

# RESEARCH: AN INTRODUCTION

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# CFAR

- BCM-UTHouston Center for AIDS Research (CFAR)
- One of 19 CFARs in the US
- Goal: Make it easier to get HIV-related research done locally
  - Support “Cores” that researchers can share or use
  - Bring researchers together
  - Fund local pilot projects
- CFAR is now partnering with the City of Houston to increase public health and academic cooperation, sharing of ideas, and improving health outcomes for HIV-infected persons
  - Scientific Advisory Council
  - Share results with the community

# Scientific Research

- Systematic investigation
- Generate or confirm a hypothesis
- Generalizable information
- Peer review by other scientists

# Types of Research

- **Stage**
  - Basic science
  - Translational
  - Clinical
    - Clinical trial
  - Epidemiologic
  - Health services
- **Focus**
  - Pathogenesis
  - Prevention
  - Diagnostics
  - Treatment
    - Pharmacologic
    - Devices
    - Surgical
    - Behavioral
  - Outcomes
  - Cost
- **Methods**
  - Retrospective
  - Cross-sectional
  - Prospective
  - Interventional
  - Controlled
  - Randomized
  - Placebo
  - Blinded
  - Clustered

# The Research Process

- Idea
- Literature review
- Protocol
- Funding (peer scientific review)
- Institutional Review Board approval (community ethics review)
- Administrative approval (administrative review)
- Conduct the study
- Analyze the data
- Publish results (peer review)
- Spread the word to stakeholders, community, policy makers
- Start over again

# Data Analysis

- Trying to understand patterns in the data
- Are the results “real” or by chance? (statistical significance)
  - Flip a coin 2 times, get heads both times, what can you conclude?
  - Flip a coin 100 times, get “heads” 95 times, what can you conclude?
  - P value less than 0.05 means the results have a less than 1-in-20 chance of being due to random variation (“chance”) alone
- Do the results matter? (clinical significance)
  - Double your chance of getting cured (4/10 to 8/10)
  - Double your chance of winning the lottery (1/10,000,000 to 2/10,000,000)
  - Relative risk (odds), compared to absolute risk (odds)

# Funding Entities

- Unfunded
- Local or state funding
- Private foundation (Elton John, Bill Gates, AmfAR)
- Federal funding (NIH, VA, CDC, NSF)
- Industry funding
  - Investigator initiated
  - Industry initiated non-registrational
  - Registrational (FDA oversight)
- Mixtures
- Funding matters

# How to Evaluate Research as a Non-Scientist

- How to evaluate the quality of research:
  - Who paid for the research? (federal, foundation, industry)
  - Who conducted the research?
  - What methods were used? (prospective, randomized controlled study)
  - Has it been published? (peer review)
  - Where was it published? (quality of the journal)
  - Who is publicizing the research (NY Times, Houston Chronicle, non-profit agency, website selling products)
  - Are there references and data, or just vague statements?
- How to understand the results:
  - Read the introduction and discussion sections carefully
  - Look for editorials, commentaries, and press coverage
  - Talk to others, look at consumer websites (The Body, AIDS Info, HIV Insite, AIDS.gov, CDC, Kaiser Family Foundation)
- Be skeptical: science is a slow process, and even breakthroughs can be seen coming from a mile away

# Some Terms to Know

- Antiretroviral therapy (aka ART, HAART, CART): medications used to treat HIV infection.
- HIV Viral Load (aka VL, HIV RNA): Once someone has HIV infection, the virus makes lots of copies of itself every day.
  - VL measures the amount of HIV virus particles in a very small amount of blood. Can range from over 10 million copies to below 20 copies.
  - Lower is healthier; higher means there is more HIV around to hurt the body.
  - ART leads to “viral suppression” which means the HIV viral load is very low.
- CD4-cell count (aka T-cell count, T-helper count): HIV infects and kills CD4 cells, which are an important part of the body’s immune system, the system that fights off other infections.
  - A CD4 cell count measures how many of these special white blood cells there are in a very small amount of blood. CD4 counts range from 0 to 1500 or so.
  - Higher is healthier; lower means the immune system is weaker and the body is more prone to infections.
  - Above 200 for someone with HIV is good, and above 500 is ideal.

# Why We Need Health Research

- Research tells us how to make the best decisions and recommendations for our patients
  - How to best test for conditions
  - Whether a new drug is safe and works
  - Whether new medications are better than old medications
  - Whether new ways of delivering care are better than old ways
- Research also tells us how society should best care for itself
  - How to spend our limited budgets
  - How to prevent disease
  - Whether programs are working as efficiently and effectively as possible
- Without research, we'd be guessing!

Thank You!