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## Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

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# APPENDIX 2

## Data on public and non-profit funding for the research, development, and production of COVID-19 vaccines

The data presented in this Appendix are up to date as of February 3, 2021.

### Search strategy and selection criteria

The websites of the lead companies of all COVID-19 vaccines included in our dashboard (see Appendix 1 for inclusion criteria) were searched for press releases about public or non-profit funding commitments for their investigational vaccines; the websites of any identified external funders were also searched. Two investigators (OJW and MS-K) independently extracted information on the amount and nature of funding obtained from public and non-profit bodies. We also reviewed financial reports filed by these companies with the United States Securities and Exchange Commission (10-Q, 8-K, and other relevant forms)[1] or the China Securities Regulatory Commission for further details. Wunan Shi (Xi'an Jiaotong University, Xi'an, China) collected data from Chinese-language sources on the costs of development and production for experimental COVID-19 vaccines being developed by Chinese firms; these data were not independently extracted by a second investigator. We also searched the online *COVID-19 R&D Tracker* (Policy Cures Research, Australia)[2] and a database maintained by the science data analytics company Airfinity (2021)[3] for additional data on the costs of research and development.

We preferred press releases or other communications directly attributable to vaccine developers and organisations running trials, but also considered media reports from reputable sources when direct communications were not available.

Only information published in Chinese, English, French, or German were included, since most candidates in clinical testing are being developed by firms headquartered in Australia, Canada, China, France, Germany, the United Kingdom, or the United States. We did not investigate the scale of private investment in these vaccine development and production projects (e.g., venture capital) since we could not reliably track such investments.

We included funding commitments that were made to companies prior to the start of the pandemic if these were relevant to the technologies being used to develop COVID-19 technologies. For example, the Coalition for Epidemic Preparedness Innovations (CEPI) provided funding to CureVac in 2019 for its mRNA technology, which is the technology CureVac is relying on for its experimental COVID-19 vaccine. Inovio, by contrast, received earlier funding from CEPI for vaccines against other diseases, so this funding

was excluded. Due to lack of transparency, we are unlikely to have captured all relevant earlier investments.

We did not count funds provided directly to licensees that produce and distribute vaccines on behalf of lead developers (e.g., Serum Institute of India), or to contract development and manufacturing organisations (CDMO) that contribute to lead developers' vaccine production (e.g., Emergent BioSolutions). Several of the licensees and CDMOs are collaborating with multiple vaccine makers, so it was not always possible to provide a breakdown by firm. And investments in licensees and CDMOs were often not publicly disclosed.

We also excluded loans (i.e., debt financing) from the European Investment bank into companies like BioNTech and CureVac. We also excluded direct equity financing by governments; for example, the German federal government bought a stake in CureVac in June 2020.

We included pre-purchase agreements between governments and companies where it appeared as though a significant portion of the funding was paid up front, or via milestone payments, for the late-stage development of an experimental vaccine (i.e., phase 1-3 trials) or the scaling up production at risk prior to the completion of clinical testing (e.g., US Government deals with Novavax, Sanofi/GSK, and AstraZeneca). We excluded such pre-purchase agreements when it appeared as though the purchase was only going towards paying for doses (e.g., US Government deal with BioNTech/Pfizer; deals between the European Union and several companies; deals between the government of Japan and companies; deal between the Brazilian government's Fiocruz and AstraZeneca).

**Table**. Public and non-profit funding for the research, development, and production of leading vaccine candidates (as of February 3, 2021).

| Developers | Known public and non-profit funding, US$ | Funding arrangements |
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| Sanofi / GlaxoSmithKline | $2.1 billion | **Deal 1 ($31m)**: Sanofi received initial $30.8 million from BARDA to support their development programme.[4,5] The funding was to support the company to "accelerate into non-clinical studies and a Phase 1 clinical trial to demonstrate initial safety and efficacy of the vaccine candidate."[6]<br><br>**Deal 2 ($2.04bn):** Sanofi received a further commitment for $2.04 billion from Operation Warp Speed[4,7] to "support advanced development including clinical trials and large-scale manufacturing of 100 million doses of a COVID-19 investigational adjuvanted vaccine".[8]<br><br>**Notes**: Sanofi and GSK have jointly struck pre-order agreements with the United Kingdom[9], European Union,[10], COVAX,[11] and several other governments.[12] |
| Novavax | $2.1 billion | **Deals 1 and 2 ($388m)**: The company received $388.4 million from CEPI.[13] In an 8-K form, the company explains: "On May 11, 2020, Novavax, Inc. (the "Company") entered into a restated funding agreement (the "CEPI Funding Agreement") with the Coalition for Epidemic Preparedness Innovations ("CEPI"), under which CEPI will provide funding of up to $384.5 million to the Company to support the development of NVX-CoV2373, the Company's coronavirus vaccine candidate against SARS-CoV-2. The CEPI Funding Agreement provides that up to $145.2 million of the total $384.5 million available to the Company may be borrowed by the Company, in its sole discretion, the form of one or more forgivable no interest term loans in order to prepay certain manufacturing activities. Any such loans are not subject to restrictive or financial covenants. The Company is only expected to repay such loans under certain circumstances to the extent it sells vaccine, produced with the funds provided and included in such loan(s), to a third party. The CEPI Funding Agreement is in addition to the $3.9 million of funding CEPI provided to the Company pursuant to an initial funding agreement entered into by the Company and CEPI in March 2020."[14] |

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| | | **Deal 3 ($60m)**: The company received $60 million in funding from the Department of Defense "to support Novavax in its production of several components of the vaccine that will be manufactured in the U.S. The agreement includes a 2020 delivery of 10 million doses of NVX-CoV2373 for DoD that could be used in Phase 2/3 clinical trials or under an Emergency Use Authorization (EUA) if approved by the U.S. FDA."[15]<br><br>**Deal 4 ($1.6bn)**: The company received $1.6 billion in funding commitments from Operation Warp Speed (Department of Health and Human Services and Department of Defense)[4] "to demonstrate commercial-scale manufacturing of the company's COVID-19 investigational vaccine. By funding this manufacturing effort, the federal government will own the 100 million doses of investigational vaccine expected to result from the demonstration project."[16]<br><br>The company, in an 8-K form pursuant to its deal with Operation Warp Speed,[17] elaborated: "Under the [Medical CBRN Defense Consortium ("MCDC")] Agreement, the Company is entitled to receive funding of up to $1.6 billion to support certain activities related to the development of NVX-CoV2373, the Company's vaccine candidate targeting SARS-CoV-2, the virus that causes COVID-19 disease, and the manufacture and delivery of the vaccine candidate to the U.S. Government. Pursuant to the MCDC Agreement, the Company is currently authorized to make expenditures or incur obligations of up to $800 million, and the parties have committed to negotiate a definitive agreement by December 2020 that provides for aggregate costs payable to the Company up to but not in excess of the approved budget of $1.6 billion. If the parties have not agreed on definitive pricing or other terms by December 2020, or any extension of such target date granted by the U.S. Government, the U.S. Government has the discretion to unilaterally determine a fair and reasonable price for completion of the definitive agreement."<br><br>"The MCDC Agreement requires the Company to conduct certain clinical, regulatory and other activities, including a pivotal Phase 3 clinical trial to determine the safety and efficacy of NVX-CoV2373, and to manufacture and deliver to the U.S. Government 100 million doses of the vaccine candidate. Of the $1.6 billion maximum amount payable to the Company, approximately $1.16 billion is payable for activities related to the achievement of various clinical development milestones relating to the enrollment of patients in clinical trials and delivery of related study reports, approximately $418 million is payable for activities related to the achievement of certain manufacturing milestones and approximately $24 million is payable for activities related to the achievement of certain regulatory and other milestones." |

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| | | "In the event that, prior to the delivery of 100 million doses of the vaccine candidate, the Company has submitted an Emergency Use Authorization under §564 of the Food, Drug and Cosmetic Act or a biologics license application under §351(a) of the Public Health Service Act and the Company (a) terminates manufacturing of NVX-CoV2373, (b) discontinues sale of NVX-CoV2373 to the U.S. Government or (c) makes any filing that anticipates federal bankruptcy protection, then upon the request of the U.S. Government, the Company will provide certain items necessary for the U.S. Government to pursue manufacturing of NVX-CoV2373 with a third party for exclusive sale to the U.S. Government. Such items include the (1) grant of a non-exclusive, nontransferable, irrevocable (except for cause), royalty-free paid-up license to practice or have practiced for or on behalf of the U.S. Government certain Background IP (as such term is defined in the MCDC Agreement), (2) transfer of necessary U.S. Food and Drug Administration regulatory filings or authorizations and (3) delivery of any outstanding deliverables contemplated or materials purchased under the MCDC Agreement."[17]<br><br>**Deal 5 ($15m):** The Bill & Melinda Gates Foundation provided a $15 million grant to help fund Novavax's phase2b COVID-19 vaccine trial in South Africa.[18]<br><br>**Notes**: Takeda will manufacture and sell Novavax's vaccine in Japan; Takeda has received funding from Japan's Health, Labour, and Welfare Ministry to scale up production of the vaccine.[19,20] The Serum Institute of India, which is expected to produce up to 1 billion doses of the Novavax vaccine for low- and middle-income countries,[21,22] is receiving funding from the Gates Foundation to scale up production of COVID-19 vaccines at risk.[23] |
| University of Oxford / AstraZeneca | $1.7 billion | **Deal 1 ($2.9m)**: The UK government provided £2.2 million in funding to Professor Sarah Gilbert (University of Oxford) "for vaccine development and trials";[24] this works out to roughly $2.9 million, based on August 8, 2020, exchange rate.<br><br>**Deal 2 ($0.5m)**: The UK government provided £0.4 million in funding to Dr Sandy Douglas (University of Oxford) for "research into vaccine manufacturing capabilities";[24] this works out to roughly $0.5 million, based on August 8, 2020, exchange rate. |

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| | | **Deal 3 ($26m)**: The University of Oxford received £20 million from the UK government for vaccine development;[25] this works out to roughly $26.1 million, based on August 8, 2020, exchange rate.<br><br>**Deal 4 ($85m)**: The University of Oxford received £65.5 million from the UK government for vaccine development and manufacturing;[26] this works out to roughly $85.4 million, based on August 8, 2020, exchange rate.<br><br>**Deal 5 ($384m)**: The University of Oxford received funding from CEPI to accelerate development of its vaccine: "CEPI provided initial funding for the Oxford project to support the manufacture of vaccine materials required for preclinical and phase 1 testing."[27] The CEPI portfolio website indicates that this initial funding "was up to US$ 1.1 million" and goes on to note that the organisation provided an "additional US$383 million".[28] The additional $383 million was to expand production capacity for the manufacture and delivery of 300 million doses to COVAX.<br><br>**Deal 6 ($1.2bn)**: AstraZeneca will get up to $1.2 billion in funding from BARDA[4] "for the development, production and delivery of the vaccine, starting in the fall. The development programme includes a Phase III clinical trial with 30,000 participants and a paediatric trial."[29]<br><br>**Notes**: AstraZeneca "reached a $750m agreement with CEPI and Gavi [as part of the COVAX Facility] to support the manufacturing, procurement and distribution of 300 million doses of the potential vaccine, with delivery starting by the end of the year."[30]<br><br>AstraZeneca has reached pre-order agreements with the United States,[31,32] Brazil,[33] European Union,[34] United Kingdom,[34] and Japan. The company has also researched a licensing agreement with the Serum Institute of India and South Korea's SK Bioscience to expand production capacity, among other partners. The Serum Institute of India, which is expected to produce up to 1 billion doses of the AstraZeneca-Oxford vaccine for low- and middle-income countries,[30] has received funding from the Gates Foundation to scale up production of COVID-19 vaccines at risk.[23]<br><br>The Lemann Foundation, a non-profit organisation in Brazil, is providing funding (100 million reais, or $18 million) for the construction of a production plant for the AstraZeneca / Oxford vaccine; the funding is going to |

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| | | Fiocruz (Oswaldo Cruz Foundation).[35] Separately, the Brazilian federal government put aside 1.9 billion reais ($356 million) for purchasing and producing the vaccine.[36]<br><br>The Carlos Slim Foundation, a Mexican non-profit organisation, struck a deal with AstraZeneca to expand access to the company's vaccine in Latin American countries (excluding Brazil). As part of this deal, the Carlos Slim Foundation will provide funding to build production capacity for the vaccine in Argentina and Mexico.[37] |
| Johnson & Johnson (Janssen) / Beth Israel Deaconess Medical Center | $1.5 billion | **Deal 1 ($456m)**: J&J received $456 billion from BARDA for "for clinical trials and other vaccine development activities".[38]<br><br>**Deal 2 ($1bn):** J&J received a commitment of $1 billion from the Department of Health and Human Services and Department of Defense **"**to demonstrate large-scale manufacturing and delivery of the company's COVID-19 vaccine candidate. Under the terms of the agreement, the federal government will own the resulting 100 million doses of vaccine."[38] |
| Moderna / National Institute of Allergy and Infectious Diseases | $957 million | **Deal 1 ($1m)**: The company received up to US $1 million in funding from CEPI[28] to accelerate development of its vaccine and conduct a phase 1 study.[39,40]<br><br>**Deal 2 ($430m):** The company received a commitment of $430 million from BARDA[4] "to accelerate the development of SARS-CoV-2 mRNA-1273 vaccine which includes non-clinical development and advanced clinical studies, regulatory support through licensure and process development for manufacturing."[41]<br><br>**Deal 3 ($53m):** The company received a commitment of $53 million from BARDA[4] "to increase the domestic manufacturing capacity of Moderna's mRNA-1273 vaccine being developed for the prevention of COVID-19."[42] As the company explained in its S-3 registration statement filed with the US Securities and Exchange Commission[43]: "In April, BARDA committed to fund up to $483 million to accelerate the clinical development and manufacturing process scale-up of mRNA-1273. Under the terms of the agreement, BARDA will fund the advancement of mRNA-1273 to FDA licensure and the scale-up of manufacturing processes. The agreement does not contemplate any product stockpiling. … We expect to utilize the proceeds of this offering to fund |

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| | | working capital needs to begin manufacturing the vaccine ahead of a potential approval and launch of mRNA-1273. We believe the substantial majority of these investments will be used for raw material purchases and other operating expenses in connection with our mRNA-1273 program, which may result in up to approximately $1 billion of incremental investments in 2020."[43]<br><br>**Deal 4 ($472m):** The company received a commitment of $472 million from BARDA[4] "to support the Phase 3 clinical trial of Moderna's mRNA-1273 vaccine candidate for COVID-19. The additional funding will allow Moderna to increase the number of participants in its Phase 3 clinical trial to 30,000 to satisfy FDA efficacy and safety requirements as rapidly as possible."[44]<br><br>**Deal 5** (**$1m):** The company received a philanthropic donation of at least $1 million from the Dolly Parton COVID-19 Research Fund;[45,46] the money was given to the Vanderbilt University Medical Center (Nashville, Tennessee, USA), which was one of the trial sites for the vaccine.[46]<br><br>**Notes:** The company has struck pre-order deals with numerous governments.[12] |
| BioNTech / Fosun Pharma / Pfizer | $445 million | **Deal 1 ($445m):** BioNTech received a grant of up to €375 million from the German Federal Ministry of Education and Research "to support the accelerated development of SARS-CoV-2 vaccines. … The goal of the initiative is the expansion of vaccine development and manufacturing capabilities in Germany, as well as the expansion of the number of participants in late-stage clinical trials."[47] This amount corresponds to about $444.8 million based on the September 15, 2020, exchange rate.<br><br>**Notes**: BioNTech / Pfizer are under contract with Operation Warp Speed,[4] but a Pfizer executive testified in a Congressional hearing that the company has not accepted any funding towards the research, development, and production of its experimental vaccine.[48]<br><br>The US government entered into a $1.95 billion contract with the companies[49]: "The U.S. Department of Health and Human Services and the Department of Defense (DoD) today announced an agreement with U.S.-based Pfizer Inc. for large-scale production and nationwide delivery of 100 million doses of a COVID-19 vaccine in the United States following the vaccine's successful manufacture and approval. The agreement also allows the U.S. |

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| | | government to acquire an additional 500 million doses."[49] The US Government later purchased an additional 100 million doses, bringing the total payment to around $4 billion; the US government has kept the option to purchase a further 400 million doses at a later date.[49,50]<br><br>Pfizer has entered into separate pre-purchase agreements with the governments of Japan[51] and the United Kingdom[52] for 120 million and 30 million doses, respectively. The financial terms of these deals have not been disclosed. Pfizer and BioNTech have struck deals with several other governments.[12]<br><br>The European Investment Bank provided BioNTech "with up to €100 million in debt financing for COVID-19 vaccine development and manufacturing";[53] this corresponds to about $117.9 million based on the August 8, 2020, exchange rate. This amount was excluded since it was a low-interest loan, rather than a subsidy towards the development or production of the vaccine candidate. BioNTech has also received $250 million from Singapore's state investor Temasek and other investors.[54]<br><br>The Chinese firm Fosun Pharmaceuticals has teamed up with BioNTech / Pfizer to trial and market the product in China; Fosun has paid a license fee of up to $85 million ("including the down payment, clinical development registration and sales milestone payment"[55]) and will pay royalties of 35% on annual sales during an agreed period.[55] Fosun also agreed to buy 1,580,777 shares of BioNTech, worth approximately $50 million.[55] |
| Clover Biopharmaceuticals Inc. / Dynavax | $430 million | **Deal 1 ($3.5m):** CEPI invested an initial $3.5 million in Clover and its Trimer-Tag technology.[56,57]<br><br>**Deal 2 ($66m):** CEPI invested a further $66 million for the clinical trial development of Clover's vaccine, which uses its Trimer-Tag technology.[56]<br><br>**Deal 3 ($258.5m):** CEPI invested a further $258.5 million for the clinical trial development of Clover's vaccine, which uses its Trimer-Tag technology.[58,59] This brought the total funding from CEPI to $328 million (maximum).[28]<br><br>**Deal 4 ($99m):** Clover is relying on the adjuvant developed by Dynavax. CEPI provided Dynavax with up to $99 million in funding to increase production and supply of its adjuvant to support the global COVID-19 response.[60] "Under the terms of the agreement, CEPI will provide Dynavax funding of up to $99 million through a forgivable |

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| | | loan for the manufacturing of CpG 1018 with the potential to support hundreds of million doses of COVID-19 vaccine for delivery in 2021 through COVAX."[60]<br><br>**Deal 5 ($3.4m):** The Gates Foundation invested $3.4 million in Dynavax to scale up production of the company's adjuvant, which is being used in several COVID-19 vaccines, including the one developed by Clover.[61]<br><br>**Notes**: Clover raised 172 million yuan in a B-2 round of financing. Clover Bio has received more than 950 million yuan ($140 million) in funding since 2016.[62] The CEPI grant to Dynavax is to support the scaling up of production of the adjuvant for use in vaccines developed by CEPI grantees. Therefore, other CEPI grantees that are currently in early stages of development (e.g., experimental vaccine from Biological E in phase 1 trial) may also benefit from this investment, as well as from the funding provided by the Gates Foundation to Dynavax. |
| CureVac | $348 million | **Deal 1 ($34m):** In 2019, CEPI awarded "US$ 34M contract to CureVac to advance The RNA Printer™—a disruptive, transportable mRNA vaccine manufacturing platform that can rapidly combat multiple diseases".[63] This is the technology the company is using for its experimental COVID-19 vaccine.<br><br>**Deal 2** (**$15.3m):** In 2020, CEPI awarded a new contract to the company, this time worth $8.3 million, to be used "for accelerated vaccine development, manufacturing and clinical tests" related to the company's experimental vaccine against the new coronavirus nCOV-2019.[64] The CEPI portfolio website indicates that the organisation provided up to $15.3 million in funding for CureVac's COVID-19 vaccine.[28]<br><br>**Deal 3 ($299m):** CureVac received a grant of up to €252 million from the German Federal Ministry of Education and Research. "In addition to the further development of CureVac's vaccine-candidate against COVID-19, the grant is expected to be used for the rapid expansion of the vaccine production. Payments are contingent on reaching predefined milestones. CureVac expects funding of up to 103 million euros in 2020 and up to 149 million euros in 2021."[65] The total amount corresponds to about $298.9 million based on the September 15, 2020, exchange rate.<br><br>**Notes:** The German government bought a stake in the company using €300 million in federal money; "direct equity financing by the Federal Government is to be made by the Kreditanstalt für Wiederaufbau (KfW)".[66] This |

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| | | works out to roughly $353.7 million, based on August 8, 2020, exchange rate. The Qatar Investment Authority, a state investor, also bought an undisclosed stake in the company.[67]<br><br>CureVac received a €75 million loan from the European Commission / European Investment Bank;[68] this was about $88.3 million based on the August 7, 2020, exchange rate. Related to this loan, the European Commission also offered financing: "the Commission offered up to €80 million of financial support to CureVac … to scale up development and production of a vaccine against the Coronavirus in Europe."[69] The Commission added that "the support would come in form of an EU guarantee of a currently assessed EIB loan".[69] |
| Sinopharm / Wuhan Institute of Biological Products | $142 million | **Deal 1 ($142m)**: The Chinese government reported an investment of 1 billion Chinese yuan (approx. $142 million based on May 28, 2020, exchange rate) for the development of the vaccine.[70] The development project was supported by the Wuhan Institute of Virology, part of the Chinese Academy of Sciences, a state-level academic centre. |
| Medicago Inc / GlaxoSmithKline / Dynavax | $137 million | **Deal 1 ($5.3m)**: The company received CAN$7 million from the Government of Quebec towards the development of its experimental vaccine, which is based on a virus-like-particle technology.[71] The company reported that this "funding will allow Medicago to continue research in Quebec, and to initiate preclinical testing to assess the safety and efficacy of the vaccine candidate."[71] In another press release related to the same funding, the company noted that this "Government support will allow Medicago to rapidly move from preclinical testing to clinical trials, as well as scaling up production for pandemic response."[72] This amount corresponds to about $5.3 million based on the August 14, 2020, exchange rate.<br><br>**Deal 2 ($0.4m):** The Ministry of Economy and Innovation of Quebec provided a grant of CAN$500,000 to "the biopharmaceutical research consortium CQDM and Medicago R&D … that will allow the Quebec City-based company to increase the competitiveness of its vaccine production platform and confirm its position as leader in the biopharmaceutical industry in Canada."[73] This amount corresponds to about $354,500 based on the May 5, 2020, exchange rate. |

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| | | **Deal 3 ($131.6m):** The Government of Canada has invested up to CAN$173 million "through the Strategic Innovation Fund … [to] advance Medicago's virus-like particle vaccine, developed on the company's unique plant-based production platform, through clinical trials. It will also establish a large-scale vaccine and antibody production facility to increase Canada's domestic biomanufacturing capacity. … The government has signed an agreement with Medicago to secure up to 76 million doses of their COVID-19 vaccine candidate, enough to vaccinate 38 million people."[74] This amount corresponds to about $131.6 million based on the October 23, 2020, exchange rate. |
| Inovio Pharmaceuticals | $107 million | **Deal 1 ($9m)**: "In January 2020, CEPI awarded the Company a grant of up to $9.0 million to develop a vaccine against SARS-CoV-2/COVID-19. This initial CEPI funding will support the preclinical and clinical development through Phase 1 human testing in the United States of INO-4800, the Company's coronavirus vaccine candidate matched to the outbreak strain."[75]<br><br>**Deal 2 ($8.2m):** The company received additional funding from CEPI for its development programme and to enter into an agreement "to expand its manufacturing partnership with the German contract manufacturer Richter-Helm BioLogics GmbH & Co. KG, to support large-scale manufacturing of INOVIO's investigational DNA vaccine INO-4800".[76] This brought the total funding from CEPI to $17.2 million.[76]<br><br>**Deal 3 ($5.3m):** On its website, CEPI states that it has provided up to US$ 22.5 million, or an additional $5.3 million on top of the two previously disclosed deals.[28]<br><br>**Deal 4 ($5m)**: "In March 2020, Gates awarded and funded the Company a grant of $5.0 million to accelerate the development of its CELLECTRA® 3PSP proprietary smart device for the intradermal delivery of INO-4800, the Company's DNA vaccine candidate for COVID-19".[75]<br><br>**Deal 5 ($71m)**: Inovio received "$71 million contract from U.S. Department of Defense to scale up manufacture of Cellectra® 3PSP smart device and procurement of Cellectra® 2000 for COVID-19 DNA vaccine."[77] The company released an 8-K form with additional details.[78] |

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| | | **Deal 6 ($8.1m):** In 2019, Inovio received $8.1m from the medical arm of the U.S. Defense Threat Reduction Agency's Medical CBRN Defense Consortium for initial development of the technology it is relying on for its experimental COVID-19 vaccine.[77] |
| Covaxx / University of Nebraska | $15 million | **Deal 1 ($15m)**: Covaxx received a grant from the Taiwanese Ministry of Health and Welfare to conduct a phase 1 study of its vaccine candidate.[79] |
| SK Biosciences | $14 million | **Deal 1 ($10m)**: CEPI has provided funding of up to $10 million "towards the cost of a phase I/II study of a recombinant protein vaccine candidate (GBP510)—manufactured using a nanoparticle platform—and manufacture of clinical trial materials needed for phase I/II and phase III trials. This collaboration represents CEPI's first next-generation or 'Wave 2' vaccine investment, jointly funded by CEPI and the Bill & Melinda Gates Foundation. In November 2020, CEPI received a grant of up to $20 million from the Foundation to expand its portfolio of COVID-19 vaccines to include 'Wave 2' candidates that are differentiated from those already in advanced development."[59]<br><br>**Deal 2 ($3.6m):** The Bill & Melinda Gates Foundation provided a $3.6 million grant to the company to "to develop a COVID-19 vaccine that can be produced in large amounts at low cost to meet the pandemic-response needs of low- and middle-income countries."[80] |
| Biological E | $9 million | **Deal 1 ($5m)**: CEPI has provided funding of up to $5 million "toward the cost of scaling up the process for manufacturing the vaccine, and will explore providing additional funding to Bio E with the goal of potentially enabling the production of 100 million doses in 2021."[59]<br><br>**Deal 2 ($4m):** The Bill & Melinda Gates Foundation provided a $4 million grant to help Biological E "to respond to the COVID-19 pandemic by developing a SARS-CoV-2 vaccine evaluated through Phase 1 clinical testing."[81]<br><br>**Notes**: The company also received seed funding from the Government of India (Department of Biotechnology).[82] |

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| University of Hong Kong | $4 million | **Deal 1 ($0.6m)**: CEPI has provided funding of up to $620,000 to the University of Hong Kong "to undertake preclinical testing of their COVID-19 vaccine candidate."[59]<br><br>**Deal 2 ($3.4m)**: The Hong Kong government, through the Food and Health Bureau's Health And Medical Research Fund, gave three separate grants totalling HK$26.5 million to researchers at the University of Hong Kong for the "development and test of candidate attenuated vaccines for SARS-CoV-2" (HK$3 million), "rapid development of anti-SARS-CoV-2 (2019-nCoV) vaccines and exploration of the feasibility of a pancoronavirus vaccine" (HK$3.2 million), and "clinical study of flu-based and PD1-based vaccines for the SARS-CoV2" (HK$20.3 million).[83] This amount corresponds to about $3.4 million based on the April 1, 2020, exchange rate. |
| Institute of Medical Biology / Chinese Academy of Medical Sciences | $3 million | **Deal 1 ($2.9m)**: The Jack Ma Foundation donated $2.86 million for "vaccine research and development" to the Chinese Academy of Sciences.[84]<br><br>**Notes**: The Institute of Medical Biology is an institute of the Chinese Academy of Medical Sciences, which is governed by the National Health Commission of the People's Republic of China. |
| AnGes / Osaka University / Takara Bio | Unknown | **Notes**: No data available in the public domain. The Japanese Government has put aside $1.3 billion to support vaccine production and industry-university collaboration on COVID-19 vaccines.[85] |
| Anhui Zhifei Longcom Biopharmaceutical Institute | Unknown | **Notes**: No data available in the public domain. The development project was supported by the Chinese Academy of Medical Sciences, a state-level academic centre. |

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| Bharat Biotech | Unknown | **Notes**: No data available in the public domain. The development project was supported by the Indian Council of Medical Research, a government organisation which coordinates and promotes biomedical research.[86] |
| CanSino | Unknown | **Notes**: No data available in the public domain. |
| Gamaleya Research Institute | Unknown | **Notes**: No data available in the public domain. The project was funded by the Russian Direct Investment Fund, the country's sovereign wealth fund. The Research Institute has received support from Sberbank of Russia, a state-owned bank.[3] The peer-reviewed report of their interim phase 3 results lists funding from the Moscow City Health Department, Russian Direct Investment Fund, Sberbank, and RUSAL.[87] |
| Research Institute for Biological Safety Problems (Kazakhstan) | Unknown | **Notes:** No data available in the public domain. This candidate is being developed a Kazakh state research institute. |
| Serum Institute of India / Max Planck Institute | Unknown | **Notes:** The European Investment Bank provided a loan of €30 million for studying the vaccine candidate against tuberculosis (the originally intended purpose of the candidate).[88] This amount was excluded since it was a low-interest loan, rather than a subsidy towards the development or production of the vaccine candidate. |

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| Sinopharm / Beijing Institute of Biological Products | Unknown | **Notes**: No data available in the public domain. Sinopharm is a state-owned enterprise in China. |
| Sinovac | Unknown | **Notes:** The company received a "low-interest rate credit line for 60 million yuan ($8.5 million) from the Bank of Beijing and the company has invested a similar amount in the project"[89] (i.e., around $17 million in total). The company has secured an additional $15 million in funding from two venture capital firms (Advantech Capital and Vivo Capital) for research and development activities, bringing the total to approximately $32 million ($17 million plus $15 million).[90] |
| Vector Institute / Rospotrebnadzor | Unknown | **Notes:** No data available in the public domain. This project is being developed by the Russian State Research Center of Virology and Biotechnology (Vector Institute), which belongs to the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor). |

€=euros. £=pound sterling (United Kingdom). $=United States dollars. AUD=Australian dollars. BARDA=Biomedical Advanced Research and Development Authority (United States, Department of Health and Human Services). CEPI=Coalition for Epidemic Preparedness Innovation. DoD=Department of Defense (United States). DNA=deoxyribonucleic acid. FDA=Food and Drug Administration (United States). MRFF=Medical Research Future Fund (Australia). NZD=New Zealand dollars. RNA=ribonucleic acid. UK=United Kingdom.

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