



Driving Pharmaceutical innovation Post-COVID:
The Position of Research Institutions as Key
Players

Prof Charles Esimone *FAS, FPSN, FNAPharm*

Preamble

The image features a light beige background with a subtle gradient. At the bottom, there are several decorative, wavy lines in shades of cream and light gold, creating a soft, flowing effect.

Outline



Introduction



Diseases do not respect geographical barriers



"Red tapisms" and the adoption of novel pharmaceuticals

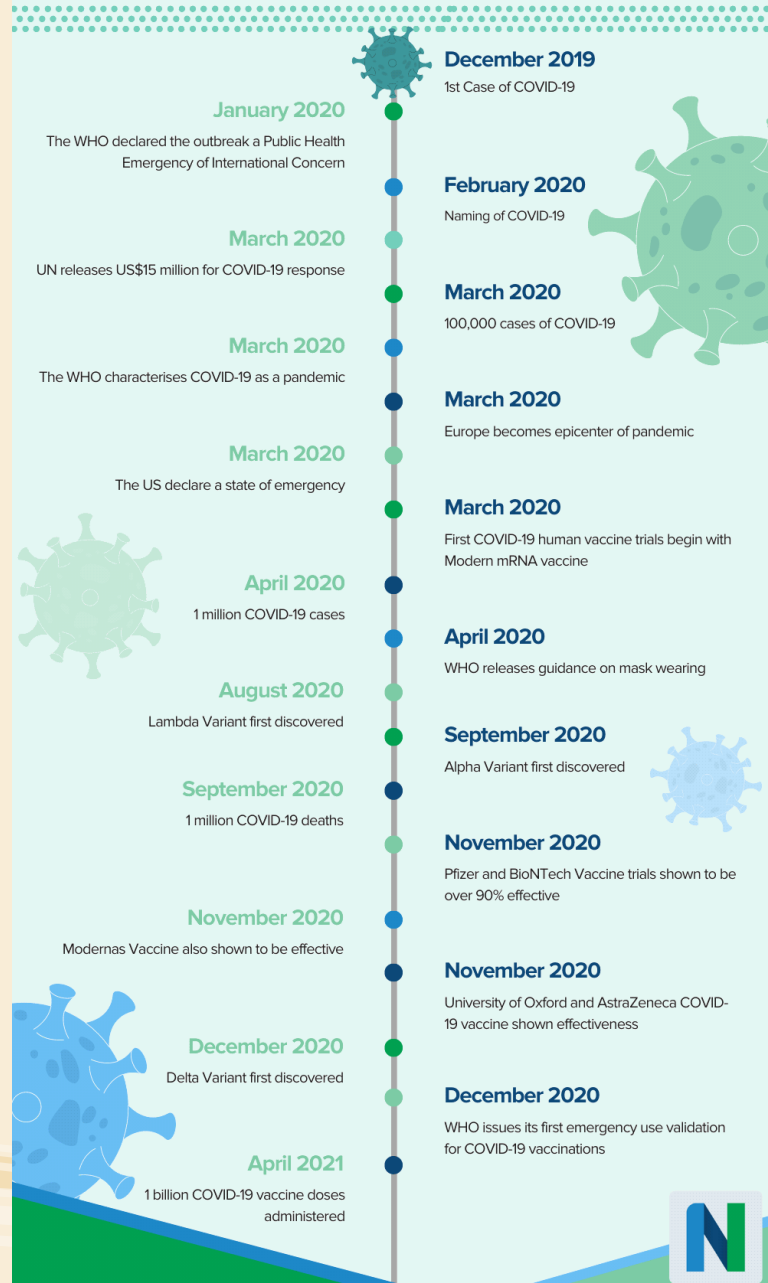


Research Institutions as *"think tanks"* for Pharmaceutical Innovations



Background

History of COVID-19



Chinese Proverb



“..if you want to go fast,
go alone but if you want
to go far, go together”

想走得快，一个人走，
想走远，一起走

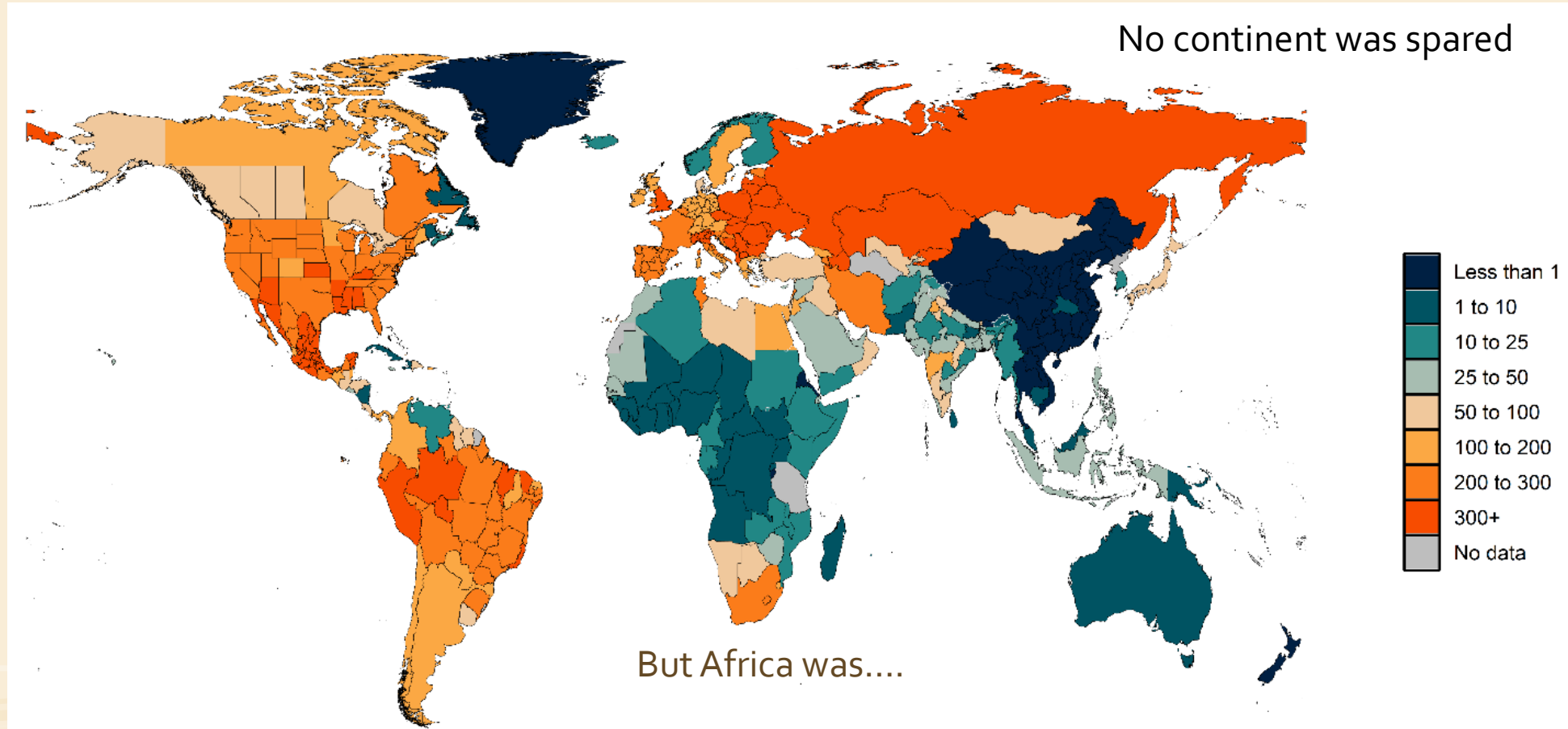
Diseases and geographical barriers

Some people thought that Africa would have been wiped out in 2020.

We do not have capacity



Cumulative total death rate

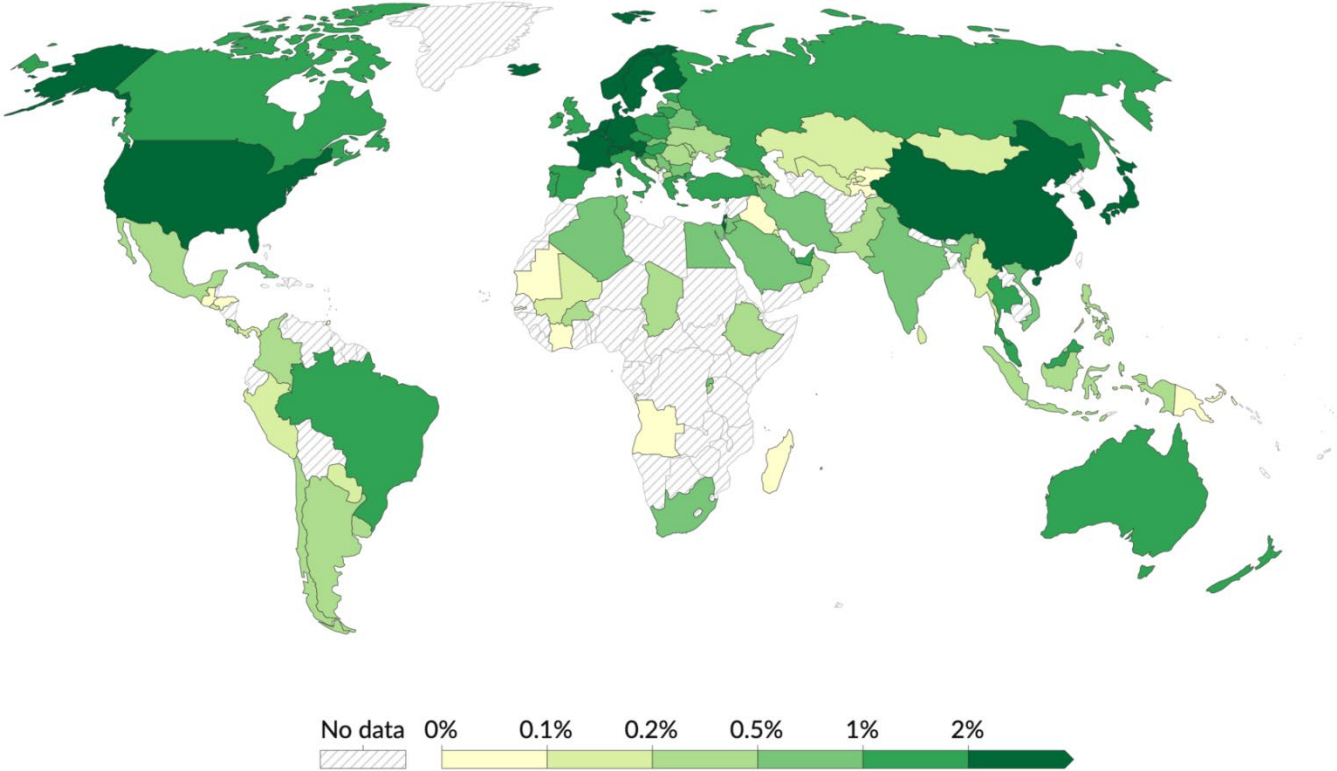


Country	COVID-19 deaths	Country	COVID-19 deaths
United States	905,289	South Africa	160,452
India	654,395	Poland	149,855
Mexico	617,127	Peru	147,765
Brazil	595,903	Ukraine	138,507
Russian Federation	593,610	France	132,680
United Kingdom	209,661	Spain	123,786
Italy	175,832	Germany	120,729
Iran	174,177	Indonesia	115,743
Egypt	170,041	Japan	108,320
		Romania	87,649
		Kazakhstan	81,696

Some figures

Research & development spending as a share of GDP, 2021

Includes basic research, applied research, and experimental development.



R&D Capacity spending as a measure of R&D Capacity

Data source: UNESCO (via World Bank)

OurWorldInData.org/research-and-development | CC BY

Note: Spending includes current and capital expenditures (public and private) on research.

'Red tapism' jetissoned

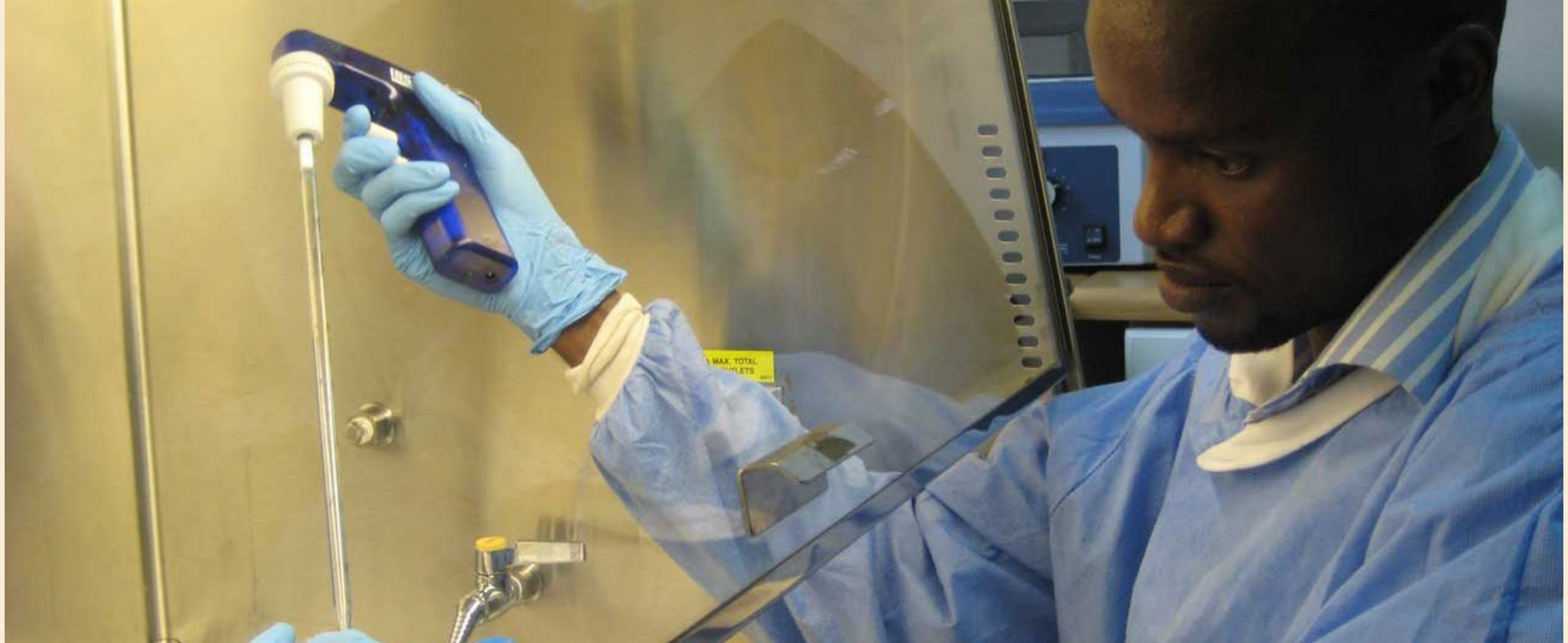




- Less than a year from the first case (10 months)
- Only 8 months after the first human trial to effective vaccines
- Only 9 months from vaccine trial in humans to WHO emergency use approval (31st Dec 2020)

The 20 years 'benchmark' for drug development is an insult to the technological capacity of the 21st century.

Way Forward: Research Institutions as Think-Thank for Pharmaceutical Innovation



The interdependence and need for collaboration

Academia invents new drugs for old and new diseases, solve industry problem

- Eg Oxford for Astra-zeneca covid-19 vaccine

Industry pay for research, provide capacity

- Astra-zeneca centre of excellence in Loughborough university
- Astra-zeneca PhD and basic and applied research

Industry



- They also have their own research and development unit
 - One of my students has been invited to work in GSK laboratory in the UK to test orphaned drugs for the purpose of repurposing. The enticing sentence they used was “you have the freedom to use our high-tech research and development laboratories with limitless possibilities to carry out research in orphan drugs”.

Where is the collaboration

Industry

- The industry provides capacity in terms of research infrastructure and equipment
- The industry feeds basic research with reports of issues encountered during production or market requirement that requires solution.

Academia

- the Academia provides the human resource and at the same time develop the capacity of the human resource who carry out basic research to break frontiers or carry out applied research to create new products or modified products using the information from basic research

Industry confidence in the Academia



The Industry in Nigeria does not have much trust in the academia

That's why they outsource their R&D to companies abroad



There is limit to the kind of research they can carry out without funding.

Funding from government and non-governmental bodies like NAPPISA can enhance their skills and potentials which will attract the industry

Way forward – Capacity building

- NAPPSA research Institute in selected Nigerian Universities
- Applied Postgraduate research
 - PostDoc, PhD, Msc
- Collaborations with US Universities facilitated by NAPPSA



Nankai University example

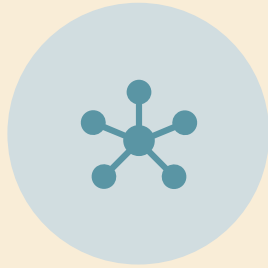
- Received \$5 B for R&D in any field
- Imported 8 nobel laureates
- \$5B_(s) + 8Nobel laureates + R&D → Capacity building
- Competent Laboratory in Nigeria

Nigeria to Nigeria collaborations

Exhaust the synergistic potentials
available within Nigeria



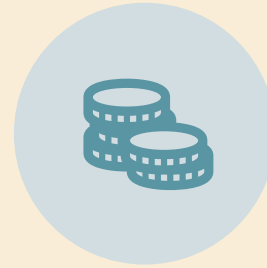
Nigeria global collaboration



AMERICA RESEARCH
NETWORKS



AMERICA FUNDING
NETWORK



AMERICA
COUNTERPART
FUNDING



SUBSCRIPTION FOR
RESEARCH
PROFESSIONALS

Focus your effort



Identify a priority research area to fund for a given number of years



Accommodate another research question when capacity has been built

Examples of successes



Oxford university-Astra Zeneca collaboration that birthed the Astra-Zeneca COVID-19

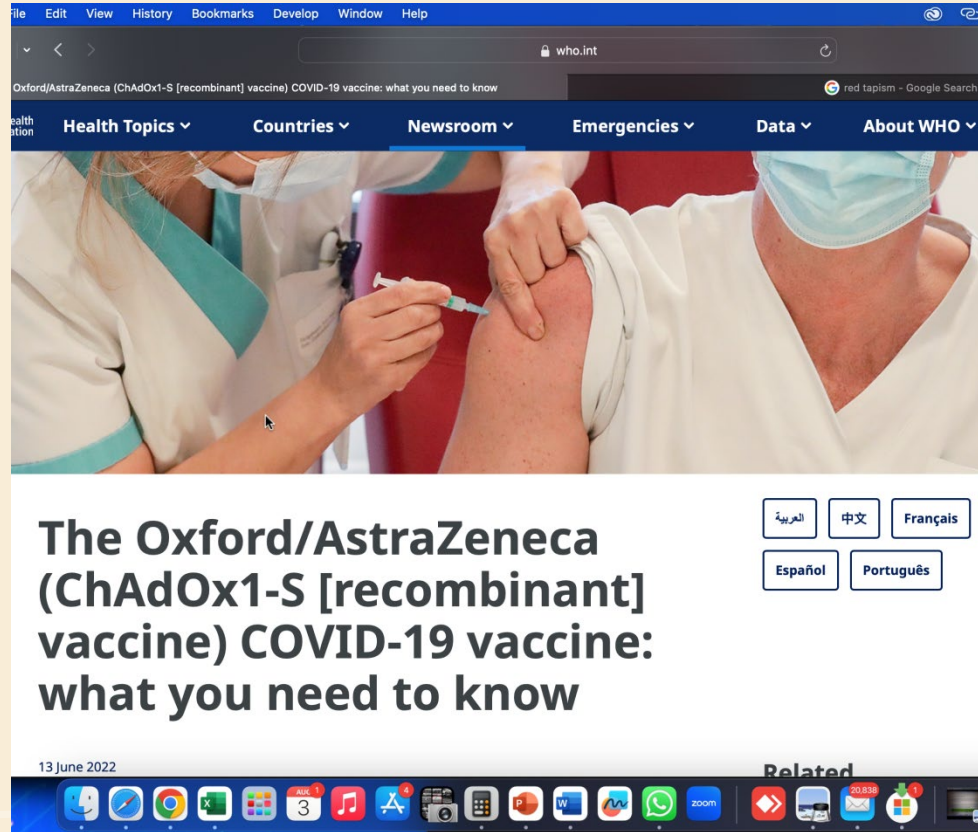


NAPA and NAIP that resulted in the development of an effective herbal cough syrup NANIP



NAPA and NAIP that resulted in the development of PINAN which is herbal cream used in the treatment of acne and rashes

The collaborations that resulted in the vaccines



A screenshot of the World Health Organization (WHO) website. The browser address bar shows 'who.int'. The page title is 'Oxford/AstraZeneca (ChAdOx1-S [recombinant] vaccine) COVID-19 vaccine: what you need to know'. The navigation menu includes 'Health Topics', 'Countries', 'Newsroom', 'Emergencies', 'Data', and 'About WHO'. The main image shows a healthcare worker in a white coat and mask administering a vaccine into a person's arm. Below the image, the article title is 'The Oxford/AstraZeneca (ChAdOx1-S [recombinant] vaccine) COVID-19 vaccine: what you need to know'. There are language selection buttons for Arabic, Chinese, French, Spanish, and Portuguese. The date '13 June 2022' is visible at the bottom left. A Windows taskbar is visible at the very bottom.

The Oxford/AstraZeneca (ChAdOx1-S [recombinant] vaccine) COVID-19 vaccine: what you need to know

13 June 2022



A screenshot of a Bentley University website article. The browser address bar shows 'bentley.edu'. The page title is 'COVID-19 vaccines built on \$17 billion in NIH funding'. The main image shows a close-up of a person's arm being vaccinated. Below the image, the article title is 'COVID-19 vaccines built on \$17 billion in NIH funding'. The subtitle is 'Broad foundation of NIH-funded research prior to pandemic provided tool kit for rapid vaccines'. The author is 'Helen Henrichs' and the date is 'April 22, 2021'. The article text discusses the unprecedented development of COVID-19 vaccines less than a year after discovery, enabled by more than \$17 billion in NIH funding for vaccine technologies prior to the pandemic. It mentions research from Bentley University's Center for Industry and the journal Vaccine. The article notes that 8,420 (16%) of 51,530 published research papers in 2019 acknowledged NIH funding totaling \$17.2 billion. Some technologies have been employed successfully since the mid-20th century, including viral vectors used in the Johnson & Johnson and AstraZeneca vaccines.

COVID-19 vaccines built on \$17 billion in NIH funding

Broad foundation of NIH-funded research prior to pandemic provided tool kit for rapid vaccines

Helen Henrichs
April 22, 2021

The unprecedented development of COVID-19 vaccines less than a year after discovery of this virus was enabled by more than \$17 billion in vaccine technologies funded by the NIH prior to the pandemic, according to new research from Bentley University's Center for Industry. The article, titled "NIH funding for vaccine readiness before the COVID-19 pandemic" demonstrates the critical role this broad government-funded research plays in ensuring vaccine readiness.

The report, published today in the journal Vaccine, examined the maturation of research and NIH funding for ten technologies that were candidate COVID-19 vaccines as of July 2020. The maturation of these technologies was described in 51,530 published research papers in 2019, of which 8,420 (16%) acknowledge NIH funding totaling \$17.2 billion. Some of these technologies have been employed successfully since the mid-20th century. Others, such as the viral vectors employed in the Johnson & Johnson and AstraZeneca vaccines, emerged



Thank you