CDC/APHL 2012 DIAGNOSTICS CONFERENCE

FINDING THOSE AT RISK: AHI in Newark, NJ

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INTRODUCTION

Current HIV screening techniques result in a small number of screen negative individuals who are recently infected and lack antibodies indicative of HIV infection. This serologic window may last up to 6 weeks.

RNA testing of pooled, HIV antibody negative specimens' permits identification of some of those recently infected with HIV and narrows the window to approximately 2 weeks.

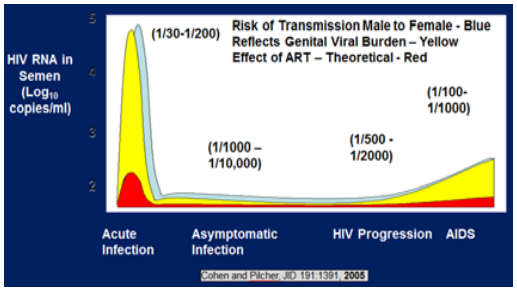
The importance of this sero-negative window is the risk of transmitting HIV to others, including infants, prior to the appearance of HIV antibodies. By combining rapid HIV testing assays with pooled NAAT, additional infected individuals can be identified and provided with treatment and effective prevention counseling during the early acute stage of HIV infection.

We employed rapid HIV testing and NAAT pooling in order to assess the relative likelihood of falsely negative HIV screening in an emergency department and an outpatient high risk clinic in Newark, New Jersey.

BACKGROUND

The risk of HIV transmission is largely a function of HIV viral load and can often be very high during the earliest phases of the disease before any significant antibody response has been mounted.

Pilcher and Cohen[1] estimate the risk of heterosexual transmission per coital act to be between 1/30 –1/200 during the acute phase of an HIV infection[1] compared to a risk of 1/1000-1/10,000 during the later asymptomatic phase of the infection.

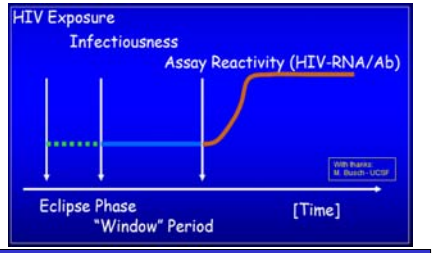


RNA testing of pooled, HIV antibody negative specimens permits identification of individuals who have been recently infected with HIV and are at increased risk of transmitting HIV to others.

The use of rapid HIV testing assays in conjunction with pooled NAAT (Nucleic Acid Amplification Testing) provides a basis for assessing the burden of acute HIV infection (AHI) in a particular locale.

Much of the data in this abstract was originally presented at the XIXth International AIDS conference July 22-27, 2012, Washington DC, USA. See: Eugene Martin[1]*, Debbie Mohammed[2], Gratian Salaru[1], Joanne Corbo[1], Michael Jaker[2], Joan Dragavon[4], Robert Coombs[4], Sindy Paul[3], and Evan Cadoff[1]. Screening for Acute HIV Infection in a Newark, NJ Hospital Setting

Events from HIV exposure to a reactive result



Opportunities

Combining rapid HIV testing with voluntary pooled NAAT identifies those most at risk of infecting others. This may play a critical role in the success of both 'treatment as prevention' and in the development of ongoing behavioral prevention strategies. Studies in other urban settings have suggested that it is possible to increase the yield of individuals identified as infected by anywhere from 6-10%.([3-6])

METHODS

Between Feb 2010 and Aug 2011 pooled NAAT testing in addition to rapid HIV screening was offered to emergency department (ED) patients and outpatients (OP) seen at University Hospital, a large, urban hospital in Newark, NJ. Rapid HIV antibody screening (12,390) was performed using Clearview HIV 1/2 STAT-PAK, rapid HIV test (Alere North America, Inc. Princeton, NJ).

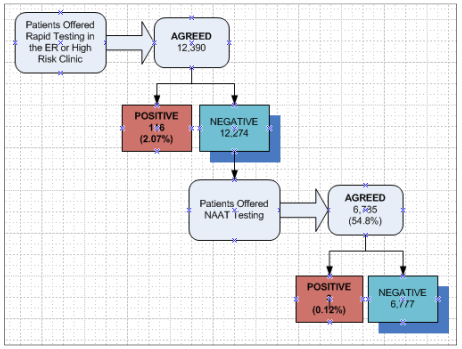
For those negative by rapid HIV and agreeing to NAAT testing (6785) , plasma samples were collected, centrifuged and stored frozen until a 27 sample batch could be pooled, frozen, and transported, to the University of Washington's Department of Laboratory Medicine where real-time reverse transcription-polymerase chain reaction (RT-PCR) amplification was performed to assess HIV RNA (dynamic range for HIV RNA detection by Real-Time RT-PCR, 30 to 1,000,000 copies/mL).

ACKNOWLEDGEMENTS:

We gratefully acknowledge the contributions of Robert Coombs, MD and Joan Dragovan of the University of Washington who provided Real Time PCR used in this study; as well as the contributions of Michael Jaker, MD (Internal Medicine) and Sandra Scott, MD (Emergency Medicine) of UMDNJ.

RESULTS

Of 12,390 individuals screened, 5605 (45.3%) had rapid HIV testing, (3139 female, 2466 male) alone, while 6785 (54.7%) (3259 female, 3524 male) agreed to both rapid HIV testing and NAAT screening. Rapid testing identified 116 antibody positive individuals (0.9 %). Pooled NAAT increased HIV case detection by 6.9% identifying 8 additional cases.



Overall, AHI yield was 0.12%. Potentially, an additional 8.1 individuals would have been identified by NAAT testing in the Rapid Only group had they agreed to testing. While representing 48.4% of those tested, all NAAT positive screens were male.

Distribution of Risk Factors by Test Groups

Risk Factor	Total NAAT by %	Acute HIV Infection N=8	Rapid Test HIV(+) by % N=116
Male-to-Male	2.8%	3 male (37.5%)	14.7%
Heterosexual Sex	97.1%	5 male (62.5%)	82.7%
Injection drug use	0.1%	0 (0.0%)	2.6%

Program	Dates	Description	Rapid Tested	NAAT Tested	AHI	HIV Ab+	% HIV Ab+	% Increase in Yield	% Yield AHI
NEWARK, NJ	2/10 to 1/12	HIV Ab neg adults receiving testing and counseling at a high risk urban hospital in Newark, NJ	12,390	6,785	8	116	0.94%	6.90%	0.12%

CONCLUSIONS

RNA testing of pooled, rapid HIV antibody-negative specimens permits identification of individuals recently infected with HIV. The proportion of individuals who present in an early phase of the infection is dependent upon a number of factors. In Newark, pooled NAAT increased HIV case detection and provided an important opportunity to focus attention on treatment and prevention messages for those most at risk of transmitting an HIV infection.

These results are consistent with reports from other US urban settings with significant local HIV epidemics.

Program	Dates	Rapid Tested	NAAT Tested	AHI	HIV Ab+	% HIV Ab +	% Inc in Yield
Maryland[2]	6/06-3/08		58925	7	1709	2.90%	0.41%
North Carolina[3]	11/02-10/03		108667	23	583	0.54%	3.95%
Los Angeles[4]	2/04-4/04		1698	1	14	0.82%	7.14%
NEWARK, NJ	2/10 to 1/12	12,390	6,785	8	116	0.94%	6.90%
Seattle King County[5]	9/03-1/05		3439	5	81	2.36%	6.17%
Atlanta[6]	10/02-1/04		2136	4	66	3.09%	6.06%
San Francisco[4]	10/03-7/04		2722	11	105	3.86%	10.48%

Why does it matter? Viral load during acute HIV infection can be very high and the ability to transmit to others is largely a function of viral load. Transmission during AHI can contribute substantially to the number of new infections. Knowledge of status can lead to reductions in risk behavior.

Existing HIV antibody methodologies do not identify all early HIV infections. Newly infected individuals are between 30-50 times more likely to transmit HIV unknowingly to an uninfected individual[1].

Studies in many urban centers, including Newark, suggest that HIV case detection is increased and a percentage of the most infectious individuals, at risk for transmitting HIV infection can be identified using a pooled approach.

SUMMARY:

- **Pooled NAAT identified 8 additional cases of HIV infection**
- **In NJ, two thirds of the identified cases were associated with heterosexual sex as the only risk factor**
- **Overall, HIV case detection increased by 6.9%**
- **Acute HIV Infection yield was 0.12%**
- **Potentially, eight additional individuals would have been identified had they agreed to NAAT testing**

References:

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Debbie Mohammed, 11/27/2012