



Prescription Medication Use During Gastrointestinal and Respiratory Outbreaks at Military Treatment Facilities

Shilpa Hakre, DrPH
Julie Pavlin, MD MPH
Yevgeniy Elbert, MS
Howard Burkom, PhD
Hailiang Wang, MS



What is ESSENCE?

Electronic **S**urveillanc**e** **S**ystem for the **E**arly **N**otification
of **C**ommunity-based **E**pidemics

- Syndromic surveillance system used by the US Department of Defense
- Uses mainly ICD-9-CM codes from outpatient visits
 - Average lag of up to 3 days from the patient's visit date to the date data are received by ESSENCE
- Clinical procedure terminology codes (CPT) and pharmacy data available also

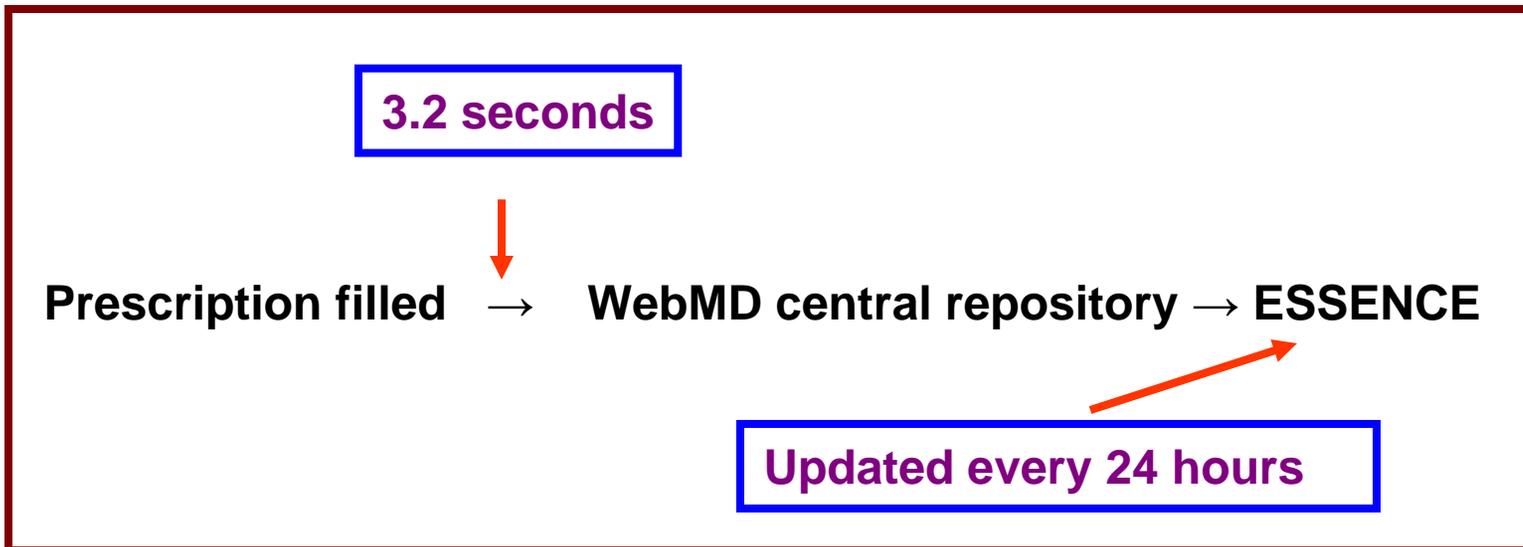


Pharmacy Data Transaction Service (PDTS)

- Developed by DoD's **Pharmacoeconomic Center (PEC)** in late June, 2001
- Database of all Tricare-reimbursed prescription medication transactions
 - Military treatment facilities (MTFs)
 - Military national mail order pharmacy
 - Tricare civilian pharmacies



Pharmacy Data Transaction Service (PDTs)





Feasibility of PDTS for ESSENCE (Eader et al., 2002 findings)

- Surveillance of PDTS with outpatient visit data for gastrointestinal and respiratory syndrome groups
 - July 2001 to April 2002 (10 months)
 - National Capital Area (NCA)
- GC3 pharmaceutical classification codes used
 - 34 in respiratory, 8 in gastrointestinal
- Significant positive correlation found between outpatient visits and PDTS data for respiratory and gastrointestinal syndrome groups



Our Study Objectives

- 1) What were the most commonly prescribed non-refill medications during gastrointestinal (GI) and respiratory outbreaks at military treatment facilities?
- 2) Is it feasible to use pharmacy data for early detection of GI and respiratory outbreaks?



Methods

Objective 1 (commonly prescribed meds?)

List of known GI and respiratory outbreaks
compiled during July 2001 to November 2003

During outbreak period:

- Outpatient visits linked to prescriptions filled at pharmacies within a 20-mile radius of MTFs
 - Linkage: merging unique identifiers in both datasets
- List of non-refill medications prescribed



Methods

Objective 2 (PDTs for early detection?)

Trends examined for commonly prescribed medications and GI/respiratory outpatient visits

- Using patient visit date and date prescription written
- For a month \pm onset of the outbreak



Results

Known GI outbreaks (9)

<u>Location</u>	<u>Outbreak period</u>	<u>Agent</u>
Ft. Monmouth, NJ	Jan. 10-26, 2002	Norovirus
Ft. Knox, KY	Jan. 15-28, 2002	Norovirus
San Diego, CA	Oct. 22-Nov. 1, 2002	Norovirus
Laughlin AFB, TX	Nov. 14-28, 2002	<i>Salmonella</i>
Kansas City, KS	Nov. 29-Dec. 12, 2002	Norovirus
Whiteman AFB, MO	Nov. 25-Dec. 15, 2002	Norovirus
Parris Island, SC	Dec. 5-7, 2002	Norovirus
	Jan. 2-8, 2003	Norovirus
	Dec. 17-20, 2002	Norovirus
Ft. Leonard Wood, MO	Nov. 16-18, 2002	<i>Campylobacter jejuni</i>
Camp Geiger, NC	Dec. 1-20, 2002	Norovirus



Commonly Prescribed Meds in GI Outbreaks Studied

- H6J - Antiemetic/antivertigo agents
- D6D - Antidiarrheals
- Z2A - Antihistamines
- S2B - NSAIDS, cyclooxygenase inhibitor type
- H3E - Analgesics/antipyretics, non-salicylate
- W1Q - Quinolones
- W1A - Penicillins



Results

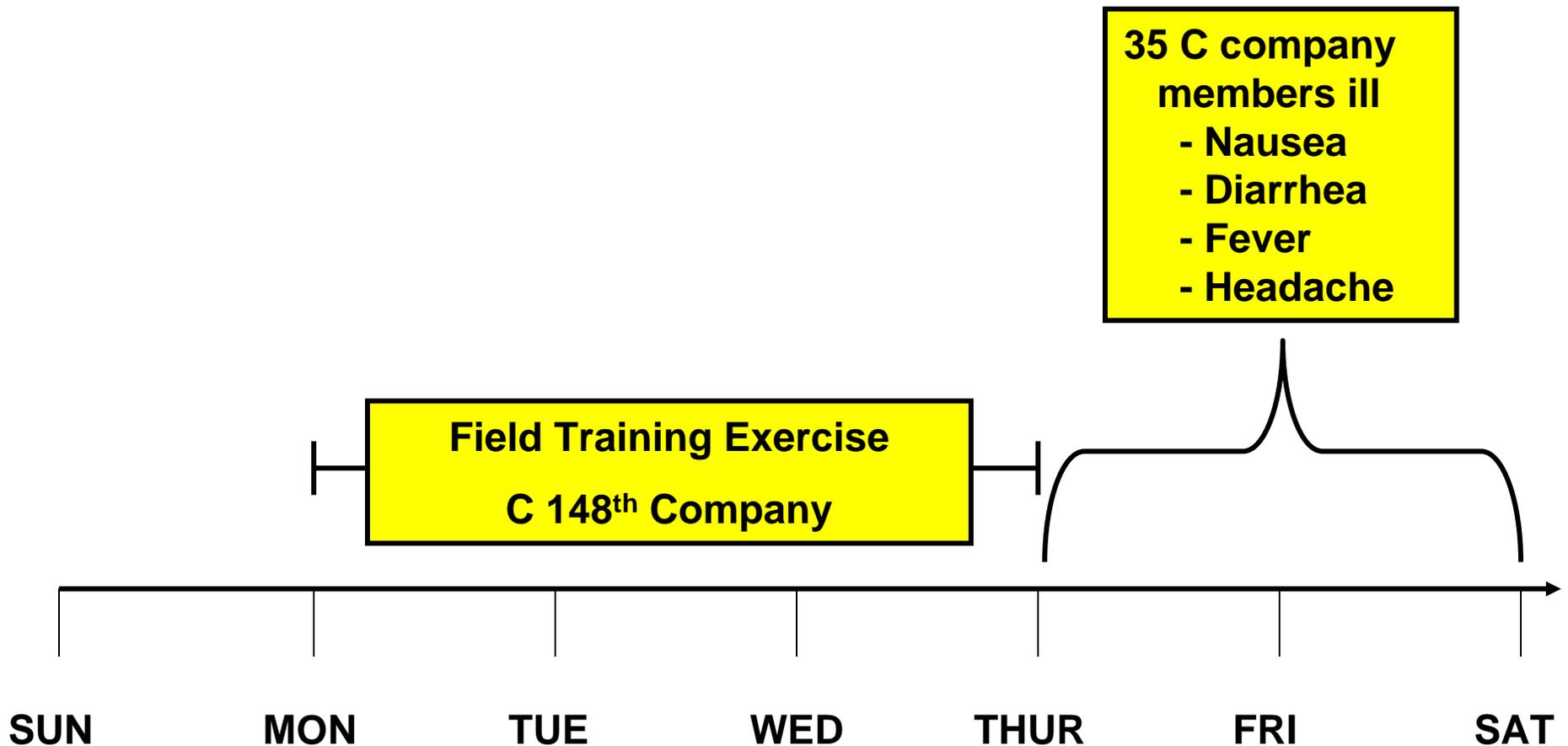
Known GI outbreaks

<u>Location</u>	<u>Outbreak period</u>	<u>Agent</u>
Ft. Monmouth, NJ	Jan. 10-26, 2002	Norovirus
Ft. Knox, KY	Jan. 15-28, 2002	Norovirus
San Diego, CA	Oct. 22-Nov. 1, 2002	Norovirus
Laughlin AFB, TX	Nov. 14-28, 2002	<i>Salmonella</i>
Kansas city, KS	Nov. 29-Dec. 12, 2002	Norovirus
Whiteman AFB, MO	Nov. 25-Dec. 15, 2002	Norovirus
Parris Island, SC	Dec. 5-7, 2002	Norovirus
	Jan. 2-8, 2003	Norovirus
	Dec. 17-20, 2002	Norovirus
Ft. Leonard Wood, MO	Nov. 16-18, 2002	<i>Campylobacter jejuni</i>
Camp Geiger, NC	Dec. 1-20, 2002	Norovirus



Results

Ft. Leonard Wood Outbreak

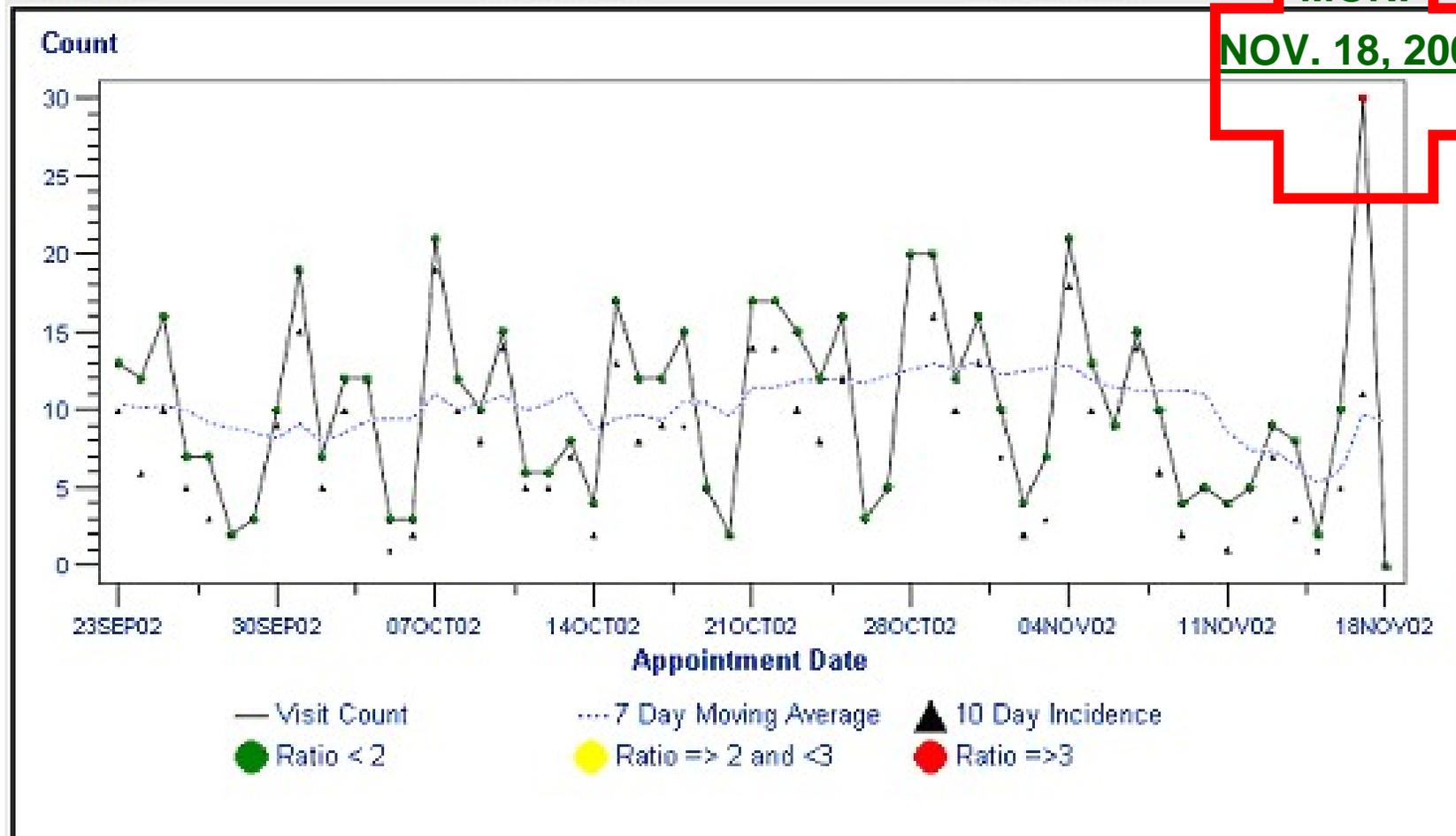




Results

Ft. Leonard Wood Outbreak

GI Syndrome Counts for L. WOOD ACH-FT. LEONARD WOOD





Results

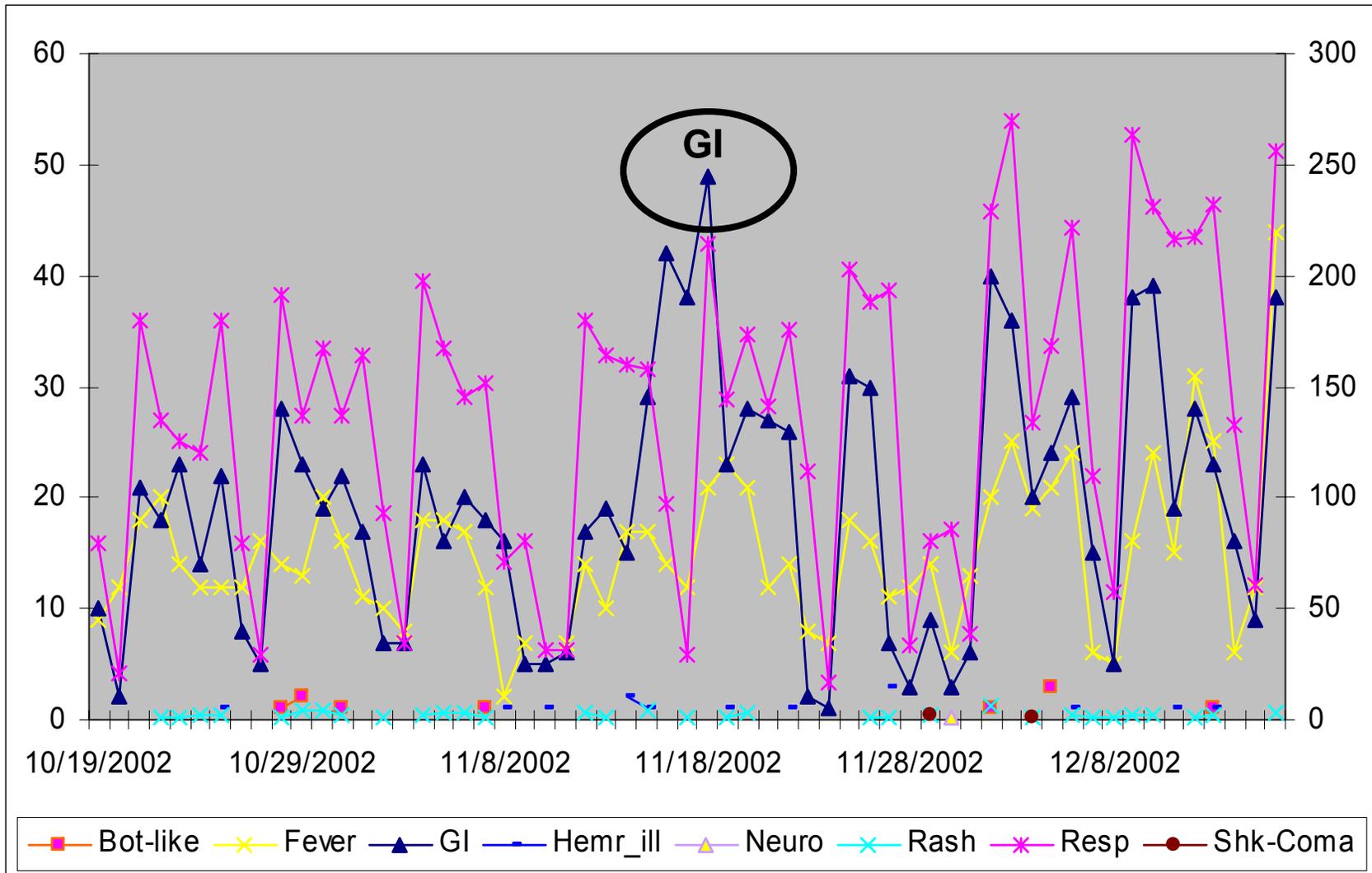
Ft. Leonard Wood Outbreak

- Food samples tested + for *Campylobacter jejuni*
- ICD-9-CM code 558.9 used
 - 84% of GI visits during outbreak
 - Diagnosis: Gastroenteritis, noninfct NEC



Ft. Leonard Wood

Other syndrome counts during GI outbreak

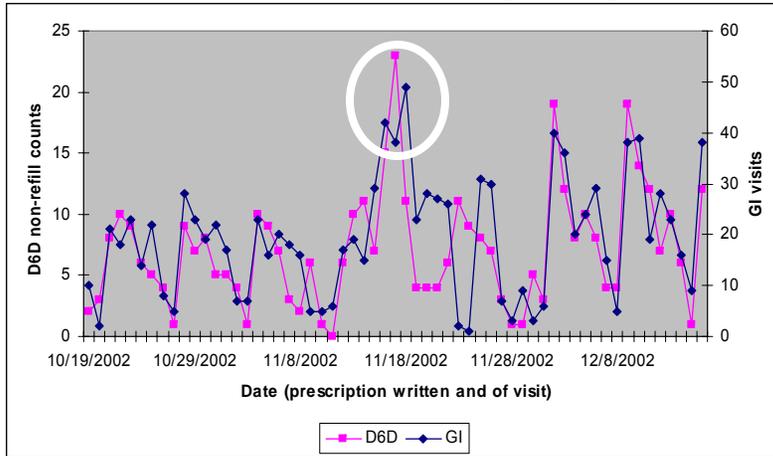




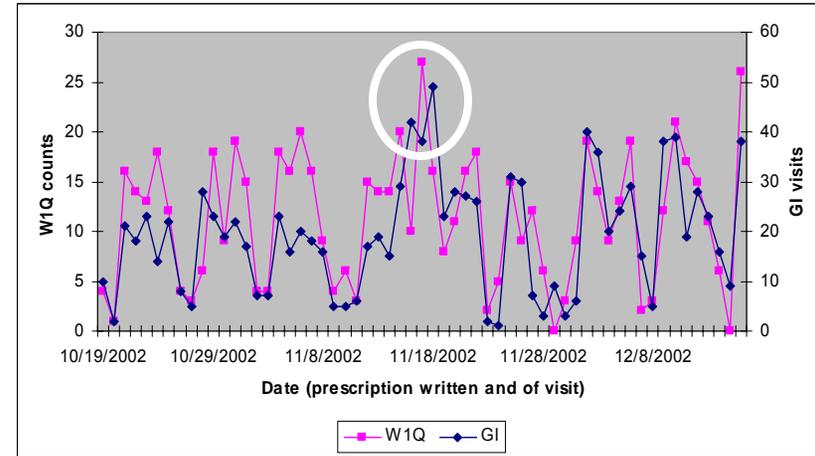
Ft. Leonard Wood Outbreak GC3 Drug Classes



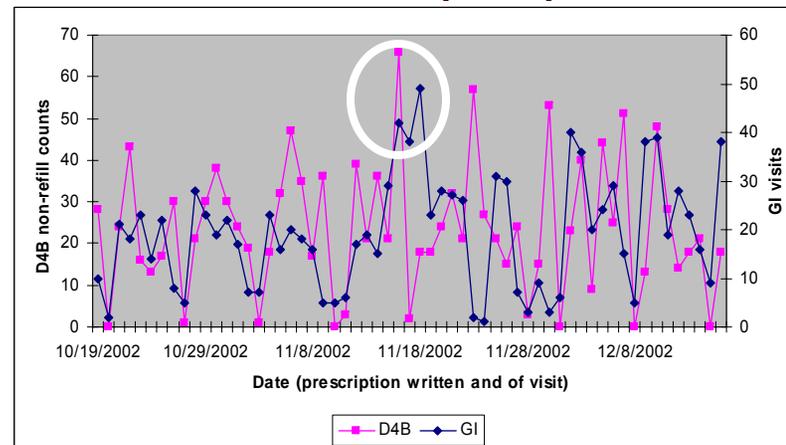
Antidiarrheals (D6D)



Quinolones (W1Q)



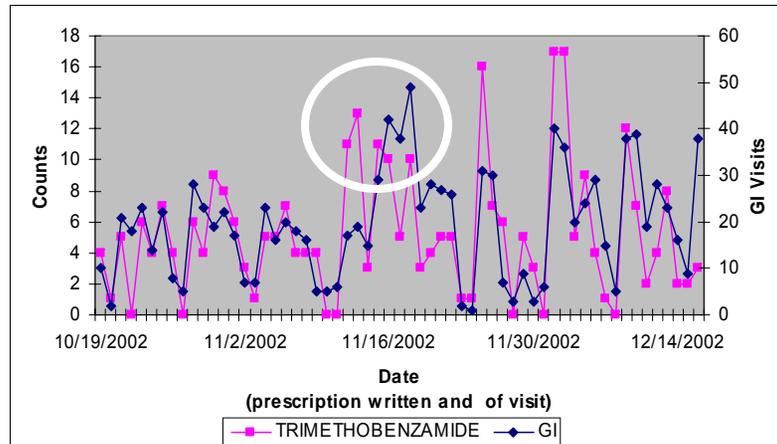
Antacids (D4B)



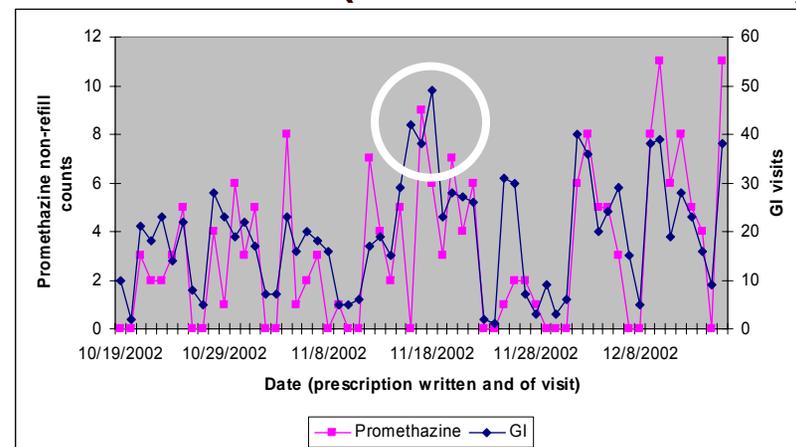


Ft. Leonard Wood Outbreak Drug Labels

Trimethobenzamide (H6J-antiemetics)



Promethazine (Z2A-antihistamines)





Known Respiratory Outbreaks

Location	Outbreak period
Ft. Benning, GA	Jul. 3-16, 2001
Camp Pendleton, CA	Nov. 28-30, 2001
	Feb. 6-12, 2002
Wright-Patterson AFB, OH	Feb. 4-18, 2002
San Diego, CA	Dec. 8-12, 2002



Medications Prescribed Commonly in Respiratory Outbreaks

- H3E – Analgesics/antipyretics, non-salicylate
- B3J – Expectorants
- J5E – Sympathomimetic agents
- W1A – Penicillins
- H6C – Antitussives, non-narcotic
- Q7D – Nose preparations, vasoconstrictors (OTC)



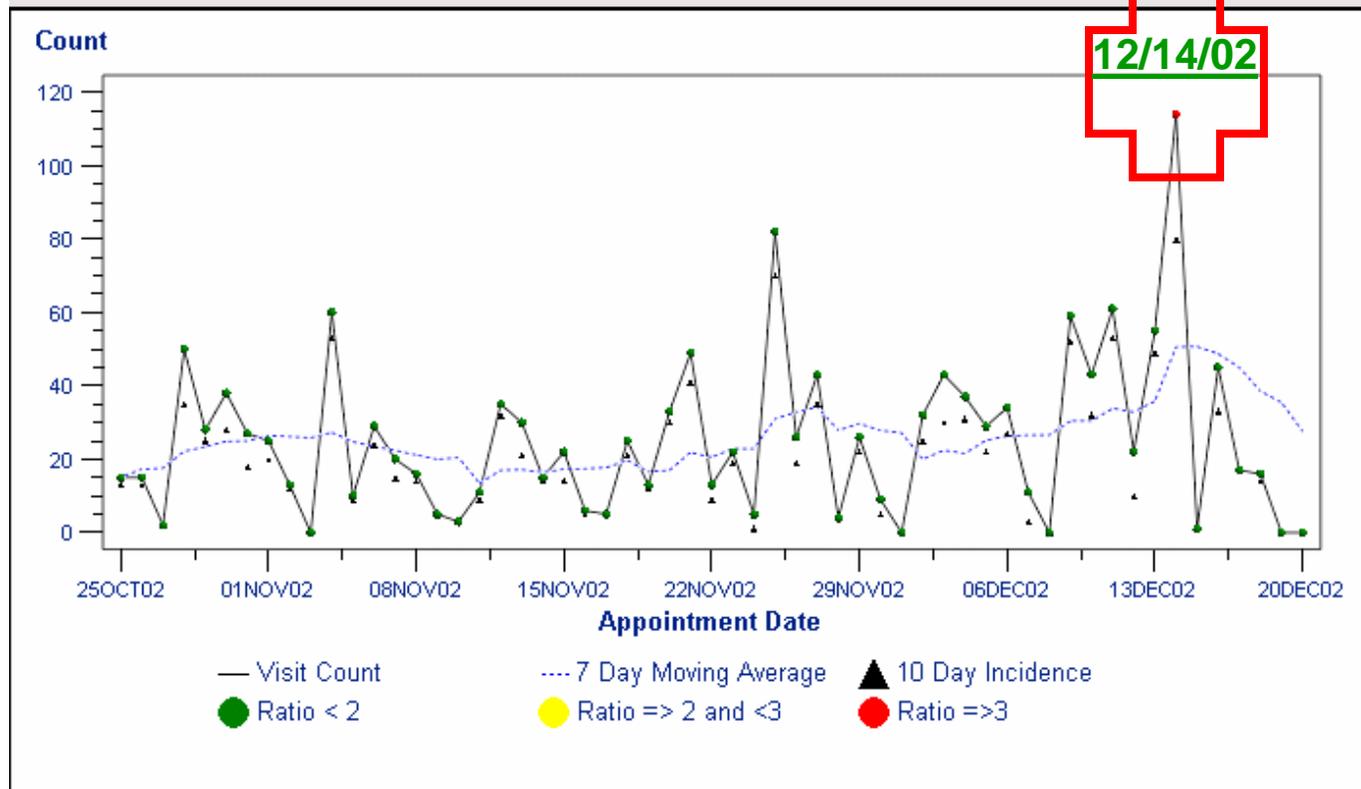
Known Respiratory Outbreaks

Location	Outbreak period
Ft. Benning, GA	Jul. 3-16, 2001
Camp Pendleton, CA	Nov. 28-30, 2001
	Feb. 6-12, 2002
Wright-Patterson AFB, OH	Feb. 4-18, 2002
San Diego, CA	Dec. 8-12, 2002



San Diego Respiratory Outbreak

RESP Syndrome Counts for NBMC MCRD SAN DIEGO





San Diego Respiratory Outbreak

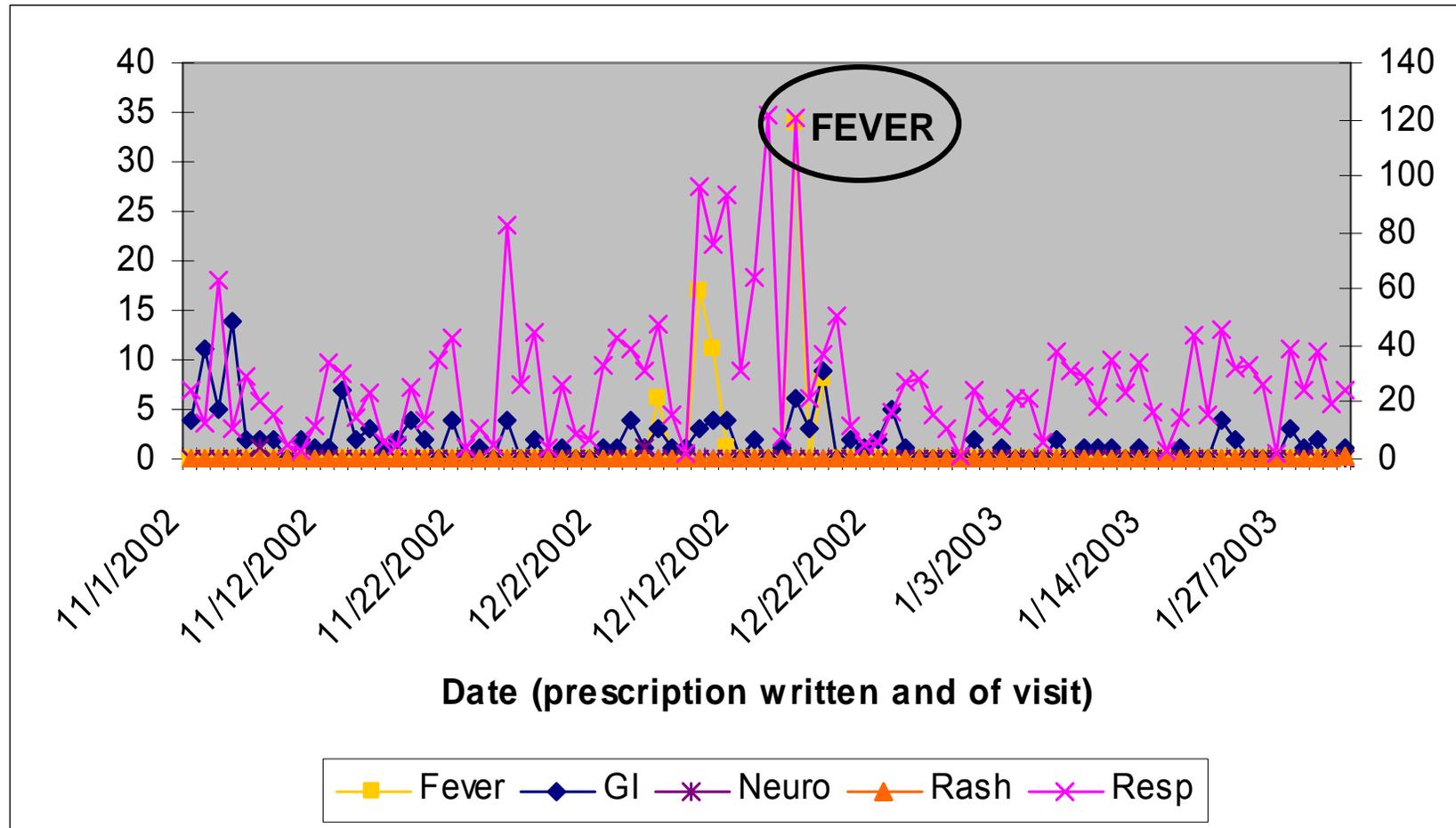
November 1 – December 20, 2002

- 128 recruits, median age 20 years
 - Radiographically confirmed pneumonia
- 31 Group A Streptococcus (GAS)
 - 6 confirmed GAS, 25 probable GAS
- Largest known GAS outbreak since 1968
(MSMR Sep/Oct 2003; 2)
- Symptoms
 - Cough
 - Fever
 - Sore throat
 - Chest pain
 - Dyspnea
 - Chills

Source: MMWR 2003 Feb 14:52(6);106-9



Other Syndrome Alerts





Medications Prescribed During San Diego Outbreak Time Period

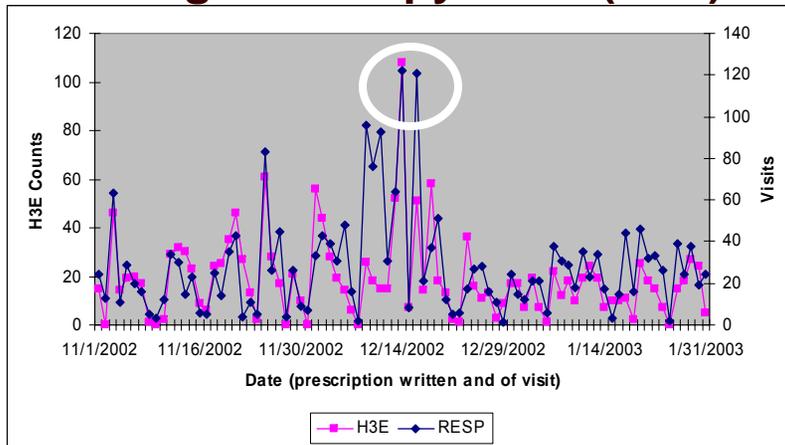
- H3E – Analgesics/antipyretics, non-salicylate
- J5E – Sympathomimetic agents
- B3J – Expectorants
- C3C – Zinc replacement
- W1D – Macrolides
- S2B – NSAIDS, cyclo-oxygenase inhibitor type
- W1Q – Quinolones



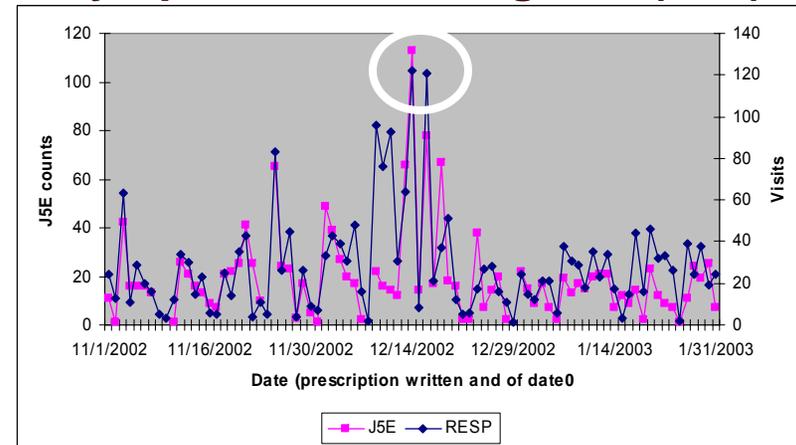
San Diego Outbreak Drug Classes



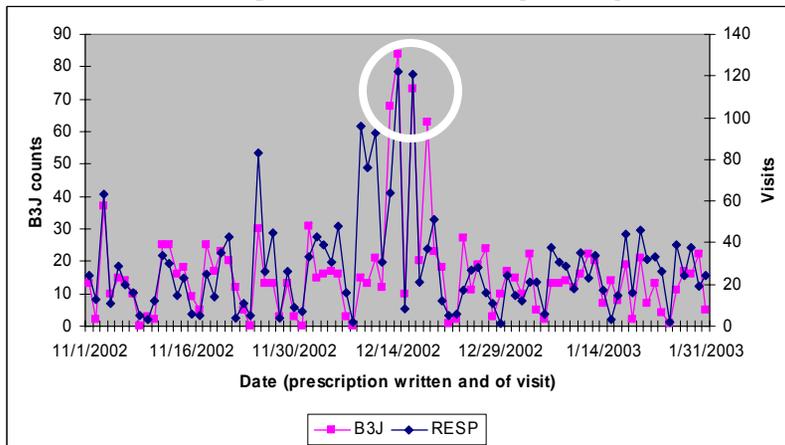
Analgesic/antipyretics (H3E)



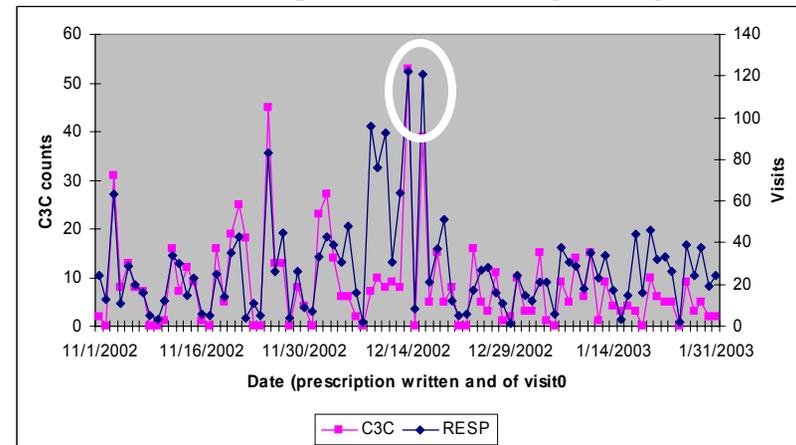
Sympathomimetic agents (J5E)



Expectorants (B3J)



Zinc replacement (C3C)





Conclusions

- Signals were better in larger outbreaks
- For GI and respiratory outbreaks, GC3 classes were generally useful
- In GI outbreaks, drilling down to the drug label was useful for drug classes that didn't show trends during outbreaks



Conclusions

- For GI syndrome, useful GC3 drug classes/labels for alerts:
 - Antiemetics (H6J)
 - Antidiarrheals (D6D)
 - Quinolones (W1Q)
 - Promethazine in Z2A (antihistamine drug class)
- For respiratory syndrome, useful GC3 drug classes for alerts:
 - H3E, analgesic/antipyretics
 - J5E, sympathomimetic agents
 - B3J, expectorants



Conclusions

- Our findings support Eader's conclusion that GC3 drug classes are useful for surveillance purposes
- This study differed from Eader's study
 - Encompassed more locations than the National Capital Area,
 - Covered a longer time frame
 - Data sources were evaluated during outbreaks
 - Studied both GC3 classes and drug labels



Conclusions

- Pharmacy data may augment outpatient visit data for GI and respiratory syndrome surveillance by ESSENCE
 - Lag of 1 day after a prescription is filled while outpatient visit data (on average, 1 to 3 days)
 - Pharmacy data are automatically sent once a prescription is filled while the reporting of outpatient visit data and the quality of data reported varies by military treatment facility