ScienceNews
EDUCATOR GUIDE

March 27, 2021
Vaccine Inequity Will Prolong Pandemic

SOCIETY FOR SCIENCE

About this Guide

In this Guide, based on the online *Science News* article "Global inequity in COVID-19 vaccination is more than a moral problem," students will learn about challenges in vaccinating the world against COVID-19 as well as potential consequences of unfair vaccine distribution. Then, students will discuss the effects of varying vaccination rates on local and global scales.

This Guide includes:

Article-based Comprehension Q&A — Students will answer questions about the online *Science News* article "Global inequity in COVID-19 vaccination is more than a moral problem," which explores the scientific and economic impacts of the failure to fairly distribute vaccines globally. A version of the story, "Vaccine inequity will prolong pandemic," appears in the March 27, 2021 issue of *Science News*. Related standards include NGSS-DCI: HS-LS3; HE-ETS1.

> **Student Comprehension Worksheet** — These questions are formatted so it's easy to print them out as a worksheet.

Cross-curricular Discussion Q&A — Students will think about how communities connect on local and global scales through the lens of COVID-19 vaccine distribution and consider why global collaboration in STEM is crucial for solving some large-scale issues. Related standards include NGSS-DCI: HS-LS3; HS-ETS1.

> **Student Discussion Worksheet** — These questions are formatted so it's easy to print them out as a worksheet.

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Article-based Comprehension, Q&A

Directions for teachers: Ask your students to read the online *Science News* article "Global inequity in COVID-19 vaccination is more than a moral problem," which explores the scientific and economic impacts of the failure to fairly distribute vaccines globally, and answer the following questions. A version of the story, "Vaccine inequity will prolong pandemic," appears in the March 27, 2021 issue of *Science News*.

1. How have COVID-19 vaccines been distributed so far in wealthy countries and countries with lower incomes?

Wealthy nations such as the United States, Canada and the United Kingdom have purchased or reserved hundreds of millions to over a billion doses — many more than those countries need based on their population sizes. In the United States, about 16 percent of the country's 330 million residents have been vaccinated. Meanwhile, 80 less-wealthy nations have yet to administer a single dose. Out of the 350 million vaccine doses that have been given worldwide as of early March 2021, only 330,000 doses were administered in all of Africa.

2. What would a more equitable distribution of COVID-19 vaccines looks like?

An equitable distribution would prioritize healthcare workers and vulnerable people in all countries.

3. What is COVAX and what is its mission? What is one large hurdle that COVAX faces in accomplishing its mission?

COVAX is an international initiative that aims to provide equitable access to COVID-19 vaccines by securing deals that send doses to low-income countries free of charge. Funding for the initiative is currently short billions of dollars.

4. What is herd immunity? What is the threshold to reach herd immunity?

Herd immunity is the level at which enough people in a population are immune to a pathogen to slow its spread. About 60 to 90 percent of a population need to be immunized to reach herd immunity.

5. What are coronavirus variants? How do variants arise and why are scientists concerned about some coronavirus variants?

Coronavirus variants are strains of the coronavirus that causes COVID-19. Variants arise when a virus replicates and acquires genetic tweaks. Those tweaks can make some variants more dangerous to people, such as making a virus more transmissible.

6. How could variants worsen the pandemic? How would the equitable distribution of COVID-19 vaccines mitigate this threat?

The more opportunity the coronavirus has to spread, the more likely it is that variants could arise that can evade existing vaccines or people's immune responses to older variants. If most of a region remains unvaccinated, a new variant could spread rapidly through the region and make its way to other vulnerable areas. Prioritizing regions that are most vulnerable to COVID-19 for vaccination could help stop a variant from becoming widespread.

7. How does the inequitable distribution of COVID-19 vaccines threaten the global economy? How could that threat be averted?

Researchers estimate that extreme vaccine inequity could cost the global economy trillions of dollars in 2021. The world's economies and supply chains are interconnected. COVID-19 infections and restrictions in countries that make goods could diminish demand and affect the profits of other countries that sell those goods. Investing relatively less money in distributing vaccines globally and more fairly could avoid such disruptions.

8. When do scientists estimate low-income countries will achieve herd immunity to the virus that causes COVID-19? Explain.

Low-income countries won't see widespread vaccination until 2023 or 2024. These countries can't get doses because wealthy nations are making deals with pharmaceutical companies to buy up most of the vaccine supply.

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Cross-curricular Discussion, Q&A

Directions for teachers:

Ask students to read and answer questions about the online *Science News* article "[Global inequity in COVID-19 vaccination is more than a moral problem]." A version of the story, "Vaccine inequity will prolong pandemic," appears in the March 27, 2021 issue of *Science News*.

Students should answer the first set of questions alone and then work with a partner to answer the second and third sets of questions.

Want to make it a virtual lesson? Post the online *Science News* article to your virtual classroom and use the questions to discuss the article with your class.

Vaccinating our global community

1. Are COVID-19 vaccines being distributed fairly around the world? Explain.

The distribution isn't equitable. Rich countries have secured many more doses of the vaccine than they need in advance, leaving fewer doses available for less-wealthy nations.

2. Which countries have had better access to COVID-19 vaccines? How does vaccine access affect countries' vaccination rates? What impact do vaccination rates have on countries?

Wealthy countries have had better access to vaccine doses and therefore have higher rates of vaccination than less-wealthy nations with poor access to vaccine doses. A country's vaccination rate can affect not only the health and social behaviors of its people, but also the health of its economy.

3. Choose one of the following quotes from the *Science News* article and discuss its meaning.

"The world is on the brink of a catastrophic moral failure, and the price of this failure will be paid with the lives and livelihoods in the world's poorest countries."

"No one is safe until all of us are safe, since an outbreak anywhere can become an outbreak everywhere."

"If we want to stop the spread we have to stop it everywhere, starting with the most vulnerable. Otherwise we're going to see continued outbreaks and suffering."

Student answers will vary but should highlight the need for a global solution to vaccinations.

4. Brainstorm communities of varying scales. Create a diagram that helps define the relative size and connectedness of the communities. One approach could be to use circles of relative sizes to define the different communities. Be sure to show how the communities are connected in your diagram.

Student answers will vary but should include individuals, families, town, county, state, national, continental, global.

Global and local impacts

1. What impact does vaccine inequity have on the global community in the short-term? What about the long-term?

In the short-term, some countries will have high vaccination rates and low numbers of COVID-19 cases. Countries that have poor access to vaccine doses will continue to have low vaccination rates and high numbers of COVID-19 cases and deaths. People in countries with high vaccination rates may have fewer social restrictions and travel would probably increase.

In the long-term, an uneven vaccination rate could cause coronavirus variants to arise that spread more easily and are potentially more infectious. As a result, COVID-19 cases could spike even in countries with high vaccination rates as the vaccines may be less effective against variants. Travel would decrease and the global economy would also probably be further interrupted.

2. Discuss what you know about the vaccination rate in your own community with your partner. How could the impact of COVID-19 vaccines in your local community change over time as a result of global vaccine inequity? Think through short-term and long-term effects.

Student answers will vary. Students may mention that as vaccination rates increase in their community, the number of cases of and deaths from COVID-19 will decline. However, an uneven global vaccination rate could spur more variants of the coronavirus. Current vaccines may be less effective against those variants, and if the variants spread to the local community, COVID-19 cases could spike again. That could lead to stricter social restrictions that could impact businesses, people's jobs and the economy.

3. Explain one existing approach to help create a more equitable solution to global vaccination distribution. Propose an idea that would help support the current approach, or suggest a unique alternative solution.

COVAX is using funds from governments and charitable organizations to buy vaccine doses from pharmaceutical companies and distribute the doses to low-income countries for free. Other student-suggested solutions will vary.

Global STEM collaboration

1. Can you think of an example from your own life where disjointed approaches to a solving a problem ended up causing a larger issue? What would have been a more successful approach?

Student answers will vary but should highlight a personal example of when collaboration led to a more successful outcome.

2. What are other examples of global collaborations in STEM that exist for the good of the humankind? Explain.

Student answers will vary. Students might mention global monitoring networks like the Global Ocean Observing System to observe climate data, the United Nations Paris climate accord or the World Health Organization.

3. Is there a STEM issue facing the world that you think needs a global solution? Explain.

Student answers will vary but could include more global collaboration to stop climate change or preparation for a future pandemic, for example.

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