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

#onewomanatatime  #thewellproject

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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.

- The HIV virus 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:
  - Decreases ability of HIV drugs to control the virus.
  - 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
What Causes Resistance?

- After infecting 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) can happen
  - 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
**Cross-resistance:** When mutations cause resistance not just to one drug, but to an *entire class of drugs*

- There are six classes of HIV drugs:
  - Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs)
  - Non-nucleoside reverse transcriptase inhibitors (NNRTIs)
  - Protease Inhibitors (PIs)
  - Entry inhibitors
  - Integrase inhibitors
  - Boosting agents
Cross-Resistance and Sequencing

• Cross-resistance is *more likely to happen in some classes* than others
  – NRTIs
  – NNRTIs
  – May limit choices when picking new combination of HIV drugs

• Health care providers think about future HIV regimen options in case current regimen does not work
  – This is called *sequencing* treatment
How Is Drug Resistance Detected?

• Resistance is common, can be transmitted with the virus
  – 10-17% of people who just acquired HIV got strains of the virus that are resistant to at least one HIV medication
  – 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 treatment
  - 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

- 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
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
Ways to Test for Resistance

**Virtual phenotype test:**
- Genotype test that goes one step further
  - Takes your genotype
  - 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 taken into account

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

- Important not to skip doses
- Take medications at the same time every day
- Good adherence
- Remember, **good adherence** is the best way to prevent resistance
  - Follow your medication schedule
  - The virus will not reproduce as quickly
  - If not reproducing, **cannot make changes that lead to resistance**
• 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
  – www.facebook.com/thewellproject
  – www.twitter.com/thewellproject