THE NEW HIV TESTING ALGORITHM IN ARIZONA

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ARIZONA PREVALENT HIV, AIDS AND TOTAL HIV/AIDS CASES 2004-2013
ARIZONA EMERGENT HIV/AIDS CASES
1990-2013

Rate per 100,000 per year

Year
ARIZONA HIV SPECTRUM OF CARE CASCADE
2013 PREVALENT CASES

- HIV-Diagnosed
- Linked to HIV care
- Retained in HIV care
- Need Antiretroviral Therapy
- On Antiretroviral Therapy
- Adherent/Undetectable

Number of People
ARIZONA HIV SPECTRUM OF CARE CASCADE 2013 PREVALENT CASES

- HIV-Diagnosed: 100%
- Linked to HIV care: 60%
- Retained in HIV Care: 49%
- Need Antiretroviral Therapy: 49%
- On Antiretroviral Therapy: 42%
- Adherent/Undetectable: 40%

Percent of People
HIV DISEASE MARKER TIMELINE

- **Acute infection**
  - Virus (p24 antigen)
  - CD4 T cell concentration

- **Chronic lymphadenopathy**
  - CD4 T cells

- **Sub-clinical immune dysfunction**
  - Anti-HIV antibody (gp120)

- **Skin and mucous membrane immune defects**

- **Systemic immune deficiency**

**Time (months after infection)**:
- 0 to 6
- 12
- 18
- 24
- 30
- 36
- 42
- 48
- 54
- 60
- 66
- 72
- 78
- 84
ACUTE HIV
ACUTE HIV CHARACTERISTICS

✓ Virus newly replicating in the body
✓ Early host immune response
✓ High viral load
✓ Increased chance of spreading the virus
THE IMPORTANCE OF ACUTE HIV

• The virus itself is thought to be more infectious
  – 75-750 times more infectious in rhesus macaques
  – Per virion (SIV)

• Transmission is more likely in the acute phase
  – Due to increased numbers of virus in blood and semen
  – In a study of discordant couples 43% of transmission that occurred was in the acute stage
CALCULATED PROBABILITIES OF TRANSMISSION PER COITAL ACT OVER TIME, HETEROSEXUAL CONTACT


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Health and Wellness for all Arizonans
HOW MUCH ACUTE HIV IS THERE?

NORTH CAROLINA NEW INFECTIONS AT PUBLIC TESTING SITES

WHY TESTING IS KEY

• Non specific symptoms - flu like
• Patient awareness early
• Early treatment is important
EARLY TREATMENT RATIONALE

• Treat symptomatic people
• Stop viral evolution at a key time
• Protect the immune system
• Limit latent pool of infected cells
• Limit transmission
HIV TESTING TIMELINE
HIV TESTING HISTORY

• First test approved by FDA in 1985 (ELISA test)
• HIV Western blot first approved in 1987
  – Still in use today
  – Was never the ‘gold standard’ of HIV diagnosis—Viral Culture
  – Utilizes IgG- late antibodies
FROM 1987
ADVANCES IN HIV TESTING

- Previous CDC testing recommendations from 1989
- New tests approved in:
  - 2010 Ag/Ab
  - 2013 Multispot (for diagnosis in new algorithm)
- WB detect infection about a month after infection
- Ag/Ab detect ~18 days before WB
- MS detect ~7 days before WB
HIV IN THE BODY AND DIAGNOSTIC TESTS

[Graph showing HIV RNA, p24 Ag EIA, 3rd Generation HIV Ab EIAs, 1st Generation HIV Ab EIAs, and Anti-HIV Ab over days post infection.]
ADAPTING TO THE NEXT GENERATION OF HIV TESTS

• New testing recommendations using a multitest algorithm and newer tests

• New Case Definition (April 2014)
  – Updated to account for new multitest algorithm
  – Old algorithm specified final test must be a WB or IFA which conflicted with new algorithm
FROM THE CDC

• On June 26th 2014 the CDC released new HIV testing recommendations
  – Works in conjunction with new case definition from April 11th 2014
  – 4th generation screening test
  – Type differentiating follow-up test
  – NAT to determine final result for discordant antigen and antibody test results
  – Western blot is no longer recommended
WHY THE CHANGE

• Earlier diagnosis is better
• Acute detection
• Not a large number of people in acute phase but they are key to stopping the epidemic
  – Estimated 9%-50% of new infections transmitted from someone in the acute phase of infection
HIV Diagnostic Testing Algorithm

Step 1. HIV-1/2 Ag/Ab combo immunoassay (4th generation)

(+)

Negative for HIV-1 and HIV-2 antibodies and HIV-1 p24 Ag*

(−)

Step 2. HIV-1/HIV-2 antibody differentiation immunoassay

HIV-1 (+) HIV-2 (−)
Positive for HIV-1 antibodies

HIV-1 (−) HIV-2 (+)
Positive for HIV-2 antibodies

HIV-1 (+) HIV-2 (+)
(Undifferentiated)
Positive for HIV antibodies

HIV-1 (−) or indeterminate HIV-2 (−)

Step 3. HIV-1 RNA assay

RNA (+)
Positive for HIV-1

RNA (−)
Negative for HIV-1

NEW ALGORITHM AVAILABILITY IN ARIZONA

• Arizona State Lab
• MIHS
• Labcorp
• Quest (other than SQ)
• ARUP
ISSUES WITH THE NEW ALGORITHM

• More complicated than old Western blot algorithm
  – WB alone confirmatory MS alone is not
  – Need for RNA test for discordant results

• Reporting of negative results in an overall positive algorithm needed

• New=Scary
  – Results not standardized between labs
  – How do you interpret the results
  – Confusion with regards to what to order, how to report and interpret results
TAKE HOME MESSAGE-COPING WITH CHANGE

• Acute HIV is an important component of HIV epidemic
• New algorithm allows for the early detection of infection
• Where to go for more information
  – AETC
  – CDC
  – APHL
  – AZDHS
  – Laboratory
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• Rick DeStephens - HIV Epidemiology Program Manager
• Amanda White - HIV Epidemiologist
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Questions?
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