

# *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?
<b>Echo</b> (highest priority)	<b>100</b>	<b>Yes</b>
<b>Delta</b> (high-priority ALS)	<b>53</b>	<b>Yes</b>
<b>Charlie</b> (low-priority ALS)	<b>46</b>	<b>Yes</b>
<b>Bravo</b> (high-priority BLS)	25	<b>Yes</b>
<b>Alpha</b> (low-priority BLS)	26	No
<b>Omega</b> (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?
<b>9 - Cardiac arrest</b>	<b>99</b>	<b>Yes</b>
<b>27 - Stab or gunshot</b>	<b>98</b>	<b>Yes</b>
<b>28 - Stroke</b>	<b>75</b>	<b>Yes</b>
<b>10 - Chest pain</b>	<b>57</b>	<b>Yes</b>
<b>19 - Heart problems</b>	<b>53</b>	<b>Yes</b>
<b>31 - Unconscious</b>	<b>49</b>	<b>Yes</b>
<b>6 - Breathing problems</b>	<b>46</b>	<b>Yes</b>
<b>24 - Pregnancy</b>	<b>46</b>	<b>Yes</b>
<b>30 - Traumatic injuries</b>	<b>41</b>	<b>Yes</b>
<b>13 - Diabetic problems</b>	<b>40</b>	<b>Yes</b>
<b>21 - Hemorrhage</b>	<b>37</b>	<b>Yes</b>
<b>1 - Abdominal pain</b>	<b>36</b>	<b>Yes</b>
<b>23 - Overdose</b>	<b>36</b>	<b>Yes</b>
<b>3 - Animal bites</b>	<b>35</b>	<b>Yes</b>
<b>5 - Back pain</b>	<b>34</b>	<b>Yes</b>
<b>26 - Sick person</b>	<b>34</b>	<b>Yes</b>
<b>33 - Transfer</b>	33	No
<b>12 - Convulsions</b>	<b>32</b>	<b>Yes</b>
<b>2 - Allergies</b>	<b>31</b>	<b>Yes</b>
<b>29 - Traffic incidents</b>	<b>31</b>	<b>Yes</b>
<b>17 - Falls</b>	26	<b>Yes</b>
<b>18 - Headache</b>	26	<b>Yes</b>
<b>25 - Psychiatric</b>	25	<b>Yes</b>
<b>32 - Unknown problem</b>	22	<b>Yes</b>
<b>0 - EMS request</b>	20	<b>Yes</b>
<b>20 - Heat/cold exposure</b>	20	<b>Yes</b>
<b>4 - Assault</b>	18	<b>Yes</b>
<b>7 - Burns</b>	17	<b>Yes</b>
<b>11 - Choking</b>	17	<b>Yes</b>
<b>8 - Carbon monoxide</b>	NA	<b>Yes</b>
<b>14 - Drowning</b>	NA	<b>Yes</b>
<b>15 - Electrocutation</b>	NA	<b>Yes</b>
<b>16 - Eye problems</b>	NA	<b>Yes</b>
<b>22 - Inaccessible incident</b>	NA	<b>Yes</b>

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.