Friday Outbreaks – Fact or Fiction?
Chingiz Amirov, Baycrest Centre, Toronto
A Webber Training Teleclass

Friday Outbreaks – Fact or Fiction?

Chingiz Amirov
Director, Infection Prevention and Control

Hosted by Patsy Rawding
Shannex Annapolis Valley, Nova Scotia

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

www.webbertraining.com March 20, 2014

A typical Friday afternoon…

- ~ 4:30 pm when you're ready to call it a day…
- … you receive an outbreak notification from your IPAC team ☹. Again…
- Why does it happen so often on Fridays? How common is this anyway?

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

2

What do we know about Friday outbreaks?

- Healthcare is rife with anecdotes about "Friday outbreaks"
- Dearth of solid data to support or rule it out
- No published analysis on *institutional* outbreaks

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

3

Our postulate

- Do institutional outbreaks occur more often on Fridays?
- H_0: no relationship exists between outbreak reporting and day of the week
- To reject H_0, identify the day(s) of the week when outbreaks are more likely to be reported

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

4

Definitions

- Institutional vs. community outbreak
- Outbreak occurrence vs. outbreak reporting
- Bugs don't live by human calendar
- So, the study is about our ability to identify outbreaks and report them

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

5

Cracking the "Friday outbreak" myth

- 2 dedicated volunteers
- 3 enthusiastic infection control practitioners
- 1 experienced statistician
- 4 years worth of outbreak reports
- 901 institutional outbreaks: enteric and respiratory
- Hundreds of institutions: acute, chronic and LTC

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

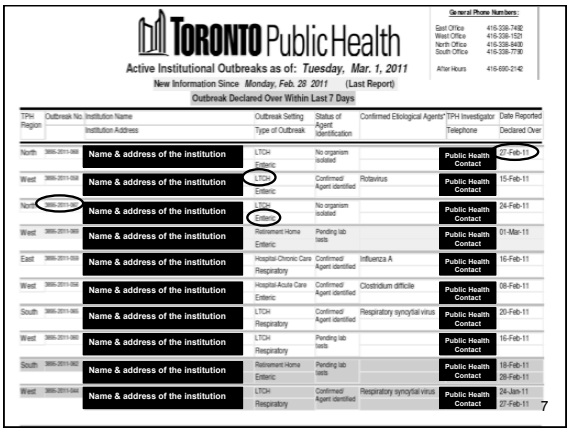
6

Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

Friday Outbreaks – Fact or Fiction?

Chingiz Amirov, Baycrest Centre, Toronto

A Webber Training Teleclass



TORONTO Public Health

Active Institutional Outbreaks as of: *Tuesday, Mar. 1, 2011*

New Information Since *Monday, Feb. 28 2011* (Last Report)

Outbreak Declared Over Within Last 7 Days

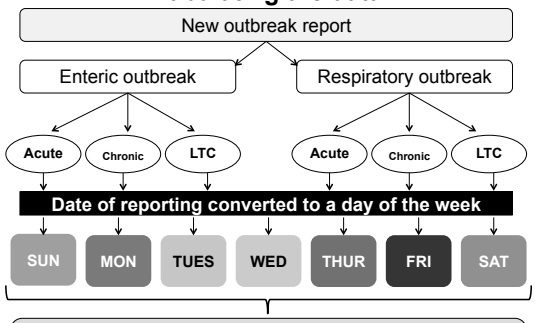
General Phone Numbers:

East Office 416-338-7482
West Office 416-338-1521
North Office 416-338-8403
South Office 416-338-7736
After Hours 416-690-2142

TPH Region	Outbreak No.	Institution Name / Institution Address	Outbreak Setting / Type of Outbreak	Status of Agent Identification	Confirmed Etiological Agents*	TPH Investigator / Telephone	Date Reported / Declared Over
North	3866-2011-040	Name & address of the institution	LTCH / Enteric	No organism isolated		Public Health Contact	27-Feb-11
West	3866-2011-034	Name & address of the institution	LTCH / Enteric	Confirmed/ Agent identified	Rotavirus	Public Health Contact	15-Feb-11
North	3866-2011-037	Name & address of the institution	LTCH / Enteric	No organism isolated		Public Health Contact	24-Feb-11
West	3866-2011-039	Name & address of the institution	Retirement Home / Enteric	Pending lab tests		Public Health Contact	01-Mar-11
East	3866-2011-029	Name & address of the institution	Hospital-Chronic Care / Respiratory	Confirmed/ Agent identified	Influenza A	Public Health Contact	16-Feb-11
West	3866-2011-036	Name & address of the institution	Hospital-Acute Care / Enteric	Confirmed/ Agent identified	Clostridium difficile	Public Health Contact	08-Feb-11
South	3866-2011-045	Name & address of the institution	LTCH / Respiratory	Confirmed/ Agent identified	Respiratory syncytial virus	Public Health Contact	20-Feb-11
West	3866-2011-050	Name & address of the institution	LTCH / Respiratory	Pending lab tests		Public Health Contact	16-Feb-11
South	3866-2011-042	Name & address of the institution	Retirement Home / Enteric	Pending lab tests		Public Health Contact	18-Feb-11 28-Feb-11
West	3866-2011-044	Name & address of the institution	LTCH / Respiratory	Confirmed/ Agent identified	Respiratory syncytial virus	Public Health Contact	24-Jan-11 27-Feb-11

7

Tabulating the data



Number of outbreaks by the type of activity (enteric vs. respiratory) and the type of care settings (acute vs. chronic vs. LTC) reported on each of the 7 days of the week

3-step data analysis

Step 1
- 7-day week analysis (chi^2 goodness-of-fit, α=0.05)
- Compare observed to expected values (avg. # of OB/day)
- Sat & Sun – clear outliers – excluded from further analysis

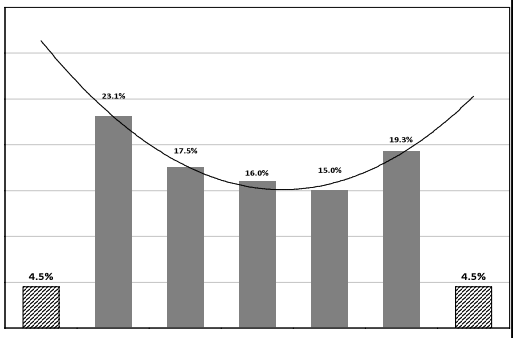
Step 2
- 5-day week analysis
- Look for anything significant in 5-day period (chi^2, α = 0.05)

Step 3
- If anything significant in 5-day period, then zero in on the day
- Post-hoc partitioning analysis (chi^2, α = 0.013)

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

9

Step 1 - all outbreaks Sat-to-Sun in all settings



10

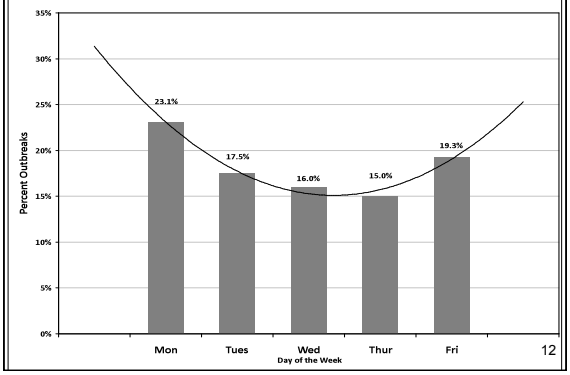
Weekend outliers

- Only 4.5% of OB reports attributed to each Sat & Sun
- "Structurally different" days of the week
- Lower staffing levels (nursing, MDs, IPAC)
- Clear outliers – excluded from further analysis

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

11

Step 2 - all outbreaks Mon-to-Fri in all settings



12

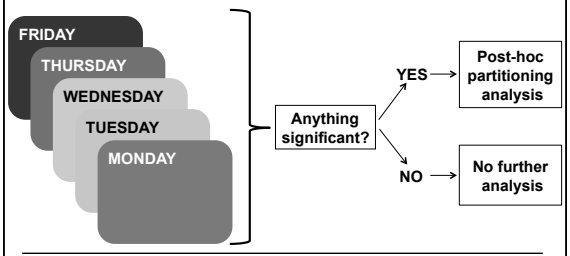
Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

Friday Outbreaks – Fact or Fiction?

Chingiz Amirov, Baycrest Centre, Toronto

A Webber Training Teleclass

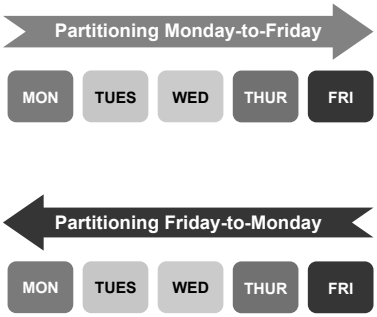
Step 2 - Anything significant?



Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

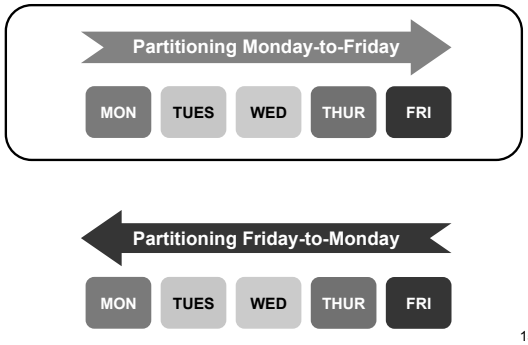
13

Step 3 - choose your direction



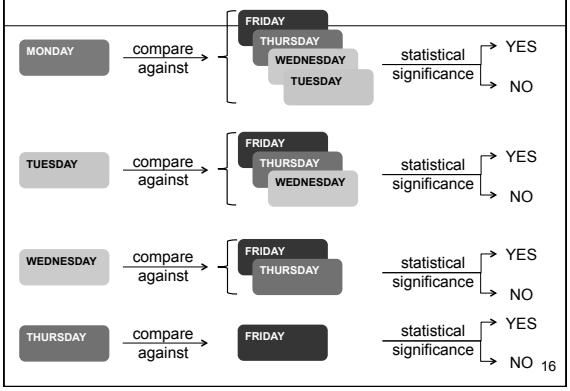
14

Step 3 - choose your direction



15

Step 3 - post-hoc partitioning analysis



16

RESULTS

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

17

Results: all outbreaks in all settings

- chi^2 goodness-of-fit: statistically significant difference
- Post-hoc partitioning: outbreaks significantly more likely to be reported on Mon vs. the remaining weekdays (p = 0.001)
- Friday statistically significant at α = 0.05, BUT…
- With α adjusted to 0.013, Friday statistically indeterminate

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

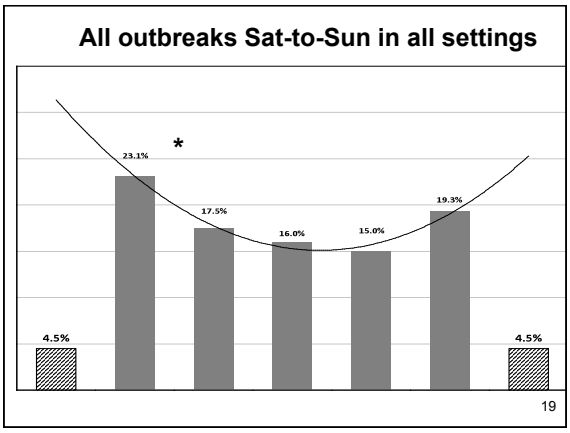
18

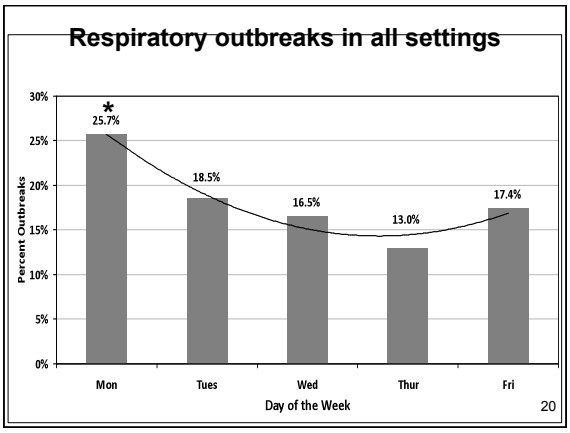
Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

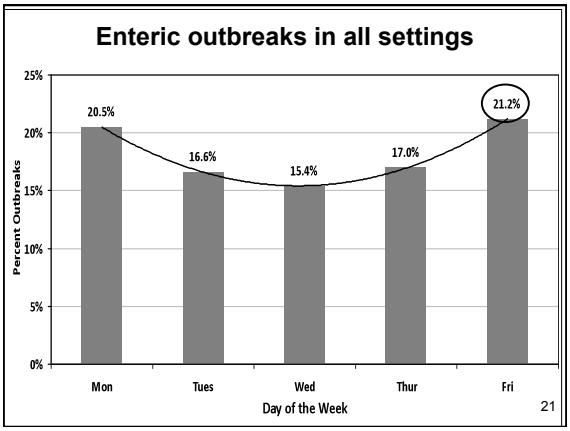
Friday Outbreaks – Fact or Fiction?

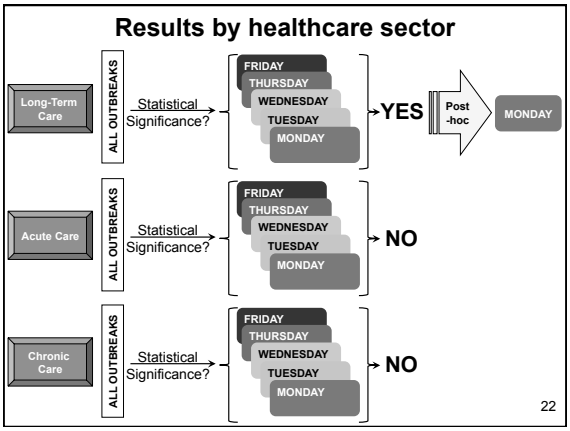
Chingiz Amirov, Baycrest Centre, Toronto

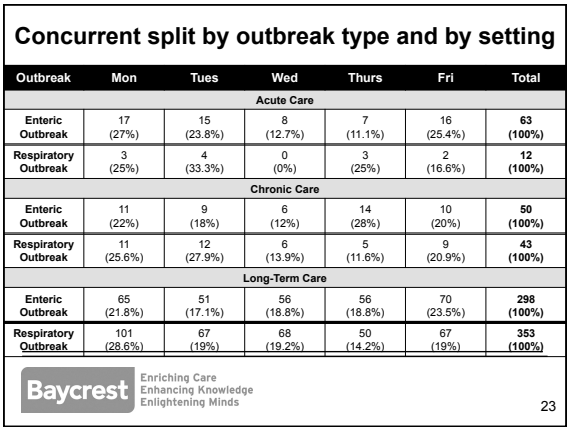
A Webber Training Teleclass









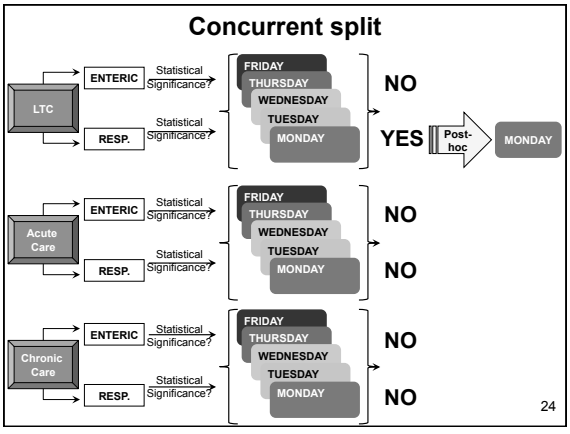


Concurrent split by outbreak type and by setting

Outbreak	Mon	Tues	Wed	Thurs	Fri	Total
Acute Care						
Enteric Outbreak	17 (27%)	15 (23.8%)	8 (12.7%)	7 (11.1%)	16 (25.4%)	**63 (100%)**
Respiratory Outbreak	3 (25%)	4 (33.3%)	0 (0%)	3 (25%)	2 (16.6%)	**12 (100%)**
Chronic Care						
Enteric Outbreak	11 (22%)	9 (18%)	6 (12%)	14 (28%)	10 (20%)	**50 (100%)**
Respiratory Outbreak	11 (25.6%)	12 (27.9%)	6 (13.9%)	5 (11.6%)	9 (20.9%)	**43 (100%)**
Long-Term Care						
Enteric Outbreak	65 (21.8%)	51 (17.1%)	56 (18.8%)	56 (18.8%)	70 (23.5%)	**298 (100%)**
Respiratory Outbreak	101 (28.6%)	67 (19%)	68 (19.2%)	50 (14.2%)	67 (19%)	**353 (100%)**

Baycrest
Enriching Care
Enhancing Knowledge
Enlightening Minds

23



Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

Friday Outbreaks – Fact or Fiction?
Chingiz Amirov, Baycrest Centre, Toronto
A Webber Training Teleclass

DISCUSSION

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

25

Why such differences in reporting?

- Bugs don't live by human calendar
- Some variations in reporting are expected
- Slight variance in outbreak detection/reporting criteria for acute and non-acute care…
- …cannot account for significant differences

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

26

A 'weekend effect'

- A clear pattern of underreporting on Sat & Sun
- Recognized in infectious disease surveillance as a 'weekend effect'
- Attributed to the structural differences in staffing
- Sat/Sun – outliers excluded from further analysis
- However, Sat/Sun directly impact Mon-Fri reporting

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

27

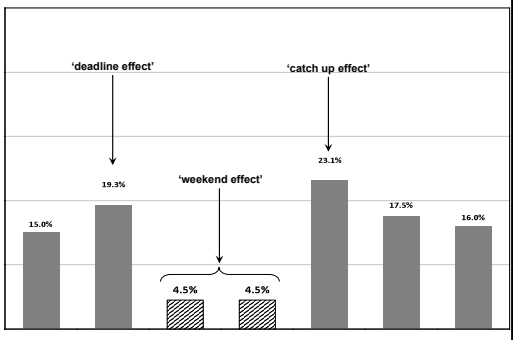
'Catch-up effect' and 'deadline effect'

- Monday – the most likely day for outbreak reporting - attributed to a 'catch-up effect', that is, a delay in detection and reporting of weekend outbreaks until Monday
- Friday – the second most likely day for outbreak reporting, likely due to a 'deadline effect', that is, a delay in declaration and reporting of midweek outbreaks, eventually urged by the impending onset of the weekend

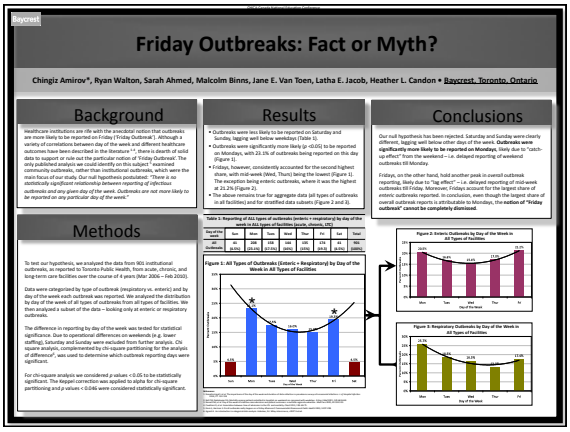
Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

28

'Deadline', 'weekend', and 'catch up' effects



29


Friday Outbreaks: Fact or Myth?

Chingiz Amirov*, Ryan Walton, Sarah Ahmed, Malcolm Binns, Jane E. Van Toen, Latha E. Jacob, Heather L. Candon • Baycrest, Toronto, Ontario

Background

Results

Conclusions

Methods

Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

Friday Outbreaks – Fact or Fiction?

Chingiz Amirov, Baycrest Centre, Toronto

A Webber Training Teleclass

American Journal of Infection Control xxx (2012) 1-4

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

Distribution of outbreak reporting in health care institutions by day of the week

Chingiz Amirov MPH, CIC[a,*], Ryan N. Walton BSc, MPH[b], Sarah Ahmed MPH[c], Malcolm A. Binns PhD[d], Jane E. Van Toen MLT, CIC[a], Heather L. Candon MSc, CIC[a]

[a] Infection Prevention and Control, Baycrest Geriatric Healthcare System, Toronto, Canada
[b] Infectious Disease Prevention and Control, Public Health Ontario, Toronto, Canada
[c] Department of Community Health and Epidemiology, Queen's University, Kingston, Canada
[d] Rotman Research Institute, Baycrest, Toronto, Canada

Key Words:
Friday outbreak
Pattern
Outbreak distribution

Background: The notion that outbreaks are more likely to occur on Friday is prevalent among staff in health care institutions. However, there is little evidence to support or discredit this notion. We postulated that outbreaks were no more likely to be reported on any particular day of the week.
Methods: A total of 901 institutional outbreaks in Toronto health care facilities were tabulated according to type, outbreak setting, and day of the week reported. A χ^2 goodness-of-fit test compared daily values for 7-day per week and 5-day per week periods. Post hoc partitioning was used to pinpoint specific day(s) of the week that differed significantly.
Results: Fewer outbreaks were reported on Saturdays and Sundays. Further analysis examined the distribution of outbreak reporting specifically focusing on the Monday to Friday weekday period. Among the weekdays, higher proportions of outbreaks were reported on Mondays and Fridays.
Conclusion: Our null hypothesis was rejected. Overall, Mondays and Fridays had the highest occurrence of outbreak reporting. We suggest that this might be due to "deadline" and "catch-up" reporting related to the "weekend effect," whereby structural differences in weekend staffing affect detection of outbreaks. Such delays warrant reexamination of surveillance processes for timely outbreak detection independent of calendar cycle.

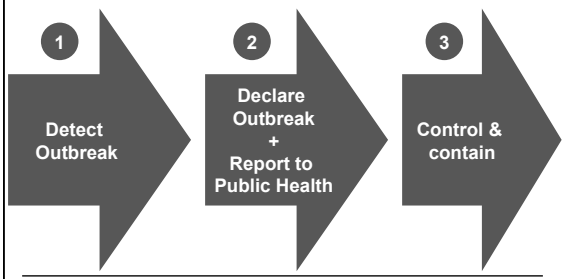
The implications of this study

- No scientific basis for outbreaks to be more likely to occur on some days of the week than others
- Yet certain reporting patterns emerge in our analysis
- A prevalent discrepancy between the true onset date of an outbreak and the date of detection/reporting
- Delays due simply to calendar cycle should prompt re-examination of surveillance processes

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

32

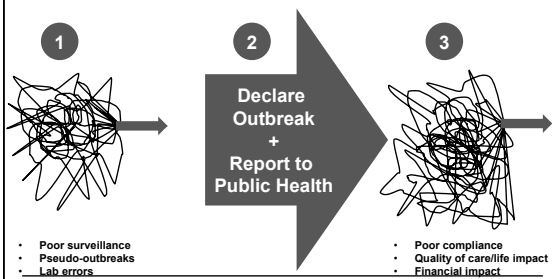
From detection to containment *(in an ideal world)*



Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

33

From detection to containment *(real world)*



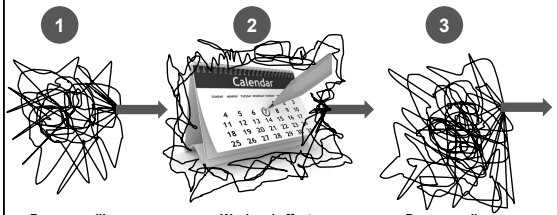
- Poor surveillance
- Pseudo-outbreaks
- Lab errors

- Poor compliance
- Quality of care/life impact
- Financial impact

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

34

From detection to containment *(real world)*



- Poor surveillance
- Pseudo-outbreaks
- Lab errors

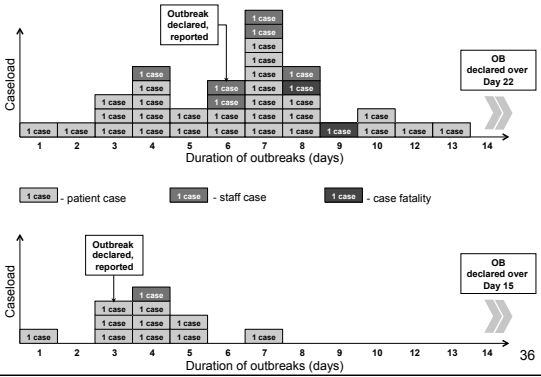
- Weekend effect
- Catch-up effect
- Deadline effect

- Poor compliance
- Quality of care/life impact
- Financial impact

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

35

Early report = early containment



36

Hosted by Patsy Rawding, Shannex Annapolis Valley

www.webbertraining.com

Friday Outbreaks – Fact or Fiction?
Chingiz Amirov, Baycrest Centre, Toronto
A Webber Training Teleclass

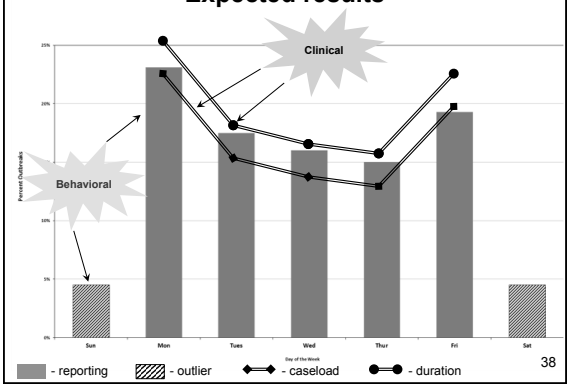
The follow up study

- Reporting alone = descriptive of behavior only
- Caseload info = clinical dimension (morbidity)
- The follow up study:
  - Province-wide data (PHO)
  - Data on >10,000 outbreaks
  - Data on reporting + caseload + duration of OBs
  - Results – next year

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

37

Expected results



38

Summary

- The null hypothesis was rejected
- Outbreaks are significantly more likely to be reported on certain days
- Sat & Sun – significant underreporting
- Monday – the highest reporting – 'catch-up effect'
- Friday – the 2nd highest (overall) – 'deadline effect'

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

39

Acknowledgements

- Heather Candon (IPAC, Baycrest)
- Jane Van Toen (IPAC, Baycrest)
- Ryan Walton (Epidemiologist, Public Health Ontario)
- Sarah Ahmed (Epidemiologist, Queens University)
- Dr. Malcolm Binns (Chief Statistician, Baycrest)

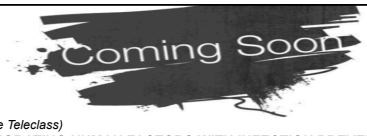
Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

40

Thank You

Baycrest Enriching Care Enhancing Knowledge Enlightening Minds

41



March 27 (Free Teleclass)
INTEGRATING HUMAN FACTORS WITH INFECTION PREVENTION AND CONTROL
Jules Storr, Claire Kilpatrick, Dr. Neil Wigglesworth, The Health Foundation

March 31 (FREE Teleclass - Broadcast Live from the German Hospital Hygiene Society Conference)
INFECTION PREVENTION IN HIGH AND MIDDLE INCOME COUNTRIES
Bruce Gamage of Canada, Dr. Pierre Parneix of France, and Prof. Dr. Li Han of China

April 3 **HOW TO BRIDGE THE GAP BETWEEN KNOWLEDGE AND PRACTICE**
Gertie van Knippenberg-Gordebeke, APIC International Section, Netherlands

April 8 (Free British Teleclass ... Denver Russell Memorial Teleclass Lecture)
ANTIBACTERIAL EFFICACY OF ATMOSPHERIC PRESSURE NON-THERMAL PLASMA
Dr. Brendan Gilmore, Queen's University Belfast

www.webbertraining.com/schedulep1.php

Hosted by Patsy Rawding, Shannex Annapolis Valley
www.webbertraining.com

Friday Outbreaks – Fact or Fiction?

Chingiz Amirov, Baycrest Centre, Toronto

A Webber Training Teleclass

Hosted by Patsy Rawding, Shannex Annapolis Valley

www.webbertraining.com