HIV TESTING STRATEGIES

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EPI 227, 11 am - Noon, May 15, 2006

Background on Testing Issues

www.ph.ucla.edu/epi/controversies_hiv.html

HIV Prevention Strategic Plan of CDC

Goal 2: Increased Knowledge of Serostatus

By 2005, through voluntary counseling and testing, increase from the current estimated 70% to 95% the proportion of HIV-infected people in the United States who know they are infected.

Controversies over HIV Testing

- Worldwide reluctance to test persons who might be harmed if found to be HIV positive
  - homosexual men
  - women intending to be married
  - pregnant women
- Some feel that benefit of not testing exceeds the harm that may come from HIV testing
  - the notion of "harm," however, does not usually include passing on the virus to a susceptible partner
Assigned Reading

**ORIGINAL ARTICLE**

Increasing risk behaviour and high levels of undiagnosed HIV infection in a community sample of homosexual men

J P Dodds, D E Mapstone, J V Purdy, A M Johnson

Objective To estimate changes in sexual behavior over time To estimate the proportion of undiagnosed HIV infection in a community sample of homosexual men To explore the relation between HIV status, diagnosis, and sexual behavior.

- sampling of gay community venues in London
- anonymous behavioral questionnaire
- anonymous saliva samples


Homosexual Men

Have homosexual men become more conscientious about avoiding transmission to susceptible partners?

![Graph showing proportion of men reporting unprotected anal intercourse (UAI) in the past year.](image1)

“Homosexual men who socialized in gay venues across London”


Reported Unprotected Anal Intercourse with 1+ Partners in Past Year

![Chart showing reported unprotected anal intercourse with 1+ partners in past year.](image2)

About one-third had not know their HIV status


Pregnant Women

Should pregnant women in high risk settings be required to ask for an HIV test (i.e., opt-in) or be routinely given an HIV test (i.e., opt-out)?

![Graph showing percentage of pregnant women who agreed to a human immunodeficiency virus (HIV) test at a prenatal clinic and who learned their HIV status within 60 days, by type of HIV testing system.](image3)

Even with “routine” testing, there remains a large void in learning HIV status


HIV Treatment with Anti-retroviral Drugs

Who to treat and at what cost?

Estimated Global Coverage with Antiretroviral Therapy
End of 2003

Source: WHO. World Health Report, 2004

Need HIV testing before being able to find and treat asymptomatic HIV/AIDS

HIV Infection in the United States in Years Gone By

40,000 incident cases per year

400,000 prevalent disease cases

40,000 deaths per year

Following 10-12 years of infection, the person with HIV dies.

400,000 prevalent carriers created 40,000 new infections each year

Few if any Cures

Current HIV Infection in the United States

40,000 incident cases per year

1,000,000 prevalent disease cases

13,658 deaths per year (2003)

(effective therapy)

Following infection, persons remain alive due to effective therapy but still harbor the virus, serving as potential transmitters

1,000,000 prevalent carriers create 40,000 new infections each year

Few if any permanent cures

Testing and Avoidance

Probability of becoming infected

Infected blood

Universal testing

Blood Transfusion

Benefit is to blood recipient

Infectious partner

Monogamous anal sex for one year

Benefit is to susceptible sexual partner

Infected partner

Occasional testing

Test and avoid or always use condom

Routine testing

Pregnant Women

If infected and unaware mother

Benefit is to child

Tested, treated and no breastfeeding
Testing and Avoidance

Probability of becoming infected

<table>
<thead>
<tr>
<th>Infected partner</th>
<th>Test and avoid or always use condom</th>
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</thead>
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Monogamous vaginal sex for one year

HIV Testing

Truth

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High sensitivity implies few false negatives

High specificity implies few false positives

Sensitivity = \( \frac{A}{A + C} \)

Specificity = \( \frac{D}{B + D} \)

Usual HIV Testing Strategy in the United States

Assay One

ELISA

Results in 1-2 weeks

Assay Two

Western Blot

Results in 1-2 weeks

Test +

Test -

Potential transmitters

*If newly positive, confirm **retest in two weeks with another sample

High Specificity (few false positives)

Planned HIV Testing Strategy in the United States

Assay One

Rapid Test

Results in < 20 min.

Assay Two

Western Blot

Results in 1-2 weeks

Test +

Test -

Potential transmitters

*If newly positive, confirm **retest in two weeks with another sample

High Specificity (few false positives)

HIV Testing

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High Specificity (few false positives)

Personal Screening for HIV (now available in USA)

Home Collection (with telephone counseling)

Laboratory

1. (1)

2. (2)

3. (3)

4. (4)

5. (5)

Telephone counseling and referral

No counseling, but informed with brochures and posters and by the general media

Personal Screening for HIV (not yet available in USA)

Home Collection (with no telephone counseling)

Laboratory

1. (1)

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Laboratory

No counseling, but informed with brochures and posters and by the general media

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High Specificity (few false positives)
Personal Screening for HIV (not yet available in USA)  
Home Testing

- Initial screening for HIV infection is done in the privacy of the home
- Saliva strip or whole blood strip
- No counseling, but informed with brochures, posters and the general media

Conclusion  
Transmission

- Because of the low infectivity (i.e., ability to lodge and multiply) of HIV, transmission of the virus should be easy to prevent, if infection status is known.
- Universal and continued condom use with at-risk partners is good in principal but appears to be too much to expect of many people.
- HIV testing has been highly effective in preventing transfusion-based transmission and passage from mother to offspring.
- An individualize prevention strategy that relies on personal screening holds promise, but only if inexpensive rapid tests are made widely available.

Additional Information on Rapid Testing

- Rapid HIV Testing: 2005 Update
- Bernard M. Branson, M.D.
- American Division for Laboratory Diagnostics
- Division of HIV/AIDS Prevention

http://www.cdc.gov/hiv/rapid_testing/materials/USCA_Branson.pdf

Conclusion  
Treatment

- HIV detection is a necessary first step before administering antiretroviral therapy
- Fear of testing and therapy cost are two major deterrents of increased HIV/AIDS treatments in the developing world
- An individualize detection and treatment strategy that relies on personal screening to identify and lead to treatment holds promise, but only if inexpensive rapid tests are made widely available.

The Safe Light

- Testing blood
- Providing therapy
- Offering condoms
- Sensitive counseling
- Deploring discrimination
- Testing mothers and children

The difficult darkness

- widespread testing
- HIV-reporting
- personal screening
- partner notification
- monogamy/abstinence