Our understanding of COVID-19 is evolving rapidly. This presentation is based on our knowledge as of May 28, 2020, 5 PM.
WHERE WE ARE NOW

• More than 5.5 million cases and 350,000 deaths due to COVID-19 confirmed worldwide

• Outbreaks continue to accelerate in many parts of the world, including in South America, and in parts of the United States

• In NYC, there has been a sustained decline in case counts, hospitalizations, and deaths

• Prevention measures must be maintained as we transition to a new stage in the pandemic response: suppression

CUMULATIVE CASES AND DEATHS REPORTED TO WORLD HEALTH ORGANIZATION

5/28/20

>5,500,000 cases
>353,000 deaths
CUMULATIVE CASES AND DEATHS, U.S.
5/28/20

>1,700,000 cases
(~30% of confirmed global cases)

>101,000 deaths
(~30% of reported global deaths)

CASES AND DEATHS PER DAY, UNITED STATES

**CURRENT STATUS OF OUTBREAK, NYC 5/28/20**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory-confirmed cases</td>
<td>198,255</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>51,449</td>
</tr>
<tr>
<td>Deaths</td>
<td></td>
</tr>
<tr>
<td>Confirmed</td>
<td>16,673</td>
</tr>
<tr>
<td>Probable</td>
<td>4,742</td>
</tr>
</tbody>
</table>

NYC Health Department. COVID-19: data. Updated daily.
COVID-19 CASES, NYC

Shows number of daily COVID-19 cases, hospitalizations, and deaths since March 3.

Deaths lag 1-2 weeks after hospitalizations.

COVID-19 DATA BY ZIP CODE OF RESIDENCE

COVID-19 DEATHS

5/28/20

Shows rate of COVID-19-related deaths per 100,000 people according to age group, race-ethnicity,* and neighborhood poverty level.*

*Age-adjusted
MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C)

Julia Schillinger, MD, MSc
Senior Director of STI Surveillance, Epidemiology, and Special Projects
NYC Department of Health and Mental Hygiene
• Serious illness with some clinical features of Kawasaki disease and toxic shock syndrome
• Fever lasting several days, along with other symptoms, including:
  • Gastrointestinal: abdominal pain, diarrhea, vomiting
  • Conjunctivitis
  • Rash
  • Irritability or sluggishness
  • Lymphadenopathy
• Breadth of symptoms, spectrum of illness still being defined
• Elevated inflammatory markers
• Majority positive for SARS-CoV-2 antibody, some for virus (rRT-PCR)
  • Hypothesized illness mediated by immune response rather than direct viral injury
ANY INDIVIDUAL AGED <21 YEARS WHO MEETS CLINICAL + GENERAL LABORATORY CRITERIA AND DOES NOT HAVE AN ALTERNATE DIAGNOSIS

CLINICAL CRITERIA (ALL 3 REQUIRED):
1. ≥ 1 day of subjective or measured fever (≥ 100.4°F/38°C)
2. Hospitalization
3. Either ≥ 1 of the following:
   • Hypotension or shock
   • Features of severe cardiac illness
   • Other severe end-organ involvement (excluding severe respiratory disease alone)

OR ≥ 2 of the following:
   • Maculopapular rash
   • Bilateral non-purulent conjunctivitis
   • Mucocutaneous inflammatory signs (mouth, hands, or feet)
   • Acute GI symptoms (diarrhea, vomiting, or abdominal pain)

GENERAL LABORATORY CRITERIA:
≥ 2 markers of inflammation (e.g. neutrophilia, lymphopenia, elevated CRP)

MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN (MIS-C)

- Report all possible cases to the NYC Health Department by calling the Provider Access Line: *(866) 692-3641*
  - Report regardless of laboratory evidence of SARS-CoV-2 infection
  - Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection
- NYC Health Department investigates all reports
- As of May 28, 203 reports were received by NYC Health Department
  - 124 met CDC case definition superscript 1 for MIS-C
  - 39 did not meet case definition
  - 40 still under investigation
  - 1 death reported

CDC Health Alert. 5/14/2020. [https://emergency.cdc.gov/han/2020/han00432.asp](https://emergency.cdc.gov/han/2020/han00432.asp)
SEQUELAE OF COVID-19 AND CONSIDERATIONS FOR POST-HOSPITAL CARE

Betty Kolod, MD, AAHIVS
Acute Care Planning and Strategies
NYC Department of Health and Mental Hygiene
OUTLINE

• Complications of severe COVID-19 illness
• Challenges to post-acute care access
• Considerations for COVID-19 post-discharge care
LONG ROAD FROM ICU TO RECOVERY

- Months to years
- Late mortality
- Cognitive deficits
- Mental illness
- Debility
- Decreased quality of life

Angus 2003; Needham 2012; Pandharipande 2013
# POST INTENSIVE CARE SYNDROME (PICS)

<table>
<thead>
<tr>
<th>Cognitive</th>
<th>Psychological</th>
<th>Physical Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Memory</td>
<td>• Anxiety</td>
<td>• Dyspnea</td>
</tr>
<tr>
<td>• Attention</td>
<td>• Depression</td>
<td>• Pain</td>
</tr>
<tr>
<td>• Visuo-spatial</td>
<td>• Post-traumatic stress disorder</td>
<td>• Sexual dysfunction</td>
</tr>
<tr>
<td>• Psychomotor</td>
<td></td>
<td>• Muscle weakness</td>
</tr>
<tr>
<td>• Impulsivity</td>
<td></td>
<td>• Fatigue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Impaired exercise tolerance</td>
</tr>
</tbody>
</table>

McNeary 2020; Stam 2020; Zhou 2020
## PICS Risk: Survivors of Severe COVID-19 Illness

<table>
<thead>
<tr>
<th>Severe COVID-19 Illness</th>
<th>Risk Factors for PICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hypoxia and hypotension</td>
<td>• Hypoxia and hypotension</td>
</tr>
<tr>
<td>• Sepsis</td>
<td>• Sepsis</td>
</tr>
<tr>
<td>• Diabetic ketoacidosis</td>
<td>• Glucose dysregulation</td>
</tr>
<tr>
<td>• 75+</td>
<td>• Age</td>
</tr>
<tr>
<td>• Long duration of mechanical ventilation</td>
<td>• Duration of mechanical ventilation</td>
</tr>
<tr>
<td>• Multiple comorbidities</td>
<td>• Premorbid mental and physical morbidity</td>
</tr>
<tr>
<td>• Delirium</td>
<td>• Delirium</td>
</tr>
<tr>
<td>• Isolation; no family at the bedside</td>
<td>• Duration of sedation</td>
</tr>
<tr>
<td>• Heavy, long-duration sedation</td>
<td></td>
</tr>
</tbody>
</table>

MECHANICAL VENTILATION AND TRACHEOSTOMY

- In a study of 1,150 patients hospitalized in NYC with COVID-19:
  - 18% required mechanical ventilation
  - Median 18 days on mechanical ventilation
- Difficult weaning and early tracheostomy
- Few decannulated by discharge

Cummings 2020; Postelnicu 2020
In a study of 5,449 patients hospitalized in NYC with COVID-19:

- 36.6% developed acute kidney injury (AKI)
  - 14.3% required renal replacement therapy (RRT)
  - 35% expired
- AKI among 89.7% of mechanically ventilated patients
  - 96.8% of patients requiring RRT were on a ventilator
- Hemodialysis and peritoneal dialysis capacity to meet need?

Chugh 2020; Cummings 2020; Hirsch 2020; Kliger 2020
ROADBLOCKS TO DISCHARGE

• Tracheostomy at 14 to 21 days or later
• Delayed PEG placement
• Medical acuity
  • Anticoagulation
  • Hypercoagulable
  • Pneumothoraces
• Discontinuation of transmission-based precaution

Lisker 2020
# POST-ACUTE CARE

Rehabilitation or palliative services following a stay in an acute care hospital, including:

- Skilled nursing facility
- Inpatient rehabilitation facility
- Long-term care hospital
- Home care from home health agency

<table>
<thead>
<tr>
<th>Long-term Acute Care Facility (LTAC)</th>
<th>Skilled Nursing Facility (SNF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Telemetry</td>
<td>- For stable patients with predictable course</td>
</tr>
<tr>
<td>- IV medication</td>
<td>- Staffed by RT and nursing</td>
</tr>
<tr>
<td>- RRT</td>
<td>- Mental health, aggressive rehabilitation not available</td>
</tr>
<tr>
<td>- Nasogastric feeding</td>
<td>- Must be medically stable</td>
</tr>
<tr>
<td>- Respiratory therapy (RT)</td>
<td>- Cohort vs. patients with conversion to negative tests in general unit</td>
</tr>
<tr>
<td>- Higher nursing ratio</td>
<td>- Few SNF spots for both RRT and mechanical ventilation</td>
</tr>
<tr>
<td>- Greater than 50% successful weaning</td>
<td></td>
</tr>
<tr>
<td>- <strong>Challenge: NYS DOH certificate of need required</strong> (H + H Henry J. Carter LTAC)</td>
<td></td>
</tr>
</tbody>
</table>

Lisker 2020
CHALLENGES TO POST-ACUTE CARE CAPACITY

- Pre-pandemic, New York State SNF bed occupancy 90%, higher than national average
  - Kings County SNF bed availability 40/10,000 person (vs. 53/10,000 persons hospitalized for COVID-19)
  - Bronx County SNF bed availability 81 beds/10,000 person (vs. 80/10,000 persons hospitalized for COVID-19)
- Understaffing
- Potential policy solutions, particularly for those who remain infectious:
  - Exclusive COVID-19 post-acute care with robust infection control
  - Convert rural, low-occupancy hospitals, hotels, dorms
  - Recruit from industries with extensive layoffs to meet staffing needs
  - Invest in hospital-at-home programs

Grabowski 2020; Kaiser Family Foundation 2019; NYC Health Department. COVID-19: data.
https://www1.nyc.gov/site/doh/covid/covid-19-data.page
LATE CONSIDERATIONS OF MODERATE COVID-19

- Isolation status
- Anticoagulation
- Mental health
- Rehabilitation
• **Requires:**
  * Caregiver
  * Separate bedroom
  * Food
  * Face covering
  * Precautions to protect vulnerable members of household

• **Patients who have been symptomatic with COVID-19 should remain in home isolation until:**

<table>
<thead>
<tr>
<th>Symptom-Based Strategy</th>
<th>Test-Based Strategy</th>
</tr>
</thead>
</table>
| • At least 10 days after symptom onset; AND  
  • Absence of fever for at least 3 days without antipyretics; AND  
  • Overall illness has improved | • Improvement in respiratory symptoms; AND  
  • Resolution of fever; AND  
  • At least two consecutive respiratory specimens collected ≥24 hours apart negative for SARS-CoV-2 RNA |
Venous thromboembolism (VTE) incidence:
- 5.8% of 123 non-critical hospitalized patients by hospital day 7
- 58% of 75 ICU patients by hospital day 21

<table>
<thead>
<tr>
<th>Prophylactic Anticoagulation</th>
<th>Empiric Anticoagulation</th>
<th>Therapeutic Anticoagulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced mobility, cancer, or D-dimer &gt; x 2 normal</td>
<td>No VTE but high D-dimer (&gt;1,500 ng/mL)</td>
<td>Confirmed VTE</td>
</tr>
<tr>
<td>≤ 45 days</td>
<td>Consider prophylactic, intermediate or empiric therapeutic regime</td>
<td>Minimum of 3 months</td>
</tr>
</tbody>
</table>

Bikdeli 2020; Middeldorp 2020; Tang 2020
PSYCHIATRIC MORBIDITY

• Severe Acute Respiratory Syndrome (SARS), 2003 outbreak: anxiety, depression, PTSD and substance use disorders
• Anxiety: among those self-isolated for COVID-19, mean anxiety mild to moderate
• PTSD: 96.2% among stable COVID-19 survivors held in temporary isolation hospitals

Bo 2020; Galea 2020; Holmes 2020; Xiao 2020
## REHABILITATION

### Pulmonary function assessment techniques:

<table>
<thead>
<tr>
<th>Assessment Items</th>
<th>Assessment Results</th>
<th>Suggested Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breath-Hold Test</td>
<td>&lt;10 seconds (30 seconds is normal)</td>
<td>Impaired lung function</td>
</tr>
<tr>
<td>Heart rate before and after</td>
<td>102–124 beats/min</td>
<td></td>
</tr>
<tr>
<td>Oxygen saturation change</td>
<td>97%–94%</td>
<td>Severely impaired endurance</td>
</tr>
<tr>
<td>Borg Dyspnea Scale score</td>
<td>0–2</td>
<td></td>
</tr>
<tr>
<td>Squat</td>
<td>Cannot complete independently</td>
<td>Lower limb muscle atrophy</td>
</tr>
</tbody>
</table>
COVID-19 POST-DISCHARGE CLINIC MODEL

- Communication
  - Patient
  - Hospital
  - Primary care
  - Specialists
  - Caregivers
- Proactive care of COVID-19 complications and exacerbated comorbidities
- Telemedicine
- Equipment
- Outcomes research and quality improvement

Bryson 2020; Sommer 2020
COVID-19 POST-HOSPITAL CLINIC BEST PRACTICES

- Reliable, regular contact
- Caregiver engagement
- Simple functional assessments
- Stress management
- Group visits via video conference
- Same-day/next-day appointments with specialists

Sommer 2020
TAKEAWAYS

• Prevent, diagnose and treat functional impairment, including cognitive dysfunction, physical debility and psychiatric morbidity

• Policy must address great need for post-acute care beds

• Care coordination and telehealth will be instrumental in the recovery of COVID-19 survivors
RESOURCES FOR
AMBULATORY
CARE PROVIDERS

Matthew Gannon
Bureau of Equitable Health Systems
Center for Health Equity and Community Wellness
ABOUT NYC REACH

• NYC REACH is operated by the Bureau of Equitable Health Systems within the NYC Health Department

• Free membership organization for NYC private practices, community health centers, health systems, and pharmacies

• Members eligible for support with health information technology, primary care workflows, medication therapy management, chronic disease self-management, the referral process, and other quality improvement projects

• Providing free resources and training for members and non-members in response to COVID-19 public health emergency
TELEHEALTH

• CMS and NYS expanded telehealth reimbursement and relaxed restrictions

• NYC REACH Primary Care Survey shows increase in uptake
  • March 2020: 81% (73/95)
  • April 2020: 89% (183/206)
  • May 2020: 91% (201/220)

• Next steps for practices: ensure telehealth implemented sustainably, develop protocols, integrate into forward planning
TELEHEALTH AND RE-OPENING

• Practices should consider
  • Finalizing protocols for telehealth: triage, monitoring of COVID+ patients, hybrid telehealth/in-person visits, etc.
  • Conducting comprehensive risk stratification to prioritize patient outreach and evaluate appropriateness of telehealth vs. in-person visits
  • Integrating telehealth strategically into schedule
  • Tailoring messaging and education for patients
  • Implementing permanent, HIPAA-compliant video platforms, and remote patient monitoring tools

• NYC REACH can support with training and resources
EHR data can be used for risk stratification, which supports prioritizing patients for outreach, developing protocols for in-person vs. telehealth visits, identifying opportunities for care and case management, and more
Licensed clinicians volunteer their time during periods of public health emergency; ambulatory care settings encourage to post requests for support, e.g.:

- **Physician, NP, PA**: Remote telehealth monitoring of practice’s COVID+ patients currently in isolation
- **Nurse**: Remote pre-screening of patients scheduled to come into the practice, remote post-visit patient follow-up with patients at high risk, in-person support of catch-up vaccination clinic
- **Social Worker**: Remote telehealth visits with patients experiencing COVID-related mental health concerns

- Register for NYC REACH’s informational webinar next Friday:
  [https://nycreservecorp.eventbrite.com](https://nycreservecorp.eventbrite.com)
• NYC has two Regional Health Information Organizations (RHIOs):
  • Healthix
  • Bronx RHIO

• Both provide NYS-required health information exchange tools, including:
  • Patient Record Lookup
  • COVID-19 Testing Alerts
  • Hospital Event Notifications (ED visit, Admit, Discharge)

• Participation in a RHIO supports transitional care management
ACCESSING NYC REACH RESOURCES

- Resources and trainings open to all NYC members and non-members in response to COVID-19 public health emergency
  - Telehealth trainings, resources, updates
  - Identification of high-risk patients
  - Patient outreach support
  - Medical Reserve Corps connections
  - Updates on policy changes and financial resources

- Connect with us via email: nycreach@health.nyc.gov

- Visit our website and search “COVID-19 Support”
  http://www.nycreach.org
COVID-19 Resources by Neighborhood

The below documents list the resources currently available in your community. Some resources are available for in-person services, while others offer remote and delivery options.

- Comprehensive Resource Guide (PDF)
  Other Languages: Español | 简体中文 | Kreyol ayisyen | Français

- Belmont and East Tremont (ZIP codes: 10457, 10458, 10460) (PDF, May 12)
- Fordham and University Heights (ZIP codes: 10463, 10468, 10469) (PDF, May 12)
- Highbridge and Concourse (ZIP codes: 10451, 10452) (PDF, May 12)
- Kingsbridge Heights and Bedford (ZIP codes: 10468, 10463, 10468) (PDF, May 12)
- Morrisania and Crotona (ZIP codes: 10456, 10460) (PDF, May 12)
- Morris Park and Bronxdale (ZIP code: 10462) (PDF, May 12)
- Mott Haven and Melrose (ZIP codes: 10451, 10466) (PDF, May 12)
- Parkchester and Soundview (ZIP codes: 10462, 10472, 10473) (PDF, May 12)
- Riverdale and Fieldston (ZIP codes: 10463, 10471) (PDF, May 12)
- Williamsbridge and Baychester (ZIP codes: 10466, 10467, 10469) (PDF, May 12)

- Bronx Sexual and Reproductive Health Provider Directory (PDF)
NYC Health Department:
- 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)
- Provider Access Line: **866-692-3641**

Other sources:
REFERENCES:

SEQUELAE OF COVID-19 AND CONSIDERATIONS FOR POST-HOSPITAL CARE


- Bryson WH. Post-Hospital Care for COVID-19: Primary Care Perspective. Webinar: COVID-19 Lessons from the Front Line: Transitions and Care of the Post-Discharge Patient. May 13, 2020. [https://assets.acponline.org/coronavirus/scormcontent/?&_ga=2.72477595.928454907.1589172989-1023225359.1587319785#/lessons/l_iQYVhe41NOQOm_m05P4YwGh_ffZsL](https://assets.acponline.org/coronavirus/scormcontent/?&_ga=2.72477595.928454907.1589172989-1023225359.1587319785#/lessons/l_iQYVhe41NOQOm_m05P4YwGh_ffZsL)


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