Forum: Promoting Science Committee

Agenda: On measures to promote universal use of vaccines

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Introduction

Beginning in the late 1890s – when human species finally discovered the existence of disease, disease always stayed beside humans. It is not an exaggeration to say that disease took 50% of our entire history. The Black Death, for instance, was a devastating pandemic that struck Europe and Asia in the mid-1300s. Fortunately, as scientists and physicians develop vaccines as a method to protect humans from disease, diseases that tortured humans species were slowly weaken. However, in the current world, an infectious disease Coronavirus Disease (so-called COVID-19) have destroyed our daily life.

Vaccines, substances used to stimulate the antibodies, have greatly reduced death caused by disease and disability. According to the Centers for Disease Control and Prevention, "vaccines have reduced preventable infectious diseases to an all-time low and now few people experience the devastating effects of measles, pertussis and other illnesses." For example, when smallpox, a highly contagious and fatal infectious disease, did not have any vaccines, the fatality rate reached about 30%, but after the vaccine has been invented, the world is now Smallpox-free by having only 68 deaths in the United States in the nine years (1959-1966). Vaccines have been the key to promote global health and are the most efficient tool to control the infectious diseases. Even though there are people who disagree with the effect of vaccines, we cannot ignore how many people vaccination saved from life-threatening diseases for hundreds of years.

Key Terms

Infectious Disease

An illness caused by a specific infectious agent or its toxic product that results from transmission of that agent or its products from an infected person, animal, etc. It is also called communicable disease.

Infectious agent

Micro-organisms or macro-organisms capable of producing an infection.

Vaccine

A substance used to stimulate the production of antibodies to provide immunity against one or several diseases.

Pandemic

A disease outbreak that spread across countries or continents. It is more effective than epidemic.

Antibody

A protein produced by the body's immune system when it detects harmful substances, called antigens.

Antigen

A toxic or other foreign substance which induces an immune response in the body.

Anti-vaccination Movement

A movement of organization formed by anti-vaccinationists, people who fear vaccines and myths against vaccines, asserting that vaccines can contribute diseases while it is not scientifically proven. Anti-vaccinationists focus on vaccine's long-term side effects.

Variolation

The method of immunizing individuals against smallpox, but it was never risk-free. Upon recovery after the variolation, between 1% to 2% people died. It is effective compared to 30% of people who died naturally by the disease – smallpox.

General Overview

Coronavirus has destroyed our daily lives. Everyone is putting their masks on and traveling around the world is prohibited. However, these days, after vaccines are released, the severity is slowly declining.

Immunization

"Vaccines are the world's safest method to protest children from life-threatening diseases." Vaccines, for over two centuries, have safely reduced the danger of diseases like polio, measles, and smallpox. Immunization contributed substantially to global health and development, which led to economic benefits. Despite its benefit, low immunization levels persist – approximately 20 million children miss out on life-saving vaccines annually. The poorest people – often most in need of vaccines – are the majority of the people missing out vaccines, or least likely to get vaccinated.

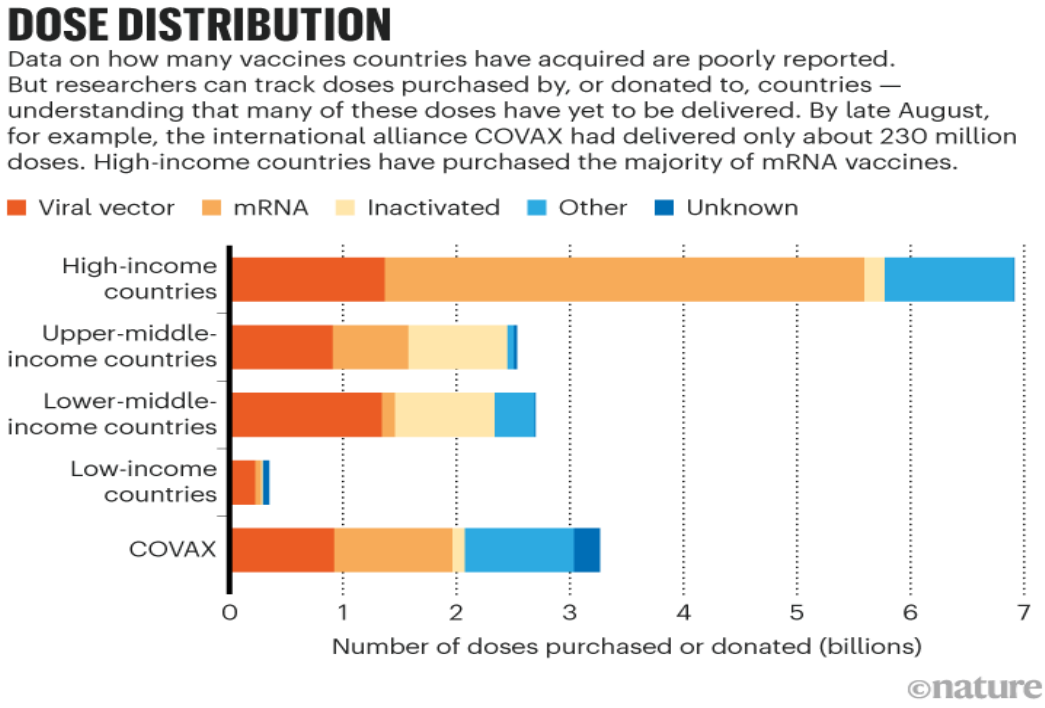
Availability of Vaccines in Developing Countries

According to PVA, "While rich nations are vaccinating one person every second, the majority of the poorest nations are yet to give a single dose." A large part of the world remains unvaccinated, especially people in developing countries, and this is a danger for all of us. For instance, in August 2021, across the African continent, only 1.65% of the population is fully vaccinated when the target is 60% of the population. Developing countries are coping with critical shortage of oxygen and medical supplies facing COVID-19. Many rich nations, such as the US, UK, and EU, are blocking a proposal over 100 developing countries to be discussed at the World Tade Organization (WTO), which leads to monopolies by pharmaceutical companies. The amount available mean only one three per cent of people in developing countries, and by the end of 2021, only one fifth, at best, can hope to be vaccinate. COVAX and the World Bank, currently, is trying to accelerate the COVID-19 vaccine supply for developing countries through a new financing

mechanism that builds on Gavi's, the Vaccine Alliance that was launched to introduce vaccines to developing countries, newly designed cost-design arrangement.

Availability of Vaccines in Developed Countries

So far, 80% of the doses have gone to people in high-income and upper-middle-income countries. For COVID-19, approximately 12 billion doses of vaccines are produced, but more are needed since many wealthy nations have purchased enough doses to cover their entire population several times when other countries have few. According to Nature, demand for mRNA vaccines has soared because wealthy countries recommending third doses, in theory, to boost their population's immunity while lower-income countries are using one-third of China's vaccines, which were questioned for efficacy. Furthermore, due to scarce of mRNA options, many nations are relying on viral-vector shots that use a harmless inactivated virus. 88% of the people vaccinated in India have gotten viral-vector shots that was developed by University of Oxford and AstraZeneca in UK.



Caption #1: Dose Distribution Chart

Inequality in Vaccine Distribution

Rich countries, or developed countries, has 14% of the world's population, but those 14% of people took 53% of the eight most promising vaccines. On the other hand, based on bmj, at least 90% of people in 67 low-income countries have little chance of getting vaccinated against COVID-19 in 2021. Oxford University and AstraZeneca have pledged to distribute 64% of their vaccine in developing countries, yet only 18%, at best, have reached the world's population.

Vaccine Equity is crucial since it is not only leaving millions or even billions of people vulnerable to deadly viruses, but also not letting new, more deadly variants to emerge and spread across the globe.

However, currently, people are failing to have equity on vaccines. According to research done, vaccines produced in 2021 will be enough to cover 70% of the globe population, approximately 7.8 billion, but most of the vaccines are reserved by wealthy countries, and the vaccine-producing countries are restricting its export so their citizens can be vaccinated first. According to the Global Dashboard for Vaccine Equity as of September 15, 60.18% of people in high-income countries have been vaccinated with at least one dose while only 3.07% of people in low-income countries have been vaccinated.

Types of COVID-19 Vaccines Available

Pfizer-BioNTech

It is a mRNA vaccine that is often shot in the muscle of the upper arm. Pfizer received FDA approval on August 23, 2021, and the ingredients are safe. Nearly all of the ingredients are found in many foods, such as fats, sugars, salts. Also, the Pfizer contains a harmless piece of messenger RNA (mRNA) – cell that teaches in the body how to create immune response to the virus that causes COVID-19.

Moderna

It also is a mRNA vaccine. The ingredients of the vaccine are safe – mRNA, lipids (or fats), salt, sugar, acid stabilizers, and acid. There are no antibiotics like sulfonamide, no preservatives like thimerosal or mercury, no tissues like aborted fetal cells or gelatin, and no medicines or therapeutics like ivermectin in the vaccine.

Johnson & Johnson's Janssen

It is a viral vector vaccine. The J&J/Janssen COVID-19 vaccine contains a piece of a modified virus that is not the virus that causes COVID-19, and this modified virus is called the vector virus. The vector virus cannot reproduce itself, so it is harmless. The vector virus gives instructions to cells in the body to create an immune response that helps protect the body from getting sick with COVID-19. After the body produces an immune response, it discards all the vaccine ingredients just as it would discard any information that cells no longer need. J&J/Janssen vaccine contains a harmless version of virus unrelated to the COVID-19 virus, sugar, salts, acid, and acid stabilizers.

Major Parties Involved

World Health Organization (WHO)

World Health Organization (WHO) is the United Nations agency that connects nations, partners, and people to promote health and to keep the world safe and serve the vulnerable. WHO leads global efforts to expand universal health coverage and directs the world's response to health emergencies.

United Nations Children's Fund (UNICEF)

United Nations Children's Fund (UNICEF) is the organization that works in the world's toughest place to reach the most disadvantaged people and to protect the right of every child, everywhere. UNICEF is the world's largest provider of vaccines and world's most supportive organization that supports child health and nutrition, safe

water and sanitation, quality education and skill building, HIV prevention and treatment for mothers and babies, and the protection of children and adolescents from violence and exploitation.

World Trade Organization (WTO)

World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. The goal of WTO is to help producers of goods and services, exporters, and importers conduct their business. It is taking a great role in vaccine distribution across the globe.

Food and Drug Administration (FDA)

Food and Drug Administration (FDA) is responsible for protecting the public health by ensuring the safety, efficacy, and security of human and veterinary drugs, biological products, and medical devices. Currently, FDA is working with US government partners, including CDC, and international partners to address the pandemic.

Centers for Disease Control and Prevention (CDC)

Centers for Disease Control and Prevention (CDC) is one of the major operating components of the Department of Health and Human Services. CDC works 24/7 to protect America from health and safety threats, both foreign and domestic. CDC increases the health security of America.

COVAX

COVAX is one of three pillars of the Access to COVID-19 Tools (ACT) Accelerator, which was launched in April in response to the pandemic. Bringing together governments, global health organizations, manufacturers, scientists, private sector, civil society, and philanthropy, with the aim of providing innovative and equitable access to COVID-19 diagnostics, treatments, and vaccines.

Timeline of Events

Date	Description of event
1000s	Variolation, a primitive form of vaccines was first developed in China and India. According to *The Life and Death of Smallpox*, Chinese Emperor K'ang Shi who survived smallpox as a child, also had his children inoculated. But some claims the history of vaccines is dated as early as 200 B.C.
1796	An English doctor, Edward Jenner performed the world's first vaccination. Based observation that milkmaids who got cowpox didn't show symptoms of smallpox, he inoculated cowpox pustule liquid from a milkmaid into a nine-year-old James Phipps' arm. Few weeks later, Jenner inoculated smallpox on Phipps' arm, but the smallpox didn't develop.

1980	WHO declared naturally-occurring smallpox to be eradicated by mass vaccination program. Smallpox became the world's first eradicated disease.
1991	Polio was completely eradicated from Western Hemisphere.
2020	
Jan. 9th	WHO announces mysterious Coronavirus-related pneumonia in Wuhan, China
Jan. 21st	CDC confirms first US Coronavirus Case
June 31st	WHO issues Global Health Emergency
Feb. 10th	China's COVID-19 death exceeds those of SARS Crisis
Mar. 11th	WHO Declares COVID-19 a Pandemic
July 21st	Vaccines from AstraZeneca, CanSino Biologics show promising results
Sept. 1st	US rejects WHO Global COVID-19 vaccine effort. The United States says it will not participate in an initiative by the WHO to develop, make, and distribute a COVID-19 vaccine.
Oct. 22nd	FDA approves remdesivir as first COVID-19 drug
Nov. 9th	Pfizer publishes Vaccine Results. Pfizer releases data from its COVID-19 vaccine trial showing that the vaccination was 90% effective.
Nov. 16th	Moderna reveals Vaccine Efficacy Results. Moderna announced that its experimental vaccine reduces the risk of COVID-19 infection by 94.5% in participants.
2021	
Jan. 27th	US Vaccine Supply to Increase by 50%
Feb. 21st	Pfizer Vaccine 98.8% effective against deaths, hospitalizations after 2 doses
May 10th	Pfizer/BioNTech Vaccine approved for adolescents
May 18th	US exports excess vaccines

UN Involvement, Relevant Resolutions, Treaties and Events

Since COVID-19 pandemic is more than a health crisis; it is an economic crisis, a humanitarian crisis, a security crisis, and a human rights crisis. COVID-19 has highlighted severe fragilities and inequalities within and among nations. UN has proposed some response for COVID-19 as shown below:

Caption #2: Responses toward COVID-19

Possible Solutions

Implementing Disease Surveillance System

To effectively monitor the spread of vaccine-preventable disease and supply appropriate vaccines when needed, this would provide possible warning of outbreaks of disease as well as gathering the impact of disease control programs for development purposes. Strengthen surveillance system will provide disease data needed for immunization initiatives and monitor the impact of new vaccines. The data collected will also tell what type of vaccines should be applied in an area.

Some Resources that might be helpful

1: https://doi.org/10.1136/bmj.m4809

2: https://www.nature.com/articles/d41586-021-02383-z

3: https://www.wto.org/english/news_e/roadmap_igo_01jun21_e.htm

4: https://www.un.org/en/coronavirus/UN-response

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