MAY 15 2025 I DENVER
RESILIENCE SUMMIT

BUILT TO LAST

Lessons in Designing and Funding Climate Resilient Buildings from the Canadian Health System

LEARNING OBJECTIVES

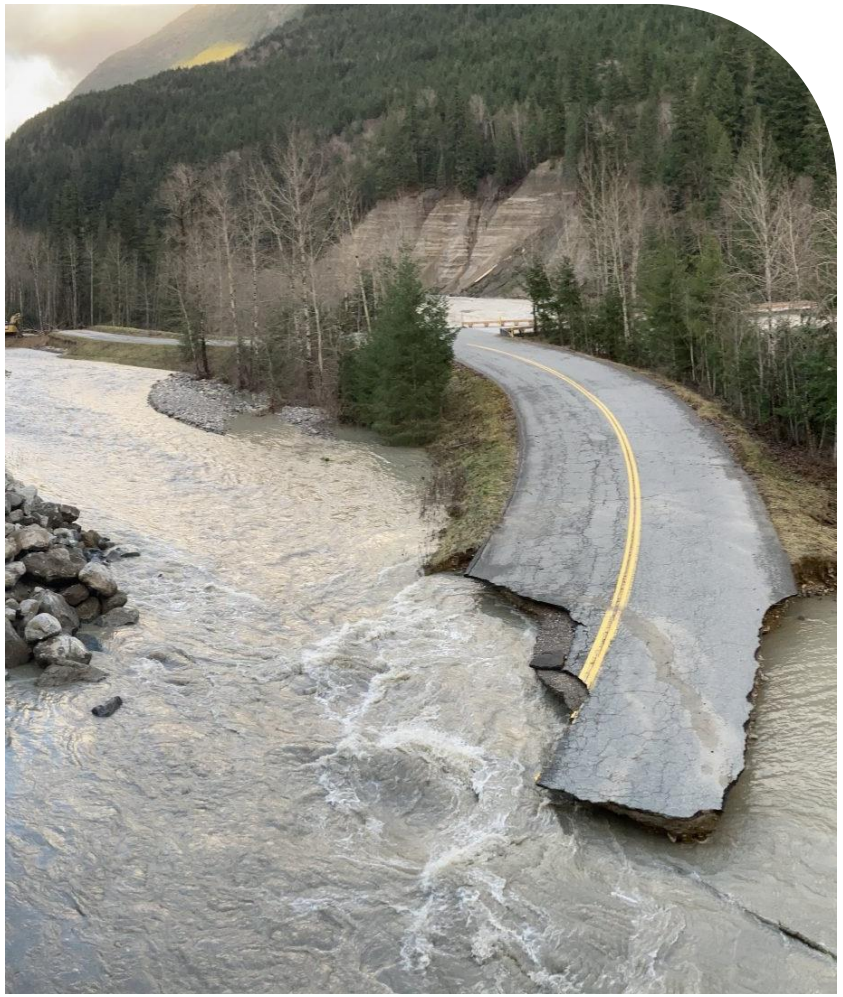
1. Enhance portfolio-scale planning, retrofits, and design and by proactively developing tools and integrating resilience into the building lifecycle.

2. Access capital for resilience strategies by highlighting their multiple benefits in achieving organizational goals.

3. Apply a similar approach to portfolio-scale planning in the US and in other sectors outside of healthcare.

BACKGROUND & CONTEXT

CLIMATE CONTEXT SETTING (BC, CANADA)



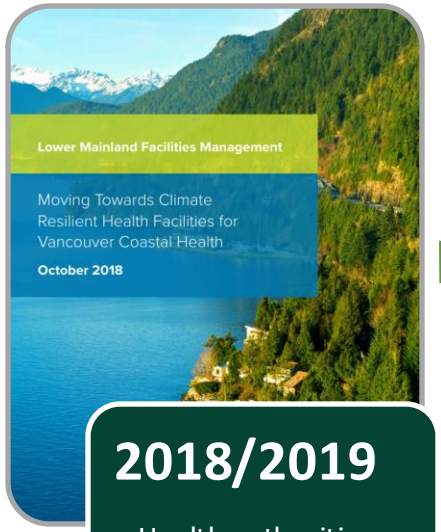
CLIMATE CHANGE & THE HEALTH SYSTEM

Source: Vancouver Coastal Health

BACKGROUND ON BC HEALTH AUTHORITIES

- 5 regional health authorities in BC
- Public Sector Organizations
- Major portfolio owner:
  - 104 hospitals
  - 296 long-term care facilities
  - 55,010 beds
  - + leased and other facilities

RESILIENCE TOOLKIT FOUNDATION

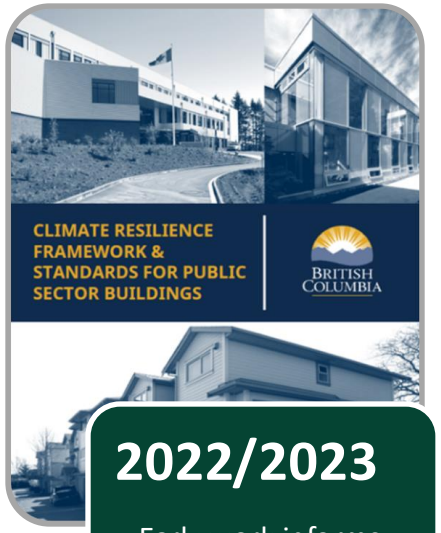


2018/2019

- Health authorities (e.g., VCH above) began establishing resilience goals for health facilities

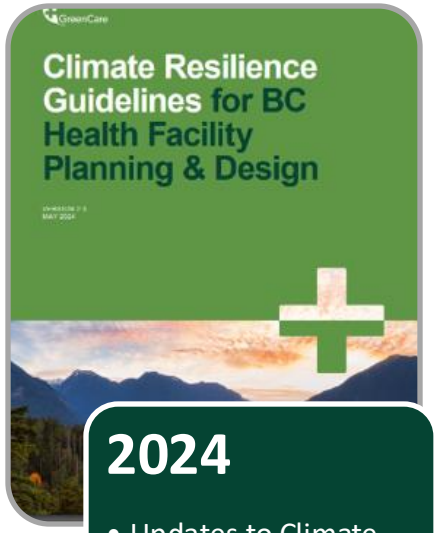
2020/2021

- Partnered to develop the Climate Resilience Guidelines for BC Health Facilities (v1.1)



2022/2023

- Early work informs Provincial Climate Resilience Framework & Standards for PSOs



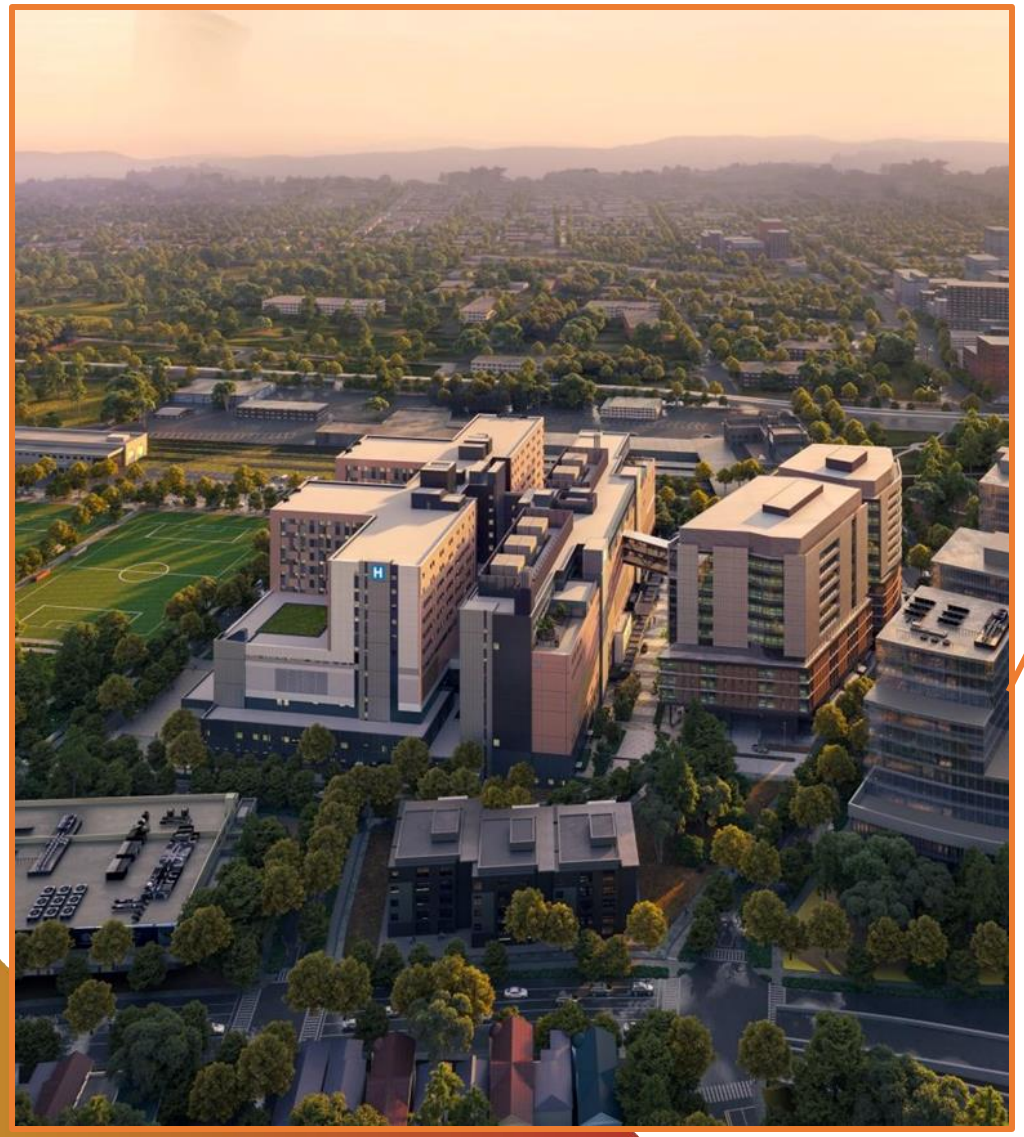
2024

- Updates to Climate Resilience Guidelines for BC Health Facilities (v2.0)

2025

- Climate Resilience Toolkit (Exposure Screen, Existing Buildings Survey & Pilots, Design Report Card)

EMBEDDING RESILIENCE IN BUILT SYSTEMS



Craig Dedels,
Regional Manager, Climate Risk & Resilience

DEVELOPING THE CLIMATE RESILIENT HEALTH FACILITY TOOLKIT

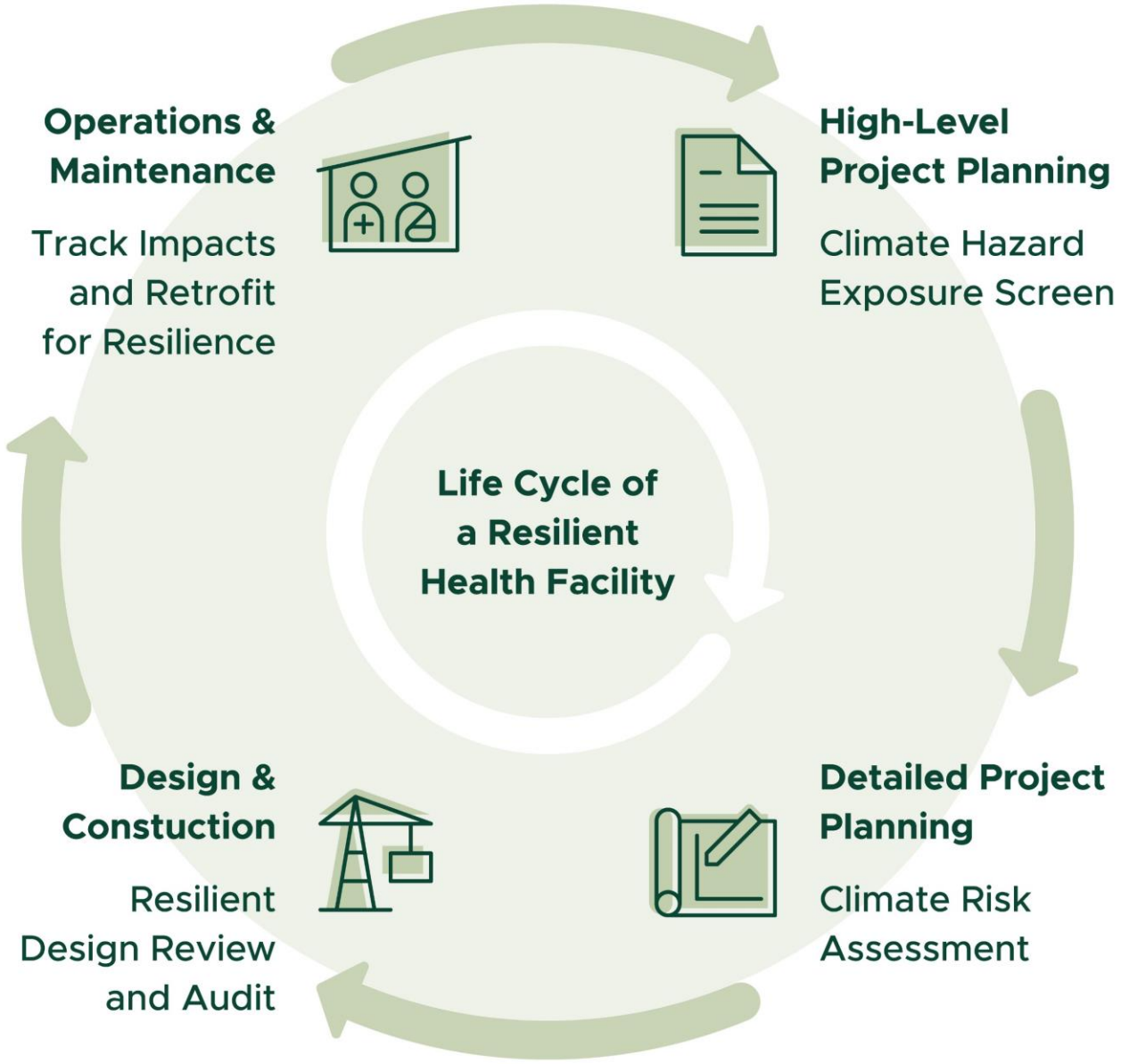
ESTABLISHING THE NEED FOR TOOLS

Developing a climate resilience toolkit to address key challenges:

- Inconsistency in climate data collection & reporting
- No standard framework for assessing buildings
- Resilience measures often get value-engineered out of design

ESTABLISHING THE NEED FOR TOOLS

Considering the life cycle of a resilient health facility:



ENHANCING DATA CONSISTENCY

Portfolio-level climate hazard exposure screen:

Hazard Group	Parameter	Hazard	Event or Trend	Hazard Relevance Screening
Meteorological	Temperature	Gradual Increase in Temperature	Trend	Yes
		Extreme Heat	Event	Yes
		Extreme Cold	Event	Yes
		Thawing Permafrost	Trend	No
		Freeze-Thaw Cycles	Event	Yes
		Ground Level Ozone	Event	Yes
	Precipitation	Gradual Increase in Precipitation	Trend	Yes
		Rainstorm	Event	Yes
		Snowstorm	Event	Yes
	Wind	Windstorm	Event	Yes
		Tornado	Event	No
		Cyclone (Hurricane or Typhoon)	Event	No
Climatological	Water Scarcity and Drought	Short Term Water Supply Constraints and Drought	Event	Yes
		Gradual Decrease in Summer Precipitation	Trend	Yes
	Wildfire	Interface Wildfire	Event	Yes
		Wildfire Smoke	Event	Yes
Hydrological	Flooding	Pluvial (Urban Stormwater) Flooding	Event	Yes
		Fluvial (Riverine) Flooding	Event	Yes
		Gradual Sea Level Rise	Trend	No
		Coastal Flooding, including Storm Surge	Event	No
	Groundwater	Gradual Saltwater Intrusion	Trend	No

Hazard	Variable	Past (baseline) *[1971-2000]*	2050s *[2041-2070]*	2070s [PCIC variables]	2080s *[2071-2100]*	Change to Mid-term Future [Past to 2050s]	Change to Long-term Future [Past to 2080s]
Gradual Increase in Temperature	Average annual temperature (°C)	7.6	10.9	-	13.0	+3.3	+5.4
	Cooling degree days (>18°C)	151	466	-	792	+209%	+425%
	Heating degree days (<18°C)	3953	3027	-	2578	-23%	-35%
Extreme Heat	Regional heat warning temperature threshold (°C)	35				-	-
	Days > 27°C	42	81	-	106	+39	+64
	Days > 29°C	27	63	-	85	+36	+58
	Days > 30°C	21	54	-	76	+33	+55
	Days > 32°C	11	37	-	59	+26	+48
	Days with humidex > 30	15	48	-	76	+33	+61
	Hottest day (°C)	34.9	39.3	-	42.6	+4.4	+7.7
	Tropical nights (Tmin > 18°C)	1	12	-	36	+11	+35
	July wet bulb temperature 97.5% (°C)	20	22.4	23.9	24.8	+12%	+24%
	July dry bulb temperature 97.5% (°C)	33	35.7	37.7	38.7	+8%	+17%
	Mapping: relative heat exposure	Heat exposure of site is Very High relative to surroundings.				-	-

ENHANCING DATA CONSISTENCY

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Widespread coverage:

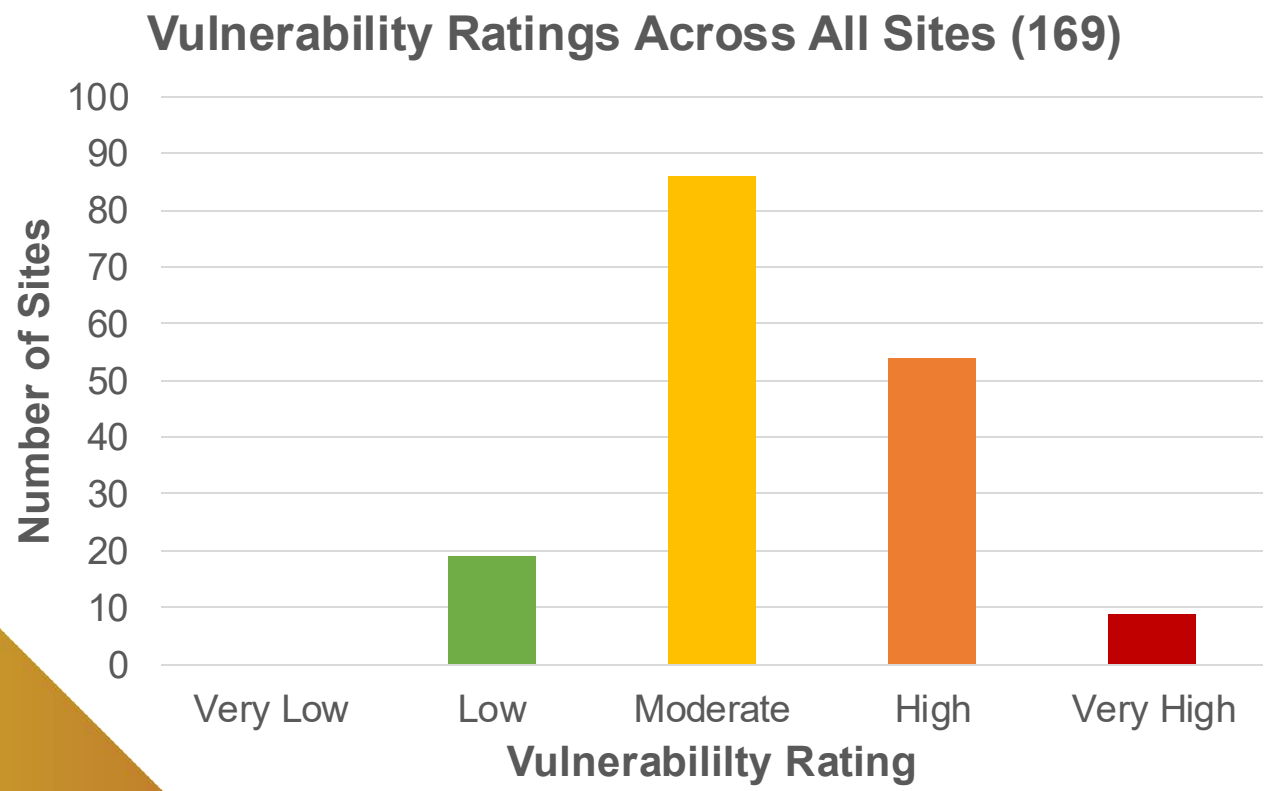
- **169** health facility sites across **5** health authorities

Hazards of Greatest Concern:

- Rising temperatures and extreme heat
- Interface wildfire and wildfire smoke
- Fluvial (riverine) flooding

ENHANCING DATA CONSISTENCY

High-Level Vulnerability Assessment:



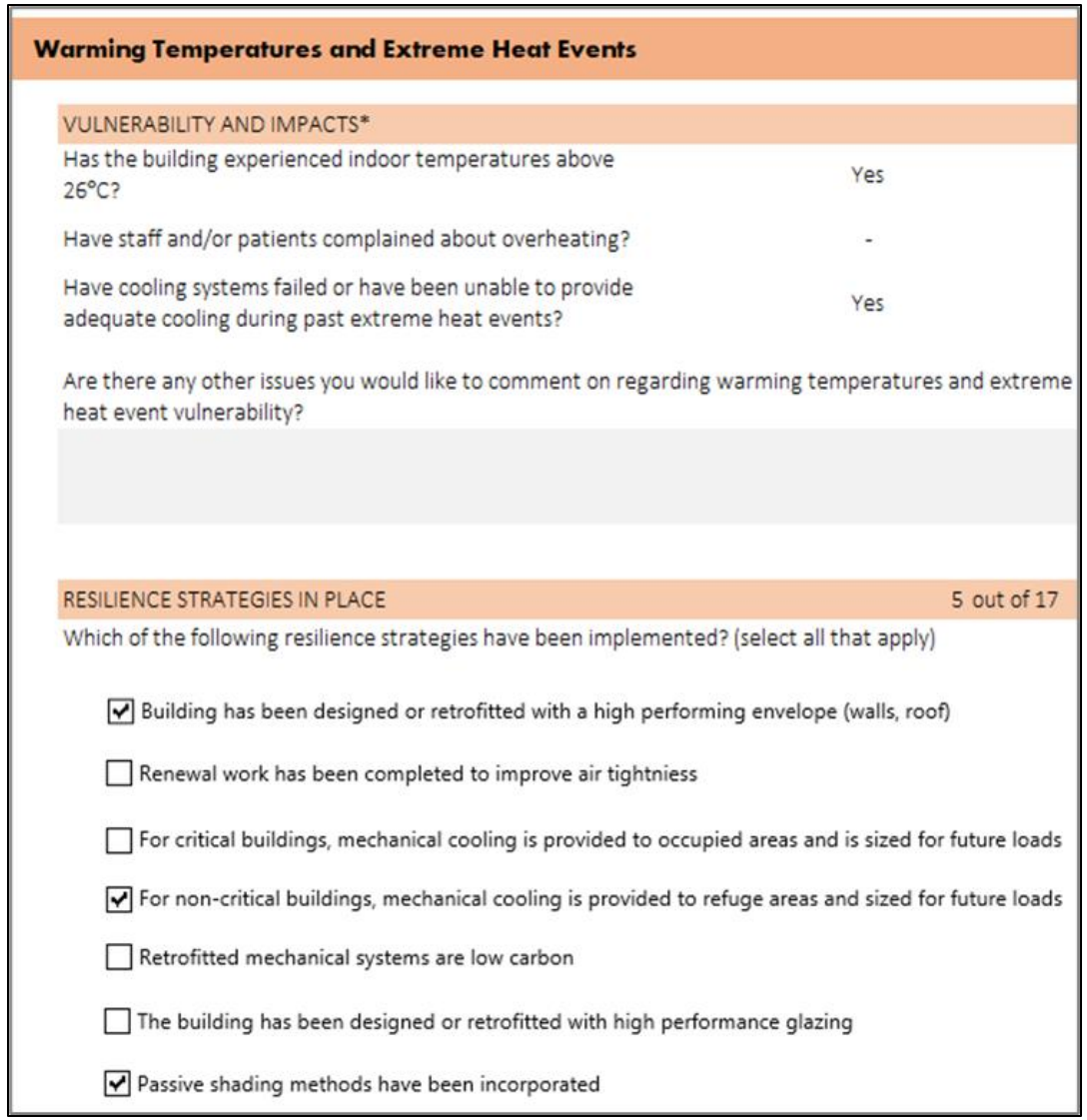
The **most vulnerable** sites tend to be:

- More remote
- Exposed to multiple hazards (especially interface wildfire and/or flooding)
- Sites that do not have hazard management plans in place

STANDARDIZING BUILDING ASSESSMENT

Existing Building Resilience Checklist:

- Complements energy audits (low carbon resilience)
- User-friendly checklist to document vulnerabilities, past impacts, and existing resilience strategies
- Auto-generated summary report highlighting key upgrade opportunities
- Easy completion through collaboration with site staff – building capacity and supporting knowledge transfer



Warming Temperatures and Extreme Heat Events

VULNERABILITY AND IMPACTS*

Has the building experienced indoor temperatures above 26°C?	Yes
Have staff and/or patients complained about overheating?	-
Have cooling systems failed or have been unable to provide adequate cooling during past extreme heat events?	Yes

Are there any other issues you would like to comment on regarding warming temperatures and extreme heat event vulnerability?

RESILIENCE STRATEGIES IN PLACE 5 out of 17

Which of the following resilience strategies have been implemented? (select all that apply)

- [x] Building has been designed or retrofitted with a high performing envelope (walls, roof)
- [ ] Renewal work has been completed to improve air tightniess
- [ ] For critical buildings, mechanical cooling is provided to occupied areas and is sized for future loads
- [x] For non-critical buildings, mechanical cooling is provided to refuge areas and sized for future loads
- [ ] Retrofitted mechanical systems are low carbon
- [ ] The building has been designed or retrofitted with high performance glazing
- [x] Passive shading methods have been incorporated

INTEGRATING WITH DESIGN

Resilient Design Report Card:

- Scalable across building, stie, or portfolio levels
- Recommendations sourced from PSO Framework & Standards for existing buildings
- Allows for integration of resilience upgrades into renewal plans, spreading out costs and optimizing resources
- Supports proactive maintenance, capital planning, and emergency management

Test Building Name Resiliency Audit Report

Project overview

Project name:
Test Existing Facility

Building Owner:
Vancouver Coastal Health

Evaluation Date:
2024-01-01

Results

Categories	Sub Category	Hazard Relevnace	80% DD Stage: % CRFS Under Design Team Consideration	% CRFS In Progress	% CRFS Meets Requirements - For Owner	% CRFS Meets Requirement - Closed
Warming Climate and Extreme Heat Events	-	Relevant	29%	71%	0%	0%
Flooding	Fluvial	Not Relevant	N/A	N/A	N/A	N/A
-	Pluvial	Relevant	45%	9%	9%	27%
Wildfires	Interface	Not Relevant	14%	N/A	N/A	N/A
-	Smoke	Relevant	0%	33%	67%	0%
Strong Wind Events	-	Relevant	0%	67%	17%	17%
Drought and Water Restrictions	-	Relevant	0%	33%	67%	0%
Cold Snaps, Extreme Snowfall Events, and Ice Storms	-	Relevant	17%	33%	17%	33%
Power Outages	-	Relevant	0%	25%	13%	63%

QUESTION

Do you use any tools for tracking climate resilience or adaptation planning for your buildings?

IMPLEMENTATION

PROJECT EXAMPLES

New St. Paul's Hospital & Health Campus – Vancouver, BC

- Opening in 2027, this 11-story, 548-bed facility is the largest hospital redevelopment project ever in BC
- Collaborative process featured many wins for resilient planning and design:
  - Post-disaster facility able to serve community for 72 hours off the power grid
  - Designed to withstand earthquakes, rising temperatures, and expected sea level rise
  - Built to LEED Gold, including improved energy efficiency, heat recovery, and rainwater management

PROJECT EXAMPLES

Sechelt Hospital – Sechelt, BC

- 67-bed hospital serving 33,000 people in surrounding small communities
- Climate vulnerability assessment during Master Planning identified Wildfire, Smoke, Flooding, Drought & Power Outage as highest climate vulnerabilities (mostly in older wings)
- “Low-carbon Resilience” approach:
- Design HVAC for 2050s, with space for 2080s
    - Design HVAC for 2050s, with space for 2080s expansion if needed
    - Consider 100% recirculation of indoor air when smokey
    - Design flexible spaces for health service demand surge

CO-BENEFITS FOR CASH

Lessons for climate resilient health facilities:

- **Rising Priority:** Climate resilience is no longer optional; it's becoming a core business priority as need increases and commitments grow
- **Integrate Early:** Start resilience planning from the outset, dedicating time and resources early in the process to ensure effective integration into design
- **Use Existing Resources:** Leverage established tools and frameworks to save time, reduce costs, and build on proven practices
- **Allow for Flexibility:** Create space for industry expertise, new ideas and customization to fit project needs
- **Maximize Co-Benefits:** Recognize the broader impact—many resilience measures align with other health system goals, creating opportunities for added value

WEIGHING COSTS & BENEFITS

- **The Cost of Doing Nothing:** Delaying adaptation increases risks, with rising insurance premiums and higher repair costs due to intensifying climate hazards
- **High ROI of Adaptation:** For every $1 invested in climate adaptation, up to $13 can be saved in future recovery costs (Climate Institute of Canada)
- **Incremental Capital Costs:** Modelled integration of resilience measures in hospitals shows minimal ICCs (1-4%) (BC Climate Action Secretariat)
- **Operational and Financial Benefits:** Proactive measures, like flood barriers and mechanical cooling, reduce hospital disruptions and repair costs while enhancing patient care

MONEY

Property insurance crisis disrupting Florida real estate market as buyers struggle to get policies

JUNE 16, 2023

Tarik Minor, Anchor, I-TEAM reporter

Published: June 16, 2023 at 3:59 PM
Updated: June 16, 2023 at 7:58 PM

Tags: Money, Florida, Property Insurance

California insurance market rattled by withdrawal of major companies

JUNE 5, 2023

Two insurance industry giants have stepped back from the California marketplace

By MICHAEL R. BLOOD Associated Press
June 5, 2023, 6:58 PM

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SEVERE WEATHER There are currently 2 active weather alerts 1 / 2

MAY 31, 2023

RECOMMENDED

This umbrella with a built-in misting fan is a summertime game-changer

Southeast Louisiana bracing for hurricane season as insurance crisis continues

Jim Donelon says more than 100,000 people are covered by Louisiana's insurer of last resort.

QUESTION

Which costs more?

1) Building better first
2) Retrofitting facilities to adapt to future climate conditions
3) Repairing after the fact

PORTFOLIO PLANNING BEYOND HEALTHCARE

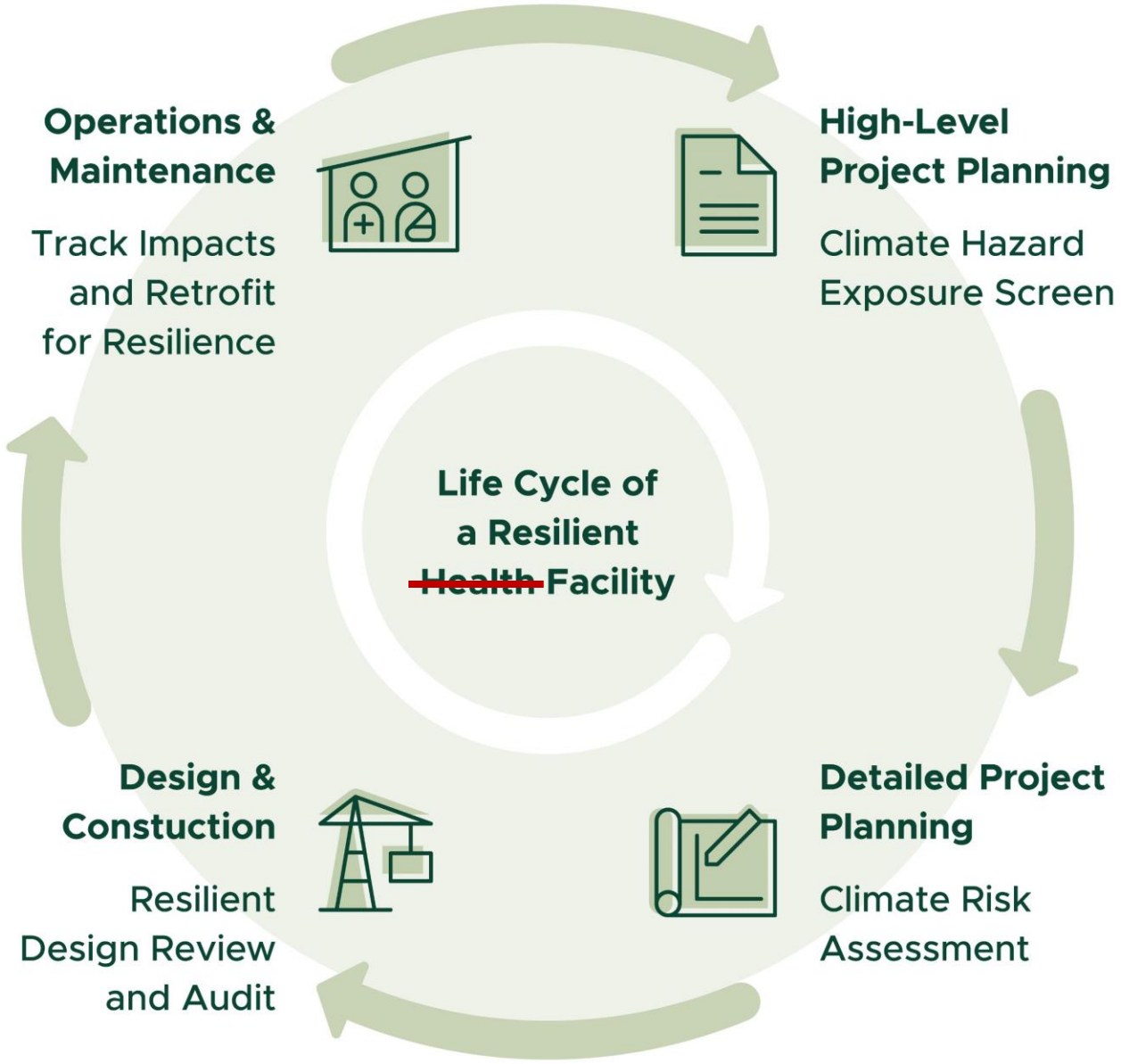
LEARNING FROM THE CAN. HEALTH SYSTEM

The same challenges apply across sectors:

- Inconsistency in climate data collection & reporting
- No standard framework for assessing buildings
- Resilience measures often get value-engineered out of design

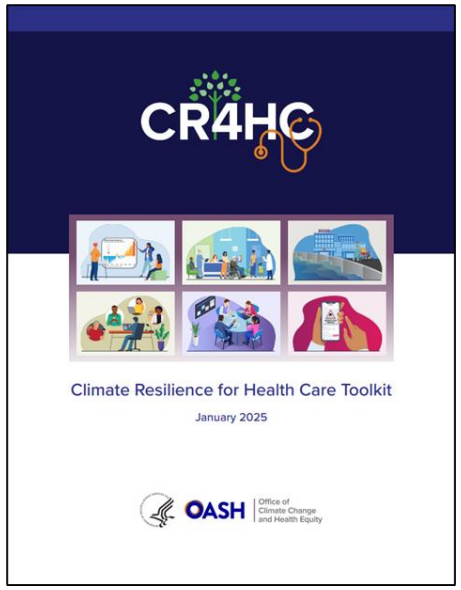
LEARNING FROM THE CAN. HEALTH SYSTEM

Similar strategies can be applied to other portfolios:

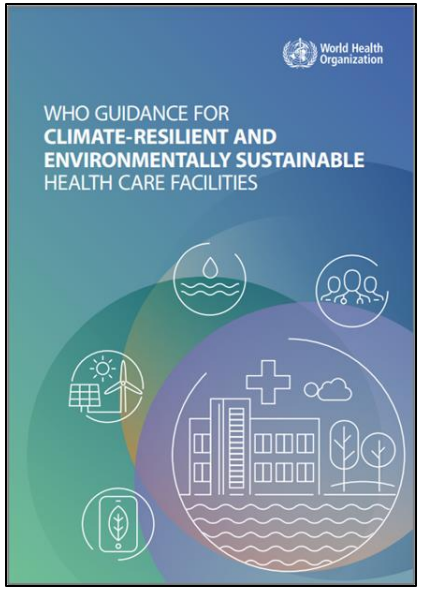


KEY EXISTING TOOLS & RESOURCES

Helping portfolio owners get started:

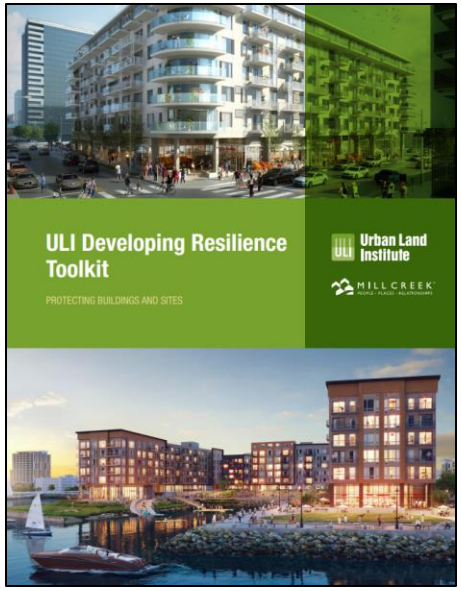


OASH Climate Resilience for Health Care Toolkit

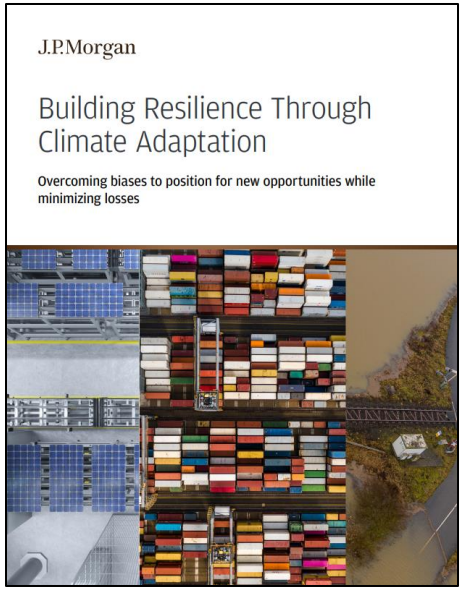


WHO Guidance for Climate-Resilient & Environmentally Sustainable Health Care Facilities

U.S. Climate Resilience Toolkit



ULI Developing Resilience Toolkit



J.P.Morgan Building Resilience Through Climate Adaptation

Q&A

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THANK YOU!

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Introba

SHARE & WIN

Share your feedback on today's event and be entered to win a complimentary registration to the 2026 Resilience Summit!