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Resistance

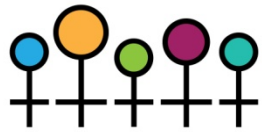
Last updated: February 7, 2025

Together, we can change the course of the HIV epidemic...one woman at a time.

#onewomanatatime

www.thewellproject.org

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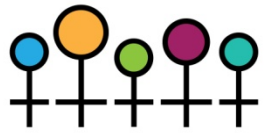


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What Is Resistance?

HIV drugs are designed to keep the amount of HIV virus in your body under control by ***preventing it from reproducing (making copies of itself)***

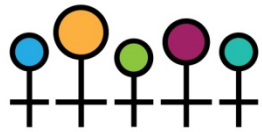
- HIV may change (**mutate**) as it makes copies of itself
 - Changes allow virus to overcome effects of a drug and keep reproducing
 - When this happens, HIV has developed **resistance** to that drug
- Resistance is a major challenge in HIV treatment:
 - Reduces treatment options



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What Is Resistance?

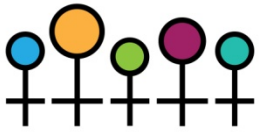
- The best way to ***prevent resistance*** is to stick closely (**adhere**) to HIV drug regimen
- With good adherence, resistance is less likely to develop
- Keeps more treatment options open for the future



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What Causes Resistance?

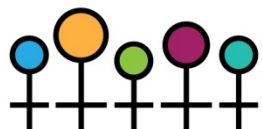
- After entering a CD4 cell (disease-fighting white blood cell), HIV makes many new copies of itself, which then infect other CD4 cells
 - This happens very quickly; HIV can make billions of new viruses every day
- When making new viruses, HIV must copy its genetic information
- Copying happens so fast that mistakes (**mutations**) happen randomly
 - Some mutations are harmless
 - Other mutations can cause big problems and allow a virus to reproduce even when it is exposed to certain HIV drugs



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What Causes Resistance?

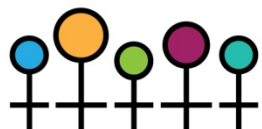
- If a drug does not work against a mutated virus, that virus will reproduce rapidly
 - This causes viral load to go up
 - May have to change drugs to get HIV back under control
- Main reason to use a combination of HIV drugs is to block reproduction at several points in HIV's lifecycle
 - Combination of drugs aimed at several different targets is much better at preventing HIV reproduction than one alone
- With less reproduction:
 - Viral load is lower
 - Mutations and resistance are less likely to occur



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Cross-Resistance and Sequencing

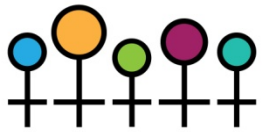
- ***Cross-resistance***: Resistance to entire drug class
- Different classes of HIV drugs:
 - Nucleoside reverse transcriptase inhibitors (NRTIs)
 - Non-nucleoside reverse transcriptase inhibitors (NNRTIs)
 - Integrase inhibitors
 - Protease inhibitors (PIs)
 - Entry and fusion inhibitors
 - Attachment inhibitor
 - Post-attachment inhibitor
 - Capsid inhibitor
 - Boosting agents



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Cross-Resistance and Sequencing

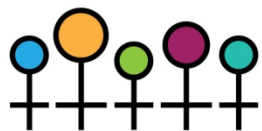
- Cross-resistance is *more likely to happen in some classes of HIV drugs* than others
 - NRTIs
 - NNRTIs
 - May limit choices when picking new combination of HIV drugs
- Healthcare providers think about future HIV regimen options in case current regimen does not work
 - This is called **sequencing** treatment



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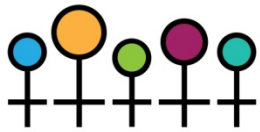
How Do I Know if I Have Drug Resistance?

- Resistance is common, can be transmitted with the virus
 - People who just acquired HIV may already have drug-resistant HIV
 - Have fewer HIV treatments to choose from
- People living with HIV who have taken HIV drugs are more likely to have resistant virus, fewer drug choices
- Regular viral load tests are best way to tell if you have drug resistance
 - If HIV drugs are working well, your viral load should be "undetectable"
- Have a drug resistance test if you are taking HIV drugs and:
 - Your viral load does not become undetectable
 - Your viral load goes up after you have been taking the drugs for a while



Resistance Testing

- US Department of Health and Human Services guidelines recommend drug resistance testing for people who:
 - Just acquired HIV
 - Are starting HIV care
 - Have never been on HIV drugs and are planning to start
 - Are on HIV drugs and see their viral load go up (usually over 1,000 copies/mL)
 - Have started HIV drugs but viral load is not coming down to undetectable
 - Are pregnant and living with HIV (in certain circumstances)
- Resistance testing is ***not usually recommended*** for:
 - People who have stopped HIV drugs for four weeks or more
 - People with a viral load below 500 copies



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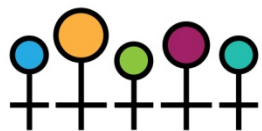
Ways to Test for Resistance

Genotype test:

- Uses HIV from your blood to check for mutations associated with drug resistance
- Preferred test for those:
 - Who are new to HIV treatment
 - Whose HIV drugs fail to bring their viral load down enough
 - Who are pregnant with detectable virus while on treatment

Phenotype test:

- Exposes your virus to many HIV drugs in a test tube
 - Determines which drugs still work against your HIV
 - Preferred test for people with complex drug-resistance patterns



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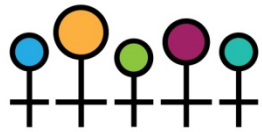
Ways to Test for Resistance

Virtual phenotype test:

- Genotype test that goes one step further
 - Takes your genotype and finds similar genotypes in a database
 - Uses their phenotypic test results to predict which drugs will be effective against your virus (and its mutations)

Resistance tests are helpful when choosing a drug regimen, ***but***

- Tests are only a guide
- Other factors (past medications, side effects, adherence) should be considered as well



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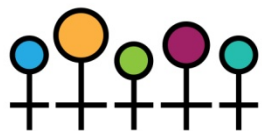
Preventing Resistance

The best way to avoid resistance is to ***take your medications daily as prescribed***

- Important not to skip doses
- Take medications at the same time every day

Good adherence is the best way to prevent resistance

- Follow your medication schedule:
 - Virus will not reproduce as quickly
 - If not reproducing, ***cannot make changes that lead to resistance***



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Learn More!

- To learn more, please read the full fact sheet on this topic:
 - [Resistance](#)
- For more fact sheets and to connect to our community of women living with HIV, visit:
 - www.thewellproject.org
 - [@thewellprojectiv.bsky.social](https://bsky.app/profile/thewellprojectiv)
 - www.facebook.com/thewellproject
 - www.instagram.com/thewellprojectiv
 - www.threads.net/@thewellprojectiv
 - www.youtube.com/thewellprojectiv