Welcome! - How to Participate Online

• Use computer audio (versus telephone).
• All participants are muted upon entry. Please do not unmute yourself.
• Please do not turn on your camera unless you are speaking.
• Hover your cursor over the WebEx window to access the menu pictured below.
• To ask a question, type it into the Chat function on the bottom right.

• Raise your hand to request to be un-muted when we pause for questions and comments:
  • Open the Participants panel & click the hand icon next to your name
COVID-19 Testing & Surveillance: Expert Briefing and Discussion on Latest Developments / Regimens
Welcome & Overview

Bill Raisch
Co-Director, Project NEXT™
& Director, International Center for Enterprise Preparedness (INTERCEP)
New York University
Tandon School of Engineering

Mary Beth Labate
President
Commission on Independent Colleges & Universities in New York
Informed by Ongoing Input from SOC-NET - Major Corporations Collaborating on Shared Challenges

• Dozens of Leading Corporations Connected & Collaborating 24/7/365

• Info & Best Practice Sharing / Benchmarking on Shared Risks including COVID-19

• Identified a Clear Need for a Problem Solving Approach & Improved Access to Actionable Resources on COVID-19

• To join SOC-NET: Contact INTERCEP@NYU.EDU
The Response: Project NEXT™

Mission: To bring key stakeholders together to best adapt and re-imagine operations and operating environment for organizations in response to the current and emerging threats including infectious disease – while also innovating for the better.

1. Identify & Analyze Key Challenges
2. Evaluate Potential Solutions / Enhance / Innovate
3. Share Insights Widely
Core Objectives

• Connect Diverse Stakeholders (users, subject matter experts & solution providers) to address urgent needs

• Partner with Leading Associations to Enable Robust Cross-Pollination of Practices & Lessons Learned on Ongoing Basis

• Advance a Holistic / Interconnected Vision - Supporting Coordination Across Efforts

• Innovate for the Better: Advancing Core Imperatives in creating our New Environment

• Integrate Incentives: Insurance, Legal Liability, Rating Agency, Operational Risk / Continuity
Identify Key Challenges / Needs
Current & Emerging

Analyze
Contributing Factors / Drivers / Considerations

Identify & Evaluate Current Solutions

Identify Potential Enhancements Improvements to Existing Solutions
If Appropriate

Spotlight Effective Approaches & Propose New Solutions As Needed

Direct User / Stakeholder Engagement: Forums, Interviews, Surveys & Research

Deliverables & Products:
- Needs Inventory
- Problem Analysis
- Inventory of Potential Solutions
- Enhancements & Improvements
- Innovations & New Approaches
- Connection of Users to Solution Providers
- Stakeholder Groups for Further Development / Test Beds / Pilots
Serving as a Global Resource & Innovation Hub

- Connecting Key Stakeholders to Collaborate on Shared Challenges
Collaborating with Leading Associations to Engage & Support Key Sectors

Key Associations

Join us: JLC27@nyu.edu or INTERCEP@nyu.edu
The COVID-19 Challenge Program

- **Targets an urgent issue** in need of innovative solutions
- **Engages key stakeholders**: subject matter experts, impacted organizations (potential users of solutions) & solution providers
- **Works through a fast-tracked problem solving approach** to identify and assess potential solutions
- **Produces actionable products** for the impacted organizations:
  - Problem analysis (key drivers, considerations, etc.)
  - Inventory of potential solution approaches
  - Assessments of key products/services with strengths/weaknesses of major solution types
  - Identification of potential enhancements/innovations to spur new solutions
Guest Panelists

Peter Katona, MD
- Chair, Infection Control Working Group, Clinical Professor of Medicine (Infectious Diseases), Adjunct Professor of Public Health (Epidemiology)
- UCLA Schools of Medicine and Public Health

Rob Lawlis
- Chief Executive Officer
- Cayuga Health Partners

Michelle Parent, PhD
- Associate Professor Microbiology & Clinical Laboratory Sciences, Director, Clinical Laboratory Services, The Collaboratory
- Albany College of Pharmacy & Health Sciences

Beth Plocharycz, MD
- Assistant Medical Director Cayuga Medical Center Laboratory

Murad Raheem
- Regional Emergency Coordinator
- US Department of Health & Human Services

Shane Rogers
- Associate Professor of Civil & Environmental Engineering
- Clarkson University

Ivan Silva, PhD
- Interdisciplinary Scientist (Project Officer)
- BARDA (Biomedical Advanced Research and Development Authority)
- US Department of Health & Human Services
Overview of Key COVID-19 Testing Regimes & Update on PCR Testing

Peter Katona, MD

Chair, Infection Control Working Group, Clinical Professor of Medicine (Infectious Diseases)

Adjunct Professor of Public Health (Epidemiology)

UCLA Schools of Medicine and Public Health
Covid-19 Testing Overview
International Center for Enterprise Preparedness
(INTERCEP) NEXT
New York University

Peter Katona, MD
Chair, Infection Control Working Group
Professor of Medicine and Public Health
UCLA
Covid Epidemic Curve
The 1918 Pandemic

The influenza pandemic of 1918 spread across Europe, Asia and North America in three distinct but uneven waves, and was fatal for about 2 percent of those who caught it. Global data is incomplete, but death rates in Britain hint at the severity of the three waves.

Weekly influenza and pneumonia deaths in Britain, 1918-19

<table>
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<th>Month</th>
<th>First Wave</th>
<th>Second Wave</th>
<th>Third Wave</th>
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</tr>
<tr>
<td>Apr. 1919</td>
<td>5</td>
<td></td>
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</tr>
</tbody>
</table>

Sources: Emerging Infectious Diseases; Jeffery K. Taubenberger and David M. Morens
As of today

- 90% of US population still susceptible
- Total 106 million tests already done in US
- 1 million tests per day ➔ promised 3 million (mostly POC)
- LA County currently down from 20,000 to 10,000 tests per day (affects cases/100,000)
- Upsurge on college campuses, young adults
How we got here with testing

• Late 2019: Covid started in Wuhan
• January 2020:
  – Cases expanded globally
  – Genome published
  – Testing started
• Counties develop their own test or used the German / WHO test
• Countries that ramped up testing early did much better
Why the US testing problem?

• Unprecedented need
• Late start
• FDA and CDC confusion, politicization
• CDC initially limiting testing
• Lab contamination
• WHO / German test refused
• Commercial & other labs initially left out
• Shortages / maldistribution of PPE, test machines, people, test sites, swabs, reagents

• NO COORDINATED FEDERAL PLAN
A Testing Mess

- Regulatory hurdles
- Horrific bureaucracy
- Lack of leadership
- Lack of coordination at many levels
- Misunderstandings, arrogance
- Slow community-level surveillance
- Political oversight over science
- Federal-state jurisdiction fights
Who has authority over lab test approval?

- Institutional Review Board (IRB)
  - Limited
- CDC (controls, LRN*)
  - EUA Issued 2/4
- FDA
  - Grants ultimate authority
  - Gives emergency use authorizations (EUAs)
- CMS (has cumbersome certification regs)
- Clinical Laboratory Improvement Amendments (CLEA) certification
- **Not** non-government labs, WHO, and academic centers

*Lab Response Network includes CDC, USDA, FDA, state/local, military, food testing, environmental, veterinary, int’l labs
Who can do lab testing?

• Public health (including CDC)
• Commercial clinical
• Commercial non-clinical
• Hospital
• Academic
• Veterinary

WE WERE VERY SLOW TO UTILIZE
Optimizing Covid Testing

• Get it done quickly with quick result
• More the better for both surveillance and cases
• Target the most likely to be positive......but
• Understand accuracy, terminology
• Plug the gaps
• Differentiate between an individual and a cohort
• Sacrifice accuracy for speed, cost?
• Quick and thorough contact tracing
Misunderstood Terminology

• # Cases (counted) does not mean # infected
• Case positivity
• Prevalence & incidence of disease in a population
• Farr’s Rule
• Sensitivity, specificity, predictive value of the test

LESS TESTS DOES NOT MEAN LESS INFECTED
Sensitivity – 100% = no false negatives

Specificity – 100% = no false positive tests
• **Prevalence**
  – Proportion of total cases in the population at a given time (rather than rate of occurrence of new cases). It indicates how widespread the disease is. It is the number of people with the characteristic of interest, divided by the total number of people in the sample.

• **Incidence**
  – Probability of occurrence in a population within a specified period of time. Conveys information about the risk of contracting the disease. Sometimes loosely expressed simply as the number of new cases during a specified time period. Better expressed as a proportion or a rate with a denominator.
Covid Testing

- **Molecular RT-PCR or Nucleic acid amplification tests (NAAT)**
  - Presence of viral RNA
- **Antigen Rapid Diagnostic Tests (RDTs)**
  - Presence of protein
  - Less accurate

- **Immunodiagnostic for antibodies (ELISA)**
  - FDA confusion, EUAs
  - Populations > individuals
  - Point of care (POC) blood/blot
  - NO PPE needed
- **Viral culture**
  - Dangerous to do
  - Should be gold standard
Purpose of Testing

• **RNA & Antigen = current cases**
  - Symptomatic & asymptomatic
  - Prevalence (for a specific time)
  - Eradicating hot spots
  - Hospital triage

• **Antibody = past / background cases**
  - Individual’s current immunity status
  - Duration of immunity
  - Community risk
  - Finding old hot spots
  - Inaccurate
Covid-19 Antibodies: Plasma and Monoclonal
Moving on from RT-PCR………

- Viral load quantification
- High throughput
- Gold standard
- Infection v. transmissibility
- Pooling algorithms
RT-PCR/RT-qPCR

- **Flourescence**
- **Ct Value**
- **Sample**
- **Exponential phase**
- **Threshold**
- **Number of Cycles**
Viral Load & Symptoms

![Graph showing cycle threshold and probability of culture positive over the days from symptom to test](image)
Why can’t we easily quantify?

Accumulated inhibitors, inactivated polymerases and limiting reagents create a lot of variation in endpoint values.
Testing Accuracy Varies

- The sensitivity & specificity of the test
- # cycles threshold
- Stage of illness
- Concentration of virus in the specimen
- Quality & quality of specimen collected
- Precise reagent formulation
- # viable viral particles detectable under/over threshold
- Collection methodology / materials
- Population prevalence
Many sites collected by a healthcare professional: Which is better?

- Nasopharyngeal (NP)
- Oropharyngeal (OP)
- Nasal mid-turbinate swab may also be collected by supervised onsite self-collection (using a flocked tapered swab)
- Anterior nares (nasal swab) specimen collected by onsite or home self-collection (using a flocked or spun polyester swab)
- Nasopharyngeal wash/aspirate or nasal wash/aspirate (NW)

Then there is self-collected and dropped off saliva
UCLA Testing Considerations

• 40,000 college students already infected
• Oct 1 a late start helps
• Spacing out in dorms
• Planning for quarantine properly
• How frequently/where to test, logistics, high throughput, in-house
• Contact tracers ready to go
UCLA Plan Essentials

- Health science campus
- New Covid bureaucracy
- Emphasis on NPIs, outdoors, indoor ventilation, cleaning surfaces
- Student partying & non-compliance concerns
- Follow CDC, Ca, LADPH, UC (PAC-12, NCAA) guidelines + wealthy alumni, politicians pressure
- Internet v. in-person teaching
- Clinical testing, daily symptom check
- Dual surveillance testing coupled with sequestration plan
- Waste water testing
- Working on dashboard and GPS contact tracing App
- Preparations for Winter Quarter taking place
Many questions where testing will help

• Quantification of viral load inoculum - infecting dose - transmission dose, disease severity
• Asymptomatic : symptomatic transmission
• Role respiratory v. fomite
• Masks, variolization, immune response
• Disease complex = ID : autoimmune : vascular?
• Role cytokine & bradykinin storms (immune dysregulation)
Sports and Finance and Governance

- “Skate to where the puck is going, not where it has been”
- “Past performance is no guarantee of future results”
- “There are known knowns, known unknowns and unknown unknowns”
Rapid, Point-of-Care SARS COVID-19 Testing: Insights & Experiences

Michelle A. Parent, MS, PhD, MLS(ASCP)CM

Associate Professor Microbiology & Clinical Laboratory Sciences
Interim Director of Health Services

Albany College of Pharmacy & Health Sciences
Rapid, Point-of-Care SARS COVID-19 Testing: Insights & Experiences

Michelle A. Parent, MS, PhD, CLS(ASCP)CM
Associate Professor Microbiology & Clinical Laboratory Sciences,
Interim Director, Campus Health Services
Director Clinical Laboratory Services at The Collaboratory
Albany College of Pharmacy & Health Sciences
michelle.parent@acphs.edu
9/24/2020
GOAL:

Establish and operationalize a **daily health questionnaire & COVID-19 testing** for the ACPHS campuses, Albany Law School, Maria College, The College of Saint Rose and Russell Sage College; employing HIPAA compliant policies; following local, state and federal reporting guidelines.

- Establish policies for campus safety & health.
- We do not have a student health services on campus.

4-25-20: **Executive Order 202.24** authorizes licensed pharmacists to order and administer **COVID-19 tests** that have been approved by the Food and Drug Administration to detect a COVID-19 infection or its antibodies.
GOAL:
Establish and operationalize a daily health questionnaire & COVID-19 testing.

- Campus expertise: Pharmacists (Medical Director), Clinical Laboratory Science (Diagnostic Testing) & Public Health (Daily data management)
- Application approved for a Limited-Service-Laboratory (LSL) to perform COVID Testing
  - https://www.wadsworth.org/regulatory/clep/limited-service-lab-creds
  - Point-of-care (POC) testing, performed at bedside, no specialized training required
  - Clinical Laboratory Improvement Amendment (CLIA), Certificate of waiver
    - Need to follow GCLP and OSHA requirements
      - https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5413a1.htm
Point-of-Care SARS COVID-19 instrument.

- CLIA certificate of WAIVER – 9 “W” assays with EUA FDA – 9/21/20

SARS Antigen- SOFIA2 QUIDEL

- Antigen detection assay
  - Supervised, self-collected nasal swab
  - Kit contains all reagents, **INCLUDING swabs**
  - 17 minutes of testing time
  - **Cost $23.00/test + PPE etc = $32.00/test total**
  - Test availability not an issue

Symptomatic & Surveillance

- Cost & RAPID results = excellent screening tool
Symptomatic & Surveillance Testing

- LSL – 8:30 to 3:30 M to F, on call Saturday testing
  - Sample collection on campus (volunteers), immediate testing and result reporting.
  - **Turnaround time on average 40 minutes from collection to result.**
  - Run 300 samples week

- **Symptomatic testing:**
  - If positive, immediate counseling then escort to quarantine or campus exit.
  - If negative by rapid assay proceed to confirmatory, saliva COVID PCR assay.
    - Send out, receiving results within 24 hours (SoftCell Laboratory- www.softcelllabs.com)
  - Screening for FLU A & B with same instrument.

- **Asymptomatic surveillance:**
  - Screening of campus populations e.g. campus residents, office suites, student class cohort.
  - Reviewed pooling options, rapid SOFIA more economical for campus.
ALL students and employees completed COVID-19 testing before entry to campus.
- NYS travel advisory states, domestic or international air flight or >300 miles travel received on campus RAPID testing.

ALL students and employee must complete daily questionnaire using ShareMyHealth
- Electronic health record
- Recorded responses to NYS required health questionnaire
ALL students and employee must complete daily questionnaire using ShareMy.Health Passport for safe campus entry.

- Problematic or answers suggesting COVID symptoms triggers testing appointment.
- Recording of all testing & daily question responses in SMH dashboard for review.
Campus Reopening, Current Policies & Campus Success

- **ALL** students and employees completed COVID-19 testing before entry to campus.
  - NYS travel advisory states, domestic or international air flight or >300 miles travel received on campus RAPID testing.

- **ALL** students and employee must complete daily questionnaire using ShareMyHealth
  - Electronic health record
  - Recorded responses to NYS required health questionnaire

- **RAPID** on campus testing of symptomatic individuals, potential exposures and individuals randomly chosen for surveillance.

- **STRICT** campus policies regarding mask usage, social distancing, campus visitors & student code of conduct contract.
Campus Success

1. Students involved in study of health sciences, uniquely positioned to comprehend the gravity of the pandemic.
2. Smaller resident population
3. *Rapid, affordable* testing and health surveillance systems
4. Catching *asymptomatic* positive cases early reduces the spread

*Team Work*
- **Wendy Parker, M.PA., Ph.D., wendy.parker@acphs.edu**
  - Director of Public Health Program
  - Director, Health Services Data Management & Analytics
- Many colleagues at our ACPHS Albany and VT campuses
Contact Information

- Michelle A. Parent, M.S., Ph.D., CLS(ASCP)CM, michelle.parent@acphs.edu
  - COVID Testing
  - Associate Professor Microbiology & Clinical Laboratory Sciences,
  - Interim Director, Campus Health Services

- Wendy Parker, M.PA., Ph.D., wendy.parker@acphs.edu
  - Data management
  - Director of Public Health Program
  - Director, Health Services Data Management & Analytics


- Limited-Service-Laboratory https://www.wadsworth.org/regulatory/clep/limited-service-lab-certs

- EUA FDA
Pooled Testing: Latest Insights & Experience Across Multiple Sample Types, Including Saliva

Rob Lawlis
Chief Executive Officer
Cayuga Health Partners

Beth Plocharczyk, MD
Assistant Medical Director
Cayuga Medical Center
COVID-19 Pooled Testing

Review of Latest Insights & Experience Across Multiple Sample Types, Including Saliva
Presenters

Dr. Plocharczyk is the Assistant Medical Director of the Cayuga Health System (CHS) Diagnostic Laboratory. Dr. Plocharczyk pioneered diagnostic applications of pooled testing techniques employed at CHS. She has continued to advance the field supporting validations across CHS, Cornell University, and platform manufacturer Rheonix. Most recently, she has completed validation and operating procedures for a diagnostic saliva test for COVID (PCR), with demonstrated equivalence between pooled and unpooled sensitivity. In addition to her board certifications in Anatomic and Clinical Pathology, Dermatopathology, and Clinical Informatics, she holds a master’s degree in public health/biostatistics.

Rob Lawlis is the Cayuga Health System (CHS) VP of Network Operations, and CEO of Cayuga Health Partners (CHP), the provider network affiliated with CHS. Mr. Lawlis is the executive lead on COVID testing operations, logistics, and technology, partnering with Tracy Gates, CHS COO, on business development, regulatory compliance, and resource deployment. Mr. Lawlis has a background in operations research and information technology, with a master’s degree in systems engineering from Cornell University.
Who is Cayuga Health System (CHS)?

• Community-based health system in upstate New York (Ithaca) including two hospitals, 400 providers

• **A special lab, and special partners**
  • Outsized lab serving clients throughout the region, processing >1m specimens per year pre-COVID.
  • Early partnership with Ithaca-based laboratory platform manufacturer Rheonix; CHS was the first lab to implement COVID-19 testing with this platform and continues to be the largest client.

• A regional leader in testing capacity, turnaround, and technology
CHS COVID Testing in numbers

• Currently serving:
  • 21 colleges, universities, and school districts
  • 17 skilled nursing facilities
  • 34 additional employers

• COVID testing:
  • >200,000 total COVID results delivered
  • 5-10% of NYS daily testing
  • Rapid-deployments regularly performing >1,000 tests at a single location
  • Mass-sampling programs since March 23rd
  • Diagnostic pooling since June 18th
  • Diagnostic pooling with Saliva validated September 13th
A Typical College Partnership

• Deploy online symptom-checker, or integration with existing campus systems
• Collaborate to tailor arrival, surveillance, and adaptive testing strategy (with prevalence and budget constraints respected)
• Available infectious disease and biosafety consultation
• Leverage online registration, scheduling, and sampling documentation app. **You can’t test 6,000 people in a day without controlling arrival times!**
• Deploy CHS team to staff initial testing events, training and supporting college staff (if in-sourcing desired)
• Transition sampling programs to college, with courier services and ongoing consultation
• Ongoing Data management, integration, advisement
What is Pooled Testing?

100 level course

- Combine multiple samples
- Run a single test
- If the test result is negative, all patients are negative
- If the test is positive, one of the patients is known to be positive
- Identify the positive individual
Pooled-Testing Barriers

• Loss of sensitivity
• Ability to return an individual result without resampling
• Contamination risks
• Data management
• Regulatory compliance; FDA & CLIA
Saliva PCR Sample acquisition

• 3 mL saliva drooled into empty sterile conical tube; patient adds 1 mL specimen transport buffer, inverts tube, cleans outside with alcohol wipe, affixes barcode label
• Sensitivity of saliva PCR using Rheonix COVID-19 MDx PCR Assay 95.1% compared to nasopharyngeal (internal data)
Saliva pooled testing

- 0.5 mL aliquots from 5 samples combined into pool and tested in one reagent slot
- All individual samples from positive pools are tested (does not require recollect)
- Saliva pooling sensitivity 100% compared to saliva individual (internal data)
Benefits of saliva pooled testing

- Extends the resource
- Self-collected, unobserved process
- Virus inactivated at collection
- Not perceived as invasive
- Fewer supply chain concerns than swab collection
- Room temperature stable collection media
- More sensitive individual result after pooling process than swabs
- Logistically simpler pooling process than with swabs
- Increased positive predictive value than single test
Key Contacts

Engaging Cayuga for COVID support:
Jennifer Turck, Senior Director, JTURCK@CAYUGAMED.ORG, 607-423-3193
Tracy Gates, COO, TGATES@CAYUGAMED.ORG 607-274-4441

Presenters:
Rob Lawlis, RLAWLIS@CAYUGAMED.ORG, 607-274-4616
Dr. Elizabeth Plocharczyk, EPOCHARCZYK@CAYUGAMED.ORG, 607-274-4474
Wastewater Testing: Latest Insight & Experience

Dr. Shane Rogers
Associate Professor, Civil & Environmental Engineering
Clarkson University
Wastewater Testing: Latest Insights & Experience

Dr. Shane Rogers
Associate Professor
Civil & Environmental Engineering
Clarkson University
Goals for COVID-19 Wastewater-Based Epidemiology

01 Monitor for changes that may be indicative of emerging cases

02 Localize presence of existing infections to improve actionability

03 Reduce testing burden and costs among a population

04 Inform early policy decisions as a leading indicator of illnesses
COVID-19 Wastewater-Based Epidemiology (WBE) is rapidly evolving in response to the pandemic as researchers globally are “dialing in” on the most suitable approaches, interpreting the results, and making further adjustments.

Three general parameters to ”tune”
Sewer (Surveillance Network)

- **Network Design**
  - Surveillance program goals
  - Analytical sensitivity
  - Location: isolation, workload, service number, cost, etc.

- **Sewer dynamics**
  - Dilution: Infiltration / inflow, combined sewers
  - Plan for data interpretation

- **Potential Interferences**
  - Known positive cases in the network
  - Network security
Sewer (Surveillance Network)

- Sample Acquisition
  - Shedding dynamics: grab vs. composite
  - Timing: trends in usage
- Potential Interferences
  - Sample holding and weather considerations

Wastewater Testing: Latest Insights & Experience
Methods (Laboratory testing)

- Sample handling
  - Biosafety: SARS-CoV-2 infectivity in sewage samples
  - Should I heat inactivate the virus?
  - Storage considerations
- Sample Concentration Methodology
  - Need for sample concentration
  - Time, handling, volume screened
  - Laboratory experience and capabilities
  - Supply chain considerations
Methods (Laboratory testing)

- Special considerations for RNA testing
  - RNA extraction / sample inhibition
  - Exogenous and endogenous controls
  - Method and analytical sensitivity (LOD)
  - Platform / sensitivity / specificity
  - Supply chain considerations

Wastewater Testing: Latest Insights & Experience
Interpretation & Response

- **Goals of the program** (e.g., emergence vs. monitoring)
- **Accounting for sewer dynamics**
  - Decay / degradation
  - Dilution: Infiltration / inflow, combined sewers
  - Interpretation of non-detects
- **Estimating numbers of active cases**¹
- **Response: plan for action**
  - Quarantine
  - Pooled / individualized testing
  - Dynamic policy changes

1. For examples, see:
   - Vallejo et al. (preprint) [https://www.medrxiv.org/content/10.1101/2020.07.02.20144865v2](https://www.medrxiv.org/content/10.1101/2020.07.02.20144865v2)
   - Bar-Or et al. (preprint) [https://www.medrxiv.org/content/10.1101/2020.04.26.20073569v1](https://www.medrxiv.org/content/10.1101/2020.04.26.20073569v1)
Wastewater Testing: Latest Insights & Experience

Emerging Needs
- COVID-19 WBE at K-12 institutions
  - Response planning
  - Potential limitations
- COVID-19 WBE at nursing facilities
- Education / student integration
  - Future of WBE
  - Preparing the next generation of wastewater engineers
Wastewater Testing:  
Latest Insights & Experience

Additional Resources for COVID-19 & COVID-19 WBE

COVID-19 WBE Collaborative  
https://www.covid19wbec.org/

COVID-19 Healthcare Coalition  
https://c19hcc.org/

US CDC  
https://covid.cdc.gov/covid-data-tracker/#cases

Johns Hopkins University  
https://coronavirus.jhu.edu/
US HHS Latest Update on COVID-19 Testing

Murad Raheem
Regional Emergency Coordinator
US Department of Health & Human Services

Ivan Silva, PhD
Interdisciplinary Scientist (Project Officer), BARDA (Biomedical Advanced Research and Development Authority)
US Department of Health & Human Services
Closing & Next Steps
Join us in Advancing Project NEXT™

- **Allied Associations** – Jointly serving members
- **Leading Public & Private Organizations** – Share Best Practices and Lessons Learned
- **Corporate Innovation Partners** – Expertise & Support

Email us at: JLC27@nyu.edu or INTERCEP@nyu.edu