

# COVID-19: KEEPING UP WITH A MOVING TARGET MAY 20, 2020 UPDATE

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





# COVID-19 Keeping Up With A Moving Target

Now, Twice Every Week @ [COVID19.DKBmed.com](https://COVID19.DKBmed.com)

Every Wednesday Evening

**C****VID-19**  
KEEPING UP WITH A MOVING TARGET

  
**Dr. Paul Auwaerter**  
Clinical Director  
Division of Infectious Disease  
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Jointly provided by The Postgraduate Institute for Medicine and DKBmed, LLC.

Every Friday Morning

**C****VID-19**  
KEEPING UP WITH A MOVING TARGET

  
**Sue Hansen, MSN, RN**  
Trauma/Surgery Critical Care,  
Clinical Nurse Specialist  
UW Medicine at Harborview Medical Center

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# CME Information

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The faculty reported the following financial relationships or relationships they or their spouse/life partner have with commercial interests related to the content of this continuing education activity:

Name of Faculty or Presenter	Reported Financial Relationship
Paul G. Auwaerter, MD, MBA, FIDSA	Scientific Advisor: DiaSorin, Shionogi Inc. JNJ: Ownership equity

Dr. Auwaerter has indicated that he will be referencing the unlabeled or unapproved use of agents currently being investigated in on-going studies and trials. These include hydroxychloroquine/chloroquine, hydroxychloroquine/chloroquine in combination with azithromycin, lopinavir plus ritonavir, tocilizumab, corticosteroids, and COVID-19 convalescent plasma. All activity, content, and materials have been developed solely by the activity directors, planning committee members, and faculty presenters, and are free of influence from a commercial entity.



# CME Information

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# Learning Objectives

- Describe immunology factors important in handling viral illness.
- Review vaccines for coronavirus, potential barriers as well as vaccine development accelerators.
- Understand the case definition for COVID-19 Multisystem Inflammatory Syndrome in Children.



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# Thank You

This program is brought to you through the generous support of DKBmed, Postgraduate Institute for Medicine, and the Institute for Johns Hopkins Nursing.

Please see **COVID19.DKBmed.com** for additional resources and educational activities



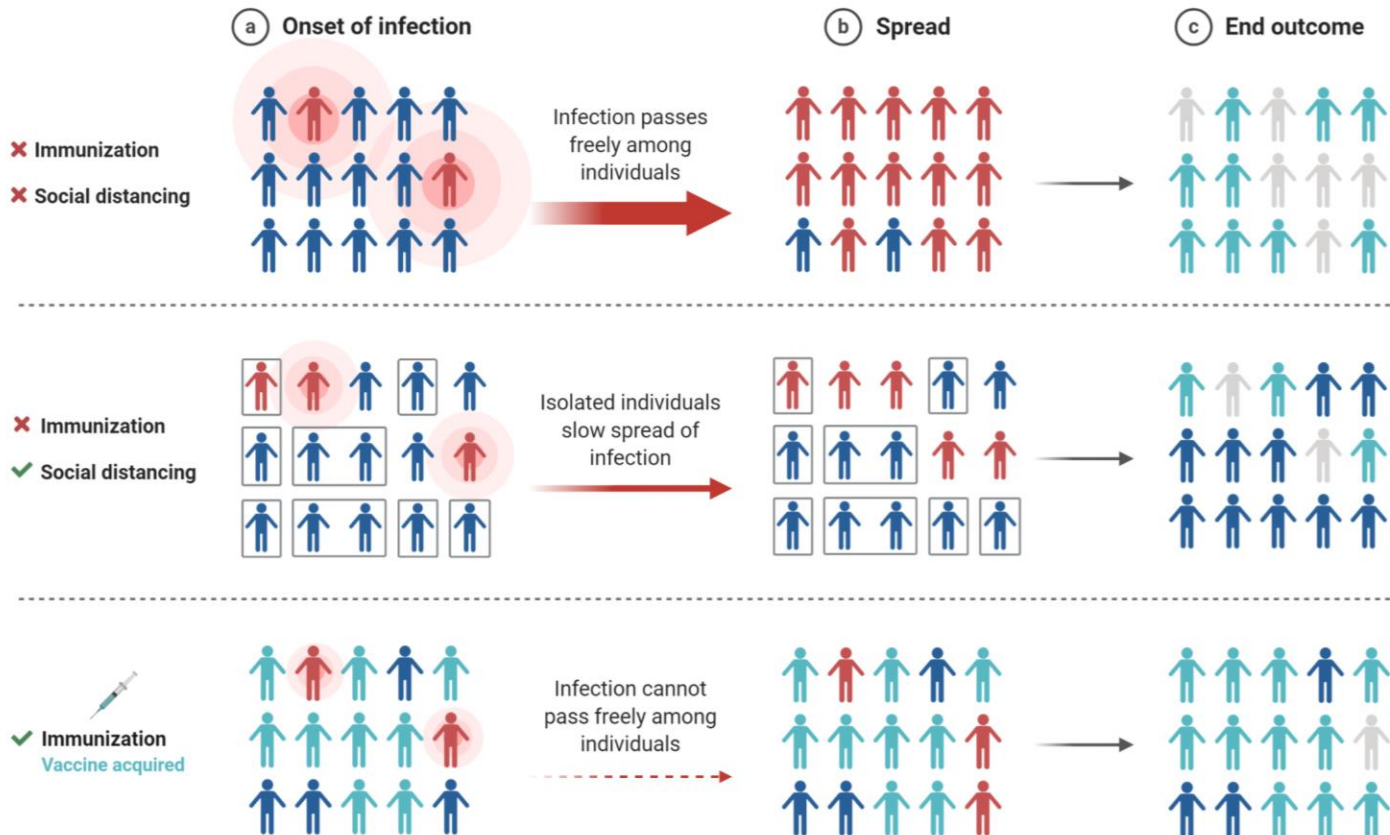






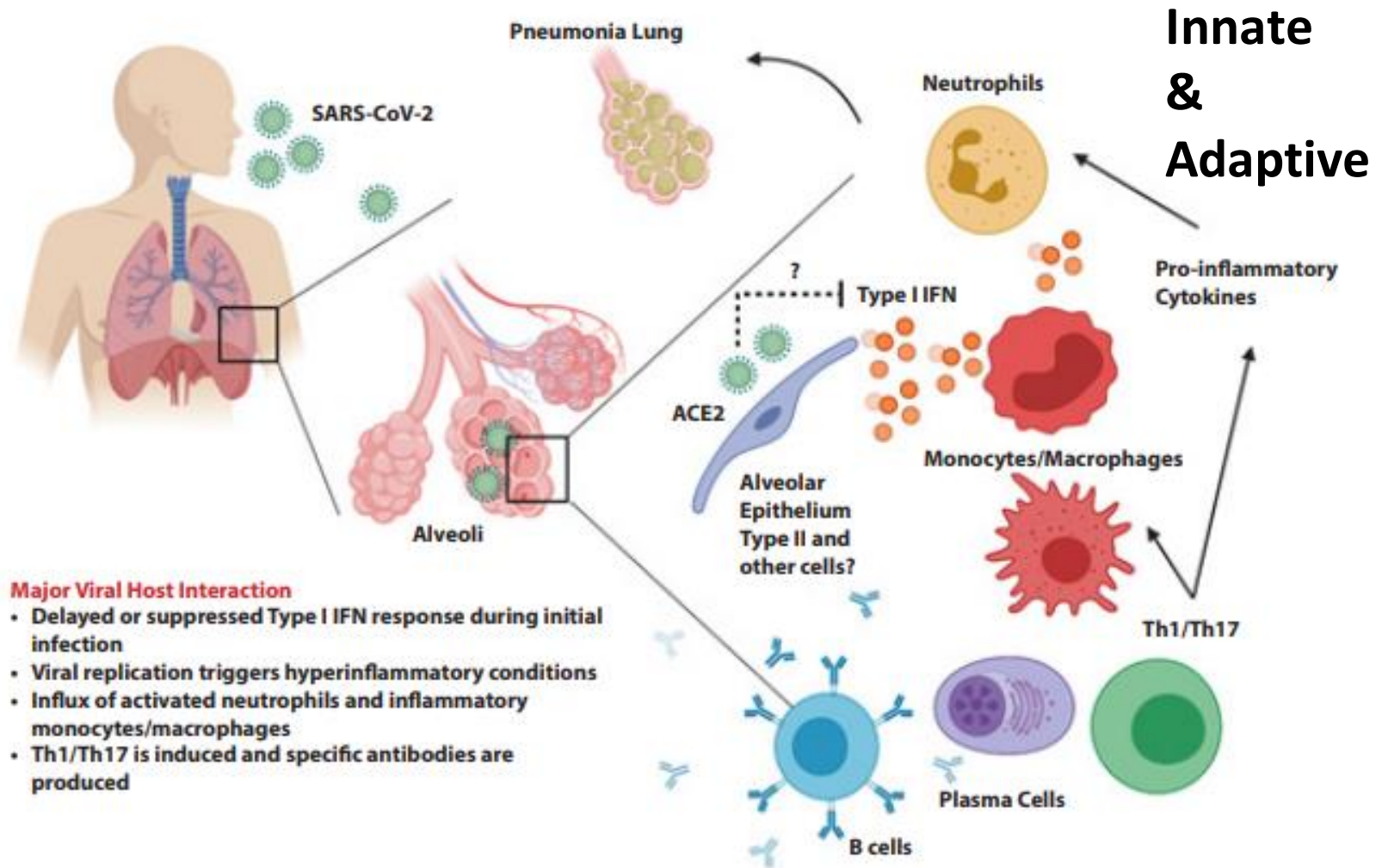
# The Great Hope: COVID-19 Vaccine

## Principles of HERD IMMUNITY & SOCIAL DISTANCING





# SARS-CoV-2 Immune Responses



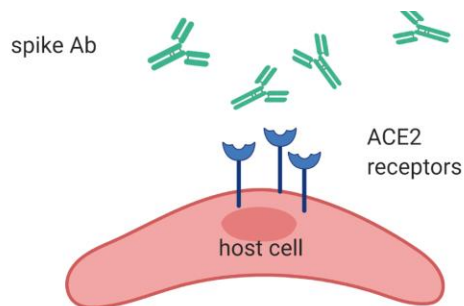
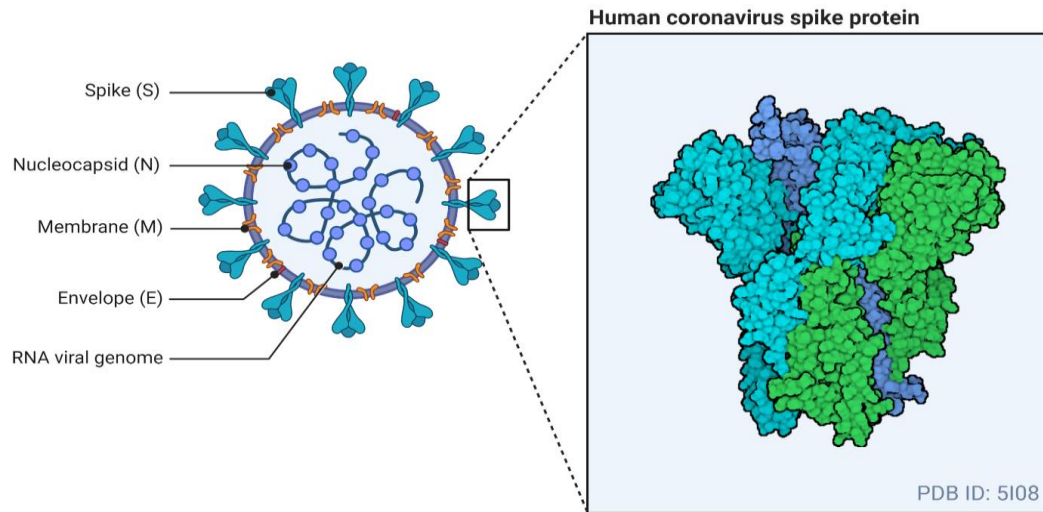


# What Do We Know About COVID-19 Immunity?

- Key questions:
  - How durable?
  - Is reinfection possible?
- Severe COVID-19, China
  - 285 pts
    - ~ 95% developed SARS-CoV-2 IgM antibodies by week 3
    - IgG appeared later (sustained immunity?)



# COVID-19 Immunity



Neutralizing  
Antibodies by  
Week 2-3 (S protein)



# COVID-19 Vaccines

- > 90 candidates
- Many approaches
- ~16% of vaccine candidates reach market

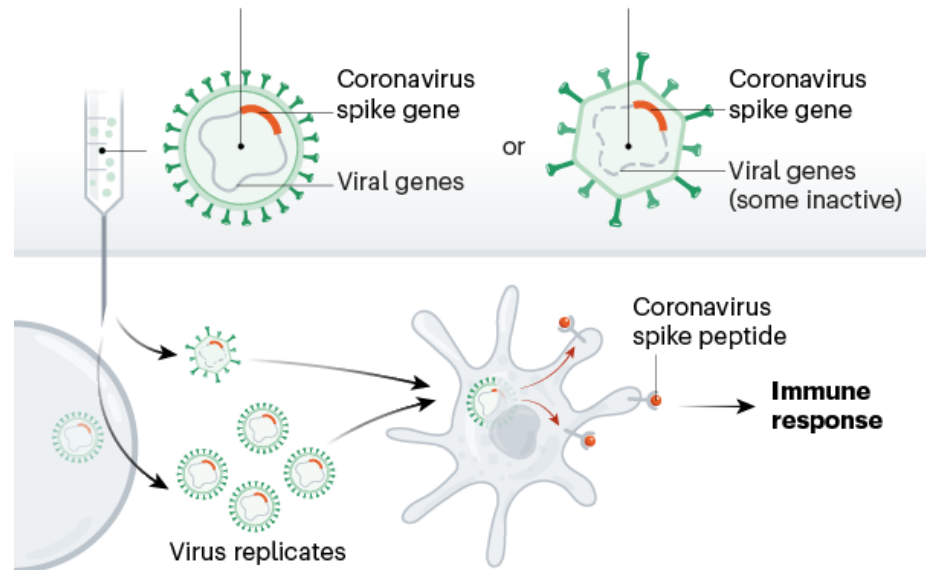
## VIRAL-VECTOR VACCINES

### Replicating viral vector (such as weakened measles)

The newly approved Ebola vaccine is an example of a viral-vector vaccine that replicates within cells. Such vaccines tend to be safe and provoke a strong immune response. Existing immunity to the vector could blunt the vaccine's effectiveness, however.

### Non-replicating viral vector (such as adenovirus)

No licensed vaccines use this method, but they have a long history in gene therapy. Booster shots can be needed to induce long-lasting immunity. US-based drug giant Johnson & Johnson is working on this approach.



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Nature 4/28/20

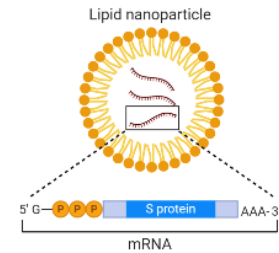
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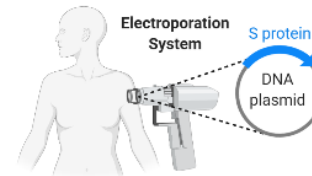
## Clinical Phase Vaccine Candidates for COVID-19\*

### Moderna (mRNA-1273)



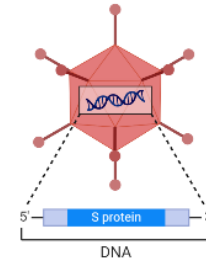
**Platform:** LNP-encapsulated mRNA encoding S protein.

### Inovio Pharma (INO-4800)



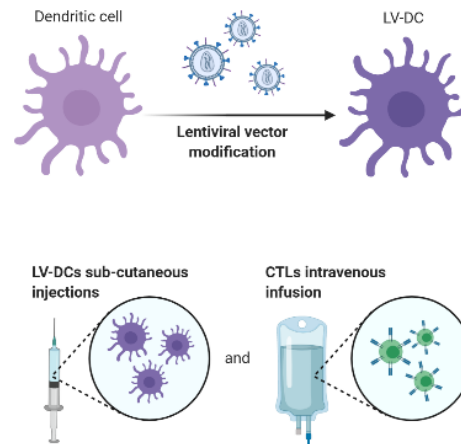
**Platform:** Electroporation of DNA plasmid encoding S protein.

### CanSino Biologics (Ad5-nCoV)



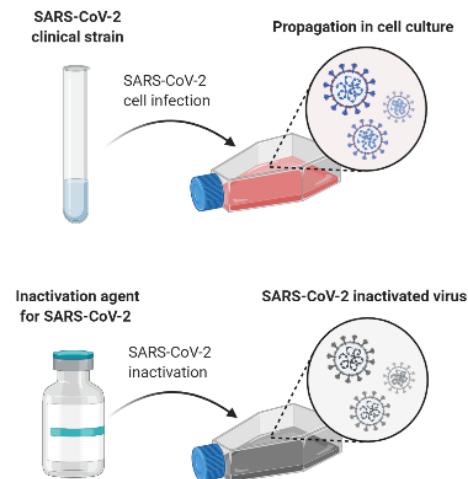
**Platform:** Adenovirus type 5 vector that expresses S protein.

### Shenzhen Medical Institute (LV-SMENP-DC)



**Platform:** Lentiviral vector modification of dendritic cells (LV-DCs) and antigen-specific cytotoxic T lymphocytes (CTLs).

### Sinovac Biotech (unnamed)



**Platform:** Inactivated virus vaccine produced from viral propagation in cells infected with a SARS-CoV-2 clinical strain.

\*As of April 2020





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## Targets of T cell responses to SARS-CoV-2 coronavirus in humans with COVID-19 disease and unexposed individuals

[Alba Grifoni](#) • [Daniela Weiskopf](#) • [Sydney I. Ramirez](#) • ... [Davey M. Smith](#) • [Shane Crotty](#) \* •

[Alessandro Sette](#)  \*  • [Show all authors](#) • [Show footnotes](#)

Published: May 14, 2020 • DOI: <https://doi.org/10.1016/j.cell.2020.05.015>

- Epitope pools find SARS-CoV-2 specific CD4<sup>+</sup> (100%) and CD8<sup>+</sup> (95%) T cells in convalescent COVID patients
- T cell responses focused not just on spike but also other proteins: M, N and other ORFs
- Robust responses by adaptive immune system
  - Additional vaccine focus beyond the spike protein





# mRNA Vaccine Phase 1



## Moderna Announces Positive Interim Phase 1 Data for its mRNA Vaccine (mRNA-1273) Against Novel Coronavirus

May 18, 2020 at 7:30 AM EDT

 PDF Version

*After two doses all participants evaluated to date across the 25 µg and 100 µg dose cohorts seroconverted with binding antibody levels at or above levels seen in convalescent sera*

*mRNA-1273 elicited neutralizing antibody titer levels in all eight initial participants across the 25 µg and 100 µg dose cohorts, reaching or exceeding neutralizing antibody titers generally seen in convalescent sera*

*mRNA-1273 was generally safe and well tolerated*

*mRNA-1273 provided full protection against viral replication in the lungs in a mouse challenge model*

*Anticipated dose for Phase 3 study between 25 µg and 100 µg; expected to start in July*

*Conference call to be held on Monday, May 18 at 8:30 a.m. ET*

<https://investors.modernatx.com/news-releases/news-release-details/moderna-announces-positive-interim-phase-1-data-its-mrna-vaccine>



# Human Viral Challenge (HVC) Model

## Vaccine Timelines

I

Vaccine Development Research Industry Average Source: ABPI



II

SARS-CoV-2 Vaccine WHO Projected Timeline 12 - 18 months



III

SARS-CoV-2 Vaccine Projected Timeline with HVC



\* Upon Safety: efficacy demonstration possible offering to healthcare workers and first responders



# Child & Adolescent COVID-19

## Percentage of total cases

- US: 2%
- China: 2.2%
- Italy: 1.2%
- Spain: 0.8%

## Range illness

China, n = 2143

- Asx 4%
- Mild 51%
- Moderate 39% (PNA)
- Severe 5%
- Critical 0.6%

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/pediatric-hcp.html>

Dong, Pediatrics 2020



BREAKING

WATCH LIVE: De Blasio, Cuomo, Murphy Updates on COVID-19

4 NEW YORK LOCAL WEATHER INVESTIGATIONS BAQUERO VIDEO TV LISTINGS TRAFFIC

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TRENDING Get Help Tri-State Case Count What's Open? Sick Kids PAUSE NYC Schools COVID-19 Hydroxychloroquine Vaccines Politics 8 WEATHER ALERTS

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# Up to 5 NY Children Dead, 100 Sickened by Rare COVID-Related Illness

New York City issued an initial health alert early last week after identifying more than a dozen children in city hospitals with the rare illness; now up to 100 cases have been identified statewide. Five children have died

By Melissa Russo • Published May 11, 2020 • Updated on May 14, 2020 at 6:54 pm



New York may have as many as 93 cases of children presenting with a new pediatric multi-system inflammatory...

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**CORONAVIRUS**  
6th New York Region to Reopen Tuesday, NYC Eves



# COVID-19 Inflammatory Syndrome in Children (Multisystem Inflammatory Syndrome in Children, or MIS-C)

CDC criteria:

- < 21 years
  - Fever, laboratory evidence of inflammation
  - Severe illness requiring hospitalization
    - Multisystem ( $\geq 2$ ) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); **and**
- No alternative plausible diagnoses; **and**
- Positive current or recent SARS-CoV-2 infection by reverse-transcriptase polymerase chain reaction, serology or antigen test; or COVID-19 exposure within the four weeks prior to the onset of symptoms



To submit your own question, please email  
[QA@dkbmed.com](mailto:QA@dkbmed.com)



**Why are nasal swabs for COVID-19 still being done if a saliva test is a better look at the lower respiratory tract, the saliva test has equal reliability to the nasal swab test, and when the nasal swab is extremely uncomfortable compared to a saliva test?**





**Is there any consensus about antibody testing?  
Which test is reliable, and what is the utility of  
antibody testing?**



**Is there any possible association between vitamin D deficiency and COVID-19 as hypothesized recently?**



**The CDC announced that childhood vaccinations are down significantly (based on purchasing data). Should all routine vaccinations (including the shingles vaccine) be carried out on schedule, regardless of local COVID-19 activity?**



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- Complete the evaluation on at [COVID19.DKBmed.com](https://COVID19.DKBmed.com)
- Upon registering and successfully completing the activity evaluation, you will have immediate access to your certificate.

## **To access more resources related to COVID-19:**

- Access our resource hub at [COVID19.DKBmed.com](https://COVID19.DKBmed.com)

## **To ask your own question to Dr. Auwaerter:**

- Email [QA@dkbmed.com](mailto:QA@dkbmed.com)