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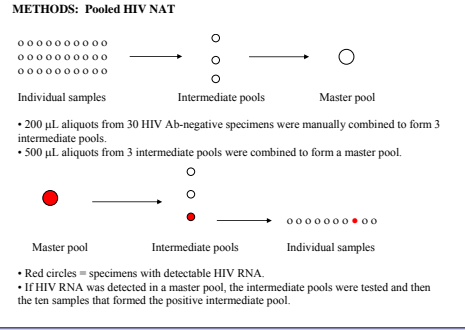
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Background: The optimal public health strategy to test for acute HIV infection (AHI) remains undetermined.
Methods: Public Health-Seattle & King County (PHSKC) has offered anonymous or confidential HIV testing using the OraQuick Rapid HIV-1 Antibody Test (OraSure) or a 1st or 2nd generation EIA (Vironostika HIV-1 Microelisa System, bioMérieux or Bio-Rad/Genetic Systems rLAV HIV-1 EIA) and confirmed all HIV-positive tests. Men who have sex with men (MSM) who test antibody (Ab)-negative were screened for HIV by HIV nucleic acid testing (NAT) in 3-stage pooling (30-3-1) using the Procleix HIV-1 Discriminatory Assay (Gen-Probe) or a real-time reverse transcription PCR assay. When available, NAT-positive sera were retested by a 3rd generation EIA [HIVAB HIV-1/HIV-2 (rDNA) EIA, Abbott], and EIA-negative sera were retested by OraQuick.
Results: From 9/03 to 6/06, 155 (2.4%) of 6395 specimens from MSM tested HIV Ab-positive, and 21 (0.3%) Ab-negative MSM tested NAT-positive. NAT improved HIV case-finding by 13.5%. Among anonymous testers, 50 (3.2%) were Ab-positive, and 0 (4%) Ab-negative MSM were NAT-positive. Among rapid testers, 45 (3.6%) were Ab-positive, and 13 (1.0%) Ab-negative MSM were NAT-positive. 3 of 11 NAT-positive samples retested by the 3rd generation EIA were Ab-positive. 3 OraQuick-negative samples were positive by 1st or 2nd generation EIA. No available EIA-negative sample was Ab-positive when retested by OraQuick. One MSM was counted among the 21 cases tested NAT-negative at PHSKC 4 days after his last sexual exposure but had AHI diagnosed 1 week later. 10 (50%) of 20 cases with charts available for review had symptoms suggestive of AHI, AHI was suspected in 4. Two other men had symptoms after testing and had AHI diagnosed elsewhere before learning PHSKC NAT results. All reviewed cases received NAT results, anonymous and confidential testers learned positive NAT results in a median of 20 (IQR 16-31) and 18 (IQR 14-19) days (p=0.2).
Conclusions:
1) Targeted screening for AHI is useful but could be improved by reducing the time to obtain results.
2) HIV NAT does not entirely eliminate the window period. 3rd generation EIAs, but not rapid tests, could shorten this period compared to 2nd generation EIAs.
3) Many persons with AHI have symptoms and seek attention; public health programs not capable to afford pooled HIV NAT should have NAT available to test at-risk persons with symptoms consistent with AHI.
4) Anonymous or rapid testing is not a contradiction to incorporation of NAT into public health HIV testing programs. NAT may have greater benefit among persons electing these testing methods.

BACKGROUND
• Public Health – Seattle & King County (PHSKC) began pooled HIV nucleic acid testing (HIV NAT) in September 2003 to identify highly infectious individuals with acute HIV infection (AHI):
–Stekler et al. Targeted screening for primary HIV infection through pooled HIV RNA testing in men who have sex with men. AIDS 2005;19: 1323-51
–Stekler et al. Screening for acute HIV infection: lessons learned. Clin Infect Dis 2007; 44: 459-61
•Questions exist about how to incorporate HIV NAT into rapid HIV testing;
• Screening is targeted because incidence in MSM is ~30-40x higher than in the heterosexual testing population.

METHODS: Patient Population and HIV Testing
• MSM who sought HIV testing through PHSKC from September 2003 – June 2006;
• Testing was anonymous or confidential;
• HIV antibody testing of blood used standard EIA (Vironostika HIV-1 Microelisa System, bioMérieux) or rapid testing of fingerstick blood samples with OraQuick (OraSure). Patients were referred for rapid testing if they reported non-concordant UAI;
• For MSM having rapid HIV testing, HIV NAT was performed on blood samples drawn for syphilis or other serologies;
• After one individual was found to be HIV-negative with the OraQuick test but HIV-positive with the Vironostika (see Results: Additional Testing), samples from OraQuick-negative individuals were re-tested with the Vironostika or rLAV HIV-1 EIA before pooling for HIV NAT;
• HIV NAT testing was performed using either the Procleix HIV-1 Discriminatory Assay (Gen-Probe) or an independently validated, real-time reverse transcription PCR assay.
• From 9/03-2/05, every sample was also tested individually by HIV NAT;
• When available, frozen NAT-positive sera were retested retrospectively with a 3rd generation EIA [HIVAB HIV-1/HIV-2 (rDNA) EIA, Abbott], and EIA-negative sera were re-tested with OraQuick.

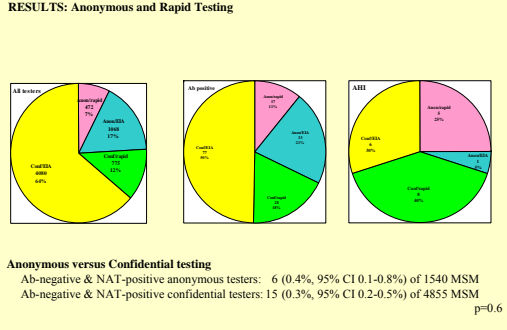


METHODS: Cost-effectiveness Analysis
• Program costs/case of acute HIV infection detected were compared to hypothetical program without NAT;
• Costs included HIV test costs, fixed costs for HIV NAT, and personnel time for clinical evaluation, the telephone results line, and post-test counseling
• Univariate sensitivity analyses tested upper and lower bounds of 95% confidence intervals (CI)

Cases

ID	HIV+ sex partner?	Any non- concordant UAI?	Last HIV test (days)	Anonymous?	Rapid test?	Ser?	Was AHI Suspected?	Days to results	Days until test PHSKC results
1	no	yes	376	no	yes	no	no	13	
2	Chart not available for review		no	no	no	no	no	Chart not available for review	
3	no	yes	30	yes	no	no	no	20	20
4	no	no	53	no	no	no	no	16	19
5	no	no	222	yes	yes	no	no	11	448
6	no	yes	71	no	yes	yes	yes	10	15
7	yes	no	49	no	yes	yes	no	7	11
8	no	no	174	no	yes	no	no	16	34
9	no	yes	44	yes	no	yes	no	15	19
10	no	yes	44	no	yes	yes	no	11	16
11	yes	no	156	no	yes	yes	no	16	16
12	no	yes	295	no	yes	no	no	17	19
13	no	yes	180	no	no	no	no	5	20
14	no	yes	362	yes	yes	yes	yes	14	15
15	no	no	no	no	no	no	no	14	15
16	yes	yes	39	no	yes	no	no	18	209
17	yes	yes	60	no	yes	no	no	13	14
18	no	no	62	no	yes	yes	yes	7	8
19	no	no	616	no	yes	no	no	15	21
20	yes	yes	477	no	no	yes	no	15	17
21	no	no	67	no	yes	yes	no	14	19

UAI, unprotected and intercourse; Ser, serology; AHI, acute HIV infection; PHSKC, Public Health – Seattle & King County
*Cases 13 and 15 developed seroconversion symptoms in the interval between testing and receipt of PHSKC results



RESULTS: Additional Testing, False-Negative Rapid Tests, & False-Negative HIV NAT

Retesting by 3rd generation EIA
• 3 (27%) of 11 NAT-positive samples were Ab-positive by the 3rd generation EIA;

False-negative rapid test results
• 3 cases (#16 and two not described): OraQuick-negative but positive by 1st or 2nd generation EIA. All 3 cases had early HIV infection.
2 of 2 samples retested with OraQuick were weakly HIV-positive.
• None of 7 available EIA-negative samples was Ab-positive when retested by OraQuick;

False-negative HIV NAT in the "window period" for HIV NAT
• One MSM not counted among the 21 cases tested NAT-negative at PHSKC 4 days after his last sexual exposure but was diagnosed with AHI 1 week later.

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RESULTS: Cost-effectiveness Analysis

	HIV Ab testing	HIV Ab + HIV NAT
Total program cost	\$542,362	\$693,289
# of cases of AHI	NA	21
Incremental cost/case detected	NA	\$7187 (base case)

Univariate sensitivity analyses:
% Ab-negative & NAT-positive: .2% \$11,038
.5% \$5036

Limitations
• Ability to extrapolate HIV NAT results in MSM in Seattle to other testing populations is uncertain;
• Individual HIV NAT was performed only for part of the study period.

CONCLUSIONS:
1) 8 (40%) MSM with AHI did not report UAI with sex partners of discordant or unknown serostatus prior to seroconversion;
2) Targeted screening for AHI is useful but could be improved by reducing the time to obtain results;
3) Neither anonymous nor rapid testing is a contradiction to incorporation of HIV NAT into public health HIV testing programs. HIV NAT may have greater benefit among persons electing these testing methods;
4) Many persons with AHI have symptoms and seek attention; thus, public health programs that are unable to afford pooled HIV NAT should have NAT available to test at-risk persons with symptoms consistent with AHI;
5) HIV NAT does not entirely eliminate the window period; however, 3rd generation EIAs, but not rapid tests, could shorten this period compared to 2nd generation EIAs. Rapid HIV testing may not be preferable to HIV testing by EIA in populations at high risk for HIV acquisition.
6) HIV NAT is cost-effective compared to other HIV case-finding activities through Public Health – Seattle & King County such as bathroom-based testing (\$8250 per case detected) and a community-based organization's HIV testing program (\$11481 per case detected).
–Golden et al. Peer referral for HIV case-finding among men who have sex with men. AIDS 2006;20: 1961-8.
Identifying cases of acute HIV infection likely has relatively greater importance for HIV prevention.

Acknowledgements: We thank the patients seeking HIV testing through Public Health – Seattle & King County and the providers for their care of these patients. The study was partially supported by GenProbe Incorporated from 9/03-2/05.