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Development and Validation of the San Diego Early Test Score to Predict Acute and Early HIV Infection Risk in Men Who Have Sex With Men

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Background. Although men who have sex with men (MSM) represent a dominant risk group for human immunodeficiency virus (HIV), the risk of HIV infection within this population is not uniform. The objective of this study was to develop and validate a score to estimate incident HIV infection risk.

Methods. Adult MSM who were tested for acute and early HIV (AEH) between 2008 and 2014 were retrospectively randomized 2:1 to a derivation and validation dataset, respectively. Using the derivation dataset, each predictor associated with an AEH outcome in the multivariate prediction model was assigned a point value that corresponded to its odds ratio. The score was validated on the validation dataset using C-statistics.

Results. Data collected at a single HIV testing encounter from 8326 unique MSM were analyzed, including 200 with AEH (2.4%). Four risk behavior variables were significantly associated with an AEH diagnosis (ie, incident infection) in multivariable analysis and were used to derive the San Diego Early Test (SDET) score: condomless receptive anal intercourse (CRAI) with an HIV-positive MSM (3 points), the combination of CRAI plus ≥5 male partners (3 points), ≥10 male partners (2 points), and diagnosis of bacterial sexually transmitted infection (2 points)—all as reported for the prior 12 months. The C-statistic for this risk score was >0.7 in both data sets.

Conclusions. The SDET risk score may help to prioritize resources and target interventions, such as preexposure prophylaxis, to MSM at greatest risk of acquiring HIV infection. The SDET risk score is deployed as a freely available tool at http://sdet.ucsd.edu.

Keywords. acute and early HIV; MSM; risk behavior; risk score.

Men who have sex with men (MSM) bear the greatest burden of human immunodeficiency virus (HIV) infection in the United States and many other nations [1, 2]. MSM represent a dominant risk group for HIV; however, the risk of HIV infection within this population is not uniform [3–5]. Characterizing and identifying the MSM at greatest risk for incident HIV infection might permit more focused delivery of both prevention resources and selection of appropriate interventions, such as intensive counseling, regular HIV screening with methods that detect acute infection (ie, nucleic acid amplification test [NAAT]), and antiretroviral preexposure prophylaxis (PrEP) [6].

Although there are a number of symptom-based scores correlated with risk of acute and early HIV infection (AEH), few of these scores actually predict HIV acquisition risk [7, 8]. One of these, the Denver HIV risk score, focuses on the overall population at risk for HIV infection [9, 10]. Demographic characteristics such as male sex, younger age, and being an MSM are the main drivers of this score [9]; therefore, it would be difficult to discern the relative risk of incident HIV infection in populations that share some or all of these characteristics (ie, MSM). To date, 2 scores have been

developed based on data from MSM repeat HIV testers: the Menza score [5] and the Smith score [11]. Both of these risk scores focus mainly on risk behavior during the 6 months before HIV diagnosis. Each of these scores has issues, however, that may contribute to suboptimal performance in real-world settings.

First, there are issues with the derivation and validation cohorts used to estimate these scores. The Menza score focused on HIV acquisition in general (ie, acute and chronic infection at the time of diagnosis) in sexually transmitted infection (STI) clinic patients. Because the population used for development of the score sought HIV testing at a median of every 1.6 years (range, 30 days–6.7 years) [5] the behavior reported for the 6 months before diagnosis may not have included the risk behavior at the time of HIV acquisition. The Smith score was derived using a clinical vaccine trial population (enrolled 1998–1999) [11]. Both of the scores were validated using subjects of Project Explore (a HIV prevention trial conducted between 1999 and 2001 [12]). Thus, both scoring methods relied on behavioral risk data collected more than a decade ago in a clinical trial population that may not accurately represent the behavioral risks associated with HIV acquisition risk in a real-world setting today. Finally, the use of methamphetamine or inhaled nitrites in the prior 6 months is weighted in both scores, whereas other drugs are not [5, 11]. The Menza score weighted the use of methamphetamine or inhaled nitrites as the most important variable (11 points), whereas all other risk variables together accounted for a maximum total of 8 points [5]. The fact that behaviors directly associated with HIV acquisition, such as condomless anal intercourse (1 point), have been weighted as significantly less important restricts the use of the score to settings where methamphetamines and inhaled nitrites are the primary drivers of the HIV epidemic (ie, the score may not be applicable to settings where other drugs such as ketamine, γ-hydroxybutyric acid [GHB], cocaine, or ecstasy are significant drivers of HIV risk). An abbreviated version of the Smith score—with similar limitations (ie, data were collected more than a decade ago in a clinical trial population using behavior reported for the 6 months before diagnosis, with inclusion of methamphetamine but exclusion of other drugs)—is currently recommended as a tool to target PrEP among MSM by the US Public Health Service [13].

It may be possible to derive a more robust model that predicts incident HIV acquisition risk by assessing contemporary risk behaviors reported in the period prior to diagnosis with AEH, not chronic infection. Here we aimed (1) to estimate the risk of AEH among MSM, designated the San Diego Early Test (SDET) score, and (2) to validate the SDET score and compare to the 2 previously published risk scores in a real-world population of MSM who underwent HIV testing between 2008 and 2014.

MATERIALS AND METHODS

This study represents an analysis of risk behavior reported for the 12 months prior to HIV screening in individuals who enrolled in the "Early Test" during the 2008–2014 study period. The Early Test is a community-based, confidential AEH screening program in San Diego, California, that provides point-of-care rapid HIV testing followed by reflex HIV NAAT in all antibody (Ab)–negative persons [14, 15]. Eligible participants included MSM diagnosed with AEH (acute: HIV NAAT$^+$/Ab$^-$ and early: HIV Ab$^+$/detuned HIV Ab consistent with infection <70 days [16, 17]) and those who were HIV uninfected. In repeat testers, data reported at the most recent Early Test encounter were used. Eligible participants were retrospectively randomized 2:1 to create a derivation and validation dataset, respectively. Risk behavior data reported for the 12 months prior to the Early Test encounter were used to calculate the SDET score.

Risk Score Development

For the risk model, we selected 7 binary variables based on simplicity and published epidemiological data that supported inclusion in the predictive model. The variables selected were (1) ≥10 partners within the last year [5, 18, 19], (2) self-reported bacterial STI during the last 12 months (syphilis, gonorrhea, or chlamydia) [20, 21], (3) the combination of condomless receptive anal intercourse (CRAI) and ≥5 male partners [22–24], (4) CRAI with an HIV-positive male [9, 18, 19], (5) CRAI with a person who injects drugs [9, 25], (6) injection drug use with shared needles [22, 26], and (7) noninjection stimulant drug use (NIDU, defined as use of methamphetamine, ketamine, cocaine, inhaled nitrites, Ecstasy, or GHB) [27, 28].

As recreational drugs used by MSM are somewhat unique by geographic location and time [29], a combined variable for NIDU was chosen. Published data suggest that methamphetamines and inhaled nitrites increase risk of HIV acquisition more than other drugs [19, 30]; thus, we also generated alternative models by substituting our combined variable (any stimulant NIDU) with reported use of either methamphetamines or inhaled nitrites.

Univariate and multivariate binary logistic regression analyses of the derivation dataset were conducted for the 7 risk variables, with AEH diagnosis used as the outcome. Odds ratios (ORs) including 95% confidence intervals (CIs) were calculated. Variables in the final model were selected with a forward stepwise procedure. Model discrimination was assessed by the goodness-of-fit Hosmer–Lemeshow statistic, and its predictive performance was assessed using receiver operating characteristic (ROC) analysis. Each significantly associated predictor in the multivariable model (P < .05, not adjusted for multiple comparisons) was assigned a point value that corresponded to its OR

Table 1. Comparison of the San Diego Early Test Score With the Smith Score and the Menza Score

	SDET Score					Smith Score					Menza Score				
Variables reported for previous 12 mo (weight)	1. CRAI with HIV-infected partner (3) 2. Combination CRAI plus ≥5 male partners (3) 3. ≥10 male partners (2) 4. Bacterial STI (2)					1. Intercourse with ≥1 or more HIV-infected partner(s) (6)[a,b] 2. CIAI with HIV-infected partner (3)[a,c] 3. CRAI (10)[a] 4. >10 male partners (7)[a] 5. 6–10 male partners (4)[a] 6. Methamphetamine use (5)[a] 7. Inhaled nitrites (3)[a] 8. Age 18–28 y (8) 9. Age 29–40 y (5) 10. Age 41–48 (2)					1. CAI with a serodiscordant partner (1) 2. ≥10 male partners (3) 3. Bacterial STI (4)[a] 4. Methamphetamine use or inhaled nitrites (11)[a]				
Cutoffs for AEH	Sens	Spec	PPV	NPV	DOR (95% CI)	Sens	Spec	PPV	NPV	DOR (95% CI)	Sens	Spec	PPV	NPV	DOR (95% CI)
Score ≥1	81%	49%	4%	99%	4.06 (2.82–5.85)	99%	4%	2%	99%	2.73 (.38–19.65)	73%	51%	3%	99%	2.81 (2.00–3.95)
Youden index (≥4 for SDET, ≥18 for Smith score[d], ≥2 Menza score[d])	58%	76%	6%	99%	4.56 (3.40–6.11)	69%	60%	4%	99%	3.40 (2.45–4.73)	67%	54%	3%	99%	2.42 (1.76–3.35)
Cutoff for a PPV approximately 10% (≥6 for SDET, ≥36 for Smith score, ≥19 Menza score)	34%	92%	10%	98%	6.16 (4.52–8.41)	7%	99%	10%	98%	5.39 (2.91–10.00)	3%	99%	9%	98%	4.37 (1.72–11.07)
Highest cutoff for a sensitivity approximately 20% (≥8 for SDET, ≥30 for Smith score, ≥12 Menza score)	23%	96%	12%	98%	7.27 (5.09–10.37)	20%	94%	7%	98%	4.14 (2.81–6.11)	22%	88%	4%	98%	2.10 (1.45–3.05)

Abbreviations: AEH, acute and early HIV infection; CAI, condomless anal intercourse; CI, confidence interval; CIAI, condomless insertive anal intercourse; CRAI, condomless receptive anal intercourse; DOR, diagnostic odds ratio; HIV, human immunodeficiency virus; NPV, negative predictive value; PPV, positive predictive value; SDET, San Diego Early Test; Sens, sensitivity; Spec, specificity; STI, sexually transmitted infection.

[a] Time period modified from previous 6 months (original score) to previous 12 months.

[b] Modification from original score necessary as number of HIV-infected male partners was not available (ie, median; originally 1 HIV-infected male partner was weighted with 4 points and ≥2 male partners with 8 points).

[c] Modification from original score necessary as number of HIV-infected male partners was not available (ie, median; originally CIAI with ≥5 HIV-infected male partners was weighted with 6 points and CIAI with less than 5 partners gave no score).

[d] Sources: Smith et al [11] and Menza et al [5].

rounded to the nearest whole integer. Integer scores were subsequently summed to give the SDET score for each patient.

Risk Score Validation

To test the validity of this new scoring system, we calculated the predictive potential of our new risk score for AEH in the validation dataset. Score performance was assessed by ROC analysis and area under the curve (AUC) values with 95% CIs. The same validation dataset was then used to compare the performance of the SDET score with scores derived using previously published risk score models [5, 11]. Slight modifications of both scores were necessary to fit our data (variables of all 3 scores as well as modifications are depicted in Table 1). AUCs were compared according to Hanley and McNeil's method [31]. Cutoff values were determined using the Youden index. Different cutoffs were compared using the diagnostic odds ratio (DOR) method.

In addition, performance of all 3 scores was compared using the whole study population (derivation and validation cohort), and for prediction of transmitted HIV drug resistance (TDR). Blood specimens were collected at the time of AEH diagnosis for drug resistance evaluation. Population sequencing of the partial HIV-1 *pol* coding region and genotypic analysis were performed, as previously described [15, 32]. Major drug resistance mutations were identified using the Stanford HIV Database Calibrated Population Resistance Tool version 6.0 (available at http://cpr.stanford.edu/cpr/index.html) [33]. The presence of 1 or more major resistance mutations in any drug class was considered to be TDR [34].

Finally, we developed an online assessment tool based on the SDET score categories.

For statistical analysis, SPSS 21 (SPSS Inc, Chicago, Illinois) was used. The University of California, San Diego Human Research Protections Program approved the study protocol, consent, and all study-related procedures. All study participants provided voluntary, written informed consent before any study procedures were undertaken.

RESULTS

A total of 8531 unique MSM underwent HIV screening during the study period. After exclusion of 205 newly diagnosed, chronically infected MSM (duration of infection >70 days), 8326 evaluable MSM were included in the analysis (200 with AEH [2.4%] and 8126 HIV-uninfected [97.6%]). The majority self-identified as white (67%), Asian (8%), and black (6%); 27% reported Hispanic ethnicity. Although there was no significant difference in race and number of previous tests, individuals with AEH were significantly younger (median, 30 [interquartile range {IQR}, 25–40] years vs 33 [IQR, 27–43] years, $P = .001$) than those who remained HIV uninfected. Data derived from evaluable participants were then randomly split (2:1) into scoring derivation (n = 5568) and validation (n = 2758) datasets.

Derivation Dataset

A total of 137 men with AEH were included in the derivation dataset of 5568 MSM. Each of the 7 selected risk variables (Table 2) were significantly associated with AEH in univariate analysis (Table 2). Results of the multivariable binary logistic regression model are shown in Table 2. The Hosmer–Lemeshow χ^2 was 2.176 ($P = .703$), and the AUC was 0.741 (95% CI, .697–.786) for the model.

Four different risk behavior variables (Table 2) were identified as independent predictors of AEH and therefore assigned a point value that corresponded to their OR rounded to the

Table 2. Model of Risk Variables Associated With Acute and Early Human Immunodeficiency Virus Infection in Men Who Have Sex With Men[a]

Risk Variable[b]	Univariate Analysis			Multivariable Binary Logistic Regression Model				
	OR	95% CI	P Value	OR	95% CI	P Value	Coefficient β	Weight for Risk Score[c]
≥10 male partners	2.615	1.857–3.682	<.001	1.568	1.058–2.323	.025	0.450	2
CRAI and ≥5 male partners	4.144	2.903–5.914	<.001	2.725	1.796–4.137	<.001	1.003	3
CRAI with HIV-infected partner[d]	4.961	3.384–7.272	<.001	3.230	2.156–4.841	<.001	1.173	3
Bacterial STI	2.422	1.592–3.683	<.001	1.695	1.087–2.645	.020	0.528	2
CRAI with PWID	4.810	2.580–8.966	<.001			.241		
NIDU[e]	1.826	1.291–2.382	.001			.804		. . .
IDU with shared needles	3.358	1.194–9.446	.022			.444		. . .

Abbreviations: CI, confidence interval; CRAI, condomless receptive anal intercourse; GHB, γ-hydroxybutyric acid; HIV, human immunodeficiency virus; IDU, injection drug use; NIDU, noninjection stimulant drug use; OR, odds ratio; PWID, person who injects drugs; STI, sexually transmitted infection.

[a] Obtained by using data for individuals with no missing covariate values (ie, 98.1% of individuals included in derivation cohort).

[b] Within the 12 months prior to HIV test encounter.

[c] Calculated for significant predictors by assigning a point value that corresponded to the OR rounded to the nearest whole integer.

[d] Defined as either reporting CRAI with an HIV-infected partner or failing to report condom use during receptive anal intercourse with an HIV-infected partner.

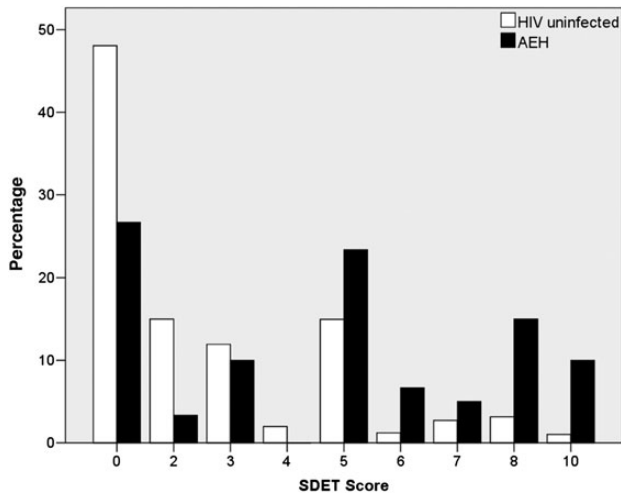[e] Methamphetamine, cocaine, poppers, GHB, ketamine, Ecstasy.

Figure 1. Distribution of San Diego Early Test (SDET) score in the validation cohort in human immunodeficiency virus (HIV)–uninfected individuals (white bars) and those with acute and early HIV (AEH) infection (black bars).

nearest whole integer. The corresponding integer score assignments are displayed in Table 2. The AUC for the score for prediction of AEH was 0.740 (95% CI, .696–.785).

The derived risk score remained unchanged when replacing the combined NIDU variable with methamphetamine use and/or inhaled nitrites alone (data not shown). None of these replacement variables was a significant predictor of AEH in the multivariable analysis. Therefore, the alternative models were discarded.

Validation of SDET Score

The dataset derived from the remaining 2758 of 8326 (33%) men, including 63 with AEH (31.5% of all AEH), were used for model validation. The median SDET scores for those with AEH were 5 (IQR, 0–8) compared with 2 (IQR, 0–4) for HIV-uninfected persons (*P* < .001, Mann–Whitney *U* test). Distribution of SDET scores in those with AEH and those without AEH are depicted in Figure 1. The prevalence of AEH was highly correlated with the SDET score (Table 3). In particular, MSM with a score of ≥5 had a 5 times higher prevalence of AEH (prevalence of 1.2% in those with a score between 0 and 4 vs 5.7% in those with a score of ≥5). Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and DOR for 6 SDET score cutoffs are depicted in Table 3. The ROC curve analysis revealed an AUC of 0.703 (95% CI, .625–.781) for AEH prediction in the validation cohort.

Comparisons of the SDET Score With Other Scores

The same validation dataset was applied to 2 previously published risk score models, and ROC curve analysis found AUCs of 0.629 (95% CI, .547–.710) for the Menza score [5], and 0.731 (95% CI, .662–.801) for the Smith score [11]. The difference between the AUC of the SDET score and the 2 other scores was not significant in the validation cohort.

When comparing performance of scores in the whole study population (ie, derivation and validation cohort), the SDET score (AUC, 0.728 [95% CI, .689–.767]; *P* < .001) and the score by Smith (AUC, 0.703 [95% CI, .665–.741]; *P* = .008) were both significantly more discriminative than the Menza

Table 3. Application of the San Diego Early Test Score to the Validation Cohort[a]

SDET Score	Men, No. (%)	Incident HIV Infection, No. (%)	Incident HIV Infection Prevalence	Prevalence of Incident Infection in Derivation Cohort
Total	2640	60	2.27%	2.44%
0–2	1645 (62)	18 (30)	1.09%	1.07%
3–4	365 (14)	6 (19)	1.64%	2.90%
5	400 (15)	14 (23)	3.50%	4.00%
6–7	108 (4)	7 (12)	6.48%	6.70%
8	90 (3)	9 (15)	10.00%	12.57%
10	32 (1)	6 (10)	18.75%	12.24%

Cutoffs for AEH in the Validation Cohort, Score	Sensitivity	Specificity	PPV	NPV	DOR (95% CI)
≥1	73%	48%	3%	99%	2.54 (1.42–4.53)
≥3	70%	63%	4%	99%	3.98 (2.28–6.96)
≥5	60%	77%	6%	99%	5.02 (2.97–8.47)
≥6	37%	92%	10%	98%	6.60 (3.83–11.37)
≥8	25%	96%	12%	98%	7.70 (4.16–14.26)
≥10	10%	99%	19%	98%	10.91 (4.32–27.6)

Abbreviations: AEH, acute and early HIV infection; CI, confidence interval; DOR, diagnostic odds ratio; HIV, human immunodeficiency virus; NPV, negative predictive value; PPV, positive predictive value; SDET, San Diego Early Test.

[a] Applied to individuals with no missing variables of the SDET risk score (ie, 97.9% of individuals included in validation cohort).
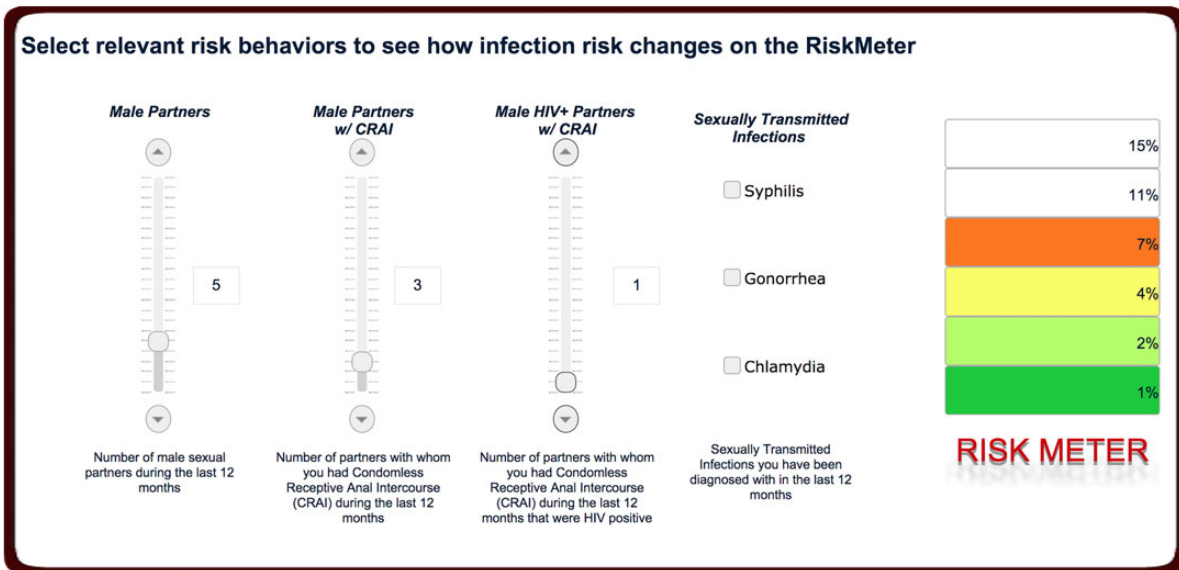
Figure 2. The San Diego Early Test (SDET) score online tool with intuitive sliders (track bars) that allow users to easily select relevant risk behaviors across the 4 dimensions central to the SDET score. After answering some basic demographic questions (used to anonymously map reported risk behavior to population-level data), users will select their risk behaviors. Once this is set, they will receive immediate feedback in terms of their current human immunodeficiency virus (HIV) risk, as indicated by the colored bars on the "risk meter." After users receive their risk score, the online SDET tool invites them to explore how their risk changes when they change behavior. By moving the scroll bars, users see the direct impact of behavior change on their HIV risk score. If users agree, the tool automatically sends each user a reminder to participate again 12 months later, which will allow exploration of linkage between increased risk awareness and effective behavior change. Available at http://sdet.ucsd.edu.

score (AUC, 0.634 [95% CI, .593–.676]). Sensitivities, specificities, PPVs, NPVs, and DORs of the 3 scores are depicted in Table 1.

TDR was detected in 15 of 131 (11.5%) AEH cases. SDET scores were higher for those with TDR than for those without TDR (median, 7 [IQR, 5–8] vs 5 [IQR, 2–7]; $P = .006$). There was no significant difference found for the other 2 scores. Sensitivity, specificity, PPV, NPV, and DOR for an SDET score of ≥6 (determined by Youden index) for prediction of TDR were 67%, 70%, 23%, 94%, and 4.72 (95% CI, 1.5–14.9), respectively. ROC curve analysis revealed an AUC of 0.717 (95% CI, .586–.848) for prediction of TDR in AEH cases.

Figure 2 shows our online tool, which is freely available at http://sdet.ucsd.edu and can be used by providers and MSM to assess HIV risk.

DISCUSSION

We used clinical and behavioral data collected with an AEH screening program during a 6-year period to construct and validate a simple multivariable risk behavior score predictive of AEH among MSM. The SDET score excludes demographics and focuses instead on relevant current risk variables directly associated with HIV acquisition among MSM: CRAI, number of male partners within the previous 12 months, and bacterial

STIs (Table 2). In contrast to previously published scores [5, 11, 13], NIDU, methamphetamine, and inhaled nitrite use were nonsignificant predictors of AEH in multivariate analysis. Although it has been demonstrated that recreational drugs such as methamphetamine or nitrites may increase sexual risk behavior such as CRAI [30, 35], which is captured in the SDET score, their usage rates change depending on geographic location [29, 36, 37]. In addition, methamphetamine use has recently been decreasing in many settings whereas sexual risk behaviors are steadily increasing [37, 38]. The fact that the SDET score focuses on sexual risk behavior instead of substance use therefore may be considered a strength, as the score is independent of regional drug use behavior and thus may be more broadly applicable to different MSM populations (as changes in sexual risk behavior associated with NIDU will still be captured). In addition, the predictors of AEH that we identified are consistent with the biology and transmission of HIV infection. The associations of AEH with multiple sexual partners, CRAI with and without high-risk partners, and concurrent bacterial STI have all previously been shown to correspond to an increased likelihood of recent HIV exposure [5, 18, 21, 24]. We therefore propose the SDET score as a straightforward and easy-to-use scoring modality that might not only help to better focus and prioritize prevention resources (such as NAAT screening or PrEP; an SDET score of ≥5 was associated with an AEH prevalence of 5.7% and

a sensitivity of 60% for AEH) in similar metropolitan populations of MSM around the world, but may also help researchers identify MSM at high risk of HIV infection for prevention trials with HIV acquisition as the primary outcome or SDET score as an outcome of harm reduction interventions in HIV-uninfected populations.

Overall, the SDET score showed a fair potential not only for predicting AEH but also for predicting TDR among those with AEH. At a cutoff of 6, the score exhibited an NPV of 94% for TDR among AEH cases. The association of TDR in persons with higher AEH risk may reflect exposure to sexual partners more likely to be HIV infected and failure of (or previous) antiretroviral therapy (ART). The SDET score may therefore help guiding immediate ART (ie, before baseline resistance testing results are available) in those with AEH, which is important in terms of preserving immune function, minimizing latent HIV reservoir, and preventing further transmissions [15, 39].

We also validated 2 previously published risk scores (validated in clinical trial cohorts from the 1990s) for the first time in a real-world population of MSM self-selecting to receive HIV screening. The SDET algorithm performed better than the Menza score for prediction of AEH [5], and was comparable to the Smith score [11]. We confirmed that a slightly modified version of the score by Smith was still useful more than a decade later (the AUC for HIV acquisition was 0.703 for our cohort vs 0.721 for the original clinical trial validation cohort). However, in contrast to the more complex Smith score, which contains 11 score categories, the SDET score might be considered simpler (only 4 score categories), suggesting that the SDET score has identified the most critical drivers that predict AEH. The SDET score may thus be more broadly applicable (independent of regional drug use behavior, no demographic variables) to MSM populations in urban settings. There were also important differences between the 2 previously published scores: In the Menza score, methamphetamine and inhaled nitrites were weighted as the most important variables, whereas in the score by Smith, their weight was significantly reduced. This may have contributed to the better performance of the Smith score compared with the Menza score for AEH. In contrast to the SDET score, neither one of the previously published scores was able to predict TDR.

Our study is subject to important limitations including its single-center and retrospective design, and the relatively small number of AEH cases. Optimally, the SDET score should undergo additional validation in other US and international populations to confirm its accuracy. Also, our development and validation samples were composed mostly of white and Hispanic MSM; thus, the results may be less generalizable to populations consisting of persons with different racial and ethnic demographics. Finally, some modifications of the 2 previous risk scores were necessary to fit our data and our analyses, potentially influencing performance of these scoring models.

In conclusion, our SDET score provides an easy-to-use scoring modality predictive of AEH and TDR in MSM populations, which may be less subject to regional patterns of illicit drug use than previously published scoring estimates. This scoring algorithm and its availability as an online scoring tool may be useful to clinicians and others in counseling MSM about their risk of HIV infection. By using a cutoff of 5, the score may help to identify persons who require more intensive prevention interventions such as PrEP or more frequent NAAT testing, while a cutoff of 6 may be helpful in guiding immediate ART in those with AEH.

Notes

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