Why Denver Health's Reported Trauma Survival Rate Is Not an Accurate Indicator of the Quality of Denver's EMS system.

By: Robert Petre

Denver Health has used their reported trauma survival percentage rate as evidence that Denver Health has provided an adequate number of Paramedic ambulances for the City. This "survival percentage rate" has been used to justify Denver Health's continued provision of EMS for the City. This rate reported as high as 95% for blunt and penetrating trauma survival has been sighted in statements such as "if Denver doesn't have a great pre-hospital system then how could our trauma survival percentage rate be so high?" The answer to this question is that Denver Health's trauma survival percentage rate is a measure of only the hospitals performance in treating trauma patients if they arrive with vital signs at Denver Health. No consideration is given to the patient's pre-hospital response or care only the patient's condition on arrival is used to determine witch patients are in the reported survival percentage rate. Denver's Pre-Hospital 911 system has no effect on Denver Health's reported trauma survival percentage rate. To be included in the survival statistics the patient must go to Denver Health and must have a pulse or signs of life on arrival at Denver Health. In addition to this large numbers of critical and fatal trauma patients are excluded from the "survival Percentage". It is also not a measure of the likelihood for survival of any given individual who suffers critical trauma somewhere in the City and County of Denver.

Denver Health excludes patients that may have died as a direct result of their own systems prolonged response times. The trauma survival statistics only include patients that come to Denver Health. The data only includes patients who arrive with some detectable vital signs. This means that if a patient arrives at Denver Health after their heart has stopped due to a prolonged response time to their critical injury they are excluded from the statistics.

There is another way that the trauma survival rate is skewed not to reflect the EMS systems performance. This issue involves the protocols for destination of trauma patients and the geographical location of Denver Health. Denver Health sits close to downtown and is surrounded by a number of outlying level 1 and level 2 trauma centers. Under the destination policy set by Denver Health patients with trauma that appears critical or that may become critical are to be transported to Denver Health regardless of the calls location. This is not the case when trauma patients are in cardiac arrest or profound shock and appear to be about to suffer cardiac arrest. In the case of cardiac arrest or profound shock and near cardiac arrest from trauma the patient is to be transported to the closest Level 1 or Level 2 Trauma center. This means that the patients

who are most likely to die are taken to the closest level 1 or level 2 trauma center while those who have the greatest likelihood of survival are taken to Denver Health. Patients that do arrive at Denver Health in traumatic cardiac arrest are also eliminated from the survival rate statistics because they arrive at Denver Health "without signs of Life".

That Denver Health's trauma survival rate is not a measure of the adequacy of the number of ALS ambulances on the streets of Denver is further shown by the following. If we reduced the number of paramedic ambulances to only one ambulance to cover the entire City and County of Denver 24/7 there would be no change in Denver Health's survival percentage rate for trauma patients that arrive at Denver Health with signs of life. We would also not see a change in their survival percentage rate if we put 50 Paramedic ambulances on the streets. This is because the survival percentage rate is based on the patient's condition when they arrive at Denver Health. (Have "signs of life" or "any vital signs") What we would see if we had only 1 Ambulance is a smaller absolute number of trauma patients with "any vital signs" arriving at Denver Health. The actual number of survivors would go down but the survival percentage rate would not change. Having 50 Paramedic ambulances would result in a larger number of trauma patients arriving with vital signs but again no change in the survival percentage rate. A greater number of lives would be saved but not a greater percentage of patients who arrive at Denver Health with vital signs.

If we look at a possible trauma case we can see how Denver Health's trauma survival statistics don't reflect the EMS systems performance. In this case a patient is critically injured at Federal and Yale in southwest Denver. If the paramedics have a quick response time and they find the patient with critical trauma he is transported emergency (lights and siren) to Denver Health. If the patient arrives at Denver Health and is not in cardiac arrest then he is placed in the trauma survival statistics. Now lets see what happens if there is a prolonged response time. If the Paramedics are delayed and arrive after the patient has gone into profound shock or cardiac arrest then he is transported to Swedish Hospital. (The closest level 1 trauma center) This patient was not transported to Denver Health and therefore is not included in the trauma survival rates reported by Denver Health. This same situation happens in any part of the city that is not in that relatively small area that is closest to Denver Health. The frequency of these events is dramatically increased by the fact that prolonged response times are most likely to occur in the parts of the city that are not closest to Denver Health.

Further evidence that Denver Health's trauma survival rate is not indicative of the adequacy of Denver's EMS system is the fact that Denver Health's "trauma survival rate" includes patients that arrive at Denver Health by private car who never access Denver's pre-hospital care system. This "survival rate" also includes patients that arrive by helicopter and from other cities and jurisdictions. According to Denver Health's "White Paper" 25% to 30% of the patients in Denver Health's trauma survival percentage rate never have contact with Denver's EMS system.

There is another group of trauma patients that can die as a direct result of a

prolonged paramedic ambulance response time and not be included in Denver Health's "trauma survival rate". This group includes patients that die while waiting for an ambulance and are then declared dead at the scene by the paramedics. This group doesn't arrive at Denver Health with "vital signs or signs of life" and are therefore also not included in their survival rate. The survival rate for patients who arrive at Denver Health with vital signs or signs of life is in fact not evidence of the adequacy of the EMS system provided by Denver Health.