Power Play: When could Canadian see a vaccine?

NOW PLAYING

Procurement Minister Anita Anand discusses how soon Canadians could see a vaccine as Moderna reveals promising results.

Extended: Moderna on its COVID-19 vaccine

NOW PLAYING

Ray Jordan, Moderna's chief corporate affairs officer, speaks about their COVID-19 vaccine and its efficacy.

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TORONTO -- The vaccines are on their way.

Despite early skepticism that a vaccine for COVID-19 could be developed, properly tested and approved within one year or so of the first detection of the novel coronavirus, the world is heading into winter with a belief that mass production of vaccines could be only weeks away.

An unprecedented effort from scientists, governments and pharmaceutical companies has brought several potential vaccines to the brink of wide-scale acceptance. The variety is welcome, because the realities of producing enough doses to vaccinate the entire world in short order mean that if several vaccines are found to offer similar effectiveness, governments will take whichever vaccines they can get their hands on.

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To that end, Canada has paid to secure access to as many as 414 million doses of potential COVID-19 vaccines, as of late November, with an estimated six million doses expected to arrive in the country by March 31, 2021. The federal government has said that it has a $1-billion fund available to use for purchasing vaccines.

Most of the vaccines that appear likely to be used in Canada require two shots to be fully effective. Some of them require complicated ultra-cold storage. All of them will have gone through a well-established scientific testing process and then been assessed separately by Health Canada before they are deployed here.

CTVNews.ca has compiled a guide to the vaccine candidates that seem most likely to be accepted and rolled out in Canada, as well as others that have made headlines, are touted by prominent backers or are being developed and studied right here in Canada.

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Moderna mRNA-1273

The Canadian government says it has signed a deal to distribute Moderna's vaccine, if it is approved by Health Canada. One of the first vaccine candidates to be developed, it was shipped to the U.S. government in February. On Nov. 16, the company released preliminary data showing a 94.5 per cent effectiveness rate. This mRNA-based vaccine candidate is administered via two shots given weeks apart, and can survive for 30 days at refrigerated temperatures, but must be kept at -20 C outside that period.

Pfizer BNT162b2

One of the biggest names in the global pharmaceutical game, Pfizer is working with German firm BioNTech to develop and test a potential mRNA-based vaccine. This vaccine candidate is administered via two shots, three weeks apart, and must be stored at -70 C. The company said Nov. 9 that BNT162b2 appeared to have been effective in 90 per cent of patients in human trials — an estimate that was upgraded to 95 per cent nine days later. Canada has signed a deal to distribute any Pfizer vaccine approved by Health Canada.

Oxford/AstraZeneca ChAdOx1 nCoV-19

Developed by a team at Oxford University and manufactured by AstraZeneca, ChAdOx1 nCoV-19 is the cheapest of the major Western vaccine efforts on the brink of production. AstraZeneca has up to 20 million doses of ChAdOx1 nCoV-19. AstraZeneca has said it could start mass-producing the vaccine by January 2021.

Sinovac CoronaVac

Chinese pharmaceutical company Sinovac is behind CoronaVac, a vaccine candidate based on the virus itself that started human trials in April. Promising results from mid-stage trials were reported in November. Sinovac has said it has a factory ready to start producing

300 million doses of CoronaVac annually as soon as it gets the green light, and could have the drug ready for distribution worldwide by early 2021. The city of Jiaxing announced in October before the interruption of the trials that it was ready to start distributing the vaccine to essential workers and others at high risk.

SinoPharm vaccine candidates

Two vaccine candidates are under development by SinoPharm, another Chinese pharma giant. They are making their way through human trials, getting permission to start their final phase in July. SinoPharm says it expects the antibodies generated by its potential vaccines to last for between one and three years. The company said in November that nearly one million people in China had already received its vaccine even though it remained in the testing phase, including some of SinoPharm's own employees.

CanSino Ad5-nCoV

At one point the clear front-runner in the race for a vaccine, Ad5-nCoV now finds itself battling for a spot at the front of a much more crowded pack. In May, it became the first vaccine candidate to be approved for human trials in Canada, but by August, the opportunity to test the vaccine here was declared to be "over" since Chinese customs didn't approve the vaccine shipment. Testing in China has produced results positive enough that the Chinese government has authorized Ad5-nCoV for use in the country's military. Final-stage testing began in Mexico in November. Ad5-nCov is adapted from a human cold virus.

Gamaleya Institute Sputnik V

Russia shocked the world Aug. 11 when it announced that it had cleared a vaccine developed by the Moscow-based Gamaleya Institute for use, even though Phase III trials had not yet begun. Russian President Vladimir Putin said one of his adult daughters had already been given Sputnik V. The Gamaleya Institute announced in November that its vaccine, which can be stored at refrigerated temperatures, has been found to be more than 95 per cent effective.

Johnson & Johnson Ad26.COV2-S

Johnson & Johnson began human tests of its potential coronavirus vaccine in Belgium and the U.S. in July. A final phase, involving 60,000 volunteers in eight countries, commenced Sept. 23. Modelled after a successful Ebola vaccine, the Johnson & Johnson candidate is unique among the front-runners in that it can be administered in a single dose. Canada announced Aug. 31 that it has signed a deal with the company to secure a supply of its vaccine candidate, should it be approved by Health Canada. On Oct. 12, the company announced that it had paused the final phase to investigate whether a study participant's "unexplained illness" is related to the shot. By mid-November, the trial was back underway and recruiting new volunteers.

Novavax NVX-CoV2373

The federal government announced Aug. 31 that it had reached a deal to receive 76 million doses of NVX-CoV2373, provided the American vaccine candidate is approved by Health Canada. Novavax says its potential vaccine uses a protein made with the company's proprietary nanotechnology to stimulate immune responses. On Sept. 25, the company started late-stage trials.

Sanofi vaccine candidate

French pharmaceutical company Sanofi and GlaxoSmithKline have partnered to develop a potential protein-based vaccine for COVID-19. Should their vaccine candidate be approved for use in Canada, a deal is in place for 72 million doses to be distributed across the country. The potential vaccine started Phase 1 and 2 trials in September.

Vector Institute EpiVacCorona

The second COVID-19 vaccine to be approved in Russia, EpiVacCorona also followed in the footsteps of Sputnik V by getting the country's OK despite human trials still being in early stages. The peptide-based vaccine was designed to be administered in two doses.

Medicago VLP vaccine candidate

On July 14, Quebec City pharmaceutical company Medicago became the first firm in Canada to administer a human trial of a potential COVID-19 vaccine. The company said its plant-based vaccine uses "virus-like particles (VLPs)" rather than the more common animal products or live viruses. The federal government announced in October that it has signed a $173-million contract to secure the rights to purchase 76 million doses of Medicago's vaccine,

November, with the company reporting that a significant antibody response was stimulated in every patient.

University Health Network BCG vaccine

A vaccine developed nearly a century ago and still used to prevent tuberculosis is being tested in Canada for possible effectiveness against COVID-19. Human trials of the BCG vaccine began in early October, with 3,600 front-line workers in the Toronto area being given the vaccine. Countries with high rates of BCG vaccination tend to have lower rates of COVID-19 infection.

Symvivo Corporation bacTRL-Spike

The Burnaby, B.C.-based Symvivo Corporation said Nov. 2 that it had commenced Phase I clinical trials of its potential COVID-19 vaccine in Australia. Its bacTRL-Spike candidate is unusual among its peers in that it can be taken orally and stored at room temperature.

IMV DPX-COVID-19

Nova Scotia-based IMV Inc. told CTV News in mid-July that it hoped to start trials of its synthetic vaccine candidate before the end of the month, although preclinical studies ended up only commencing in August. The company said DPX-COVID-19 could be particularly helpful for the elderly and those with immune disorders – two groups that might not be helped much by other potential vaccines. The federal government has committed up to $10 million to funding research into this vaccine candidate.

Entos Covigenix

The first of two potential vaccines from Edmonton-based Entos Pharmceuticals is expected to commence human trials this fall, the company said in a news release in September. The vaccine candidates work by injecting pieces of DNA code into cells, essentially programming them to create an antibody capable of stopping SARS-CoV-2.

University of Saskatchewan plant-based vaccine candidate

Medical cannabis firm ZYUS Life Sciences and researchers at the University of Saskatchewan have developed a COVID-19 vaccine candidate based on a protein from a tobacco plant. As of mid-July, their vaccine candidate was expected to start being tested in animals within weeks.

Providence Therapeutics PTX-COVID19-B

Providence Therapeutics, a cancer treatment company based in Toronto, said in June that it was ready to start human trials of a potential COVID-19 vaccine after successful tests on animals, but could not do so without government assistance. That assistance arrived Oct. 26, with news of federal funding of up to $4.7 million. Following that news, the company said it expected to begin trials of its mRNA vaccine candidate within weeks.

Precision NanoSystems mRNA vaccine

Prime Minister Justin Trudeau announced in October that the federal government is investing $18 million in Vancouver-based Precision NanoSystems as it attempts to develop a COVID-19 vaccine. The company has said that it plans to create a "best-in-class" mRNA vaccine, although its work has not yet reached the stage where it can begin clinical trials.

Interactive by Jesse Tahirali and Mahima Singh

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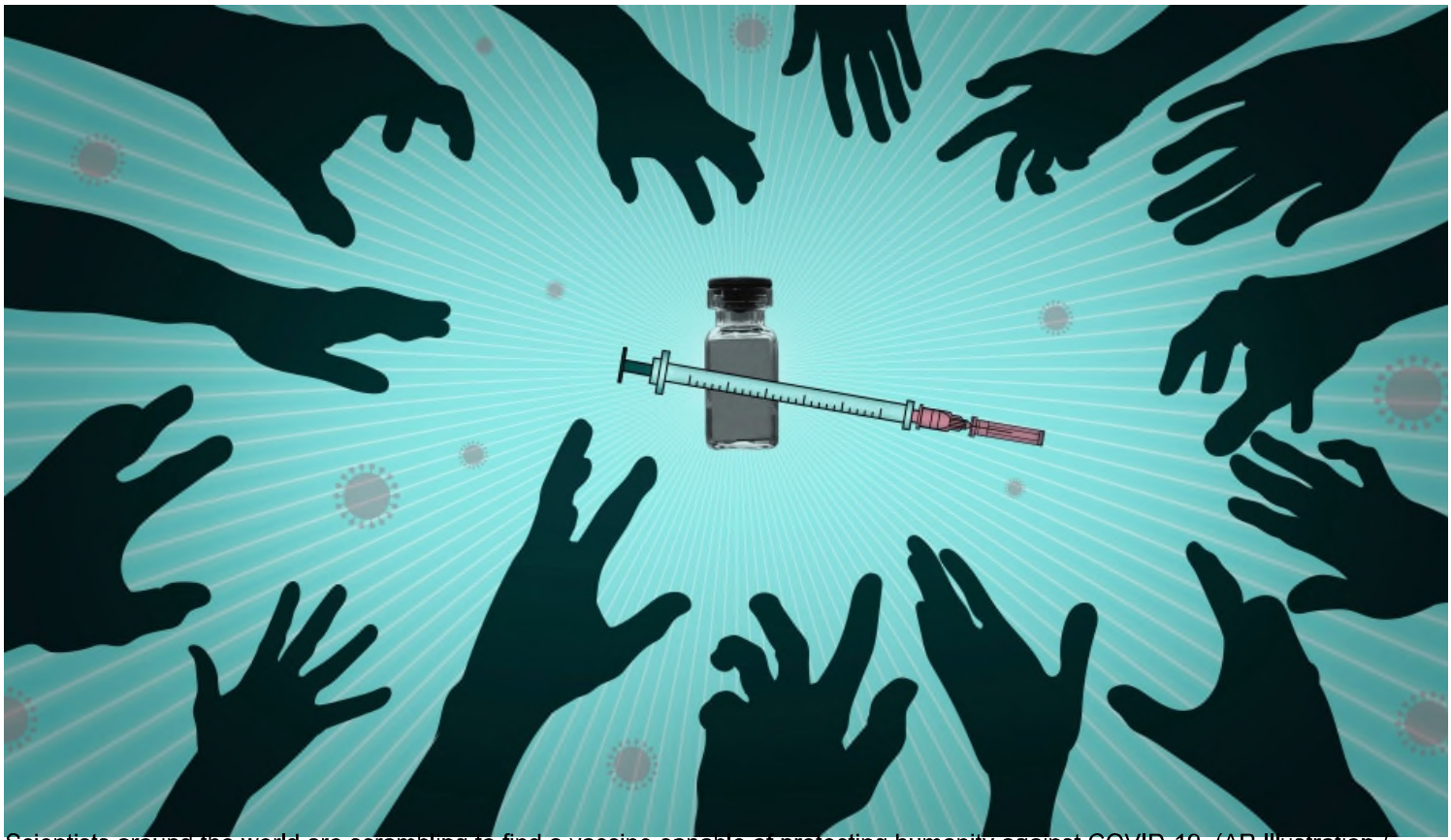

Scientists around the world are scrambling to find a vaccine capable of protecting humanity against COVID-19. (AP Illustration / Peter Hamlin)

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