaches using drugs or other products, it is referred to as biomedical HIV prevention research.

Preventing HIV is our best hope for stopping the HIV/AIDS epidemic.

It is also important to promote awareness and understanding of this research and to build public support for this work. Researchers often partner with a variety of individuals and groups in the community for this awareness, understanding, and support. Successful partnerships among the following can make a difference:

- Community leaders
- Local and national organizations
- Health professionals
- Educators

How to Prevent HIV

Methods of HIV prevention include:[3]

- HIV testing and counseling
- Correct and consistent condom use with internal/external condoms
- Using antiretroviral drugs for:
  - Treatment as prevention (TasP)
  - Anyone living with HIV
  - Pregnant mothers
  - Pre-exposure prophylaxis (PrEP)
  - Post-exposure (PEP) prophylaxis
- Sex education
- Family planning
- Sterile needles and works
- Formula instead of breastfeeding for mothers with HIV (only recommended where formula is safe for babies, e.g. where clean water is available for mixing)
- Open communication
- Treating drug addiction
- Reducing behavioral factors
- Voluntary medical penile circumcision
- Screening the blood supply

All methods have some limitations, and some work better under certain circumstances than others.

Notes

How HIV Is Transmitted

In this activity, you will have a chance to find out more about how HIV is transmitted. The more you know about how HIV is transmitted will help you understand why HIV prevention is important.[4]

1. You will hear one statement.

2. Decide if you think the statement is true or false.

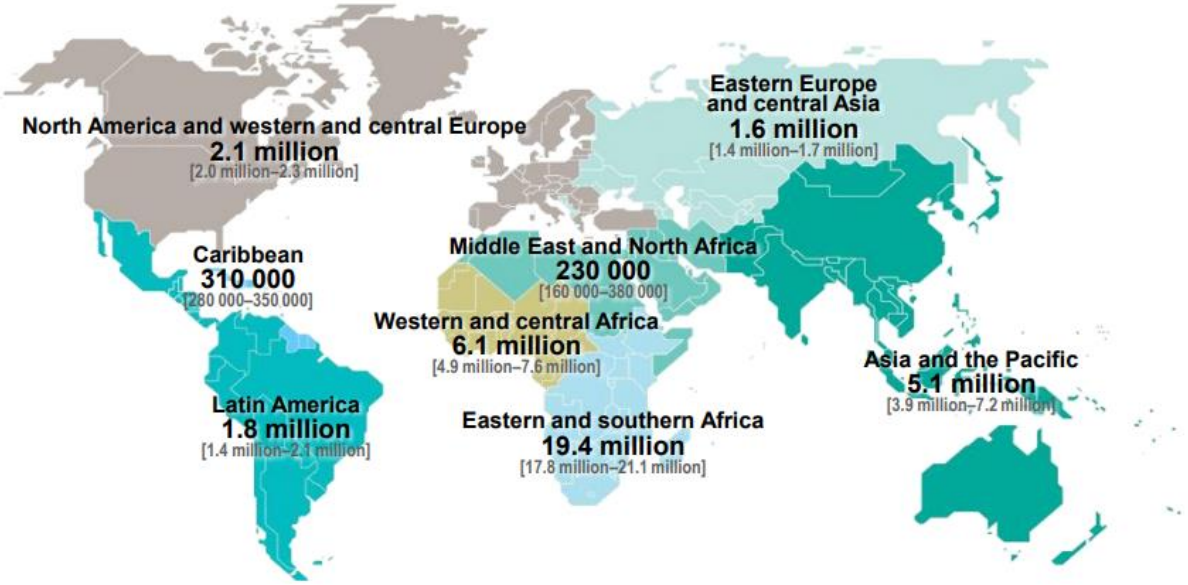
3.
   - If you think the statement is true, move to the "True" sign.
   - If you think the statement is false, move to the "False" sign.
   - If you are not sure what the answer is, stay where you are.

What new information did you learn from this activity?

History of HIV/AIDS

- The first cases of what we now call AIDS were reported in the U.S. in June 1981.
- Just over a year later (July 1982), a group of federal officials, university researchers, community activists, and others gave this disease the name *acquired immune deficiency syndrome*, or AIDS.
- In 1984, researchers discovered HIV as the cause of AIDS and developed a blood test to diagnose HIV seropositivity.

AIDS is now a global epidemic. It has become one of the greatest threats to human health and development. Although HIV and AIDS are found in all parts of the world, some areas are more affected than others.



Total: 36.7 million people living with HIV

Adults and children estimated to be living with HIV, 2016.[5]

HIV/AIDS continues to take a huge toll on people all over the world. The facts:

- **HIV has killed more than 35 million people worldwide.**
- HIV/AIDS is most prevalent in sub-Saharan Africa.

By comparison, approximately:

- 40 million people died during World War II.
- 20 million people died worldwide during the flu epidemic of 1918.

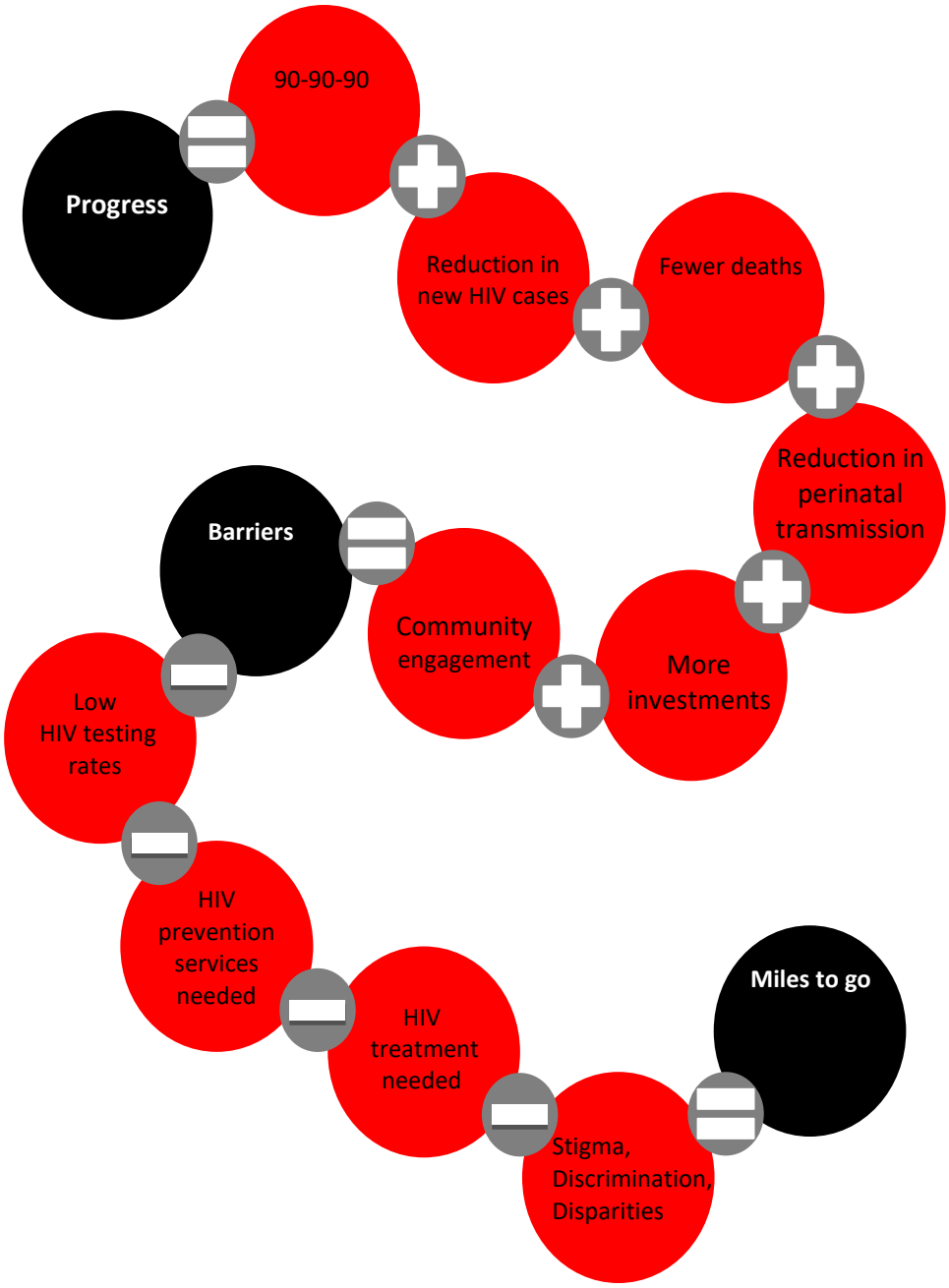
Past 35 Years: Challenges and Successes Globally

1981	• The U.S. Centers for Disease Control (CDC) releases its first public report about what we now know as AIDS. • 121 people died from the disease by the end of the year.
1982	• Acquired Immune Deficiency Syndrome (AIDS) is named. • AIDS is reported among people who have received blood transfusions in the U.S.
1983	• The first AIDS cases among non-drug using women and children appear. • One thousand people in the U.S. have died of AIDS.
1984	• Scientists identify HIV and link it to the cause of AIDS. • Cases of HIV are described in Africa.
1985	• HIV blood tests become available. • Rock Hudson is the first major celebrity to announce that he has AIDS. • AIDS is reported in China.
1986	• More than 38,000 AIDS cases have been reported worldwide.
1987	• AZT is identified as the first drug used to treat AIDS.
1988	• U.S. government conducts its first national AIDS education campaign. • The first World AIDS Day takes place.
1994	• The Pediatric AIDS Clinical Trials Group Study 076 found that AZT treatment of pregnant women decreased the rate of HIV to the newborn from about 25% to 8%.
1995	• First protease inhibitor (saquinavir) was approved in record time by the U.S. Federal Drug Administration, ushering in a new era of highly active antiretroviral therapy (HAART).
1996	• The Joint United Nations Programme on AIDS (UNAIDS) is established. • Patients show success in using a combination of several types of treatment medications called antiretrovirals (ARVs) (sometimes referred to as a “drug cocktail”). • The World Health Organization (WHO) releases the first medical guidelines to prevent perinatal transmission of HIV.
1997	• An estimated 22 million people are living with HIV worldwide.

	• Nevirapine research for the prevention of perinatal transmission of HIV starts in Uganda.
2002	• Botswana is the first African country to begin a national AIDS treatment program.
2003	• The first HIV vaccine (AIDSVAX) to be tested in a large clinical trial is found ineffective.
2005	• 46,684 AIDS-related deaths worldwide in 2005. • Penile circumcision clinical trials start in Africa.
2006	• Only 28% of people with HIV in developing countries are receiving treatment.
2007	• An estimated 33 million people are living with HIV worldwide.
2009	• RV144 shows an HIV vaccine regimen is approximately 32% effective in preventing HIV acquisition, which shows that a preventive vaccine against HIV is possible.
2010	• Researchers conduct the iPrEx clinical trial showing a 44% reduction in new cases among HIV-negative participants if they took a daily dose of Truvada® (also known as TDF/FTC). This is one of several clinical trials providing proof of concept for pre-exposure prophylaxis (PrEP). • CAPRISA 004 research shows there were 39% fewer new HIV cases among women who use 1% tenofovir gel before and after sex (proof of concept for a vaginal microbicide).[6]
2011	• There are 700,000 fewer new HIV cases across the world in 2011 than in 2001. • 22,800 AIDS-related deaths are reported worldwide in 2011. • A 51% decline in AIDS-related deaths is reported since 2005 as a result of HIV treatment programs. • Results of the HPTN052 clinical trial show that, if a person with HIV adheres to an effective antiretroviral therapy regimen, the likelihood of transmitting the virus to an HIV-negative sexual partner can be reduced by 96% (showing proof of concept for treatment as prevention). Among participants in this trial with an undetectable viral load, zero HIV transmissions to sex partners occurred, paving the way for the U=U campaign.
2012	• Truvada® (also known as TDF/FTC) is approved for daily use for HIV prevention by the U.S. Food and Drug Administration (FDA).[7]
2013	• VOICE (Vaginal and Oral Interventions to Control the Epidemic) shows three daily HIV antiretroviral prevention approaches are not effective for the women in the trial.

Information assembled and adapted from "Dr. Myron Cohen, Prevention of HIV-1 Infection and UNAIDS World AIDS Day Report 2011,"[8] and UNAIDS World AIDS Day Report 2012"[9]

Global Goals



UNAIDS Global AIDS Update 2018

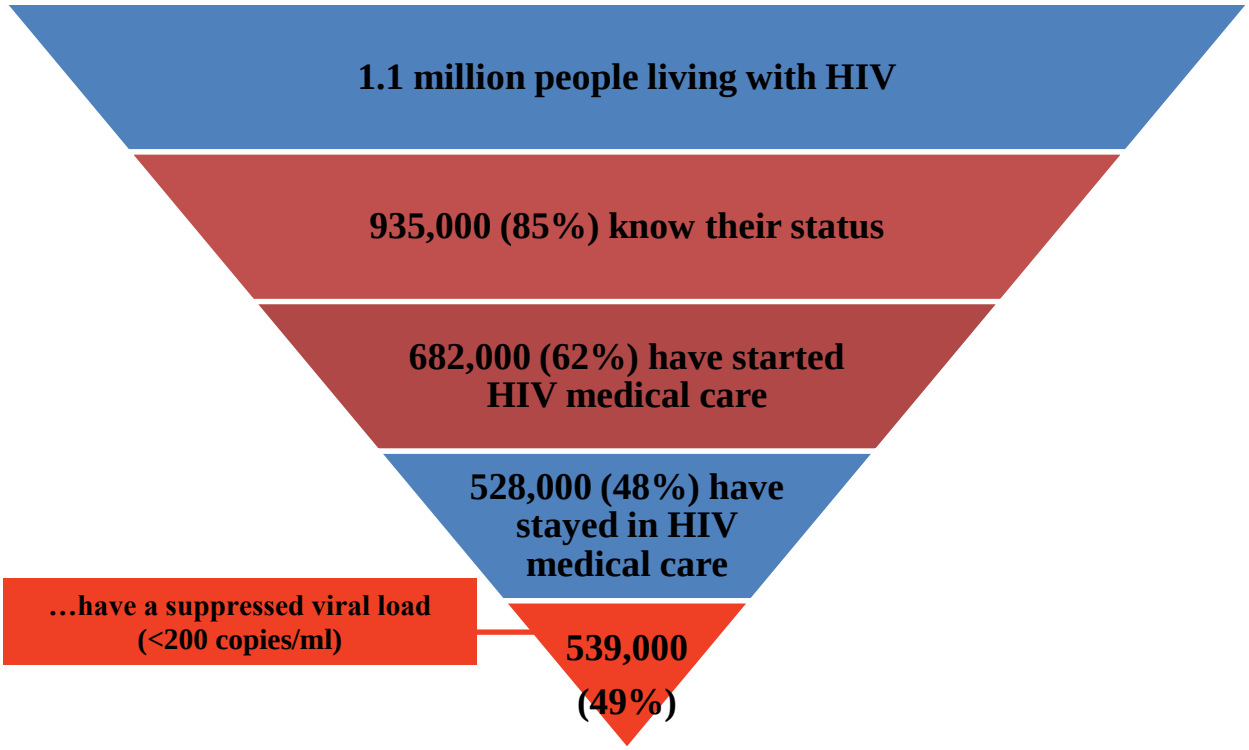
HIV/AIDS in the U.S.

In 2018-2019, The U.S. Centers for Disease Control and Prevention published the following updates about HIV/AIDS in the U.S.

- People living with HIV:[10]
  - 1.14 million people aged 13 years and older are living with HIV.
  - 1 in 7 people living with HIV are unaware of their HIV-positive status.
- New HIV cases:[10]
  - There are approximately 40,000 new HIV cases every year.
  - Most new cases (about 70%) are among men who have sex with men MSM.
  - African Americans and Hispanic/Latinx people continue to be disproportionately affected.
- Among transgender persons:[11]
  - The percentage of transgender people receiving an HIV diagnosis is 3 times the national average.
  - Approximately 44% of Black transgender women, 26% of Hispanic/Latina transgender women, and 7% of white transgender women are living with HIV.
- Among African Americans: [10]
  - The rate of new HIV cases among African American males is 8 times higher than for white males.
  - 80.3% of new HIV cases among African American males were among MSM.
  - African American females accounted for 11% of all new HIV cases in the U.S. and 60% of all new HIV cases among females.
- Among Hispanic/Latinx people: [10]
  - The rate of new HIV cases for Hispanic males is 4.3 times higher than that for white males.
  - The rate of new HIV cases for Hispanic females was 3.1 times that of white females.
- Among American Indians and Alaska Natives (AI/AN):[12]
  - 75% of new HIV cases among AI/AN males are attributed to male-to-male sexual contact.
  - 69% of the new HIV cases among AI/AN females were attributed to heterosexual contact.
- Among Asians as well as Native Hawaiians and Pacific Islanders (NHOPI):[13,14]
  - The number of Asians receiving an HIV diagnosis has increased in recent years, driven primarily by an increase in HIV diagnoses among Asian MSM.
  - In 2017, there were 58 HIV diagnoses among NHOPI, 39 of which were attributed to male-to-male sexual contact
  - HIV affects NHOPI in ways that are not always apparent because of small population sizes

The Treatment Cascade in the U.S.

The treatment cascade shows the number of people living with HIV in the U.S. who have been diagnosed as having HIV, who receive medical care and treatment, and who reach viral suppression.[15]



The significance of the treatment cascade is that it shows gaps in HIV testing, care, and treatment. Continuing HIV care is important because:

- People with HIV can stay healthy longer if the amount of virus in the body is reduced.
- Controlling the virus reduces the chances of passing HIV to others. Four clinical trials (HPTN 052, PARTNER, PARTNER 2, and Opposites Attract) showed that people who are on ART vastly reduce their likelihood of passing HIV to their sex partners, and those with an undetectable viral load cannot pass HIV to their HIV-negative sex partners, even if they don't use condoms or PrEP.
- Medical care and ART can prevent the development of AIDS.

How to Support People Living with HIV/AIDS

People living with HIV/AIDS participate in every aspect of society. They are part of families, schools, and neighborhoods. They work, get married, have children, and can live lives that look no different from anyone else. But due to their health status, many people with HIV experience unfair treatment and prejudice. Stigma and discrimination against people living with HIV/AIDS contribute negatively to the health and well-being of our community as a whole. Some people are reluctant to get tested for HIV for fear of how they will be treated if they are diagnosed. Creating supportive communities where people with HIV/AIDS feel respected and have access to the care they deserve is another vital tool in the goal of reaching an AIDS-free generation.

Stigma and discrimination occur when we start to act differently because we are afraid of something or do not understand something. In fact, we may pull away from people with HIV when they need friends and family the most.

Stigma and discrimination refer to negative attitudes, prejudice, maltreatment, and abuse directed at people living with HIV and AIDS. Some consequences of stigma and discrimination are:[16]

- Avoidance by family, peers, and the community
- Poor treatment in health care and education settings
- Psychological distress
- Low self-esteem, which can lead to poor health outcomes
- Negative effect on the success of HIV testing and treatment
- Job loss
- Travel restrictions
- Verbal and physical abuse
- Criminalization

On a personal level, a person's health status is private. Just as we should not ask how or why someone has cancer or diabetes, we should not ask how or why someone has HIV/AIDS. And, we should not make assumptions about how people acquired HIV or the kind of life they lead.

Ways to prevent HIV/AIDS stigma and discrimination include:

- Break the silence and talk about your fears and the fears of others.
- Treat people with HIV like anyone else with a health issue: demonstrate respect, empathy, and compassion.
- Destigmatize language; listen to how people with HIV describe themselves and their condition.
- Get informed about how to prevent HIV.

What Would You Do?

In this activity, you will think about different situations you may encounter and how you would handle them. Use what you have already learned about HIV/AIDS to do this activity. With your group:

- Look at the scenario and questions on the card you are given.
- Discuss them with your group.
- Write down notes below that you feel are important.

Share your answers with the whole group so they can hear your ideas. As each group shares their answers, you can write them down below.

What Did You Learn?

In this activity, you will think about how you can apply what you learned about HIV/AIDS by answering a question.

- Write down your thoughts about the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. How can you use what you learned today about HIV/AIDS in your daily life?

2. How has what you learned today impacted YOU?

Summary

Medically speaking, HIV is a lot like other viruses, including those that cause the flu or the common cold. But there is an important difference. Over time, your immune system can get rid of most viruses. But the human immune system cannot get rid of HIV by itself.

HIV can hide for long periods of time in cells, use them to make more copies of itself and then destroy those cells. Over time, HIV destroys so many cells that the body can no longer fight infections and diseases.

Efforts to prevent, control, and eliminate HIV/AIDS are continuing worldwide. Stigma is still a major barrier to eliminating HIV.

In this session, you learned about:

- HIV and AIDS
- How HIV is transmitted
- How HIV is prevented
- The history of HIV/AIDS, including challenges and successes
- Interacting with people living with HIV/AIDS

Notes

Glossary

The following terms and abbreviations were used in this section:

AI/AN	American Indians and Alaska Natives
AIDS	Acquired Immunodeficiency Syndrome
antibody	A protein molecule that can be found in the blood produced by a type of white blood cell that helps prevent against infection
API/NHOPI	Asians and Pacific Islanders / Native Hawaiians and Other Pacific Islanders
ARV	Antiretroviral medications used for the treatment of HIV; they block HIV replication in multiple phases in the reproductive cycle of the virus
ART	antiretroviral therapy
AZT	The first drug used to treat HIV/AIDS
biomedical	Medicines, vaccines, approaches, and tools to fight disease that include biological and medical characteristics
CDC	Centers for Disease Control and Prevention
cure	A method or course of medical treatment used to restore health and clear an infection from the body
discrimination	Unfair or unequal treatment resulting in denial of opportunity
epidemic	A disease affecting many people at the same time and spreading from person to person in a locality where the disease does not exist permanently
HAART	highly active antiretroviral therapy
HIV	Human Immunodeficiency Virus

immune deficiency	A weakness in the body's immune system that fights diseases which makes it hard for a person to fight off infections
microbicides	Products being developed and tested for use in the vagina or rectum to reduce the likelihood of HIV transmission during vaginal and anal sex
MSM	Men who have sex with men
pre-exposure prophylaxis (PrEP)	a biomedical prevention approach for people who do not have HIV; they take medication to reduce their likelihood of acquiring HIV
proof of concept	A treatment or process found to function as intended or has the potential for real-world application
stigma	The concept of people being identified as different in a negative way based on some characteristic that separates them from the rest of the society
syndrome	A group of health problems that make up a disease
TasP	Treatment as Prevention is a medical prevention approach that uses antiretroviral treatment for people with HIV to decrease their chance of transmitting HIV, ideally to zero chance under conditions of viral suppression (undetectable)
T-cells	cytotoxic T-lymphocytes (cells that fight infection)
treatment cascade	A visual representation that shows the number of people that receive the medical care and treatment they need from diagnosis to suppression of HIV
UNAIDS	United Nations Programme on AIDS
vaccine	A biological preparation that improves immunity by stimulating the production of antibodies and T-cells to a disease
viral load	The amount of HIV in a person’s body
virus	A small infectious agent that can replicate only inside the living cells of another organism

VOICE	Vaginal and Oral Interventions to Control the Epidemic (a study)
voluntary medical penile circumcision	A surgical procedure to remove the penis's foreskin; reduces the likelihood of the insertive partner acquiring HIV through the penis during vaginal sex by approximately 60%. "Voluntary medical" means the surgery is performed on adults who consent to the procedure for this medical purpose.
WHO	World Health Organization
YMSM	young men who have sex with men

Frequently Asked Questions (FAQs)

See below for commonly asked questions about HIV/AIDS:

How can I tell if I have HIV?	The only way to determine if you have HIV is to be tested. Do not rely on symptoms to know. Many people who have HIV do not have any symptoms for many years. Common symptoms can be easily mistaken for a cold or the flu, so only an HIV test can tell for sure.
Where can I get tested for HIV?	Common locations include local health departments, private physicians, hospitals, and test sites specifically set up for HIV testing. On the web, go to http://hivtest.cdc.gov/ and enter your zip code to find testing locations near you. The CDC National AIDS Hotline can answer questions about testing and can refer you to testing sites in your area. The hotline number is 1-800-232-4636.
What if my test shows I have HIV?	If your test shows you have HIV, the sooner you take steps to protect your health, the better. Early medical treatment, a healthy lifestyle, and a positive attitude can help. Prompt care may delay the onset of AIDS and prevent some life-threatening conditions. See a doctor. Join a support group. Call the CDC National AIDS Hotline for more information and referrals at 1-800-232-4636. If you have ever been in a clinical trial for an HIV vaccine, it is possible that you could have antibodies caused by the vaccine and not by the actual virus. It is important to go back to the research clinic for HIV testing. If you need help accessing HIV testing after your clinical trial is over, call the HVTN VISP Testing Service directly at 1-800-327-2932. See http://www.fredhutch.org/en/research/divisions/vaccine-infectious-disease-division/research/immunology-and-vaccine-development/be-the-

	generation/vaccines.html for more details.
How likely am I to contract HIV from sex without condoms or ARVs?	People can contract HIV by having condomless and PrEP-less vaginal or anal sex with someone who has a detectable viral load. Although it is possible to contract HIV through oral sex, this is extremely rare and only happens in situations where the virus penetrates open wounds in a person's mouth.
How effective are condoms in preventing HIV?	Consistent and correct usage of condoms every time a person has sex can lower the likelihood of contracting HIV by nearly 100%. Their effectiveness decreases with improper usage and breakage.

Additional Resources

For more information about HIV/AIDS, go to:

http://www.bethegeneration.org

http://www.hiv.gov/

http://www.cdc.gov/hiv/

http://aidsinfo.nih.gov/

http://www.thebody.com/

https://www.hanc.info/Pages/default.aspx

http://www.niaid.nih.gov/topics/hivaids/Pages/Default.aspx

https://actgnetwork.org/

https://www.hptn.org/

http://www.hvtn.org/

https://impaactnetwork.org/

http://www.mtnstopshiv.org/

WHAT IS CLINICAL RESEARCH?

Objectives

In this section, you will learn about:

- The importance of clinical research
- What clinical research includes
- Clinical trials
- The clinical research process
- The importance of ethics in clinical research

Introduction

Research is a systematic investigation to establish facts. Clinical research refers to clinical trials involving people as participants. It helps develop solutions to improve the health of people all over the world. Clinical research includes:

- Development of new ways to treat, prevent, and control disease
- The evaluation of new interventions for:
  - Safety
  - Efficacy (the capacity to produce a desired effect/effectiveness)
  - Acceptability and adherence (whether or not people use the product as designed)
  - Preventing infections and controlling disease

Clinical research over the past 100 years has improved the health and lives of people around the world. The benefits of clinical research are far too many to list here, but here are a few of them:

- Global eradication of smallpox
- Vaccines for measles and polio
- Discovery of Tylenol and Ibuprofen for headache relief and reducing fevers
- Antibiotics to treat infections
- Improved medicines and treatments for many types of cancer
- Improved medicines and treatments for HIV and AIDS

Research follows the scientific method. The scientific method includes asking and answering questions by observing and doing tests.

Why Is Research Important?

Research is important because it investigates how something works and affects the people it is intended to help. Research may be:

Biomedical	Behavioral
Biomedical research is designed to understand and treat or prevent a disease or health condition. It may include: • Drugs (medications) • Vaccines • X-rays and other diagnostic tests • Physical examinations • Giving blood or other tissue/fluid samples	Behavioral research involves investigation to: • Understand how social factors and behavior relate to disease • Study the impacts of changing behavioral and social factors on health outcomes • Encourage healthy behavior

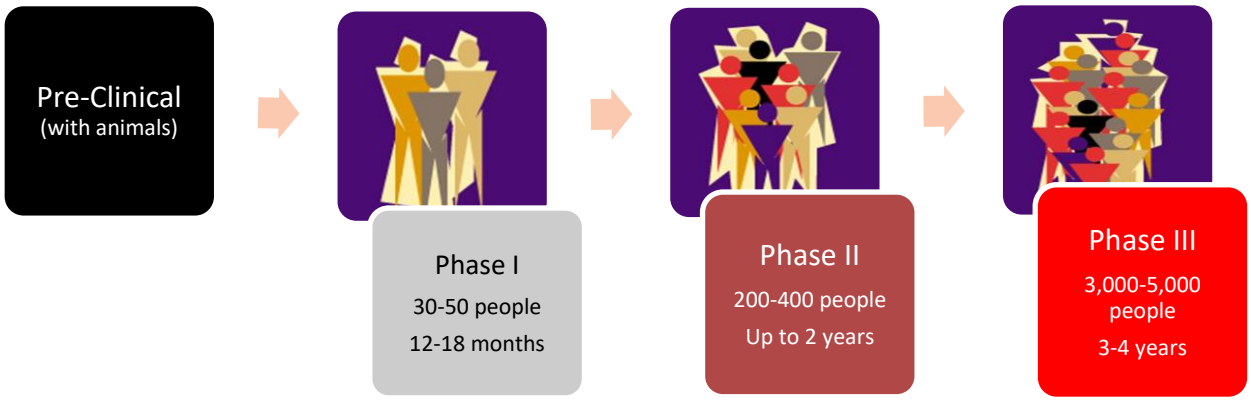
Each clinical trial answers scientific questions about preventing, screening for, diagnosing, managing, and/or treating a disease.

The goal of research is to develop interventions to improve health.

Notes

What Is the Clinical Research Process?

The entire research process is very lengthy, and it can take many years for a new treatment or prevention strategy to receive full approval by the Food & Drug Administration (FDA) of the U.S. government. This approval is required before something can be made available for general use.



The clinical research process includes:

Pre-Clinical Testing	In laboratory and animal clinical trials to: • Find out if there is a potential benefit of a drug, vaccine, or other intervention • Explore general safety
Investigational New Drug Application (IND)	An investigational new drug application (IND) must be filed that: • Describes the results of pre-clinical testing • Clearly defines how future human clinical trials will be conducted
Phase I (Assess Safety)	For the first time, the testing is done in people. The goals of phase I are to: • Assess safety for people • Select the optimal dose to be used in future clinical trials • Observe how the human body reacts • Find out what side effects occur as dosage levels are changed
Phase II (Test for Early Effectiveness and Safety)	If an intervention is shown to be safe during Phase I, it must be tested further in Phase II. Phase II tests in a larger group of people for: • Continued safety • Early efficacy • Acceptability (clinical trial design, scientific value, and whether or not the intervention is acceptable to the people who are using it)

Phase III (Large-Scale Testing)	This testing provides a better understanding of: • Efficacy • Risks and benefits • Comparison to the standard intervention
Licensing (Approval To Use)	After all clinical trial phases are complete and, if the research demonstrates that the strategy is safe and efficacious, a New Drug Application (NDA)/Biologics License Application (BLA) is filed with the FDA. The NDA/BLA contains all scientific information compiled over the course of the clinical trials.
Approval (Available for Prescription)	After FDA approval of the NDA/BLA, the intervention becomes available. Even if an intervention is approved, it must continue to comply with regulatory requirements. Reviews continue to ensure safety over time.
Post-Marketing Studies (Special Studies and Long-Term Effectiveness/Use)	The studies/clinical trials can monitor: • Long-term effects • The impact on a person's quality of life Some studies/ clinical trials help determine the cost-effectiveness of an intervention compared to other traditional and/or new therapies. These studies/clinical trials may be performed in special populations not previously studied (for example, children or the elderly).

What Is a Clinical Trial?

After testing in laboratories and animal clinical trials, the most promising interventions or prevention methods are moved into clinical trials. A clinical trial is sometimes called a clinical study. A clinical trial:

- Is research that tests how well an intervention works in a group of people
- Tests for new methods of screening, prevention, or diagnosis
- Is conducted in phases to learn about:
  - Safety and the optimal doses
  - The efficacy of an intervention
  - Whether or not people are willing to use the intervention (also known as "acceptability")

During a clinical trial, information is learned about an intervention, its risks, and whether or not it works for an individual or larger population.

Who Can Participate in a Clinical Trial?

Participants in clinical trials must be diverse:

- Age range
- Gender
- Race/ethnicity
- Geographic locations

Some research needs people:

- Who have the illnesses or conditions to be studied in the trial
- Who do not have the disease being studied

Diversity among Clinical Trials Participants Is Important

Diverse representation among clinical trial participants is important:

- Some biological traits may affect how well a medicine works.
- Sometimes these traits differ based on heritage or geography.
- People may differ because of the environmental conditions in which they live.
- The immune system changes naturally as people age, so it is important to conduct clinical trials in different age groups.
- Men, women, and transgender individuals have different immune system responses that can be influenced by different hormones and other factors, so it is important to include people from diverse sex and gender backgrounds in clinical trials.
- Trust in biomedical products begins with the research process.

What Is a Protocol?

Clinical research is conducted according to a very well-defined plan (a protocol). The protocol acts like a "recipe" for conducting the clinical trial. The protocol describes what will be done in the trial, how it will be conducted, who can participate, and why each part of the trial is necessary. The protocol is carefully designed to safeguard the participants' health and includes details on how safety will be monitored during the clinical trial.

The same protocol is used by every doctor or research center taking part in that specific clinical trial. A protocol also describes what the clinical trial is designed to prove:

- Who is eligible to participate in the clinical trial and the research objectives
- Details about tests, procedures, medications, and dosages
- Details about how the data and samples that are collected will be analyzed in order to answer the research objectives
- The length of the clinical trial and what information will be gathered
- What is known about the intervention from previous clinical trials in animals and/or humans
- A detailed rationale for why the clinical trial is warranted
- How safety will be monitored, and who will do it
- The methods that will be used to obtain informed consent from people who are interested in joining the clinical trial and a sample consent form written in simple language that explains the clinical trial

Notes

Safety and Well-Being of Participants

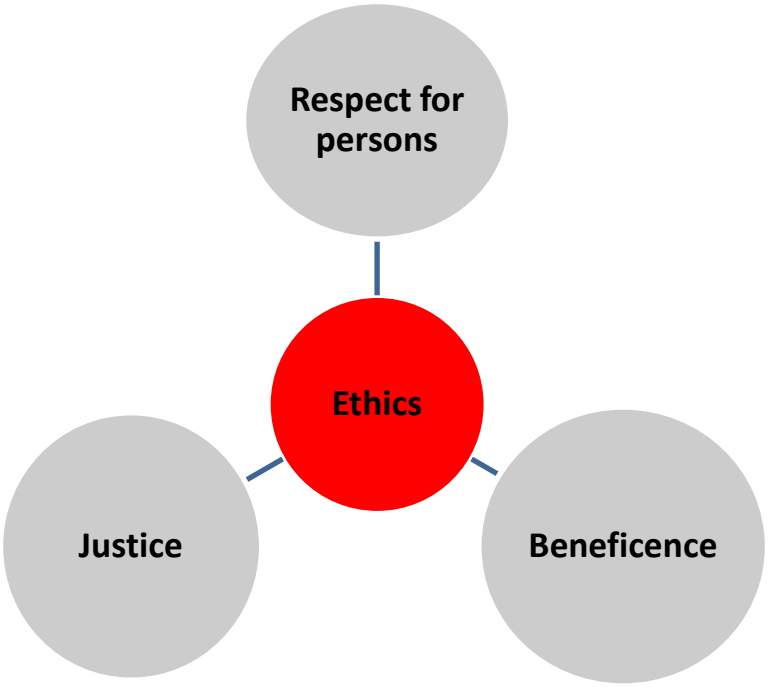
Clinical trials have safeguards in place to protect the safety and well-being of participants:

- Institutional review boards (also called Ethics Committees) and Data and Safety Monitoring Boards (DSMB) are independent groups who protect the safety and well-being of clinical trial volunteers by carefully reviewing the details of the clinical trial from start to finish.
- The FDA, which regulates all U.S. government-sponsored clinical trials, carefully reviews all clinical trials for potential safety issues and comparable groups in other countries.
- The U.S. Office of Human Research Protection provides educational programs and materials, regulatory oversight and advice on ethical and regulatory issues in research.

What Are Research Ethics?

Human research ethics are grounded in three principles that are the foundation of all regulations or guidelines governing research done with people. These principles apply to all geographic, cultural, economic, legal, and political boundaries.[17]

- Respect for persons
- Beneficence
- Justice



What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about clinical research by answering a question. With your group:

- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. How can you use what you have learned about clinical research in your daily life?

2. If someone you know wants to participate in a clinical trial, what would you tell them?

3. In what ways do ethics play a part in your life and why are ethics important in research?

4. In what ways has this information about clinical research impacted YOU?

Summary

Clinical research provides the means to make sure HIV research is conducted safely and effectively. Clinical research is an important step in finding ways to prevent and treat HIV/AIDS.

In this session, you:

- Learned about the importance of clinical research
- What clinical research includes
- The role of clinical trials in research
- The clinical research process
- The importance of ethics in clinical research
- Reviewed important terms and abbreviations used in clinical research
- Discovered links to additional information
- Completed an activity to apply what you learned

Glossary

The following terms and abbreviations were used in this section:

acceptability	During Phase II of the clinical research process, the design and scientific value of the clinical trial is checked
adherence	In clinical research, whether or not people use the product as instructed
AIDS	Acquired Immunodeficiency Syndrome
BLA	Biologics License Application (BLA)
behavioral research	Investigation of how people form health habits and make decisions that impact their health
beneficence	To do good; in clinical research, means to do no harm, or maximize possible benefits and minimize possible harm
clinical research	Research conducted in people that helps develop solutions to improve health all over the world
clinical trial	Research designed to measure the safety, efficacy, and/or appropriate dosage of a new intervention; research that tests how well an intervention works in a group of people; it tests for new methods of screening, prevention, diagnosis, or treatment
DSMB	Data and Safety Monitoring Board
efficacy	The degree to which a diagnostic test or intervention produces a desired result in patients under the idealized circumstances of a clinical trial
ethics	Respect for persons, beneficence, and justice
HIV	Human Immunodeficiency Virus
intervention	Any measure whose purpose is to improve health or alter the course of disease
NDA	New Drug Application

research	The gathering of data, information, and facts for the advancement of knowledge
scientific method	The scientific method includes asking and answering questions by observing and doing tests
research study/trial	Research conducted in people that helps develop solutions to improve health all over the world; the formal evaluation of new interventions for both safety and efficacy following strict guidelines
vaccine	A medical prevention substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection

Frequently Asked Questions (FAQs)

The National Institutes of Health (NIH) is one of the world's foremost clinical research centers, and the Federal focal point for clinical research in the U.S. See below for commonly asked questions about research:

Where can I go for information about clinical trials?	You can visit "NIH Clinical Trials and You" to learn about clinical trial basics, read volunteer and researcher stories, find ways to connect with clinical trials, and locate other educational resources for the public and health care providers.
Can I volunteer for NIH research even if I'm healthy?	The NIH Clinical Center provides an opportunity for healthy volunteers to participate in clinical research trials (sometimes called protocols or trials). Healthy volunteers provide researchers with important information for comparison with people who have specific illnesses.
Where can I find information about the latest research highlights coming out of NIH?	You can read about the latest NIH research advances on the News and Events page. A list of selected research highlights from the previous year is available through Research Matters: http://www.nih.gov/researchmatters/january2012/researchmatters2011recap.htm.

Who is responsible for the assurance of proper conduct of research?	The HHS Office of Research Integrity (ORI) promotes integrity in research supported by the U. S. Public Health Service (PHS) at about 4,000 institutions worldwide. ORI monitors institutional investigations of research misconduct and facilitates the responsible conduct of research through educational, preventive, and regulatory activities.

Additional Resources

For more information about research, go to:

http://www.nih.gov/

NIH Clinical Trials and You:
http://www.nih.gov/health/clinicaltrials/

Programs for Healthy Volunteers:
http://clinicalcenter.nih.gov/participate/studies/healthy_vol_prg.shtml

WHAT IS COMMUNITY ENGAGEMENT?

Objectives

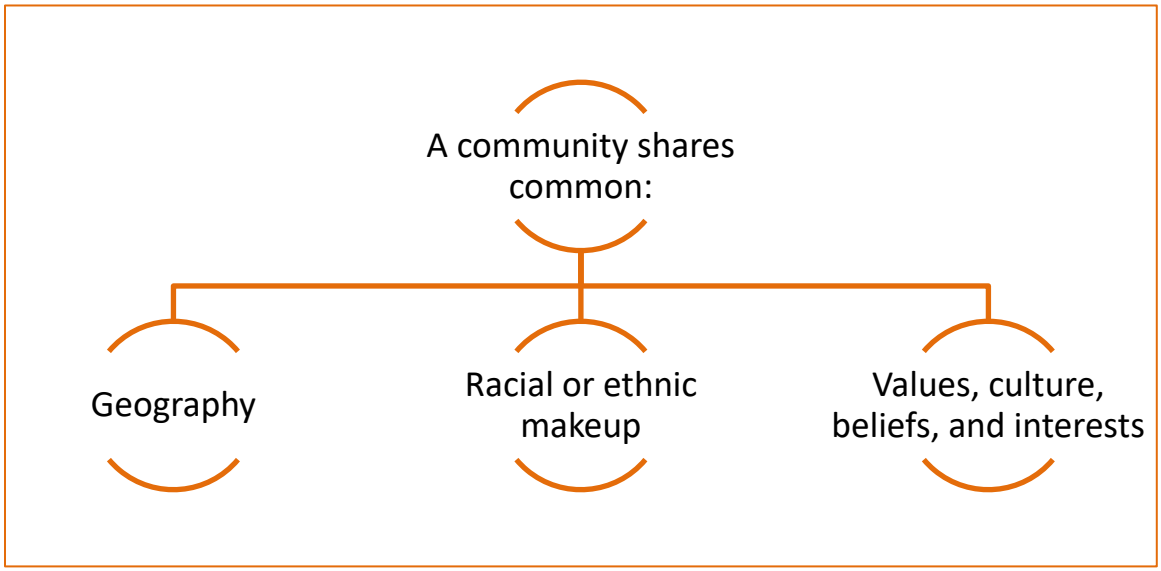
In this session, you will learn about:

- Community engagement and its goals
- What community groups do
- Who belongs to a community
- What a Community Advisory Board (CAB) does

Introduction

People can belong to many communities at the same time. Communities and the makeup of a population are always changing. The important thing to remember is that a community shares a variety of perspectives.

What Is a Community?



People in Communities

People in a community share many things. But people with differing opinions and experiences are important, too.

Community members are important to HIV/AIDS research and outreach. They include people who are living with or affected by HIV. Their voices are important to understand the full impact of HIV/AIDS on those who are most impacted by it.

Community members offer different perspectives:

- Social
- Spiritual
- Emotional
- Reflective of their life experiences[18]

Who Is in the HIV/AIDS Research Community?

HIV/AIDS affects many aspects of life. Community engagement plays an important role in HIV/AIDS research by making sure that a variety of groups and people are working with research staff on many fronts:

- Prevention research
- Treatment research
- Outreach, education, and training
- Health policies
- Sharing information that reflects and respects the local community

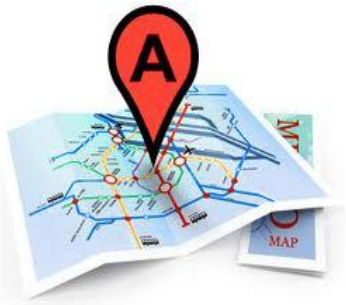
Who Is in Your Community?

When you think of the community or communities you belong to, which of the following do you generally share with others in those communities (circle all that apply)?

racial or ethnic identity	hobbies	business and finance
sexual orientation or gender identity	news and politics	volunteering
same age group	music	reading
retirement	health and fitness	travel and regional
Art	personal finance and investing	shopping
hunting and fishing	nature and science	outdoor and nature
pets	religion and spirituality	parenting and families
dance	health and self-improvement	technology and internet
home and garden	history	fashion and style
Other (write your own):		

HIV/AIDS Community Engagement

Community engagement comes in many forms and occurs locally, nationally, and internationally.



There are multiple ways of engaging communities. Community Advisory Boards (CABs) are one way that research teams work with communities.

What Form Does Community Engagement Take?

There are also other approaches and partnerships that help researchers make sure that the broader community has:

- Information about ongoing and planned research
- An increased understanding of and support for these research activities
- An opportunity to provide input into the research process and share ideas or concerns

Community Advisory Board or Group	•A group of community members that regularly meets with research staff
Community Forum	•Health fair, town hall meeting, seminar, or educational forum
Focus Group	•Facilitated session to gather information on a specific topic or from a specific group of individuals
Consultation	•A larger group meeting to seek input/advice or gather information

The National Institute of Allergy and Infectious Diseases (NIAID) is an organization within the U.S. National Institutes of Health that funds and coordinates HIV/AIDS research around the world. Community engagement is an important part of NIAID's HIV/AIDS clinical trials networks.

A clinical trials network is made up of researchers from universities, hospitals, and clinics in different areas of a country or parts of the world who work together to answer the same research questions. A clinical research site is a location where participants in a study come for study visits and procedures. In order to receive funding from NIAID, the HIV/AIDS clinical trials research networks, as well as the sites that work with them, must demonstrate that they engage with the community and seek the community's input into the clinical trials they conduct.

Notes

Working Together

Community members and network leadership work together in HIV prevention research.

Community	Research Staff
• Facilitate information exchange	• Coordinate CAB activities
• Provide input on research plans/specific studies	• Facilitate CAB understanding of research
• Increase understanding of community	• Foster information exchange
• Provide linkages to facilitate partnerships	• Keep CAB apprised of all research plans and updates
• Help translate complex ideas into lay language	• Develop strategies for CAB recruitment and retention
• Relay information about research and results	• Relay information about research and results

Notes

Principles of Community Engagement

The United Nations Programme on AIDS (UNAIDS) and AVAC have developed guidelines for trial sponsors, funders, and researchers to follow when planning, implementing, and disseminating research results to the community.

- Set clear goals.
- Learn about the community.
- Develop cultural humility.
- Foster transparency.
- Build partnerships and trust.
- Provide and promote capacity building.
- Maintain a long-term commitment.

Goals of Community Engagement

The goals of community engagement are to:[19]

- Build trust among the research team and community members.
- Increase knowledge of the people in the area where clinical trials are being conducted.
- Explain research and clinical trials in easy-to-understand language.
- Help people to better understand the scope, importance, and need for research.
- Give people a voice in the research process.

Successful community engagement ensures that clinical research proceeds smoothly.

Community Advisory Boards (CABs)

CABs are independent advisory groups that meet regularly with research team representatives, inform community stakeholders about proposed and ongoing research, and provide feedback to research teams about local norms and beliefs, as well as local views and concerns that arise in specific trials.[20]

CABs were established to:	CABs do the following:
• Share the interests and needs of the community with the research team. • Represent people living with or affected by HIV.[21] • Share the interests and needs of the research/researchers with their communities.	• Review local procedures and customs. • Review why the clinical trial is planned and what it consists of, why a clinical trial is being conducted, how long it will take, who can participate, what will be involved, etc. • Review how the clinical trial will be implemented. • Review how to educate and inform others about research plans. • Review how participants will be recruited to join the clinical trial. • Share information with and get feedback from specific communities. • Share information with the research team about the communities' needs, questions, and concerns. • Promote understanding among researchers of the value added by community engagement.

Notes

What Did You Learn?

In this activity, you will think about how you can apply what you learned about community engagement by answering a question. With your group:

- Write down your thoughts about the question you are assigned (you only need to answer one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. Imagine that you have been asked to give a presentation at a community meeting about a new HIV prevention clinical trial. What information would you include in your presentation?

2. Imagine that you have been asked to become a CAB member. What would you like to find out about before deciding?

Summary

Community engagement focuses on reaching and involving everyone from all walks of life and perspectives. Community engagement is especially important during clinical trials. During HIV/AIDS outreach activities, community engagement brings together people affected by HIV/AIDS. Community engagement ensures that the:

- Community's concerns and needs are shared with researchers
- Community is aware of, can learn about, and have input into the research process

In this session, you learned about:

- Community engagement and its goals
- What community groups do
- Who belongs to a community
- What a Community Advisory Board (CAB) does

Notes

Glossary

The following terms and abbreviations were used in this section:

clinical research	Research conducted in people that helps develop solutions to improve health all over the world
clinical trial	Research that tests how well an intervention works in a group of people; it tests for new methods of screening, prevention, diagnosis, or treatment
clinical trials network	A clinical trials network is made up of researchers from universities, hospitals, and clinics in different areas of a country or parts of the world that work together to answer the same research questions; the National Institute of Allergy and Infectious Disease supports 5 clinical trials networks that are focused on the treatment and prevention of HIV/AIDS
Community Advisory Boards (CABs)	Groups of community representatives (including non-scientists) who work with researchers and staff to provide input into the research process, help shape research plans and priorities, review protocols, and share information with the rest of the community; CABs help to ensure an exchange of information between researchers and the broader community
community engagement	Community engagement builds trust and allows for an exchange of information between the research team and community members; increases knowledge, understanding, and awareness of research in a community and of the people in a particular area, and can help ensure ethical policies are followed in practice and that clinical research proceeds smoothly
NIAID	National Institute of Allergy and Infectious Diseases
PMTCT	Prevention of Perinatal Transmission; (formerly “Mother-to-Child Transmission,” a term which many found stigmatizing, so “perinatal” and “vertical” were adopted)
protocol	The detailed plan for a clinical trial, outlining its rationale, purpose, methodologies (such as vaccine dosages, routes of administration, length of clinical trial, eligibility criteria) and other aspects of clinical trial design
research	The gathering of data, information, and facts for the advancement of knowledge

research study/trial	Research conducted in people that helps develop solutions to improve health all over the world; the formal evaluation of new interventions for both safety and efficacy following strict guidelines
UNAIDS	United Nations Programme on AIDS

Frequently Asked Questions (FAQs)

What can I expect if I join a CAB?[22]	There will be new terms to learn and understanding the research process can take time. Having a mentor can help. A mentor already knows a lot and can answer questions. Many CABs have mechanisms for mentoring new members and training them. CAB meetings are friendly and welcoming. Be yourself. Take notes so you can think about interpreting clinical trials in your own words to better understand the information. Be prepared to share your thoughts and your knowledge about your community with the researchers.

Additional Resources

For more information about community partnerships in HIV research, go to:

www.bethegeneration.org

https://www.facebook.com/HANCLegacyProject/

https://actgnetwork.org/community

https://www.hptn.org/community

https://www.hvtn.org/en/community.html

https://impaactnetwork.org/community/index2.html

https://mtnstopshiv.org/community-outreach

WHAT IS HIV PREVENTION AND THE HIV COMBINATION PREVENTION TOOLBOX?

Objectives

In this session, you will learn about:

- The qualities of high-impact HIV prevention
- The HIV combination prevention toolbox and what it contains

Introduction

HIV prevention includes medicines, medical devices, medical procedures, physical barriers, and behavioral approaches. Research is ongoing to identify new approaches to prevent HIV and to see if there are ways to combine approaches to improve prevention.

Comprehensive HIV prevention includes multiple approaches instead of just one or two approaches. Combination prevention incorporates biomedical, behavioral, and other interventions all designed to reduce HIV transmission.

No one HIV prevention approach will be acceptable to all people. HIV vulnerability also varies for each person and changes over time. Therefore, it is important that people have options for HIV prevention so they can choose the approach that is the best fit for them. The best option for one person may not be the best for others. Research is critical to develop and test new prevention options that offer people more choices. Finding clinical research participants who are willing and able to meet the rigorous clinical trial requirements is also important.

HIV prevention methods also need to be supported by the community at the local and national levels.

Notes

High-Impact Prevention

The U.S. Centers for Disease Control and Prevention (CDC) is using what they call high-impact prevention. High-impact prevention includes:

"…using combinations of scientifically proven, cost-effective, and scalable interventions targeted to the right populations in the right geographic areas."[23]

To make high-impact prevention work, the CDC is working to implement, evaluate, strengthen, and further develop effective HIV prevention efforts nationwide and globally. The CDC is also giving financial and technical support for:[24]

- Disease surveillance
- HIV testing, counseling, and referral services
- Street and community outreach
- Risk-reduction counseling
- Prevention case management
- Prevention and treatment of other sexually transmitted infections (STIs)
- Public information and education
- School-based HIV/AIDS education
- International clinical trials
- Technology transfer systems
- Organizational capacity building

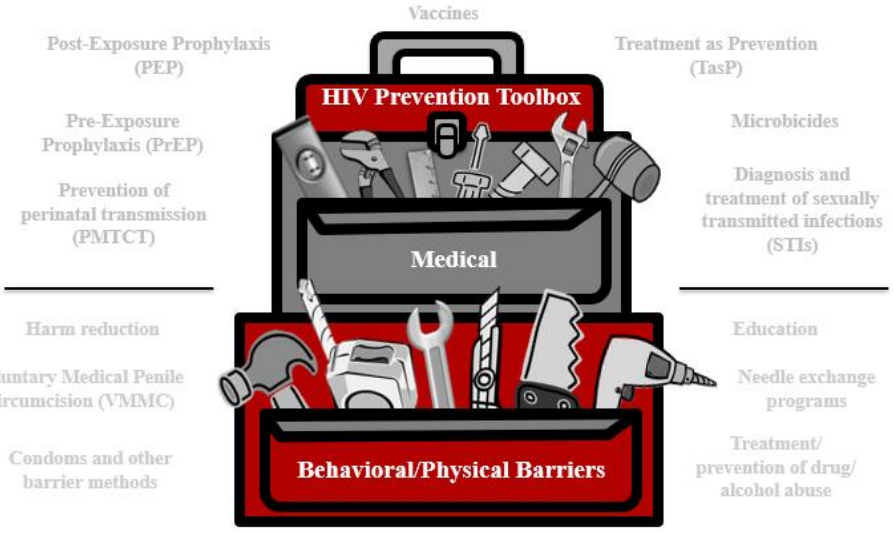
Notes

The HIV Combination Prevention Toolbox

The HIV combination prevention toolbox shows this kind of combination of approaches. The toolbox is organized into two sections:

- Tools and approaches that are “medical” in nature:
  - Medicines
  - Medical devices
  - Medical procedures
- Tools and approaches that are “behavioral” in nature are risk reduction counseling and effective behavioral interventions.

We have divided the combinations of interventions that can be used to prevent HIV infection into medical (meaning ones that generally would require a prescription or use of a biological product) and behavioral/physical barriers (meaning ones that are within the direct control of the person and hopefully readily available). It should be emphasized that all of these interventions are generally used in combination and all involve some behavioral activity on the part of the user. Most of the HIV prevention research being conducted by the NIH HIV/AIDS Clinical Trials Networks involves some type of medical intervention in combination with behavioral components.



The HIV combination prevention toolbox shows the importance of both medical and behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention. Some of these tools have both a medical and behavioral component. For example, PrEP is a medical tool because it involves antiretroviral medications, but there is also a behavioral component because people have to follow the prescribed plan and take the medication.

Effective HIV Prevention Programs

Effective HIV prevention programs are comprehensive and science-based. They include:[25]

- An effective community planning process
- Collection of data about HIV vulnerabilities, incidence, or prevalence
- HIV counseling, testing, and referral, and partner counseling and referral, linkage to medical care, prevention, and intervention services
- Health education and risk reduction activities, including individual-, group-, and community-level interventions
- Accessible services for diagnosis and treatment of other STIs
- Public information and education programs
- Comprehensive school health programs
- Training and quality assurance
- An HIV prevention technical assistance assessment and plan
- Evaluation of major program activities, interventions, and services
- Knowledge about HIV prevention research
- Knowledge about research outcomes in communities most impacted by HIV
- Two-way information:
  - Bringing scientific information to the community
  - Bringing community opinions, beliefs, and concerns to researchers
- Personal responsibility:
  - Know your HIV status.
  - Seek treatment if living with HIV.
  - Use combination treatments as prescribed for your own health and to prevent transmission to others.
  - If not living with HIV, use combination prevention strategies.
  - If not living with HIV, retest regularly. The CDC recommends that people who are vulnerable to HIV be tested every three months.

What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about HIV prevention by answering a question. With your group:

- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. How can you use what you have learned about HIV prevention in your daily life?

2. If someone you know wants more information about HIV prevention, what would you tell them?

3. If you were concerned about someone close to you becoming HIV-positive, what would you do?

4. In what ways has this information about HIV prevention impacted YOU?

Summary

Comprehensive HIV prevention includes treatment, education, skills, personal responsibility, and access to tools, products, and approaches.

Different HIV prevention approaches need to be tested to find out what works best. Identifying and offering more options will allow people to determine which options fit their lifestyle, their needs, and the needs of their family and friends. Ongoing HIV prevention research supports:

- More HIV prevention options
- More combination HIV prevention options
- More diverse research participants to expand the understanding of what works

In this session, you learned about:

- The qualities of high-impact HIV prevention
- The HIV combination prevention toolbox and what it contains

Notes

Glossary

The following terms and abbreviations were used in this section:

AIDS	Acquired Immunodeficiency Syndrome
antibody	A protein molecule that can be found in the blood produced by a type of white blood cell that helps prevent against infection
ARV	**A**nti**r**etro**v**iral medications used for the treatment of HIV by blocking HIV replication in multiple phases in the reproductive cycle of the virus
CDC	Centers for Disease Control and Prevention
clean syringes (needle exchange programs)	A prevention approach that provides sterile needles to reduce HIV transmission through injecting drugs; needle exchange programs provide a safe way for people to turn in their used syringes for appropriate disposal and receive new sterile syringes in return; some programs also provide information on how to clean syringes using bleach and water
combination HIV prevention	Information, skills building, and access to preventive tools like condoms
condoms and other barrier methods	A behavioral/physical barrier prevention that prevents passage of blood, semen, or vaginal fluids from passing from one person to another
education	A prevention approach that includes knowing your status, encouraging testing, and knowing how the disease is transmitted
harm reduction	A way of dealing with behavior that damages the health of a person (and sometimes the health of their community). Harm reduction can include education about drug use, sex, and HIV.
high-impact prevention	Using combinations of scientifically proven, cost-effective, and scalable interventions targeted to the right populations in the right geographic areas
HIV	Human Immunodeficiency Virus

HIV prevention	Medicines, medical devices, medical procedures, behavioral approaches, and research to reduce HIV transmission
microbicides	Products being developed and tested for use in the vagina or rectum to reduce the likelihood of HIV transmission during vaginal and anal sex
needle exchange programs	A behavioral/physical barrier prevention that provides sterile needles to reduce the likelihood of HIV transmission through injecting drugs
PEP	Post-exposure prophylaxis is a medical prevention approach that includes taking anti-HIV drugs as soon as possible *after* exposure to HIV
PMTCT	Prevention of Perinatal Transmission is a medical prevention approach to reduce infant exposure to HIV during pregnancy, labor, and breastfeeding
PrEP	Pre-exposure prophylaxis is a medical prevention approach for people who do not have HIV but are vulnerable to contracting it; they take medication *before* exposure to HIV
sexually transmitted infections (STIs) diagnosis and treatment	A medical prevention approach to reduce STIs that can increase the likelihood of HIV transmission
STIs	Sexually Transmitted Infections
TasP	Treatment as prevention is a medical prevention approach that uses antiretroviral treatment for people living with HIV to decrease their chance of transmitting HIV, ideally to zero change under conditions of viral suppression (undetectable)
treatment/ prevention of drug/alcohol abuse	A behavioral prevention approach that focuses on injection drug use, behavior while under the influence, and effects of drug use and addiction on a person's overall health
vaccine	A medical prevention substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection

voluntary medical penile circumcision	A surgical procedure to remove the penis's foreskin; reduces the likelihood of the insertive partner acquiring HIV through the penis during vaginal sex by approximately 60%. "Voluntary medical" means the surgery is performed on adults who consent to the procedure for this medical purpose.

Frequently Asked Questions (FAQs)

How effective are external and internal condoms in preventing HIV?[26]	Condoms, when used consistently and correctly, are highly effective in preventing sexual transmission of HIV. The ability of condoms to prevent transmission has been scientifically established in laboratory clinical trials as well as in epidemiologic clinical trials of persons highly vulnerable to contracting HIV because they were involved in sexual relationships with partners living with HIV. It should be noted that condom use cannot provide absolute protection against HIV. For vaginal and anal sex, use a latex, polyurethane, silicone, or polyisoprene external or internal condom.
What are some techniques to decrease my chances of getting HIV?	Be aware of your body and your partner's body. Cuts, sores, STIs, or bleeding gums increase the likelihood of spreading HIV. Rougher sex can cause bleeding or small tears that give HIV an easier way to enter the body. Use any of the biomedical or behavioral HIV prevention methods described in this training.
How can I get tested for HIV?	There are several ways to test for HIV. Some take about a week to get the results. Other tests can give results in less than 20 minutes. Some require a blood draw from the arm or just a finger stick. Other tests use an oral swab. Some HIV tests look for antibodies to the virus rather than the virus itself. Antibodies almost always show up 1-3 months after transmission. See a doctor to find out which test is right for you. You can get HIV tests from your doctor, public health clinics and testing sites, and even over the counter from drug stores offering at-home tests.

Additional Resources

For more information about HIV prevention, go to:

www.bethegeneration.org

http://www.thebody.com/

http://www.cdc.gov/hiv/

WHAT ARE HIV PREVENTION TOOLS AND HOW ARE THEY USED IN HIV PREVENTION RESEARCH?

Objectives

In this session, you will learn about:

- Prevention research and HIV prevention research successes
- PrEP, TasP, and integrated strategies in HIV prevention research
- Microbicides in HIV prevention research
- Vaccines in HIV prevention research

Introduction

Research is looking at a number of ways to prevent the spread of HIV. It includes:

- Promoting awareness, understanding, and dialogue between researchers and members of impacted communities and advocates
- Encouraging support for ongoing HIV prevention research
- Developing and evaluating new HIV prevention tools and approaches
- Improving HIV treatment regimens

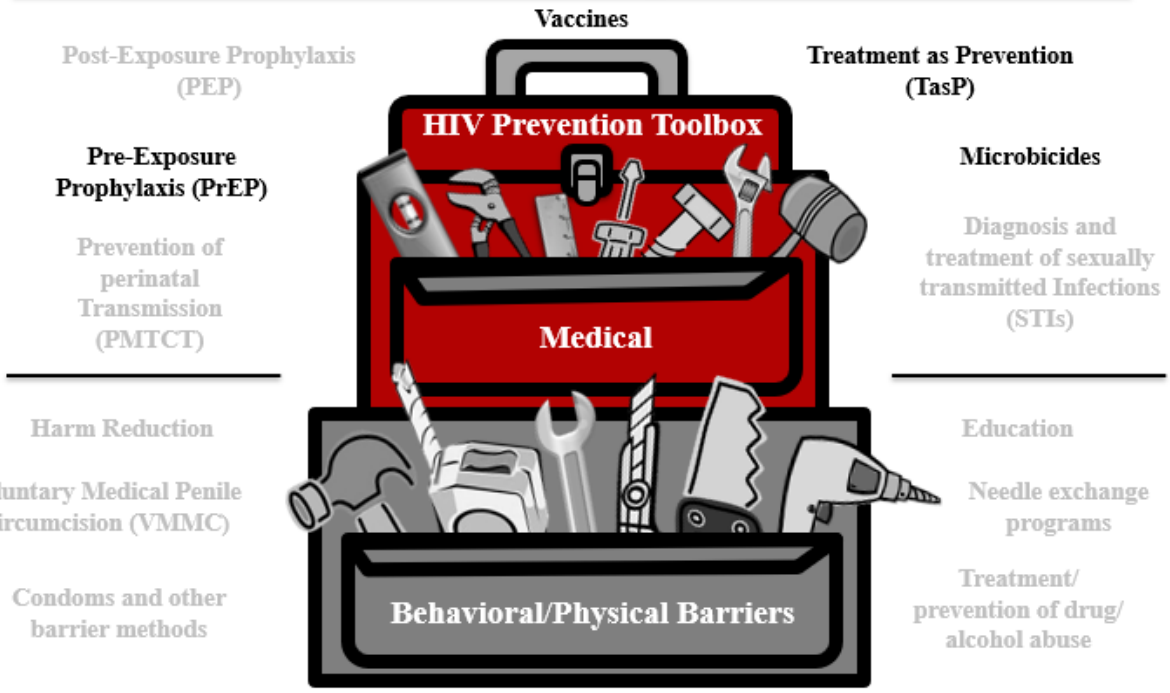
Three Important Medical Prevention Tools

One of our goals today is to increase awareness of and knowledge about HIV prevention research. During this section of the course, we will focus on three important areas of biomedical prevention:

- Pre-exposure prophylaxis (PrEP), TasP, & Integrated Strategies: PrEP is an HIV prevention approach for HIV negative individuals to stay HIV-negative by taking anti-HIV medicines. There are two FDA approved medications for PrEP. One is called Truvada® and one that was approved in 2019 is Descovy ®. These are pills that are approved for daily use in the US. TasP is the use of anti-HIV medicines among people with HIV to reduce the likelihood of transmission to others. “Integrated strategies” refers to other ways of administering PrEP that are currently under research, like injections.
- Microbicides: Microbicides are products being developed and tested in different forms like vaginal rings, rectal inserts, suppositories, douches, and gels that release drugs in the body over time. They are designed for people of all genders to be applied in the vagina or rectum to help prevent HIV during sex.

- Vaccines: An HIV vaccine would teach the body to recognize the virus and activate protective cells to prevent infection or control disease. There is no HIV vaccine right now. But some clinical trials have given hope that an effective vaccine could be developed, and newer trials are ongoing to find out.

We call these medical prevention tools “modalities.”



HIV Prevention Research Successes

A variety of HIV prevention research successes are creating a great deal of hope that we will soon be able to prevent the spread of HIV. Even when an approach or tool being tested does not work, researchers learn a great deal and can redirect their future efforts accordingly.

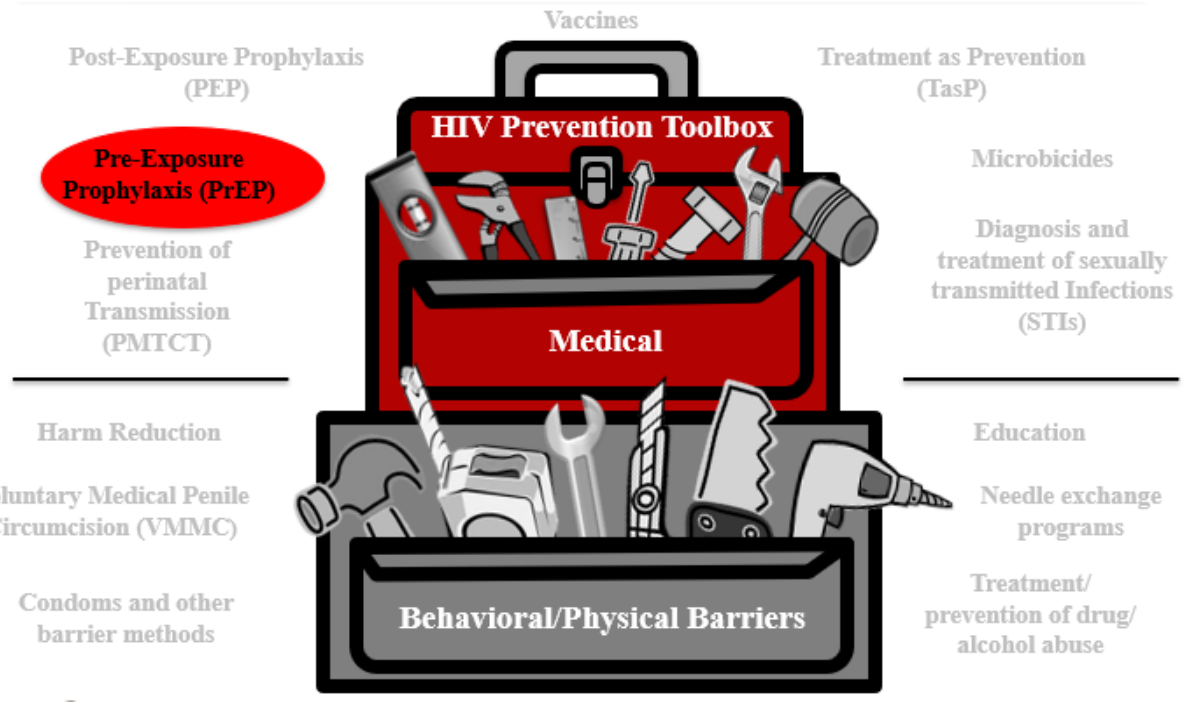
Prevention of Perinatal Transmission (PMTCT)	• PMTCT began as clinical research. • It is now considered regular care in the U.S. and much of the world.	• Before 1994, women with HIV had at least a 25% chance of passing HIV to their babies. • Now, in the U.S., there is less than a 2% chance of HIV transmission when mothers with HIV and their babies receive HIV treatment.
The Thai HIV Vaccine Trial (RV144)	• RV144 was a clinical trial from 2003-2009 testing a combination of two HIV vaccines (the “prime” and the “boost”). • The goal of the prime/boost approach is to stimulate different parts of the body’s immune system and increase the body's overall immune response to HIV.	• RV144 is the first clinical trial to show evidence of moderate protection and the possibility for an effective vaccine. • It provided a lot of new information about how antibodies form in response to the vaccine. • The prime/boost vaccine combination lowered the rate of HIV infection by about 31%.
CAPRISA 004 Microbicide	• CAPRISA 004 was a clinical trial from 2007-2010 testing the effectiveness of a microbicide gel product containing 1% tenofovir (an antiretroviral medication) in cisgender women used before and after vaginal sex.	• CAPRISA 004 is the first clinical trial to show evidence of moderate protection and the possibility of an effective vaginal microbicide. • There were 39% fewer HIV transmissions among women who used the CAPRISA 004 microbicide.
iPrEx & Partners PrEP	• iPrEx was a clinical trial from 2007-2009 to test if taking a daily tablet containing two antiretroviral drugs could prevent HIV transmission through anal sex among cis men who have sex with men and transgender women who have sex with men. • These trials helped pave the way	• Partners PrEP was a clinical trial from 2008-2010 for heterosexual couples where one partner had HIV and the other did not. • The medicine proved to be safe and well-tolerated.

	for what we know today: PrEP is nearly 100% effective when taken as prescribed	• The FDA approved this PrEP tablet in May 2012
HPTN 052 (Treatment as Prevention)	• HPTN 052 was a clinical trial from 2005-2010 for couples (mostly heterosexual) where one partner had HIV and the other did not. • It involved the person with HIV taking a combination of three or four drugs from a group of 11 HIV ARVs.	• There was a 96% reduction in HIV transmission overall. • There was a 100% reduction in HIV transmission under conditions of viral suppression (undetectable). • HPTN 052 was the first randomized clinical trial to demonstrate that early antiretroviral therapy can improve health outcomes for people with HIV *and* prevent transmission of HIV to HIV-negative sex partners.[27]
ASPIRE, The Ring Study, & HOPE	• ASPIRE and The Ring Study were two clinical trials (2012-2016) testing a monthly vaginal ring containing the ARV dapivirine for HIV prevention. • The two studies combined enrolled over 4,500 cisgender women in Africa and showed that the ring was safe and reduced HIV rates by 1/3.	• Women who used the ring most had the greatest benefit: up to 75% reduction in HIV transmission. • HOPE was a trial in which former ASPIRE participants could use the ring open-label (there was no placebo). Results from 1,456 women showed high adherence and suggested a 39% reduction in HIV risk.[28] • Additional trials of the vaginal ring have occurred, and the ring is currently under regulatory review for licensure.
HPTN 083 & HPTN 084 (Injectable PrEP)	• HPTN 083 was a study from 2016-2020 testing an injection of the drug *cabotegravir* for HIV prevention among cisgender men and transgender women who have sex with men. • The injections were given in the buttock muscle once every other month. They proved to be safe, well-tolerated, and equally as effective as oral PrEP.[29]	• 083 was one of the first studies to set, meet, and exceed enrollment goals for Black MSM and transgender women. • HPTN 084 is testing the same injectable PrEP drug among cisgender women in Africa. Results are forthcoming.

Pre-Exposure Prophylaxis (PrEP)

Introduction

The PrEP prevention approach is focused on people who do not have HIV, but may be vulnerable to contracting HIV through sex and/or injection drug use (IDU). With PrEP, people who do not have HIV receive a prescription to take a medication. The medication may lower their likelihood of contracting HIV if they are exposed to it through sex or IDU. This approach is only effective if the medication is taken exactly as prescribed on a consistent, daily basis.[30]



The HIV combination prevention toolbox shows the importance of both medical and behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention. It is recommended that people who are prescribed PrEP also receive counseling as part of a comprehensive HIV prevention package and consistently use condoms.

PEP vs. PrEP

PEP (post-exposure prophylaxis) is the use of antiretroviral drugs *after* a possible HIV exposure to reduce the chance of HIV becoming established in your body. PEP must be started as soon as possible after HIV exposure to be effective. A combination of 2-3 antiretroviral medications is usually given for about 28 days to reduce the chance of HIV establishing itself in the body. These medicines keep HIV from making copies of itself and becoming permanently established. PEP is not always effective; it does not guarantee that someone exposed to HIV will not become HIV-positive.

PEP is in contrast to PrEP where medications are used *prior* to HIV exposure. People who take PrEP every day as prescribed greatly lower their likelihood of contracting HIV.

For more information, see: http://www.fredhutch.org/en/research/divisions/vaccine-infectious-disease-division/research/immunology-and-vaccine-development/be-the-generation/prep-tasp.html.

Oral PrEP Progress

One major milestone in HIV prevention was the first approval of daily oral PrEP in the United States. This happened for the first time in 2012, marketed under the brand name Truvada®. Truvada® is a combination of two antiretroviral drugs:

- Tenofovir disoproxil fumarate (also called TDF, or tenofovir)
- Emtricitabine (also called FTC)

Truvada® milestones are:

- January 2011: Interim guidance issued by the U.S. Centers for Disease Control and Prevention (CDC) for men who have sex with men and transgender women who are vulnerable to contracting HIV
- July 2012:
  - Approved by the U.S. Food and Drug Administration (FDA) for daily use
  - World Health Organization issued guidance on PrEP use
- August 2012: Interim guidance issued by the CDC for heterosexual men and women vulnerable to HIV, such as those in relationships where one person has HIV and the other does not
- June 2013: CDC adds injection drug use to the interim guidance on PrEP use based on the results of the Bangkok Tenofovir Study[31]

HIV Prevention Using Oral PrEP

We will focus on Truvada® instead of Descovy® because Truvada is approved for anyone to use while Descovy has limited approval. Truvada® (also known as TDF/FTC) is FDA-approved for daily use for HIV prevention (for HIV treatment, Truvada® is approved only in combination with other ARVs). Truvada® must be taken as prescribed to be effective as PrEP. Like any HIV prevention modality (including condoms), PrEP is not 100% effective in preventing HIV. And, because it does not prevent the transmission of other sexually transmitted infections such as syphilis, gonorrhea, and chlamydia, it is recommended that people who are prescribed PrEP continue to use condoms.

While the availability of Truvada® as a prescription for use as PrEP is a major breakthrough, it still has limitations (particularly around access), and there are specific guidelines for use.[32]

How Truvada® as PrEP works	**Who should use Truvada® for HIV prevention?**	**Requirements for USE**
• Truvada® is a pill consisting of two antiretroviral medications (ARVs) that protects people who do not have HIV if they are exposed to the virus • ARVs block HIV replication in multiple places in the reproductive cycle of the virus.[33]	Anyone who is vulnerable to contracting HIV, including: • Men who have sex with men • Transgender women who have sex with men • Couples where one partner has HIV and the other does not • People who inject drugs • Anyone who may benefit!	• Be HIV-negative proven by testing prior to PrEP use • Test for HIV at least every three months while taking Truvada® • Take Truvada® as prescribed to achieve the maximum HIV prevention benefit

PrEP & Integrated Strategies Continuing Research

Although PrEP has now been approved in the U.S., ongoing PrEP research is still needed. Some of the goals of that research include:[34]

- Conducting research in more countries with additional populations
- Different drugs, delivery methods, and dosing schedules
- Conducting implementation research to understand what happens after more people are prescribed PrEP in "real world" settings

Notes

What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about PrEP by answering a question. With your group:

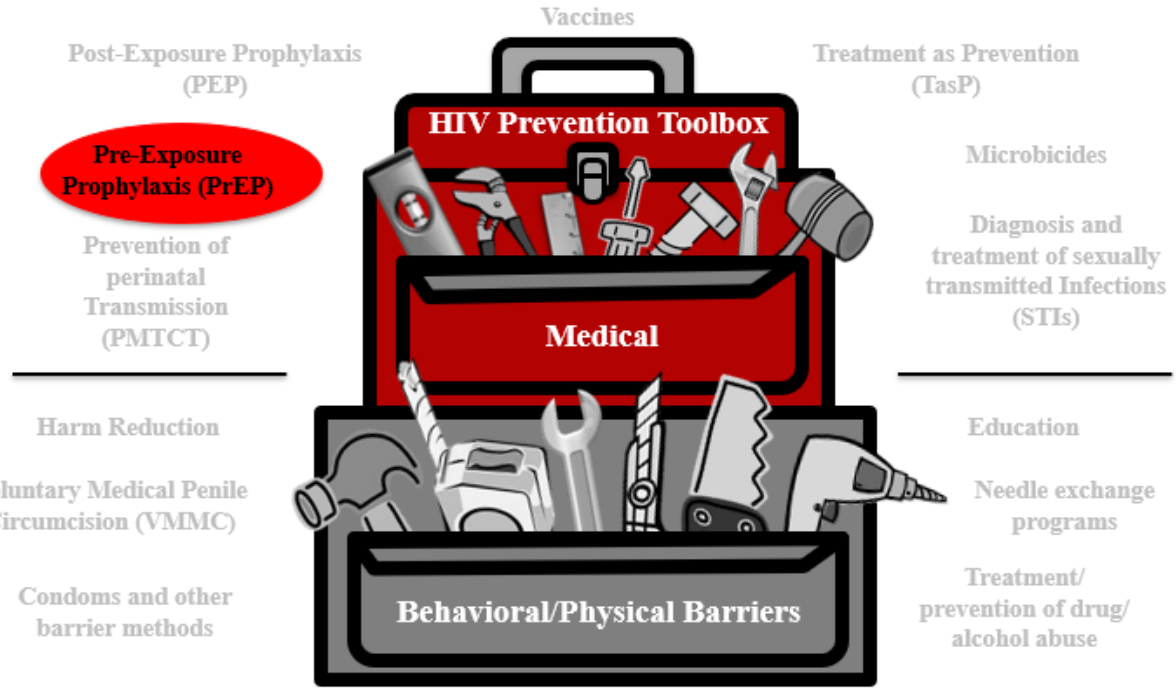
- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. What thoughts, questions and concerns came to your mind about PrEP as you heard/read information about this HIV prevention modality?

2. If you were asked to speak to an audience about PrEP, what would be the three most important messages you would want to convey?

PrEP Summary

PrEP is a medical prevention approach for people who do not have HIV but are vulnerable to contracting HIV. It involves taking a specific medication on a daily basis to reduce the likelihood of contracting HIV through sex or injection drug use. Researchers are studying new PrEP approaches like injectables and implants that would theoretically last much longer than daily-dose pills.

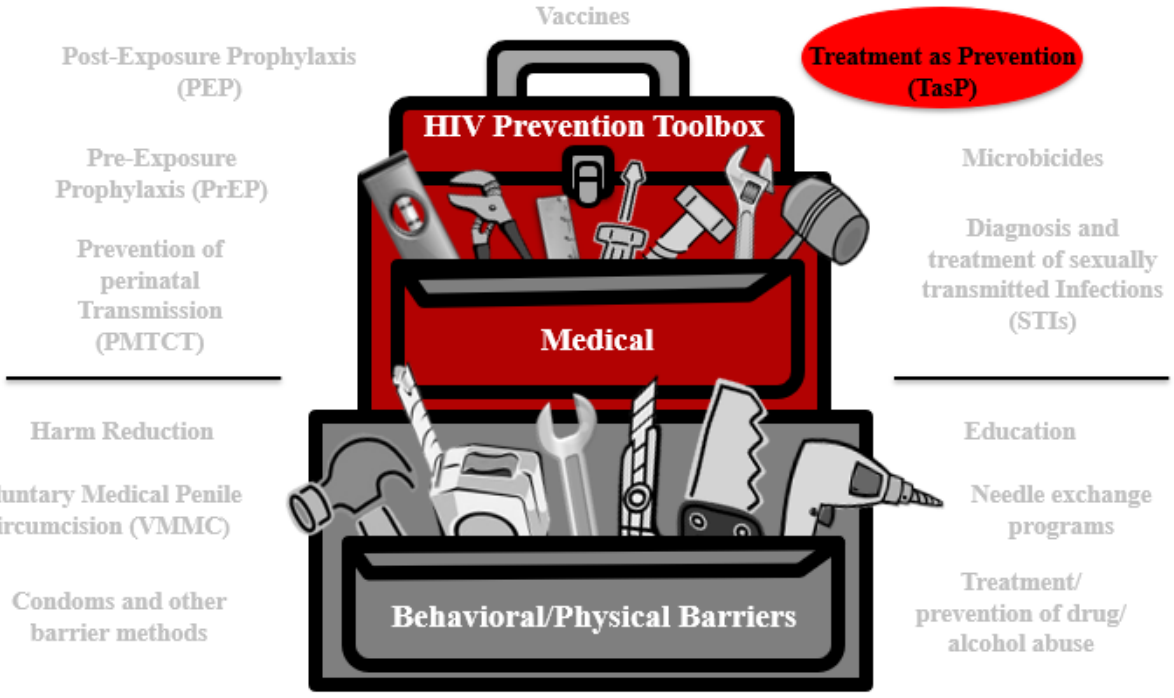


The HIV combination prevention toolbox reinforces the role of PrEP combined with other behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention.

Treatment as Prevention (TasP)

Introduction

We just talked about PrEP. Now let's talk about another highly effective HIV prevention method: Treatment as Prevention, or "TasP." While PrEP is only to be used by people who do not have HIV, TasP is an approach for people living with HIV to reduce the likelihood of passing HIV to others.



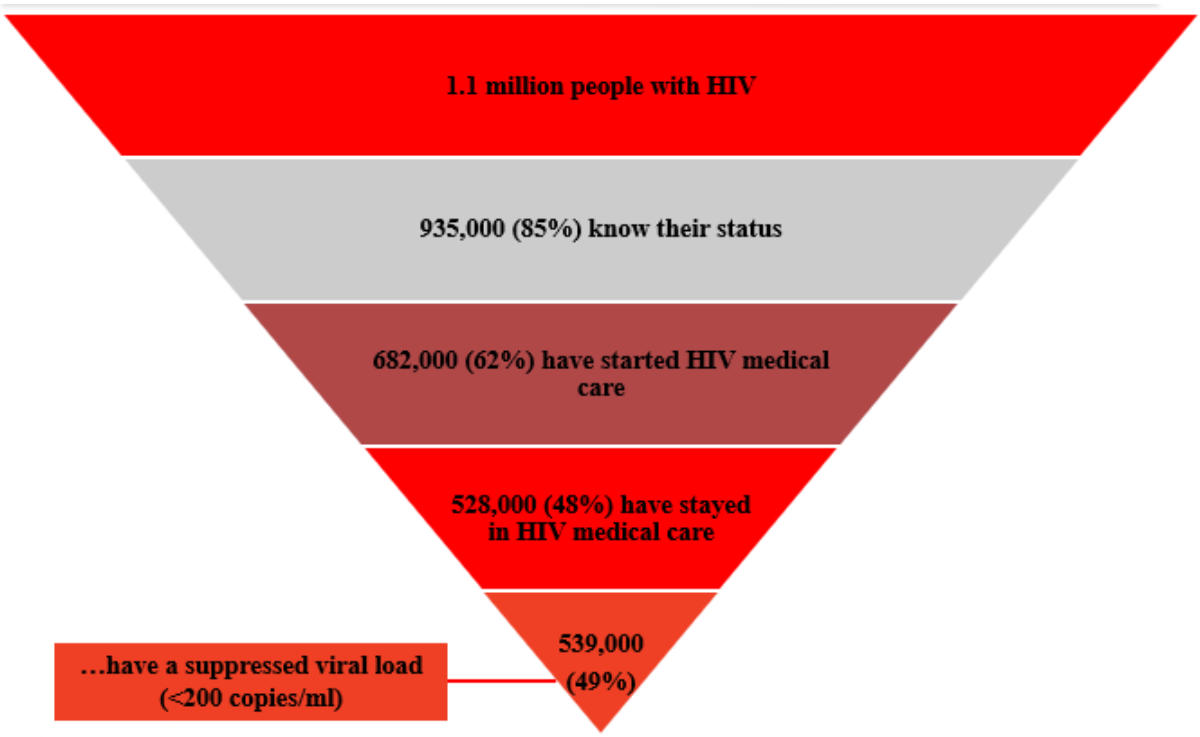
With TasP, people with HIV take medication. The medication controls the HIV in their bodies and keeps them healthy. The medication also lowers their likelihood of transmitting HIV to others through sex.

As discussed previously in the history of HIV, we have had effective combination anti-retroviral therapies for treating HIV since 1996. Today, many people with HIV take only one pill a day to successfully treat HIV and live healthy lives with life expectancy nearly equal to that of people who do not have HIV. There are now many different options for drug regimens prescribed to treat HIV, and the main purpose of anti-retroviral therapy is to control the amount of HIV in the body to keep the immune systems of people with HIV healthy, protecting against opportunistic infections and the development of AIDS. Additionally, we have learned through clinical research that ART is also highly effective in preventing the transmission of HIV to others. By successfully treating HIV in people living with the virus, we are also preventing new transmissions. This is why we call it Treatment as Prevention (TasP).

TasP Progress

- In 2011, the HPTN 052 study became the first randomized clinical trial to show that early ART improves health outcomes for people with HIV
    - It also showed that ART helps prevent transmission to HIV-negative sex partners. In the study, ART reduced HIV transmission by 96% overall. Stunningly, it also reduced HIV transmission by 100% when study participants taking ART had achieved viral suppression, meaning the ART was working such that the amount of HIV in the body had durably dropped below 200 copies per mm^3. This is also known as "undetectable."
    - This study paved the way for a massive global campaign called U=U, which means "undetectable equals untransmittable." In other words, people with HIV who have an undetectable viral load cannot transmit HIV to their sex partners. The U=U concept applies only to sexual transmission of HIV; having an undetectable viral load is not 100% protective against HIV transmission by other means (e.g. injection drug use or breastfeeding). U=U was started by an organization called Prevention Access Campaign.
- In 2016, the PARTNER study showed zero HIV transmissions under conditions of viral suppression after at least 58,000 distinct acts of penetrative sex without condoms. This study reinforced what we learned from HPTN 052 about TasP and U=U.
- In 2016 and beyond, many organizations in the US and around the world began signing onto the U=U message: the US National Institutes of Health, US Centers for Disease Control and Prevention, state and local health departments, and many more.
- In 2017 and beyond, more studies with mixed HIV status couples continued to confirm that undetectable really does equal untransmittable. The earlier studies had enrolled mostly heterosexual couples, but the U=U message was shown to be true for cisgender gay male couples too in studies like Opposites Attract and PARTNER 2. Combined, these studies showed zero transmissions under conditions of viral suppression after nearly 100,000 acts of condomless anal sex without PrEP.

The Treatment Cascade in the US



The research findings about TasP have helped us to better understand the importance of the treatment cascade. About half of the people living with HIV in the US have a suppressed viral load, which means they cannot transmit HIV to others as long as their viral load stays suppressed. The better we can help more people know their status, link them to HIV care, start ART, and achieve viral suppression, not only will we help people with HIV stay healthy, but we will also drastically reduce rates of new HIV transmissions.

Adding PrEP into the landscape for people who do not have HIV but are vulnerable to getting it has the potential to turn around the trajectory of the epidemic. Using multiple strategies in combination has the best chance of ending the epidemic.

TasP is most effective if the medication is taken exactly as prescribed.

Continuing Research: Treatment as Prevention

Research into treatment for people with HIV continues, including research looking specifically at treatment as prevention. We know that only about half of people with HIV in the US have reached viral suppression, so additional strategies are needed to improve treatment. If every person with HIV in the US could reach viral suppression, we could effectively end the sexual transmission of HIV. But that is not the world we currently live in; we need a multitude of products, dosing, delivery methods, and so forth because no single product will be right for everyone.

Develop products that:

- Are/are not ARV-based
- Address adherence issues
- Reach the most vulnerable populations

Conduct more research on:

- Drug resistance
- Alternate dosing
- Delivery methods (for example, injections and implants)

Understand issues around:

- ART access and availability
- Cost
- Barriers to linkage and retention in HIV medical care
- Stigma

Summary: PrEP & TasP

TasP is a medical HIV prevention approach for people with HIV to reduce the likelihood of transmission to others. Many treatment options are available for TasP, but gaps persist in the HIV treatment cascade. Researchers are studying new treatment approaches to address these gaps like injectable ART and ART implants.

Together, PrEP and TasP have the potential to end the HIV epidemic as we know it. However, the PrEP and TasP approaches we currently have are not reaching those who need them most. Research continues to strive to find improved PrEP and TasP methods to end the epidemic.

A number of public and private organizations, in partnership and individually, are working together to find solutions that can help prevent HIV. The HIV Prevention Trials Network (HPTN), funded by the National Institute of Allergy and Infectious Diseases (NIAID), the National Institute of Mental Health (NIMH), and the National Institute on Drug Abuse (NIDA), is dedicated to discover and develop new and innovative research strategies to reduce the acquisition and transmission of HIV.

Notes

What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about TasP by answering a question. With your group:

- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. What thoughts, questions and concerns came to your mind about TasP as you heard/read information about this HIV prevention modality?

2. If you were asked to speak to an audience about TasP, what would be the three most important messages you would want to convey?

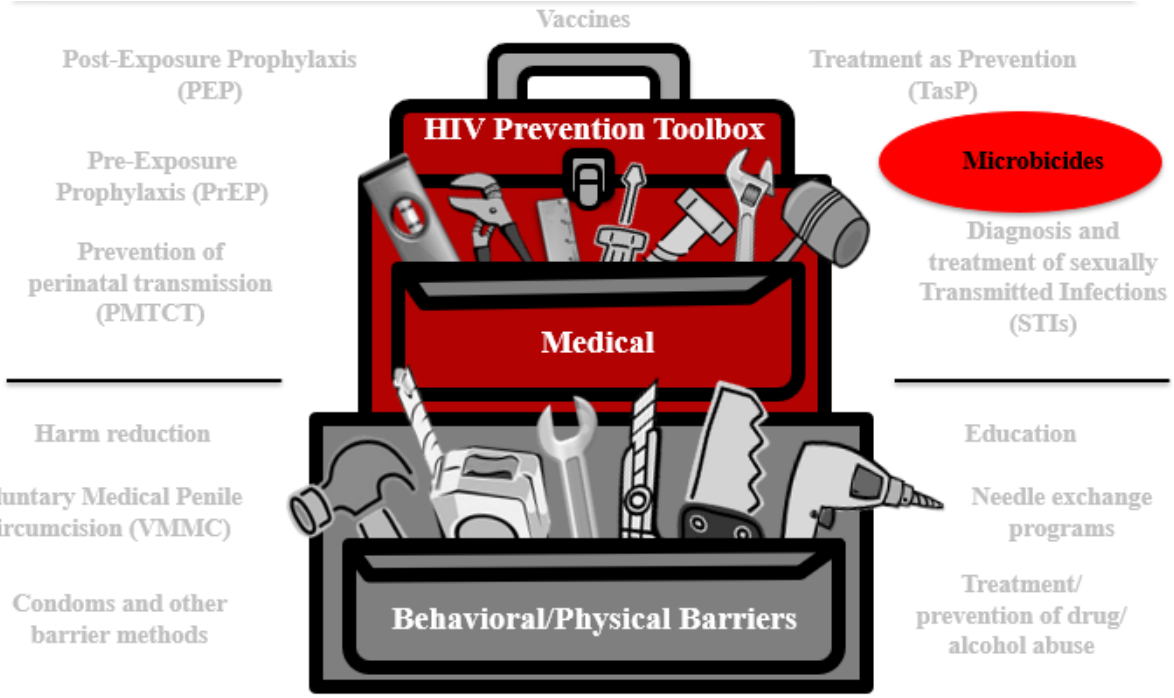
Microbicides

Introduction

Microbicides are products applied inside the vagina or rectum to protect against HIV through sex. They are different from other PrEP products because they only deliver anti-HIV drugs to the sites of potential HIV transmission with very little drug absorbed into the body, whereas pills, injectables, and implants deliver drugs systemically (throughout the entire body). Microbicides could fulfill the need for a non-systemic and/or short-acting method for HIV prevention that could be used around the time of sex. Microbicides being studied include:

- Films, gels, douches, fast-dissolving inserts, and suppositories
- Vaginal rings, which are furthest along in development and may be licensed soon

Most microbicides being tested today contain antiretroviral (ARV) drugs. ARVs block HIV replication in multiple places in the reproductive cycle of the virus. These drugs have been shown to protect people who do not have HIV if they are exposed to the virus by disrupting HIV's life cycle, thus preventing HIV from taking hold in the body.



The HIV combination prevention toolbox shows the importance of both medical and behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention.

Why Are Microbicides Important?

Microbicides are not yet available for use outside clinical trials. The microbicides under study are used vaginally and/or rectally to protect the user from HIV transmission during sex.

- Vaginal microbicides are designed to prevent HIV acquisition through the vagina:[35]
  - Cisgender women represent about 20 percent of new HIV cases in the U.S.
  - Cis women are more likely than cis men to contract HIV through heterosexual sex.
- Rectal microbicides are designed to prevent HIV among people of all genders during anal sex:[36]
  - An estimated 5-10% of the world's population engages in anal sex.[37]
  - Because the lining of the wall of the rectum is different from the lining of the vagina, rectal-specific microbicides and formulations are being tested in clinical trials in addition to products for vaginal use.
  - The likelihood of contracting HIV during condomless/PrEPless anal sex is 10 to 20 times greater than condomless/PrEPless vaginal sex. Because the rectal lining is only one-cell thick, the virus can more easily reach cells.[38]

"If proven effective…microbicides could protect against HIV in people who are unable or reluctant to use condoms [or oral PrEP]. Unlike condoms, they could provide an alternative way to reduce risk that is not controlled by one's sexual partner and possibly enhance sexual pleasure, helping to motivate consistent use."[39]

Microbicides and women	Microbicides and men
For transgender and cisgender women around the world, some prevention tools are not practical. Because of gender-based violence and other factors it can be difficult for women to: • Insist that partners use condoms • Limit their or their partner's HIV exposure • Get themselves or their partners treatment for sexually transmitted infections (STIs)	In the U.S., men who have sex with men: • Make up about 70% of all new HIV cases • Represent more than 50% of the people currently living with HIV • Globally, are 19 times more likely to have HIV than the general population[41]
There are many complex societal, economic, and cultural reasons why women specifically need multiple forms of HIV prevention tools.[40]	Consistent condom use doesn't work for many men. Microbicides may offer an alternative and can be formulated like lubricants and douches, which many men already use for anal sex.

Challenges with Microbicides

HIV prevention in general has challenges, and microbicides are no exception:

- Dependence on human behavior requiring regular application
- Cultural and regional preferences
- Rectal microbicides research is in the early phase of clinical development due in part to scientific challenges related to the biology of the rectum and cultural reluctance to address anal sex. Several clinical trials evaluating the rectal safety of microbicides have been completed to date.[42]

Microbicides Continuing Research

Next steps in vaginal and rectal microbicides research are to:[43]

- Develop products that:
  - Are/are not ARV based
  - Are contraceptive, non-contraceptive, and broad spectrum against several sexually transmitted diseases
  - Designed for vaginal and/or rectal use
- Conduct more research on drug resistance, alternate dosing, and delivery methods (for example, the vaginal ring), and effects on pregnancy and breastfeeding
- Understand issues around access and availability, cost, regular HIV testing requirements, and need for prescriptions for ARV-based microbicides

A number of public and private organizations, in partnership and individually, are working together to find microbicides can help prevent HIV. The Microbicide Trials Network (MTN), funded by the National Institute of Allergy and Infectious Diseases (NIAID), brings together international investigators, community stakeholders, and industry partners who focus on developing and evaluating microbicides. The MTN is focused on evaluating non-systemic and multi-purpose products with studies designed to support potential regulatory approval of products.

Notes

What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about microbicides by answering a question. With your group:

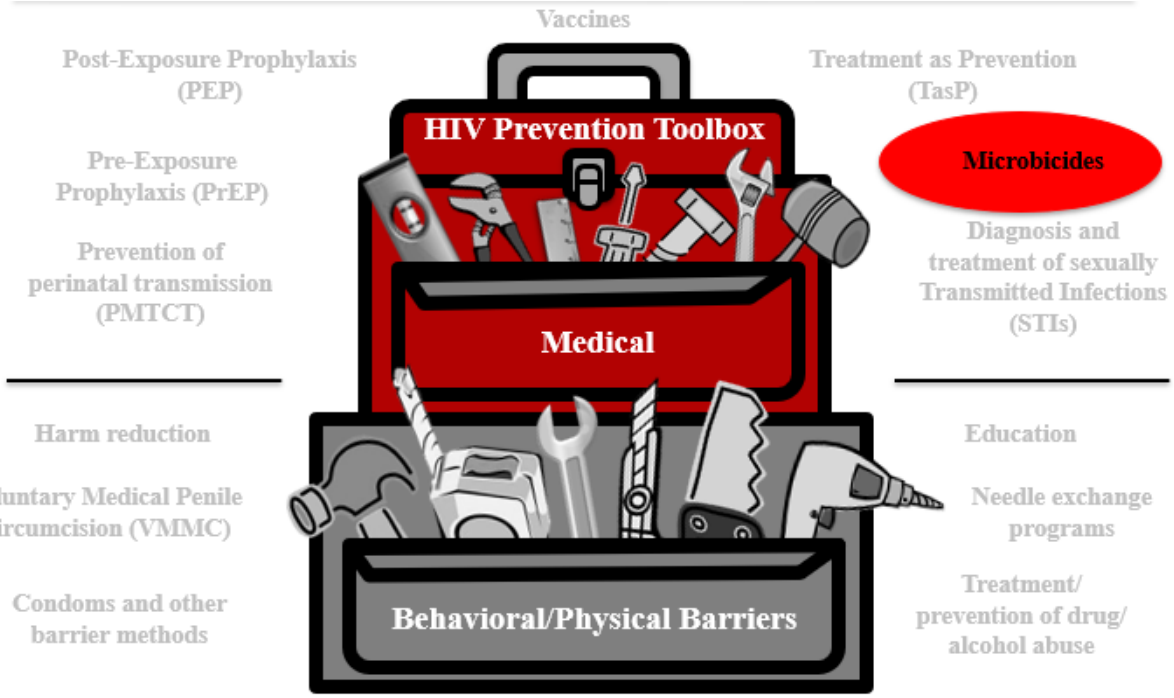
- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. What thoughts, questions and concerns came to your mind about microbicides as you heard/read information about this HIV prevention modality?

2. If you were asked to speak to an audience about microbicides what would be the three most important messages, you would want to convey?

Microbicides Summary

Microbicides are products being developed and tested for use in the vagina or rectum to reduce HIV transmission during vaginal and anal sex.



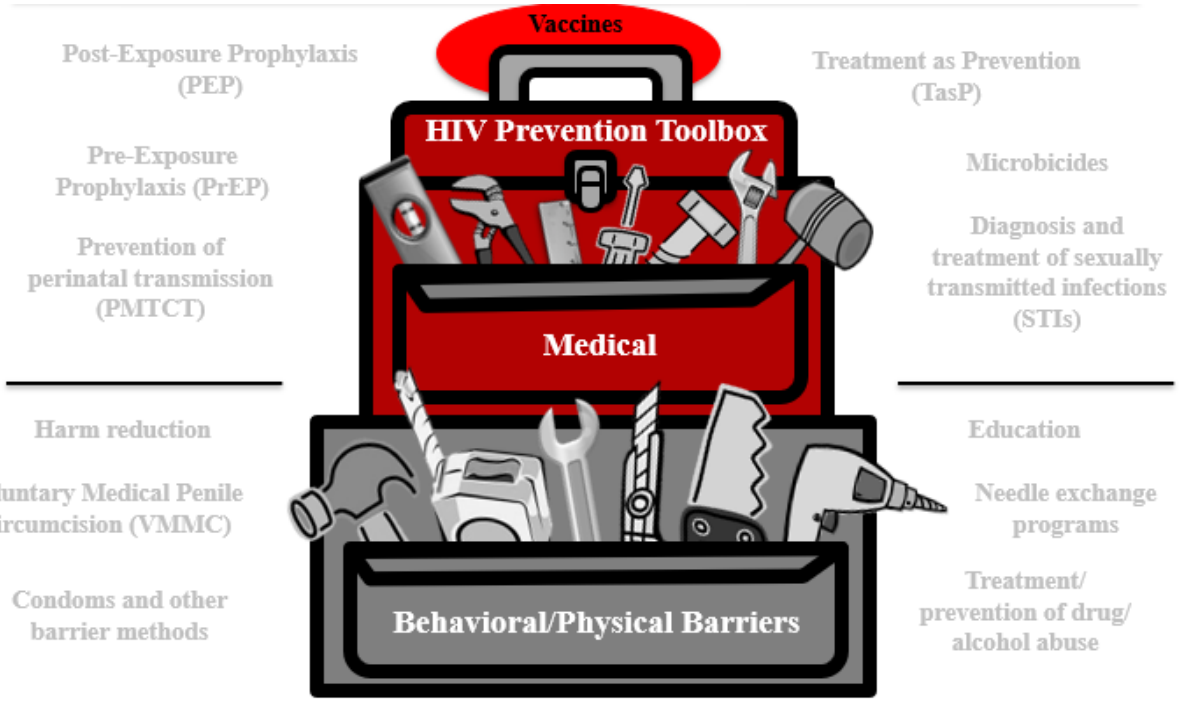
The HIV combination prevention toolbox reinforces the role of microbicides combined with other behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention.

Vaccines

Introduction

A vaccine is a substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection.

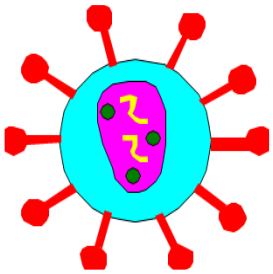
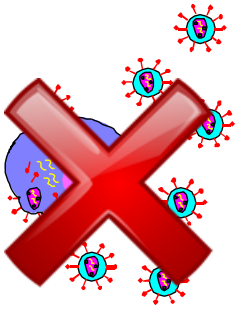
A safe and effective preventive vaccine is believed to be the best way to control the HIV/AIDS epidemic in the long term. There is a lot of important research going on to find a safe and effective HIV vaccine. However, there is currently no licensed vaccine against HIV or AIDS.



The HIV combination prevention toolbox shows the importance of both medical and behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention.

How Would a Vaccine Work?

HIV vaccines would work to:

Teach the body to recognize HIV	Tell the body to sound an alarm	Send fighter cells to go into action	Result: HIV is controlled or killed
			

Vaccines do not contain live or killed forms of a virus.

Why Do We Need a Vaccine?

An HIV vaccine, even one that is only partially effective, is thought to be our best chance at long-term control of the HIV/AIDS epidemic. The HIV prevention tools we have now are limited in their ability to end the epidemic. For example,

- ART can be complex, costly, and have side effects
- HIV can develop resistance to ARVs
- ARVs and PrEP depend on long-term patient adherence; a vaccine could provide protection with minimal action from the patient
- A preventive HIV vaccine could help save millions of lives and billions of dollars each year in treatment costs

HIV Vaccines—the Future

Vaccines are important to control the spread of HIV. Preventive vaccines are tested with people who do not have HIV. HIV vaccines may one day be able to prevent or delay AIDS in people with HIV, too.

How an HIV vaccine might work	HIV vaccine possible benefits
• Prevent HIV in most people • Prevent disease progression after people contract HIV	• Even if a vaccine only protects some people, it would have a major impact on controlling the HIV/AIDS epidemic • A partially effective vaccine could decrease the number of people who contract HIV • There would be fewer people with HIV who would be able to pass the virus on to others

Important Numbers

Using current projections, the development of a safe and effective HIV vaccine remains a critical but elusive goal.

-25%

- An HIV vaccine with just 50% efficacy administered to 30% of the population of developing countries between 2015 and 2030 could prevent 25% of the new HIV cases that would otherwise occur.

+66%

- Without an HIV vaccine, the number of new HIV cases per year could increase to 10 million by 2030.

Challenges in Developing an HIV Vaccine

Most vaccines we use today (polio, rubella, mumps) took more than 25 years to develop. Some challenges in developing HIV vaccines are:

- HIV can “hide” from the immune system that protects the body.
- HIV attacks the same immune cells that the body uses to defend itself against infections.
- There are many different varieties of HIV.
- HIV changes rapidly, even in a single person.
- There is no good model for testing HIV vaccines in animals, because HIV impacts people in ways that are different from the animal versions.
- The human immune system is not designed to clear HIV, so we are not sure what the immune response is that would be needed for protection; we have to do better than “mother nature.”

Vaccines Continuing Research

Some of the goals of ongoing HIV vaccine research include:

- Adapt RV144 regimen: HVTN 702 was a clinical trial based on the Thai Trial (RV 144). The goal was to have greater and more sustained protection than that which was found in the Thai Trial. Researchers adapted this experimental vaccine to the HIV subtype that predominates in southern Africa, where it was tested. The research team had hoped for better results, but unfortunately, it was announced in January 2020 that the experimental vaccine being studied in HVTN 702 did not work to prevent HIV. While these results are disappointing, we can still learn from them. We now know that this particular vaccine design did not work in this particular context.
- We learned that the vaccine was highly safe and well-tolerated. The researchers will continue to analyze the data to learn more about what is needed for an HIV vaccine to work.
- Study "mosaic" vaccine candidates to cover a variety of global HIV strains
    - HVTN 705 is a clinical trial studying a "mosaic" vaccine to see if it will be safe and effective for protection against a variety of HIV strains, or "clades." It is also being tested in southern Africa.
    - HVTN 706, known as "Mosaico," is another study testing a "mosaic" vaccine. It is taking place in the US, Latin America, and Europe.
- Inform future prevention strategies via antibody-mediated prevention studies (AMP)
    - About 20% of people with HIV can develop broadly-neutralizing antibodies after several years living with the virus.[44] Broadly neutralizing antibodies, or "bNAbs," are produced by the immune system to attack or "neutralize" active HIV in the body. bNAbs cannot reach latent HIV, also known as the "reservoir" of HIV in a person's body. The idea with AMP is to take some of these antibodies and manufacture more of them in labs so they can be given via IV infusion to HIV-negative people and observe how they do or do not protect against HIV taking hold in people who receive them. These studies may provide a proof-of-concept for future vaccine and other prevention strategies, showing how vaccines or other strategies might work if we can induce a preventive antibody response. Some bNAbs are also being studied for treatment to see if they can be used alongside ARVs to achieve viral suppression in people living with HIV.

A number of public and private organizations, in partnership and individually, are working together to find a vaccine that could end the epidemic. The HIV Vaccine Trials Network (HVTN), funded by the National Institute of Allergy and Infectious Diseases (NIAID), is an international collaboration that conducts all phases of clinical trials to test HIV vaccines. The HVTN's mission is to fully characterize the safety, immunogenicity, and efficacy of HIV vaccine candidates as rapidly as possible for prevention of HIV globally.

HVTN clinical research sites are located at leading research institutions throughout the world.

Notes

What Did You Learn?

In this activity, you will brainstorm how you can apply what you learned about vaccines by answering a question. With your group:

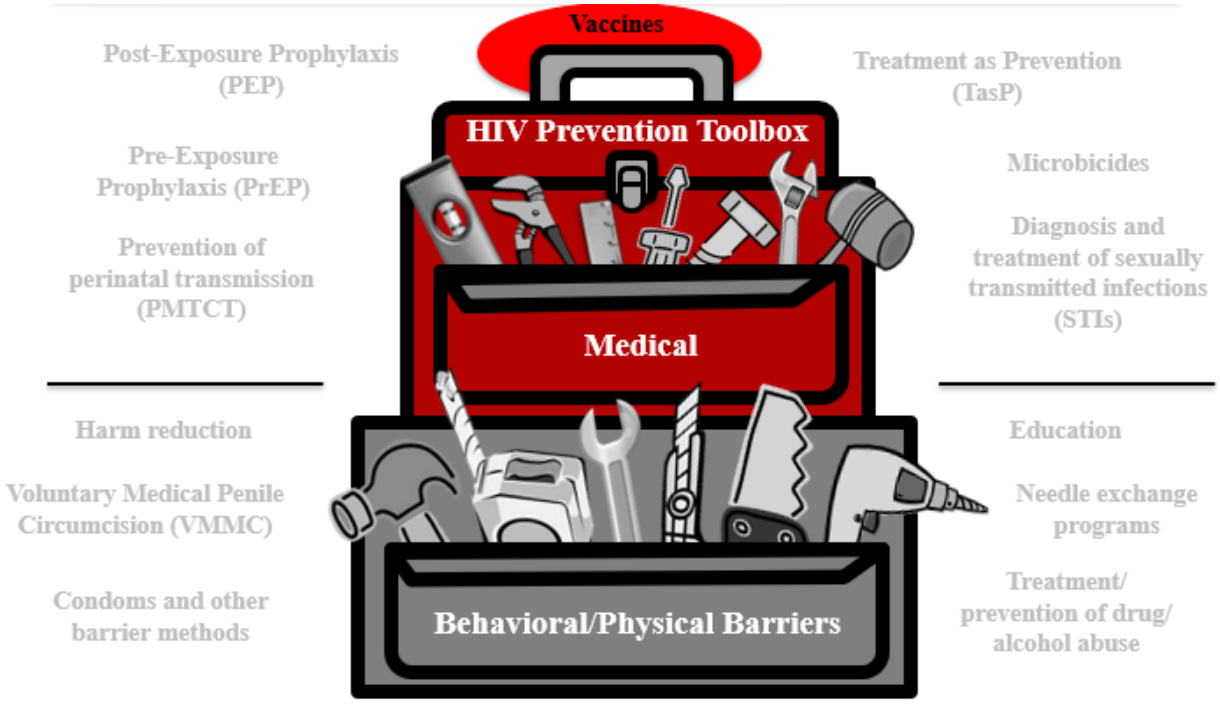
- Brainstorm the question you are assigned (you only need to brainstorm one of the questions).
- Share your answers with the whole group so they can hear your ideas.

1. What thoughts, questions and concerns came to your mind about vaccines as you heard/read information about this HIV prevention modality?

2. If you were asked to speak to an audience about vaccines what would be the three most important messages, you would want to convey?

Vaccines Summary

A vaccine uses a substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection.



The HIV combination prevention toolbox reinforces the role of vaccines combined with other behavioral/physical tools. Combining multiple tools may provide the best method for HIV prevention.

Prevention Tools Activity

In this activity, you will think about all of the different HIV prevention tools you have learned about.

You will receive a card with one of the tools from the HIV combination prevention toolbox.

1. What is your prevention tool?

2. Is your prevention tool (circle one):

   Medical? Behavioral/Physical Barrier? Both?

   If you selected both, why do you think so?

3. Now look at the list of words on the next page. Circle all words that you think are related to your prevention tool.

4. Cross off all words that you think are not related to the prevention tool.

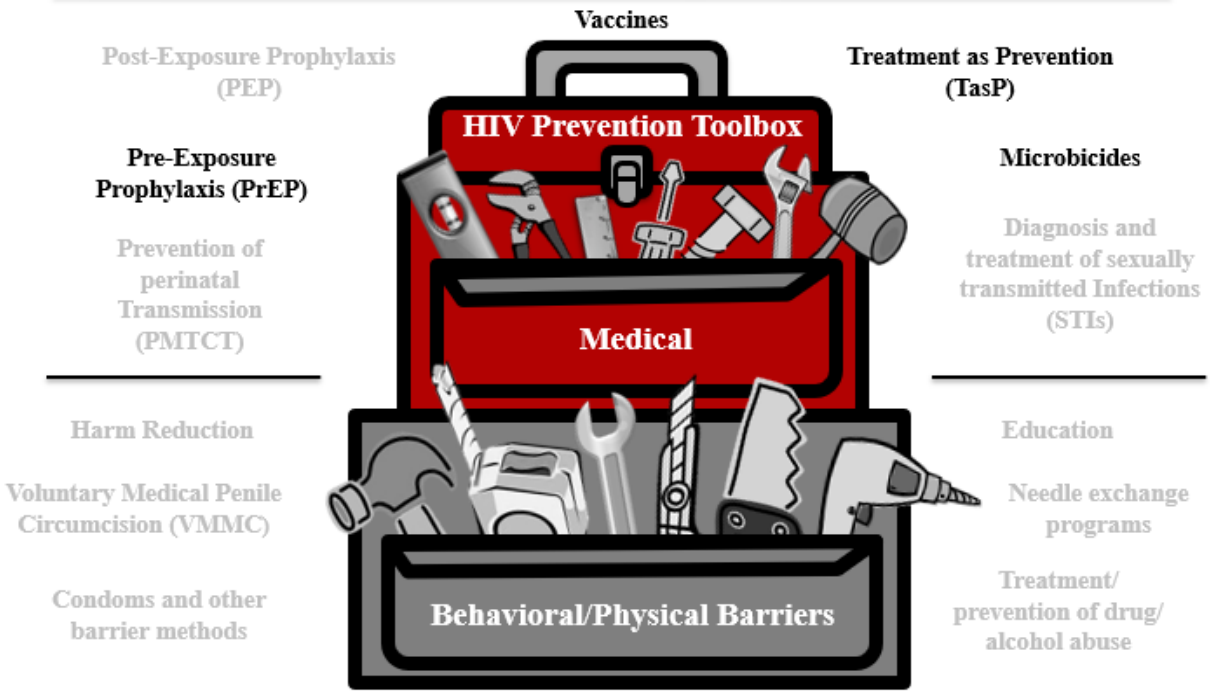
5. Put a question mark next to all words that you are not sure about.

harm reduction	creams	sobriety
emtricitabine (FTC)	condom distribution	vaccines
raising awareness	antiretroviral medication (ARV)	microbicides
Treatment as Prevention (TasP)	research	TDF/FTC
education	drug abuse	reusable
HIV testing and counseling	mobile resources and tools	Prevention Training Centers
vaginal ring	gels	vaginal film
drug treatment programs	suppository	voluntary medical penile circumcision
latex	external condom	dialogue with your partners
internal condom	barrier methods	Truvada®
silicone	clean syringes	needle exchange programs
Sexually Transmitted Infection (STI) regular screening	sexually transmitted infections (STIs)	reducing stigma and discrimination
methadone as a substitute for heroin	Prevention of Perinatal Transmission (PMTCT)	Comprehensive Risk Counseling and Services (CRCS)
Tenofovir	post-exposure prophylaxis (PEP)	pre-exposure prophylaxis (PrEP)

Summary

HIV prevention research is important to find safe and effective approaches to prevent the spread of HIV. These approaches can include:

- Promoting awareness, understanding, and dialogue
- Supporting research
- Developing new prevention technologies



In this session, you learned about:

- Prevention research and HIV prevention research successes
- The role of pre-exposure prophylaxis (PrEP) in HIV prevention research
- The role of treatment as prevention (TasP) in HIV prevention research
- The role of microbicides in HIV prevention research
- The role of vaccines in HIV prevention research

Glossary

The following terms and abbreviations were used in this section:

antibody	A protein molecule that can be found in the blood, produced by a type of white blood cell; helps prevent against infections
ARV	**A**nti**r**etro**v**iral medications used for the treatment of HIV by blocking HIV replication in multiple places in the reproductive cycle of the virus
biomedical	Medicines, approaches, and tools to fight disease that include biological and medical characteristics
CDC	Centers for Disease Control and Prevention
clinical research	Research conducted in people that helps develop solutions to improve health all over the world; the formal evaluation of new interventions for both safety and efficacy that follows strict guidelines
clinical trial	Research that tests how safe and how well an intervention works in a group of people; it tests for new methods of screening, prevention, diagnosis, or treatment
epidemic	A disease affecting many people at the same time and spreading from person to person in a locality for a period of time
FDA	U.S. Food and Drug Administration
FTC	Emtricitabine (an antiretroviral drug)
Film	A dissolvable strip containing a drug
HIV	Human Immunodeficiency Virus
HIV-1	HIV-1 is the most common strain of the virus located throughout the world
HIV combination prevention toolbox	Medicines, medical devices, medical procedures, behavioral approaches, physical barriers, and other approaches to prevent HIV

HPTN	HIV Prevention Trials Network
HVTN	HIV Vaccine Trials Network
immune system	The body's system that fights diseases
implementation research	Research conducted to understand what happens after an intervention is shown to work in a clinical trial to confirm the effectiveness of the intervention in a large group of people in a real-world setting
IDU	Injection drug use
intervention	Any measure whose purpose is to improve health or alter the course of disease
microbicides	Products being developed and tested for use in the vagina or rectum to reduce the likelihood of HIV transmission during vaginal and anal sex
modalities	Medical prevention tools, such as pills, microbicides, and vaccines
MTN	Microbicide Trials Network
PEP	**P**ost-**e**xposure **p**rophylaxis is a medical prevention approach that includes taking anti-HIV drugs as soon as possible after exposure to HIV
PrEP	Pre-exposure prophylaxis is a biomedical prevention approach for people who do not have HIV; they take medication before exposure to reduce their likelihood of acquiring HIV
PrEP-ception	Sero-discordant (mixed HIV status) couples using PrEP to reduce the likelihood of HIV transmission during conception; PrEP has been used by some couples who would like to have a child when one of the partners has HIV and the other does not (sero-discordant couples)
PMTCT	Prevention of Perinatal Transmission (formerly “Mother-to-Child Transmission,” a term which many found stigmatizing, so “perinatal” and “vertical” were adopted)

"prime/boost" vaccine	A vaccine product that works with another vaccine product to stimulate different parts of the body's immune system and increase the body's overall immune response to HIV
research	The gathering of data, information, and facts for the advancement of knowledge
retrovirus	A virus that converts its genes into DNA (a molecule that contains the hereditary material of the body) and then replicates and infects a host cell
STIs	Sexually Transmitted Infections
TasP	Treatment as Prevention is a medical prevention approach that uses antiretroviral treatment for people with HIV to decrease their chance of transmitting HIV, ideally to zero chance under conditions of viral suppression (undetectable)
T-cells	cytotoxic T-lymphocytes (cells that fight infection)
TDF	Tenofovir disoproxil fumarate; also called Viread (marketed name); an antiretroviral medication
TDF/FTC	A combination of two antiretroviral drugs: tenofovir (TDF) and emtricitabine or (FTC); also known as Truvada®; used for treatment of HIV as well as for HIV PrEP
vaccine	A medical prevention substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection

Frequently Asked Questions (FAQs)

How does PrEP prevent the spread of HIV?	Antiretrovirals (ARVs), if taken properly, block some of the steps that HIV uses to make copies of itself in a person's body. The best results for PrEP occur when a person who does not have HIV takes ARVs exactly as prescribed prior to being exposed to HIV.[45]
Do people who are not vulnerable to HIV need an HIV vaccine?	Anyone can acquire HIV. A person may not be likely to contract HIV right now, but life situations can change. We all need a vaccine.
If my partner knows I am using a microbicide to prevent HIV, should we still use condoms?	Microbicides are not currently available for use outside of clinical trials. Condoms are still an important HIV and STI prevention option; people should still use condoms if they can.[46]

Additional Resources

www.bethegeneration.org

http://www.thebody.com/

www.avac.org

http://www.niaid.nih.gov/topics/HIVAIDS/Research/prevention/Pages/art.aspx

http://www.hvtn.org/

http://www.mtnstopshiv.org/

http://www.hptn.org/

http://www.cdc.gov

CONCLUSION

You have now completed the workshop about HIV (Human Immunodeficiency Virus) prevention research. This vital research is designed to find safe and effective methods to prevent HIV and AIDS (Acquired Immunodeficiency Syndrome). Preventing HIV is our best hope for ending the HIV/AIDS epidemic.

It is also important to promote awareness and understanding of this research and to build public support for this work. Researchers often partner with a variety of individuals and groups in the community for this awareness, understanding, and support. Successful partnerships among the following can make a difference:

- Community leaders
- Local and national organizations
- Health professionals
- Educators

What Is HIV/AIDS?

Scientifically, HIV is a lot like other viruses, including those that cause the flu or the common cold. But there is an important difference. Over time, your immune system can get rid of most viruses. But the human immune system cannot get rid of HIV by itself.

HIV can hide for long periods of time in cells, use them to make more copies of itself and then destroy those cells. Over time, HIV destroys so many cells that the body can no longer fight infections and diseases.

HIV is also stigmatized, which continues to be a barrier to ending the epidemic. Efforts to prevent, control, and eliminate HIV/AIDS are continuing worldwide.

What Is Clinical Research?

Research is a systematic investigation to establish facts. Clinical research refers to clinical trials in people and helps develop solutions to improve the health of people all over the world. Clinical research includes:

- Development of new ways to treat, prevent, and control disease
- The evaluation of new interventions for:
  - Safety
  - Efficacy (the capacity to produce a desired effect/effectiveness)
  - Acceptability and adherence (whether or not people use the product as designed)
  - Preventing and controlling disease

Clinical research over the past 100 years has improved the health and lives of people around the world. Clinical research provides the means to make sure HIV research is conducted safely and effectively. Clinical research is an important step in finding ways to prevent and treat HIV/AIDS.

What Is Community Engagement?

Community engagement focuses on reaching and involving everyone from all walks of life and perspectives. Community engagement is especially important during clinical trials. During HIV/AIDS outreach activities, community engagement brings together those people affected and impacted by HIV/AIDS. Community engagement ensures that the:

- Community's concerns and needs are shared with researchers
- Community is aware of, can learn about, and have input into the research process

What Is HIV Prevention and the HIV Combination Prevention Toolbox?

Comprehensive HIV prevention includes treatment, information, skills, personal responsibility, and access to tools, products, and approaches.

Different HIV prevention approaches need to be tested to find out what works best. Identifying and offering more options will allow people to determine which options fit their lives, their needs, and the needs of their family and friends. Ongoing HIV prevention research supports:

- More HIV prevention options
- More combination HIV prevention options
- More diverse research participants to enlarge the understanding of what works

What Are HIV Prevention Tools and How Are They Used in HIV Prevention Research?

HIV prevention research is important to find safe and effective approaches to prevent the spread of HIV. These approaches can include:

- Promoting awareness, understanding, and dialogue
- Supporting research
- Developing new prevention technologies

Some important areas in biomedical HIV prevention are:

- The PrEP prevention approach is focused on people who do not have HIV, but may be vulnerable to exposure to HIV through sexual contact and injection drug use (IDU). With PrEP, people who do not have HIV receive a prescription to take a medication before exposure to HIV. If taken as prescribed, the medication lowers their likelihood of contracting HIV.
- Treatment as Prevention (TasP) is an approach for people living with HIV to reduce the likelihood of passing HIV to others. With TasP, people with HIV take medication. The medication controls the HIV in their bodies and keeps them healthy. The medication also lowers their likelihood of transmitting HIV to others through sex, ideally to zero chance when undetectable (U=U).
- Microbicides are designed to reduce HIV transmission during vaginal and anal sex. Most microbicides being tested today contain antiretroviral (ARV) drugs. These drugs have been shown to help prevent HIV acquisition if someone is exposed to the virus.
- A safe and effective preventive vaccine is believed to be the best way to control the HIV/AIDS epidemic in the long term. A vaccine uses a substance that teaches the body's immune system to recognize and protect against a disease caused by an infectious agent or virus, often by stimulating the body to produce antibodies and T-cells against that infection. There is a lot of important research going on to find a safe and effective HIV vaccine.

This project was originally supported through Federal funds from the Division of AIDS (DAIDS), National Institute of Allergy and Infectious Diseases, National Institutes of Health, Department of Health and Human Services Grant # UM01 AI068614: "Leadership Group for a Global HIV Vaccine Clinical Trials (Office of HIV/AIDS Network Coordination)." It has been independently operated by the Office of HIV/AIDS Network Coordination since 2014.

For More Information

For more information on HIV Prevention Research, visit:

- Be The Generation http://www.bethegeneration.org/
- The Legacy Project: https://www.facebook.com/HANCLegacyProject/
- Office of HIV/AIDS Network Coordination: https://www.hanc.info
- HIV Prevention Trials Network http://www.hptn.org/
- HIV Vaccines Trials Network http://www.hvtn.org/
- Microbicide Trials Network http://www.mtnstopshiv.org/
- AVAC http://www.avac.org/

Endnotes

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[20]https://www.hvtn.org/en/community/community-advisory-board.html
[21]https://www.hanc.info/cp/resources/Pages/training.aspx
[22]http://www.thebody.com/content/art4866.html
[23]http://www.cdcnpin.org/scripts/hiv/prevent.asp
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[25]https://www.cdc.gov/hiv/policies/hip/works.html
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[32]http://www.truvada.com/
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