

# THE PARAMEDIC PROFESSION: A CAREER OF PHYSICALLY DEMANDING TASKS

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# DOCUMENTING THE PHYSICAL DEMANDS OF PARAMEDIC WORK

- *Ontario Health & Injury* study (2012)
- need to accurately identify the demands of the job
- paramedic perspective
  - » by paramedics, with paramedics, for paramedics
- foundational first step towards improving the health and safety of paramedics across Canada

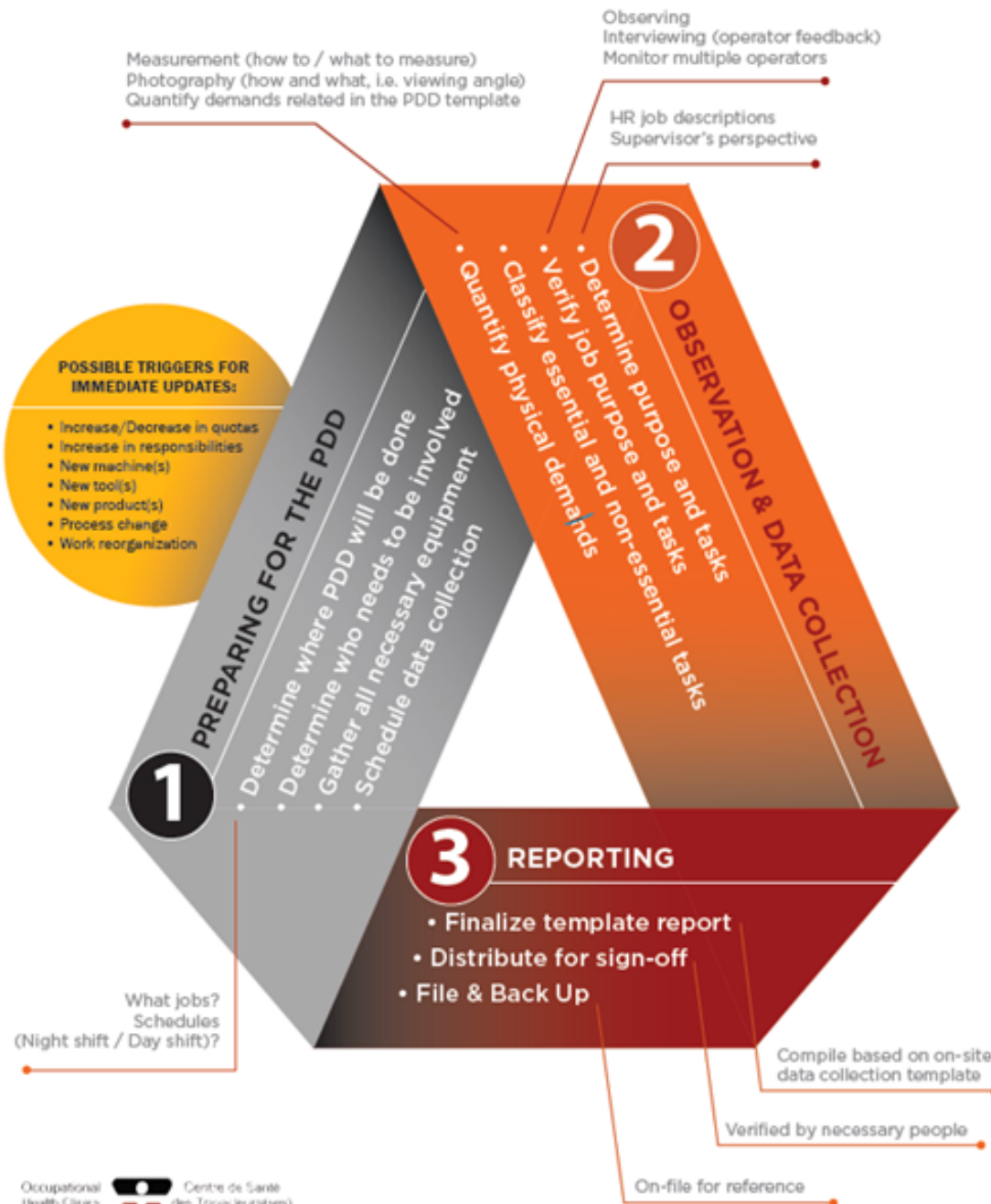


# WHY IS KNOWING THE PHYSICAL DEMANDS OF THE PARAMEDIC PROFESSION IMPORTANT?

- provides a benchmark that helps to:
  - » prioritize interventions to reduce high demand situations (where possible)
  - » lead to a better understanding of the physical capabilities required to be a paramedic (bona fide occupational requirements)
  - » guide paramedics in identifying and implementing appropriate treatment plans



## THE PDD PROCESS



# Physical Demands Description

*“a systematic procedure that can be applied to observe, quantify, and report on all of the physical components of all essential and non-essential tasks within a job”*

# A PDA LIKE NO OTHER

- traditional model = trained ergonomics professional
- challenges?
- non-traditional approach to a non-traditional occupation



# BUILDING STRONG CONNECTIONS WITH THE PARAMEDIC COMMUNITY



Connecting research capabilities to paramedic service needs



# CRITICAL FUNDING SUPPORT



» Leveraging resources to support paramedic research

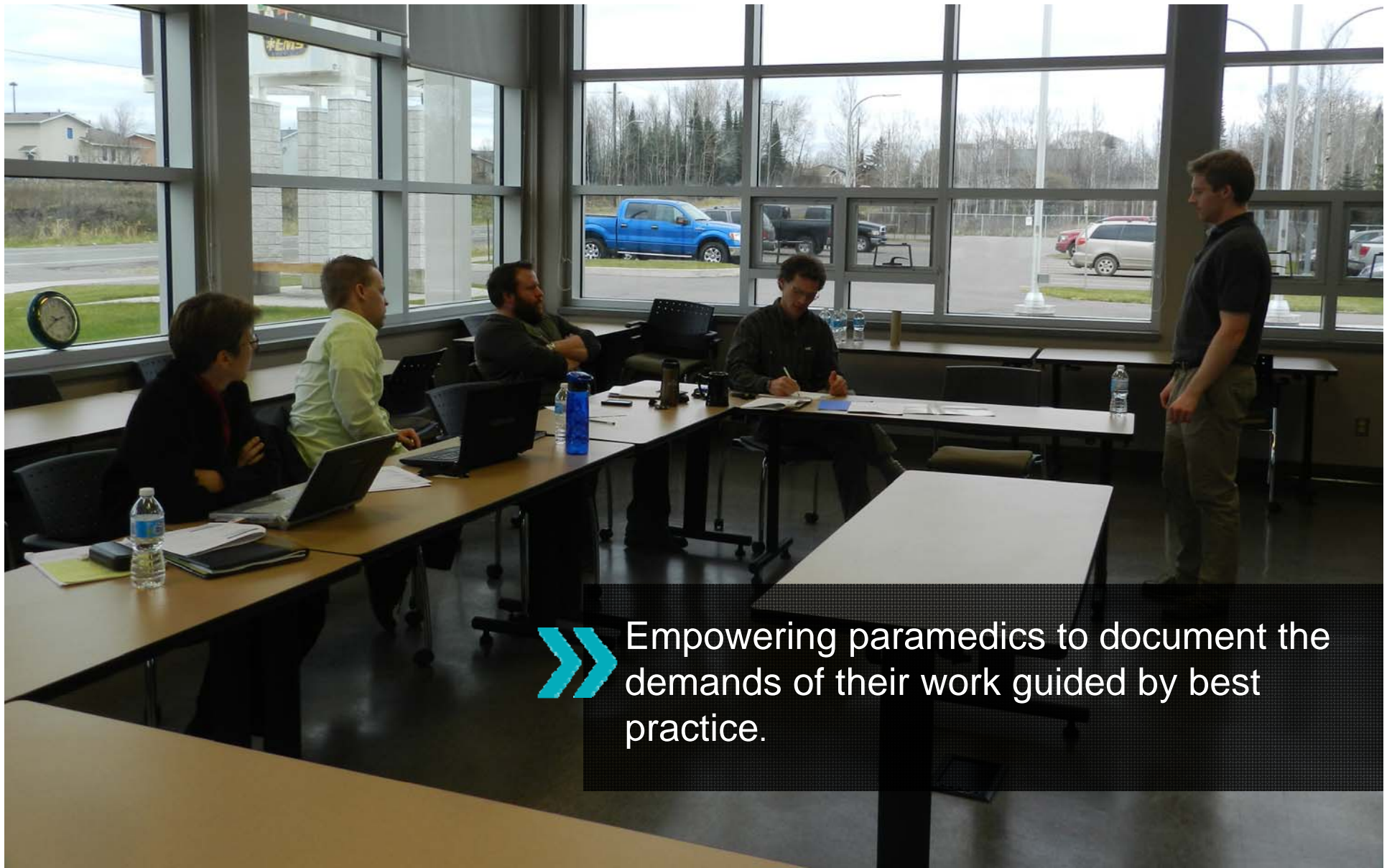


# METHODOLOGY

- recruitment
  - » front-line paramedics as Research Assistants (RA)
- training
  - » 6 hour training session
  - » PDD handbook
  - » baseline equipment measurements and weights
- observation and data collection
  - » quantitative data - ride-outs (x2)
  - » qualitative data – paramedic reflection & commentary







Empowering paramedics to document the demands of their work guided by best practice.



By paramedics, with paramedics, for paramedics!



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# RESULTS

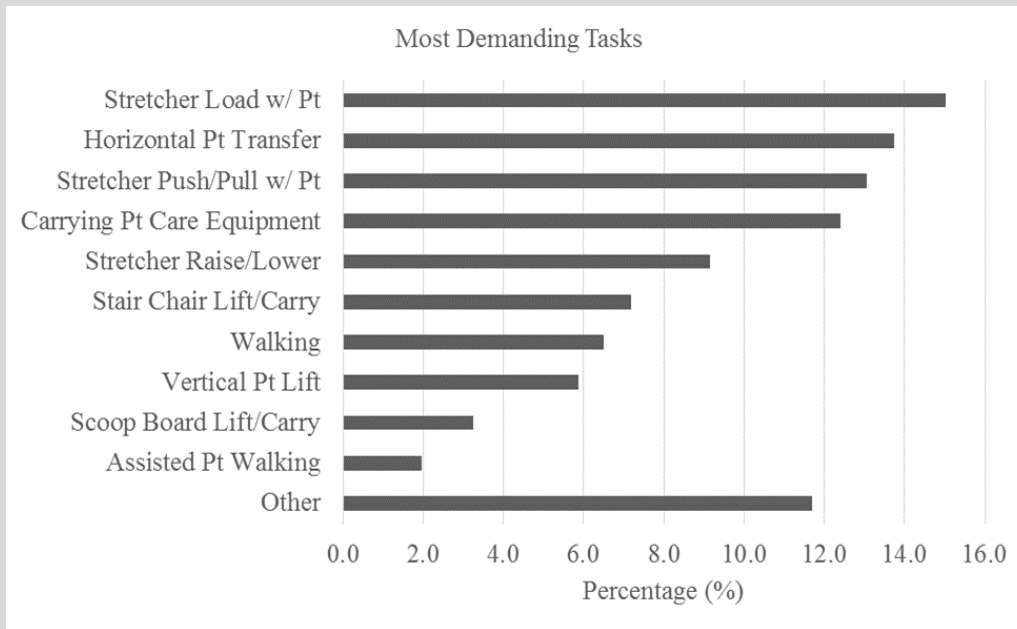
- 13 paramedic services across Canada
- approximate annual call volume = 900,000
- 57 full shift (12 hour) ride-outs
- 237 unique calls
  - » 190 calls included in the data analyses
- Canadian Triage & Acuity Scale (CTAS) level
  - » 21% = CTAS 1 or 2
  - » 53% = CTAS 3
  - » 26% = CTAS 4 or 5

Morales L, McEachern BM, MacPhee RS, Fischer SL. (2016). *Applied Ergonomics*, 56, 187-193.

Coffey B, MacPhee R, Socha D, Fischer SL. (2016). *International Journal of Industrial Ergonomics*, 53, 355-362.



# RESULTS



**Table 8 - Perceived ratings of demands stratified by call urgency. Data represents the mean and standard deviation, in parentheses.**

	High	Medium	Low	p-value
Clinical	4.35 <sup>a</sup> (±2.13)	3.01 <sup>b</sup> (±1.95)	1.07 <sup>c</sup> (±1.32)	<0.001
Physical	4.54 <sup>a</sup> (±2.17)	4.37 <sup>a</sup> (±2.28)	2.63 <sup>b</sup> (±1.97)	<0.001
Emotional	2.76 <sup>a</sup> (±2.04)	2.29 <sup>a</sup> (±1.88)	1.24 <sup>b</sup> (±1.19)	0.001

<sup>a,b,c</sup> Different letters indicate significant differences between groups (p < 0.05).

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# SUMMARY

## Quantitative Data

- physically demanding tasks identified vary by geographical location (i.e., Canada vs US)
- CTAS level is one of the most important determinants of physical demands faced by paramedics
  - » higher CTAS level = increased demands
- stretcher loading is of particular concern
- lifting / carrying of patient care equipment



# SUMMARY

## Qualitative Data

- paramedics' perceptions of emotional, clinical and physical demands are affected by CTAS level
- perception of physical demand is in keeping with actual physical demand



# WHAT CAN WE DO WITH THIS INFORMATION?

## DEPLOYMENT STRATEGY EVALUATION



Deployment Strategy Evaluation

Paramedic workload



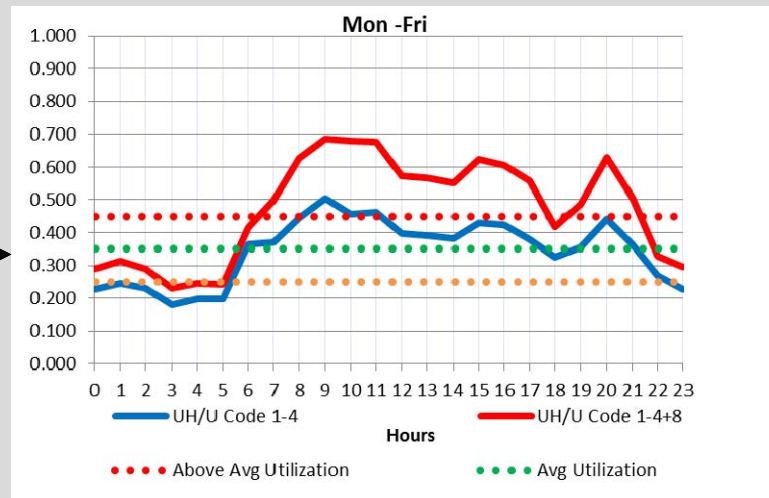
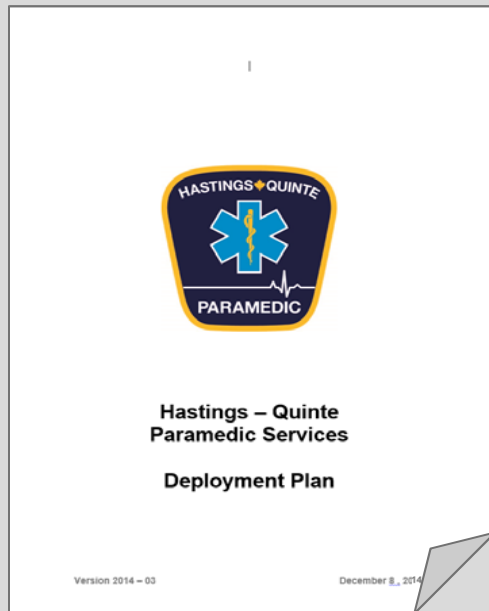
Historically, paramedic services have not been able to quantitatively analyze their deployment strategies and response capabilities. The development of resource deployment plans have been a "best guess" based on experience and intuition as well as political pressure from municipal councils. To address this issue, CAE's Integrated Enterprise Solutions group, in collaboration with its partners, has developed a simulation-based analysis capability for evaluating deployment strategies and resourcing issues.



Develop models to predict paramedics' exposures to physically demanding activities



# ESTIMATE PHYSICAL EXPOSURES



Contents lists available at [ScienceDirect](http://ScienceDirect)

**Applied Ergonomics**

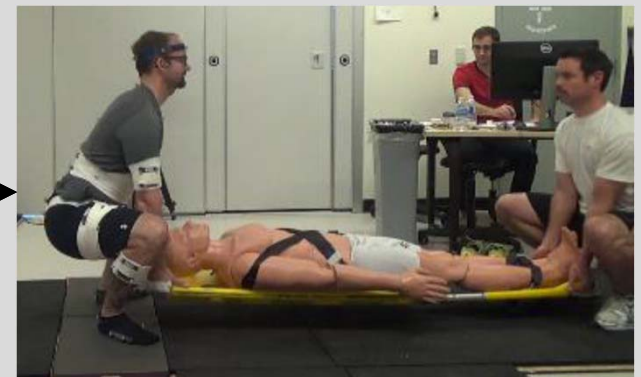
journal homepage: [www.elsevier.com/locate/apergo](http://www.elsevier.com/locate/apergo)

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Patient acuity as a determinant of paramedics' frequency of being exposed to physically demanding work activities

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<sup>c</sup> University of Waterloo, Department of Kinesiology, Waterloo, ON, Canada



» Synthesizing essential information

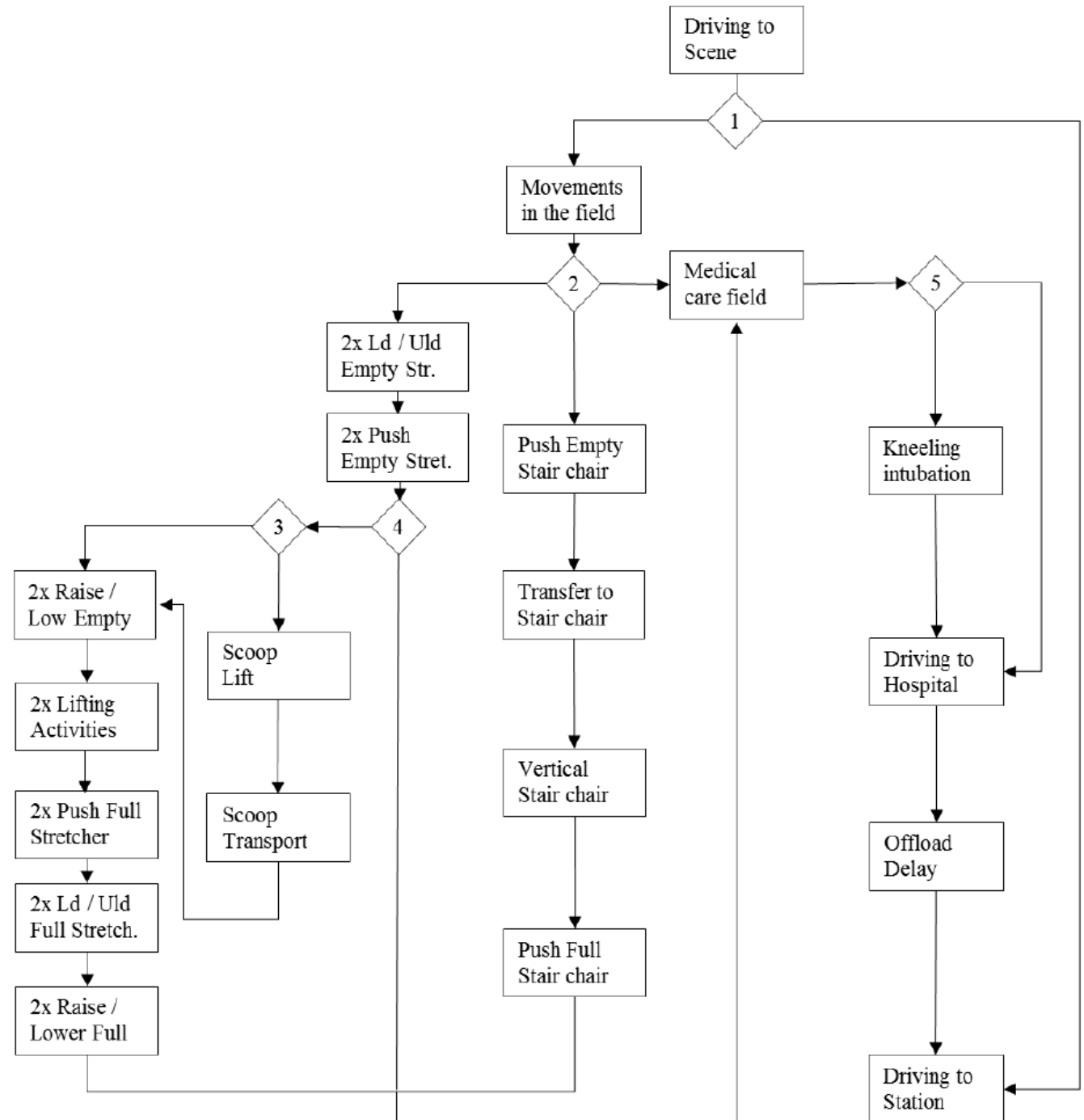


## Probability of sequences:

- Depend on the nature of the call

## Information per task:

- Average / Peak Spine Compression
  - Patient Weight
- Duration of the task

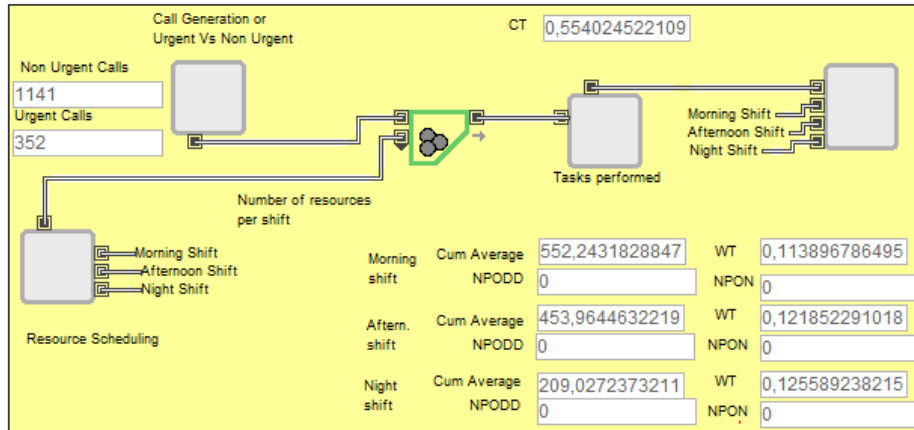




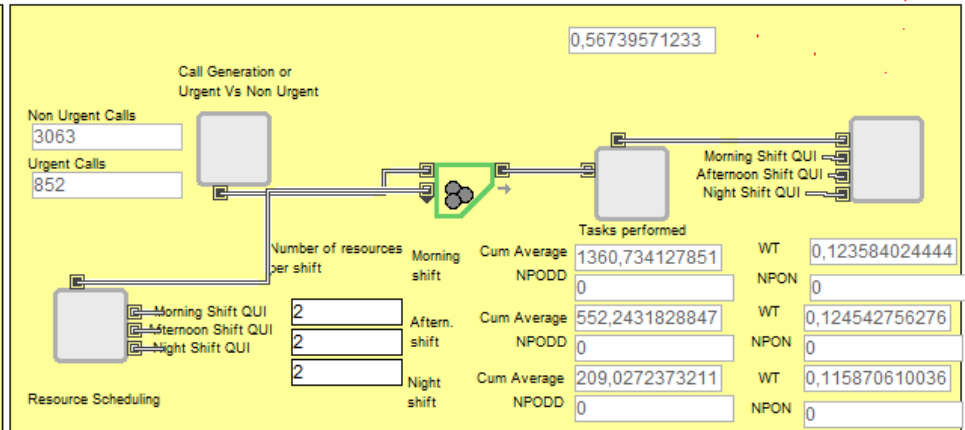
# LOOKING UNDER THE HOOD



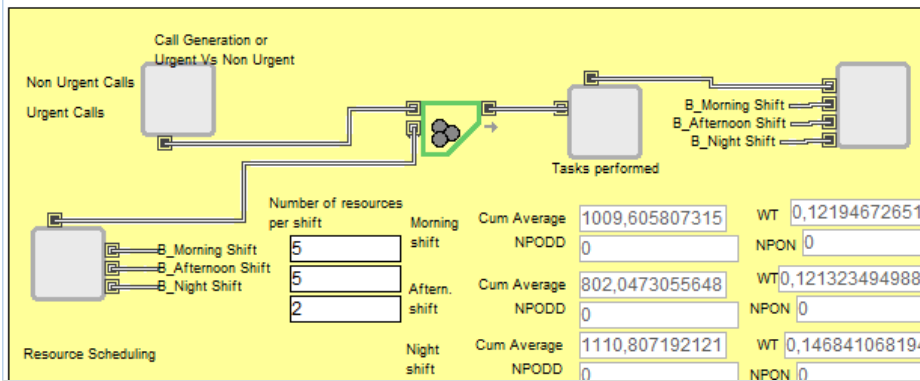
BANCROFT 04



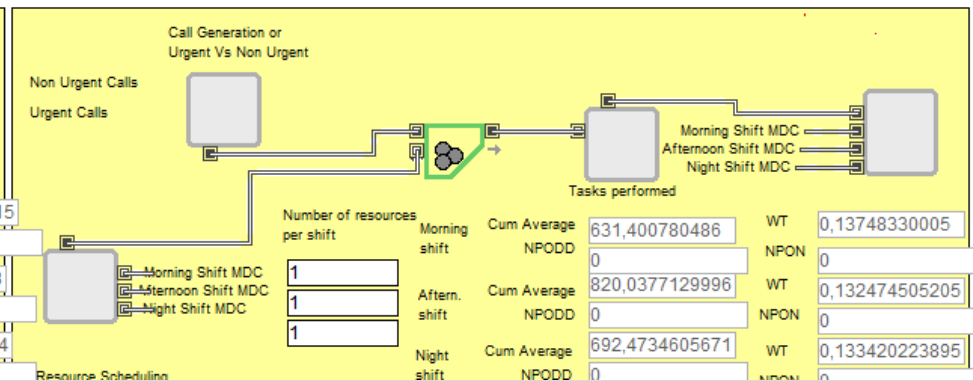
QUINTE WEST 02



BELLEVILLE 01



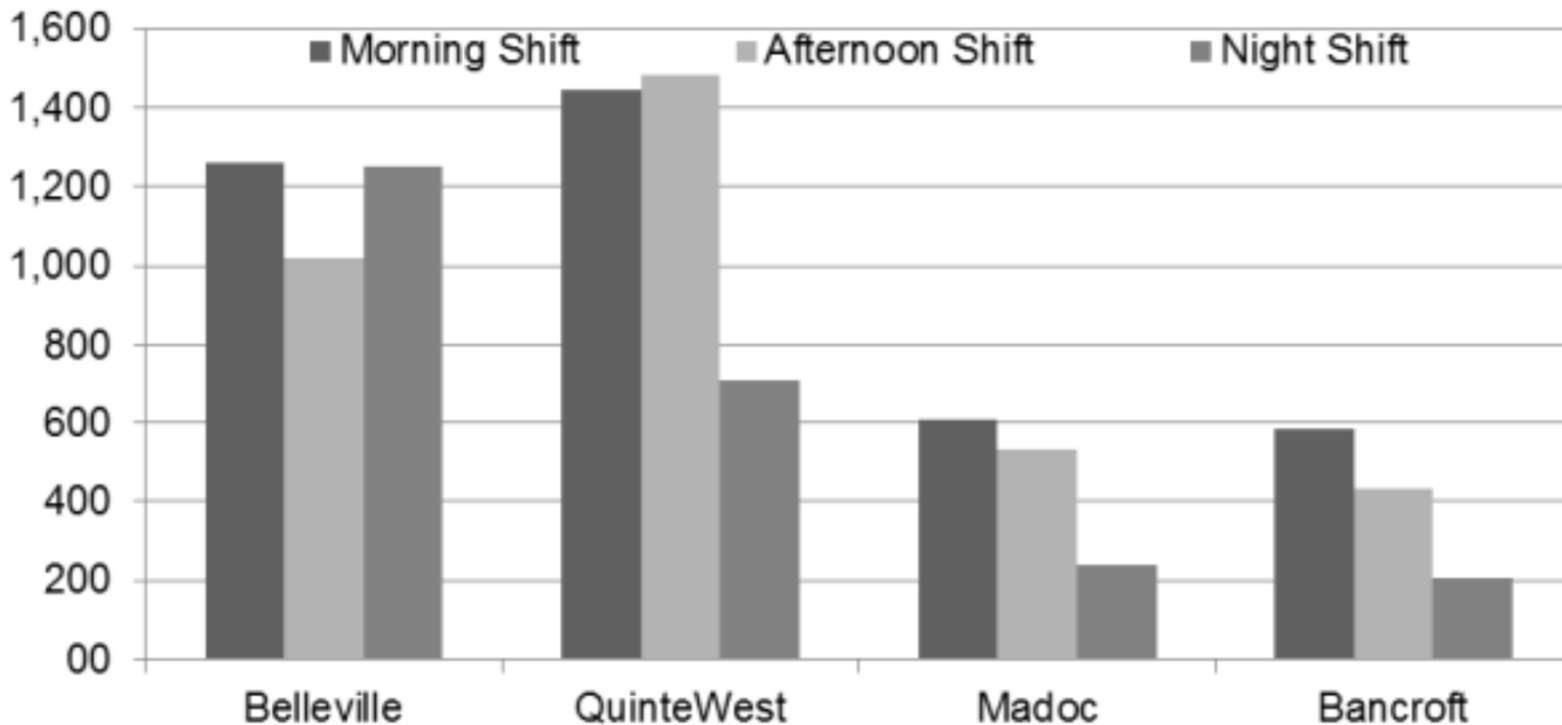
MADOC 03



Discrete Event Simulation using ExtendSim 9

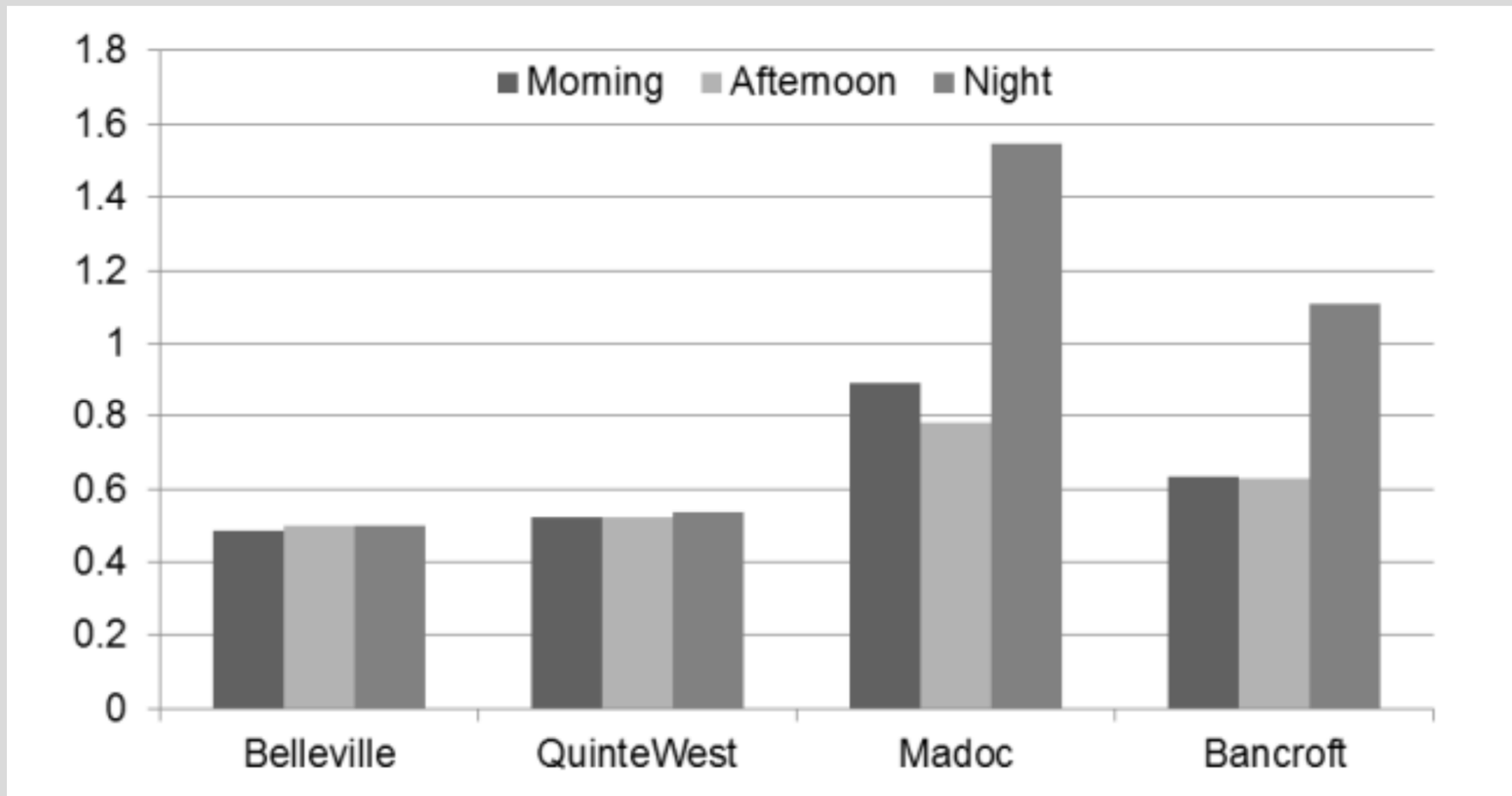


# RESULTS – CUMULATIVE SPINE COMPRESSION: DAILY DOSE (N·h)



» Where paramedics are stationed can effect their daily cumulative dose

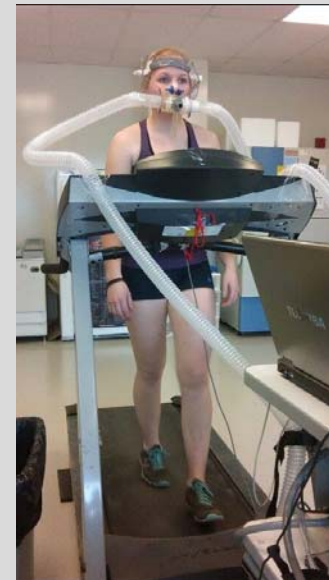
# RESULTS – CUMULATIVE SPINE COMPRESSION: DOSE VARIATION



» Where paramedics are stationed effects the variability in their exposure dose



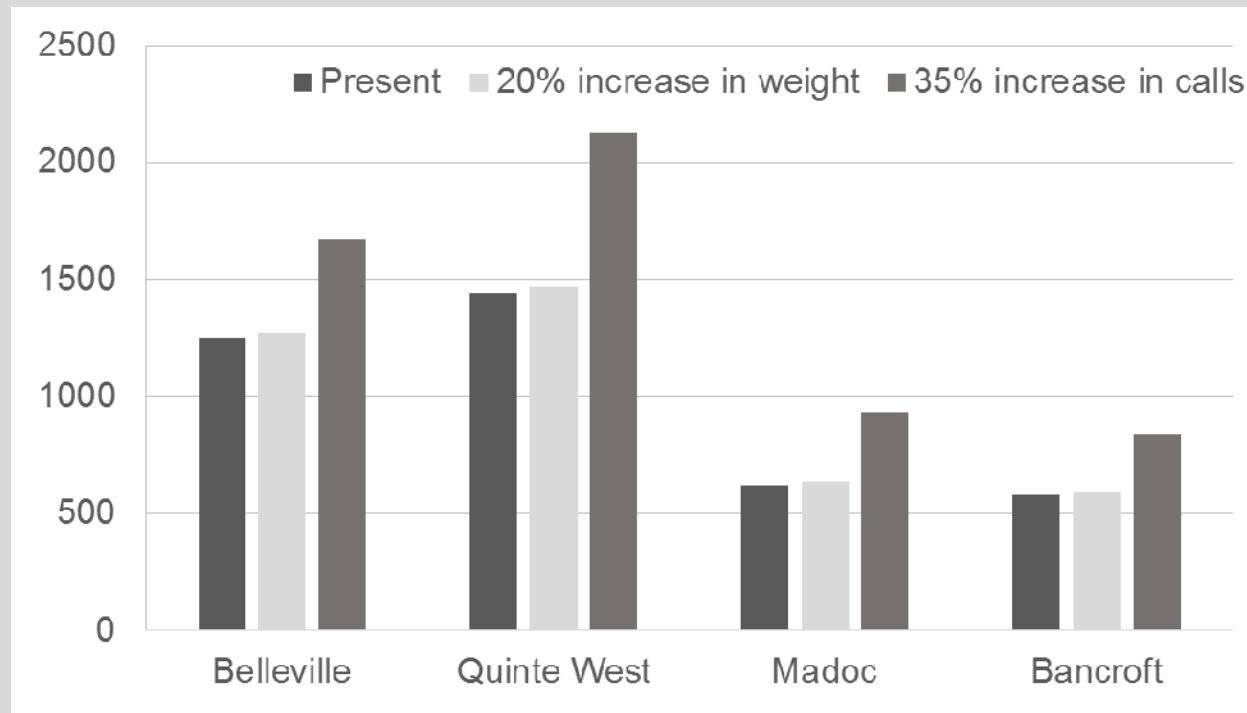
# POTENTIAL IMPLICATIONS



» Modeling workload may help optimize paramedic performance

# CONSIDERING OTHER SCENARIOS: WHAT IF...

- Patient weight increases?
- Call volume increases?



» Data driven predictions to support operational decisions



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