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Expanded HIV Testing and Finding the Undiagnosed: Challenges, Insights, and Successes

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Overview

- Background
- Challenges: Expanded HIV testing in the ED
- Insights: Serosurvey
- Successes: Inpatient HIV testing
- Conclusions

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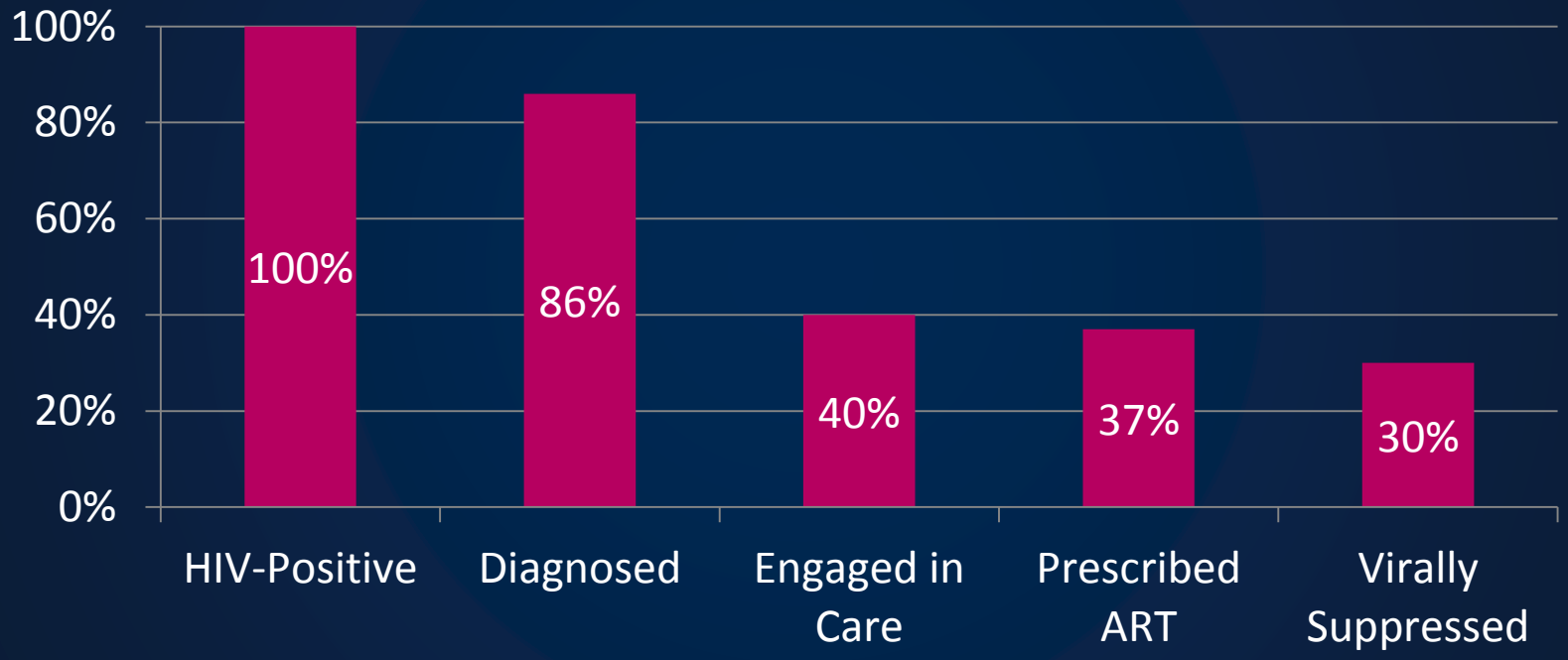
HIV Care Continuum: 2011



CDC. Vital Signs, *MMWR.* 2014

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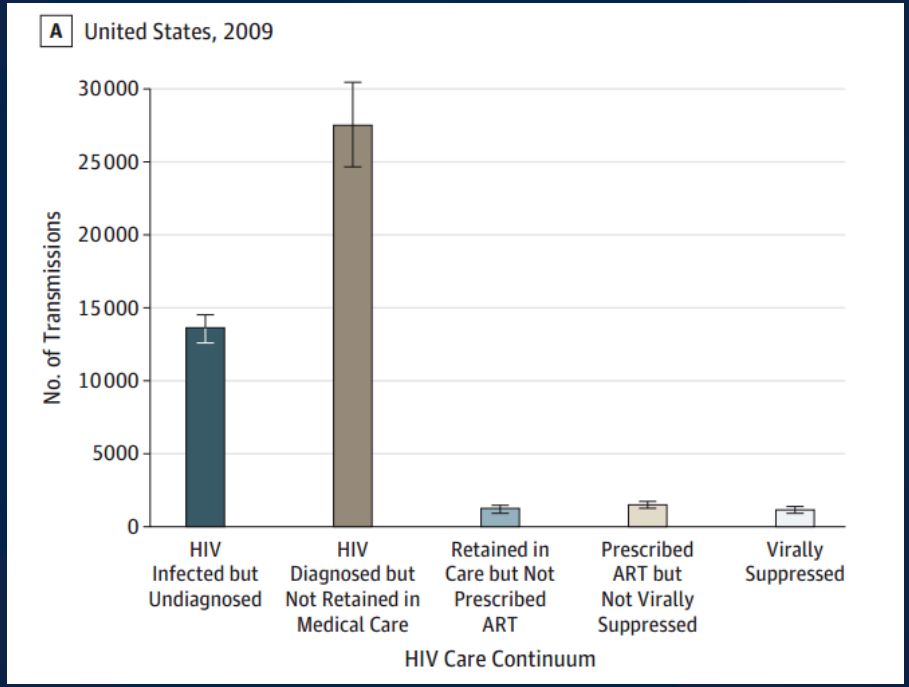
Why Undiagnosed HIV Matters:



Skarbinski, et al. JAMA Int Med, 2015.

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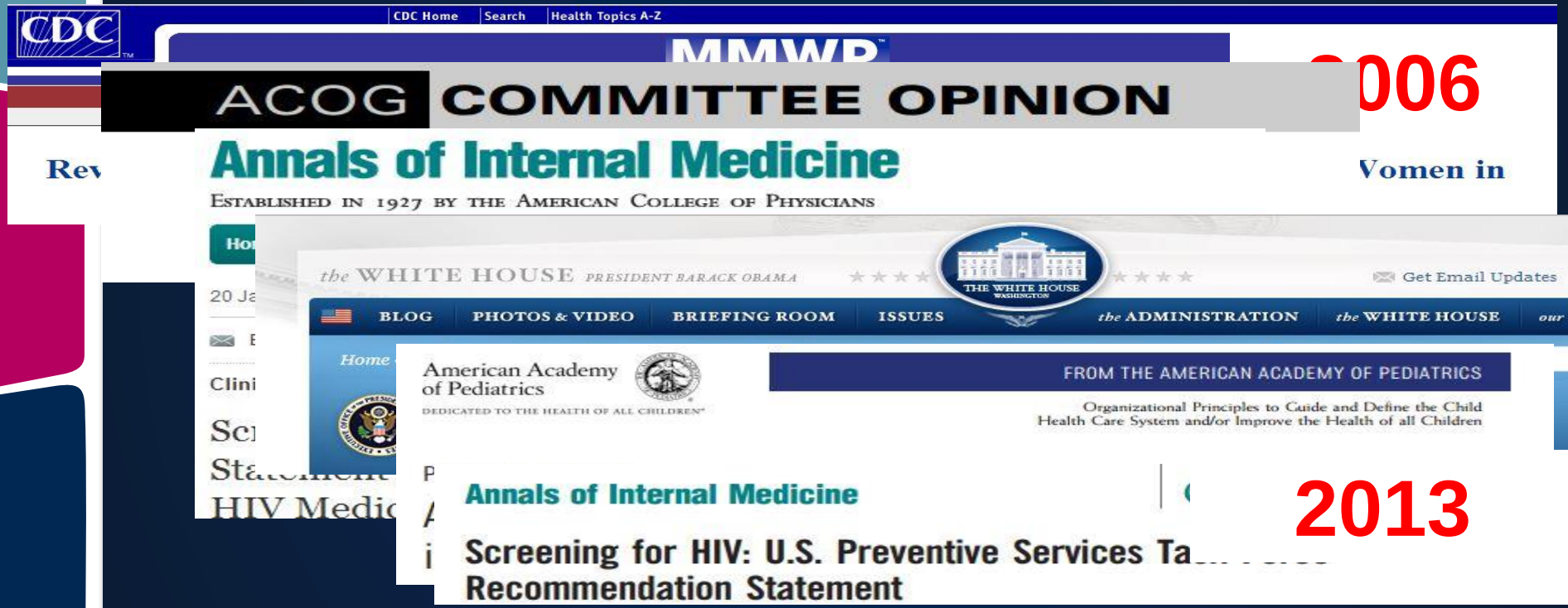
Background



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Montefiore Health System

- Largest health system in the Bronx, NY
  - HIV prevalence in the Bronx: 2%
  - Shared EMR across sites:
    - >700K primary care visits/year
    - >275K ED visits/year
    - >80K adult inpatient admissions/year
    - >50k patients tested for HIV annually

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Challenge: Expanded Testing in the ED

- 2011-2013: 5% of ED patients 21-64 tested for HIV
- Routine Testing implemented Nov 2013:
  - Strategy developed by multidisciplinary task force
    - Opt-in offer by primary nurse
    - Emphasis on lab-based testing rather than POC
    - Follow-up of results by non-ED staff using cumulative, web-based report

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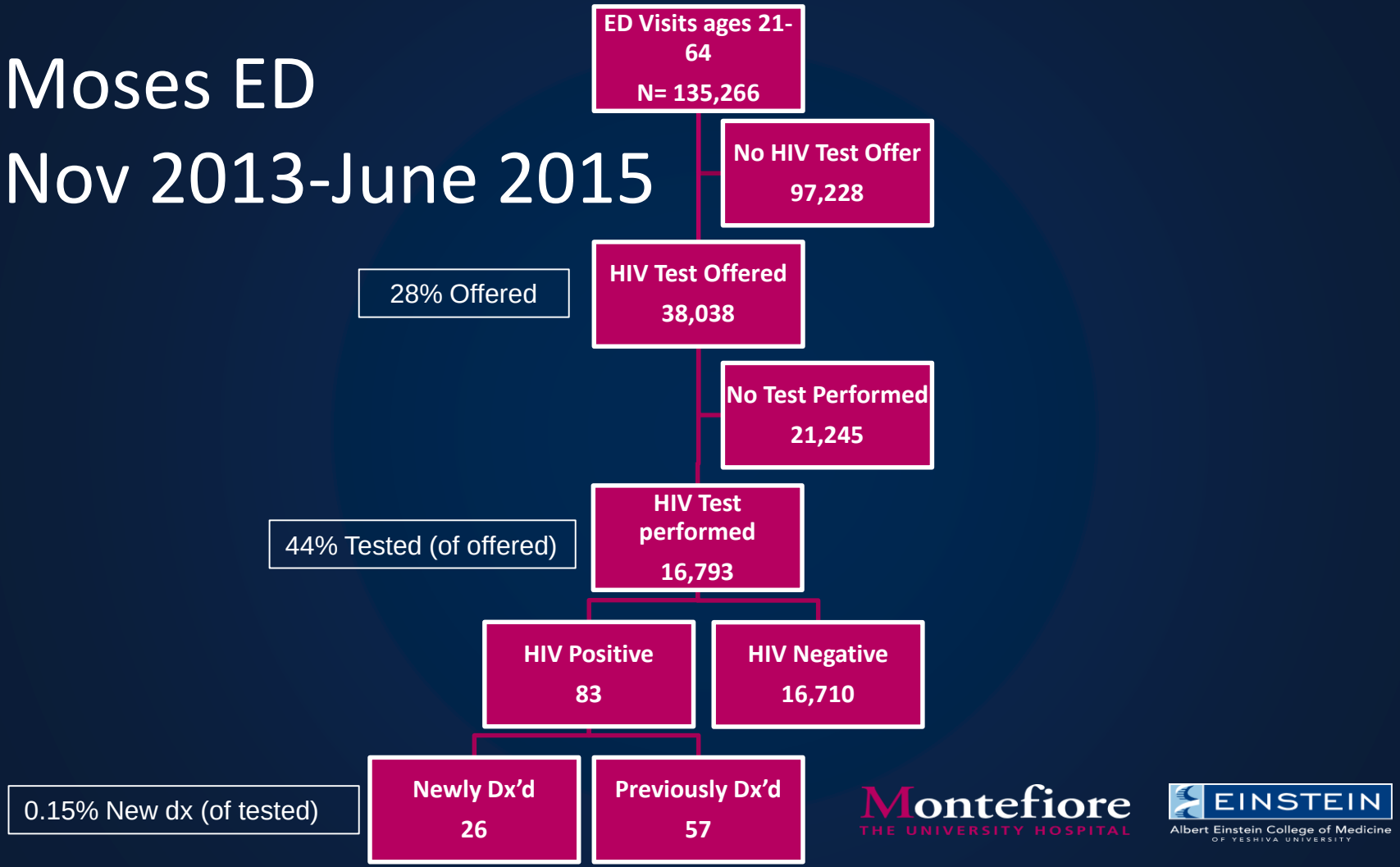
Moses ED
Nov 2013-June 2015



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Another way to look at it. . .

- 135,266 visits made by 78,096 *unique patients*
  - 26 new diagnoses/ 78,096 patients
    - =33 new dx/ 100,000 patients

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Challenge: Is this effective?

- Need to know prevalence of undiagnosed HIV
  - Extrapolate from cascade of care?
  - 2010 Jacobi ED serosurvey:
    - 14 undx'd HIV / 3,373 patients
      - = 415 undx'd/ 100,000 patients (!)

Eavey,et al. Abstract #TUPE282, IAC 2012.

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Where are the Undiagnosed?

- Not present?
- Not offered testing?
- Not tested?

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Insights: Serosurvey

- Collaboration with NYC DOHMH
- 8 weeks, March 2015-May 2015:
  - Collection of remnant blood specimens from central lab of all patients >=21 seen in Moses ED
    - 63% of ED patients get blood drawn
  - Demographics extracted from EMR
  - ED census matched to DOHMH HIV registry to account for known HIV pos
  - All adequate specimens tested for HIV after stripping identifiers

Torian,et al. Abstract #903, CROI 2017.

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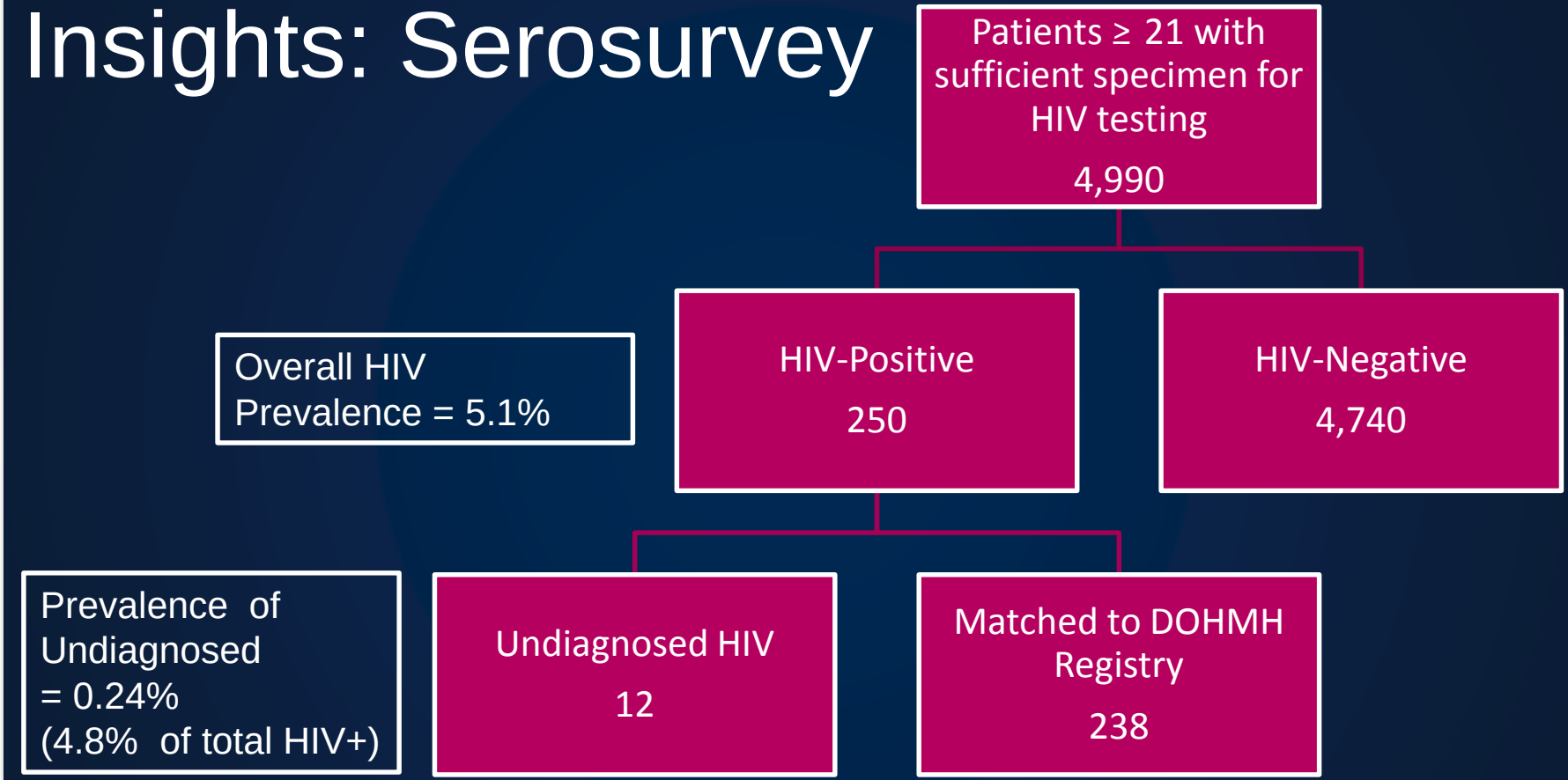
Insights: Serosurvey



Torian,et al. Abstract #903, CROI 2017.

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Insights: Serosurvey

	HIV Negative (n= 4,740)	Undx'd HIV (n= 12)	P
	n (%)	n (%)	
Sex			0.149
Female	2,952 (62.3)	5 (41.7)	
Male	1,788 (37.7)	7 (58.3)	
Age (category)			0.659
21-29	775 (16.4)	2 (16.7)	
30-39	741 (15.6)	1 (8.3)	
40-49	730 (15.4)	3 (25.0)	
50-59	894 (18.9)	4 (33.3)	
60-64	409 (8.6)	0 (0.0)	
65+	1,191 (25.1)	2 (16.7)	
Race/ethnicity			0.312
Hispanic	2,552 (53.8)	5 (41.7)	
Black, non-Hispanic	1,490 (31.4)	5 (41.7)	
White, non-Hispanic	309 (6.5)	0 (0.0)	
Asian, non-Hispanic	85 (1.8)	0 (0.0)	
Other	210 (4.4)	1 (8.3)	
Unknown/Missing	94 (2.0)	1 (8.3)	

Torian,et al. Abstract #903, CROI 2017.

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Insights: Serosurvey

- 12 patients had undiagnosed HIV, were they identified through routine testing in the ED?
  - Were they offered testing?
  - Did they consent to testing?

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Insights: Serosurvey

	HIV Negative (n= 4,740)	Undx'd HIV (n= 12)	P
Offered routine HIV test in ED			0.125
Yes	1,397 (29.5)	6 (50.0)	
No	3,343 (70.5)	6 (50.0)	
Consented to HIV test*			>0.999
Yes	541 (38.7)	2 (33.3)	
No	856 (61.3)	4 (66.7)	
*Among those offered (N=1,403)			

Only 2 of 12 patients (16.7%) with undx'd HIV were identified through routine testing

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Insights: Serosurvey

- Undx'd HIV is present, but the vast majority is missed
- Identifying patients with undx'd HIV requires increased testing across all demographic subgroups

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Successes: Expanded Inpatient Testing

- Modeled on 2006 CDC HIV Testing Recs
  - Test those with no prior HIV test
  - Re-test those with high-risk diagnoses
- EMR-based clinical decision support
  - Automated prompt recommending testing
  - Automatic addition of HIV testing order set

Felsen,et al. JAIDS, 2017. In Press.

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Name: ABBBSTAN, Aprone

MR#:	03705711	**Gender:**	M	**DOB - Age:**	1-Apr1979=34
Floor:	F6B	**Room Bed:**	F683-B	**Bed Phone:**	3256
PCP:	TEST, MD ONE	**Attending:**	WARD, TIM	**ADMD LOS:**	1-Apr13=218

HIV INPATIENT SCREENING

OFFER HIV TEST

- [ ] HIV test with consent by COUNSELOR
- [ ] HIV test with consent by ORDERING PROVIDER

*** HIV TEST NOT INDICATED***

- [ ] PATIENT REPORTS HIV POSITIVE STATUS
- [ ] PATIENT DECLINES HIV TEST
- [ ] PT CURRENTLY UNSTABLE/LACKS CAPACITY
- [ ] PT PERMANENTLY WITHOUT CAPACITY AND NO SURROGATE
- [ ] PT TERMINALLY ILL

New York State law mandates offering an HIV test to all inpatients 13-64 and recommends retesting those at high risk for HIV.

Selecting "HIV test with consent by COUNSELOR" sends an order to a certified counselor to speak with the patient M-F 9am-5pm.
If patient accepts testing, counselors will obtain consent, order phlebotomy, and follow up on all tests they perform.

Start Date: 5-NOV2013 Time: 1052

Ordered By: MAHDAD, YASSINE Order Mode: E

Signed By: MAHDAD, YASSINE

Cancel

Process

Outcomes

1. Proportion of hospital admissions during which an HIV test was performed
2. Rate of new HIV diagnoses made by screening

Felsen,et al. JAIDS, 2017. In Press.

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Pre-Post Study

"Standard Testing" vs. "Enhanced Testing"

EMR Support	✗	✓
Provider-initiated Testing	✓	✓
Counselor-initiated Testing	✓	✓
Opt-in consent	✓	✓
Lab-based testing	✓	✓

Felsen,et al. JAIDS, 2017. In Press.

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Patients

- Inclusion
  - 21 – 64 years old
  - Admission to any of 3 adult hospitals
- Exclusion
  - HIV test performed during ED portion of hospitalization
  - Admission to obstetrics

Felsen,et al. JAIDS, 2017. In Press.

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Data Collection

- EMR
- Manual chart review of all patients with pos HIV test
  - Differentiate whether test sent for purpose of confirmation, diagnosis, or screening

Felsen,et al. JAIDS, 2017. In Press.

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Classifying Positive HIV Tests

	Chart review criteria
Confirmatory	Documentation that patient known to be HIV+ prior to return of HIV test result
Diagnostic	Documentation that HIV was diagnostic consideration prior to return of HIV test result
Screening	No documentation that patient known to be HIV positive or that HIV a diagnostic consideration prior to return of HIV test result

Felsen,et al. JAIDS, 2017. In Press.

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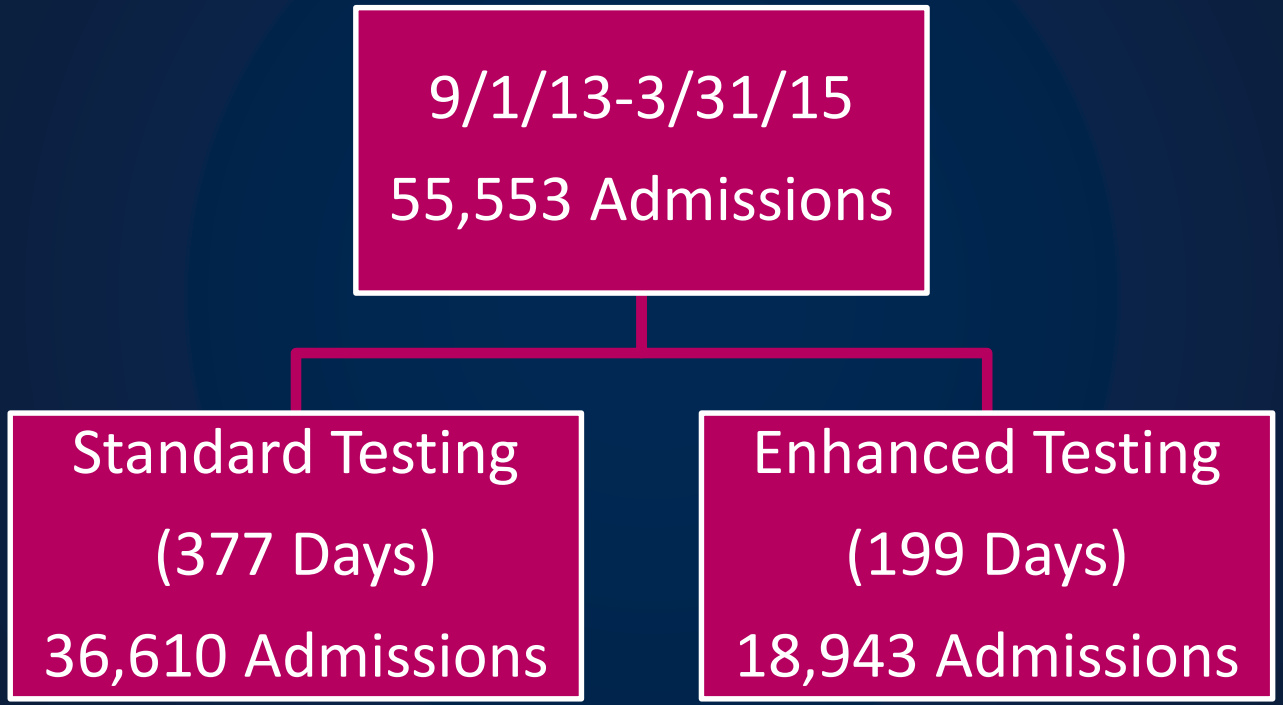
Results



Felsen,et al. JAIDS, 2017. In Press.

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Patient Characteristics

	Standard Testing (377 Days) N= 36,610 (%)	Enhanced Testing (199 Days) N= 18,943 (%)	p
Sex			0.47
Female	55	55	
Age (median years, IQR)	51 (40-58)	51 (41-58)	<0.001
Race/ethnicity			0.62
Hispanic	43	44	
Black	36	36	
White	11	10	
Other/Missing	10	10	
Insurance			<0.001
Public	70	70	
Private	26	26	
Other/Missing	4	5	
Admission Service			0.71
Medicine	67	67	
Surgery	23	23	
Other	10	10	
Length of stay (median days, IQR)	3 (2-6)	3 (2-6)	<0.001

Felsen,et al. JAIDS, 2017. In Press.

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HIV Status at Time of Admission

	Standard Testing (377 Days) N= 36,610 (%)	Enhanced Testing (199 Days) N= 18,943 (%)	p
HIV Status			<0.001
HIV-Positive	7	6	
No prior HIV test	52	49	
HIV-Negative	41	45	
With subsequent high-risk diagnosis	--	18	

Felsen,et al. JAIDS, 2017. In Press.

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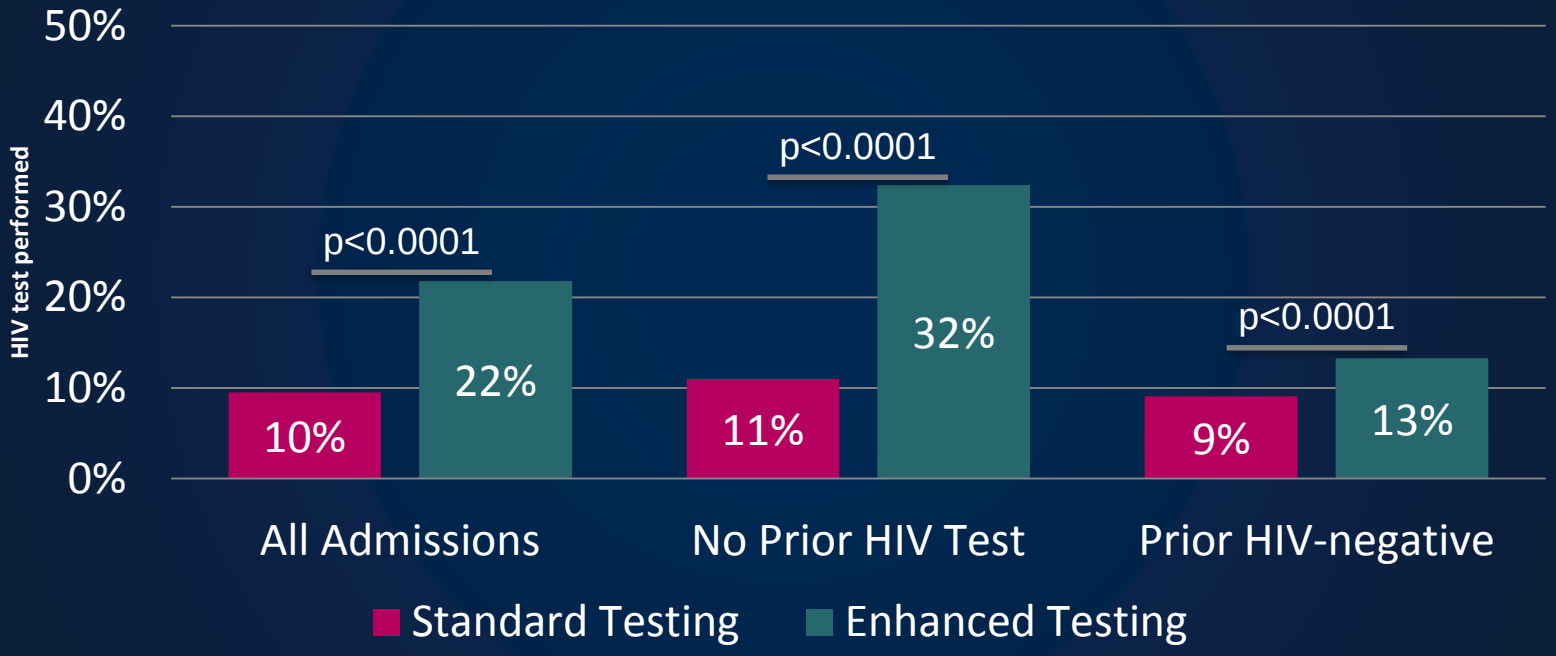
HIV testing increased



Felsen,et al. JAIDS, 2017. In Press.

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New HIV diagnoses made by screening increased

	Standard Testing (377 Days) N= 36,610		Enhanced Testing (199 Days) N= 18,943			
	Observed HIV+ Tests	Rate per 100,000 admissions	Observed HIV+ Tests	Rate per 100,000 admissions	Odds Ratio (95% CI)	p
Screening						
Diagnostic						
Confirmatory						

Felsen,et al. JAIDS, 2017. In Press.

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Comparison across strategies

Site/Strategy	# Unique Pts	# New dx	Rate new dx/100,000 pts
ED (“routine” testing)	78,096	26	33.3
Inpatient (standard)	24,906	29 (3 screen+26 diagnostic)	116.4
Inpatient (enhanced)	10,987	17 (7 screen + 10 diagnostic)	154.8
ED Serosurvey	4,990	12	240.5

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Inpatient Testing: Conclusions

- EMR was successfully adapted to support recommendations for expanded HIV testing
- EMR-enhanced HIV testing strategy associated with:
  - Increased testing among those with and without prior testing
  - 3.5-fold increase in likelihood of making new diagnoses by screening
- Progress towards uncovering population of undiagnosed, but substantial numbers still leaving untested

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Linkage to Care: Inpatient

- Virology lab emails all ordering provider for confirmed positive tests, cc's Med Director for HIV testing
- Counselors follow-up on all tests they send
- Goal: LTC appointment within 1-2 weeks from discharge
  - Counselors and SWs call all new patients ahead of scheduled appointments

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Linkage to Care: Emergency Dept

- Cumulative, web-based, secure report of all positive tests accessed daily
- Counselors contact patients for in-person post-test counseling
- Linkage to care initiated with delivery of post-test counseling (same day when possible)
- DOHMH Field Services unit contacted when patient can’t be reached

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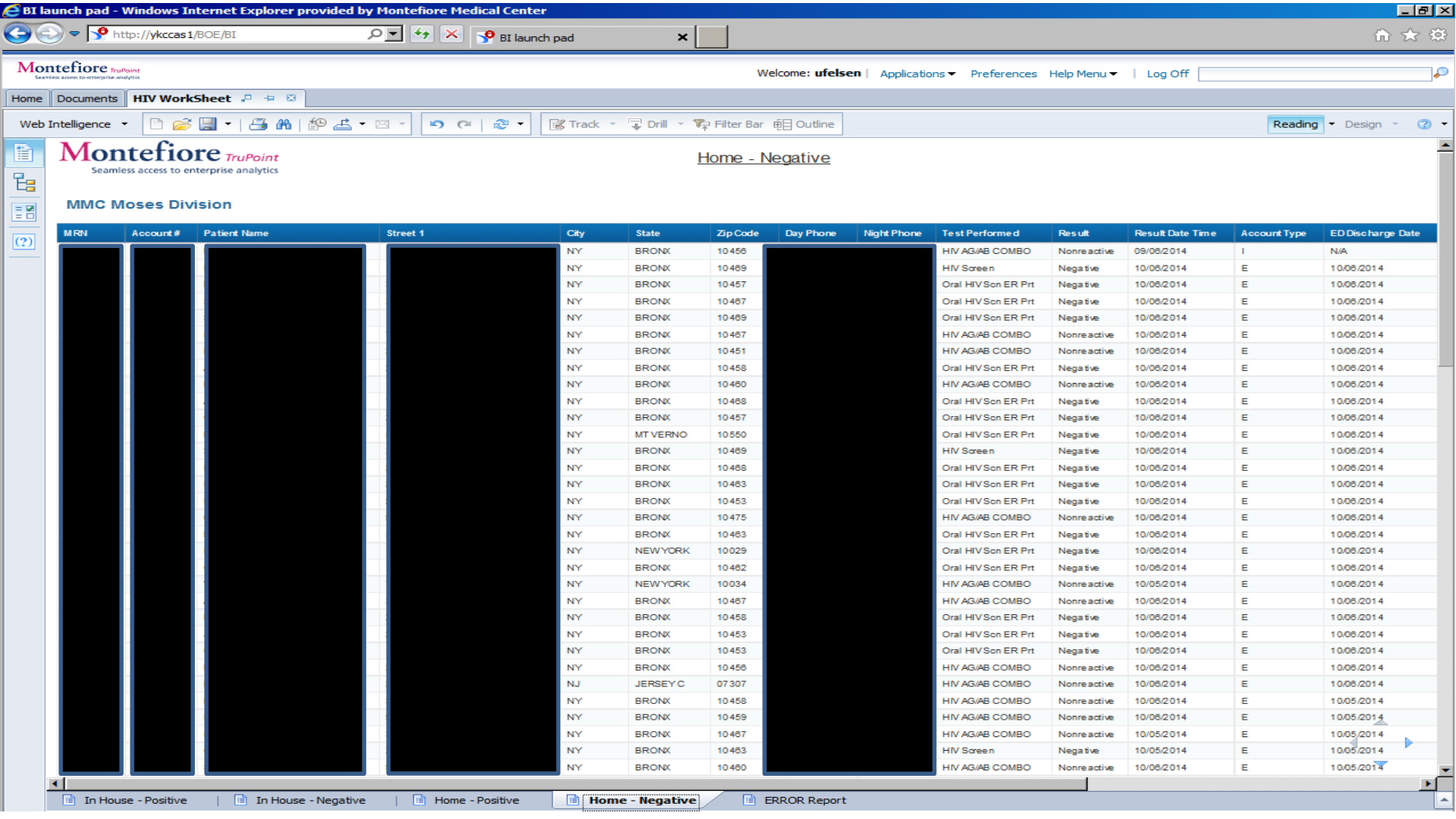
BI launch pad - Windows Internet Explorer provided by Montefiore Medical Center
http://ykccas1/BOE/BI
BI launch pad
Montefiore TruPoint
Seamless access to enterprise analytics
Welcome: ufelsen | Applications | Preferences | Help Menu | Log Off
Home | Documents | HIV WorkSheet
Web Intelligence | Track | Drill | Filter Bar | Outline | Reading | Design
Montefiore TruPoint
Seamless access to enterprise analytics
Home - Negative
MMC Moses Division
MRN | Account # | Patient Name | Street 1 | City | State | Zip Code | Day Phone | Night Phone | Test Performed | Result | Result Date Time | Account Type | ED Discharge Date
NY BRONX 10456 HIV AG/AB COMBO Nonreactive 09/06/2014 I N/A
NY BRONX 10469 HIV Screen Negative 10/06/2014 E 10/06/2014
NY BRONX 10457 Oral HIV Scn ER Prt Negative 10/06/2014 E 10/06/2014
NY BRONX 10467 Oral HIV Scn ER Prt Negative 10/06/2014 E 10/06/2014
NY BRONX 10469 Oral HIV Scn ER Prt Negative 10/06/2014 E 10/06/2014
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NY BRONX 10451 HIV AG/AB COMBO Nonreactive 10/06/2014 E 10/06/2014
NY BRONX 10458 Oral HIV Scn ER Prt Negative 10/06/2014 E 10/06/2014
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NY BRONX 10457 Oral HIV Scn ER Prt Negative 10/06/2014 E 10/06/2014
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NJ JERSEY C 07307 HIV AG/AB COMBO Nonreactive 10/06/2014 E 10/06/2014
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NY BRONX 10467 HIV AG/AB COMBO Nonreactive 10/05/2014 E 10/05/2014
NY BRONX 10463 HIV Screen Negative 10/05/2014 E 10/05/2014
NY BRONX 10460 HIV AG/AB COMBO Nonreactive 10/06/2014 E 10/05/2014
In House - Positive | In House - Negative | Home - Positive | Home - Negative | ERROR Report

Conclusions

- Prevalence of undiagnosed HIV improved but still too high
  - Serosurvey reflects ED population, what about those not accessing care?
- Not all expanded testing strategies are equally effective
  - Different contexts and workflows associated with different testing “cascades” (i.e. rates of offer, consent, and new diagnoses)
  - EMR a useful tool for implementing system level change
- Diagnosis is not the endpoint
  - Effective testing strategies require effective LTC and adherence strategies to EtE

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Thank You

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Acknowledgments

- Barry Zingman, MD
- Chinazo Cunningham, MD MS
- Moonseong Heo, PhD
- Donna Futterman, MD
- Jeffrey Weiss, MD
- Lucia Torian, PhD (NYC DOHMH)
- Montefiore AIDS Center HIV Counseling and Testing team
- Montefiore Information Technology
- Montefiore ED Leadership

- NYC Dept of Health and Mental Hygiene/ Public Health Solutions contract 13-SLC-165
- K23MH106386

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Expanded Inpatient HIV Testing

- Determine the impact of an HIV testing strategy enhanced by automated electronic medical record (EMR) support on:
  1. Rate of HIV testing among hospitalized patients
  2. Rate of new HIV diagnoses made by screening

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Lessons Learned

- Barriers to routine testing remain:
  - Systemic – consent requirements
  - Provider - behavior difficult to change
  - Patient - high rates of decline

- Provider behaviors difficult to change, automate when possible
- Integration with provider workflow is critical

Study Design

- Pre-Post study:
  - “Standard Testing” vs. “Enhanced Testing”

    (No EMR Prompt) *(EMR Prompt Active)*
- Outcomes:
  - Primary:
    - Proportion of admissions with HIV test performed
  - Secondary:
    - Differences in characteristics of patients tested
    - Rate of new diagnoses made by screening

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Background

- Tested strategies include:
  - Revisions of consent
  - Workflow adaptations
  - EMR prompts
- Generally focus on outpatient and Emergency Department

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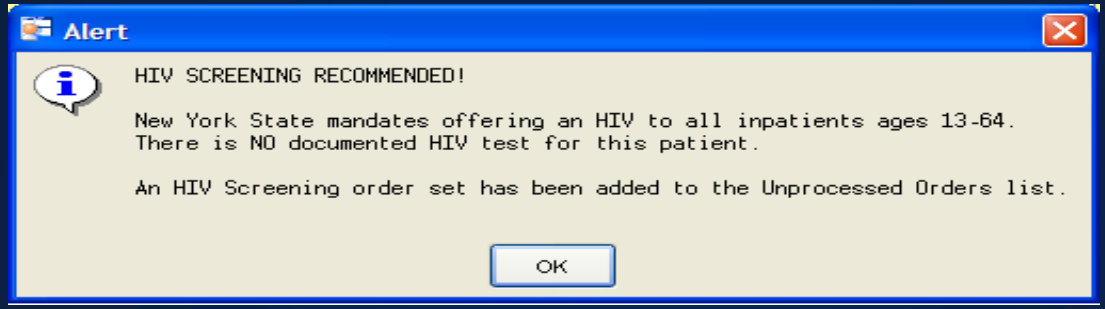
Intervention



- No prior HIV test
- High risk diagnoses subsequent to last negative HIV test
  - Acute STIs
  - Hepatitis B, C
  - Substance abuse
  - HIV “indicator” diagnoses
    - Eg: AIDS-related conditions, certain malignancies, leukopenia

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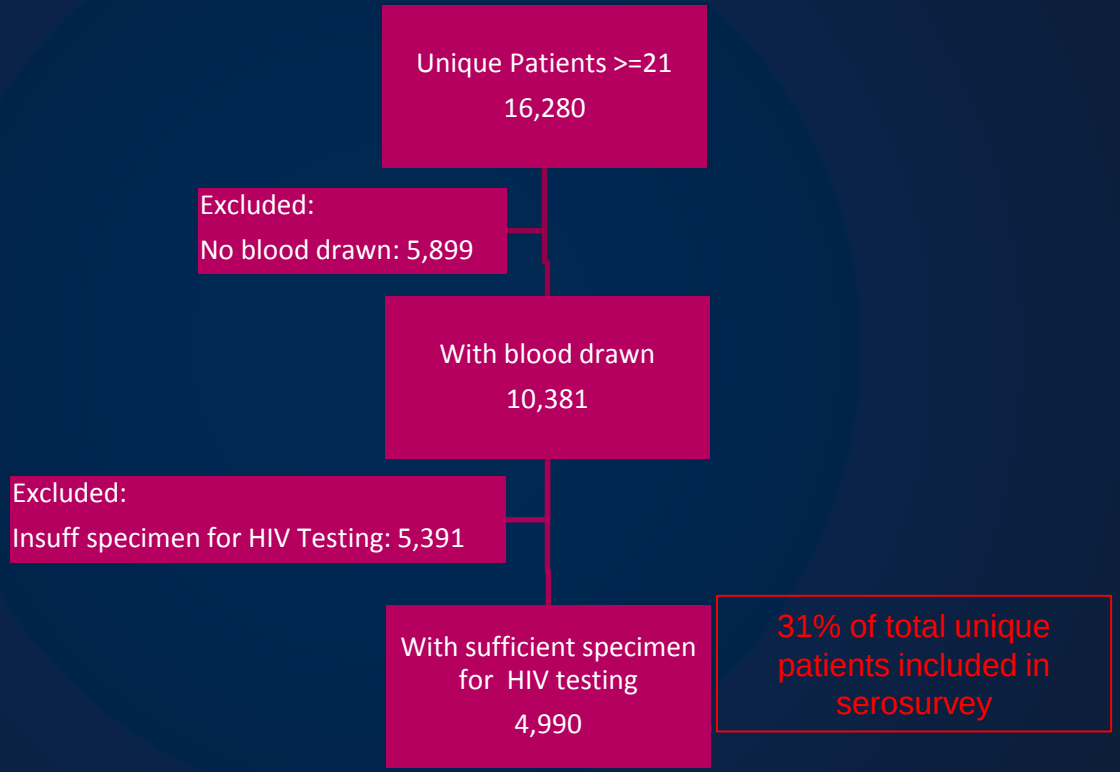
Insights: Serosurvey



Torian,et al. Abstract #903, CROI 2017.

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Intervention

- BOTH “Standard Testing” and “Enhanced Testing”
  - Opt-in, lab based
    - Provider initiated
      - Offer testing, obtain consent themselves
      - Place order for counselor to offer testing, obtain consent
    - HIV counselor initiated
- “Enhanced Testing” only:
  - Automated EMR prompt and order set

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Analyses

- Generalized linear mixed models

Adjusted

1. Association between study phase and performance of HIV test
2. Change of association between patient characteristics and performance of HIV test by study phase

Unadjusted

3. Association between study phase and new HIV diagnoses made by screening

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Intervention

- Intervention

Standard Testing

- Provider initiated
- Counselor initiated
- Provider order for counselor in EMR

Enhanced Testing

- Provider initiated
- Counselor initiated
- Provider order for counselor in EMR
- EMR Prompt

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Patient Characteristics

	Standard Testing (377 Days)	Enhanced Testing (199 Days)	p
Characteristic	N (%)	N (%)	
Total	36,610 (100)	18,943 (100)	
Sex			0.47
Female	20,154 (55.1)	10,489 (55.4)	
Age (median years, IQR)	51 (40-58)	51 (41-58)	<0.001
Race/ethnicity			0.62
Hispanic	15,865 (43.3)	8,231 (43.5)	
Black, non-Hispanic	13,145 (35.9)	6,747 (35.6)	
White, non-Hispanic	3,848 (10.5)	1,974 (10.4)	
Asian, non-Hispanic	690 (1.9)	378 (2.0)	
Other†	1,945 (5.3)	991 (5.2)	
Unknown/Missing	1,117 (3.1)	622 (3.3)	
Insurance			<0.001
Public	25,499 (69.7)	13,228 (69.8)	
Private	9,674 (26.4)	4,832 (25.5)	
Uninsured	595 (1.6)	222 (1.2)	
Unknown/Missing	842 (2.3)	661 (3.5)	
Hospital Site			0.04
A	9,670 (26.4)	5,141 (27.1)	
B	6,913 (18.9)	3,658 (19.3)	
C	20,027 (54.7)	10,144 (53.6)	
Admission Service			0.71
Medicine	24,488 (66.9)	12,596 (66.5)	
Surgery	8,325 (22.7)	4,407 (23.3)	
Neurology	1,042 (2.9)	522 (2.8)	
Psychiatry	868 (2.4)	453 (2.4)	
Rehab Med	298 (0.8)	141 (0.7)	
Gynecology	1,589 (4.3)	824 (4.4)	
Inpatient length of stay (median days, IQR)	3 (2-6)	3 (2-6)	<0.001

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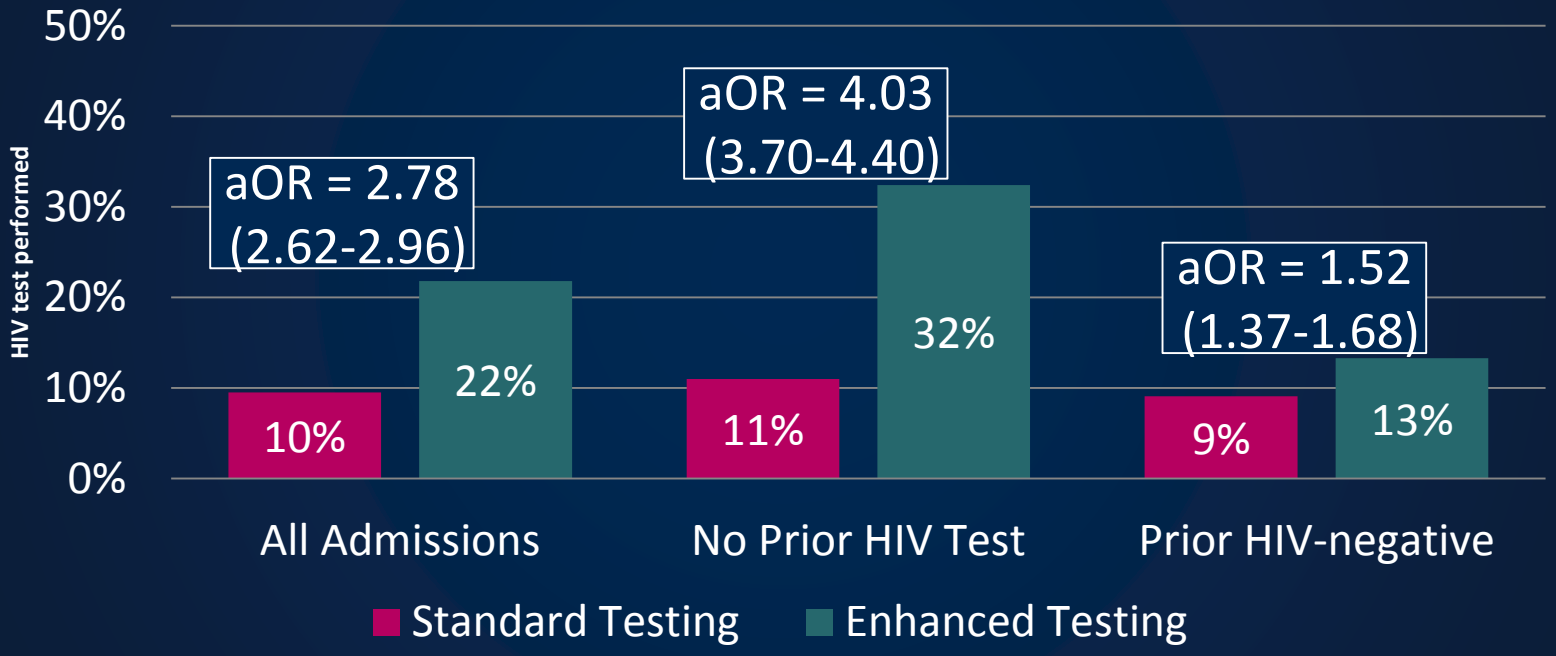
Patient Characteristics

	Standard Testing (377 Days) N= 36,610 (%)	Enhanced Testing (199 Days) N= 18,943 (%)	p
Sex			0.47
Female	55	55	
Age (median years, IQR)	51 (40-58)	51 (41-58)	<0.001
Race/ethnicity			0.62
Hispanic	43	44	
Black	36	36	
White	11	10	
Asian	2	2	
Other	5	5	
Unknown/Missing	3	3	
Insurance			<0.001
Public	70	70	
Private	26	26	
Uninsured	2	1	
Unknown/Missing	2	4	
Hospital Site			0.04
A	26	27	
B	19	19	
C	55	54	
Admission Service			0.71
Medicine	67	67	
Surgery	23	23	
Neurology	3	3	
Psychiatry	2	2	
Rehab Med	1	1	
Gynecology	4	4	
Inpatient length of stay (median days, IQR)	3 (2-6)	3 (2-6)	<0.001

HIV testing increased



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Analyses

- Generalized linear mixed models

Adjusted
1. Association between study phase and whether an HIV test was performed

Unadjusted
2. Association between study phase and new HIV diagnoses made by screening

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Background

- Identifying those with undiagnosed HIV is necessary to achieve HIV treatment and prevention goals
- Expanded HIV testing is a key strategy to identify those who are undiagnosed
- Little is known about effective strategies to expand HIV testing among hospitalized patients or the impact of expanded testing on key outcomes

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Serosurvey

			HIV-infected			HIV prevalence		Prevalence of undiagnosed HIV		Proportion of undiagnosed HIV	
			Diagnosed	Undiagnosed	Subtotal						
	N	Col %	n_1	n_2	n	n/N, % (95% CI)	P-value	n_2/N, % (95% CI)	P-value	n_2/n, % (95% CI)	P-value
Total	4,990	100.0	238	12	250	5.0 (4.4, 5.7)		0.2 (0.1, 0.4)		4.8 (2.5, 8.2)	
Sex											
Male	1,926	38.6	131	7	138	7.2 (6.1, 8.4)	<0.001	0.4 (0.2, 0.8)	0.16	5.1 (2.1, 10.2)	0.82
Female	3,064	61.4	107	5	112	3.7 (3.0, 4.4)		0.2 (0.0, 0.4)		4.5 (1.5, 10.1)	
Age											
21-29	795	15.9	18	2	20	2.5 (1.5, 3.9)	<0.001	0.3 (0.0, 0.9)	0.23	10.0 (1.2, 31.7)	0.18
30-39	768	15.4	26	1	27	3.5 (2.3, 5.1)		0.1 (0.0, 0.7)		3.7 (0.1, 19.0)	
40-49	783	15.7	50	3	53	6.8 (5.1, 8.8)		0.4 (0.0, 1.1)		5.7 (1.2, 15.7)	
50-59	984	19.7	86	4	90	9.2 (7.4, 11.1)		0.4 (0.1, 1.0)		4.4 (1.2,11.0)	
60-69	840	16.8	49	0	49	5.8 (4.4, 7.6)		0.1 (0.0, 0.4)		0.0 (0.0, 7.3)	
70-79	566	11.3	8	2	10	1.8 (0.8, 3.2)		0.4 (0.0, 1.3)		20.0 (2.5, 55.6)	
80-85	254	5.1	1	0	1	0.4 (0.0, 2.2)		0.0 (0.0, 1.4)		0.0 (0.0, 97.5)	
Race/ethnicity											
Black	1,605	32.2	110	5	115	7.2 (6.0, 8.5)	<0.001	0.3 (0.0, 0.7)	0.48	4.4 (1.4, 9.9)	0.40
Hispanic	2,663	53.4	106	5	111	4.2 (3.4, 5.0)		0.2 (0.1, 0.4)		4.5 (1.5, 10.2)	
White	318	6.4	9	0	9	2.8 (1.3, 5.3)		0.0 (0.0, 1.1)		0.0 (0.0, 33.6)	
Other/Unknown	404	8.1	13	2	15	3.7 (2.1, 6.1)		0.5 (0.1, 1.8)		13.3 (1.7, 40.5)	

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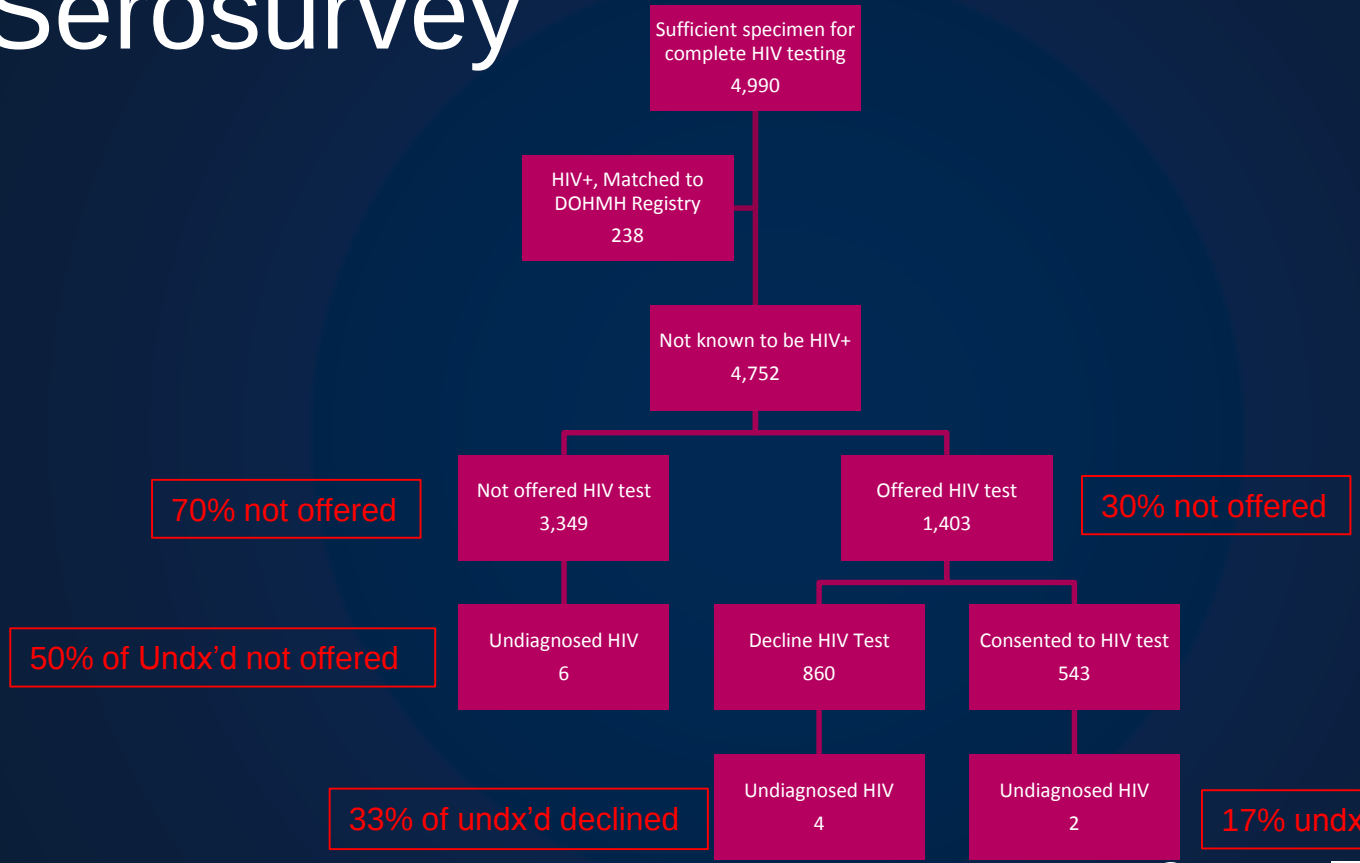
	ED Census			Offered Voluntary HIV Test	Not Offered Voluntary HIV Test	p			Voluntary HIV Test Performed (among those offered)	Declined Voluntary HIV Test (among those offered)	p
Total	4,752			1,403 (29.52)	3,349 (70.48)				543(38.70)	860 (61.30)	
Sex						0.266					0.026
Female	2,957 (62.23)			890 (63.44)	2,067 (61.72)				364 (67.03)	526 (61.16)	
Male	1,795 (37.77)			513 (36.56)	1,282 (38.28)				179 (32.97)	334 (38.84)	
Age (category)						<0.001					<0.001
21-29	777 (16.35)			330 (23.52)	447 (13.35)				154 (28.36)	176 (20.47)	
30-39	742 (15.61)			272 (19.39)	470 (14.03)				128 (23.57)	144 (16.74)	
40-49	733 (15.43)			276 (19.67)	457 (13.65)				107 (19.71)	169 (19.65)	
50-59	898 (18.90)			296 (21.10)	602 (17.98)				100 (18.42)	196 (22.79)	
60-64	409 (8.61)			94 (6.70)	315 (9.41)				31 (5.71)	63 (7.33)	
65+	1,193 (25.11)			135 (9.62)	1,058 (31.59)				23 (4.24)	112 (13.02)	
Race/ethnicity						0.132					0.150
Hispanic	2,557 (53.81)			776 (55.31)	1,781 (53.18)				315 (58.01)	461 (53.60)	
Black, non-Hispanic	1,495 (31.46)			432 (30.79)	1,063 (31.74)				168 (30.94)	264 (30.70)	
White, non-Hispanic	309 (6.50)			71 (5.06)	238 (7.11)				22 (4.05)	49 (5.70)	
Asian, non-Hispanic	85 (1.79)			26 (1.85)	59 (69.41)				10 (1.84)	16 (1.86)	
Other[†]	211 (4.44)			67 (4.78)	144 (4.30)				17 (3.13)	50 (5.81)	
Unknown/Missing	95 (2.00)			31 (2.21)	64 (1.91)				11 (2.03)	20 (2.33)	
Prior HIV Test						<0.001					0.754
No	2,572 (54.12)			698 (49.75)	1,874 (55.96)				273 (50.28)	425 (49.42)	
Yes	2,180 (45.88)			705 (50.25)	1,475 (44.04)				270 (49.72)	435 (50.58)	
Prior ED Visits						<0.001					0.042
0	1,309 (27.55)			432 (30.79)	877 (26.19)				188 (34.62)	244 (28.37)	
1-3	1,312 (27.62)			403 (28.72)	909 (27.14)				159 (29.28)	244 (28.37)	
4-6	665 (13.99)			194 (13.83)	471 (14.06)				71 (13.08)	123 (14.30)	
7-9	396 (8.33)			95 (6.77)	301 (8.99)				28 (5.16)	67 (7.79)	
10+	1,070 (22.52)			279 (19.89)	791 (23.62)				97 (17.86)	182 (21.16)	
Discharge disposition						<0.001					0.153
Discharged home	2,801 (58.94)			944 (67.28)	1,857 (55.45)				385 (70.90)	559 (65.00)	

Serosurvey



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Limitations

- Observational study design
- Reliance on data within EMR of a single health system
- May not be generalizable to settings with:
  - Lower HIV prevalence
  - Less robust EMRs
  - No access to dedicated counselors
  - Different HIV testing policies

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Inpatient Testing

- Determine the impact of an HIV testing strategy enhanced by automated electronic medical record (EMR) support on:
  1. Rate of HIV testing among hospitalized patients
  2. Characteristics of the patients who were tested while hospitalized
  3. Rate of new HIV diagnoses made by screening

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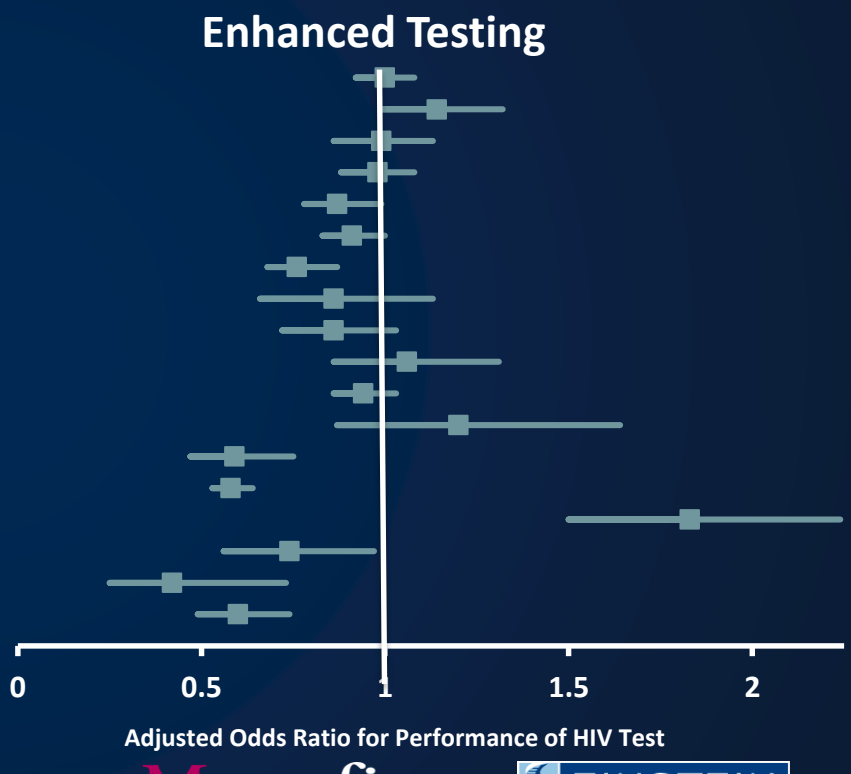
Disparities in testing improved



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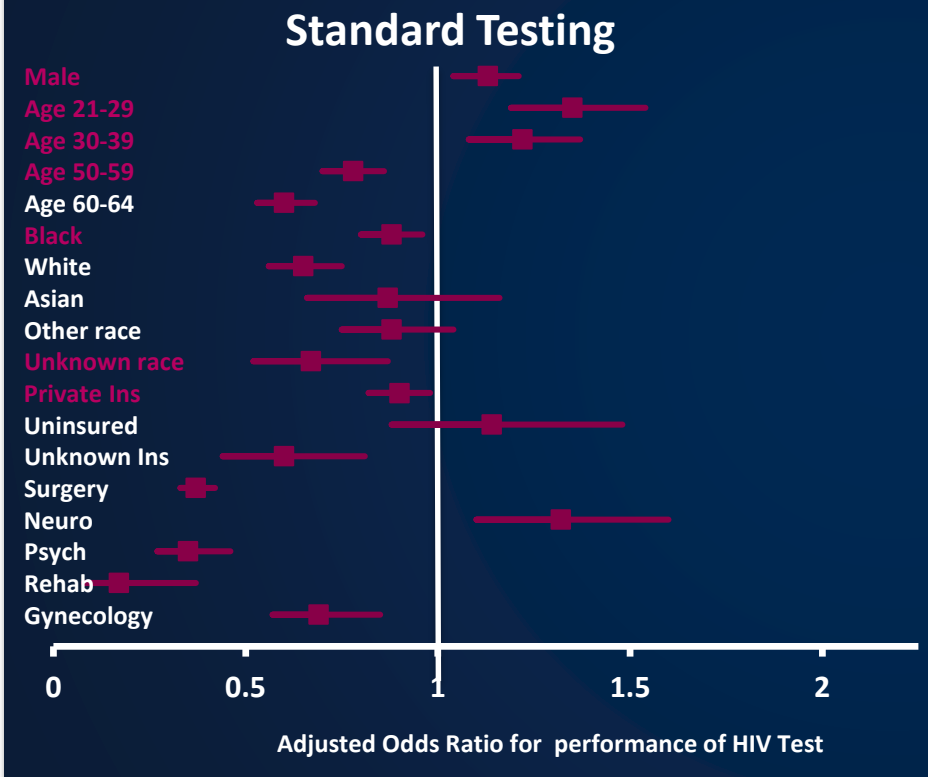

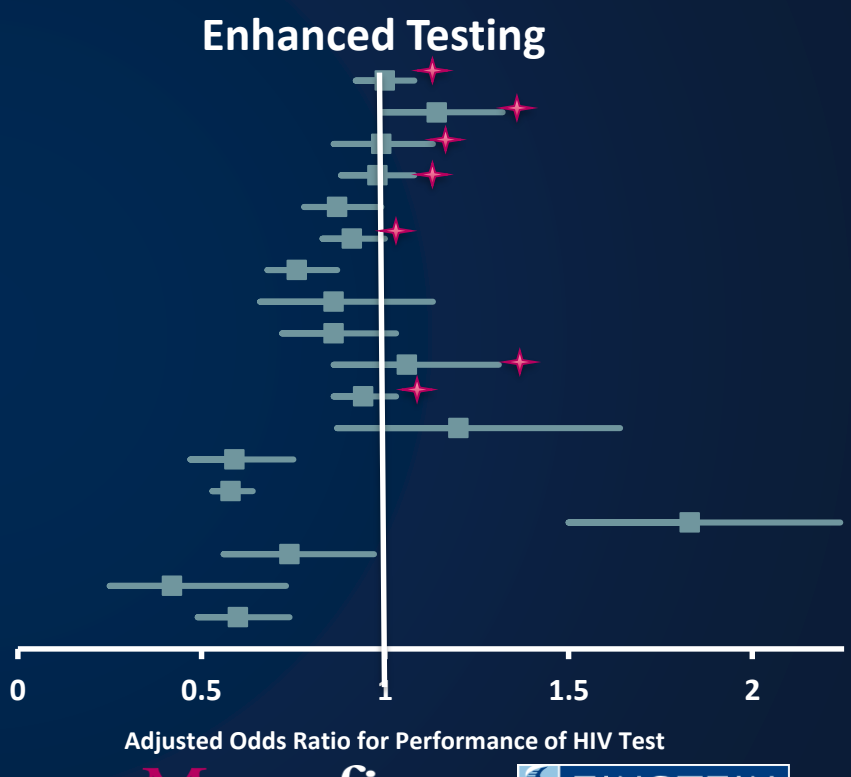

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Next Steps

- Adapt successful aspects of the inpatient strategy to the ED
  - Change in timing of offer from primary nurse to triage nurse
  - Inclusion of EMR support in the ED
- In both ED and Inpatient, explore strategies to close gaps in "testing cascade"
  - Increase the proportion of patients offered (e.g. opt-in → opt-out)
  - Increase proportion of those tested among offered (e.g. address reasons for declining)

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