

Using Statewide Ambulance Diversion Data to Monitor Access to Emergency Care

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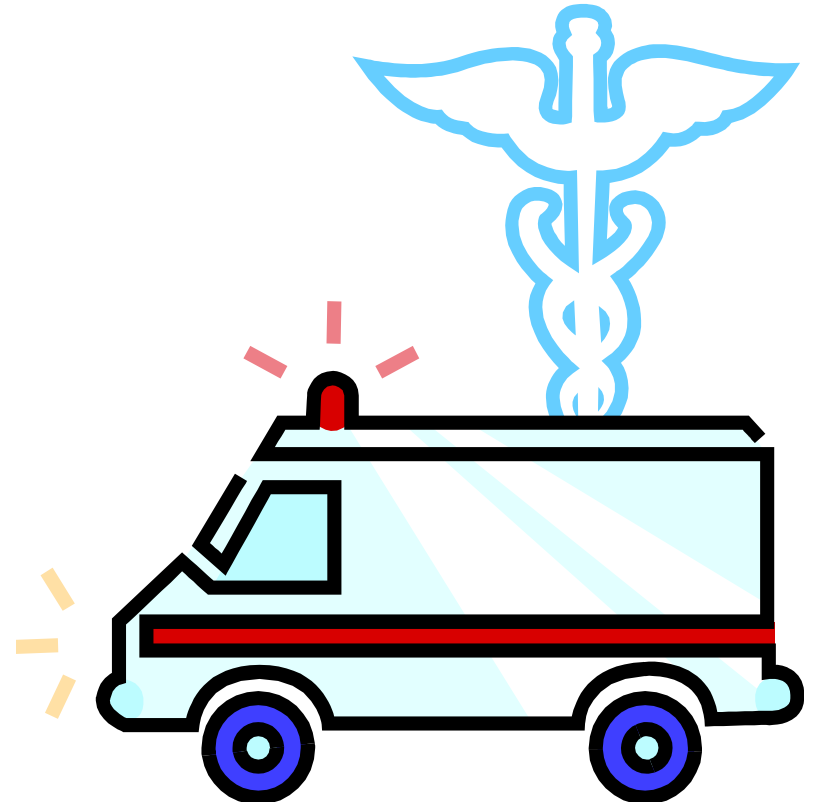
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Ambulance diversion

- Signal of ED overcrowding
- Direct access barrier
- Affects critically ill/injured

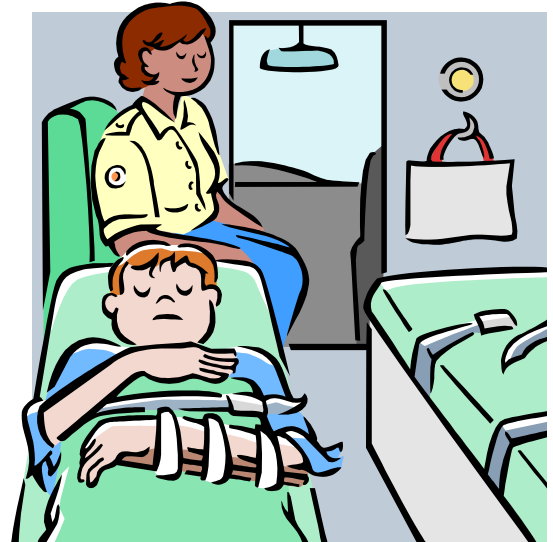
- Occurs once every minute nationally (NCHS)

- Part of larger ED overcrowding problem (IOM)



Surveillance of ambulance diversion activity

- Some states & local jurisdictions have real-time diversion alert systems
- Used to alert/re-route ambulances
- Sometimes used for EMS planning/performance measurement
- Not well-integrated into other areas of healthcare policy/planning
 - EMS is isolated
 - Missed opportunities to improve system performance

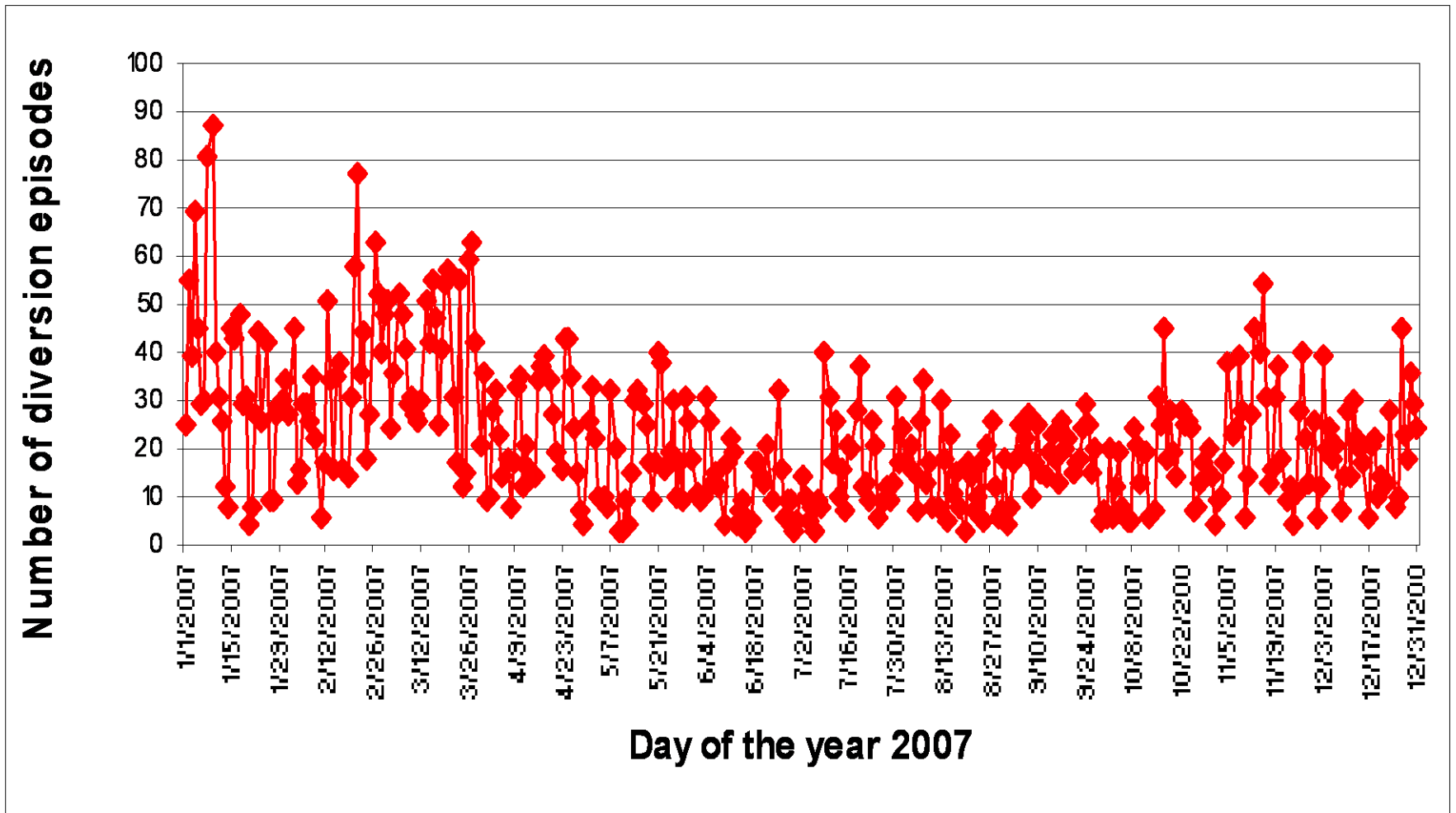


Research project

- Use ambulance diversion data as a tool for access surveillance
- Based on ambulance diversion alert system in NJ
- Daily records of “diversion alerts” for all of 2007
- Specific measures
 - Prevalence
 - Cyclicity
 - Concentration
 - Characteristics of frequently diverting hospitals

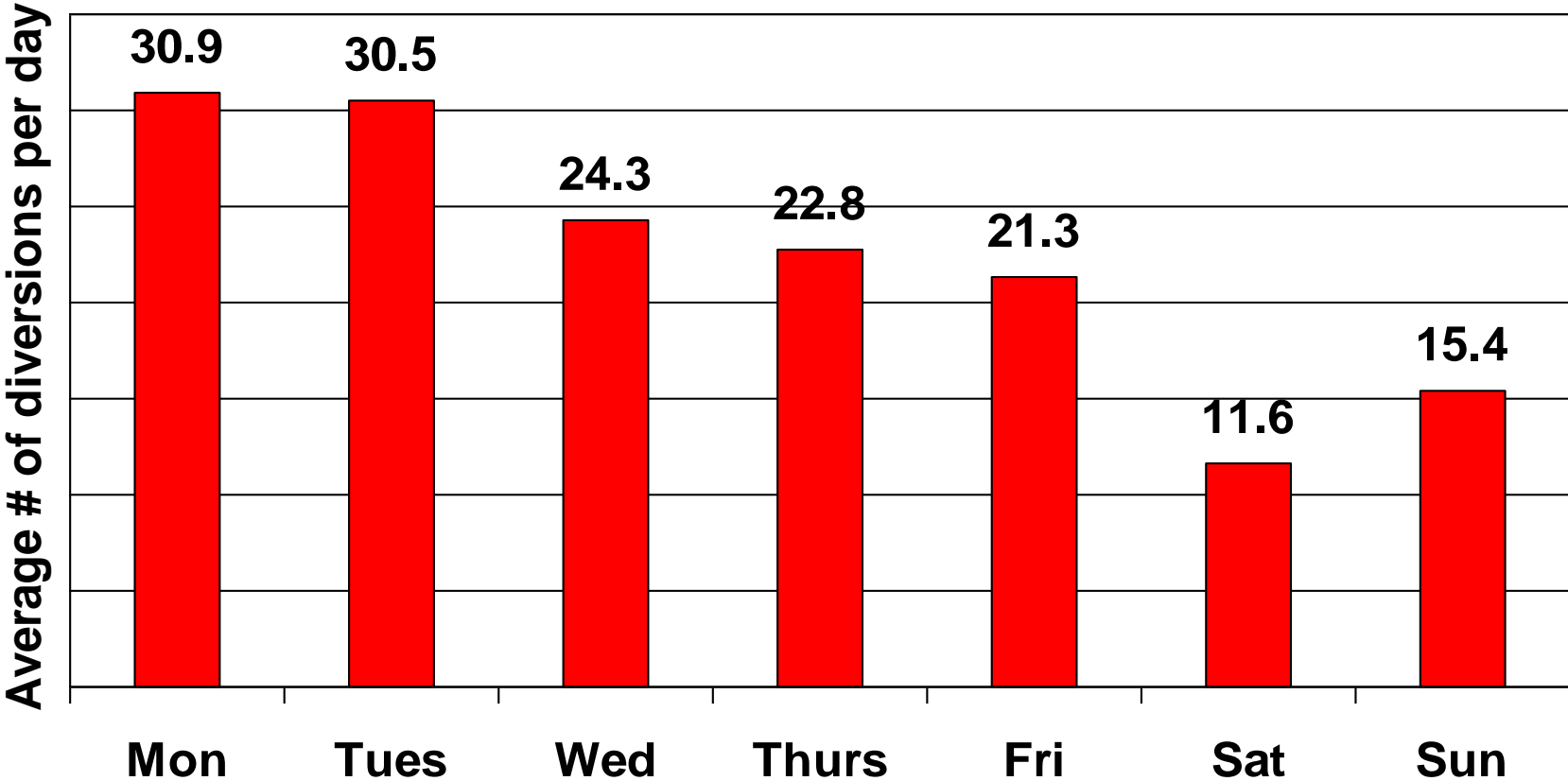
Ambulance diversions are common & cyclical.

8,172 total alerts \approx once per hour statewide



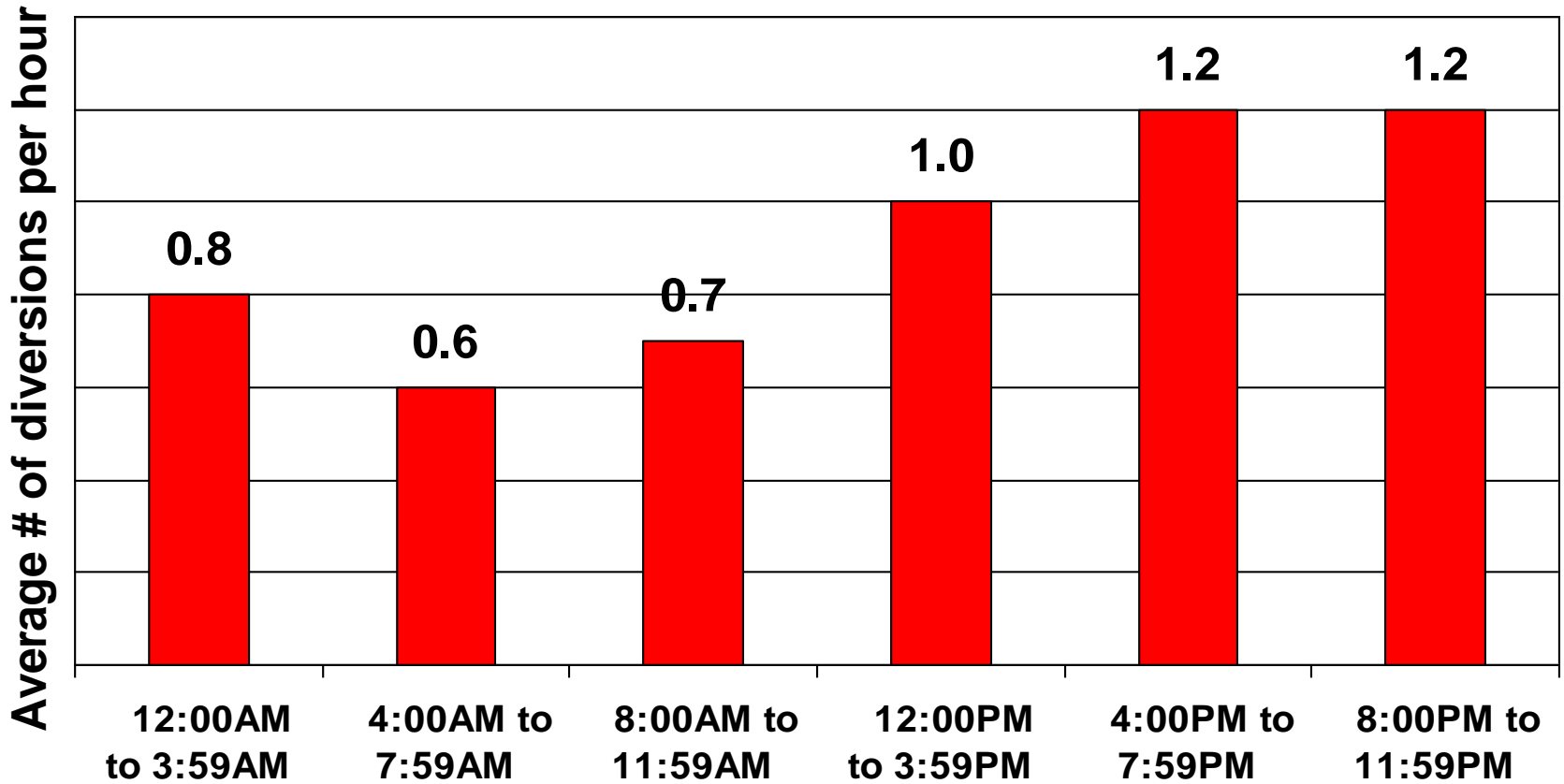
Source: NJ EMS Status

Ambulance diversions are more common early in the week and less common on weekends.



Source: NJ EMS Status

Ambulance diversions are most common in the early & late evening hours.



Source: NJ EMS Status

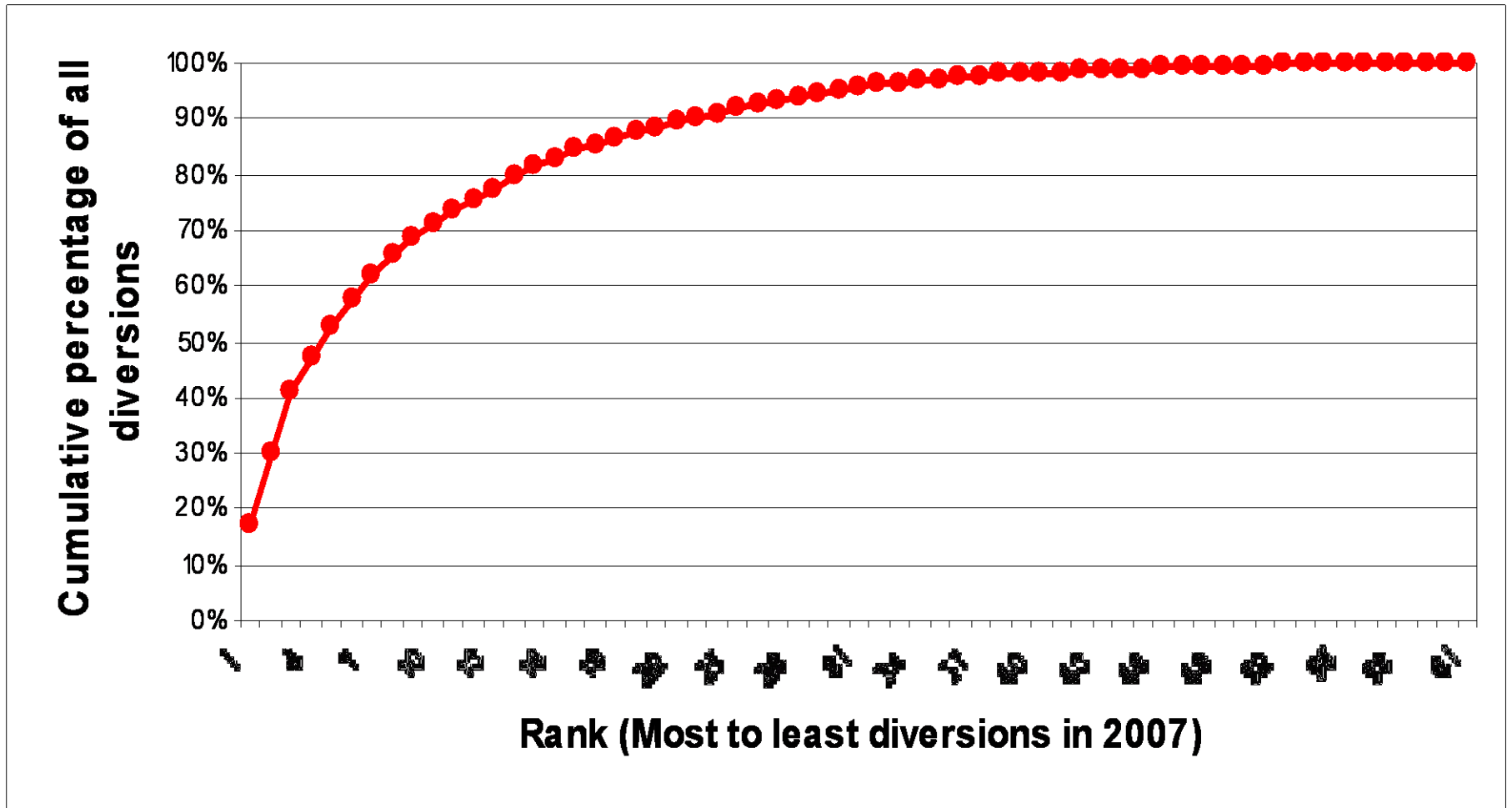
Hospitals in the same county diverting ambulances on the same day, 2007

| # Hospitals | # Days |
|--------------------|---------------|
| 2 or more | 657 |
| 3 or more | 154 |
| 4 or more | 33 |
| 5 or more | 6 |
| 6 or more | 1 |

Source: NJ EMS Status

Ambulance diversions are highly concentrated among a few hospitals.

21% of hospitals accounted for 84% of all diversion alerts



Source: NJ EMS Status

Classification of hospitals by diversion frequency

- Frequent diverters: 100+ diversions, N=17
- Occasional diverters: 1-99 diversions, N=45
- Never divert: 0 diversions, N=19

Frequency of ambulance diversion is positively associated with hospital size & volume.

Per hospital averages, 2007

| | Diversion frequency | | |
|-----------|----------------------------|------------------------------|----------------------------|
| | Never (0) | Occasional (1-99) | Frequent (100+) |
| Beds | 217 | 251 | 299 |
| ED visits | 38,651 | 40,036 | 50,812 |
| Tot adm | 10,451 | 13,199 | 17,701 |
| ED adm | 7,052 | 7,878 | 10,832 |
| Pt days | 52,358 | 63,580 | 83,026 |

Sources: NJ EMS Status, B-2 Hospital Utilization Report

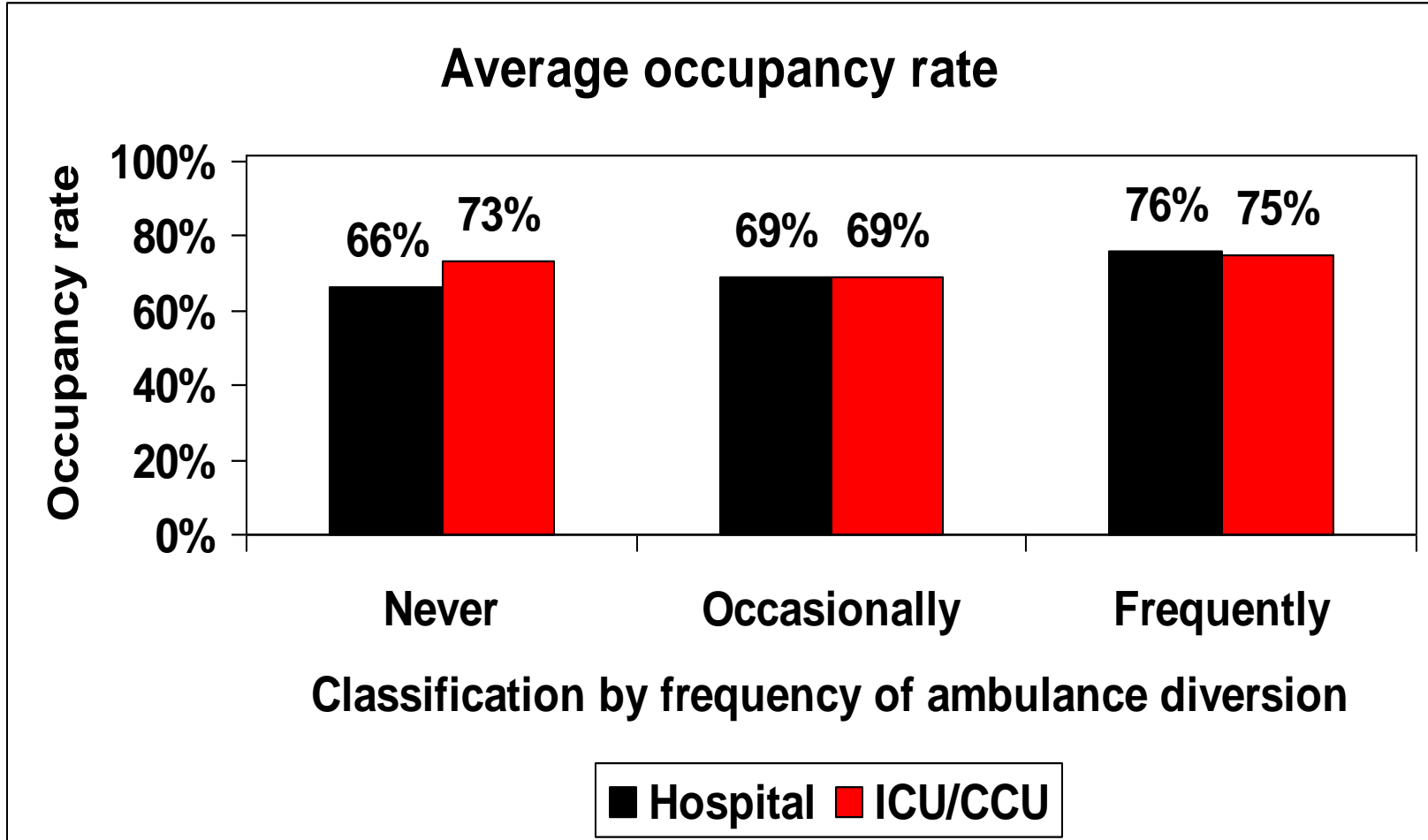
Frequency of ambulance diversion is positively associated with ICU/CCU size & volume.

Per hospital averages, 2007

| | Diversion frequency | | |
|--------------|----------------------------|------------------------------|----------------------------|
| | Never (0) | Occasional (1-99) | Frequent (100+) |
| ICU/CCU beds | 18 | 23 | 29 |
| ICU/CCU adm | 687 | 719 | 797 |
| ICU/CCU days | 4,800 | 5,714 | 7,926 |

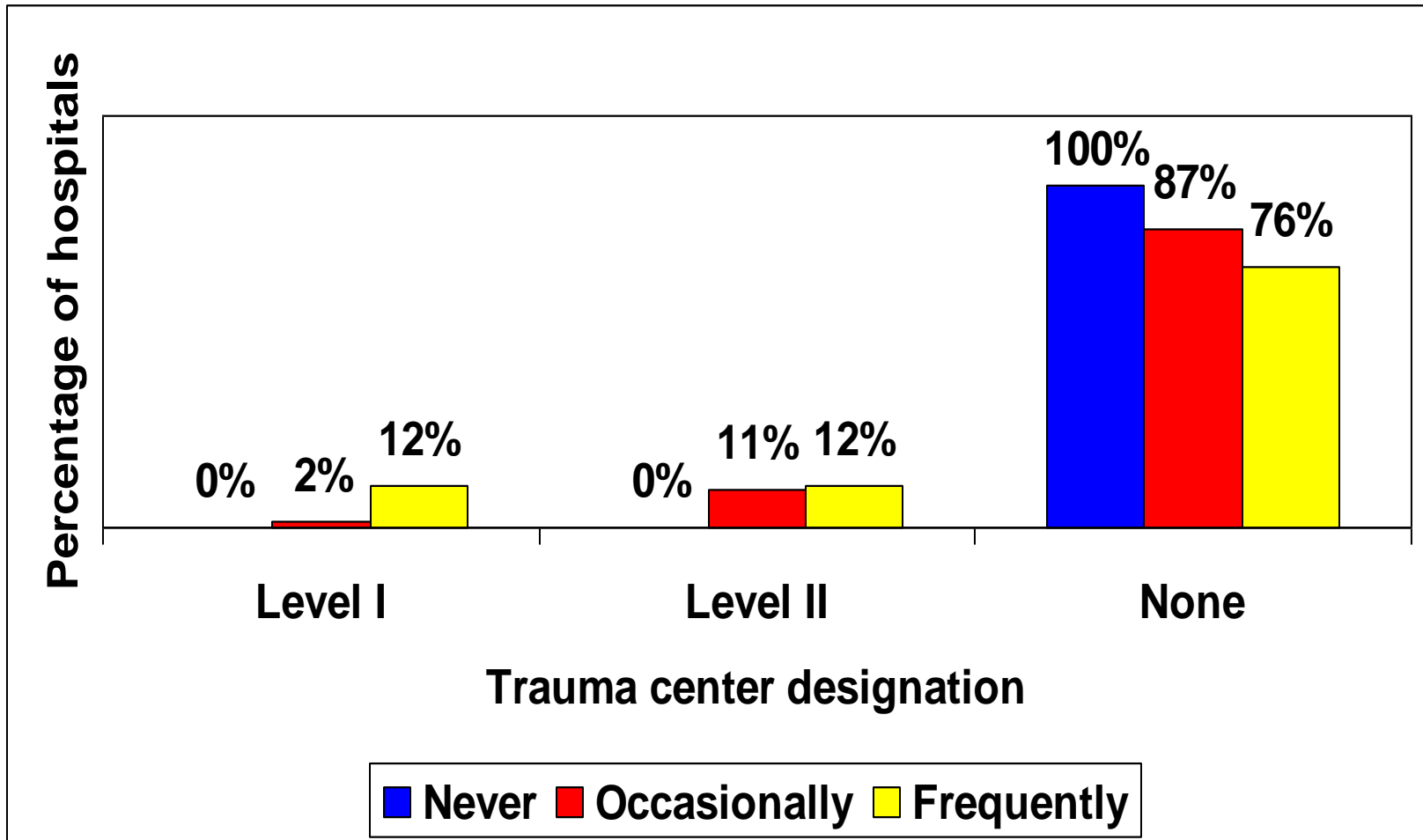
Sources: NJ EMS Status, B-2 Hospital Utilization Report

Frequency of ambulance diversion is associated greater hospital occupancy rates but not greater ICU's/CCU occupancy rates.



Sources: NJ EMS Status, B-2 Hospital Utilization Report

Diverting hospitals are more likely to be trauma centers. Frequently diverting hospitals are more likely to be Level I trauma centers.



Sources: NJ EMS Status, B-2 Hospital Utilization Report

Summary & conclusions

- Ambulance diversion is frequent
- Cyclical & somewhat predictable
Similar to prior research on occupancy rates
- Diversions among nearby hospitals on the same day
==> Signal of major access problems
- Limitation: Better to measure time on diversion within empirically derived markets
- Frequent diverters typically large, high volume, & trauma hospitals (most needed in emergencies)

Implications for hospital capacity & closure

- Hospital closures & bankruptcies are major policy issues in NJ
- Commission on Rationalizing HC Resources
Widespread belief that there is excess hosp capacity
More closures expected
Support for “essential” & “efficient” facilities only
- Excess capacity + ambulance diversions = ??????

New questions raised

- Is hospital capacity in NJ really excessive?
Not by U.S. or international standards
Higher occupancy, few beds per capita
- What if marginal facilities closed?
More stress on large/trauma hospitals
- Can remaining hospitals be used more efficiently?
Improve patient flow, primary care
- If so, can diversion be reduced/eliminated?
Goal, condition for receiving state aid

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