COVID-19 HEALTHCARE PROVIDER UPDATE

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NYC Health

DISCLAIMER

- Our understanding of the novel coronavirus is evolving rapidly
- This presentation is based on our knowledge as of April 23, 2020, 5:00 PM

Outline

- CURRENT STATUS OF OUTBREAK
- NYC SURVEILLANCE DATA
  CLINICAL FINDINGS
- HEALTH EQUITY ISSUES AND INITIATIVES AMIDST THE PANDEMIC
- DISCUSSION

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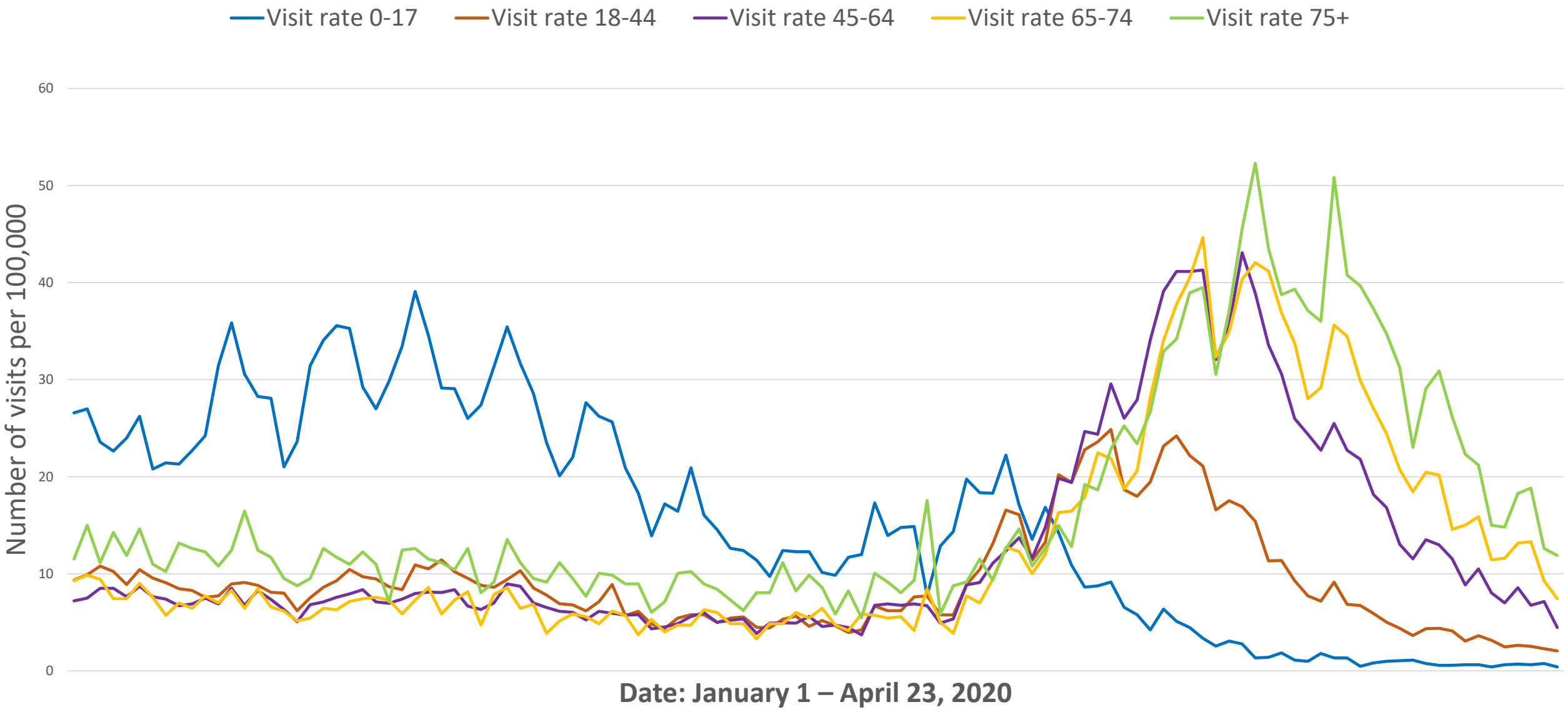
WHERE WE ARE

- There is still widespread community transmission of COVID-19 in New York City and around the world
- Almost two months have passed since New York City reported its first confirmed COVID-19 case
- We continue to see high numbers of new diagnoses, including those who require hospitalization
- There is good news – we have begun to flatten the curve – syndromic data shows improvement in emergency department visits and admissions
- However, we cannot let down our guard. We must continue to reinforce mitigation measures that are working as we begin to implement containment and suppression measures

Influenza-Like Illness and Pneumonia Emergency Department Visits per 100,000 Population



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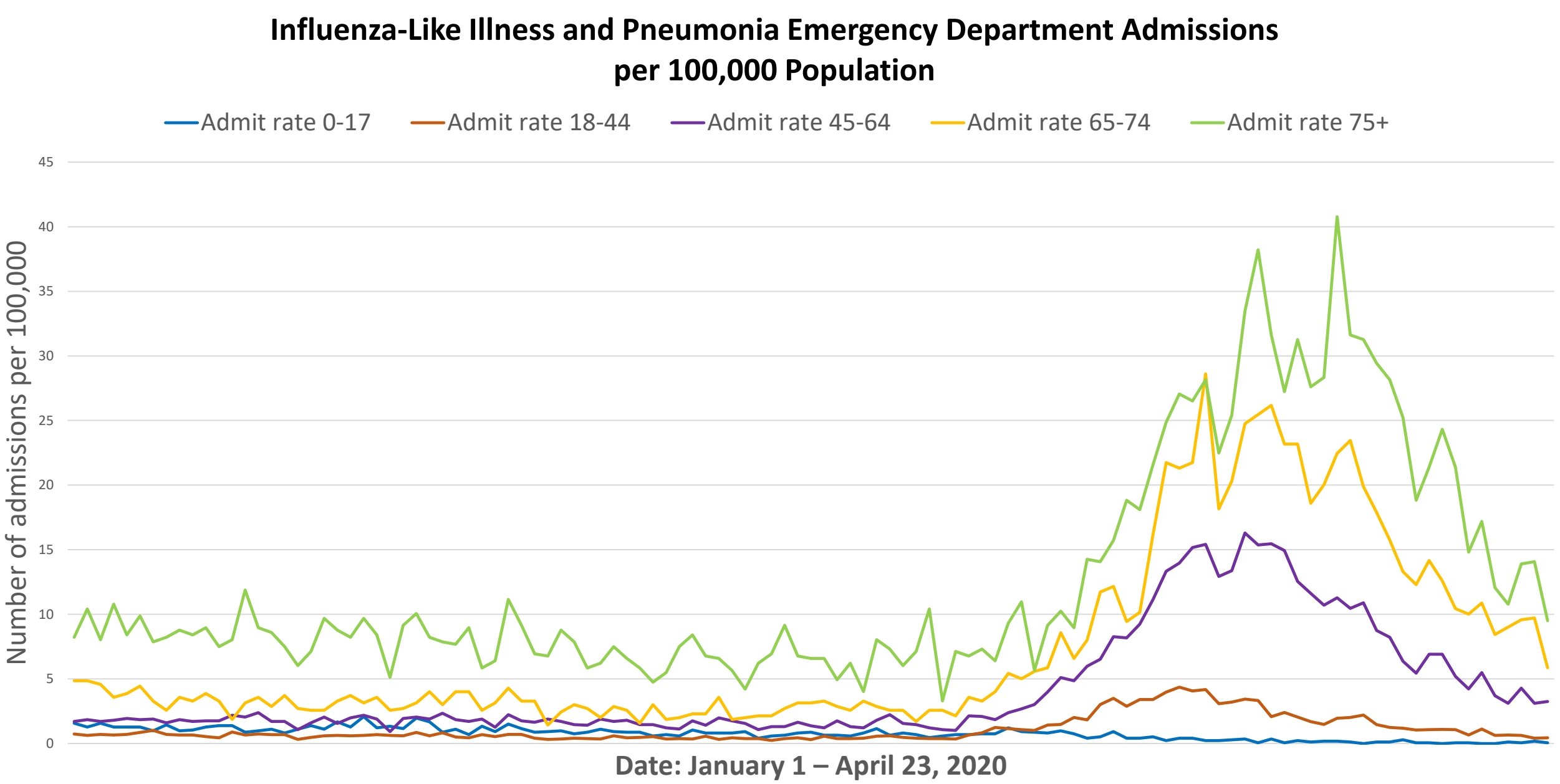
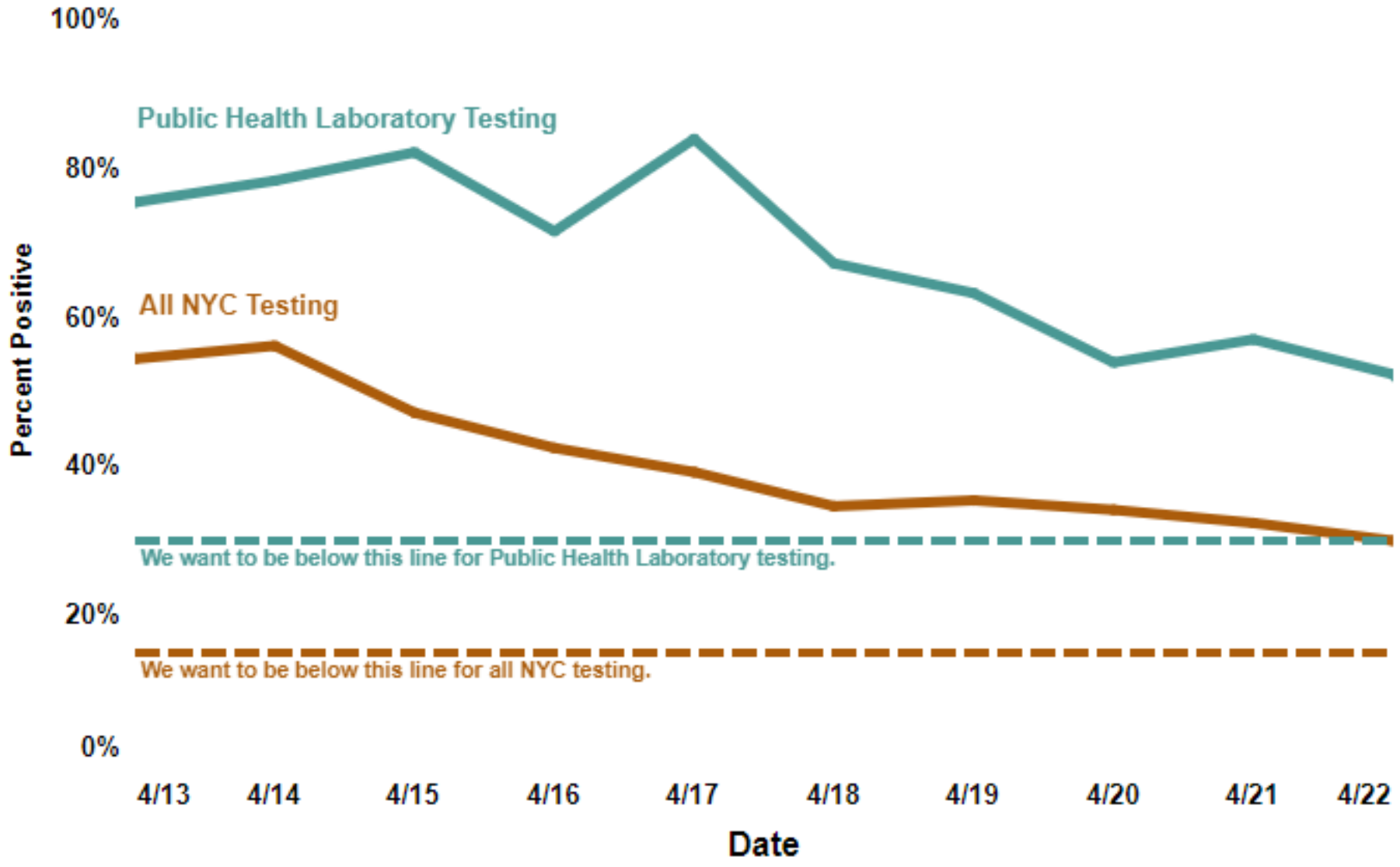

Influenza-Like Illness and Pneumonia Emergency Department Admissions per 100,000 Population
Admit rate 0-17
Admit rate 18-44
Admit rate 45-64
Admit rate 65-74
Admit rate 75+
Number of admissions per 100,000
45
40
35
30
25
20
15
10
5
0
Date: January 1 – April 23, 2020

WHEN CAN PHYSICAL DISTANCING BE RELAXED?

- NYC Health Department is closely monitoring key public health indicators to determine when physical distancing restrictions can be loosened
- Indicators that are being followed include:
  - Hospital admissions
  - Critical care capacity
  - Positive test rates
- Restrictions may first be eased for people not at high risk for serious COVID-19 illness
- See COVID-19 Public Health Milestones for the latest indicator data: https://www1.nyc.gov/site/doh/covid/covid-19-goals.page

PERCENT OF NYC RESIDENTS WHO TEST POSITIVE



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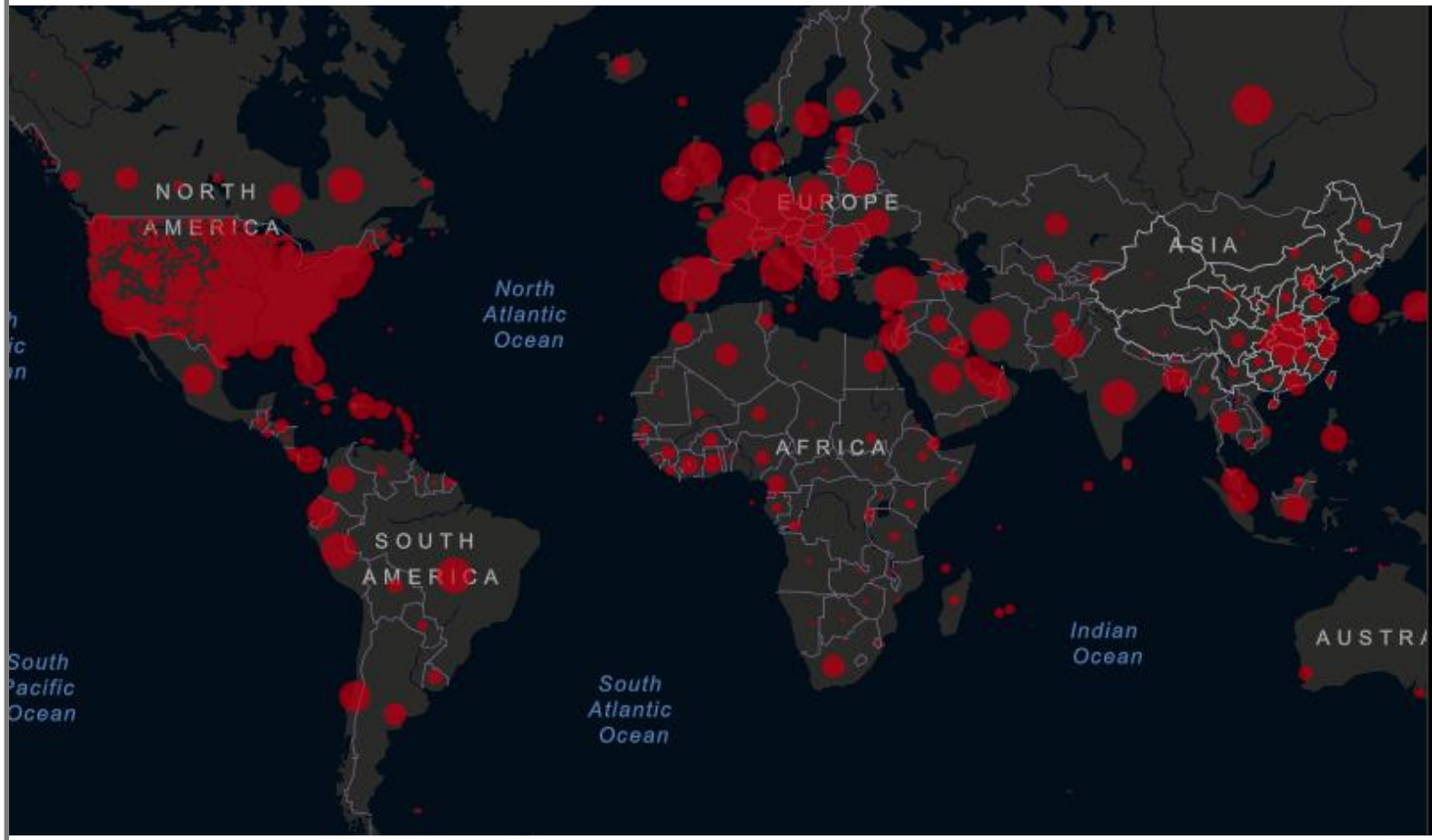
CUMULATIVE CASES AND DEATHS, WORLDWIDE

4/23/20

>2,703,613 cases
>190,490 deaths

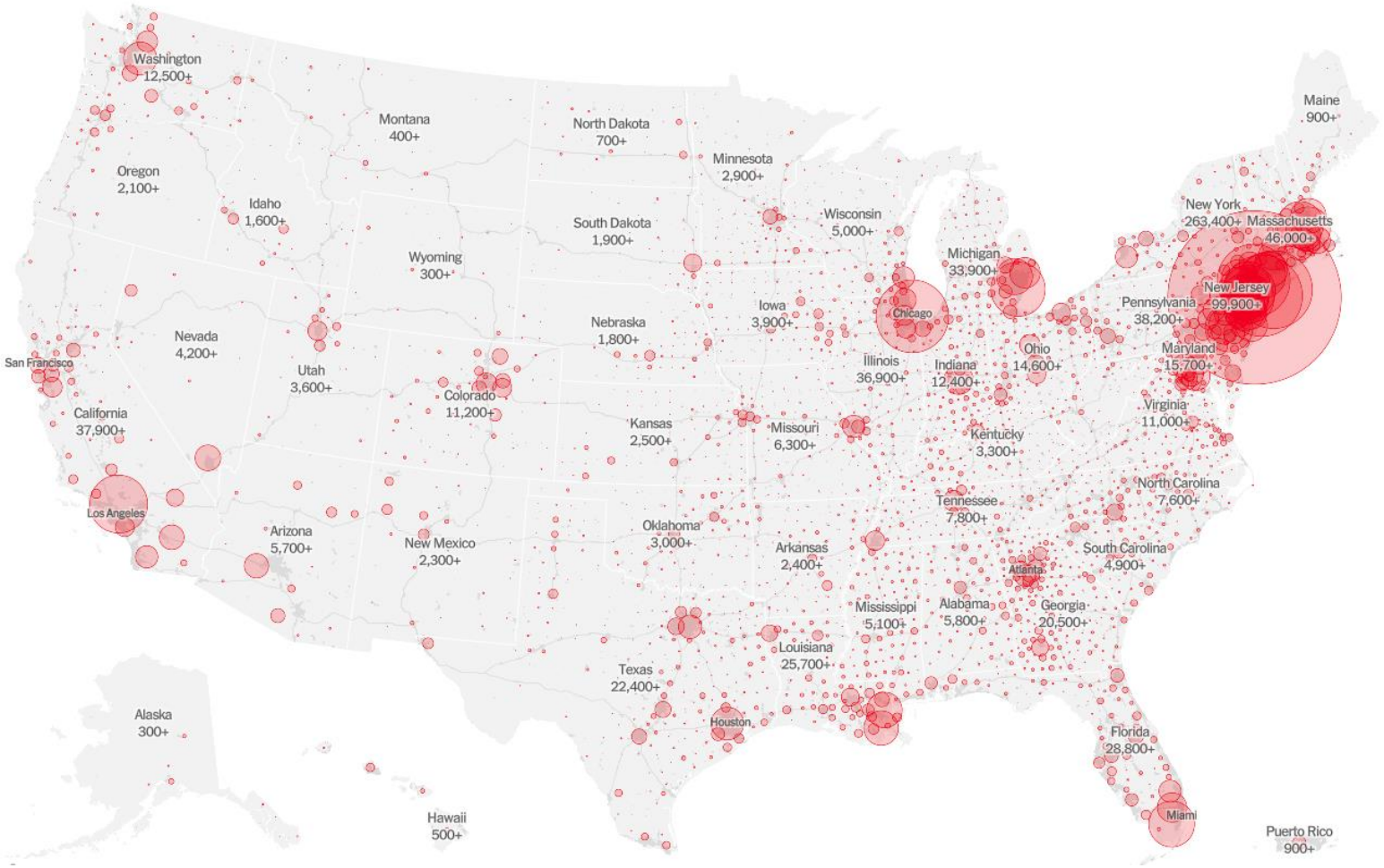


https://www.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6

CUMULATIVE CASES AND DEATHS, US

4/23/20

>861,058 cases
>46,367 deaths



https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html

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CURRENT STATUS OF OUTBREAK, NYC 4/23/20

- **Laboratory confirmed cases**
  141,754
- **Total hospitalized**
  36,723
- **Deaths**
  - **Confirmed cases**
    10,290
  - **Probable cases**
    5,121

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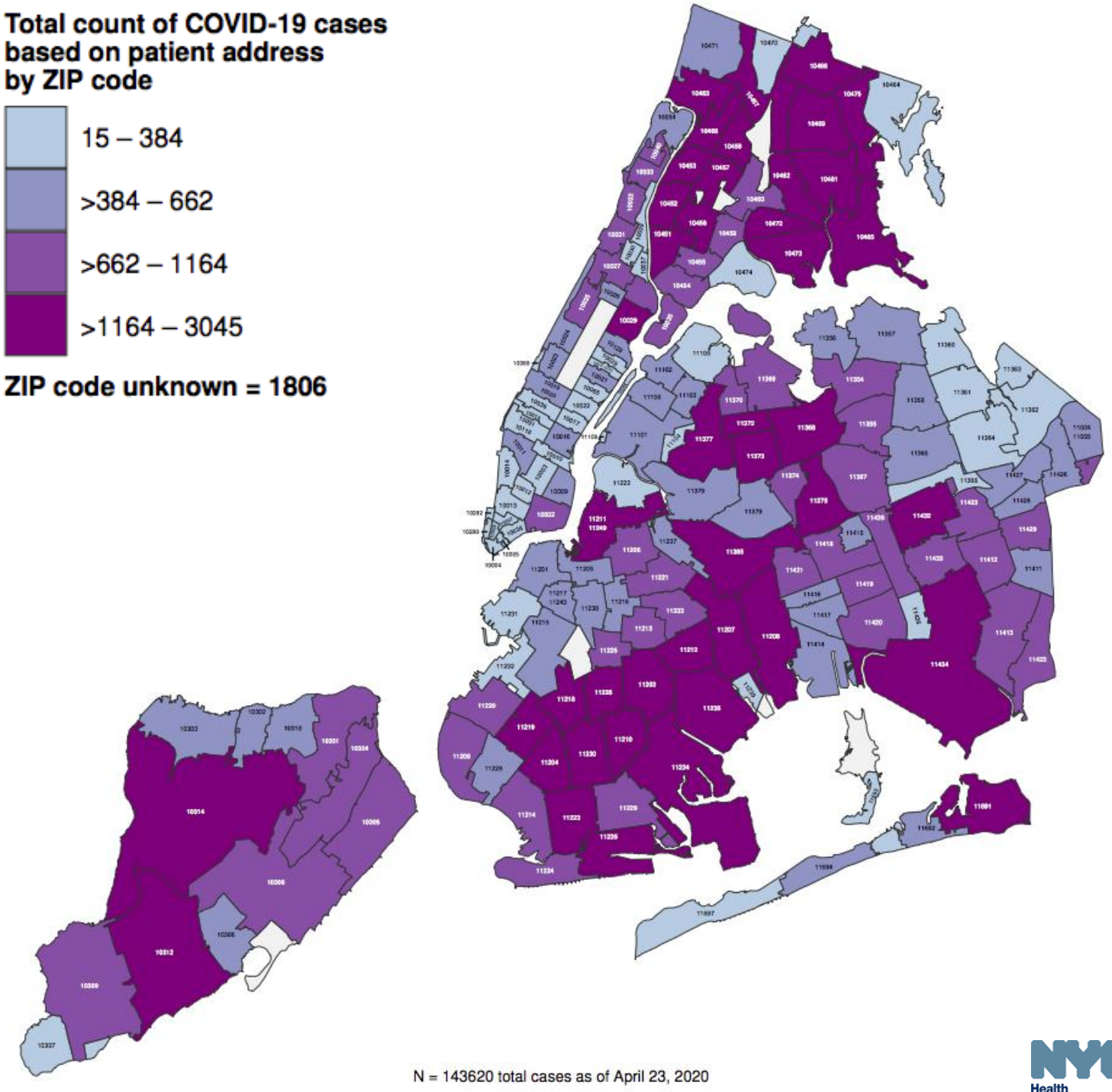
TOTAL COVID-19 CASES BY ZIP CODE, NYC

4/23/20

This chart shows the total count of COVID-19 cases based on patient address by zip code.



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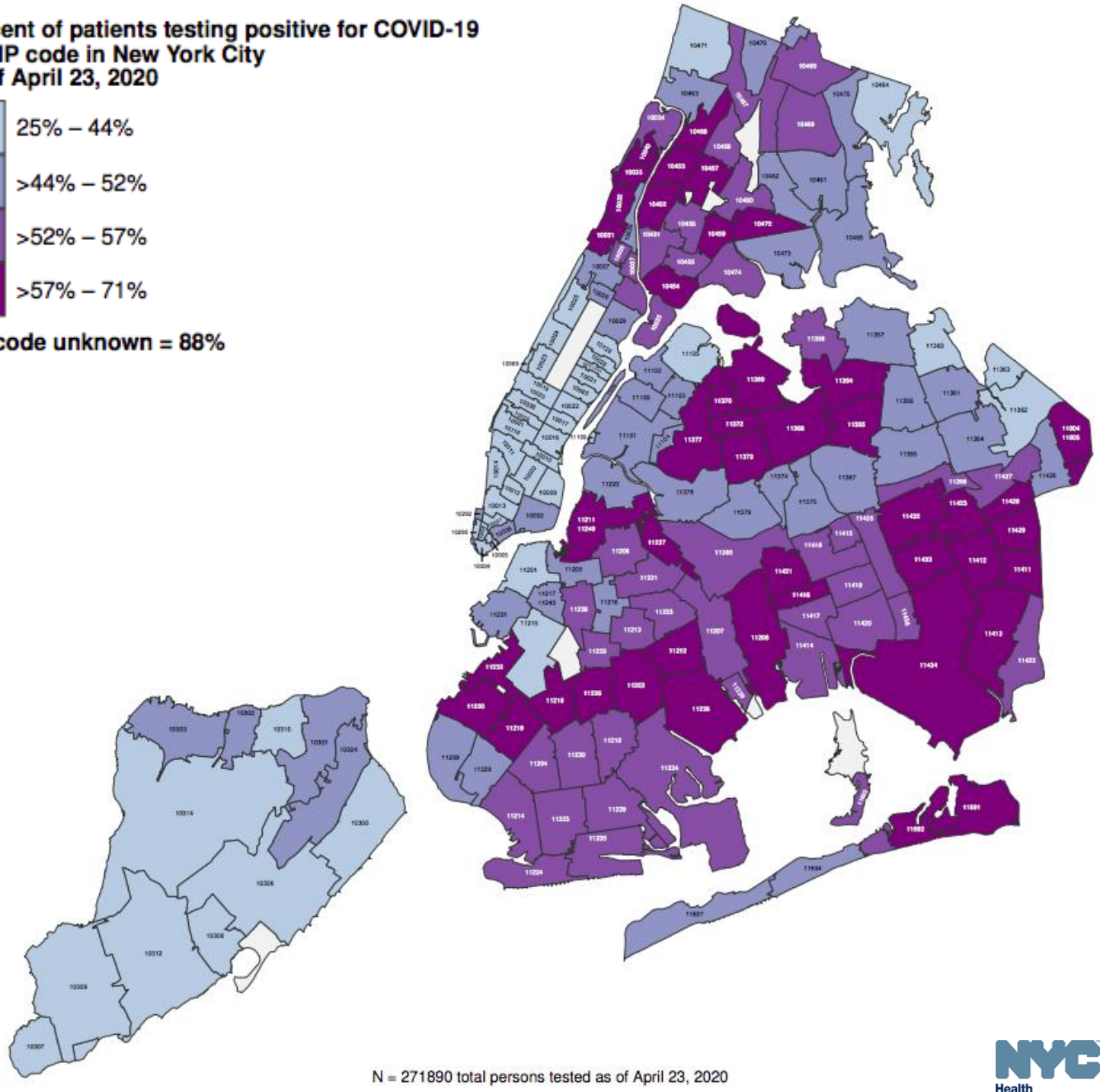
PERCENT TESTING POSITIVE FOR COVID-19 BY ZIP CODE, NYC

4/23/20

This chart shows the percent of patients testing positive for COVID-19 by zip code.



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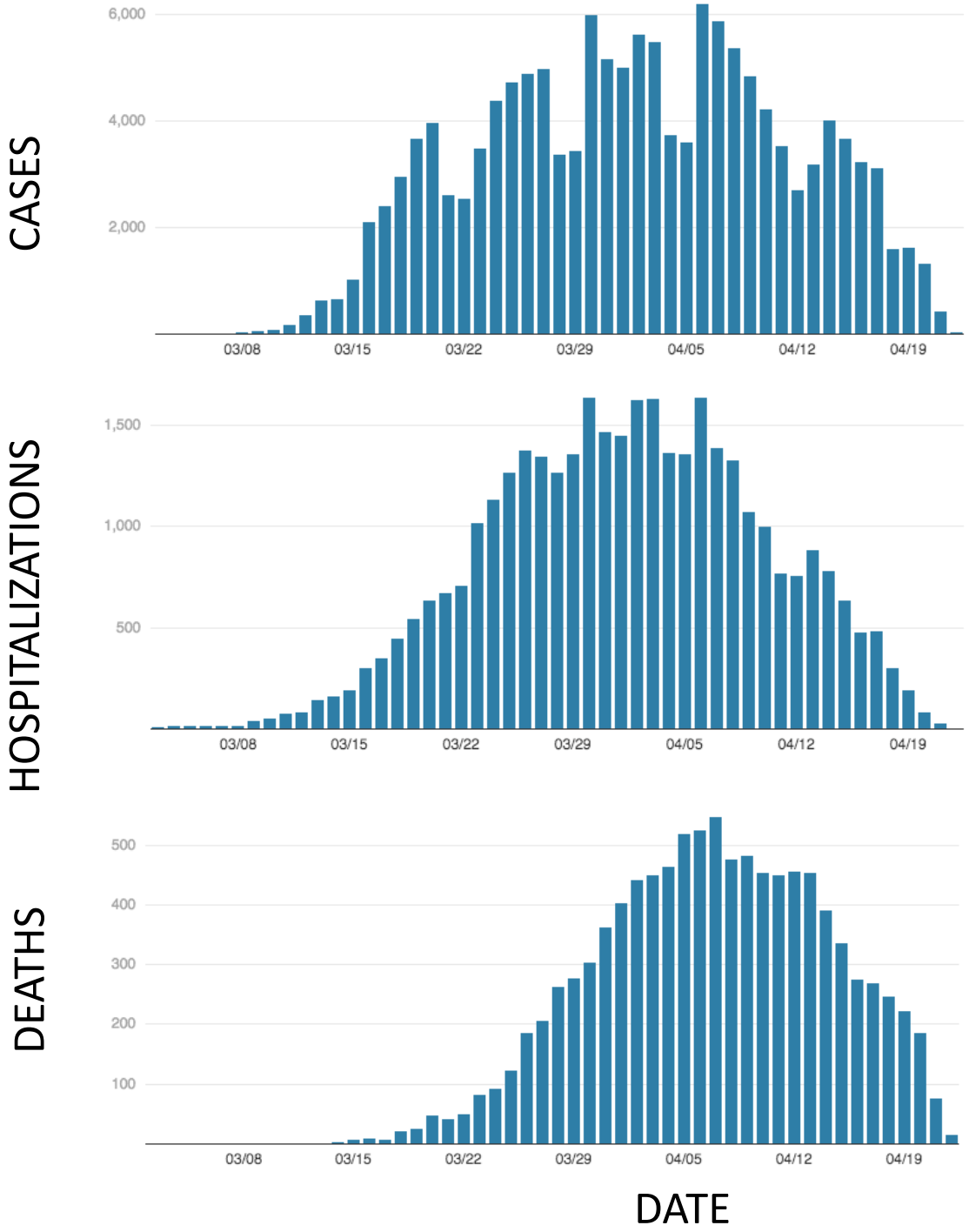
COVID-19 CASES, OVER TIME, NYC

3/6/20 – 4/23/20

This chart shows the number of COVID-19 cases, hospitalizations and deaths by date. It also demonstrates how deaths lag 1-2 weeks after hospitalizations.



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COVID-19 RATES BY BOROUGH, NYC 4/23/20

This chart shows the number of positive cases per 100,000 people in each borough. It indicates the spread of COVID-19 relative to each borough's population

	Rate per 100,000 people	Count
The Bronx	2,168	31,911
Staten Island	2,110	10,582
Queens	1,748	43,824
Brooklyn	1,384	37,564
Manhattan	944	17,803
Citywide		141,754

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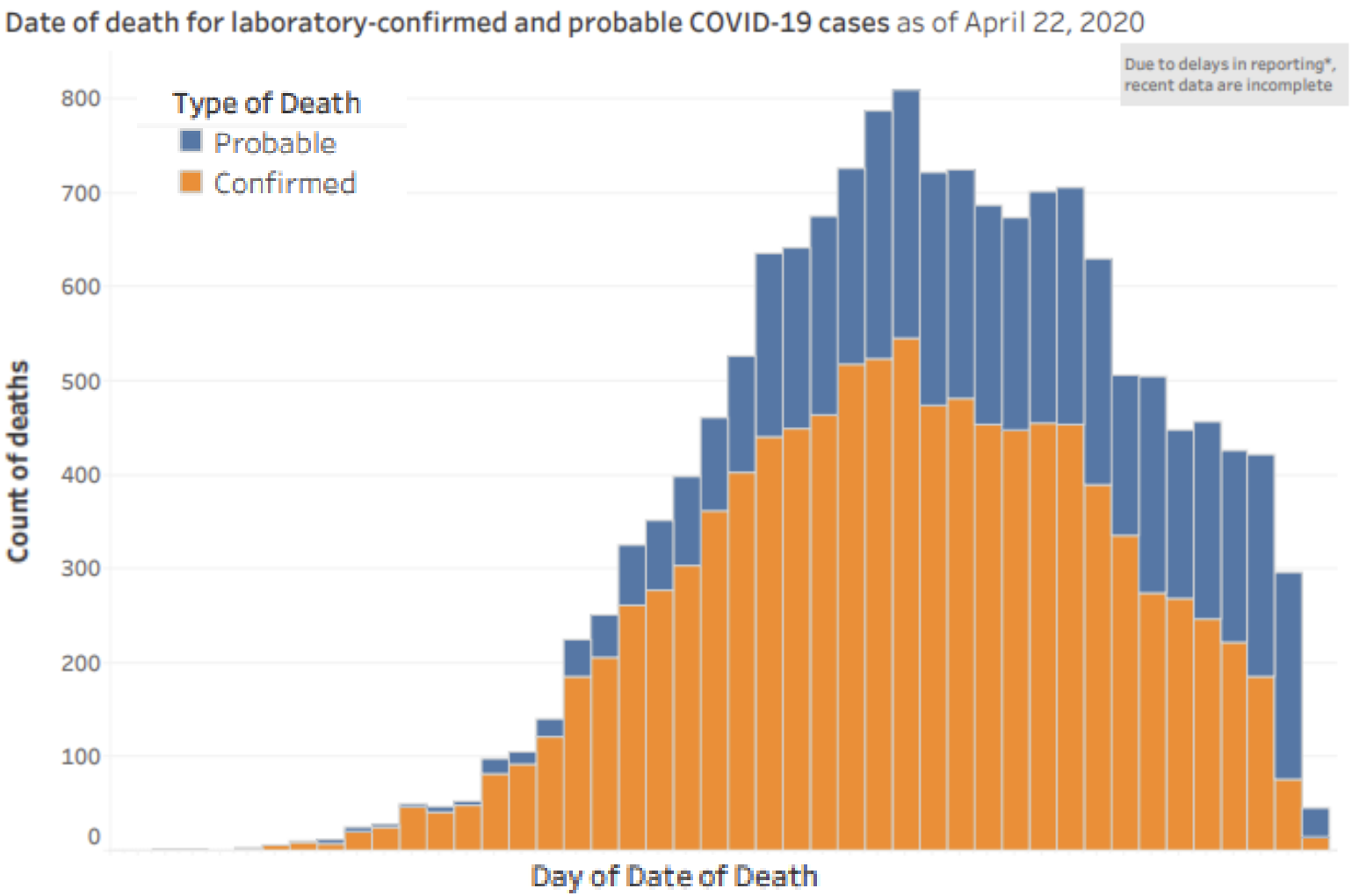
NUMBER OF DEATHS BY PROBABLE OR CONFIRMED COVID-19, NYC

This chart shows the number of probable and confirmed COVID-19 deaths by date



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Deaths by Underlying Conditions (as of April 15, 2020)

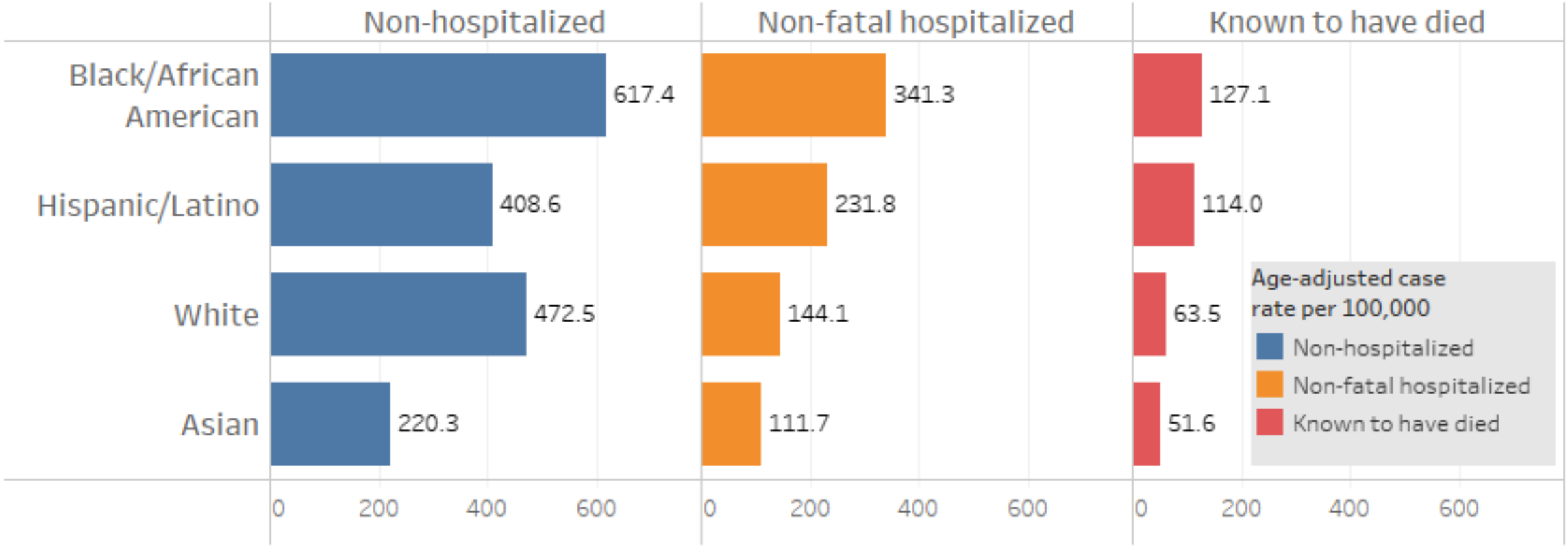
Underlying conditions can include lung disease, asthma, heart disease, a weakened immune system, obesity, diabetes, kidney disease, liver disease and cancer.

Deaths, by age and presence of underlying conditions

	Total deaths	With underlying conditions	Without underlying conditions	Unknown
0-17	3	3	0	0
18-44	309	244	25	40
45-64	1,581	1,343	59	179
65-74	1,683	1,272	26	385
75+	3,263	2,289	27	947

Due to ongoing investigations, the presence of underlying conditions has not been determined for all patients confirmed to have died from COVID-19.

Age-adjusted rates of lab confirmed COVID-19 non hospitalized cases, estimated non-fatal hospitalized cases, and persons known to have died per 100,000 by race/ethnicity group



RACIAL DEMOGRAPHIC DATA COMPLETE* FOR

40% of non-hospitalized cases, 79% of non-fatal hospitalizations, 92% of persons known to have died

COVID-19 HOSPITALIZATIONS AND DEATHS BY RACE/ ETHNICITY, NYC

Age-adjusted rates of lab-confirmed COVID-19 non-hospitalized cases, estimated non-fatal hospitalized cases, and patients known to have died per 100,000 by race/ethnicity group, as of April 22, 2020

WARNING ABOUT SEROLOGY ASSAYS FOR SARS-COV-2

- NYC Health Department Health Alert No. 11*
  - Serologic tests should not be used to diagnose acute or prior SARS-CoV-2 infection, nor to determine immune status to SARS-CoV-2
  - Providers and clinical laboratories should be cautious of numerous unvalidated and inaccurate SARS-CoV-2 serology test kits coming into the U.S. marketplace
  - Test sensitivities, specificities and predictive values for these kits have not been evaluated by any independent government agency, including FDA
- The Infectious Diseases Society of America (IDSA) strongly cautions that antibody testing for SARS-CoV-2 should not be used as a sole source of diagnosis, or for assumptions regarding immunity to new infections.**

* https://www1.nyc.gov/assets/doh/downloads/pdf/han/alert/2020/covid-19-status-of-serologic-testing.pdf
**https://www.idsociety.org/globalassets/idsa/public-health/covid-19/idsa-covid-19-antibody-testing-primer.pdf

UPDATED: SPECIMENS ACCEPTED AT PHL FOR COVID-19 TESTING

- NYC Public Health Laboratory (PHL) now accepting nasal swabs and saliva for COVID-19 testing
  - This is in addition to previously accepted specimens, including combined nasopharyngeal and oropharyngeal swabs, and lower respiratory specimens
- Use synthetic fiber swabs with plastic shaft; flocked swabs preferred
  - Dacron or rayon swabs also acceptable
  - Do not use calcium alginate swabs, cotton swabs, or swabs with wooden shafts
- PHL testing only offered for hospitalized patients with acute lower respiratory illness
- To obtain approval, contact the NYC Health Department Coronavirus Testing Call Center by calling the Provider Access Line (PAL) at 866-692-3641

FACEMASK AND FACE COVERING POLICIES

- Policies to help prevent asymptomatic transmission
- Health care workers and staff:
  - All health care facility staff should wear a facemask regardless of type of setting or service being provided
  - Follow guidance from the health care facility regarding what type of facemask to wear
- All New Yorkers:
  - Wear a face covering when outside the home if physical distance of 6 feet cannot be maintained (e.g., grocery shopping, riding public transport, seeking medical care)
  - *Face covering*: a well-secured paper or cloth (like a bandana or scarf) that covers one's mouth and nose

ACUTE KIDNEY INJURY IN COVID-19

- Acute kidney injury (AKI) is an abrupt reduction in kidney function
- Early studies of cases in China suggest a low percentage of patients develop AKI
- **U.S. and European experience of AKI is different!**
- Stage 2 or 3 AKI (more severe kidney injury) reported in about 30% of ICU patients in some U.S. centers
- Five percent of patients hospitalized in two centers in NYC required new renal replacement therapy

Hoste E. Acute Kidney Injury in COVID-19 Patients. European Society for Intensive Care Medicine. https://esicm-tv.org/webinar3_live_26-acute-kidney-injury-in-covid-19-patients.html;
Goyal P, Choi JJ, Pinheiro LC, et al. Clinical characteristics of COVID-19 in New York City. *N Engl J Med*. April 17, 2020. https://doi.org/10.1056/NEJMc2010419

SARS-COV-2 AND KIDNEY IMPAIRMENT ASSOCIATED WITH DEATH

- Cohort study by Cheng et al, in which medical records reviewed for 710 hospitalized COVID-19 patients
- Showed high prevalence of kidney impairment
- Those with baseline kidney dysfunction were more likely to die (31% vs. 9%)
- Proteinuria, hematuria, elevated blood urea nitrogen, and serum creatinine were independent risk factors for death
- High level of kidney impairment in COVID-19 patients may overwhelm hospital capacity for dialysis

Cheng Y, Luo R, Wang K, et al. Kidney impairment is associated with in-hospital death of COVID-19 patients. *medRxiv.* 2020. (not peer-reviewed) https://doi.org/10.1101/2020.02.18.20023242

KIDNEY DYSFUNCTION IN PATIENTS WITH COVID-19

- Study of relationship of kidney function and mortality in 193 hospitalized patients with COVID-19
- Found significantly higher mortality risk (~5.3-times) in patients with COVID-19 who developed acute kidney injury than those who did not
- Proteinuria, hematuria, and elevated levels of blood urea nitrogen, serum creatinine, uric acid, and D-dimer were significantly associated with death
- Authors suggest monitoring kidney function, regardless of past disease history, and consider interventions to prevent development of AKI in patients with severe COVID-19

Li Z, Wu M, Yao J, et al. Caution on kidney dysfunctions of COVID-19 patients. *medRxiv.* 2020. (not peer-reviewed) https://doi.org/10.1101/2020.02.08.20021212

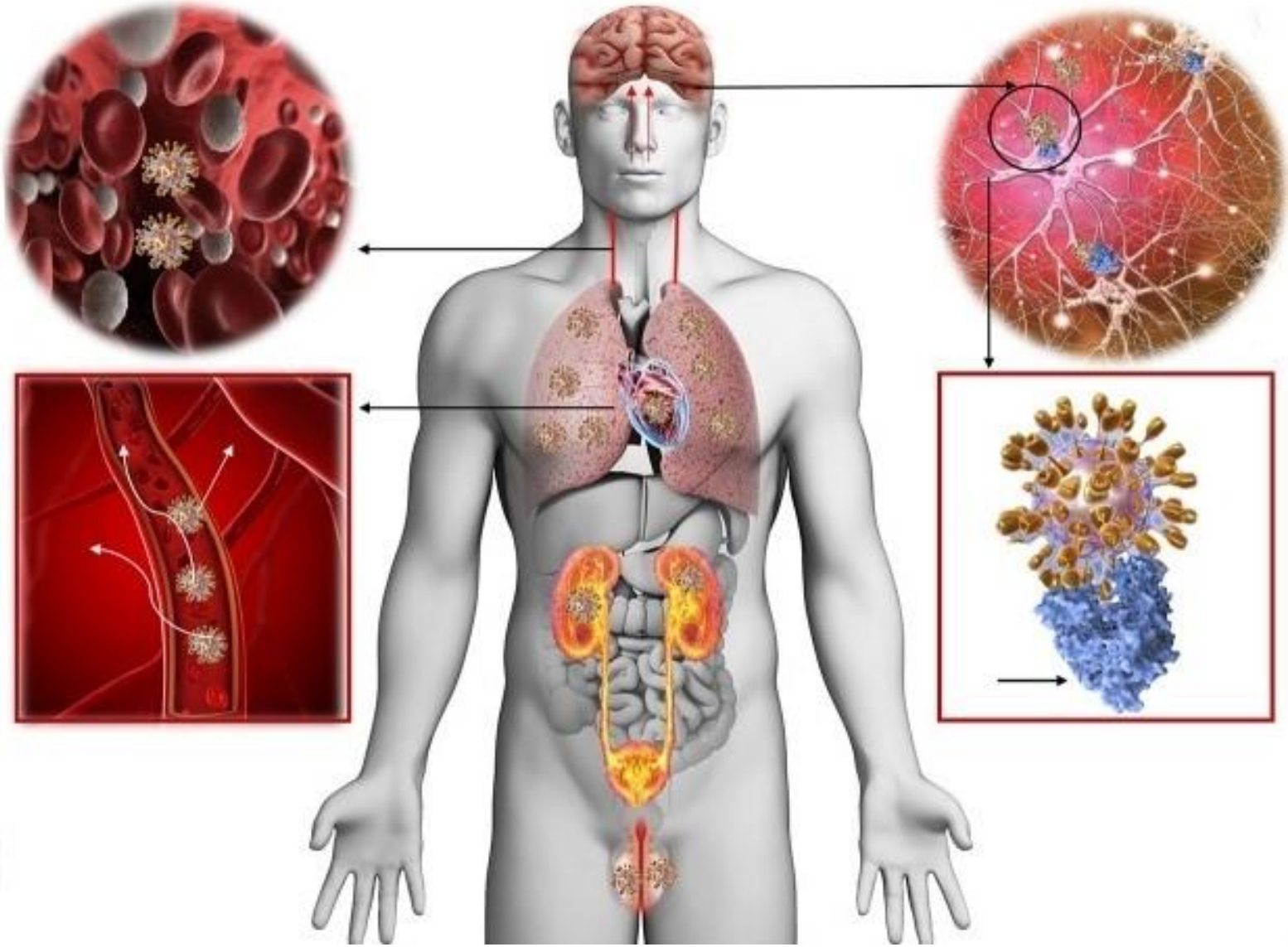
MECHANISM OF KIDNEY DYSFUNCTION IN COVID-19

- Mechanism of kidney injury in COVID-19 is still unclear
- Theories include:
  - Viral infection
  - Thrombosis
  - Cytokine storm-induced injury
  - Treatment modalities
- More than one of these may contribute to acute kidney injury in COVID-19

Ronco C, Reis T. Kidney involvement in COVID-19 and rationale for extracorporeal therapies. *Nat Rev Nephrol.* April 9, 2020. https://doi.org/10.1038/s41581-020-0284-7

POSSIBLE VIRAL INJURY TO KIDNEYS IN COVID-19

- SARS-CoV-2 likely enters human cells by binding to the ACE-2 receptor
- ACE-2 receptors are found on *podocyte* cells and in the *proximal tubule* of the kidney



Baig AM, Khaleeq A, Ali U, Syeda H. Evidence of the COVID-19 virus targeting the CNS: Tissue distribution, host-virus interaction, and proposed neurotropic mechanisms. *ACS Chem Neurosci*. 2020;11(7):995-998. https://dx.doi.org/10.1021/acschemneuro.0c00122

Naicker S, Yang CW, Hwang SJ, Liu BC, Chen JH, Jha V. The novel coronavirus 2019 epidemic and kidneys. *Kidney Internat*. 2020;97(5):824-828. https://doi.org/10.1016/j.kint.2020.03.001

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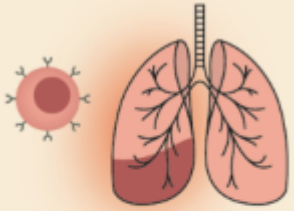
POSSIBLE KIDNEY THROMBOSIS IN COVID-19

RISK FACTORS

- Acute illness
- Bed-ridden, stasis
- Genetics
- Fever
- Diarrhea
- Sepsis
- Liver injury
- CKD
- COPD
- HF
- Malignancy

INFLAMMATORY RESPONSE → ENDOTHELIAL DYSFUNCTION SUPERINFECTED

Tissue factor
↓TFPI

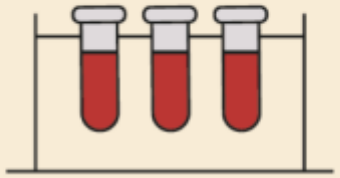


Lymphopenia

Inflammatory cytokines
↑IL-6, CRP

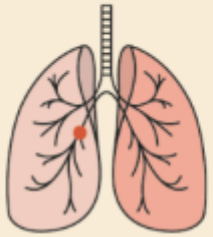
HEMOSTATIC ABNORMALITIES

- Pulmonary microthrombi
- Intravascular coagulopathy
- Myocardial injury
- ↑Cardiac biomarkers



- ↑D-dimer, FDPs, PT
- ↓Platelets

CLINICAL OUTCOMES



Venous Thromboembolism

Myocardial Infarction

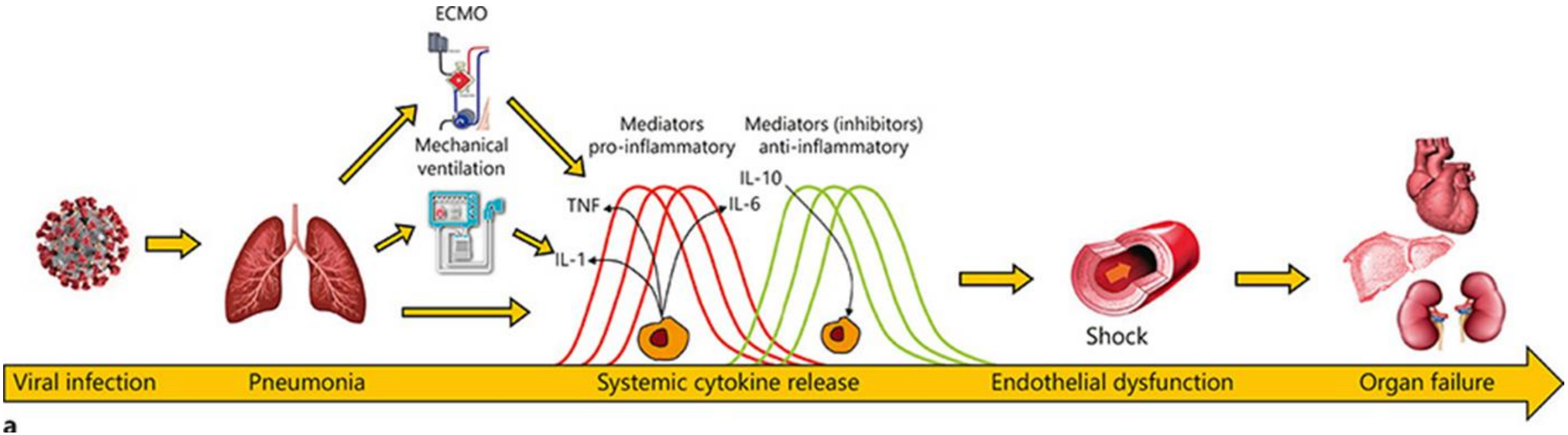
Disseminated Intravascular Coagulation

-Continuous Dialysis circuits are clotting frequently, adding to shortages

-Thromboses in the kidney may affect kidney function

Bikdeli B, Madhavan MV, Jimenez D, et al. COVID-19 and thrombotic or thromboembolic disease: Implications for prevention, antithrombotic therapy, and follow-up. *J Am Coll Cardiol*. April 17, 2020 https://doi.org/10.1016/j.jacc.2020.04.031

POSSIBLE KIDNEY INJURY DUE TO CYTOKINE STORM



Ronco C, Reis T, De Rosa S. Coronavirus epidemic and extracorporeal therapies in intensive care: si vis pacem para bellum. *Blood Purif*. March 13, 2020. https://doi.org/10.1159/000507039

POSSIBLE TREATMENT-INDUCED INJURY TO KIDNEYS IN COVID-19

Increased intrathoracic pressure with mechanical ventilation*

- ARDSnet protocols suggest higher PEEP and lower FiO2
- High PEEP can create higher intra-abdominal pressure
- Contributes to decreased renal function

Inadequate fluid resuscitation for lung protection**

- Guidelines initially suggested conservative fluid resuscitation for lung protection
- Easy to underestimate insensible loss from fever and sepsis
- May result in pre-renal injury

*Koyner JL, Murray PT. Mechanical ventilation and lung-kidney interactions. *Clin J Am Soc Nephrol*. 2008;3(2):562-570. https://doi.org/10.2215/CJN.03090707

**Alhazzani W, Moller MH, Arabi YM, et. al. Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). *Intensive Care Med*. March 28, 2020. https://doi.org/10.1007/s00134-020-06022-5

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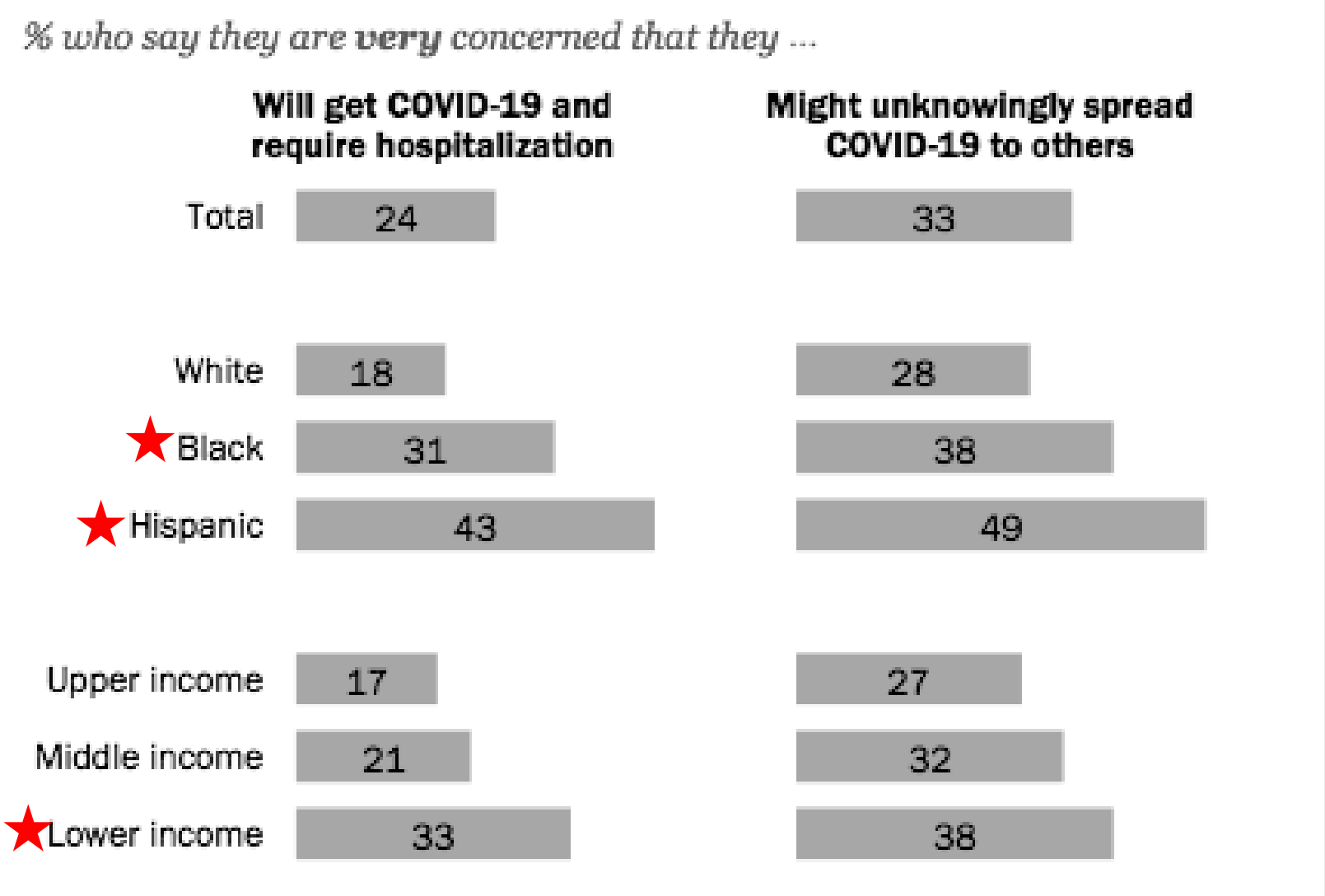
COVID-19: BLACK PEOPLE AND OTHER MINORITIES ARE HARDEST HIT IN U.S.

- Black people are hospitalized and dying at disproportionally higher rates from COVID-19
- Underlying conditions and social and historical factors are at play
- Other “invisible” communities where there are little data will likely suffer disproportionately
- These include U.S. indigenous peoples and undocumented immigrants

Dyer O. COVID-19: Black people and other minorities are hardest hit in US. *BMJ*. April 14, 2020. https://doi.org/10.1136/bmj.m1483

RACIAL AND INCOME DIFFERENCES IN CONCERNS OVER CONTRACTING COVID-19, SPREADING IT TO OTHERS



Pew Research Center. Health Concerns from COVID-19 Much Higher Among Hispanics and Blacks than Whites. April 14, 2020. https://www.people-press.org/2020/04/14/health-concerns-from-covid-19-much-higher-among-hispanics-and-blacks-than-whites

OPINION: FAILING ANOTHER NATIONAL STRESS TEST ON HEALTH DISPARITIES

- Social determinants of health relevant to COVID-19 include:
  - Living in poverty, cramped apartments where social distancing is difficult, areas where access to healthy food is limited, having to take public transportation when unable to work from home, working front-line jobs under hazardous conditions with limited access to PPE
- Biological risk factors include diabetes, hypertension, and obesity
- Further contributing influences
  - Health beliefs, lack of cultural competency among providers, and provider distrust
- These can all contribute to high rates of infection and death among blacks and Latinos as compared to whites

Owen WF, Carmona R, Pomeroy C. Failing another national stress test on health disparities. *JAMA*. April 15, 2020. https://jamanetwork.com/journals/jama/fullarticle/2764788

OPINION: FAILING ANOTHER NATIONAL STRESS TEST ON HEALTH DISPARITIES

- While data are still limited, they should compel inclusion of health disparities and the effects of social determinants in ongoing pandemic response planning
- Authors recommend two immediate actions:
  - Mandate data collection of COVID-19 cases stratified by race, ethnicity, sex, socioeconomic status, and community health status
  - Multilingual multimedia public service announcement campaign targeting minority populations

Owen WF, Carmona R, Pomeroy C. Failing another national stress test on health disparities. *JAMA*. April 15, 2020. https://jamanetwork.com/journals/jama/fullarticle/2764788

NYC HEALTH DEPARTMENT RESOURCES ON COVID-19

- Provider page: on.nyc.gov/covid19provider
- Data page: on.nyc.gov/covid19data
- Weekly webinars: Fridays, 2 PM (sign up on provider page)
- Dear Colleague COVID-19 newsletters (sign up for *City Health Information* subscription at: nyc.gov/health/register)
- NYC Health Alert Network (sign up at https://www1.nyc.gov/site/doh/providers/resources/health-alert-network.page)

QUESTIONS?