



Photo credit: Neil Zeller

Status of Emergency Preparedness – A Focus on Critical Infrastructure Risk

2020 October 22

Emergency Management Committee of Council

#EM2020-1192



Agenda

- I. Introduction
- II. Comprehensive Emergency Management
- III. A Focus on Risk – Critical Infrastructure
- IV. COVID-19
- V. Conclusion
- VI. Q & A

Tom Sampson
Chief, CEMA

Sue Henry
Deputy Chief, CEMA

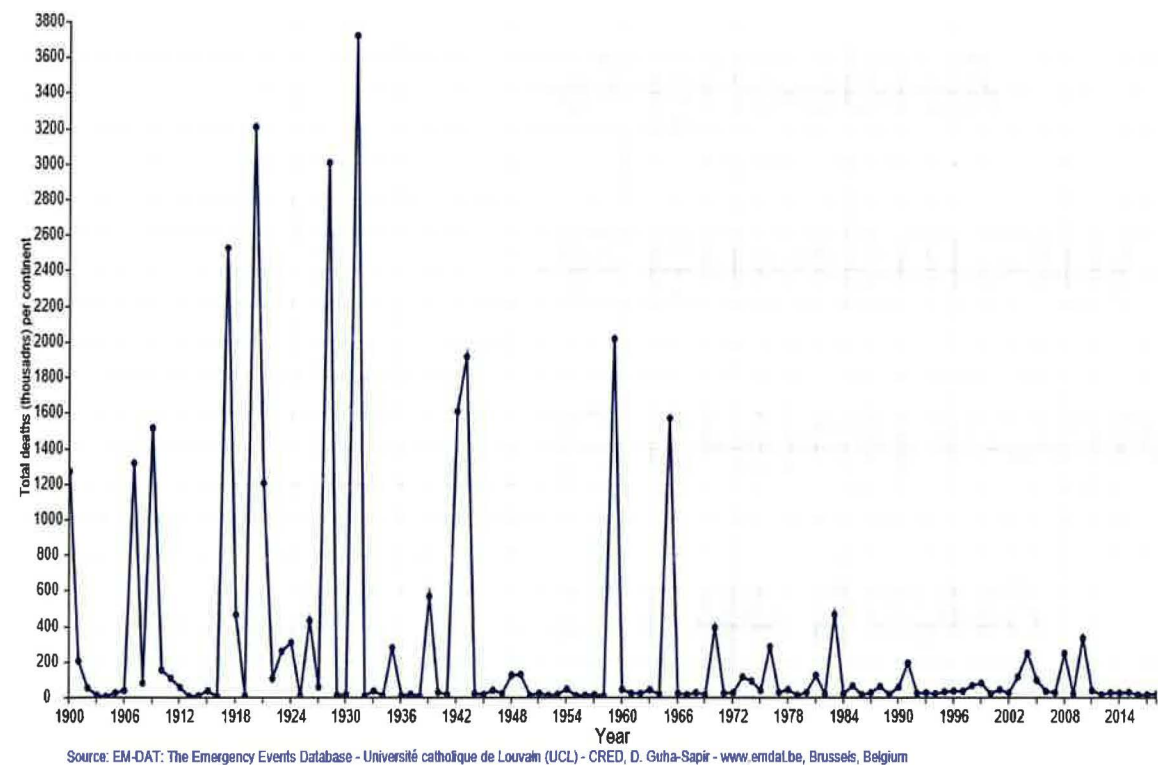
Coby Duerr
Assistant Chief, CEMA

Mike Luchia
Leader, Disaster Risk Reduction

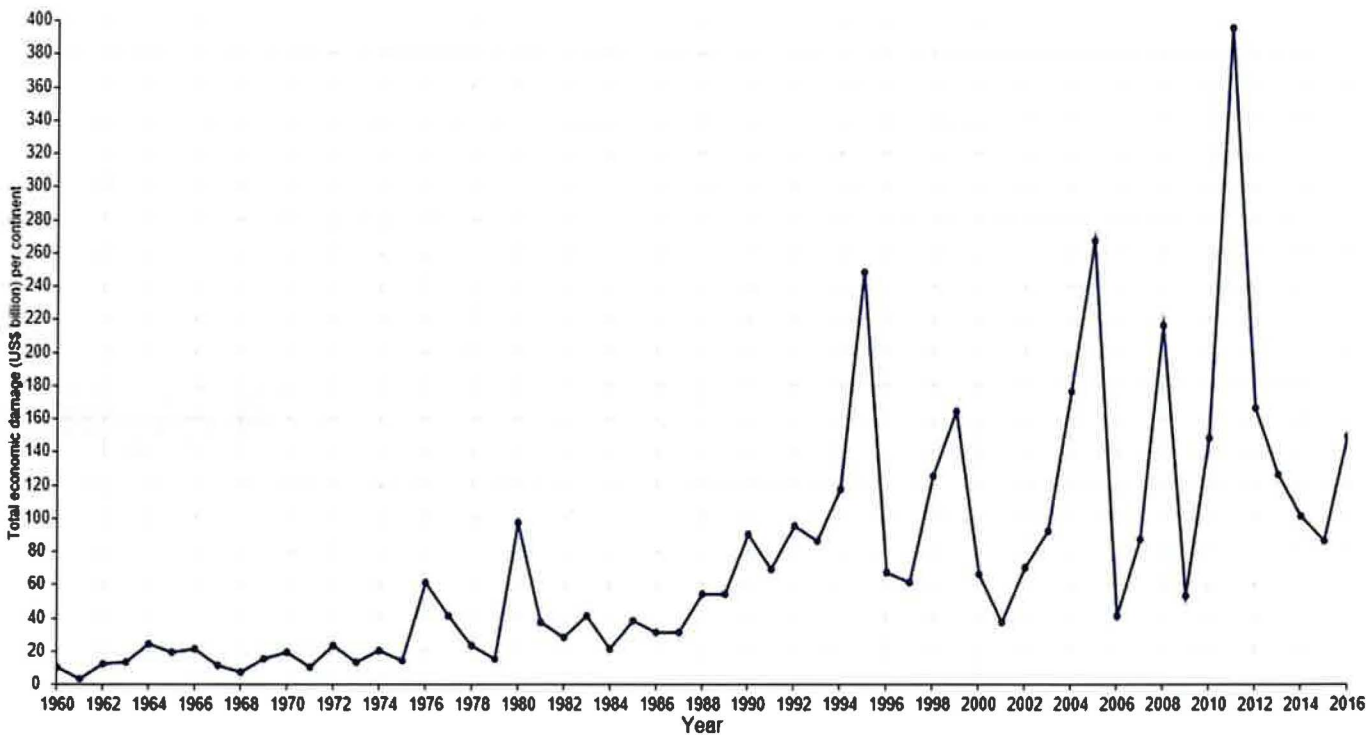
Kerrie Green
Planner, Calgary's Critical Infrastructure Network

Evolving Trends in Disaster Impact

Total Deaths caused by Natural Disasters: 1900 - 2018



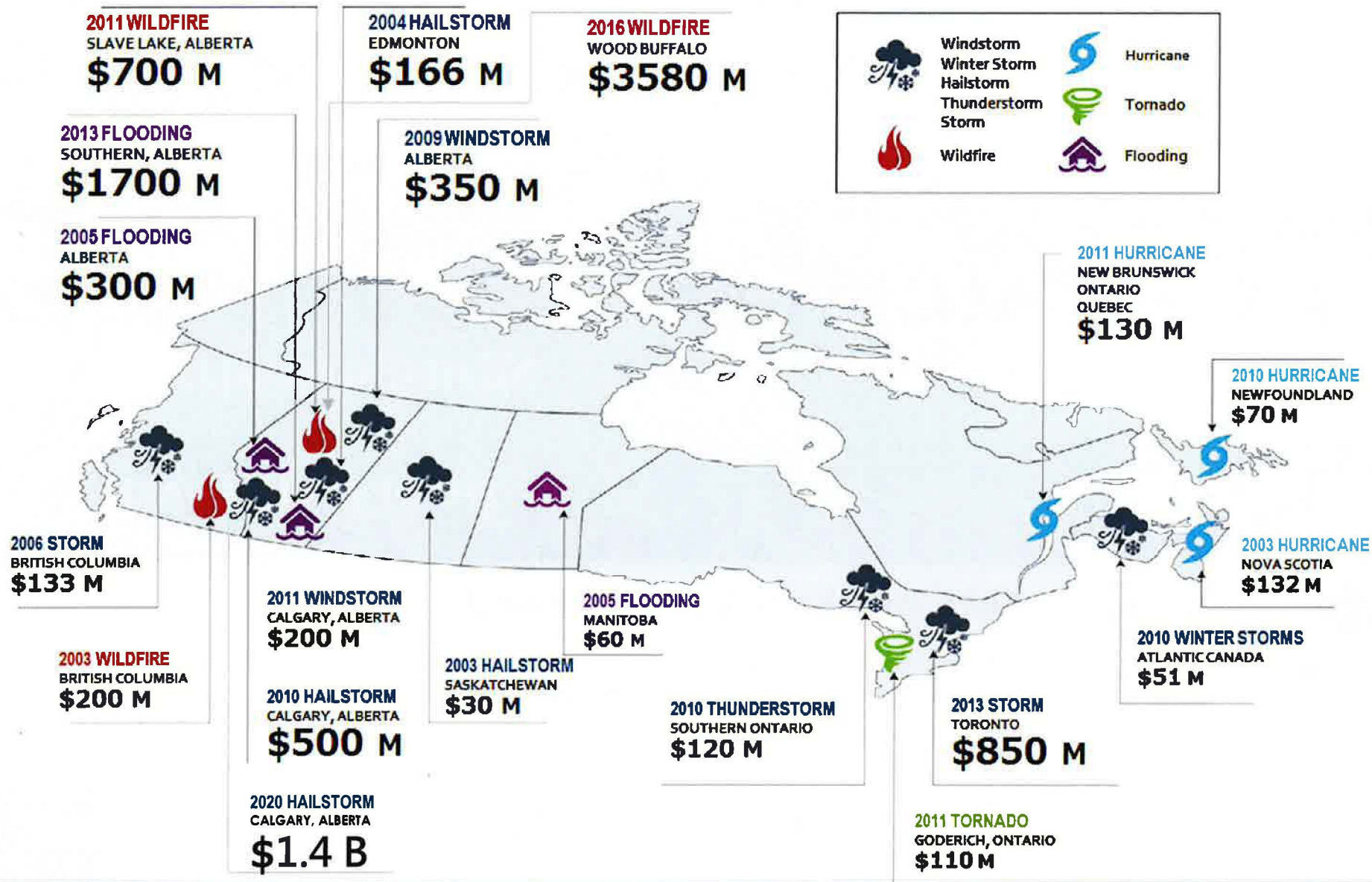
Total Damage caused by Natural Disasters: 1900 - 2018



Emergency Management Priorities






- 1) Life Safety**
- 2) Critical Infrastructure**
- 3) Environment**
- 4) Economy**
- 5) Cultural Heritage**

National, Provincial and Local





Advantages to Risk Reduction

| National Benefit-Cost Ratio Per Peril <i>*BCR numbers in this study have been rounded</i> Overall Hazard Benefit-Cost Ratio | | | Federally Funded | Beyond Code Requirements |
|---|--------------------------------------|--|-------------------------|---------------------------------|
| | | | 6:1 | 4:1 |
|  | Riverine Flood | | 7:1 | 5:1 |
|  | Hurricane Surge | | Too few grants | 7:1 |
|  | Wind | | 5:1 | 5:1 |
|  | Earthquake | | 3:1 | 4:1 |
|  | Wildland-Urban Interface Fire | | 3:1 | 4:1 |

Source: NIBS Hazard Mitigation Saves: 2017 Interim Report



Advantages to Risk Reduction – Holistic ROI

Benefit: \$157.9 billion

43% – Casualties & PTSD: \$68.1

37% – Property: \$58.1

8% – Additional living expenses &
direct business interruption: \$12.9

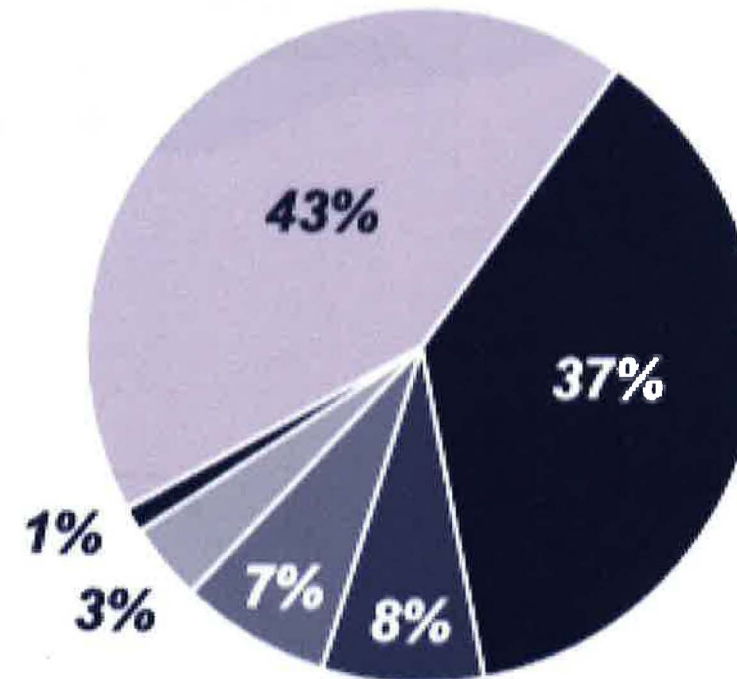
7% – Insurance: \$10.5

4% – Indirect business interruption: \$6.3

1% – Loss of service: \$2.0

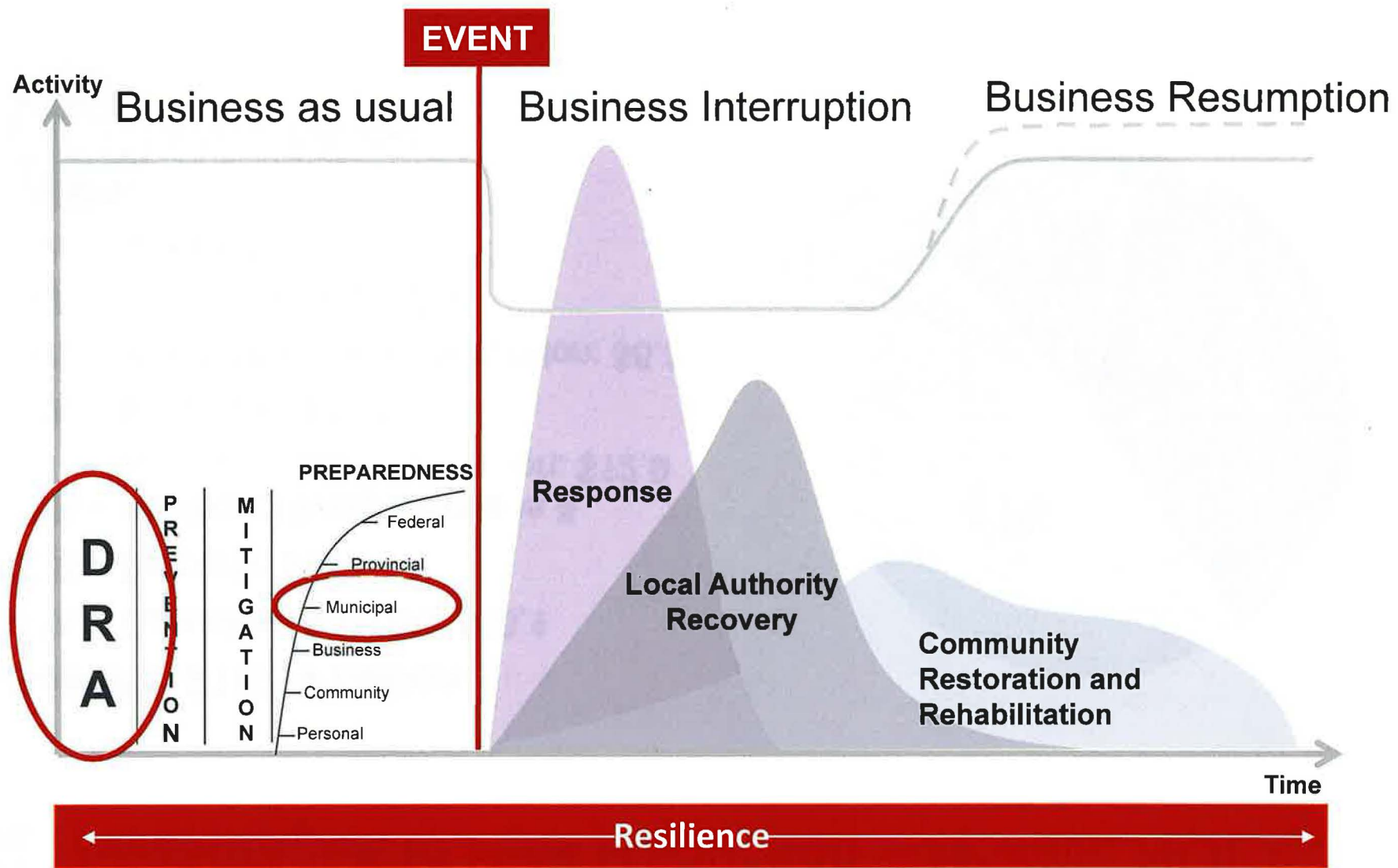
billions 2016 USD

Cost: \$27.4 billion



Overall = 6:1 Return on Investment

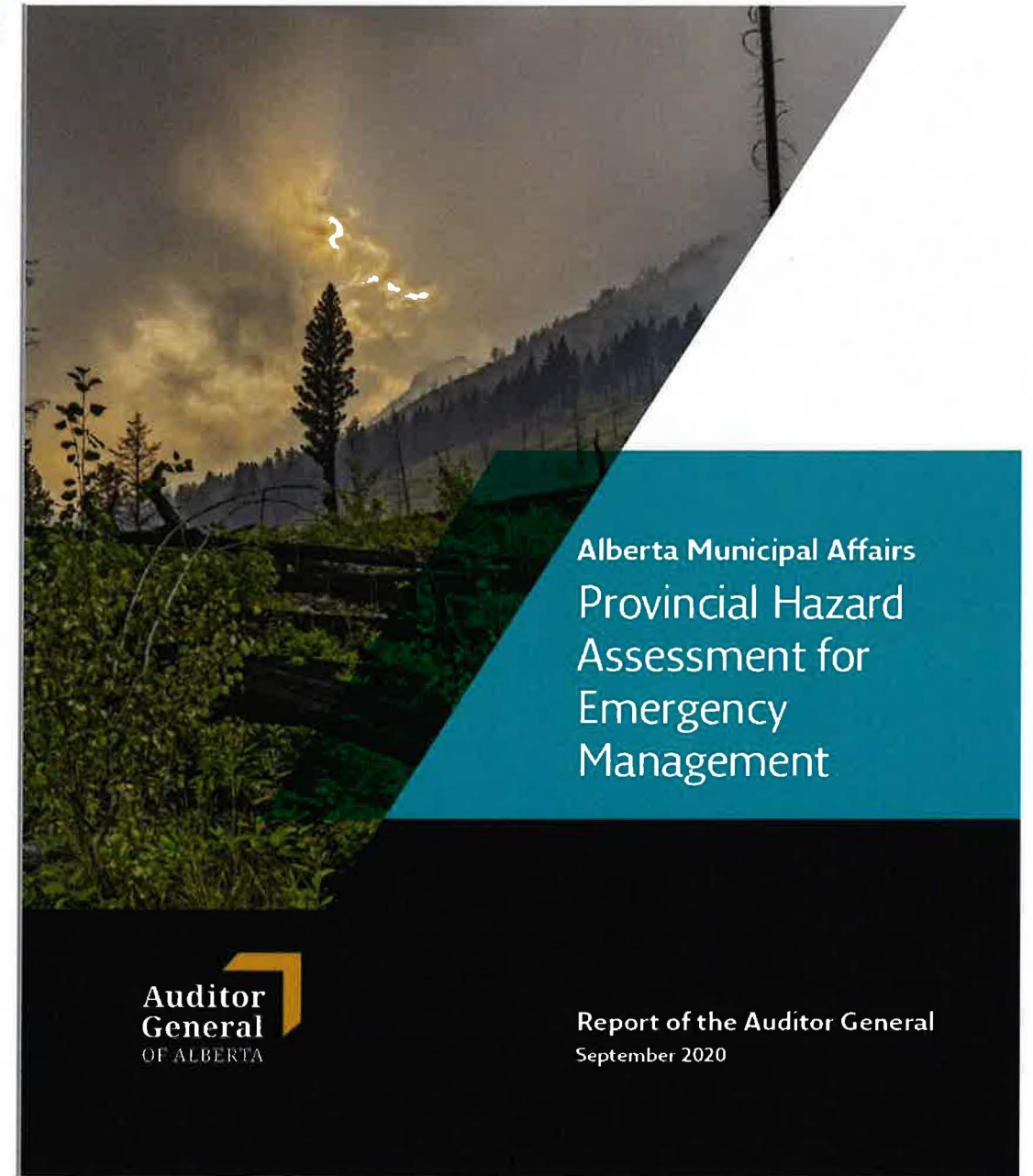
Comprehensive Emergency Management Model





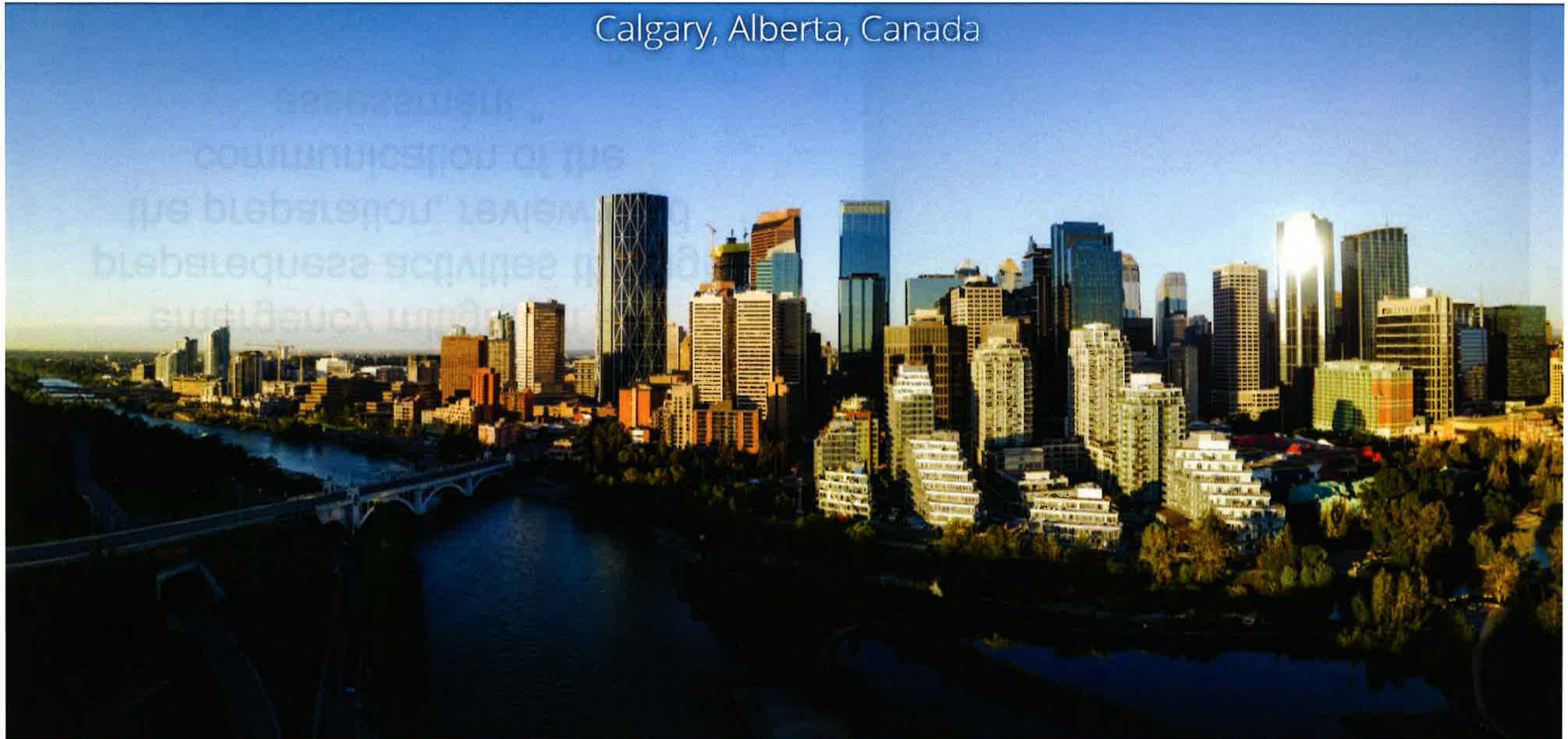
“Calgary's City Auditor found that Calgary had an effective disaster risk assessment process that supported its emergency mitigation and preparedness activities through the preparation, review and communication of the assessment.”

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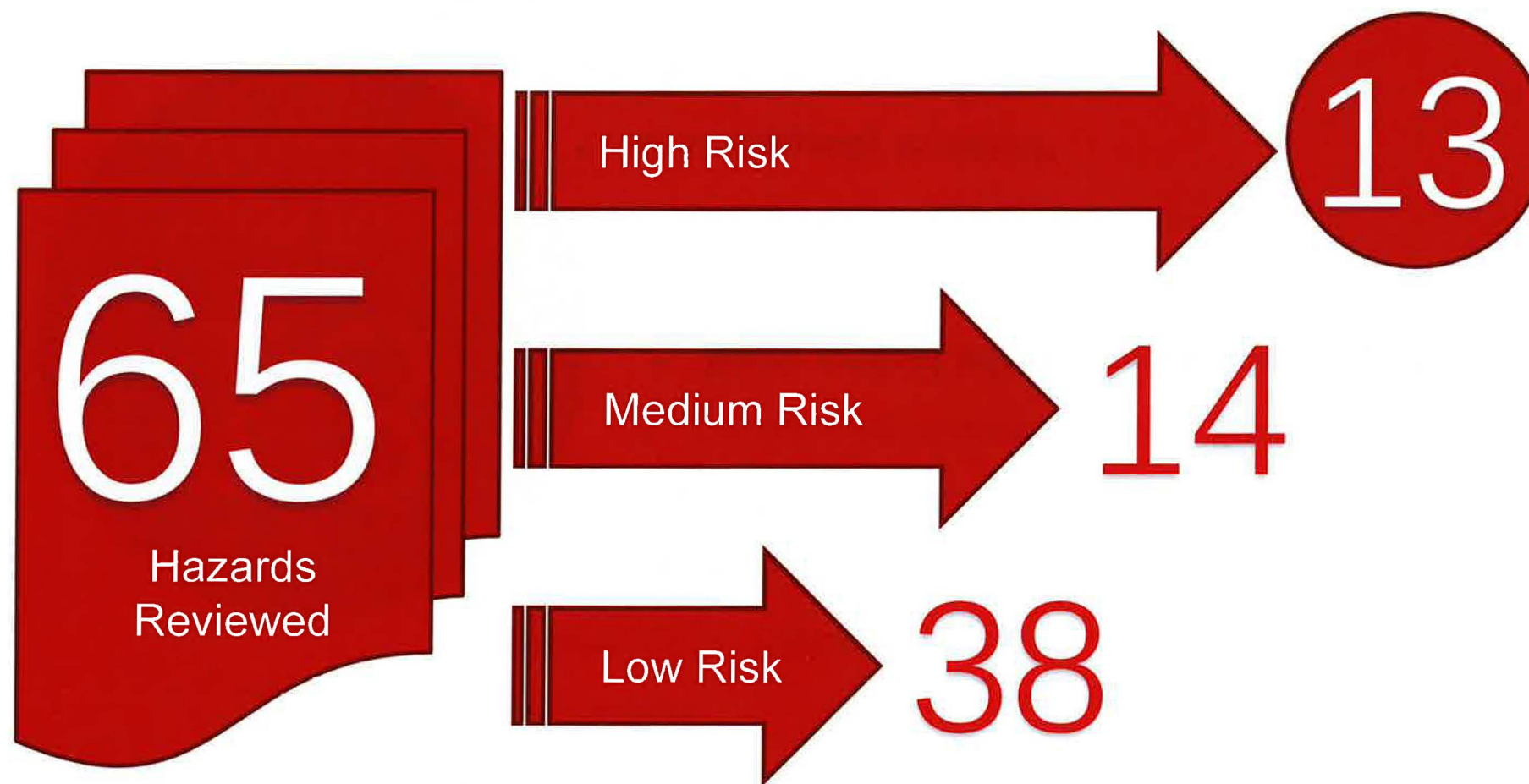


Disaster Risk Assessment

Calgary, Alberta, Canada



2018 Disaster Risk Assessment (DRA)





High Risk Disasters in Calgary

- Extreme cold
 - Major rail incident
 - Severe storm - blizzard
 - Major dam breach – Bow River
 - Severe storm - winter storm
 - Catastrophic riverine flooding Elbow River (1:100)
 - **Major critical infrastructure failure or disruption**
 - Catastrophic riverine flooding Bow (1:100)
 - Severe storm - heavy rainstorm
 - **Mass casualty incident***
 - **Major hostage incident***
 - **Major drought**
 - Tornado

* special consideration when determining likelihood for police/security threats

What is Critical Infrastructure?

CRITICAL INFRASTRUCTURE SECTORS



Transportation



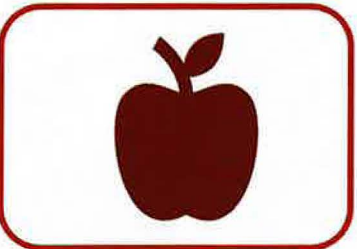
Energy & Utilities



IT/Communications



Safety



Food



Water



Government



Manufacturing



Health



Finance

Introduction to Critical Infrastructure Risk

Risk Level: **High**

Likelihood: **Likely**

Risk Trend: **Increasing**

Consequence: **Moderate**

Factors to Consider...

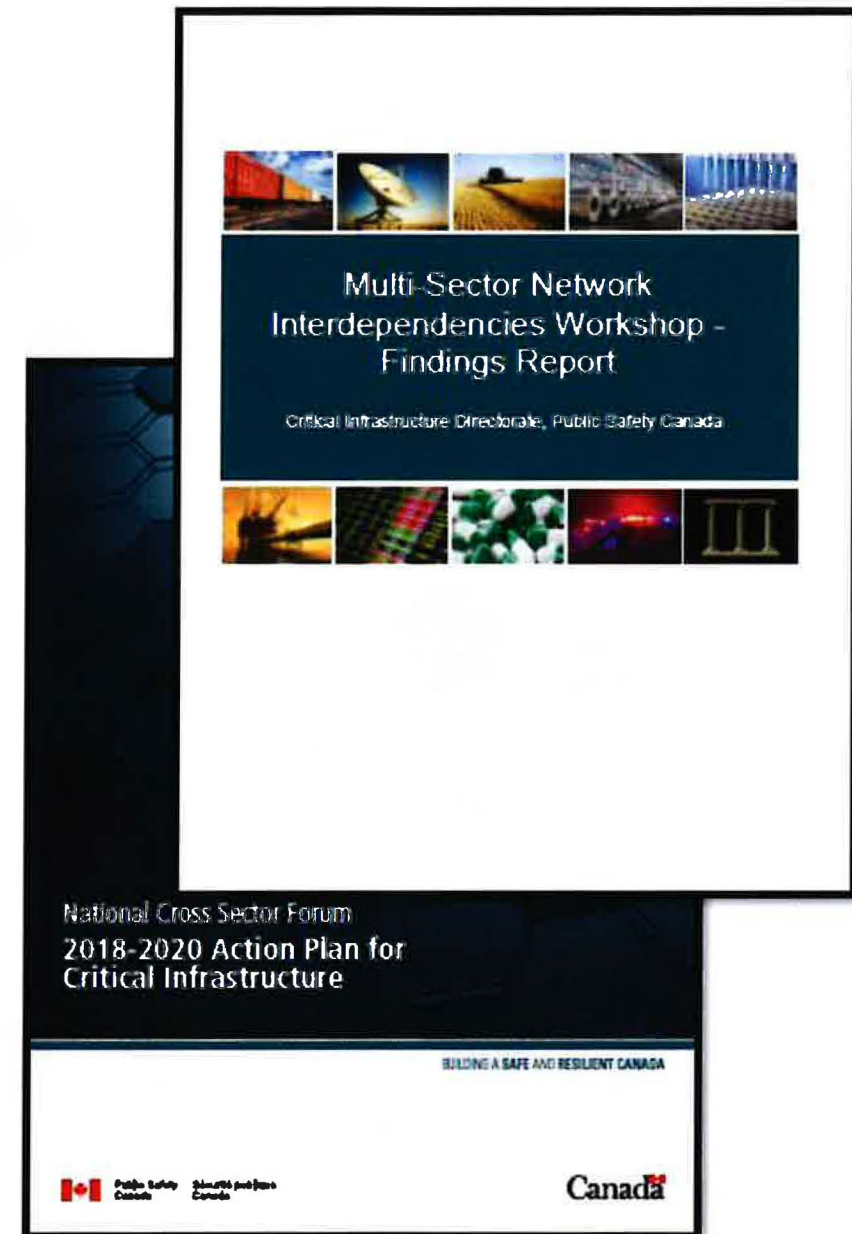
- Multi-jurisdictional
- Interdependencies and interconnected systems
- Increasing complexity and technological dependence
- Vulnerable to other hazards



Public Safety Canada's National Critical Infrastructure Strategy (2009) noted 3 key focuses to build resilience:

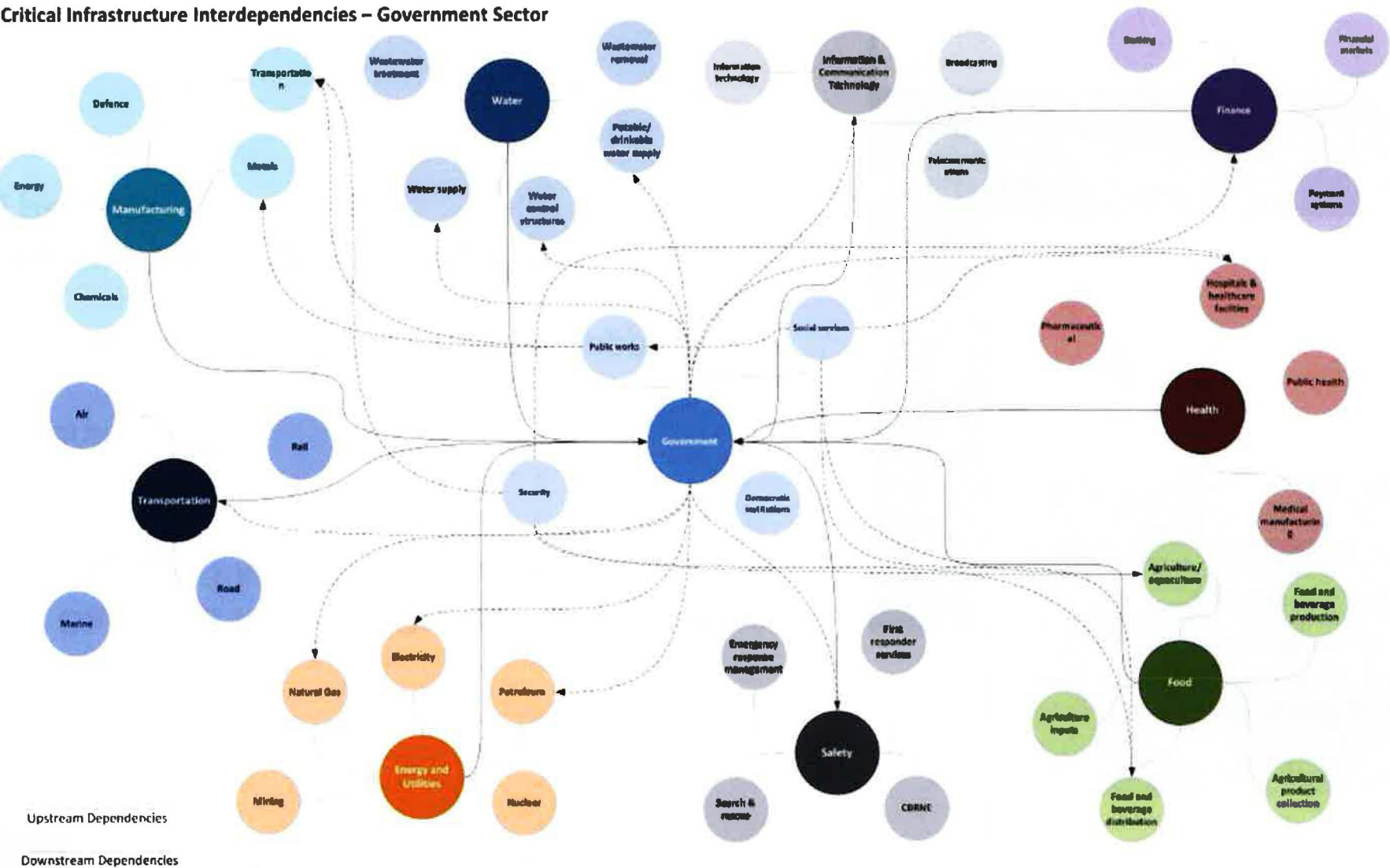
1. Build Partnerships
2. Implement an all-hazards risk management approach;
3. Advance the timely sharing and protection of information among partners

Source: Public Safety Canada (2009)



Interdependencies and Evolving Impacts

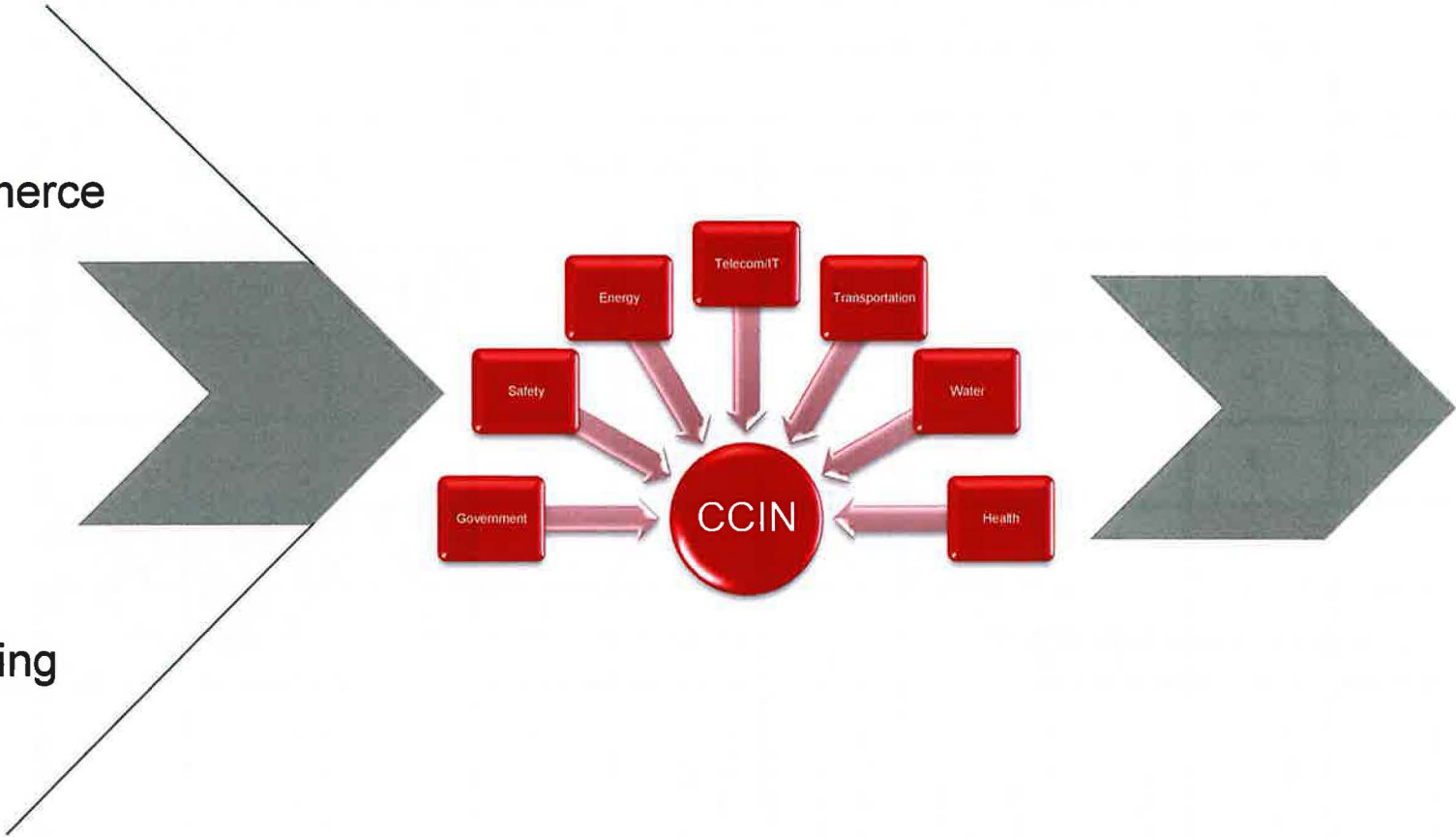
Critical Infrastructure Interdependencies – Government Sector



| | | Secondary Consequential Event | | | | | | | | | | | | |
|---|-----------------------------------|---|---------------------|----------------------------|------------------------|----------------------------|---------------------------------|-----------------------------------|--------------|---------------|-----------------|------------------------|---------------------|---------|
| | | Human-induced and technological threats | | | | | Natural hazards | | | | | | | |
| | | CI Failure | Major Rail Incident | Major Dam Breach Bow River | Major Hostage Incident | Major Mass Casualty Attack | Catastrophic Flooding Bow River | Catastrophic Flooding Elbow River | Extreme Cold | Major Drought | Severe Blizzard | Severe Heavy Rainstorm | Severe Winter Storm | Tornado |
| Human-induced and technological threats | CI Failure | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| | Major Rail Incident | 3 | 4 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Major Dam Breach Bow River | 4 | 4 | 4 | 1 | 1 | 3 | 3 | 0 | 1 | 0 | 1 | 0 | 1 |
| | Major Hostage Incident | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Major Mass Casualty Attack | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Natural hazards | Catastrophic Flooding Bow River | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Catastrophic Flooding Elbow River | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Extreme Cold | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| | Major Drought | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| | Severe Blizzard | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| | Severe Heavy Rainstorm | 3 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Severe Winter Storm | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| | Tornado | 3 | 3 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |

Calgary Critical Infrastructure Network

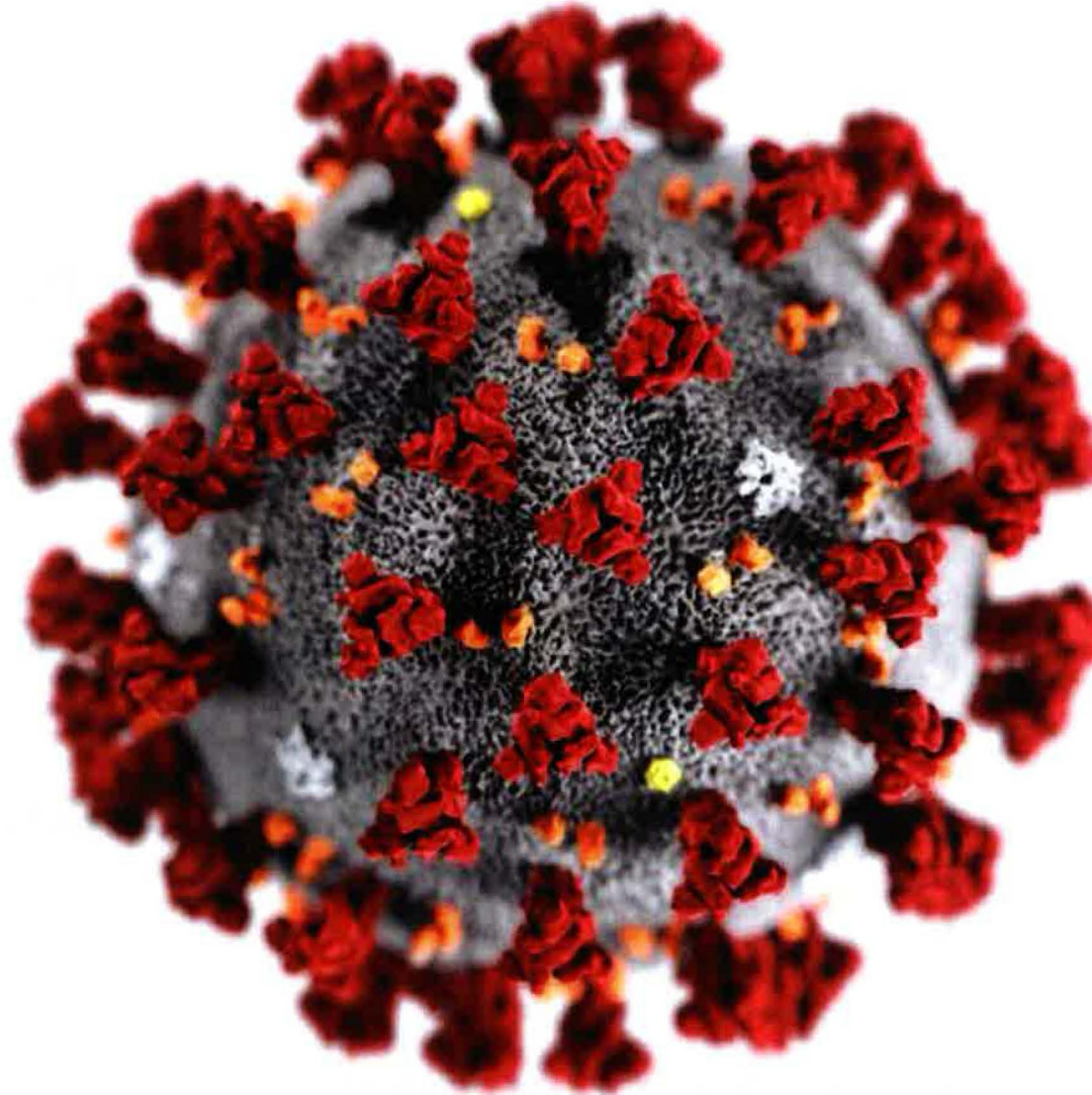
- Alberta Health
- Calgary Airport
- Water
- CEMA
- Chamber of Commerce
- TransAlta
- EMS
- Fire
- Police
- Roads
- City Clerks
- Waste and Recycling
- ENMAX
- ATCO
- TELUS
- Shaw
- Transit



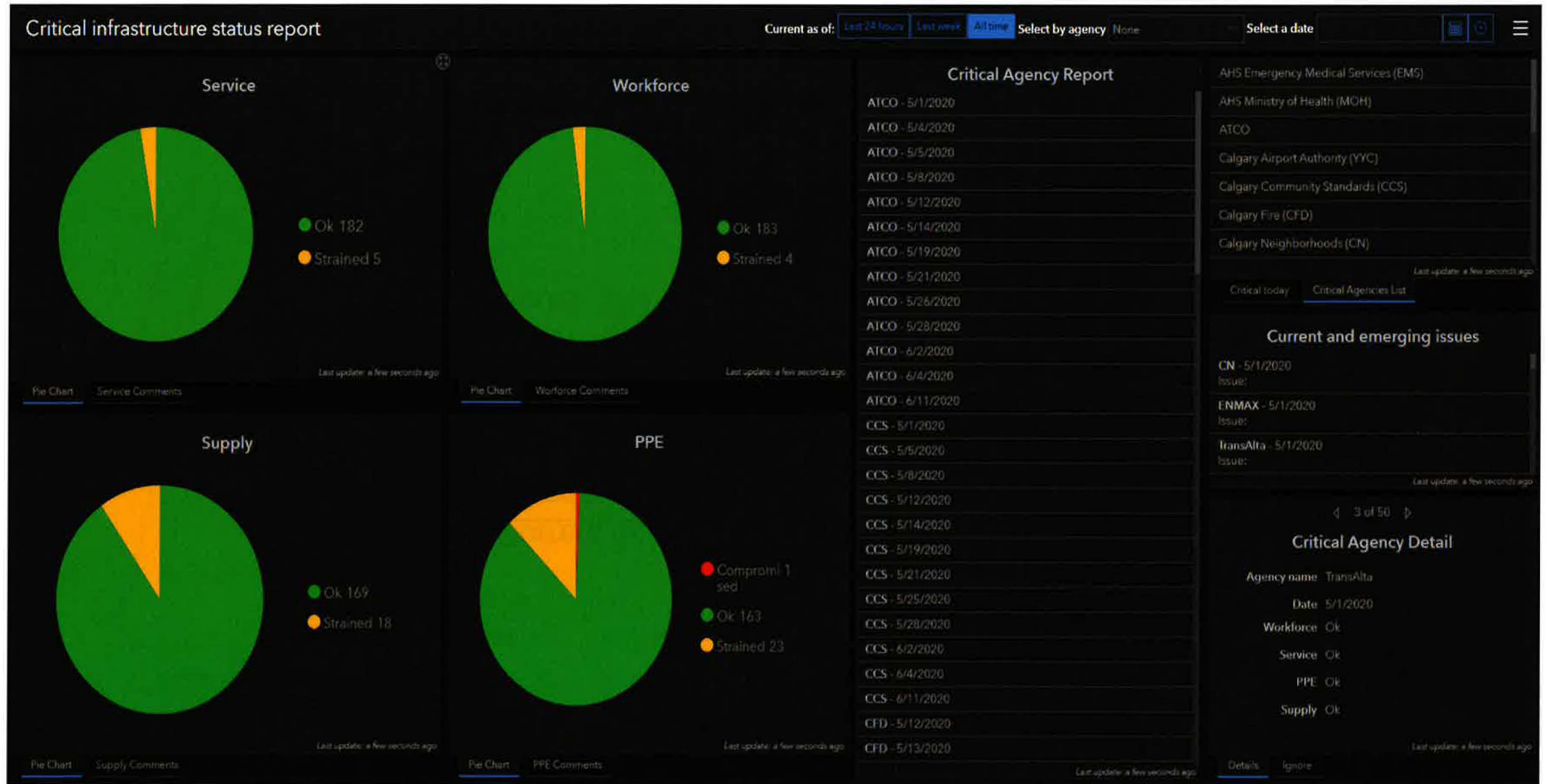
- Coordinated
- Collaborative
- Cooperative
- Cohesive

1. Facilitate cross-sector education
2. Develop communication tools
3. Develop a common understanding of Critical Infrastructure
4. Engage in training & exercises

Calgary Critical Infrastructure Network in COVID

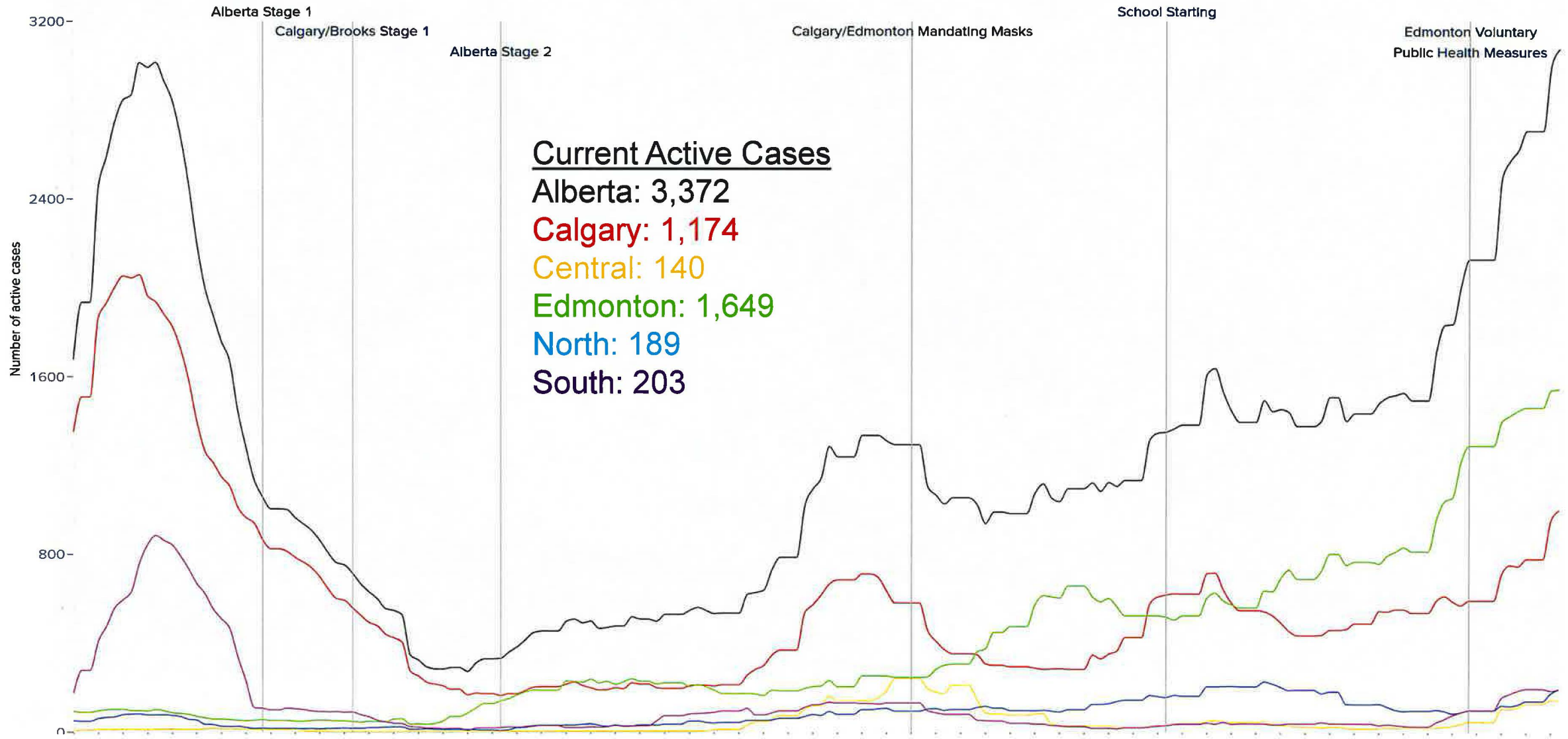


Calgary Critical Infrastructure Network: COVID Dashboard



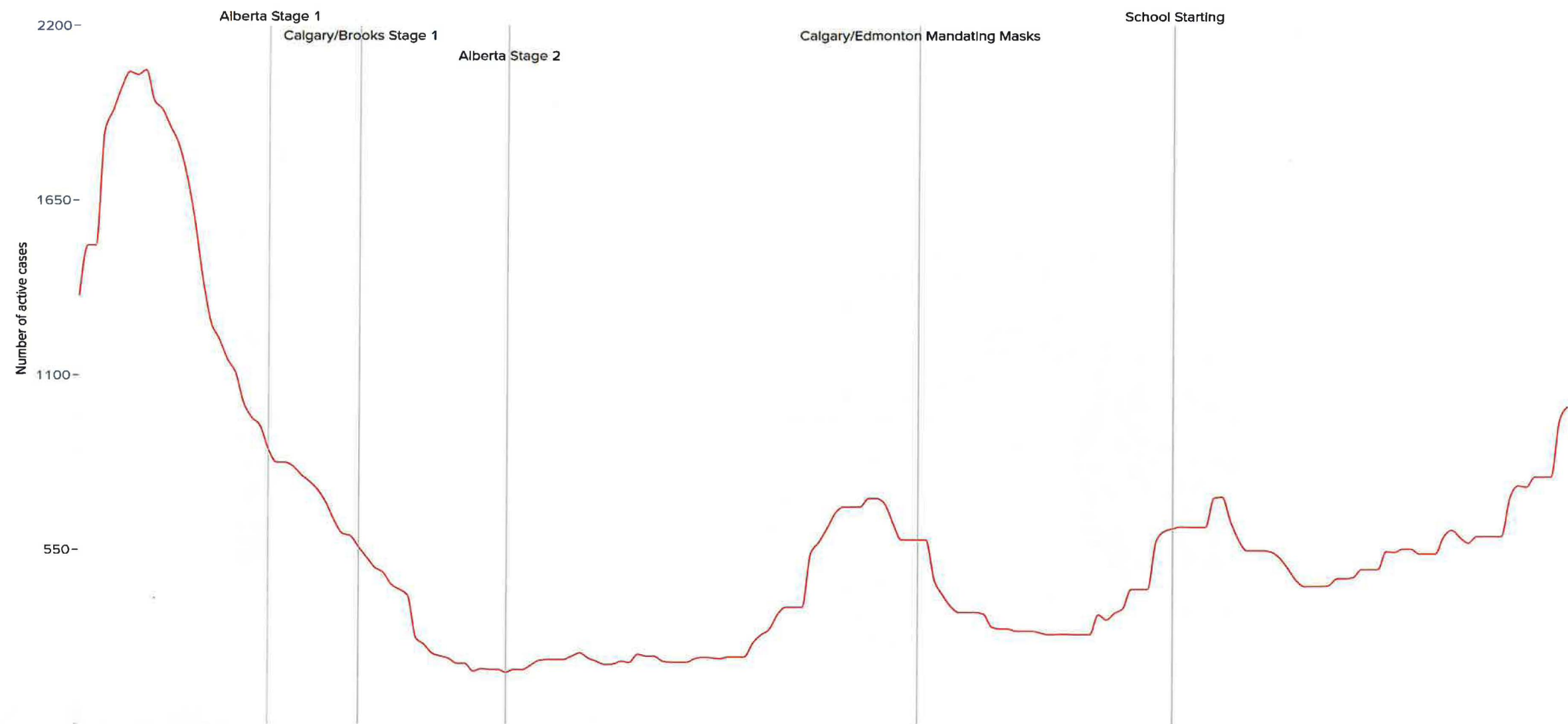


COVID-19 Update: Calgary / Alberta Active Case Comparison



Source: University of Calgary: <https://www.chi-csm.ca/>

COVID-19 Update: Calgary Active Cases

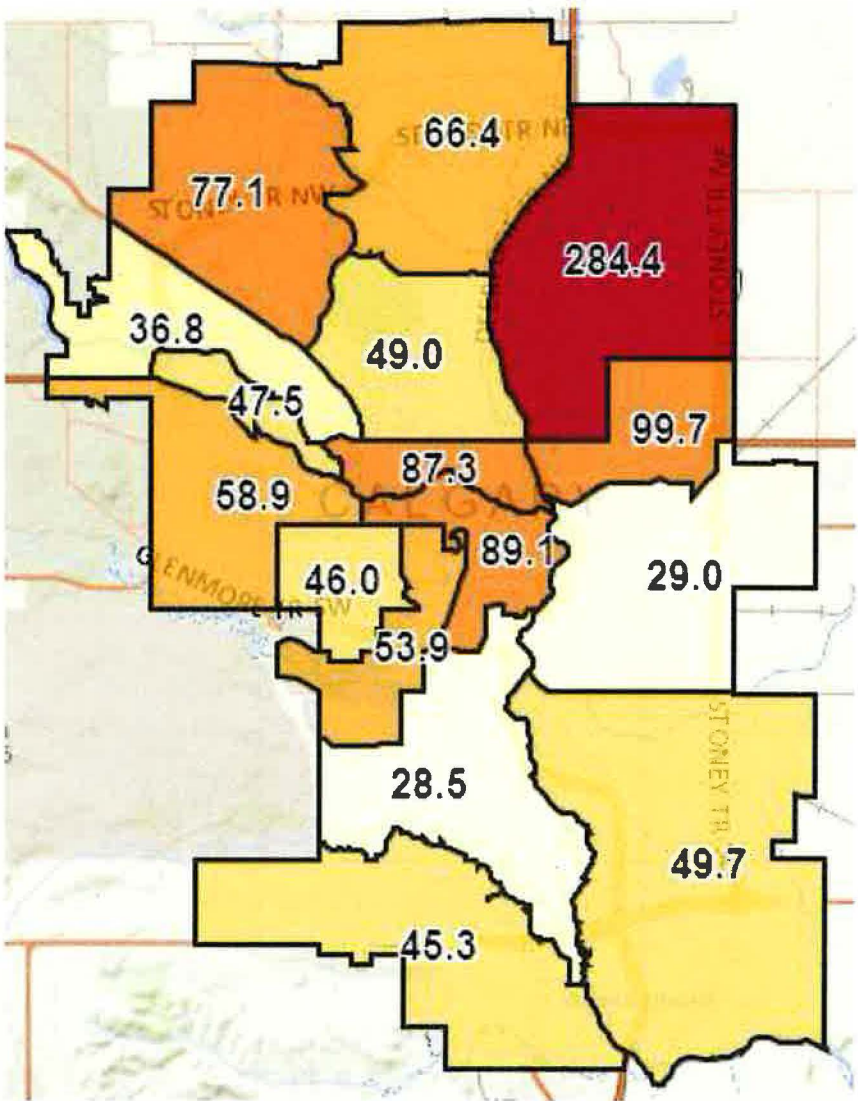
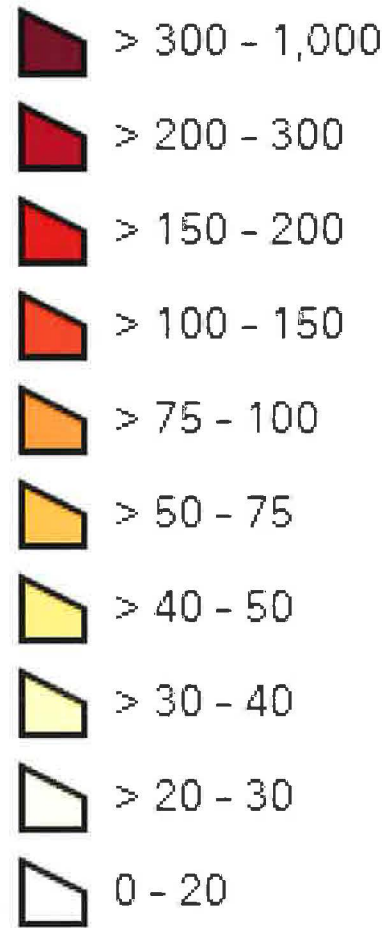


Source: University of Calgary: <https://www.chi-csm.ca/>

COVID-19 Update: Local Geographic Areas

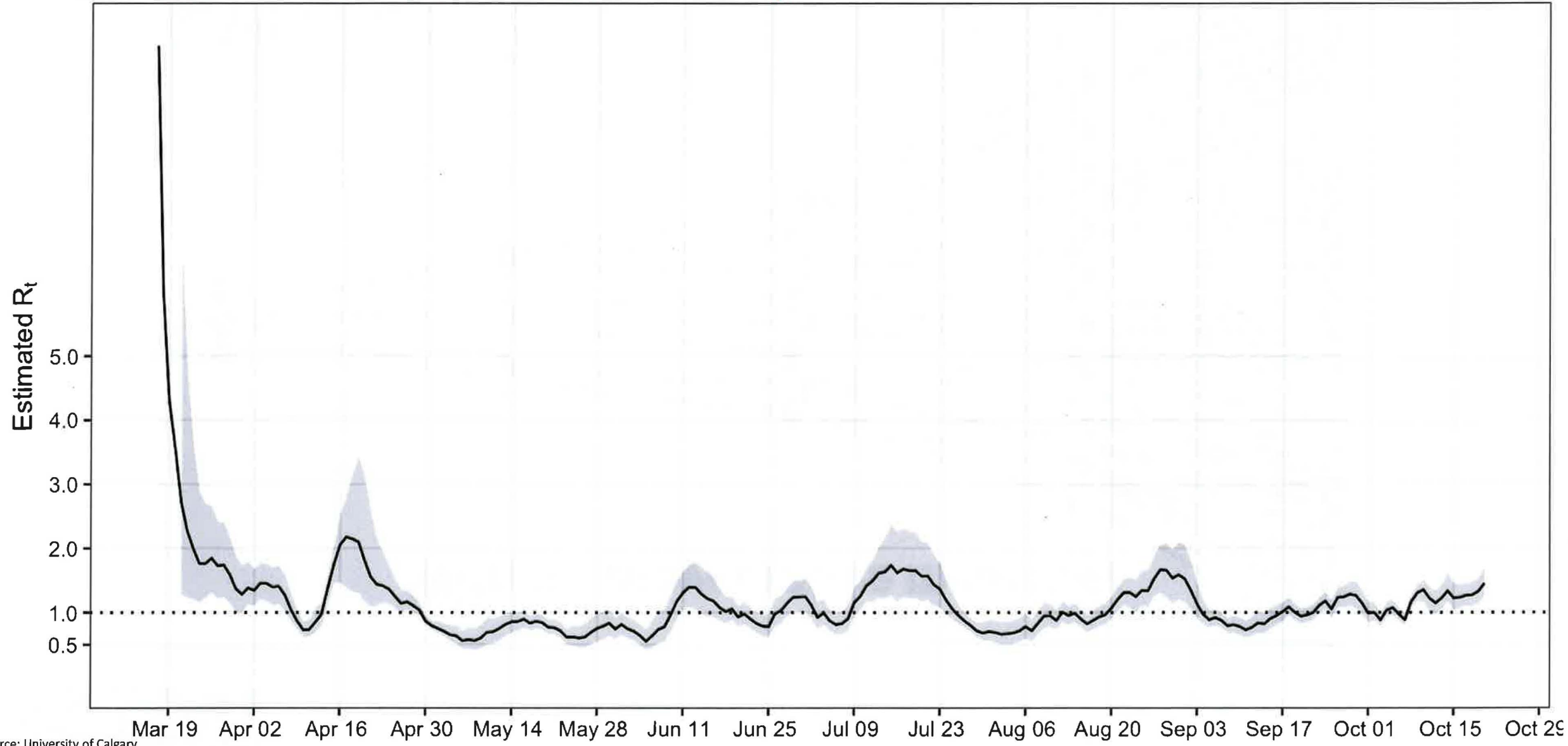
AHS Local Geographic Areas - current

Regional Indicator Value (Cases/100K)

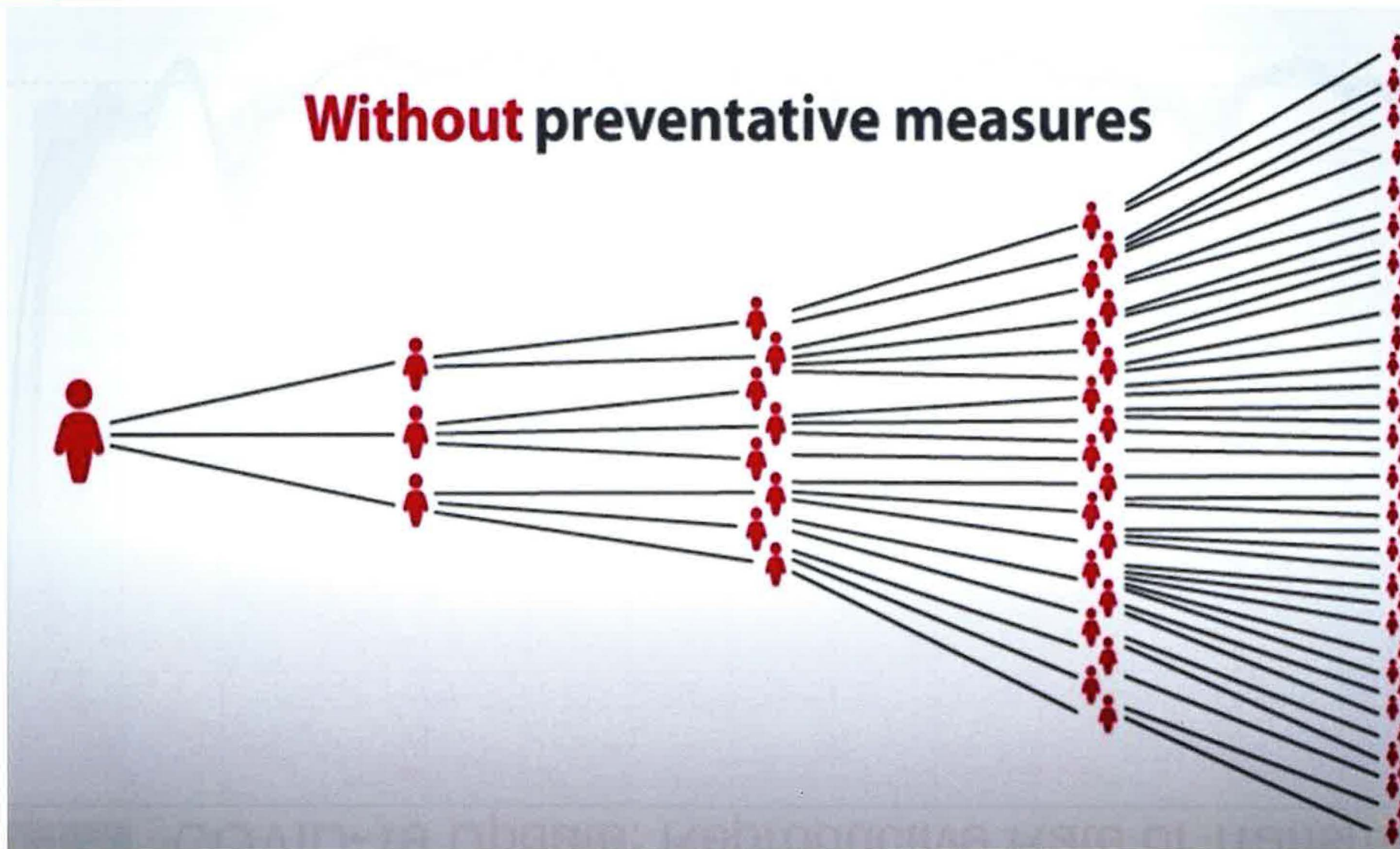


Source: City of Calgary

COVID-19 Update: Reproductive Rate of Transmission

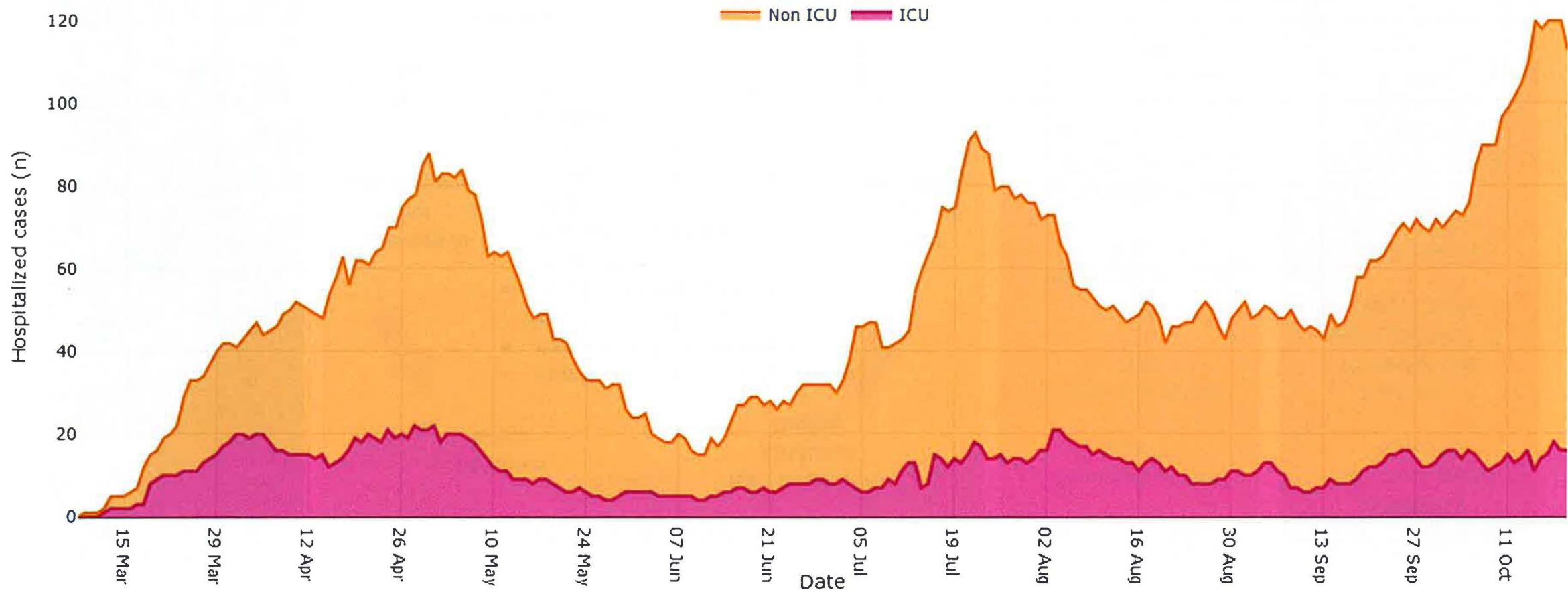


Source: University of Calgary





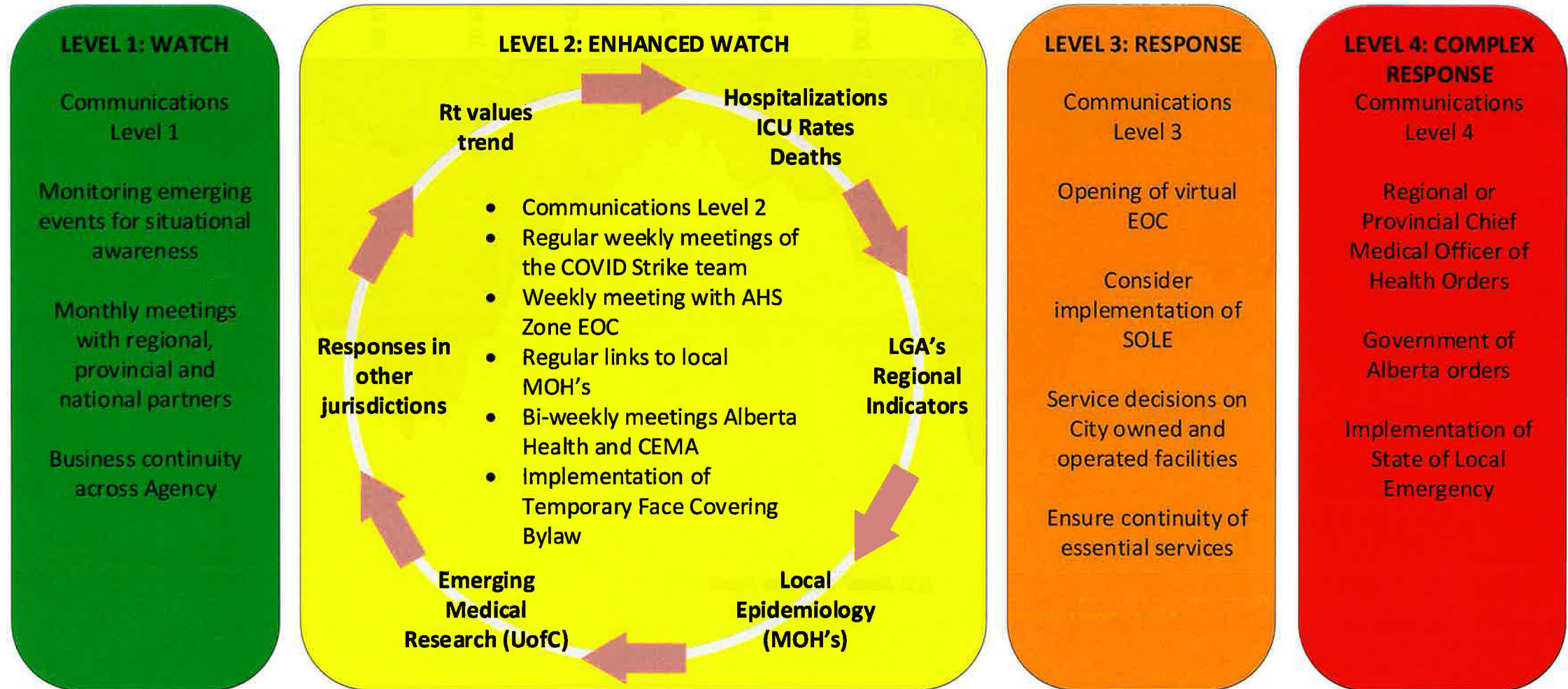
COVID-19 Update: Hospitalizations in Alberta



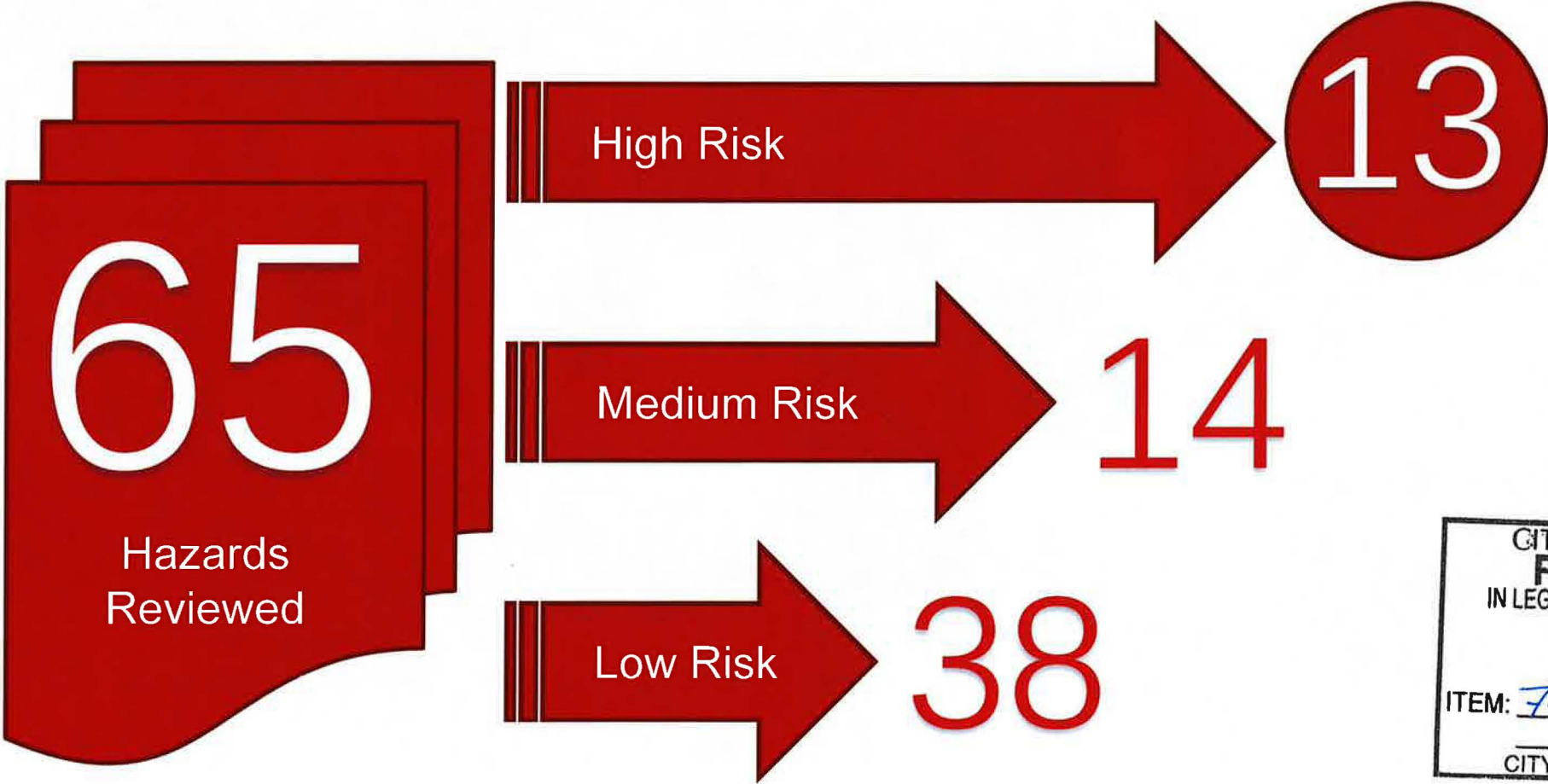
Source: Government of Alberta: <https://www.alberta.ca/stats/covid-19-alberta-statistics.htm>



COVID-19 Update: COVID-19 Response Plan



2018 Disaster Risk Assessment (DRA)





Calgary Emergency Management Agency **Collaboration & Coordination**

