



Weekend Admission and In-Hospital Mortality: Should Patients Avoid Hospitals on Weekends?

Canadian Institute for Health Information (CIHI)

Background

- Reduced availability of some health care services due to reduced staffing on weekend
- Potentially associated with worse patient outcomes
- First study was by Bell & Redelmeier (2001) showed significant weekend effect in 23 of the top 100 highest-mortality conditions
- Since then many studies examined weekend effect within Canada, Europe, and USA

thestar.com

Heart attack patients admitted to hospital after hours face higher death risk, study finds

Cardiac patients who arrive during hospital off hours face a 5-per-cent relative increase in mortality, about 600 extra deaths annually in Canada, a doctor says.

By: **Theresa Boyle** Health, Published on Tue Jan 21 2014

Denis Campbell, health.com
The Guardian, Wednesday 29 May

Updated: Dec 10 9:39 PM ET



Objectives

- Is there a reason to be more worried if you are admitted to hospital on weekend rather than a weekday?
 - Is there a weekend effect ?
 - Is it due to sicker patients or inadequate hospital care ?
 - Are there less procedures and more delays on weekends ?

Methods

Data Sources

- Discharge Abstract Database (DAD), Hospital Morbidity Database (HMDB), National Ambulatory Care Reporting System (NACRS)

Inclusion

- Acute care hospitalizations from all Canadian facilities
- 3 fiscal years period: 2010, 2011, and 2012

Exclusion

- Palliative care patients
- In-depth AMI and stroke analysis excluded QC

Methods: Continued

Weekdays, Weekends and Holidays

- Midnights used to divide days into weekdays and weekends
- Statutory holidays were added to weekends ~ 12 days per year

Outcome

- In-hospital mortality

Analysis

- Mortality rates compared between weekdays and weekends
- Logistic regression models used to adjust for age, sex, comorbidity, and CMG
- Potential excess deaths estimated for different patient groups
- Procedural rates and delays examined in the heart attack (AMI), and stroke analyses

Results: Weekend effect

- Included about 9 million patients across Canada's almost 700 hospitals
- No statistically significant weekend effect for pediatrics, obstetric, and mental health groups
- Elective visits occurred almost entirely on weekdays (97%), thus, analysis was focused on true urgent admissions

Results: Weekend effect

For the 3.74 million urgent admissions:

- Mortality rate on weekend was 6.1% compared to 6.0% on weekdays (OR=1.02, adjusted OR=1.04)
- The number of weekend admissions dropped by 11% suggesting patients of a higher severity level are admitted

Results: by Case Mix Group

- 468 Case Mix Groups (CMG) were examined
- 34 groups showed statistically significant weekend effect. At the top of the list:

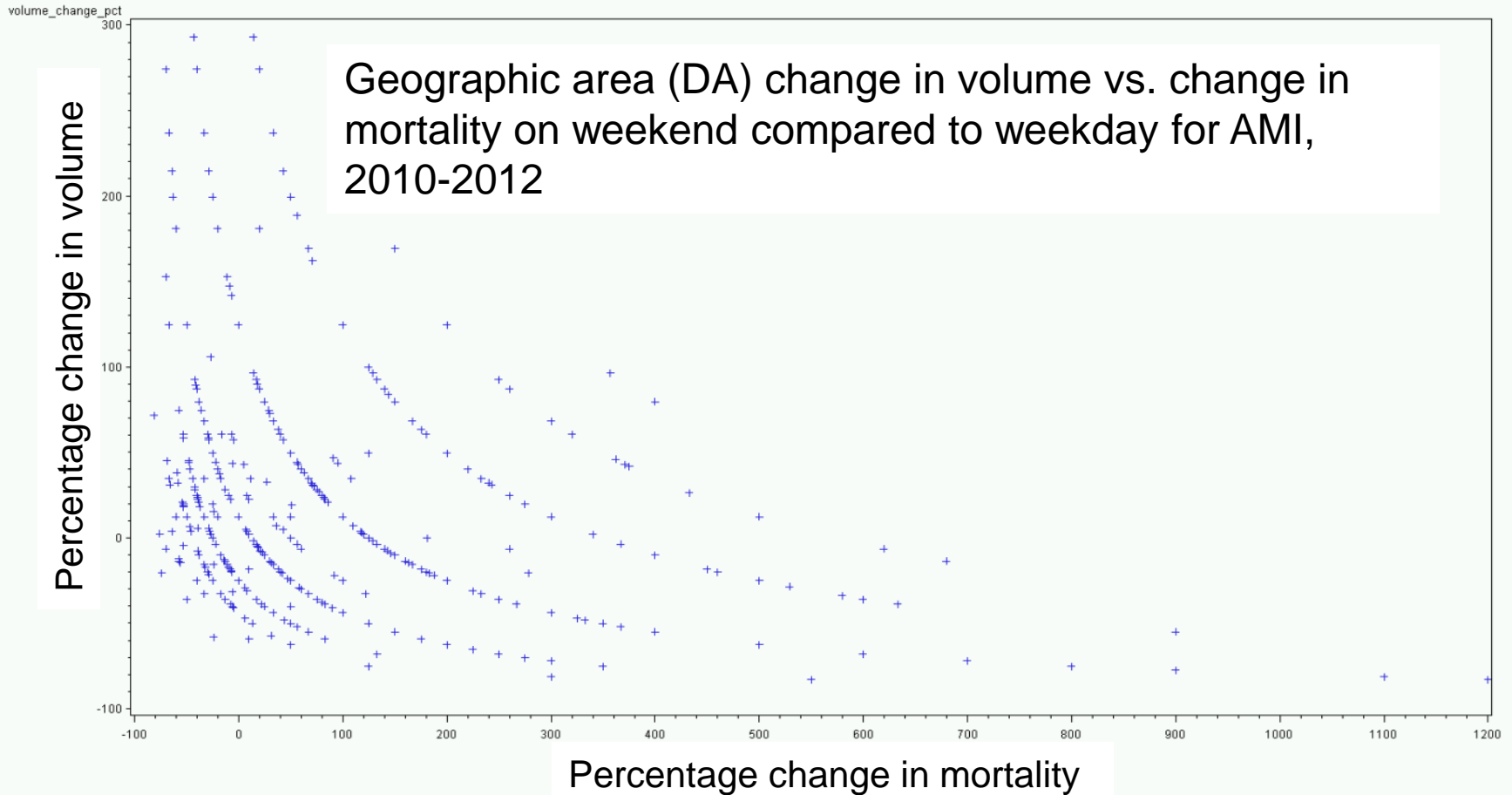
Case Mix Groups	Mortality (%)		Adjusted Odds Ratio (95% CI)	Excess deaths per year
	Weekday	Weekend		
Myocardial Infarction/Shock/Arrest without Angiogram	15.8	16.8	1.07 (1.02, 1.11)	73
Renal Failure	12.5	14.0	1.13 (1.06, 1.20)	55
Malignant Neoplasm of Respiratory System	26.1	28.1	1.11 (1.05, 1.18)	53
Digestive Malignancy	18.8	21.7	1.22 (1.12, 1.33)	44

Results: AMI and Stroke, weekend effect

- AMI had slightly higher mortality on weekend (OR=1.08) with considerable variation by year and by STEMI vs. NSTEMI
- Stroke had no increase in the overall mortality on weekend, but with variation by year and by stroke types

	Mortality Rate (%)		Odds Ratio (95% CI)
	Weekday	Weekend	
AMI	9.3	9.9	1.08 (1.04, 1.13)*
Stroke	15.7	16.0	1.01 (0.97, 1.05)

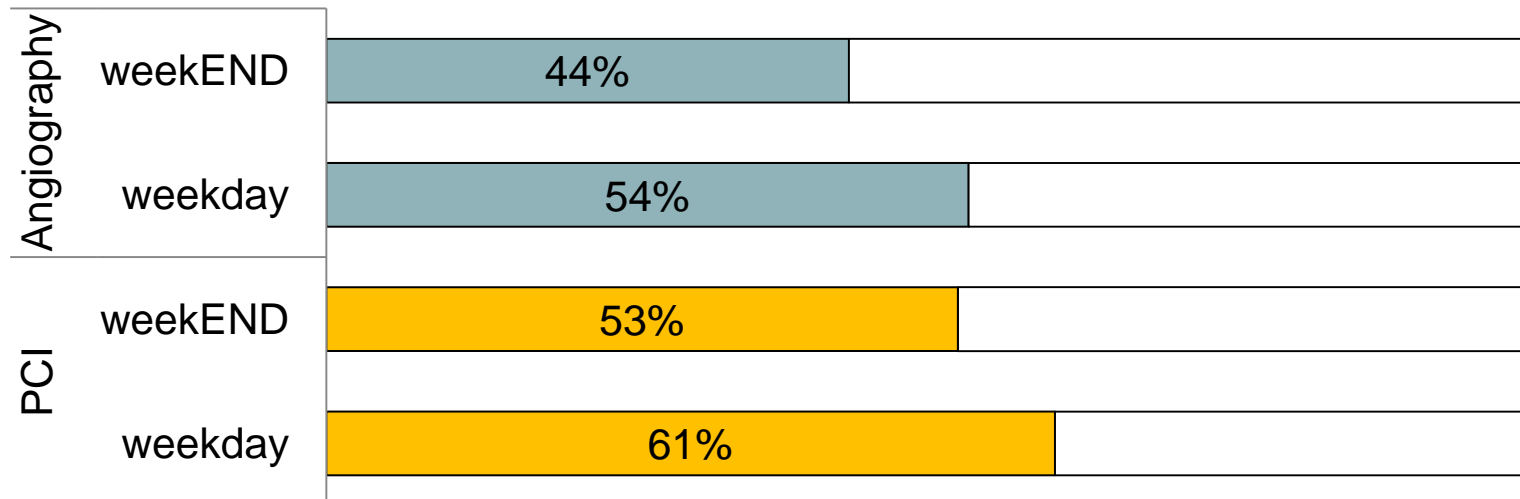
Results: weekend effect in relation to volume change



Results: AMI, time to procedures

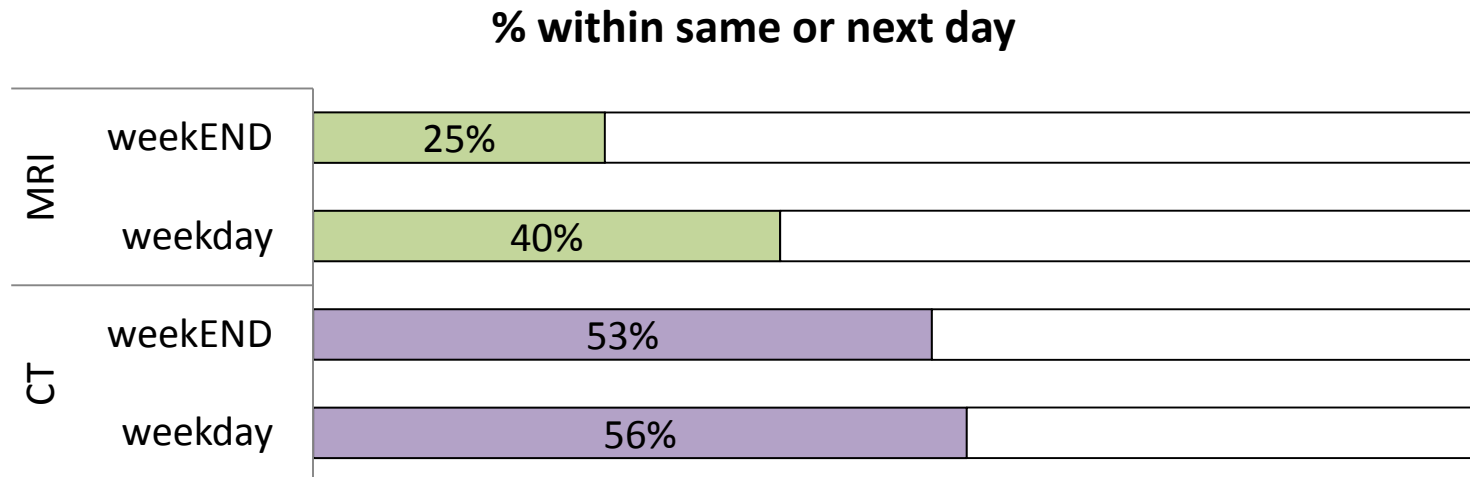
- On weekends major procedures for AMI are carried later than on weekdays
- Eventually weekend patients receive these procedures at the same rate as weekday patients

% within same or next day



Results: Stroke, time to procedures

- Diagnostic procedures for stroke including CT, MRI, ultrasound and X-ray are carried later than it is on weekdays
- Major interventions (e.g. mechanical ventilation, drainage, and implant surgeries) are not delayed on weekends



Results: AMI and stroke, length of stay

- For some patients, LOS is longer on Saturday compared to Monday

	LOS % staying < 5 days	
	Monday	Saturday
AMI	52	43
Stroke	33	27

- ED wait times are slightly shorter on Saturday

Conclusion

- The estimated increase in mortality rate for weekend admissions in Canada is small
- Fewer urgent patients admitted on weekends which suggests different case mix of patients
- Available data may not fully capture patient severity
- A proportion of patients admitted on weekend wait until the weekday for their procedures or discharge decision

Acknowledgements

Canadian Institute for Health Information (CIHI)

- Hani Abushomar, Senior Analyst
- Xi-Kuan Chen, Program Lead
- Jennifer D'Silva, Program Lead
- Jihee Han, Analyst
- Viachaslau Herasimovich, Senior Analyst
- Olga Krylova, Senior Analyst
- Ling Na, Analyst
- Chelsea Taylor, Program Lead
- Jeremy Veillard, Vice President
- Kathleen Morris, Director
- Katerina Gapanenko, Manager

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- Chaim Bell, Mount Sinai Hospital
- Lauren Lapointe-Shaw, Mount Sinai Hospital
- Heather Sherrard, University of Ottawa Heart Institute
- Dianne Tomarchio, Rouge Valley Health System



Report release in June 2014

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