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# Stress-Testing Canada's Health System for Large-Scale Combat Operations (LSCO)

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# Presentation Overview — 40 Minutes

- Introduction: Canada's preparedness gap and the geopolitical context
- Why the CAF LSCO casualty challenge requires a unique approach to health system planning
- Methodology: Why simulation and wargaming?
- Exercise Trillium Cura (2024): Ontario's starting point
- Exercise Canada Paratus (2025): Scaling to the national level
- Key findings and pan-Canadian recommendations
- The path forward: What must happen now



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SECTION 1

# The Geopolitical moment demands we act



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- Global uncertainty- economic/conflict
- National threat assessments by NATO nations sound alarms for war- e.g. France, UK, Germany
- Uncertainty over US commitment
- LSCO in a new era of drone warfare and battlefield care:
  - Mass casualty not counterinsurgency conflict
  - New mechanism of injuries
  - The “golden hour” for medical evacuation is no longer viable
- Canadian health system preparedness for high casualty volume is low
  - Canada had 13,000 military hospital beds in WW2 – currently none, none planned
  - Strained Canadian health system in: HHR, financial, supply chains

***“The strong do what they can and the weak suffer what they must” Thucydides***

# A Mixed System Carrying a Growing Military Load

- Canada — like most NATO and Five Eyes nations — operates a mixed civilian-military health care system
- Glassco Commission (1960s) implementation,
  - Canada no longer has dedicated military in-patient hospital or rehabilitation beds
  - CAF relies on civilian specialist and hospital care
- Reservists rely largely on civilian systems — at a time when Canada is planning a significant expansion of the Reserves
- Over 400,000 CAF Veterans rely almost entirely on civilian provincial health care systems
- Wartime injuries often result in a lifelong need for war-service-related care and rehabilitation

# Lessons from Conflict — and a Troubling Situation

- **Afghanistan: 158** Canadians killed, **~2,000** wounded, **44,000** CAF members served over a **~10** year period— CAF health system relied on local relationships because no formal system existed.
- **Today's scenario is fundamentally different:** conventional ground war and drone technologies produces far higher rates of death and injury.
- **Russia–Ukraine** conflict demonstrates the brutality and casualty volumes (including civilians) of 21st-century warfare.
- **Canada has navigated past crises with uneven results:** lesson from SARS (2003) and COVID-19 (2020) – incomplete follow-through and a lack of ongoing preparedness efforts (atrophy)
- CAF currently has **~2,200** personnel in Latvia — vulnerability is real and immediate; and Canada may accept patients from allied nations

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*Lack of health system resilience is the Achilles heel of NATO.*

— Dr. Margaret Bourdeaux, Harvard Working Group on Threats to Health Systems



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## Injury Patterns

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- Devastating blast injuries and polytrauma
- Severe and complex burns requiring specialized care
- Profound mental health impacts at scale
- Chemical, biological, radiological, nuclear (CBRN) casualties
- Multi-drug-resistant infections
- Captured persons requiring care under legal obligations

## Concurrent Pressures

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- Ordinary civilian health care demand continues uninterrupted
- Climate-related events: heat domes, wildfires, floods, pandemics
- Large scale mobilization could significantly affect the civilian health workforce (e.g. WW2)
- Cyber-attacks on health IT and surveillance systems
- Economic and financing pressures under wartime conditions
- Combined load could rapidly exceed COVID-19 pressures
- Supply chain disruption/ challenges

# Four Framing Thoughts

1

Canada must join NATO nations preparing for LSCO — involving considerable casualty volumes

2

Civilian-military health cooperation will be essential for success

3

Health systems must be treated as a joint military-civilian national security asset

4

Strengthening integration should be viewed through an 'all-hazards threat' lens

- **Nov 6-8 2024: 'Exercise Trillium Cura' (ETC)**— Ontario-wide simulation testing health system response to sustained military casualties from a European conflict-presented to CIDP one year ago
- **Sept 10-12 2025: 'Exercise Canada Paratus'(ECP)** — the direct answer to ETC participants' call to scale to a Pan-Canadian level
- **Both exercises designed to stress-test health care systems under Large-Scale Combat Operations (LSCO) in Europe:**
  - Military context provided a jurisdictional neutral challenge that could be applied as all-hazards
  - Identify critical gaps in system capacity and governance
  - Improve crisis response planning and inter-agency relationships
  - Maintain civilian access to care while managing repatriated casualties
- **Serious subject matter** — many Canadians including the health care community are becoming increasingly aware of the heightened global threat posture , geopolitical instability, and therefore the need to domestically prepare for long-term conventional war engagement. We see this in heightened defense spending and recruitment priorities

- Health system financing under wartime economic conditions?
- Is health care leadership and governance designed to manage sustained emergencies across jurisdictions?
- Are health information systems vulnerable to enemy sponsored cyber attacks- administrative IT, disease surveillance, patient records, connectivity between civilian and military patient information systems (new CMAJ paper – on state of national patient record systems)
- Would the workforce be able to serve both civilian and military needs simultaneously?
- Is the system prepared to treat the diversity of injuries expected in modern conflict — burns, blast trauma, and CBRN - Chemical, Biological, Radiological and Nuclear casualties?

SECTION 2

# Methodology

Why simulation and wargaming?



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# Why Wargaming and Tabletop Simulation?

- Game theory enables discovery of problems that would otherwise remain unrealized until a real crisis occurs
- Tabletop simulations allow participants to test decision-making under stress without real-world consequences
- Wargaming reveals critical gaps
- Exercises build the human relationships
- Pre- and post-exercise surveys provide measurable outcomes
- Both exercises used structured wargame techniques
- NATO and allied nations use similar methods



# Canada's Strategic Evacuation Plan (STRATEVAC)



SECTION 3

# Exercise Trillium Cura (2024)

Ontario's starting point — getting the foundation right



# Exercise Trillium Cura: Design and Scope

- Two-day tabletop simulation conducted in 2024 through civilian-military collaboration
- Partners: academic, healthcare, public health, public service, and Canadian Armed Forces
- Tested how Ontario's health system would manage sustained inflow of military casualties from prolonged European conflict — while maintaining civilian care
- **45** participants + **27** observers using wargame techniques
- Simulated an average of **45** casualties per week flowing into the Ontario health system
- **Six** months in the making — deliberately scoped to one province to allow specific, actionable findings without federal-provincial jurisdictional friction
- Deliberately avoided jurisdictional debates to focus on operational health system challenges
- [Exercise Trillium Cura Report](#)

## Governance & Operations

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- Unclear decision-making roles and communication structures
- Consideration for dedicated repatriation and triage hub(s)
- Pan-Canadian national repatriation hub concept emerged
- Trauma registry required with due diligence on legal/ethical information-sharing
- Opportunities for AI-enhanced triage and service delivery support

## Capacity & Resources

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- Burn care bed capacity and access to artificial skin severely limited
- Surge capacity for blood products inadequate
- Significant strain on human health resources including mental health
- Supply chain vulnerabilities across multiple domains
- Information management and technology challenges
- COVID-19 preparedness alone is insufficient for sustained conflict-related mass casualty events

- Major conclusion: COVID-19 response framework is insufficient — this different challenge has unique demands to be met.
- Significant unresolved governance and supply chain issues identified as a critical systemic problems
- Immediate relationship benefits: senior health leaders and clinicians formed critical new connections
- Improved shared understanding of civilian-military requirements and capabilities
- Pre- and post-exercise surveys showed marked improvements in participants' perceptions of preparedness
- Participants viewed the simulation as high value and overwhelmingly called for it to be repeated and expanded

## **Some Successes:**

- Resulted in a clear focus on Cdn Blood Services requirements (e.g. skin graft resourcing, blood donor systems, freeze-dried plasma)

**Key recommendation: scale to a Pan-Canadian level — directly leading to Exercise Canada Paratus**

SECTION 4

# Exercise Canada Paratus (2025)

Scaling the challenge to a national level



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# Exercise Canada Paratus: Design and Scope

- Landmark three-day, strategy-level tabletop exercise held September 2025 at Unity Health, Toronto
- **79** participants and observers from every province and territory
- Participants: academia, federal and provincial health systems, public sector agencies, private industry, and CAF
- Simulated casualty load doubled from ETC: **100** casualties per week, reflecting more demanding LSCO scenario
- Added new dimensions ETC could not address: captured persons, strategic airlift and sealift, national-scale civilian-military policy tensions, long-term rehab/MH considerations
- [Exercise Canada Paratus Post-Exercise Report - Dalla Lana School of Public Health](#)

# New Dimensions in Exercise Canada Paratus

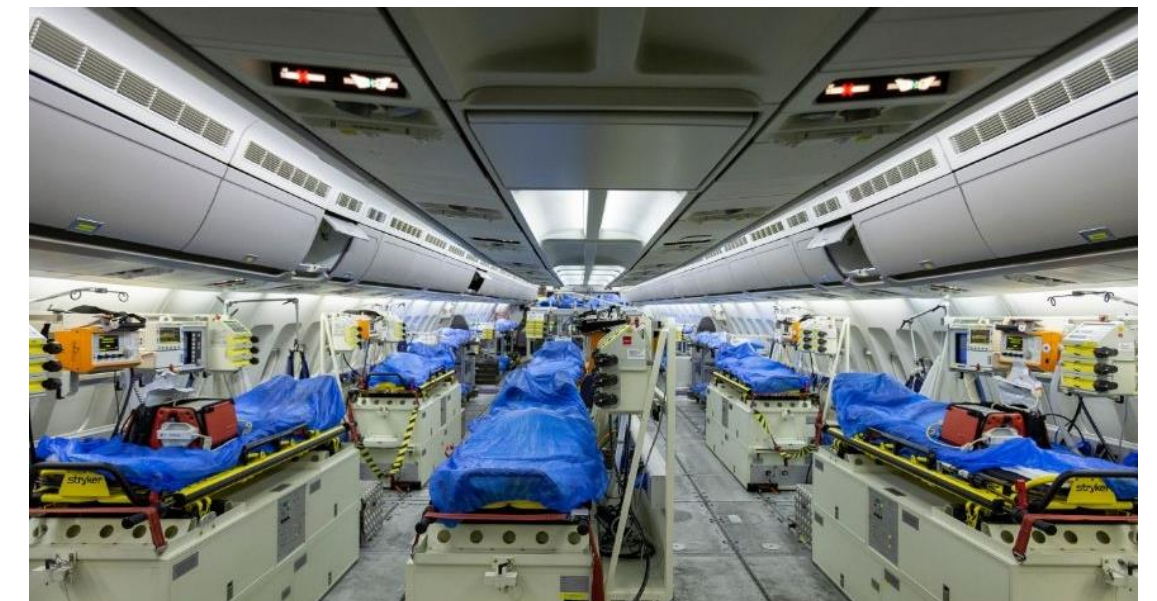
- Exercise Canada Paratus added more complexity to simulation compared to Exercise Trillium Cura
- Canadian environmental disaster scenarios: concurrent climate events alongside conflict casualties
- Cyberattack scenarios targeting health IT infrastructure and disease surveillance
- Multi-drug-resistant infection outbreaks within the casualty population
- Care of captured persons — legal and ethical obligations under international humanitarian law
- Strategic airlift and sealift planning for mass casualty repatriation
- Management of civilian-military policy and cultural tensions at national scale



Photo: Captain Jonathan Farlam, Canadian Armed Forces | Combat Camera



Cybersecurity | Freepik.com



German Air Force MedEvac | News18.com

# Key Finding: The Governance Gap

- **Lack of a pan-Canadian governance structure for managing a sustained mass casualty crisis**
- **Top recommendation:** creation of an FPT Health Emergency and Security Table with:
  - Clearly identified lead agency with defined roles and authorities
  - Explicit trigger points for activation
  - Peacetime mandate for planning and rehearsal
  - Importance of clear and consistent communications
- Leadership and governance ambiguity creates vulnerability in all areas

## From ETC Gaps to ECP Recommendations

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- Trauma registry → interoperable patient tracking linked to NATO and US registries, standardized data sets, full EMR/EHR integration
- Burn care gaps → domestic skin tissue procurement, potential modification of donor cards
- Blood supply concerns → fully domestic collection, processing, and logistics solutions
- AI-enhanced triage → detailed implementation pathways with named agencies

## Mental Health at Scale

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- Mental health and addictions care identified as a major system challenge
- Requires trauma-informed, military-competent supports
- Centres of excellence and dedicated protocols needed for health care workers themselves
- Public mental health risks from prolonged conflict and visible casualty repatriation
- Pre-conflict communications strategies required to maintain public trust and social cohesion
- Requires dedicated TTX/War game to explore

# Advancing the Relationship-Building Mission

- Like ETC, ECP produced measurable improvements in participants' understanding of their own roles and those of partner organizations and demonstrated that the relationships built in simulation are themselves a preparedness outcome
- We demonstrated how civ-mil health systems are a significant aspect of defence and security
- Civilian-military policy and cultural tensions surfaced: differing discharge criteria, divergent command cultures — require deliberate relationship-building and standardized frameworks
- There is value in the use of a “layered” series of TTXs with a focus on specific areas- e.g. MH, supply chain, rehab etc.
- Developing a culture of war-gaming/TTX as normal organizational functions

SECTION 5

# The Path Forward

The time to act is now



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# Recommendations: What Needs to Happen Now

- Establish an FPT Health Emergency and Security Table with a peacetime planning mandate and defined lead agency
- Initiate conversations around financial frameworks to sustain cross-jurisdictional health needs
- Develop interoperable pan-Canadian patient tracking systems linked to NATO and US registries
- Continue to build domestic burn care and skin tissue procurement capacity, including donor card modifications
- Create fully domestic blood collection, processing, and logistics solutions for surge scenarios
- Design and implement pre-conflict public communications strategies to maintain social cohesion
- Conduct annual and ongoing TTX's exercises across levels (F/P?, local, regional etc) modeled on learnings from ETC and ECP to identify opportunity to build resilience models and stress tests governance – prevent atrophy
- Develop additional TTX arms for the non-acute parts of the health system e.g. rehabilitation, home care, mental health and addictions, social supports (i.e. families and caregivers), etc.

# The Strategic Imperative

## **National Security**

Health systems are a joint military-civilian national security asset — they must be treated as such in defence policy-supply chains, governance and public health measures.

## **All-Hazards**

Civilian-military health integration strengthens the system against war, pandemics, climate events, and cyberattacks simultaneously

## **NATO Obligation**

Canada's allies are already planning for LSCO health system resilience — we must be at the table and contribute

## **Moral Duty**

Those who serve deserve a system capable of caring for them — and their care cannot be allowed to undermine care for all Canadians

# Questions?



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