**Incentive-Compatible Multi-level Triage in Emergency Medical Services**

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The Emergency Medical Services (EMS) system is designed to handle life-threatening emergencies, but a large and growing number of non-emergency patients are accessing hospital-based healthcare through EMS. A recent national survey estimated that 17% of ambulance trips to hospital Emergency Departments (EDs) were medically unnecessary, and that medically unnecessary trips make up an increasing proportion of all EMS trips. These non-emergency patients do not need the high level of care that an ED provides and could often be treated at an outpatient facility at considerably lower cost. Preliminary studies have shown that EMS ambulance workers could identify and filter out non-emergency patients with high accuracy, if given the chance. However, current reimbursement policies preclude this kind of triage at the ambulance, as most ambulance services only get reimbursed for providing transportation to the ED. Without triage at the ambulance, non-emergency patients often end up in congested ED waiting rooms for extended periods, because EDs strictly prioritize emergency patients. These non-emergency patients are therefore a prime target for reducing the load on EDs in order to meet quality-of-service goals, such as waiting time targets, without increasing costs or reducing quality of care. Our study uses a queueing model to examine the feasibility and benefit of constructing alternative arrangements whereby the hospital incentivizes the ambulance service to divert non-emergency patients to outpatient facilities. The usefulness of such arrangements depends upon the average hospital costs and reimbursements of emergency and non-emergency patients and on the current ambulance reimbursement rates through insurance and Medicare. We identify multiple scenarios where both the hospital and ambulance service can benefit by agreeing upon a certain level of triage by the ambulance service.