

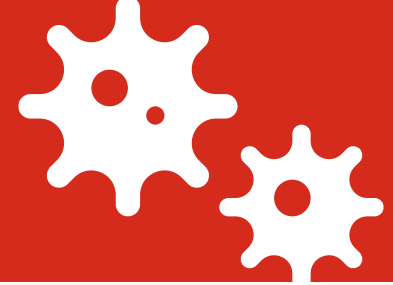
# COVID -19 Modeling

## First Nations and Inuit Health Branch

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Epidemic Calculator used for this modeling is publicly available  
at: <http://gabgoh.github.io/COVID/index.html>

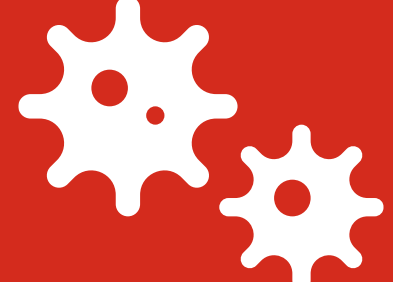
# Why Modeling?



- Helps us understand what might happen in an outbreak of COVID-19
- Helps guide planning and response activities

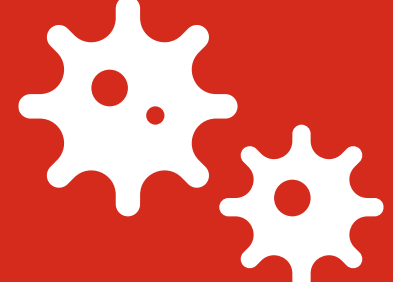


# How models work?



- Different variables are used in a mathematical equation
- Models can take into account certain assumptions and other variables that are specific to the population and context you are planning for
- Models are predictions – they are not 100% accurate

# What we know already:



## **Underlying condition:**

- Almost one quarter of people age 20 and above have diabetes.
- Hospital admissions for diabetes are 4 times the Ontario rate.

## **Health outcomes in communities are linked to underlying determinants including:**

- Overcrowded housing
- Inadequate infrastructure to support health services and other community services

# Parameters that were included in the model:

Parameters	Estimates	Description
Reproduction number ( $R_0$ )	1.43	Number of people infected by someone who has the virus. If the $R_0$ is 1, one person is infecting one other person. The $R_0 = 1.43$ is being parameterized in the models to project the number cases, hospitalization and deaths in First Nations Communities
Case fatality rate (CFR)	2%	Proportion of deaths compared to the total number of people with the virus. The cases fatality of 2% is being parameterized in the models to project the number cases, hospitalization and deaths in First Nations Communities
Hospitalization rate	9%	Proportion of people infected that need to be admitted to hospital from the virus compared to total number of people infected by the virus.
Length of incubation period	5 days	The time from which someone is infected with the virus to when they are showing symptoms. <b>We used the current median published in scientific papers.</b>

# Things that were included in the model:

Parameters	Estimates	Description
Duration patient is Infectious	3 days	The length of time in which a person who is infected with the virus can spread the virus to another. Takes into consideration that they will not pass the virus on once they start isolation.
Time from end of Incubation to Death	21 days	The average time from being infected to death. Current findings show that this is approximately 20 -21 days.
Length of hospital stay	15 days	The average number of days someone with severe symptoms who will be admitted to hospital. <b>Because of the high rate of other medical conditions we used a higher number than other models.</b>
Recovery time for mild cases	15 days	The average time it takes someone, who has mild symptoms of the virus, to fully recover. Current findings show this is 14 days.
Time to hospitalization	8 days	The time for infection with the virus to the time they are hospitalized. Current findings show this is approximately 8-12 days. The models used 8 days to prevent fatality given delays.

# Models were done for 4 population sizes:

**Small  
Community**  
lesser than 500  
people

**Medium  
Community**  
= between 500  
& 1499 people

**large  
Community**  
= between 1500  
& 4500 people

**Larger  
Community**  
greater than 4500  
people

n is infecting one  
other person. The more daily

# Models were done for 3 scenarios:

**Scenario 1:**  
No physical distancing

**Scenario 2:**  
Half of community practicing physical distancing

**Scenario 3:** Strict social distancing & isolation

**Note:** All of these models assume that the virus has entered the community. Current travel restrictions and requirements for community members to self-isolate for 14 days when they return to the community are stopping the virus from entering the community.

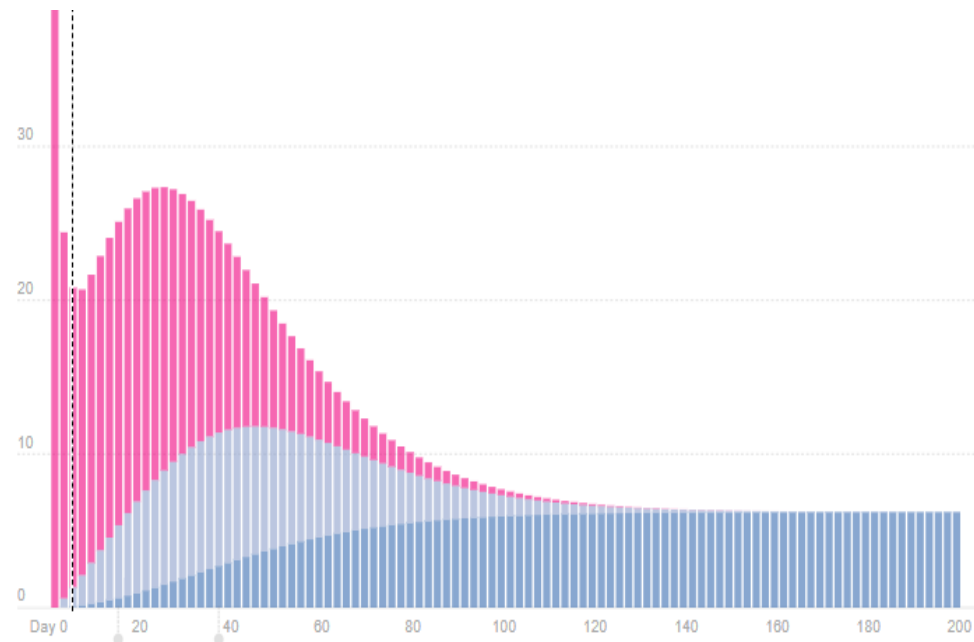


# Modelling Results

Scenario 1: Community **NOT** practicing physical distancing

## SMALL COMMUNITY

- **Day 30:** On average 18 active infections
- **Day 60:** On average 6 people hospitalized
- **Day 180:** 4 deaths

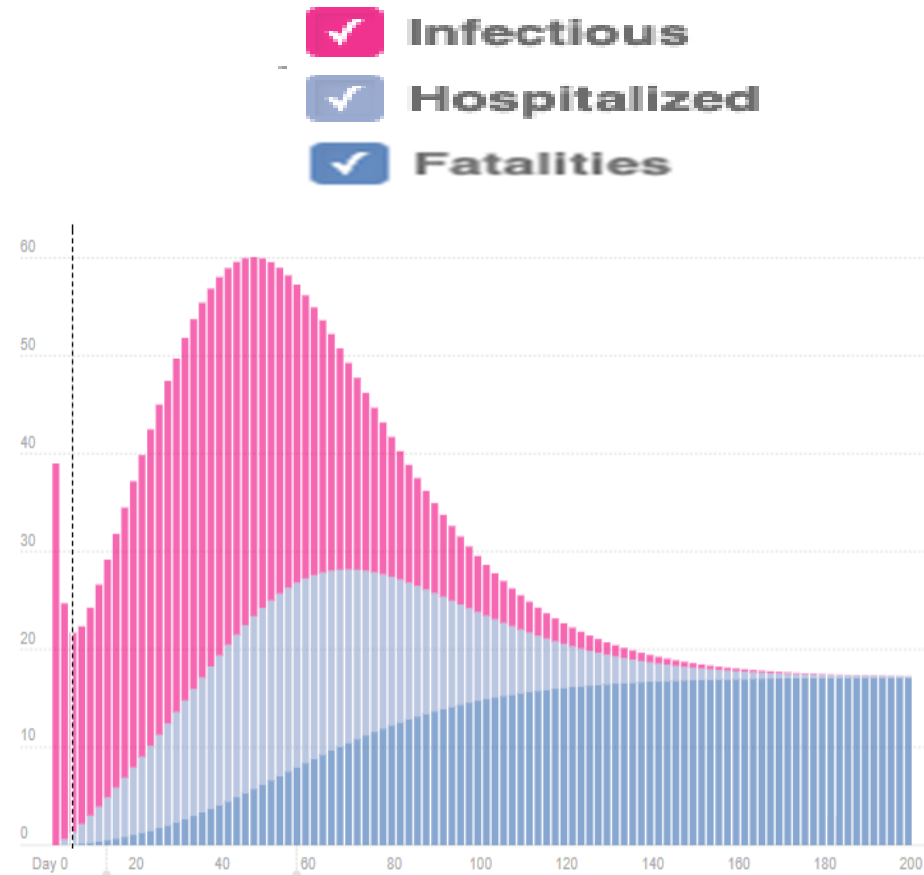


# Modelling Results

Scenario 1: Community **NOT** practicing physical distancing

**MEDIUM  
COMMUNITY**

- **Day 30:** On average 37 active infections
- **Day 60:** On average 19 people hospitalized
- **Day 180:** 17 deaths

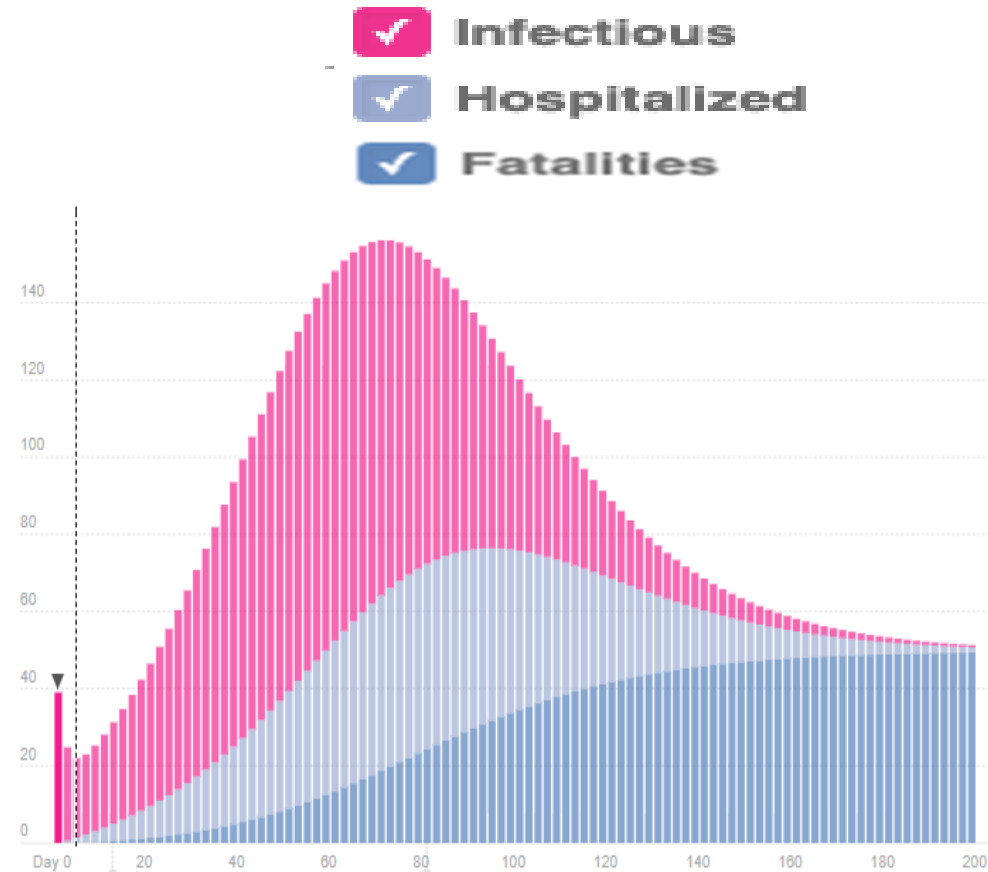


# Modelling Results

Scenario 1: Community **NOT** practicing physical distancing

**LARGE  
COMMUNITY**

- **Day 30:** On average 50 active infections
- **Day 60:** On average 37 people hospitalized
- **Day 180:** 49 deaths

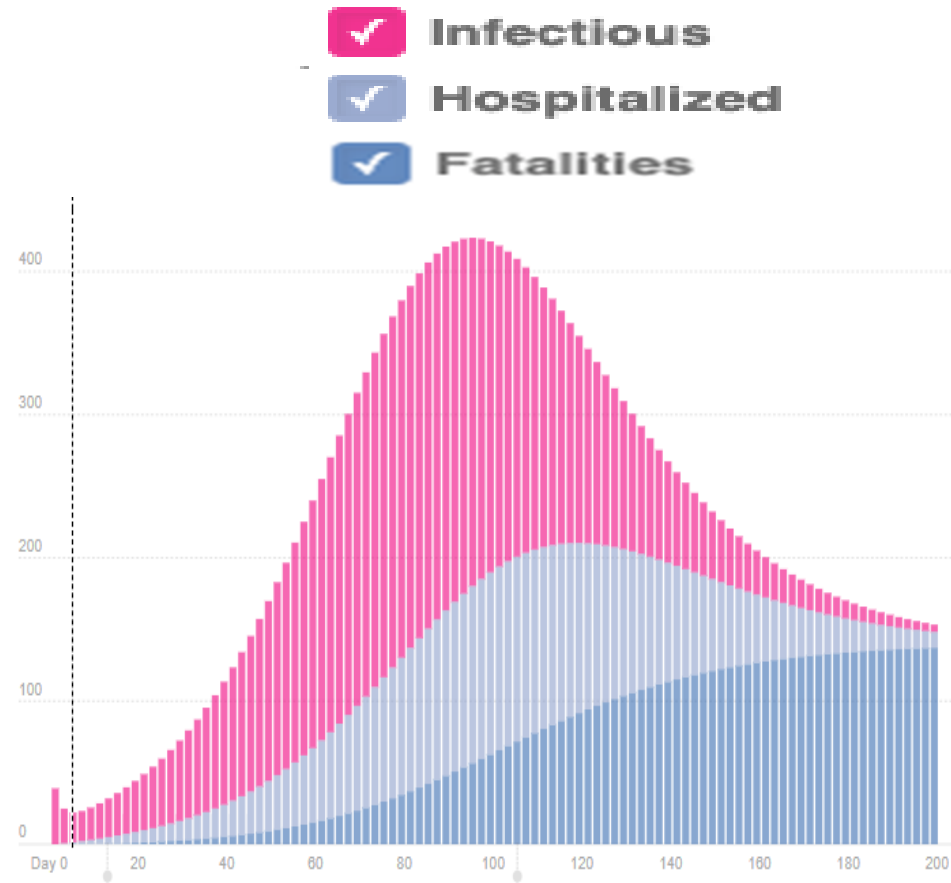


# Modelling Results

Scenario 1: Community **NOT** practicing physical distancing

LARGER  
COMMUNITY

- **Day 30:** On average 61 active infections
- **Day 60:** On average 52 people hospitalized
- **Day 180:** 134 deaths

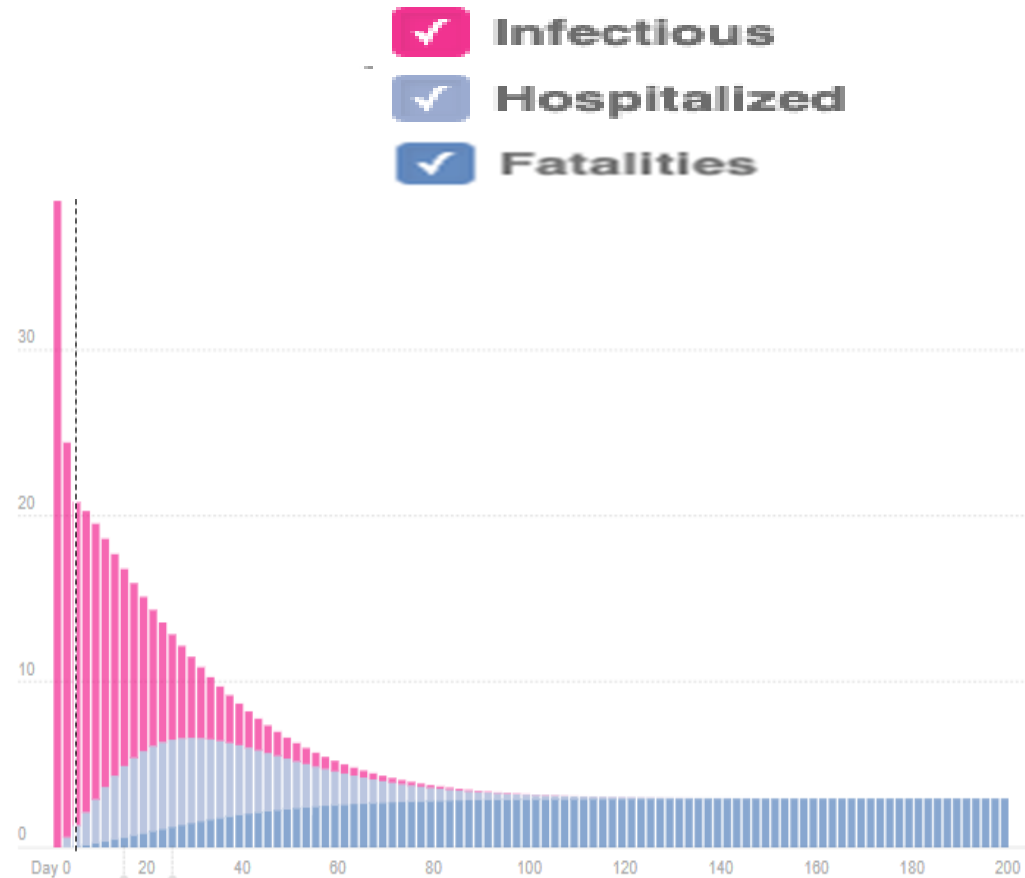


# Modelling Results

Scenario 2: **HALF** of the Community practicing physical distancing

**SMALL  
COMMUNITY**

- **Day 30:** On average 5 active infections
- **Day 60:** On average 3 people hospitalized
- **Day 180:** 2 deaths

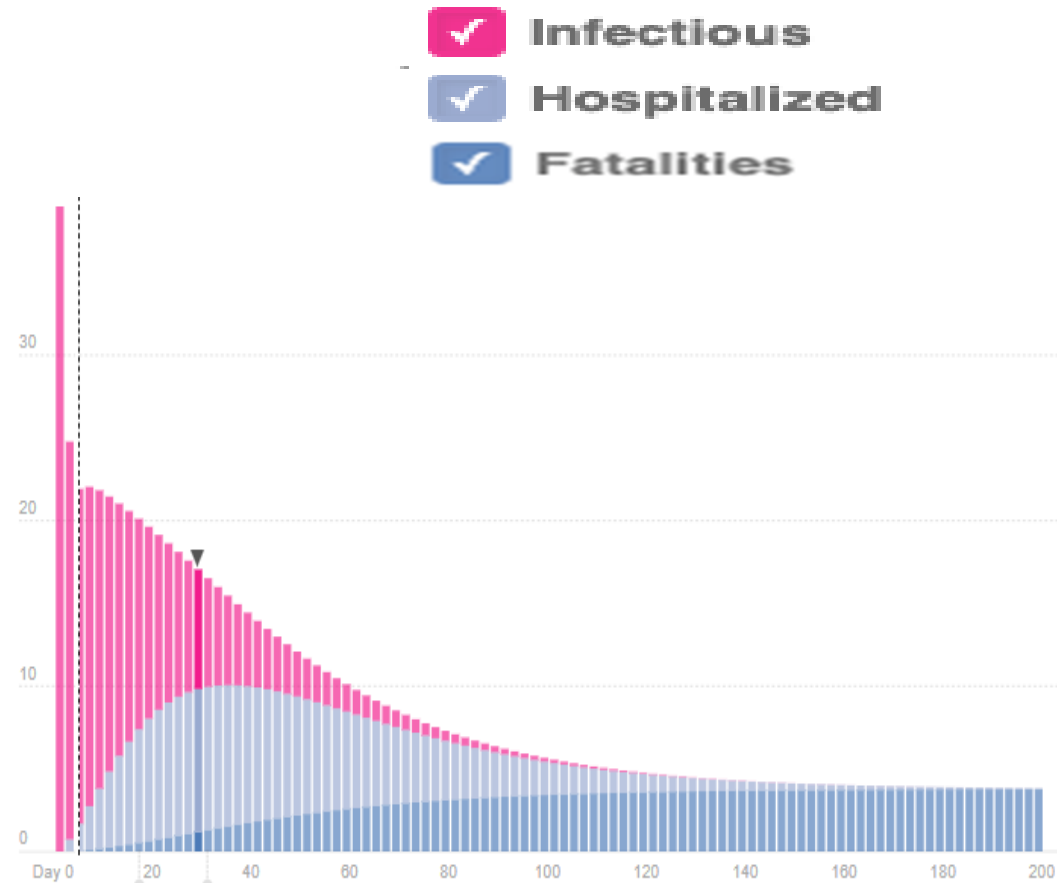


# Modelling Results

Scenario 2: **HALF** of the Community practicing physical distancing

**MEDIUM  
COMMUNITY**

- **Day 30:** On average 7 active infections
- **Day 60:** On average 4 people hospitalized
- **Day 180:** deaths 3

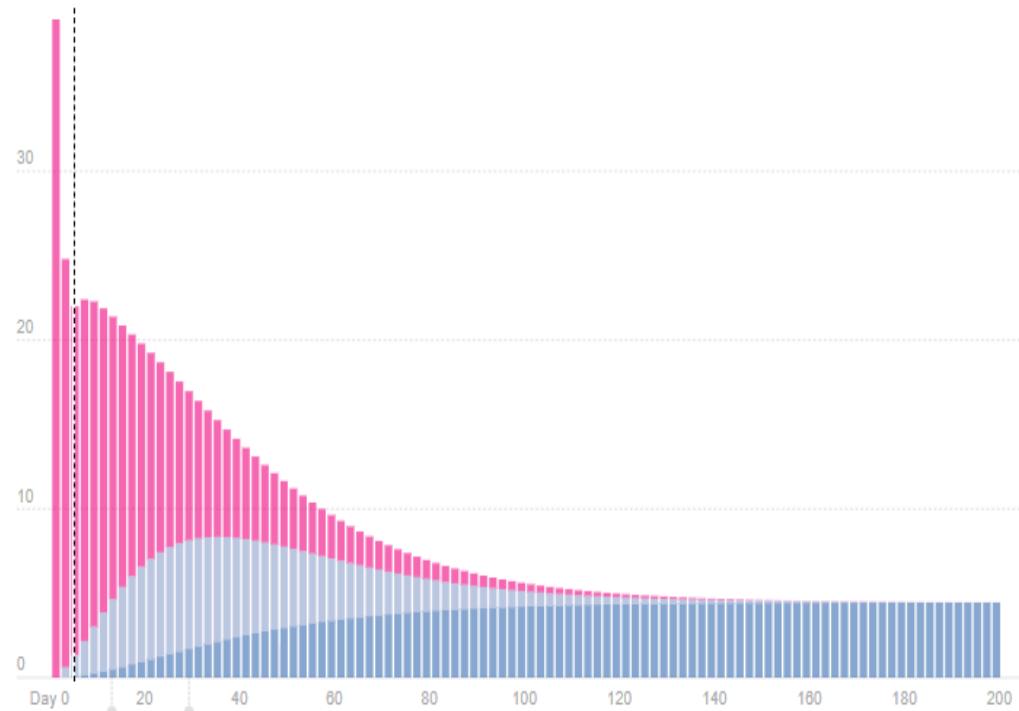


# Modelling Results

Scenario 2: **HALF** of the Community practicing physical distancing

## LARGE COMMUNITY

- **Day 30:** On average 9 active infections
- **Day 60:** On average 5 people hospitalized
- **Day 180:** deaths 4

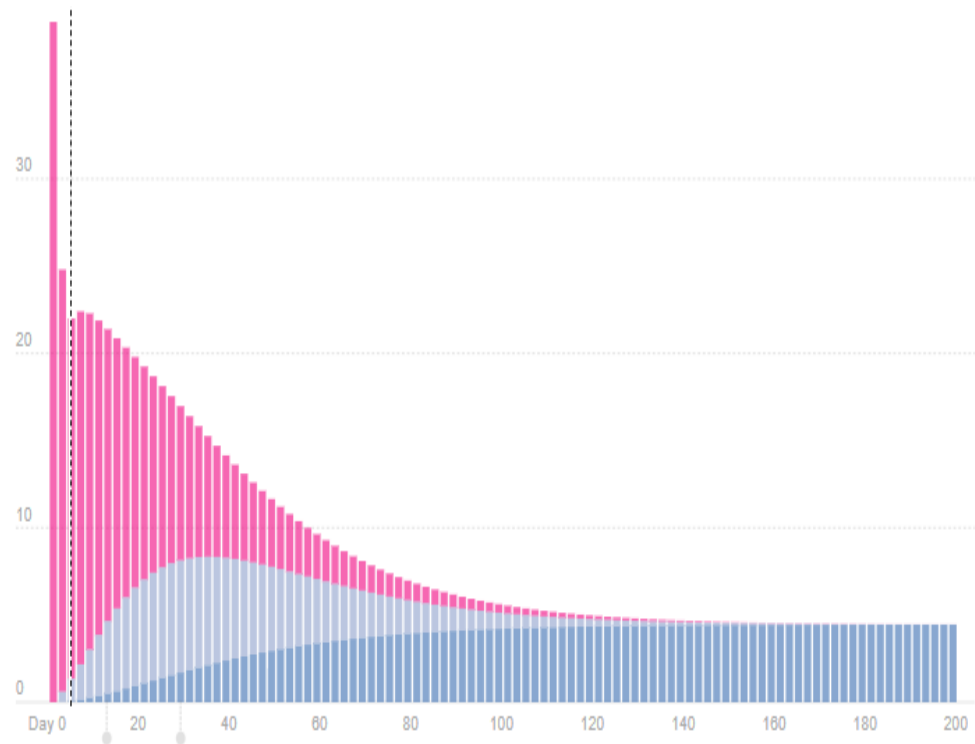


# Modelling Results

Scenario 2: **HALF** of the Community practicing physical distancing

## LARGER COMMUNITY

- **Day 30:** On average 10 active infections
- **Day 60:** On average 5 people hospitalized
- **Day 180:** deaths 5



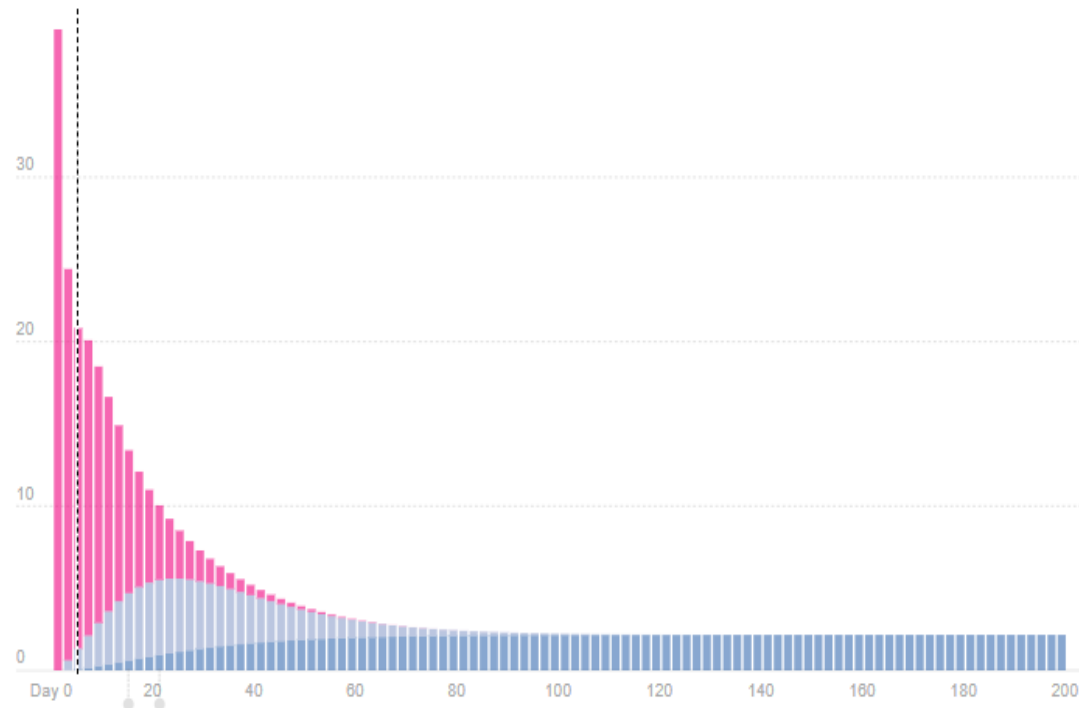


# Modelling Results

Scenario 3: Community practicing **STRICT** physical distancing & Isolation

**SMALL  
COMMUNITY**

- **Day 40:** On average 2 active infections
- **Day 60:** On average 1 people hospitalized
- **Day 180:** deaths 2

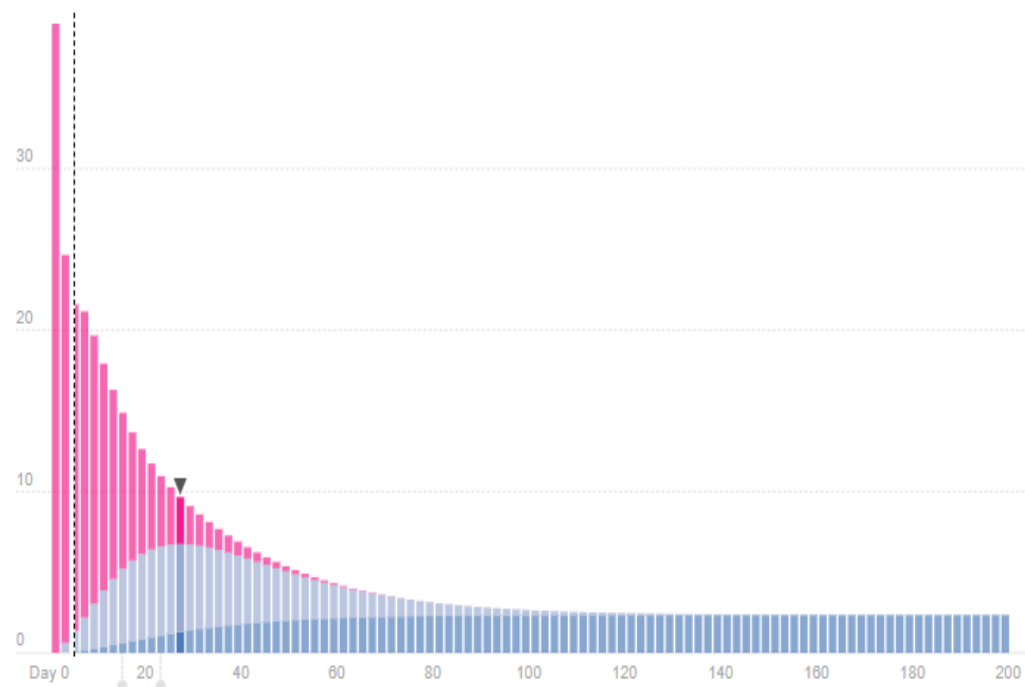


# Modelling Results

Scenario 3: Community practicing **STRICT** physical distancing & Isolation

**MEDIUM  
COMMUNITY**

- **Day 40:** On average 3 active infections
- **Day 60:** On average 2 people hospitalized
- **Day 180:** deaths 2

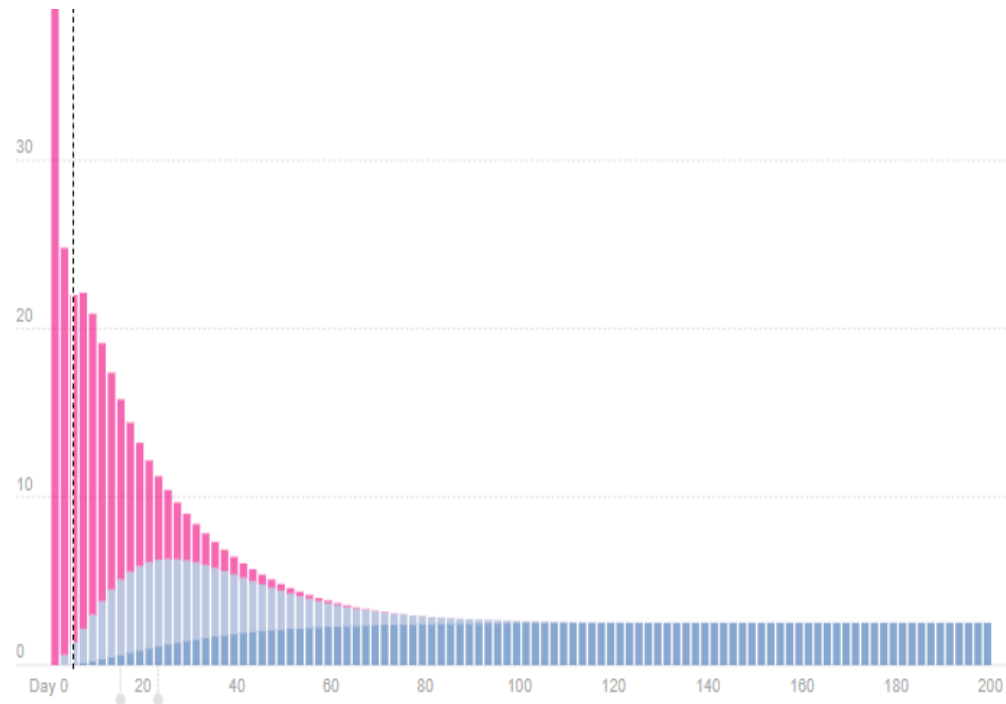


# Modelling Results

Scenario 3: Community practicing **STRICT** physical distancing & Isolation

**LARGE  
COMMUNITY**

- **Day 40:** On average 3 active infections
- **Day 60:** On average 2 people hospitalized
- **Day 180:** 2 deaths



# Modelling Results

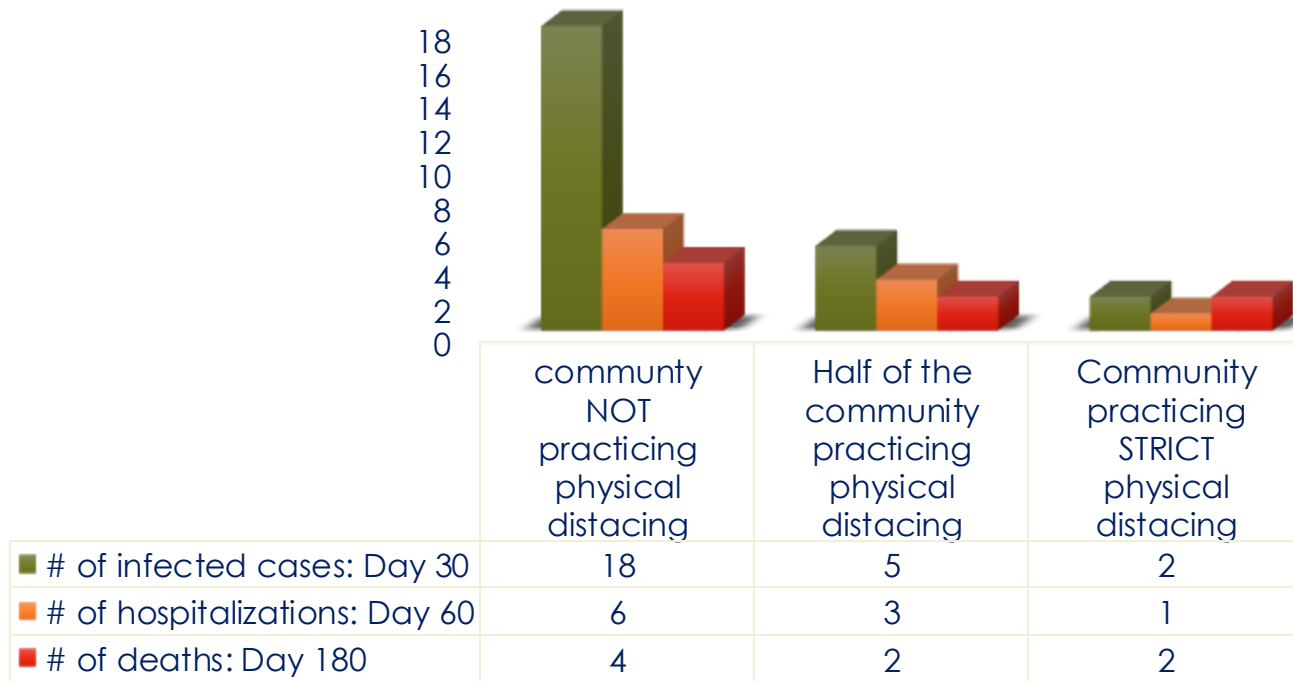
Scenario 3: Community practicing  
**STRICT** physical distancing & Isolation

**LARGER  
COMMUNITY**

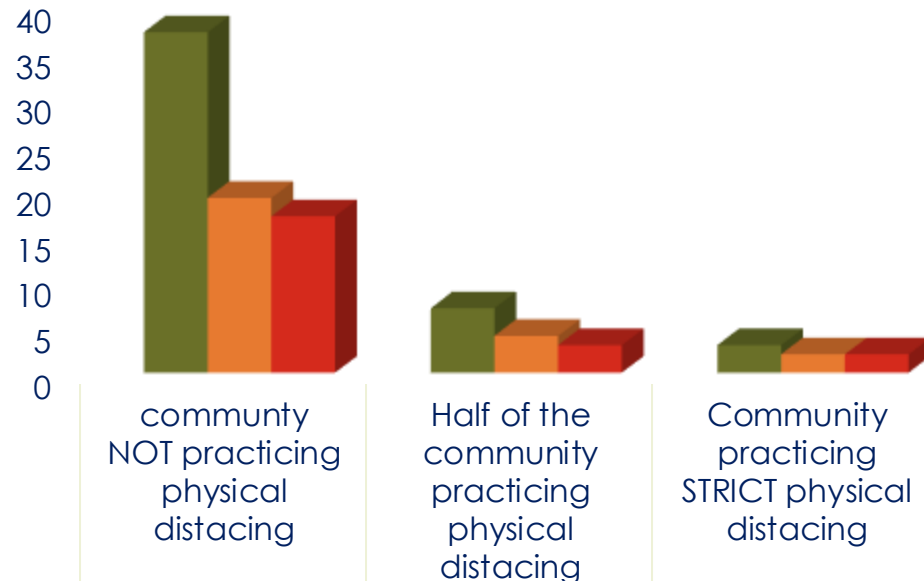
- Infectious**
- Hospitalized**
- Fatalities**

- **Day 40:** On average 3 active infections
- **Day 60:** On average 2 people hospitalized
- **Day 180:** deaths 3

# Summary of Modelling Results for a Small Size Community

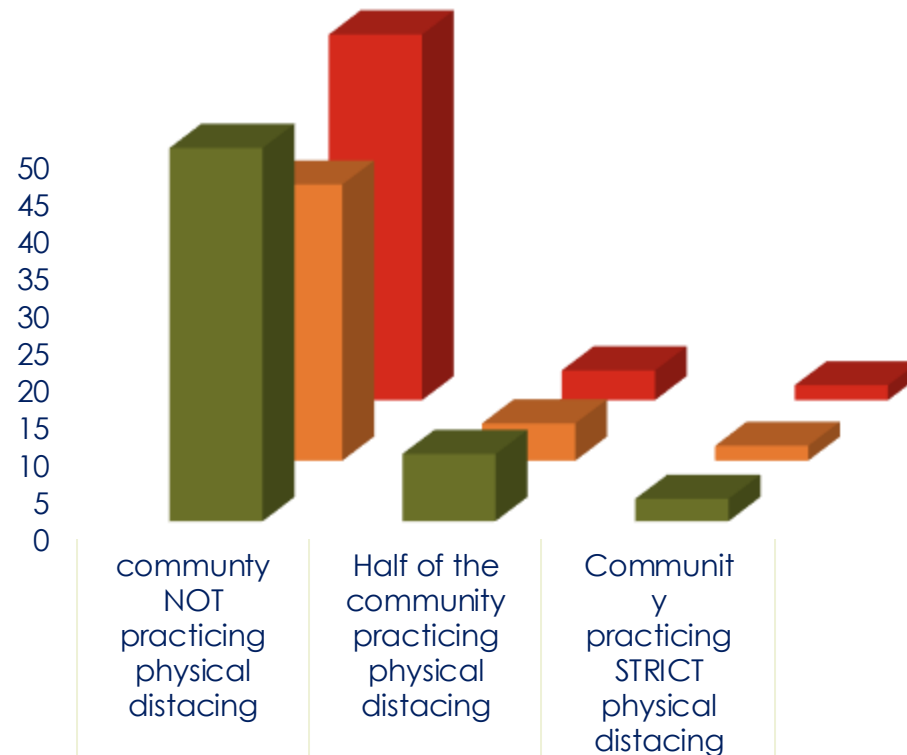


# Summary of Modelling Results for a Medium Size Community



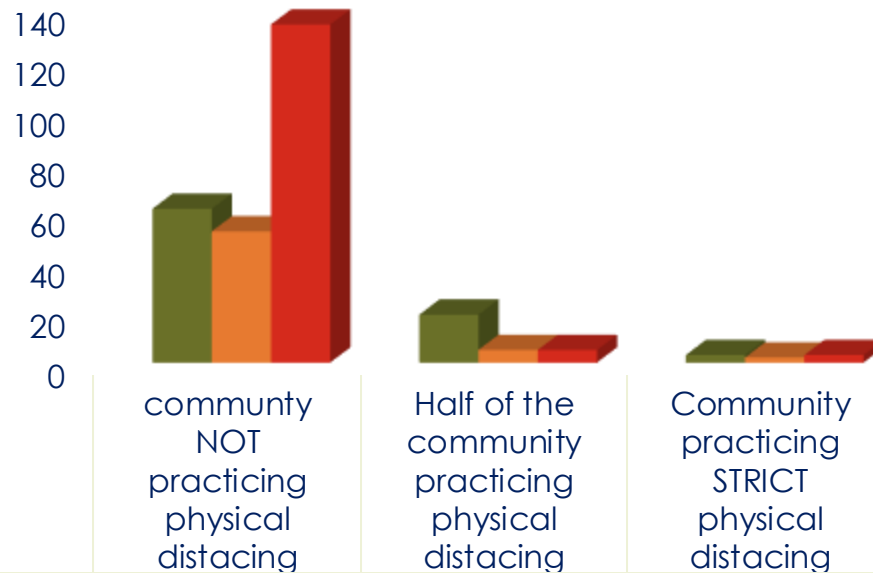
■ # of infected cases: Day 30	37	7	3
■ # of hospitalizations: Day 60	19	4	2
■ # of deaths: Day 180	17	3	2

# Summary of Modelling Results for a Large Size Community



■ # of infected cases: Day 30	50	9	3
■ # of hospitalizations: Day 60	37	5	2
■ # of deaths: Day 180	49	4	2

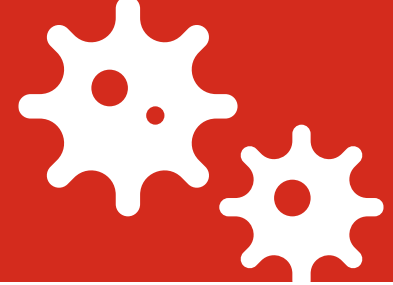
# Summary of Modelling Results for a Larger Community



■ # of infected cases: Day 30	61	19	3
■ # of Hospitalizations: Day 60	52	5	2
■ # of deaths: Day 180	134	5	3



# Next Steps:



- Social/physical distancing proved to be an effective strategy in preventing the spread of COVID-19
- COVID-19 cases and hospitalizations reach their peak between 40 – 60 days. Please visit the graphs
- Developing messaging/explanation for wider community audience
- Share and use the information with leadership for all communities and Tribal Councils to help planning around surge capacity, etc.
- Surging capacity is required prior to approaching this winter given the high risk of coinciding Flu, ILI and COVID-19 increasing the risk of case fatality.

**FNIHB is**

**Committed to supporting First Nations Communities to preventing disease, promoting health and saving lives, thousands at a time**

**PUT YOUR LOGO**