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ASIA EDITION

# Approved and effective vaccine against COVID-19 may not be available until 2021 summer: IHS Markit

June 19, 2020 | Opinion | By Gustav Ando

**Five vaccine candidates are currently being developed in China**



Ten COVID-19 vaccine candidates are currently in clinical trials (as of 4 June). These are listed in the below, in approximate descending order of advancement, taking into account scale of development and expected reporting dates. So far, one has entered Phase II/III development, two are in Phase II, and several more are in Phase I/II and Phase I.

In addition, some selected high-profile preclinical-stage projects have also been listed. The success of any of these will depend on safety, level of immunogenicity, and duration of protection.

Five vaccine candidates are currently being developed in China, including those from CanSino and Sinovac. China itself has a chequered history in biopharmacuetical clinical development, but this is a unique and watershed opportunity to prove itself on the world stage.

While data on its candidates remain relatively scant at this stage, China may indeed succeed in becoming first-to-market in this space, or at least provide a critical option on the global stage for vaccines against COVID-19 in 2021.

*"Although there is still considerable uncertainty about the duration of protective immunity developed in the population after COVID-19 infection, and even the feasibility of generating an effective vaccine with any long-term effect, a large number of researchers and companies have initiated a diverse selection of vaccine projects, using a broad mix of established and innovative technologies. Development for COVID-19 has been accelerated considerably by acquired knowledge developed*

*during the generation of candidate vaccines for related SARS and MERS coronaviruses, as well as recent research into Ebola vaccines." – Gustav Ando, head of life sciences and industry services, IHS Markit*

**High-profile COVID-19 vaccine candidates in development**

| Vaccine name | Vaccine type |
|---|---|
| AZD1222 (ChAdOx1-S) | Non-replicating adenoviral vector displaying spike protein |
| Ad5-nCoV | Non-replicating adenoviral vector displaying spike protein |
| mRNA-1273 | Lipid nanoparticle (LNP)-encapsulated mRNA vaccine encoding pre-fusion stabilised form of viral spike (S) protein |
| BNT162 | Three candidates based on LNP-delivered modified mRNA vaccines, encoding viral spike protein sequence or smaller binding domain |
| COVID-19 vaccine, Sinovac | Inactivated virus vaccine, alum adjuvant |
| NVX-CoV2373 | Full-length recombinant spike glycoprotein nanoparticle vaccine, Matrix-M adjuvant |
| COVID-19 vaccine, Sinopharm – Wuhan | Inactivated virus vaccine |
| COVID-19 vaccine, Sinopharm – Beijing | Inactivated virus vaccine |
| INO-4800 | DNA plasmid vaccine encoding spike protein, delivered via Cellectra 3PSP electroporation device |
| COVID-19 vaccine, CAMS | Inactivated virus vaccine |
| COVID-19 vaccine, Janssen | Non-replicating AdVac adenoviral vector displaying spike protein |
| COVID-19 vaccine, GSK/Sanofi | Recombinant subunit vaccine (baculovirus expression system), adjuvanted |
| AAVCOVID | Adeno-associated virus (AAV) vector delivering spike protein gene |
| COVID-19 vaccine, Merck/IAVI | Replication-competent chimaeric vesicular stomatitis virus (VSV) vector expressing spike protein antigen |