

# *HIV and COVID-19 in New York City:* *A Population-level Analysis*

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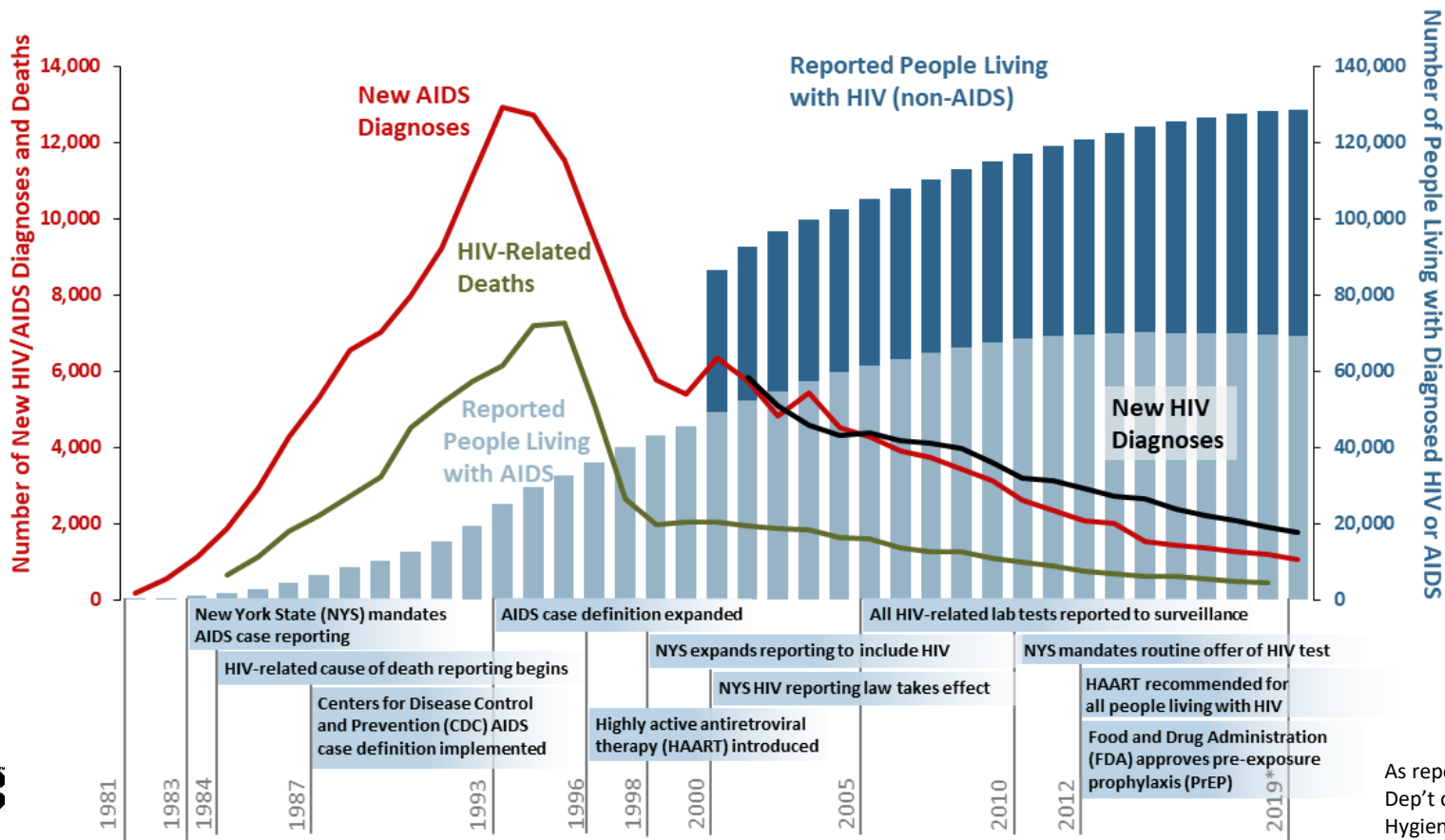
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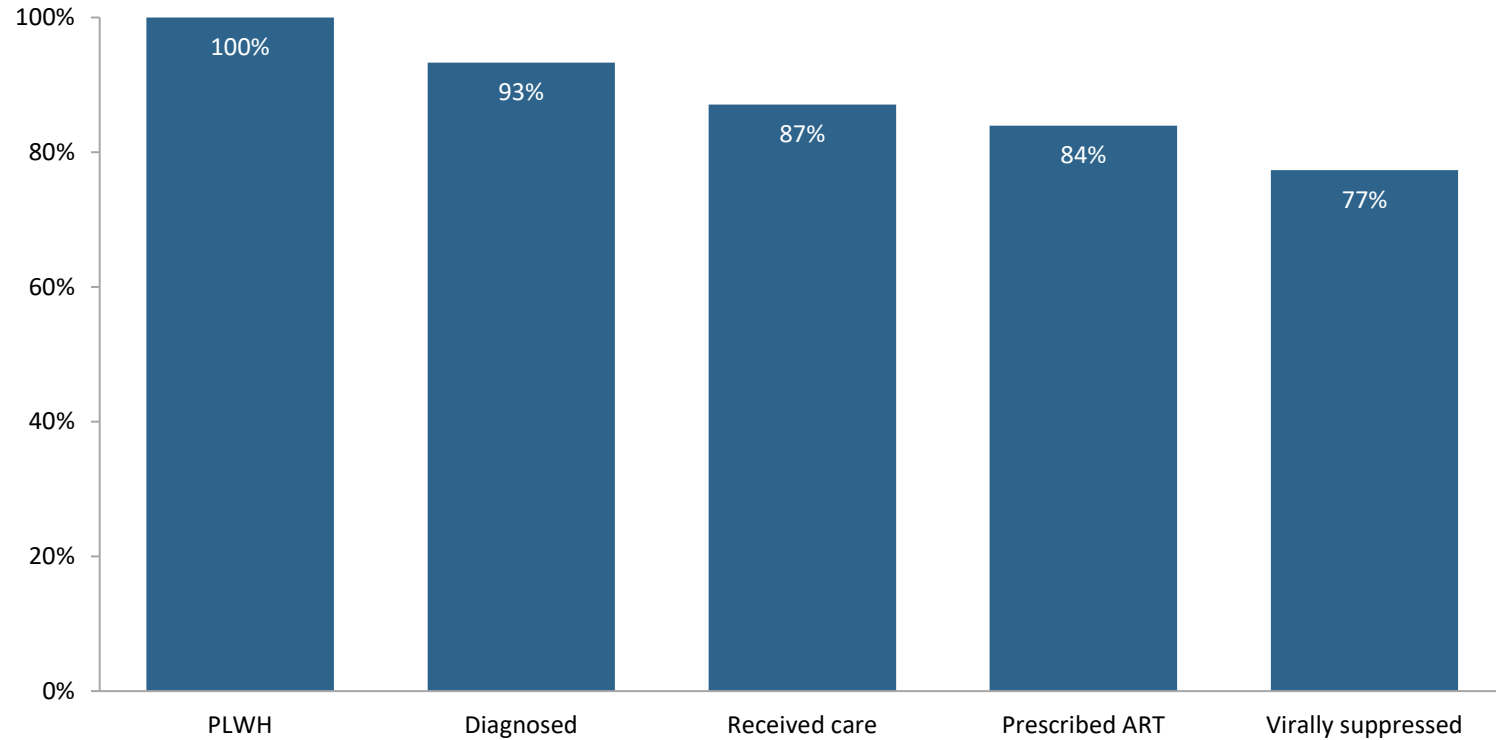


This activity is jointly provided by Physicians' Research Network and the Medical Society of the State of New York.

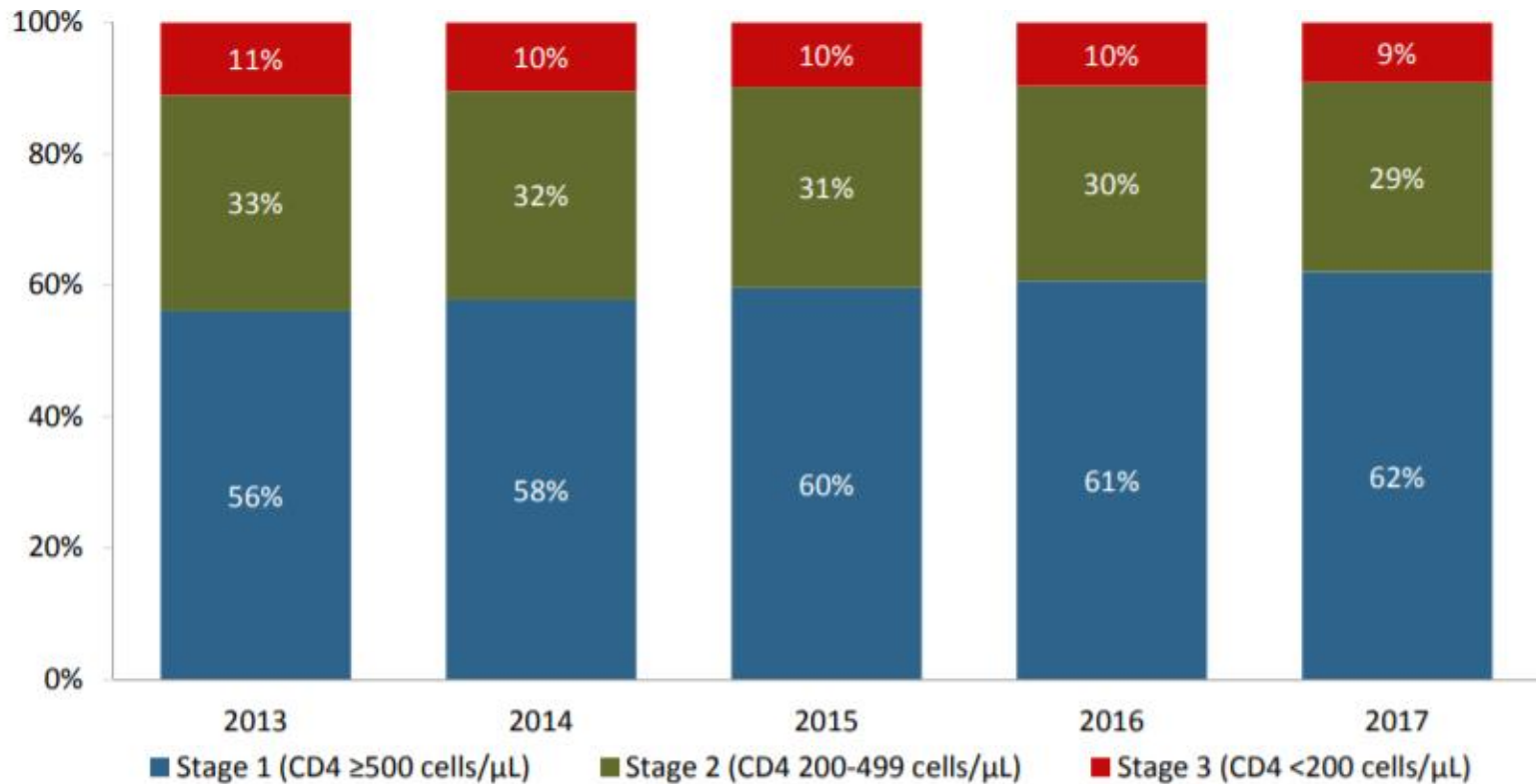
# History of the HIV Epidemic in New York City



# New York City HIV Care Continuum, 2019



# HIV Infection Stage among People Living with HIV, NYC 2013-2017



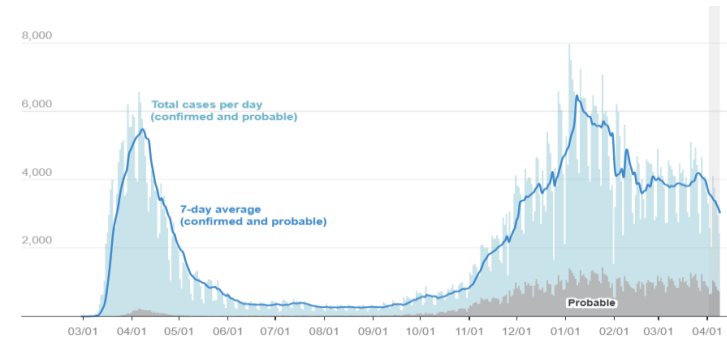
# Surveillance for COVID-19 in New York City

Measure	Last 7 days	Weekly average (last 4 weeks)	Trend
<b>Percent Positive</b> Percent of people tested who test positive	<b>See Milestones</b>	6.50%	Decreasing
<b>Confirmed Cases</b> People with a positive molecular test	15,559	18,912	Decreasing
<b>Probable Cases</b> People with a positive antigen test, or symptoms and confirmed exposure, or probable death	5,722	6,739	Decreasing
<b>Total Cases</b>	21,281	25,650	Decreasing
<b>Hospitalizations</b> People hospitalized within 14 days of diagnosis	1,144	1,617	Decreasing
<b>Confirmed Deaths*</b> Deaths with a positive molecular test	265	346	Decreasing

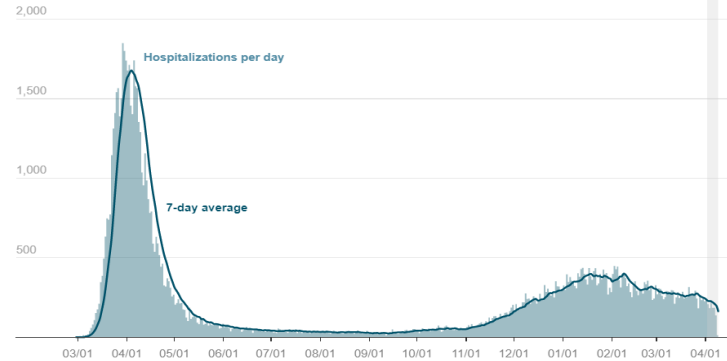
Updated: April 12, at 1 p.m.

# COVID-19 Cases, Hospitalizations, and Deaths in New York City 3/1/20 – 4/1/21

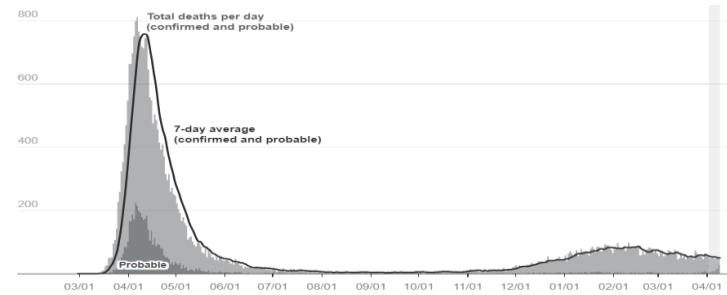
## CASES



## HOSPITALIZATIONS



## DEATHS



DATE

# COVID-19 and HIV

- Significant public health and clinical interest in the intersection between COVID-19 and HIV
  - How many people with HIV have been diagnosed with COVID-19?
  - Which people with HIV are being affected by COVID-19?
  - Is there higher risk for COVID-19 among people with HIV ?
  - Do people with HIV have poorer outcomes once infected with COVID-19?

# Objective for our study

To identify and describe people with previously diagnosed HIV (PWH) who were diagnosed and reported with COVID-19 infection in New York City from March 1 to June 2, 2020



# Analysis

- Matched NYC COVID-19 surveillance dataset of confirmed COVID-19 cases and deaths reported as of June 2, 2020, to the HIV Surveillance registry
- Described and compared PWH\* with diagnosed COVID-19 and all NYC COVID-19 cases (excluding diagnosed PWH):
  - Demographic characteristics
  - HIV viral suppression status (PWH)
  - COVID-19-related outcomes

# Data Sources and Matching Methods

## Data sources:

1. NYC COVID-19 surveillance dataset of confirmed COVID-19 cases (people with a positive diagnostic test) and deaths attributed to COVID-19 (confirmed and probable) reported to the NYC DOHMH as of June 2, 2020.
2. NYC HIV surveillance registry (eHARS) containing records for people diagnosed with HIV in NYC and reported to the NYC DOHMH; live eHARS dataset used for matching cases on June 19 and deaths on July 2.
  - HIV surveillance analytic dataset as of March 31, 2020, used for analysis.

Match methods: In-house 36-key deterministic matching algorithm, with manual review for records matching on keys 8-36

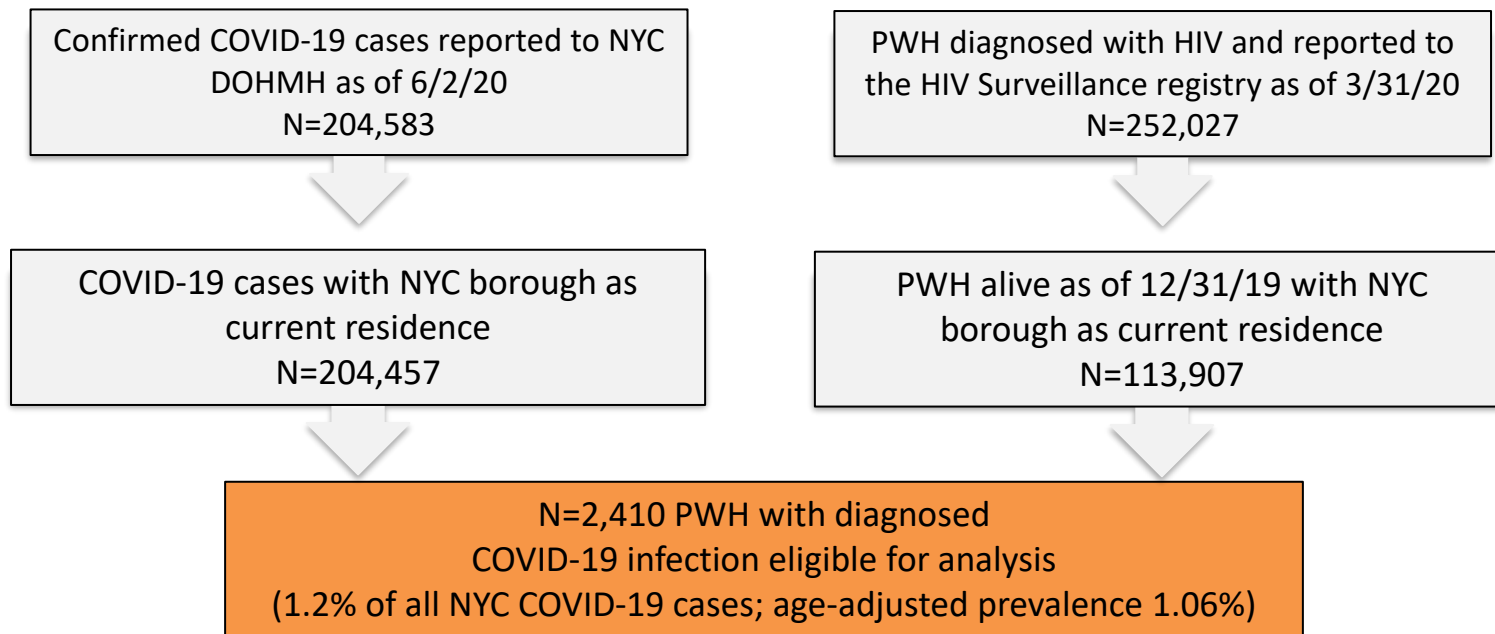
# Analysis

Objective: To identify and describe people with previously diagnosed HIV who were diagnosed and reported with COVID-19 infection from March 1 to June 2

Analysis:

- ❑ Used matched data along with additional data from the HIV Surveillance registry (reported as of March 31, 2020) and the COVID-19 surveillance dataset to describe and compare PWH with diagnosed COVID-19, PWH without diagnosed COVID-19 and all NYC COVID-19 cases (excluding diagnosed PWH):
  - Demographic characteristics
  - HIV transmission category, year of HIV diagnosis, HIV viral suppression status (PWH)
  - COVID-19-related outcomes

# Matched data suggest that PWH are not overrepresented among NYC COVID-19 cases



*PWH comprise 1.5% of the NYC population.*

*From the data we have thus far, PWH do not appear to be overrepresented among people diagnosed with COVID-19 in NYC.*

# A higher proportion of PWH with COVID-19 were male or older

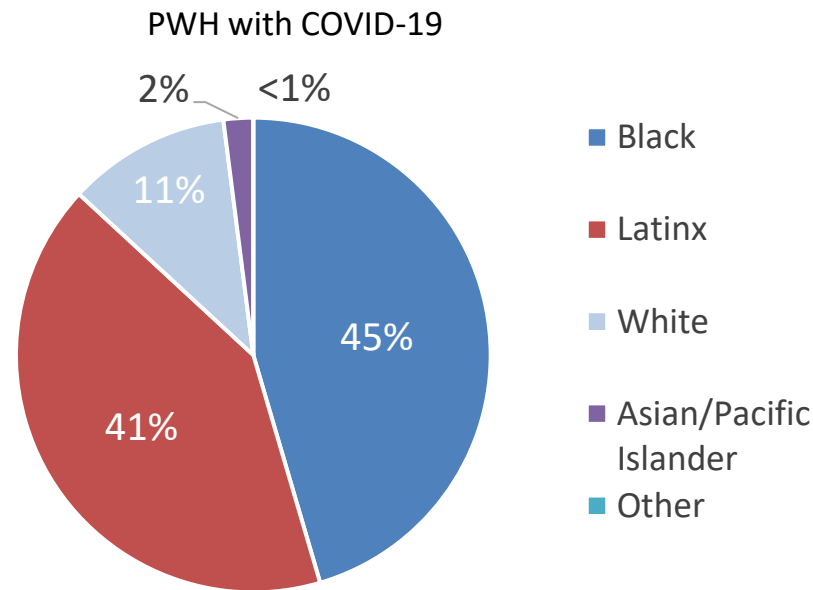
	<b>PWH with COVID-19</b>	<b>NYC COVID-19 cases overall</b>
<b>Sex at birth</b>		
Female	29%	49%
Male	71%	51%
<b>Age group (years)</b>		
0 to 17	<1%	3%
18 to 44	23%	37%
45 to 64	56%	36%
65 to 74	16%	12%
75+	5%	12%

# A higher proportion of PWH with COVID-19 live in the Bronx and Manhattan, lower proportion live in Queens

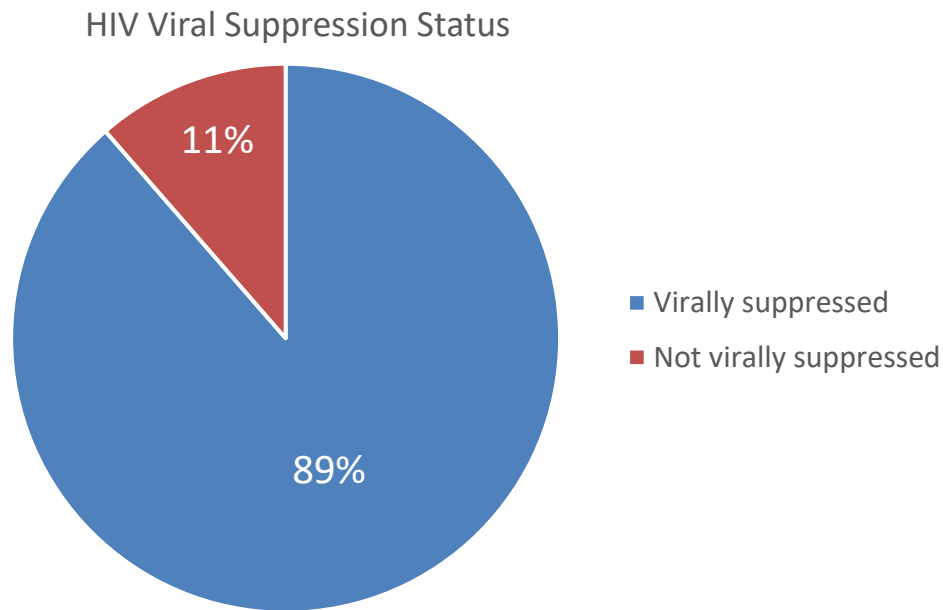
<b>Borough</b>	<b>PWH with COVID-19</b>	<b>NYC COVID-19 cases overall</b>
Bronx	34%	23%
Brooklyn	24%	28%
Manhattan	21%	12%
Queens	19%	31%
Staten Island	3%	7%

# Black and Latinx people were overrepresented among PWH with COVID-19

Race/ Ethnicity*	PWH with COVID-19	NYC COVID- 19 cases overall
Black	45%	29%
Latinx	41%	33%
White	11%	29%
Asian/Pacific Islander	2%	8%
Other	<1%	1%



# The vast majority of PWH with COVID-19 were HIV virally suppressed<sup>1</sup>



<sup>1</sup>Viral suppression defined as most recent HIV viral load through March 31, 2020, with value of <200 copies/mL.

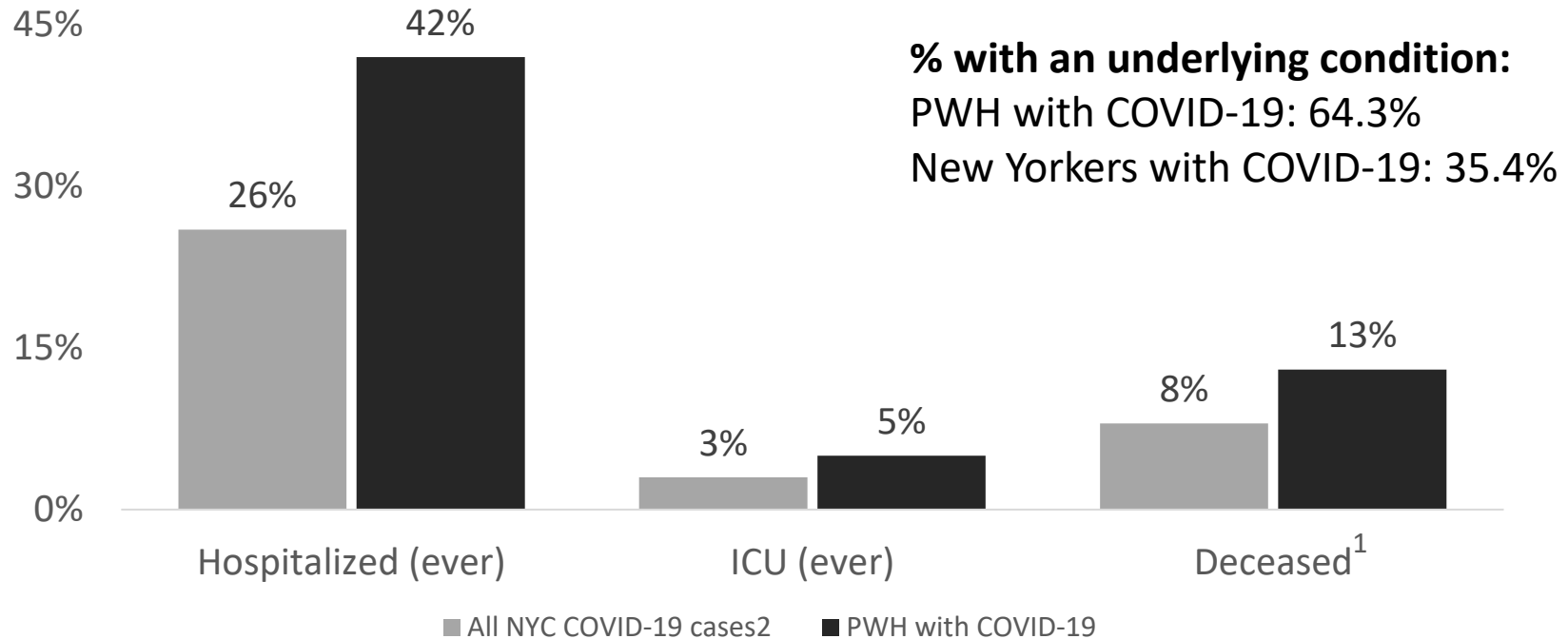
PWH=People with HIV

Data source: match of NYC COVID-19 surveillance data reported as of June 2, 2020, against the NYC HIV surveillance registry.

Braunstein et al. *Clin Infect Dis* <https://pubmed.ncbi.nlm.nih.gov/33252620/>



# Higher proportions of PWH with COVID-19 were hospitalized, admitted to ICU, or died compared with NYC COVID-19 cases overall



<sup>1</sup>Deaths shown here are “confirmed” COVID-19 deaths (those among people with positive molecular-based diagnostic test for SARS-CoV-2).

<sup>2</sup>Excludes people with diagnosed HIV.

PWH=People with HIV

Data source: match of NYC COVID-19 surveillance data reported as of June 2, 2020, against the NYC HIV surveillance registry.

Braunstein et al. *Clin Infect Dis* <https://pubmed.ncbi.nlm.nih.gov/33252620/>

# Descriptive Analysis of COVID-19 and HIV in NYC: Summary

- Based on data match through June 2, PWH do not appear to be overrepresented among NYC COVID-19 cases
- Data suggest differences between PWH with COVID and NYC COVID-19 cases overall:
  - PWH with COVID-19: ↑ male, older, Black, Latinx, Bronx, Manhattan; ↓ White, Queens
  - PWH with COVID-19: nearly all virally suppressed.
- Data suggest poorer outcomes among PWH with COVID-19, particularly hospitalization
- Substantially higher proportion of PWH with COVID-19 have other underlying conditions

# Are COVID-19 Outcomes Worse among People with HIV?

- Studies to date are mixed<sup>1</sup>
  - Some studies<sup>2</sup> have suggested increased risk for adverse COVID-19 outcomes (hospitalization, intubation, death) among PWH
  - Others<sup>3</sup> have suggested no difference in COVID-19 outcomes by HIV status
  - Methods and populations vary, for example some studies are among hospitalized cohorts, others are population-level; some control for the presence of other underlying conditions, others do not.
- Evidence is still accumulating around whether people with HIV are more likely to acquire COVID-19 and whether people with HIV have higher risk of severe illness from COVID-19
  - Role of CD4 count, viral suppression status

1. Triant and Gandhi CID 2021

2. Boulle et al. CID 2020; Geretti et al. CID 2020; Bhaskaran et al. Lancet HIV 2020; Braunstein et al. CID 2020; Tesoriero et al. JAMA 2021; Patel et al. JAIDS 2021.

3. Sigel et al. CID 2020; Hadi et al. AIDS 2020; Miyashita and Juno HIV Med 2020;

# COVID-19 and HIV in New York City: Next Steps

- Descriptive analysis suggested that PWH more frequently experience adverse COVID-19 outcomes
- Additional analysis underway to examine this finding more robustly
  - Study question: Is risk of COVID-19-related death and hospitalization higher among PWH diagnosed with COVID-19 compared to people without HIV diagnosed with COVID-19?
  - Analytic design: Retrospective cohort design
  - Open cohort starting February 29, 2020, through October 17, 2020. All people ages 13+ diagnosed with COVID-19 in NYC
  - Primary exposure: diagnosed HIV
  - Outcomes: 1) incidence of COVID-19-related hospitalization, 2) incidence of COVID-19-related death, 3) demographic and clinical predictors (incl. underlying conditions) of hospitalization and death, overall and among PWH

# COVID-19 among People with HIV in New York State

- Objectives: compare COVID-19 diagnosis, hospitalization and mortality rates for PWH in NYS to the non-PWH population; determine the factors associated with these outcomes among PWH
- Definitions:
  - People diagnosed with COVID-19 (PCR-confirmed SARS-CoV-2 infection) reported to the New York State Department of Health (NYSDOH) through June 7, 2020. Subset of individuals with HIV (and diagnosed COVID-19) identified by matching records of confirmed SARS-CoV-2 infection to the NYS HIV surveillance registry
  - Hospitalizations as of June 15, 2020, identified by matching confirmed SARS-CoV-2 infection cases to the SHIN-NY, a public health information exchange network connecting NYS hospitals
    - COVID-hospitalization if positive result:  $\leq 30$  days before admission,  $\leq 3$  days after discharge, during the hospital encounter.
  - In-hospital death: any individual hospitalized due to COVID-19 with a patient discharge status indicating death or discharged to a funeral home

# COVID-19 among People with HIV in New York State-Cont'd

For diagnoses, hospitalizations and in-hospital deaths computed:

- PWH vs. non-PWH
  - Rates per population and “per continuum stage”
  - Standardized rate ratios: sex and age within region
- Among PWH
  - Additional variables: race/ethnicity, HIV transmission category, CD4 level and viral load suppression status
  - Rates per population and “per continuum stage”
  - Adjusted rate ratios, using Poisson regression

# COVID-19 among People with HIV in New York State-Cont'd

COVID-19 diagnosis, hospitalizations, and in-hospital deaths per 1,000 among persons living with and without diagnosed HIV infection New York State, March 1 – June 7, 2020

	PWH		Non-PWH		Rate Ratio (95% CI)
	n	Rate/1,000 pop	n	Rate/1,000 pop	
COVID-19 Diagnosis	2,988	27.65	375,260	19.40	1.43 (1.38-1.48)
Hospitalized with COVID-19	896	8.29	61,371	3.15	2.61 (2.45-2.79)
In-hospital death due to COVID-19	207	1.92	14,522	0.75	2.55 (2.22-2.93)
Total Population*	108,062		19,345,499		

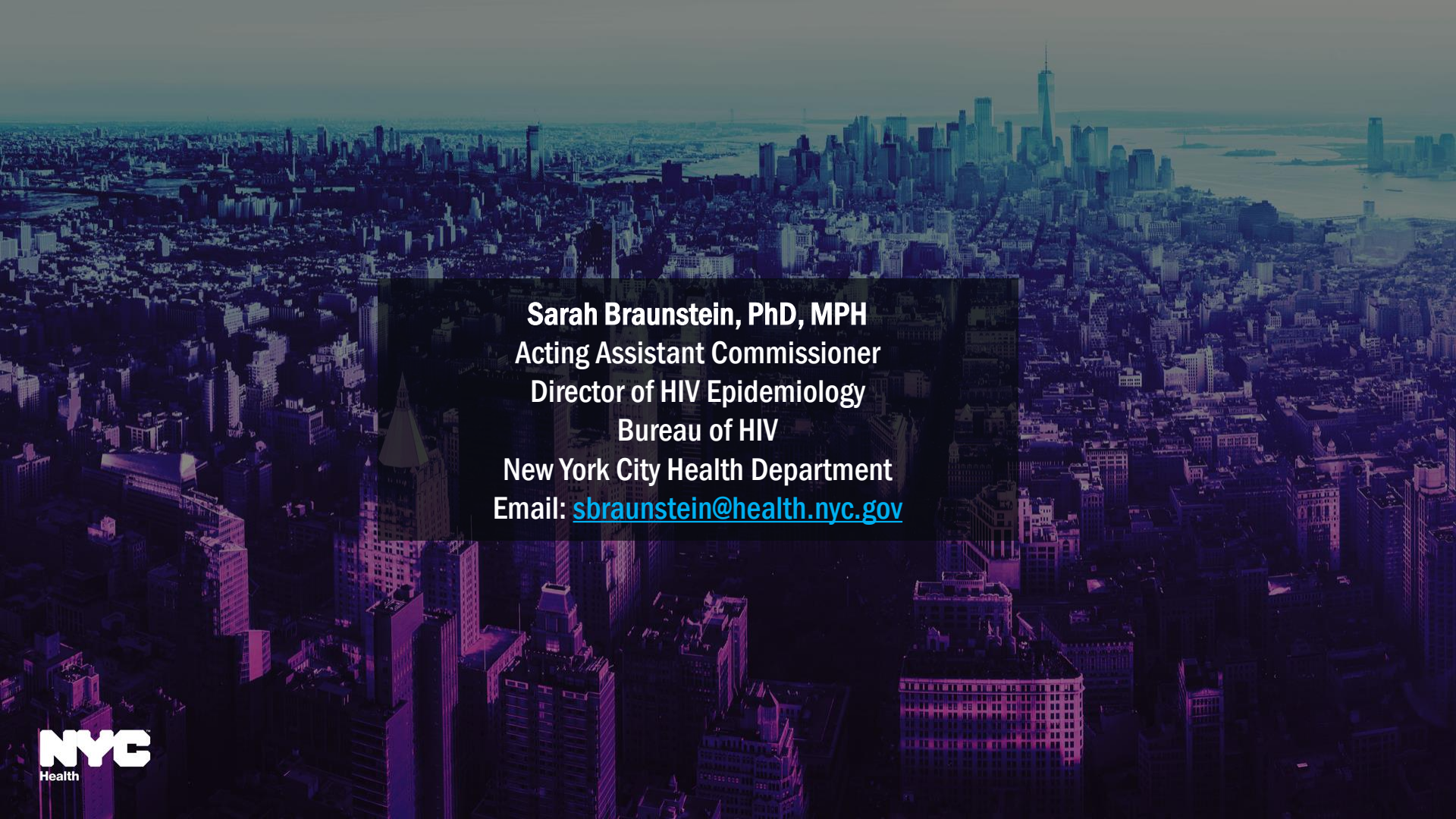
# COVID-19 among People with HIV in New York State-Cont'd

- In the first 3 months of the COVID-19 pandemic, nearly 3,000 PWH in NYS had been diagnosed with COVID-19
  - Nearly 900 PWH had been hospitalized
  - Over 200 PWH had died: 1 in 522 PWH, compared to 1 in 1,340 non-PWH
- Controlling for age, sex, and region, PWH in NYS are diagnosed with COVID-19 at roughly same rate as non-PWH, and once hospitalized have similar mortality rates
- However, PWH in NYS were hospitalized at 40% higher rate than general population, with low CD4 and high VL contributing factors to higher hospitalization among PWH



# Acknowledgements

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