COVID-19 Update: Epi, Antigen, Vaccine, Oh My!

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Department of Health and Human Services

Agenda

- Response Overview
- Current Situation
- Antigen Testing
- Vaccine Planning
- Treatment Highlights

Response and Current Epidemiology

Warm up (and start to sweat!)

New Hampshire Response

Community Mitigation?

Community mitigation is a package of actions that don't involve medicines or vaccines and are important for stopping the spread of COVID-19:

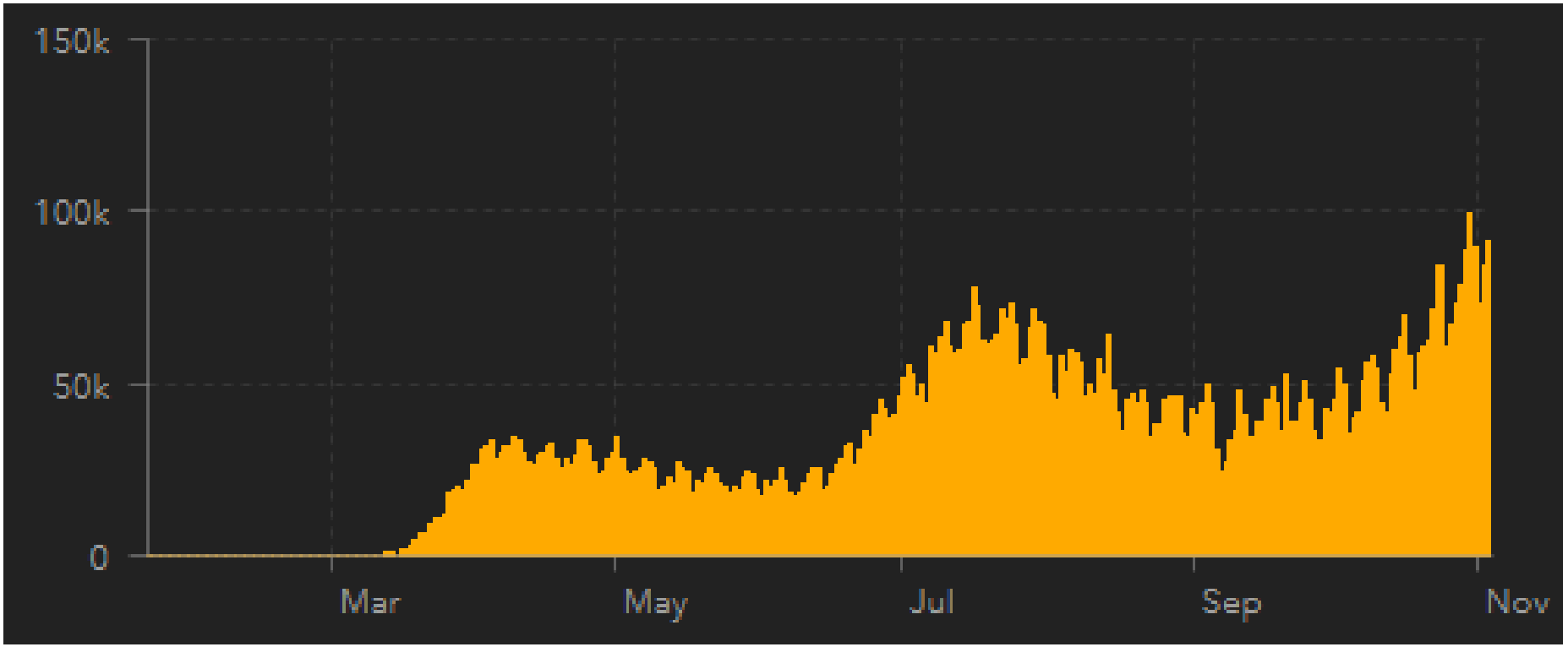
1. Staying home
2. Keeping a safe distance of at least 6 feet from others
3. Moving to remote learning for schools
4. Encouraging tele-work for businesses
5. Cancelling mass gatherings
6. Closing non-essential businesses

Goals of Community Mitigation

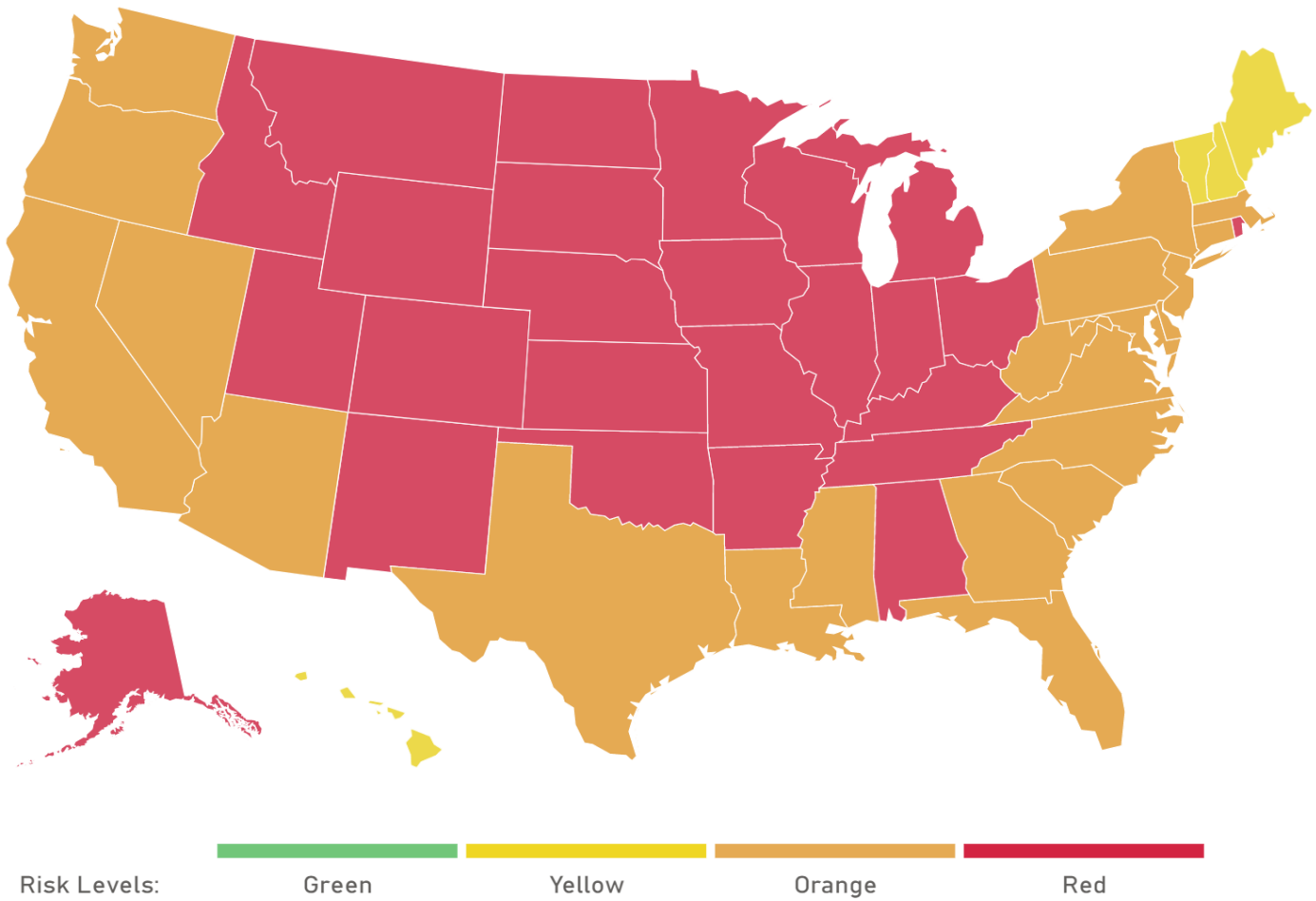
1. Slow how fast the epidemic is spreading
2. Spread out when people get sick (delay the peak)
3. Reduce the overall number of patients
4. Decrease deaths
5. Prevent overwhelming our healthcare system

U.S. Epidemic Curve

(new cases per day)



Number of Daily New Cases per 100,000 Population (7-Day Rolling Average)



https://globalepidemics.org/key-metrics-for-covid-suppression/

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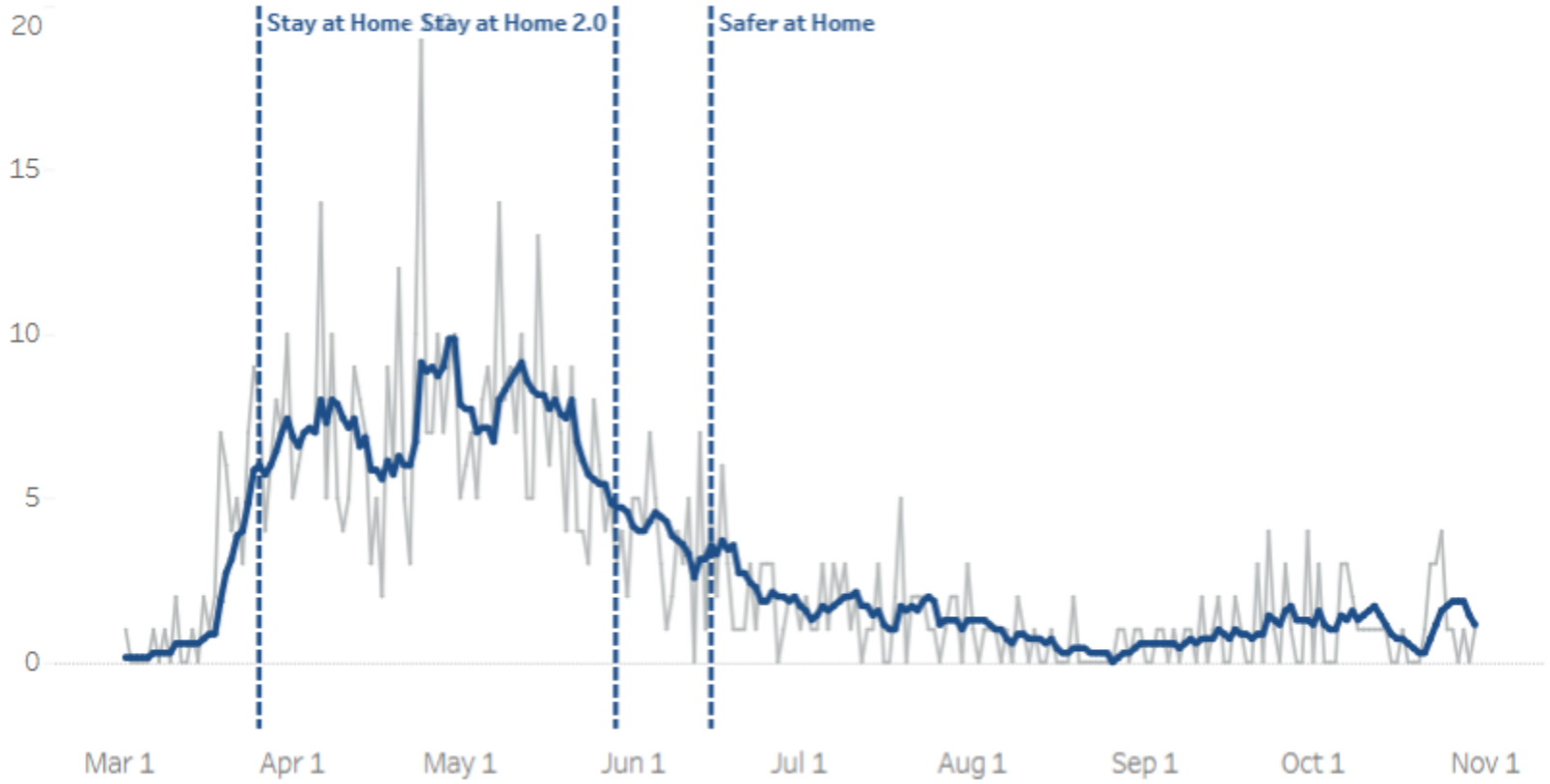
NH New Cases by Day

NH Hospitalizations by Day



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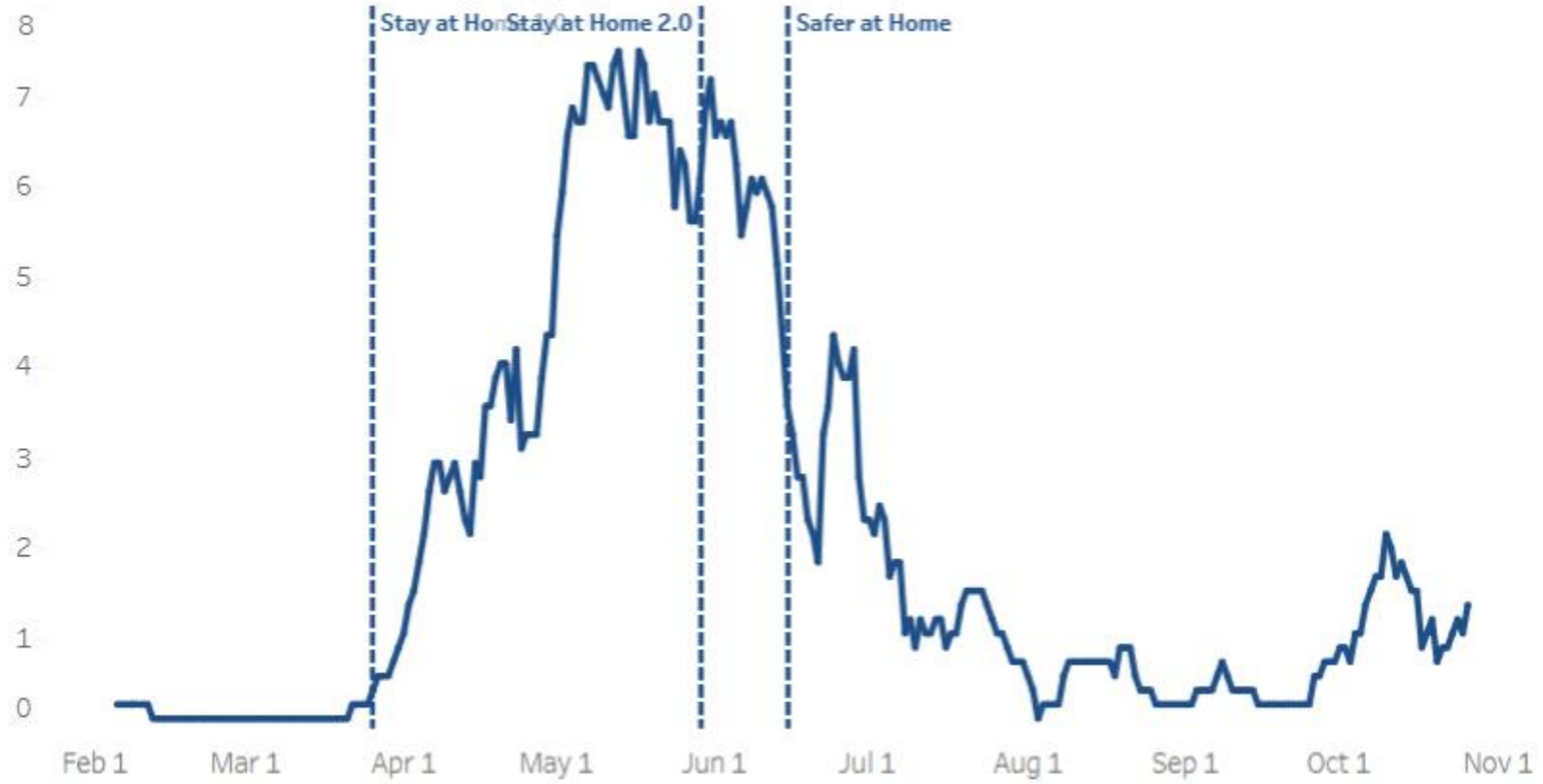
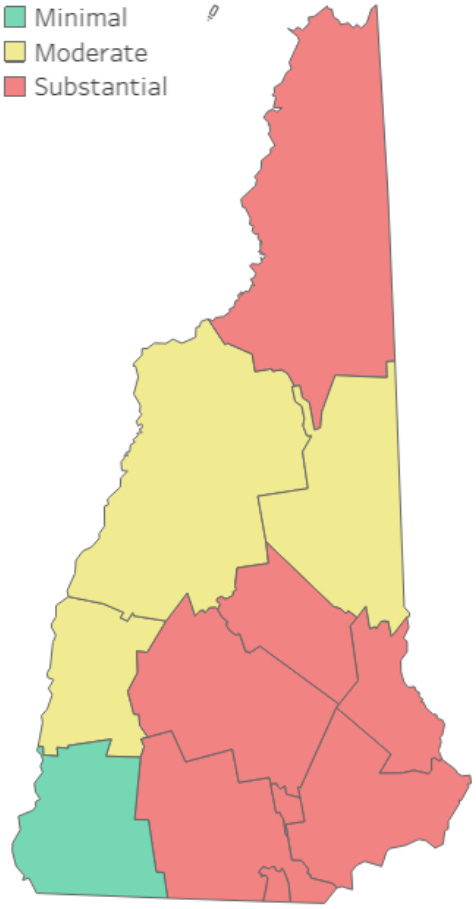
NH Deaths by Week



Community Level Metrics



Level of Transmission	New Cases per 100k over 14 days	New Hosp per 100k over 14 days	7-Day PCR Test Positivity Rate
Substantial	121.1	1.3	1.7%

School Associated Case Data (Current School Year)

Search by School Level: (All)

Search by School Town: (All)

Search by School Name:

Show: All Schools

School Name	Active Cases	Recovered Cases	Number of Clusters	Current Outbreak	Last Case Reported
2nd Nature Academy/Nature of Things	0	0	0	No	No Cases
A. Crosby Kennett Middle School	0	0	0	No	No Cases
Abbot-Downing School	0	0	0	No	No Cases
Academy for Science and Design Charter (H)	0	0	0	No	No Cases
Academy for Science and Design Charter (M)	0	0	0	No	No Cases
Acton Academy New Hampshire	0	0	0	No	No Cases
Acworth Elementary School	0	0	0	No	No Cases
Adeline C. Marston School	0	3	0	No	10/15/2020
Allenstown Elementary School	0	3	0	No	10/13/2020
Alstead Primary School	0	0	0	No	No Cases
Alton Central School (Elem)	0	1	0	No	10/1/2020
Alvirne High School	0	1	0	No	10/29/2020
American University of Madaba	0	0	0	No	No Cases
Amherst Middle School	0	3	0	No	10/10/2020

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Risk Factors for COVID-19

Risk Factors of Persons with COVID-19	Infections		Hospitalizations		Deaths	
	Persons	% of Total	Persons	% of Total	Persons	% of Total
Contact with someone with COVID-19	3,071	26.6%	129	16.4%	16	3.3%
Community Transmission	2,482	21.5%	253	32.1%	38	7.9%
Cluster-Associated*	3,367	29.1%	263	33.4%	403	83.3%
International or Domestic Travel	1,684	14.6%	109	13.9%	21	4.3%
Unclear / Unknown	959	8.3%	33	4.2%	6	1.2%
Grand Total	11,563		787		484	

https://www.nh.gov/covid19/dashboard/summary.htm

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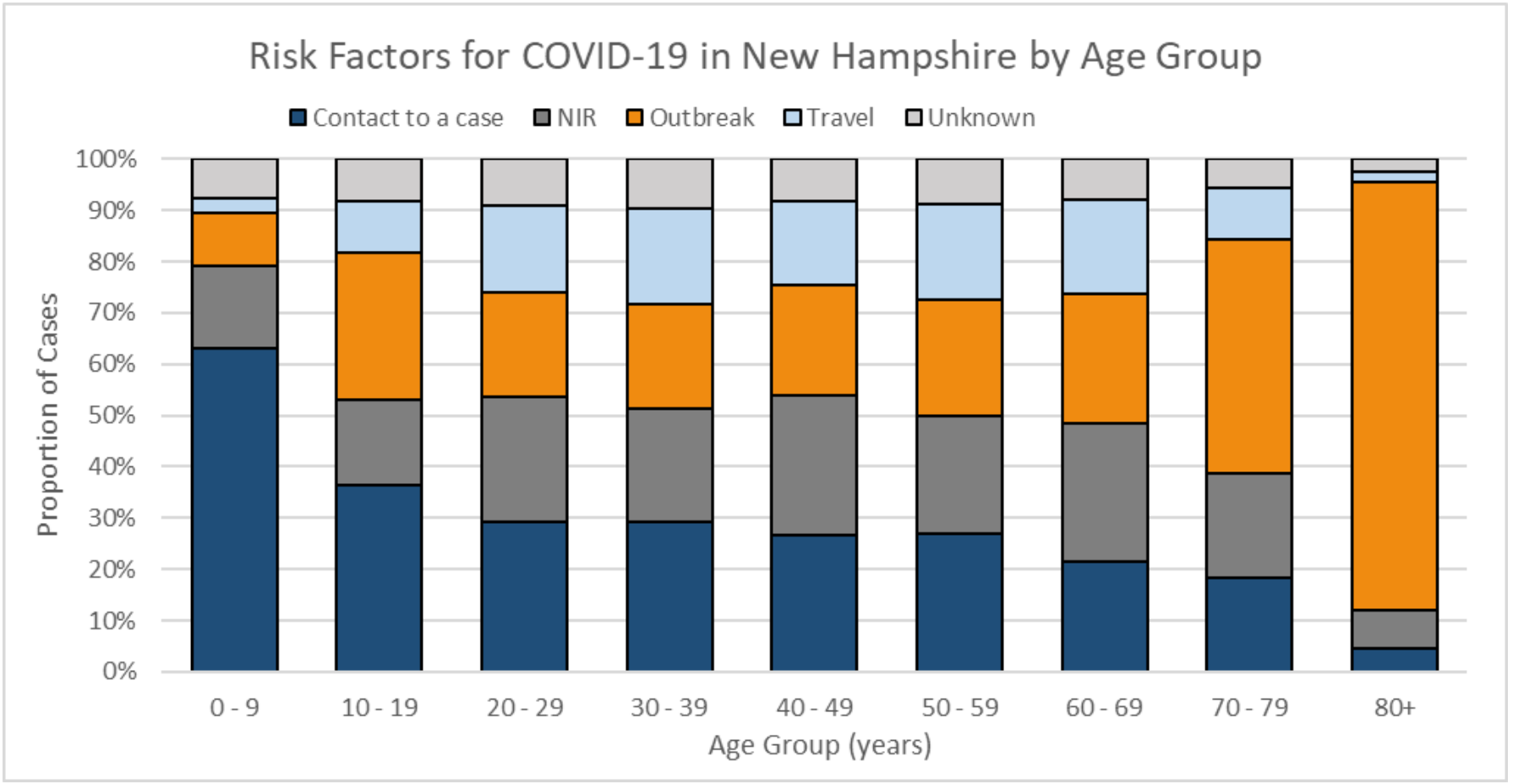
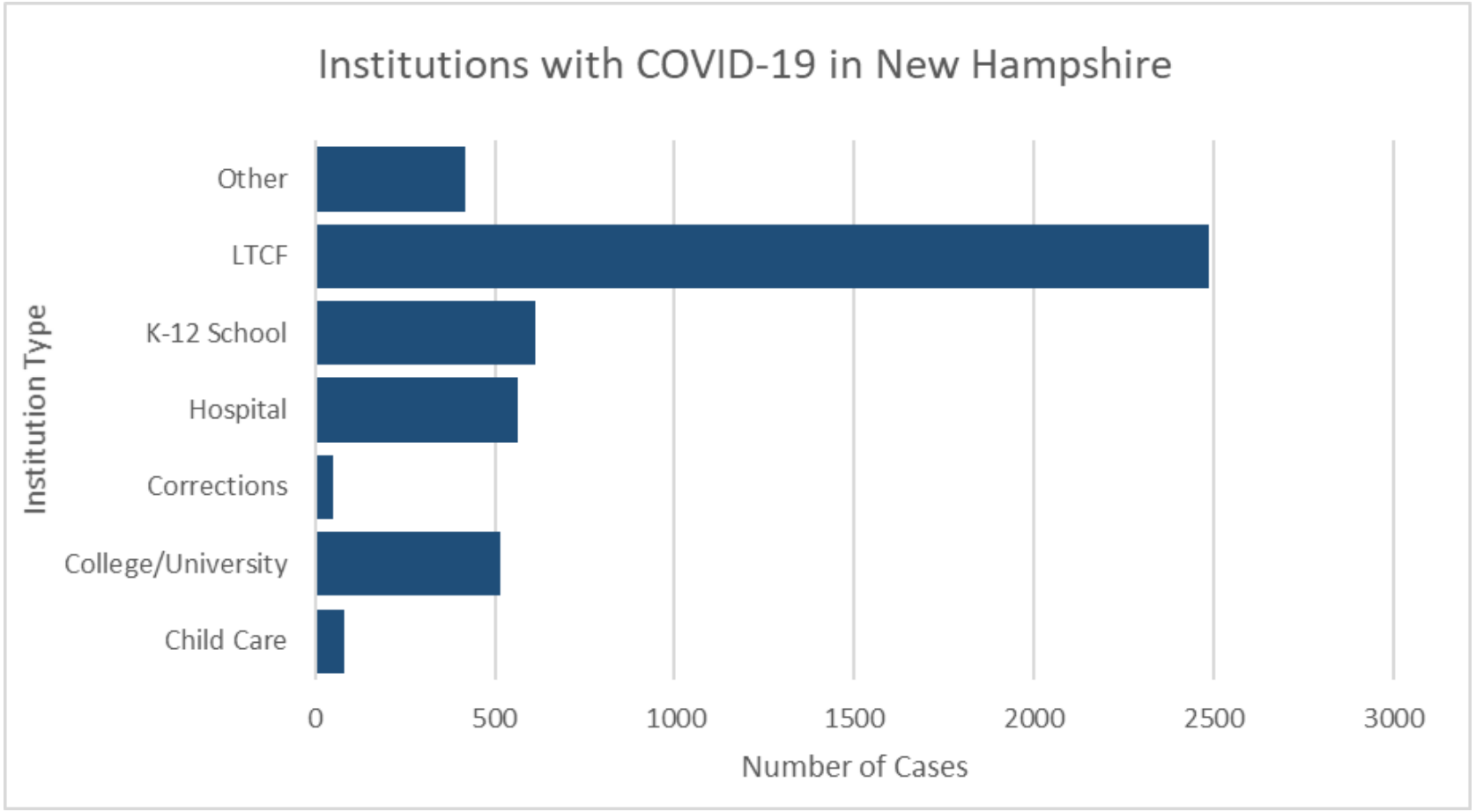
Risk Factors
by age

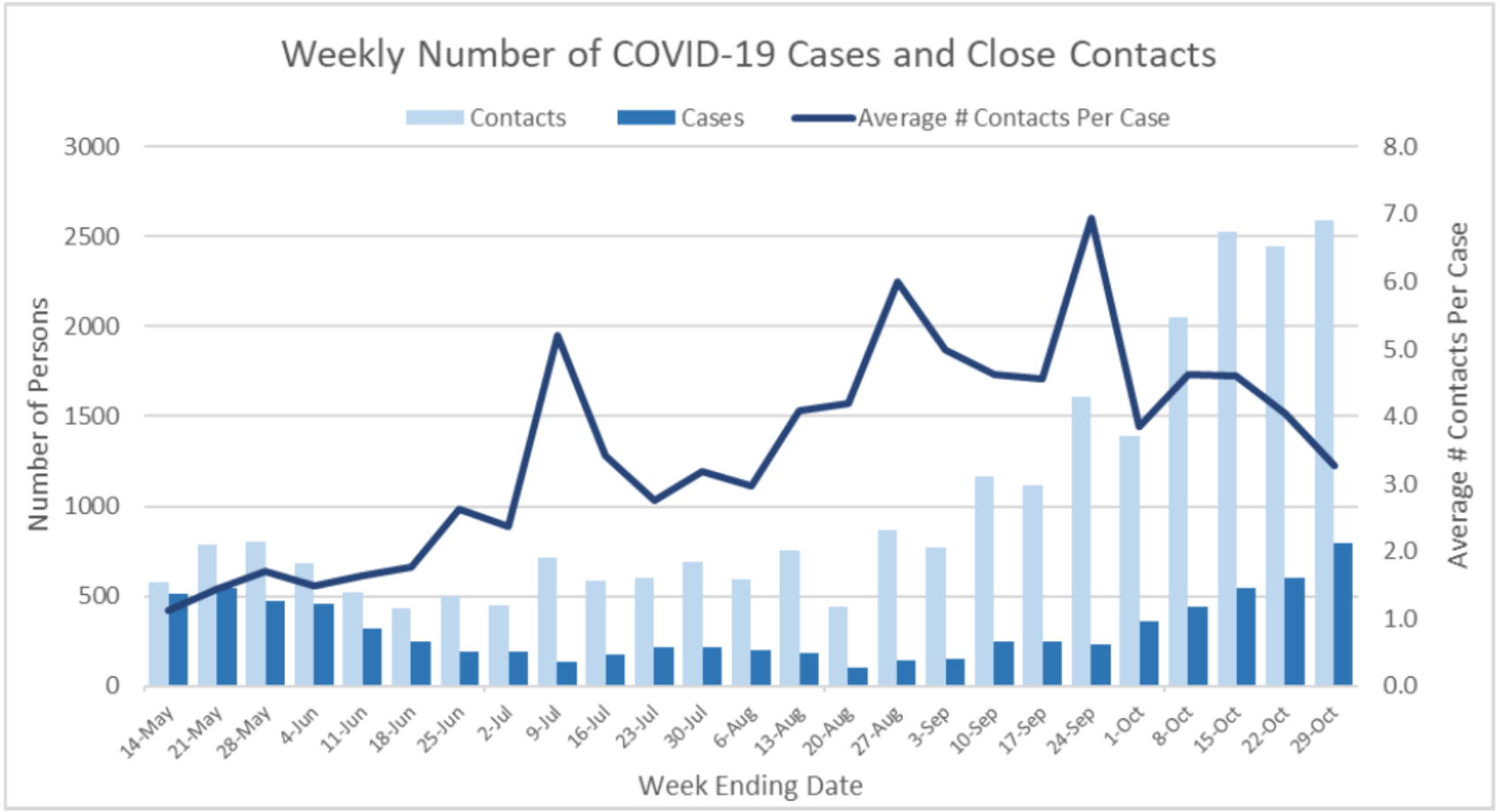


Impact on Institutional Settings



Other: Residential homes, transitional housing, recovery centers, etc.

Close Contacts
Exposure Date



Note: Excludes household contacts and travelers

Close Contacts
Type of Contact

Contact Type	Cumulative	
	n	%
Household	12,480	38%
Healthcare Facility Contact*	340	1%
Workplace	2,138	7%
Close Contact (other)	11,842	36%
Other / Not Listed	6,000	18%
Total	32,800	

* The number of healthcare facility contacts does not include close contacts residing in residential health facilities (e.g. long-term care facilities) because these persons were notified and monitored by the healthcare facility and not by NH DHHS.

Antigen Testing

A New Tool We Need to Know How to Use

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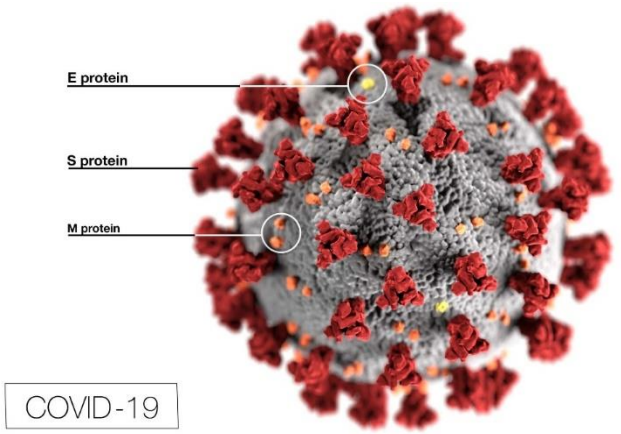
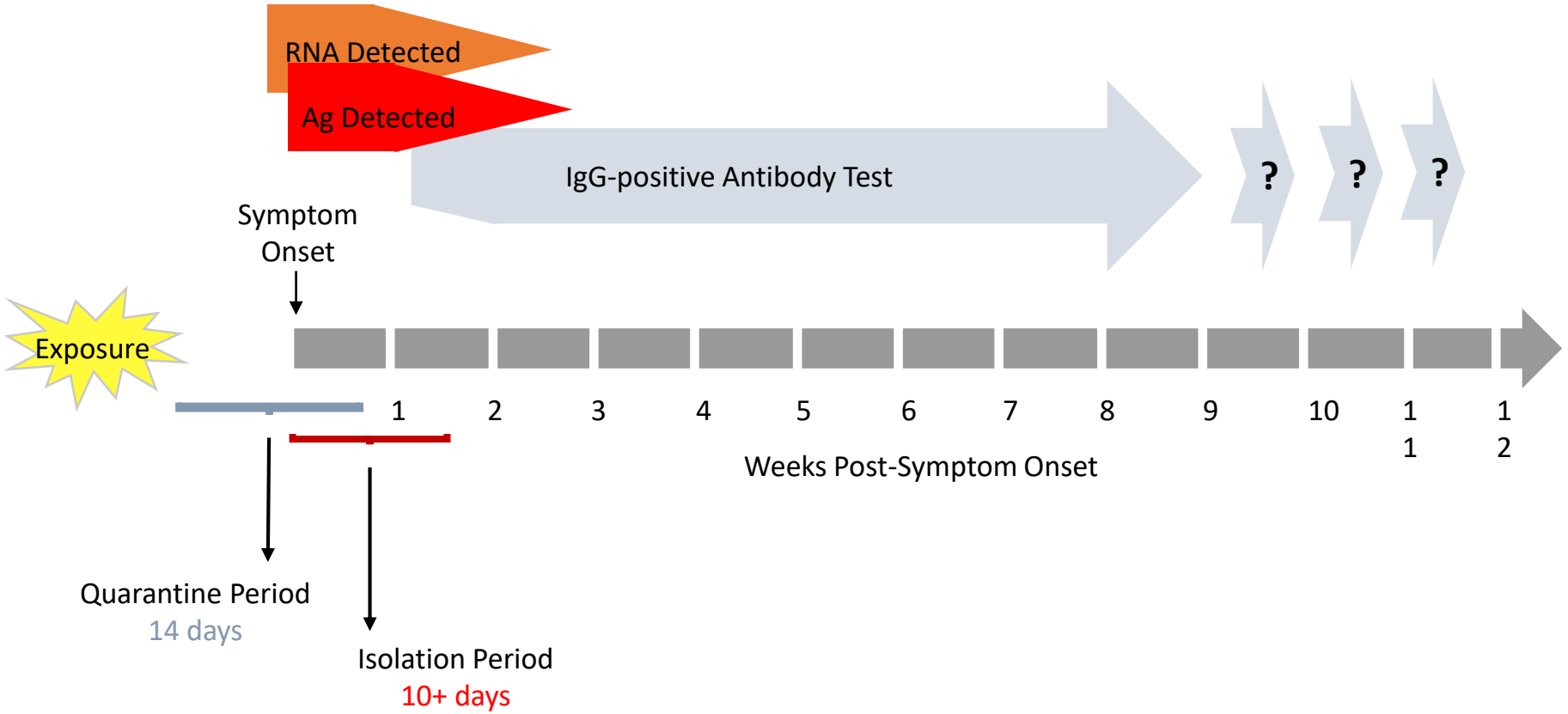
What Are Antigen Tests?

- Detect fragments of proteins on or within the virus
  - Intended to detect acute infection
- Advantages: cost less to manufacture (cost ~$20), bulk availability, fast TAT, POC, positive results are highly accurate
- Disadvantage: higher probability of returning false negative results
  - Negative tests in suspected patients need to have PCR



COVID-19 Testing Landscape



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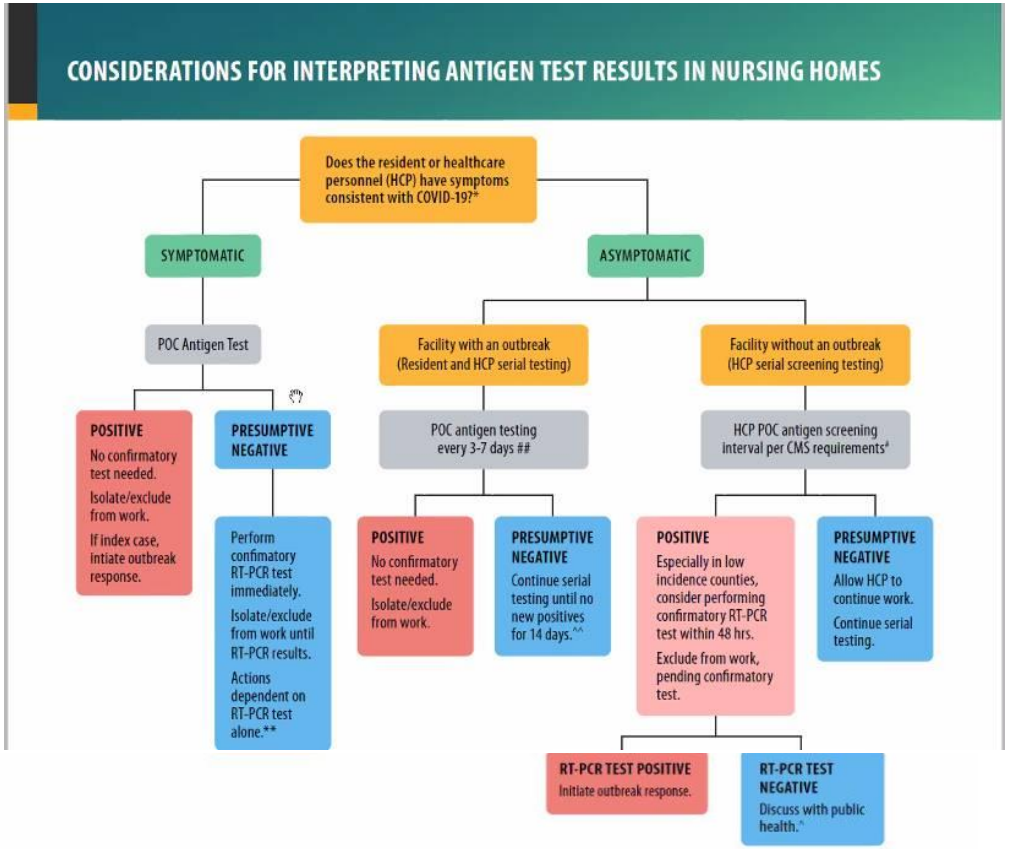
HHS Antigen Test Roll Out

- 14 July the Trump Administration announced HHS embarked on one-time procurement of antigen testing devices and tests to be distributed to 800 nursing homes
  - Intended for use on healthcare workers
  - Each nursing home received either Quidel Sofia 2 Instrument or Veritor Plus system with associated tests
  - Procure additional tests directly from manufacturer
- Oct 27, announced distribution of 150M Abbott BinaxNOW COVID-19 Ag Card Point of Care (POC) SARS-CoV-2 diagnostic tests to expand strategic, evidence-based testing
  - "Potentially deployed to schools and to assist with serving other special needs populations"

CDC Antigen Guidance



This algorithm should be used as a guide, but clinical decisions may deviate from this guide if indicated. Contextual factors including community incidence, characteristics of different antigen testing platforms, as well as availability and turnaround times of RT-PCR, further inform interpretation of antigen test results.

RT-PCR: reverse-transcriptase polymerase chain reaction
POC: point-of -care
HCP: healthcare personnel
Index case: a newly identified case of SARS-CoV-2 infection in a resident or HCP in a nursing home facility with no known infections of SARS-CoV-2 infection in the previous 14-day period.
COVID-19 outbreak response in a nursing home is triggered when one nursing home-onset SARS-CoV-2 infection in a resident or one HCP SARS-CoV-2 infection.

* Asymptomatic individuals who have recovered from SARS-CoV-2 infection in the past 3 months and live or work in a nursing home performing facility-wide testing do not need to be retested. If an individual has recovered from SARS-CoV-2 infection in the past 3 months and develops new symptoms suggestive of COVID-19, alternative diagnoses should be considered prior to retesting for SARS-CoV-2.

** Some antigen platforms have higher sensitivity when testing individuals within 5 days of symptom onset. Clinical discretion should be utilized to determine if retesting by RT-PCR is warranted.

\# CMS recommendations for testing asymptomatic HCP in facilities without a case

\## CDC guidance on testing residents of nursing homes. CDC guidance on testing HCP

^ In discussion with the local health department, community incidence and time between antigen test and RT-PCR test can be utilized to interpret discordant results and determine when HCP can return to work.

^^ If an antigen test is presumptive negative in a facility with an outbreak, residents should be placed in transmission-based precautions or HCP should be allowed to continue working while monitoring for symptoms.

Pre-Test Probability

- Positive predictive value is probability that positive test is true-positive
- If testing with test with 99% specificity in population with COVID-19 prevalence
  - <1% (e.g., screening asymptomatic HCP in non-outbreak settings), positive predictive value could be <40%
  - >10% (e.g., testing asymptomatic residents and HCP as part of outbreak response), positive predictive value >90%
- Testing in low-prevalence populations with antigen or RT-PCR tests might produce false positives, but that is less likely in outbreak settings

Table: Comparison of Antigen Diagnostic Tests for SARS-CoV-2 which Have Received Food and Drug Administration (FDA) Emergency Use Authorization (EUA)

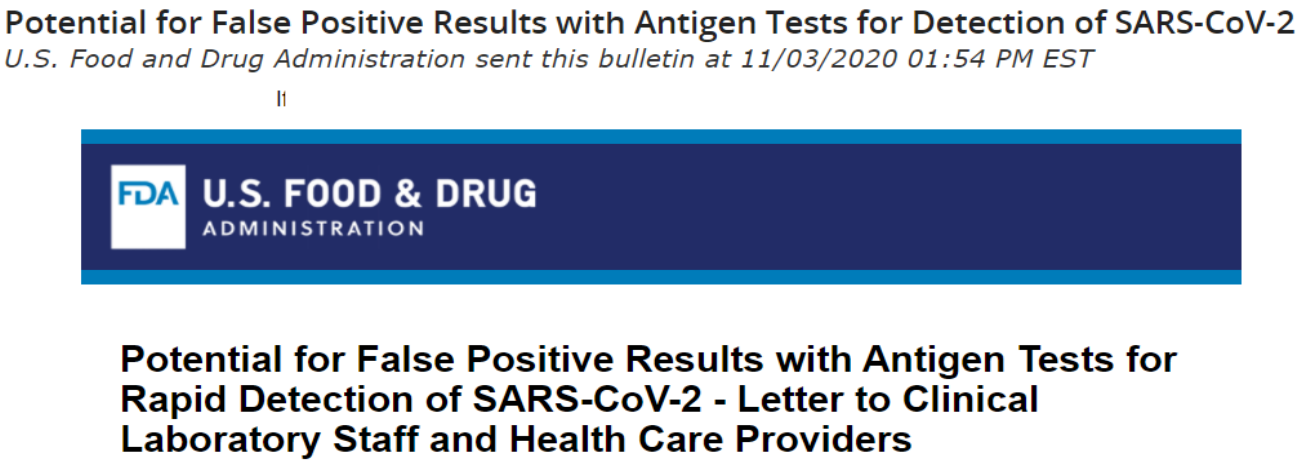
Test Name	**Manufacturer**	**Specimen Types**	**Maximum Time Frame to Test After Symptom Onset**	**Positive Agreement** (compared to RT-PCR)	**Negative Agreement** (compared to RT-PCR)	**Manufacturer Instructions**
Sampinute COVID-19 Antigen MIA	Celltrion USA, Inc.	NP Swab	5 days	94.4%	100%	Package Insert
CareStart COVID-19 Antigen Test	Access Bio, Inc.	NP Swab	5 days	88.4%	100%	Package Insert
BinaxNOW COVID-19 Ag Card	Abbott Diagnostics Scarborough, Inc.	Nasal Swab	7 days	97.1%	98.5%	Package Insert
LumiraDx SARS-CoV-2 Ag Test	LumiraDx UK Ltd.	Nasal Swab	12 days	97.6%	96.6%	Package Insert
BD Veritor System for Rapid Detection of SARS-CoV-2	Becton, Dickinson (BD) and Company	Nasal Swab	5 days	84%	100%	Package Insert
Sofia 2 Flu + SARS Antigen FIA	Quidel Corporation	NP or Nasal Swab	5 days	95.2%	100%	Package Insert
Sofia SARS Antigen FIA	Quidel Corporation	NP or Nasal Swab	5 days	96.7%	100%	Package Insert

***NP**: nasopharyngeal; **RT-PCR**: reverse transcription polymerase chain reaction*

https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas#individual-antigen

What is the Risk of False-Positive Results?

- CDC Website (Sept 4th): "The specificity of rapid antigen tests is generally as high as RT-PCR – the first antigen tests that have received FDA EUAs have reported specificity of 100% – which means that false positive results are unlikely."
- We are now hearing numerous reports of problems with false-positive results, especially when used in asymptomatic individuals!


Potential for False Positive Results with Antigen Tests for Detection of SARS-CoV-2

U.S. Food and Drug Administration sent this bulletin at 11/03/2020 01:54 PM EST

FDA U.S. FOOD & DRUG ADMINISTRATION

Potential for False Positive Results with Antigen Tests for Rapid Detection of SARS-CoV-2 - Letter to Clinical Laboratory Staff and Health Care Providers

https://www.fda.gov/medical-devices/letters-health-care-providers/potential-false-positive-results-antigen-tests-rapid-detection-sars-cov-2-letter-clinical-laboratory

Several Different Issues Affecting Test Accuracy

- Test characteristics (sensitivity and specificity) – published numbers are based on testing of a very small number of specimens (sometimes less than 100!)
  - "Real world" sensitivity and specificity will be lower
- Testing process and procedures:
  - Ease of use: BinaxNOW > BD Veritor > Quidel Sofia (?)
  - Specimen collection and handling – need to develop a process to avoid contamination while running high-volume of specimens
  - See CDC guidance
- Prevalence of disease in a community and pre-test probability affect positive predictive value (PPV) and negative predictive value (NPV) of a test

Pretest Probability & Positive Predictive Value

Table 3. Relationship between pre-test probability and the likelihood of positive and negative predictive values

Pretest Probability*	Negative Predictive Value**	Positive Predictive Value**	Impact on Test Results
Low	High	Low	Increased likelihood of False Positives Increased likelihood of True Negatives
High	Low	High	Increased likelihood of True Positives Increased likelihood of False Negatives

https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antigen-tests-guidelines.html#table3

What is the Appropriate Use of Antigen Tests?

- "Approved" for use in symptomatic persons
- Antigen tests have received an FDA Emergency Use Authorization (EUA) for use in symptomatic persons in whom healthcare providers suspect COVID-19 (i.e., diagnosis of SARS-CoV-2 infection)
- Why is the federal government saying it's ok to use in testing asymptomatic individuals?
  - Different requirements and regulatory oversight based on intent of testing
  - FDA and CMS have allowed "off-label" use of antigen tests to "screen" asymptomatic individuals at the discretion of a healthcare provider, but with preference for using "highly sensitive" tests (i.e., molecular based tests) for this purpose
  - FDA does not regulate surveillance testing

https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/faqs-testing-sars-cov-2#general

Different Requirements Based on Intent

- Diagnostic: Intended to identify current infection at the individual level; perform when a person has signs/symptoms of COVID-19 or when a person is asymptomatic but has an exposure
- Screening: Intended to identify infected persons who are asymptomatic and without a known or suspected exposure; perform to identify persons who may be contagious in order act to prevent transmission
- Surveillance: Intended to monitor community- or population-level transmission of disease, or define incidence and prevalence of disease; perform on de-identified specimens NOT linked to individuals so that testing cannot be used for individual decision-making

https://www.cdc.gov/coronavirus/2019-ncov/lab/faqs.html#Testing-Strategies-for-SARS-CoV-2

Summary of Testing Strategies for SARS-CoV-2

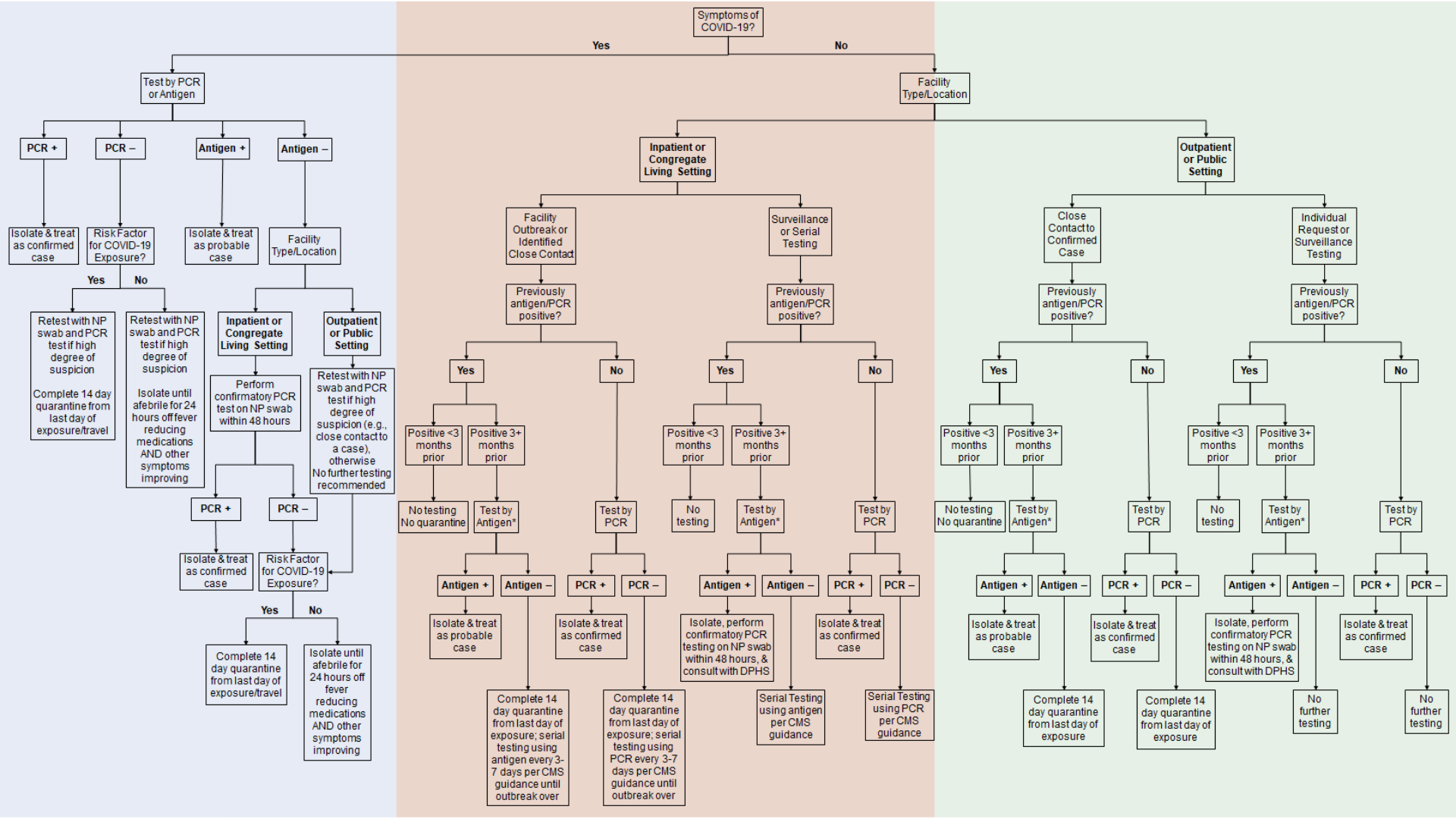
	Diagnostic	Screening	Surveillance
Symptomatic or Known or Suspected Exposure	Yes	No	N/A
Asymptomatic without Known or Suspected Exposure	No	Yes	N/A
Characterize Incidence and Prevalence in the Community	N/A	N/A	Yes
Results may be Returned to Individuals	Yes	Yes	No
Results Returned in Aggregate to Requesting Institution	No	No	Yes
Results Reported to State Public Health Department	Yes	Yes	Only if requested; must be in aggregate
Testing can be performed in a CLIA-Certified Laboratory	Yes	Yes	Yes
Testing can be performed in a Non-CLIA-Certified Laboratory	No	No	Yes
Test System Must be FDA Authorized or be Offered under the Policies in FDA's Guidance	Yes	Yes	No

https://www.cdc.gov/coronavirus/2019-ncov/lab/faqs.html#Testing-Strategies-for-SARS-CoV-2

How Does NH Public Health Recommend Antigen Testing Be Implemented?

- Antigen testing recommendations depend on a number of different factors:
  - Symptom status (symptomatic vs. asymptomatic)
  - Setting of use (hospital or congregate living vs. outpatient)
  - Purpose/intent of testing – diagnostic vs. screening vs. surveillance
  - Previous diagnosis of infection AND duration of time since initial infection
- This leads to different guidance for different situations, and really complicated testing algorithms!

New Hampshire COVID-19 Ideal Testing Recommendations Algorithm



Abbreviations:
CMS: Centers for Medicare & Medicaid Services
COVID-19: Coronavirus Disease 2019
NP: nasopharyngeal
PCR: polymerase chain reaction

Notes:
* If antigen testing is unavailable for persons previously positive for COVID-19, continue testing using PCR. If PCR is positive in someone who is asymptomatic and previously infected, then consult with public health.

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New Hampshire's Recommendations for Antigen Testing in Ambulatory Settings (1)

- We continue to recommend that antigen tests be used primarily in ambulatory/outpatient settings to test people with symptoms of COVID-19 (diagnostic purposes):
  - A positive antigen test in a symptomatic person should be treated as a true-positive and does not require PCR confirmation
  - Clinicians should use clinical judgement when deciding whether to confirm a negative antigen test in symptomatic persons – we recommend reflexing to PCR confirmation in high-risk or high-consequence settings, or if there is high suspicion of COVID-19 based on risk factors or symptoms (e.g., loss of taste or smell)
  - A negative test in a symptomatic person in a low-risk setting does not require PCR confirmation, and a person can return to school/work once fever-free off meds for 24 hours and other symptoms are improving

https://www.dhhs.nh.gov/dphs/cdcs/alerts/documents/covid-19-update23.pdf

New Hampshire's Recommendations for Antigen Testing in Ambulatory Settings (2)

- We do NOT recommend routine use of antigen testing for asymptomatic persons
- There are settings, however, where antigen testing in asymptomatic individuals may occur in consultation with public health, (e.g., LTCFs, State-sponsored screening/surveillance programs, testing requirements related to Reopening Guidance):
  - Any positive antigen result in an asymptomatic person should be confirmed with a PCR-based test as soon as possible after the positive result (ideally same day), but no longer than 48 hours after positive test (and person must isolate)
  - A negative test does not need PCR confirmation

https://www.dhhs.nh.gov/dphs/cdcs/alerts/documents/covid-19-update23.pdf

Reporting of Antigen Tests Required

- See NH HAN, Update #22 for information on reporting
- Organizations performing point-of-care testing have two options for submitting all test results:
  1. Enter test results for each patient tested via an online form
  2. Submit daily results for multiple patients via a specially formatted file submitted through a secure file transfer solution; see instructions online
- People diagnosed with COVID-19 can also be reported by filling out and faxing the COVID-19 Case Report Form to 603-271-0545

COVID-19 Vaccines

Candidates, Ethical Allocation and Effective Distribution

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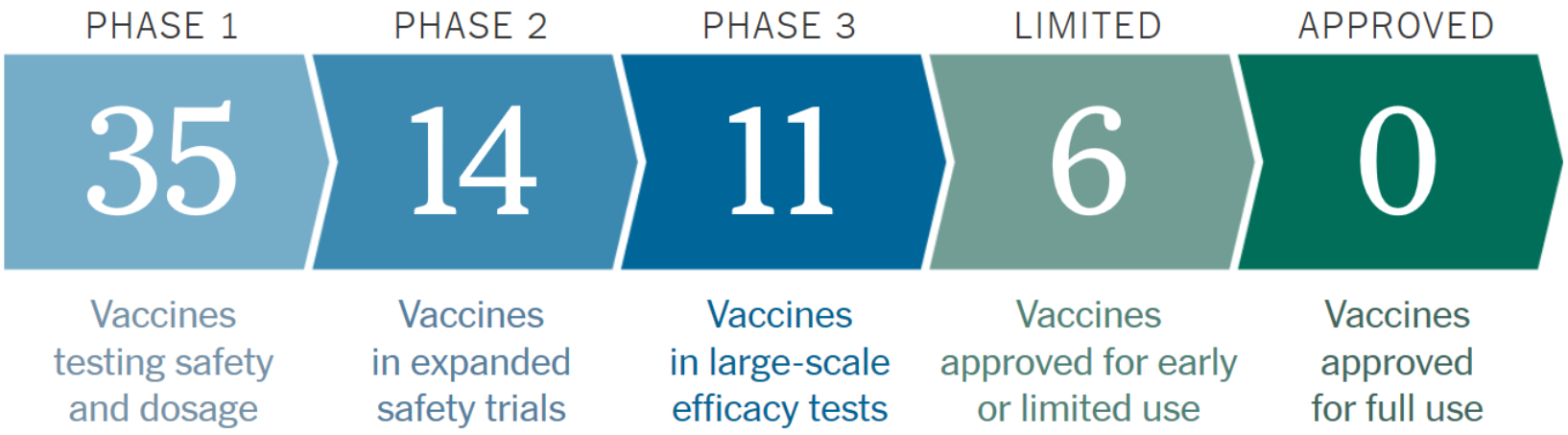
Coronavirus Vaccine Tracker

By Jonathan Corum, Sui-Lee Wee and Carl Zimmer Updated October 29, 2020



https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html

Selected COVID-19 Vaccine Candidates

Platform	Developer	Phase 1/2	Phase 2/3
Nucleic acid	moderna	Enrolled	Ongoing
	BIONTECH Pfizer	Enrolled	Ongoing
Viral vector	UNIVERSITY OF OXFORD AstraZeneca	Enrolled	Ongoing
	Janssen Johnson & Johnson	Enrolled	Ongoing
	MERCK	Ongoing	--
Protein subunit	NOVAVAX Creating Tomorrow's Vaccines Today	Ongoing	Ongoing
	gsk SANOFI	Ongoing	--

Most Advanced US Candidates

Vaccine	Platform	Ph 3	Updates
Moderna NIH	2-dose (21d) mRNA (-20C)	July 27	July: Patent dispute lost Oct 23: completed ph3 EUA subm mid-Dec
Pfizer BioNTech Fosun Pharma	2-dose (28d) mRNA (-70C)	July 27	Sept 12: expanded to 43k Target analysis Oct 2020 EUA subm 3rd week Nov
Johnson and Johnson	1-dose Ad26 (~Ebola)	Sept	Oct 12 pause for AE
AstraZeneca Oxford	2-dose (28d) ChadOx1	July	Sept 6 pause for AE Oct 23 restarted in US
Novavax	2-dose (21d) Protein subunit (nanotech)	Sept in UK End Nov in US	Early 2021 results

Any 2-dose series has to be with the same vaccine

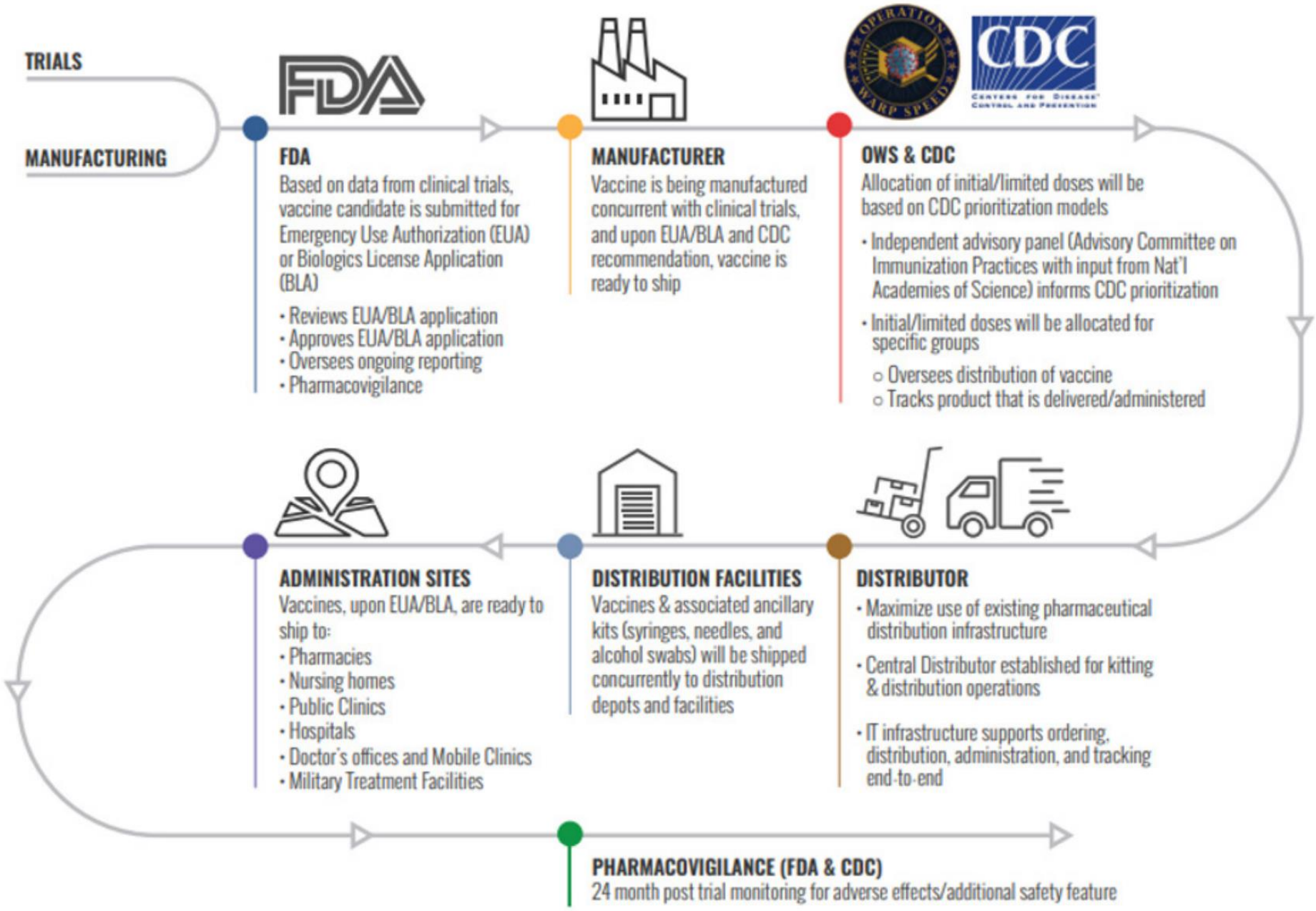
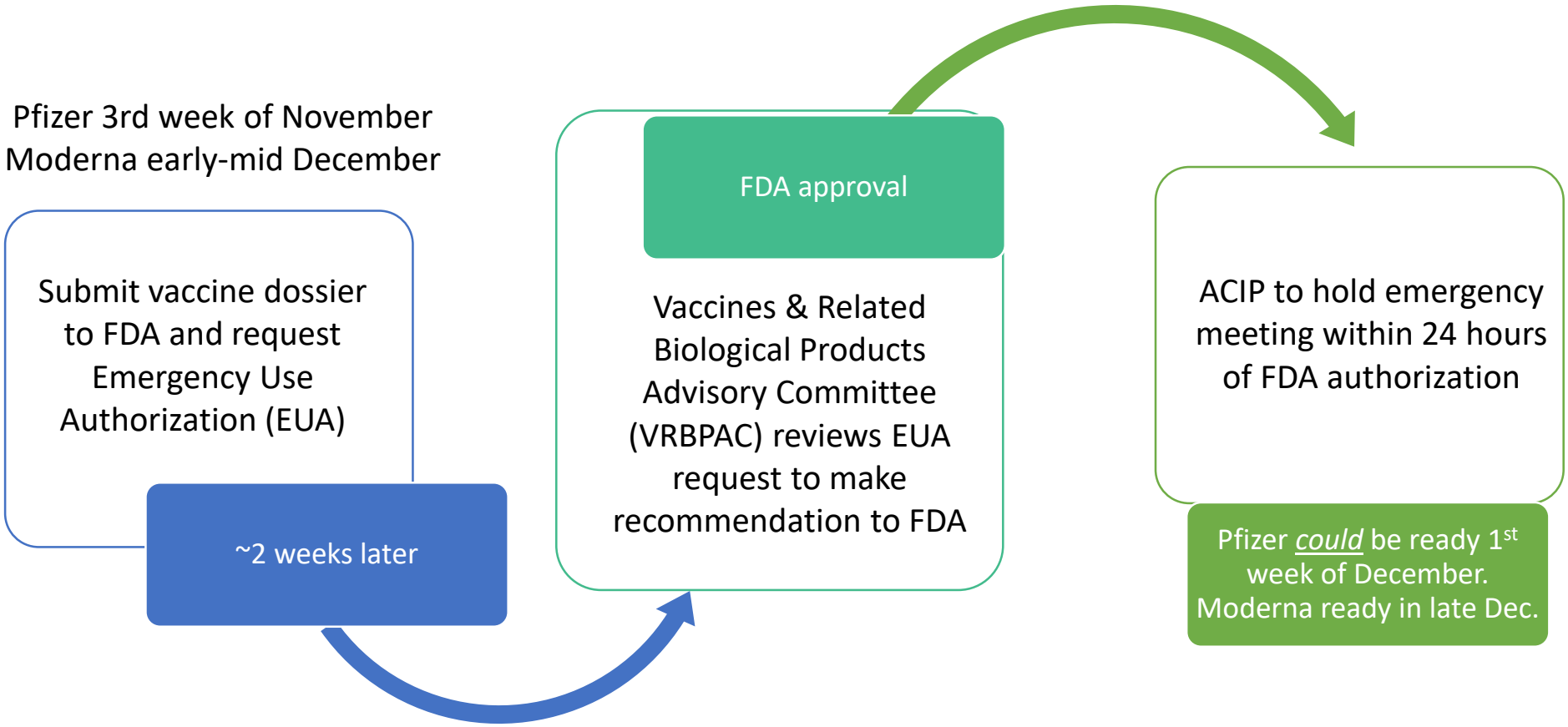
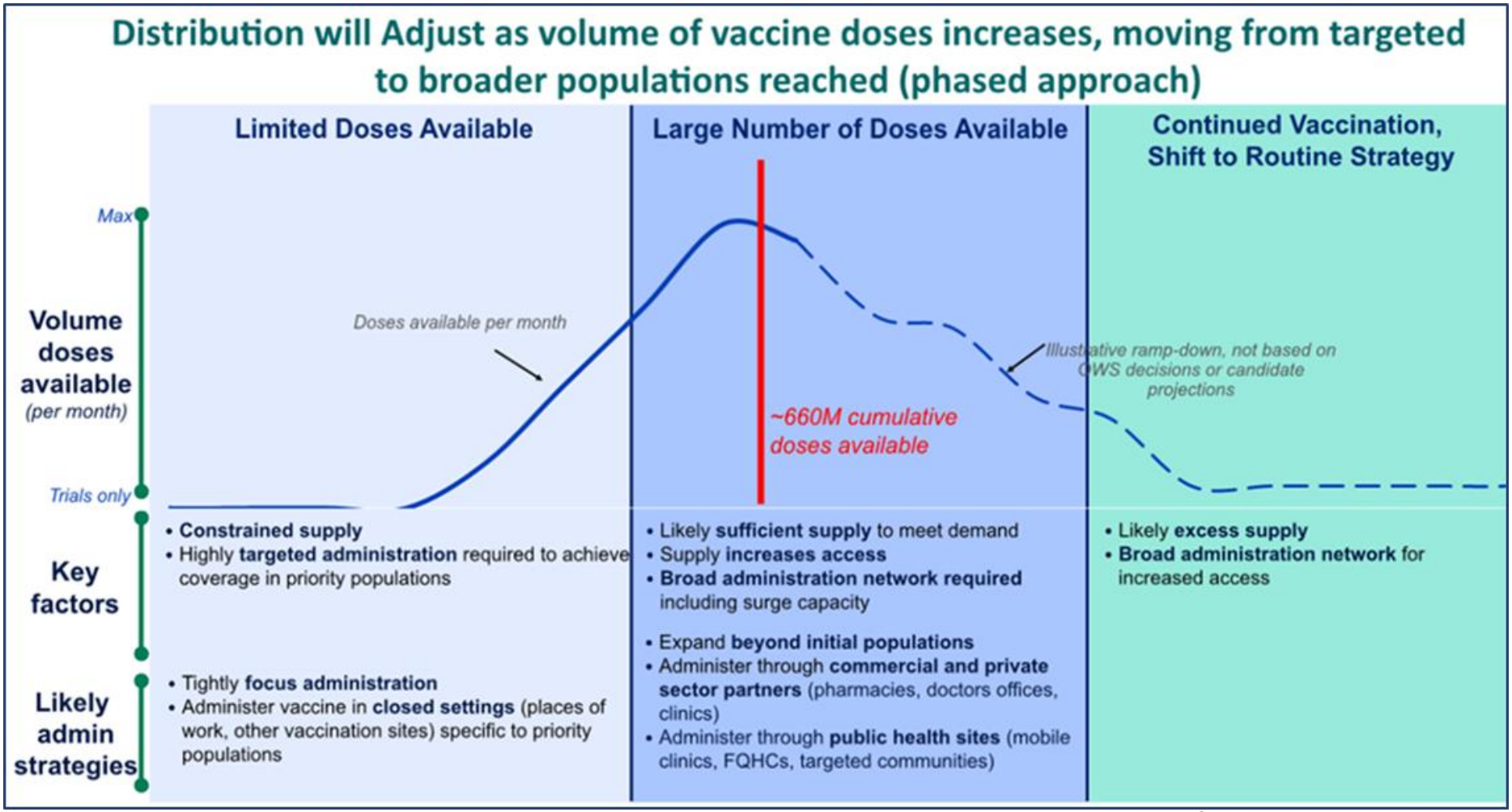


FIGURE 1-2 Operation Warp Speed vaccine distribution process.
SOURCE: HHS, 2020b.

Vaccine Allocation: Timeline – Best Estimate



Phases of Vaccine Distribution



Vaccine Allocation Process

- The Vaccine Allocation Strategy Branch (VASB) is leveraging information from:
  - National Academy of Sciences Framework for Equitable Allocation of Vaccine for the Novel Coronavirus
  - CDC's COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations
  - ACIP recommendations expected late in approval process
  - State Disaster Medical Advisory Committee
- This is a work in progress, constantly updated with research data and expert guidance

Major Elements of the Framework for Equitable Allocation of COVID-19 Vaccine

Foundational Ethical Principles

Maximum benefit: The obligation to protect and promote the public's health and its socioeconomic well-being in the short and long term.

Equal concern: The obligation to consider and treat every person as having equal dignity, worth, and value.

Mitigation of health inequities: The obligation to explicitly address the higher burden of COVID-19 experienced by the populations affected most heavily, given their exposure and compounding health inequities.

Foundational Procedural Principles

Fairness: Decisions should incorporate input from affected groups, especially those disproportionately affected by the pandemic. Once informed by public input, decisions should be data-driven and made by impartial decision makers, such as public health officials.

Transparency: The obligation to communicate with the public openly, clearly, accurately, and straightforwardly about the vaccine allocation criteria and framework, as they are being developed and deployed.

Evidence-based: Vaccination phases, specifying who receives the vaccine when, should be basked on the best available scientific evidence, regarding risk of disease, transmission, and societal impact.

Goal

Reduce severe morbidity and mortality and negative societal impact due to the transmission of SARS-CoV-2

Allocation Criteria

Risk of: 1) acquiring infection; 2) severe morbidity and mortality; 3) negative societal impact; and 4) transmitting infection to others

Four Allocation Phases

Phase 1a: High-risk health workers and first responders

Phase 1b: People with significant comorbid conditions (defined as having two or more); and older adults in congregate or overcrowded settings

Phase 2: K-12 teachers and school staff and child care workers; critical workers in high-risk settings; people with moderate comorbid conditions; people in homeless shelters or group homes and staff; incarcerated/detained people and staff; and all older adults

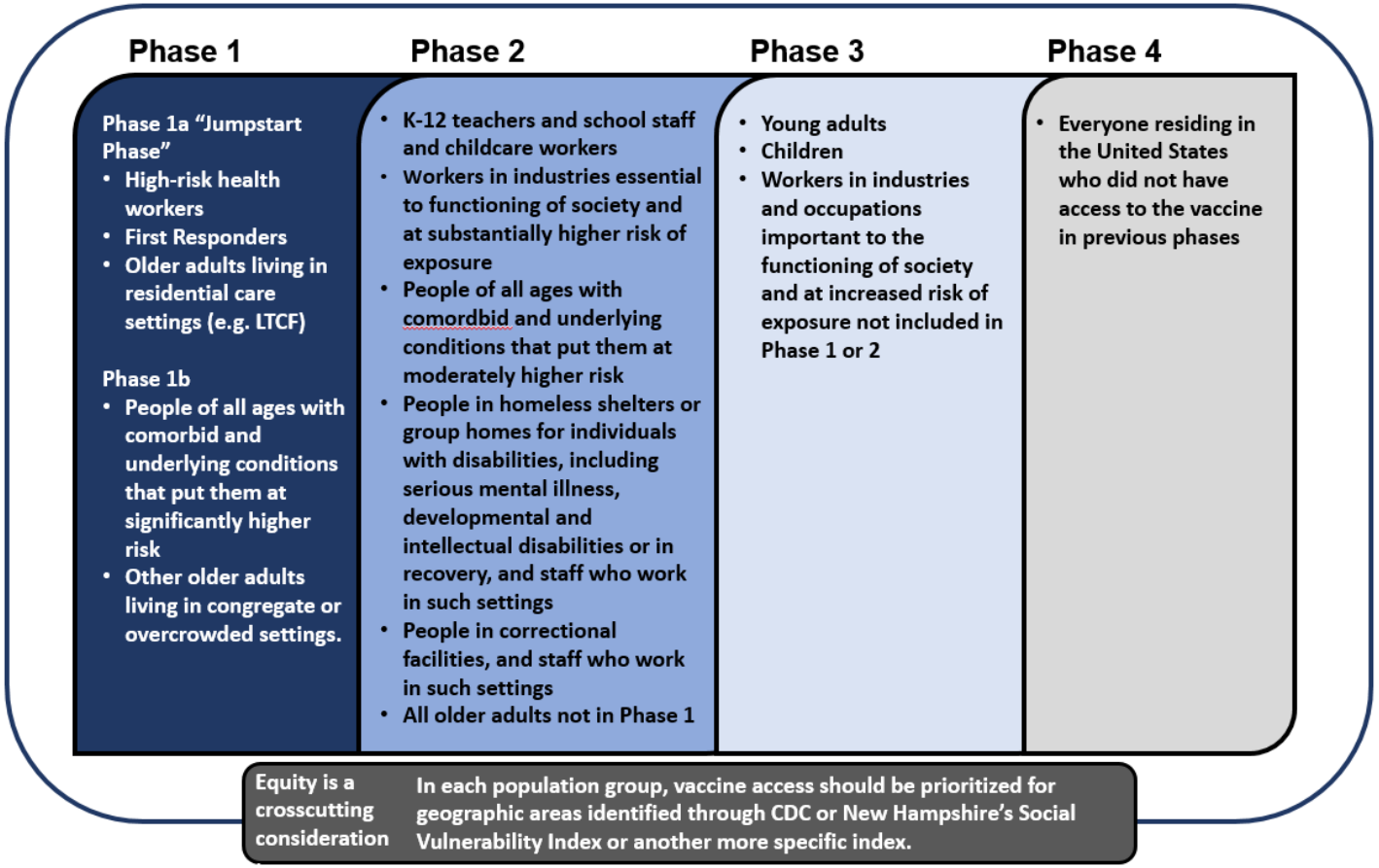
Phase 3: Young adults; children; workers in industries important to the functioning of society

Phase 4: All other individuals residing in the United States who are interested in receiving the vaccine for personal protection

Equity is a crosscutting consideration: In each population group, vaccine access should be prioritized for geographic areas identified through CDC's Social Vulnerability Index or another more specific index.

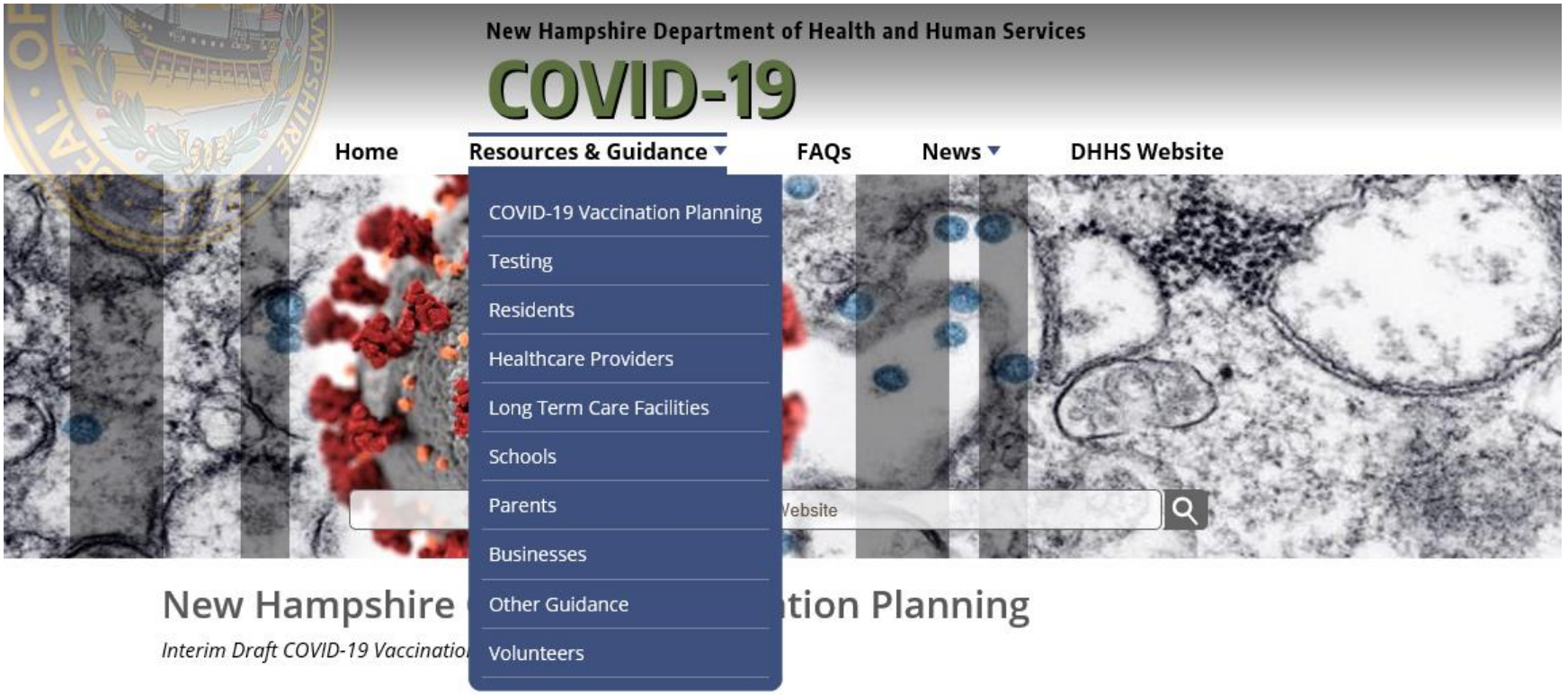
NH Vaccine Allocation Plan

******Subject to Change!******



NH Vaccine Resources

https://www.nh.gov/covid19/resources-guidance/vaccination-planning.htm



Vaccine Distribution

- Estimated 75% non-government / 25% government
  - PPP: HHS contract with CVS and Walmart for LTCFs/ALFs
- All COVID-19 vaccinators need to establish a CDC COVID-19 Provider Agreement with NH DHHS
- Those that have a contract with CDC may get vaccine directly through CDC allocation
- Agreements will communicate many of the logistics

******Subject to Change!******

Documentation

- Two components to documentation
  - Vaccine ordering and distribution
  - Doses administered to individuals
- Phase 1: CDC's Vaccine Administration Management System (VAMS)
- Phase 2 and beyond: More robust system to include registration and scheduling functionality
- Final location of COVID vaccination data will be in the State Immunization Information System (IIS)
  - Also in healthcare organization's EMR

******Subject to Change!******

Cost (CMS Communication 10/28)

- Prohibit providers from charging consumers for admin of vaccine
- Insurance companies cover the administration fee without cost sharing for Medicare, Medicaid and Private Insurance
  - Medicare admin fees: 1st dose-$16.94 / 2nd dose-$28.39
  - Encourage private insurance to adopt the same fee structure
- Uninsured: Providers able to bill for reimbursement through Provider Relief Fund administered by Health Resources and Services Administration (HRSA)
- When emergency ends, some coverage and cost sharing will expire

Communication

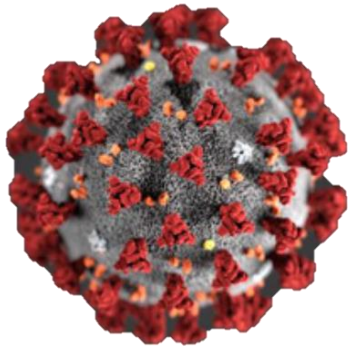
- Partner outreach:
  - Regional Public Health Networks
  - Long-term care facilities
  - Hospitals
  - Pharmacies
  - Clinical partners
  - Others
- Public outreach:
  - Proactively address safety and efficacy concerns
  - When and how to access vaccine

Vaccine Talking Points

- Leading candidates require at least 2 doses of vaccine spaced by at least 3w requiring infrastructure to ensure follow-up dosing
  - Same vaccine needed for both doses
- Approved vaccine will not protect 100% of recipients
  - Efficacy bar for EUA set low at 50%
  - Protection rates will likely be lower in older persons
- NH's priority for safe, efficient, equitable and collaborative distribution

A heavy lift… but we have each other!

Thank you!



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