

# Advanced Primary Care Newsletter – COVID-19 Vaccination



January 2021- authored by Dr. Mary Szabo MD

## *Introduction*

The Covid-19 epidemic continues to rage globally, in Canada the number of confirmed COVID-19 cases continue to surge and is predicted Canada will soon reach 10,000 cases per day.

A return to normality has increasingly come to rely on the success of vaccines to prevent disease and, we hope, limit further spread of infection.

Currently Health Canada has approved 2 vaccines and we are currently in phase I of vaccine roll out. There have been many questions concerning vaccine safety, efficacy, mechanism for action and vaccine roll out. This newsletter will address these questions.

## *What COVID -19 vaccines are currently approved by Health Canada?*

There are currently 2 mRNA based vaccines approved by Health Canada. The mRNA-1273 vaccine from Moderna and Pfizer BNT162b2, both showed high overall efficacy (94.1% for Moderna and 95% for Pfizer) of preventing Covid-19 illness, including severe disease. Aside from transient local and systemic reactions, no safety concerns were identified in their study.

Both vaccines require 2 doses, 21 days apart for Pfizer and 28 days apart for the Moderna vaccine. Both vaccines are currently available in Canada.



## *What are mRNA vaccines?*

Most vaccines use weakened or inactivated version/components of disease-causing agent to stimulate the body's immune response to create antibodies and immunity.

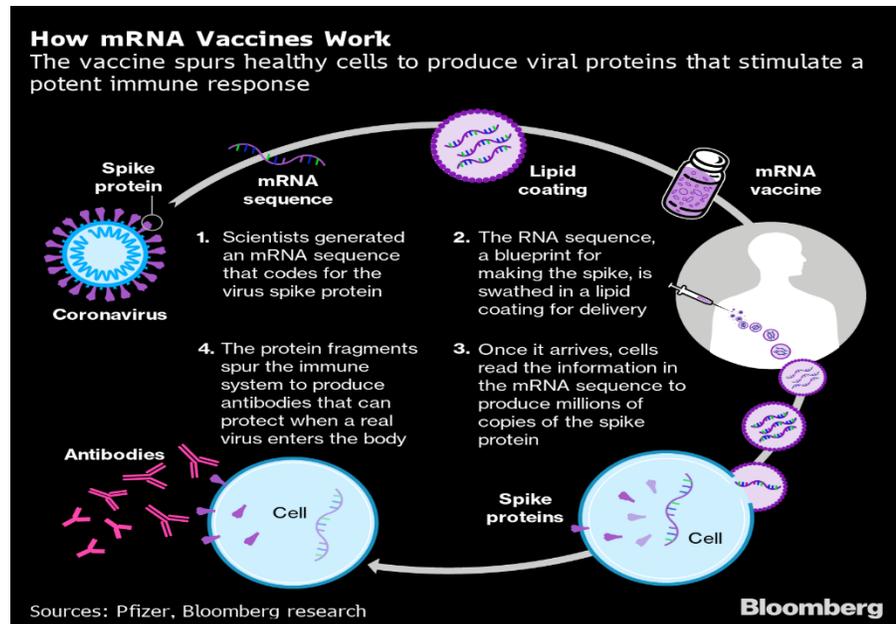
mRNA vaccines have strands of genetic material called mRNA encapsulated inside a special coating. This coating protects the mRNA from enzymes in the body that would break it down. It also helps the mRNA enter immune cells (dendritic cells and

macrophages) in the lymph node near the vaccination site.

## What is the mechanism of action for mRNA vaccine?

Once it has entered a cell, mRNA provides instructions for the cell on how to **make a harmless piece** of the “spike protein” that is unique to SARS-CoV-2. Since only part of the protein is made, it **does not do any harm** to the person vaccinated but it is antigenic (ability to induce an immune response).

Next, the cell displays the protein piece on its surface. Our immune systems recognize that the protein does not belong there and begins building an immune response and making antibodies, activating T-cells to fight off what it thinks is an infection like what happens in natural infection against COVID-19.



These immune responses are specific to the SARS-CoV-2 virus, which means the immune system is primed to protect against future infection.

After the piece of the spike protein is made, the cell breaks down the mRNA strand and disposes of them using enzymes in the cell. **It is important to note that the injected mRNA strand never enters the host cell's nucleus or affects genetic material.** This information helps counter misinformation about how mRNA vaccines alter or modify someone's genetic makeup.

## Facts about COVID-19 mRNA Vaccines

There has been lots of fear and concerns about COVID-19 mRNA vaccines, particularly about the rapid development and approval of the vaccines. mRNA Vaccines are new but not unknown, scientists have been studying them for decades. Below are some of the facts about COVID-19 mRNA vaccines:

- **They cannot give someone COVID-19**  
mRNA vaccines are **not live vaccines** and **do not use an infectious element**, so they carry no risk of causing disease in the person vaccinated.
- **They do not affect or interact with our DNA in any way**  
mRNA never enters the nucleus of the cell, which is where our DNA (genetic material) is kept. The cell breaks down and gets rid of the mRNA soon after it is finished using the instructions.

- COVID-19 mRNA vaccines have ***gone through the same rigorous safety assessment*** as all other vaccines before they are authorized for use. This includes large clinical trials and data review by a safety monitoring board.  
There will be ***ongoing rigorous evaluation and safety monitoring*** of the approved COVID-19 vaccines by Health Canada and FDA.

## ***What are the benefits of mRNA Vaccines?***

There are several benefits for mRNA vaccine compared to other types of vaccine such as:

- Use of a non-infectious element
- Shorter manufacturing times  
mRNA vaccines can be developed in a laboratory using a DNA template and readily available materials. This means the process can be standardized and scaled up, making vaccine development faster than traditional methods.
- Potential for targeting of multiple diseases.  
In the future, mRNA vaccine technology may allow for one vaccine to target multiple diseases

## ***Vaccines roll out***

Alberta is receiving both the Pfizer and Moderna vaccines, both of which have been approved by Health Canada in December 2020.

In Alberta, vaccine is being distributed through a phased immunization program while supply of the vaccine is limited.

Factors considered in a limited vaccine roll out:

- 1) Individuals who are high risk for severe illness and deaths from COVID-19 such as advanced age
- 2) Individuals most likely to transmit COVID-19 to high-risk individuals such as health care workers and caregivers providing care in long-term care or congregate care facilities for senior citizens.
- 3) Essential health care workers in maintaining the COVID 19 response such as frontline hospital / medical workers
- 4) Individuals contributing to the maintenance of other essential services for the function of society such as policeman, EMS, fire fighters, grocery store staff, etc.



There are 3 planned phases for COVID-19 roll out in Alberta and it is based on the population at risk for severe COVID -19 and those who are essential to maintain COVID 19 response. The timelines for these phases are dependent on vaccine supply:

Phase 1: Jan / Feb2021

- Frontline hospital health care workers such as those working in intensive care units, emergency department, medical, surgical, and COVID-19 units, or operating rooms.
- Staff in long term care and designated supportive living facilities.
- Home care workers.
- All residents of long-term care and designated supportive living, regardless of age.

- Seniors 75 years of age and over, no matter where they live.
- First Nations, Métis and persons 65 years of age and over living in a First Nations community or Metis Settlement.

Phase 2: April to Sept 2021 – continue targeting populations at risk, decision on target population pending and will be made in 2021.

Phase 3: Fall 2021

Anticipated start of roll-out to the public.

### ***Is there enough vaccine for the general population?***

There are currently 30 potential COVID-19 vaccines in clinical trials. It is anticipated by March/April of 2021 there will be 2 more mRNA COVID -19 vaccines (one only require single dose) which are currently in their phase 3 clinical trials and likely be approved by Health Canada and FDA.

***Hope is on its way and for now we will need to strictly adhere to public health measures until a majority of us have been vaccinated.***

### **References:**

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