

Predicting Actual Patient Severity with Priority Dispatch Code

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Study objective:

Does priority dispatch code accurately predict the actual medical severity of the patient?

Secondary objective: Are fire/rescue departments being appropriately dispatched to the higher severity medical calls?

Methods:

A retrospective study of Citizens Memorial Hospital (CMH) Emergency Medical Services (EMS) Electronic Patient Care Reports (ePCR) was conducted to determine actual medical severity of patients. These results were compared to dispatch code provided by Polk County 9-1-1 using the National Academy of Emergency Medical Dispatch (NAEMD) Medical Priority Dispatch System (MPDS). ePCR data analyzed only included data for Polk County, Missouri from January 1, 2012 through May 18, 2015 and was compiled to include dispatch code, transport status, and billing code.

A formula was created to assign a numeric value to average actual medical severity of patients:

$$\dot{S} = \frac{100\% \left(\frac{A + 2B + 10C}{13} \right)}{\max(S)}$$

- S = Average actual medical severity of patients. The higher the number, the more severe the patient on a scale of 0-100.
- A = Percent of calls billed at “ALS1” rate.
- B = Percent of calls billed at “ALS2” rate.
- C = Percent of calls where the ambulance transported the hospital with lights and siren.
- *Note: If the number of calls in the time period studied (2012 through 2015) was less than 10 calls, a severity score was not calculated due to not having enough data.*

Results:

MPDS assigns a priority level to calls processed by an Emergency Medical Dispatcher (EMD).

Table 1 - Priority Code vs. Severity Score

Priority Code	Severity Score	Rescue currently dispatched?
Echo (highest priority)	100	Yes
Delta (high-priority ALS)	53	Yes
Charlie (low-priority ALS)	46	Yes
Bravo (high-priority BLS)	25	Yes
Alpha (low-priority BLS)	26	No
Omega (lowest priority)	14	No

MPDS assigns a protocol to calls processed by an EMD.

Table 2 - Protocol vs. Severity Score

Protocol	Severity Score	Rescue currently dispatched?
9 - Cardiac arrest	99	Yes
27 - Stab or gunshot	98	Yes
28 - Stroke	75	Yes
10 - Chest pain	57	Yes
19 - Heart problems	53	Yes
31 - Unconscious	49	Yes
6 - Breathing problems	46	Yes
24 - Pregnancy	46	Yes
30 - Traumatic injuries	41	Yes
13 - Diabetic problems	40	Yes
21 - Hemorrhage	37	Yes
1 - Abdominal pain	36	Yes
23 - Overdose	36	Yes
3 - Animal bites	35	Yes
5 - Back pain	34	Yes
26 - Sick person	34	Yes
33 - Transfer	33	No
12 - Convulsions	32	Yes
2 - Allergies	31	Yes
29 - Traffic incidents	31	Yes
17 - Falls	26	Yes
18 - Headache	26	Yes
25 - Psychiatric	25	Yes
32 - Unknown problem	22	Yes
0 - EMS request	20	Yes
20 - Heat/cold exposure	20	Yes
4 - Assault	18	Yes
7 - Burns	17	Yes
11 - Choking	17	Yes
8 - Carbon monoxide	NA	Yes
14 - Drowning	NA	Yes
15 - Electrocutation	NA	Yes
16 - Eye problems	NA	Yes
22 - Inaccessible incident	NA	Yes

Currently, ambulances are dispatched in Polk County to approximately 11.9 calls per day. Fire Departments assist with medical calls and are currently dispatched on all Echo, Delta, Charlie, and Bravo calls in Polk County which averages 6.1 calls per day.

Conclusion:

A clear relationship exists between MPDS-assigned priority level and actual patient severity score as seen in Table 1 - Priority Code vs. Severity Score. However, the difference between Alpha and Bravo priorities is negligible in regard to severity score.

Secondary conclusion: A modification may be necessary to current dispatch policies to more appropriately assign fire/rescue to only the higher severity calls. The author makes no recommendations on what the new policy should be, but some options are listed below.

- If fire/rescue is only dispatched to Echo, Delta, and Charlie priorities, the average daily call volume would be reduced from 6.1 to 4.7 calls per day. The only change would be not responding the Bravo calls which has a comparable severity score to Alpha calls that are currently not being responded to.
- If fire/rescue is only dispatched to call types with a severity score of 30 or greater, the average daily call volume would be reduced from 6.1 to 4.7 calls per day. The only change would be not responding to the following call types:
 - 0 (EMS request)
 - 4 (Assault)
 - 7 (Burns)
 - 11 (Choking)
 - 17 (Falls)
 - 18 (Headache)
 - 20 (Heat/cold exposure)
 - 25 (Psychiatric)
 - 32 (Unknown problem)
- If fire/rescue is only dispatched to Echo, Delta, and Charlie priorities and call types with a severity score of 30 or greater, the average daily call volume would be reduced from 6.1 to 3.0 calls per day. The only change would be not responding to Bravo calls and not responding to the call types listed in previous example.