

Effects of electronic laboratory ordering on Emergency Department process efficiency

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Dear Editor,

Emergency Department crowding is a complex problem with associated patient mortality.¹ Solutions include eliminating bottlenecks in care processes to improve emergency department (ED) capacity, flow and crowding.² Since every one minute reduction in laboratory turnaround times shortens individual ED length of stay (LOS) by 30 seconds, reducing the time interval from ordering laboratory tests to results becoming available could contribute to incrementally reducing overall LOS.³

St. Vincent's University Hospital (SVUH) Emergency Department changed from paper-based laboratory orders to electronic ordering (OCS) on 09/05/2023. We conducted a focused pre- and post-implementation evaluation of the effect of this change using two convenience samples of 50 ED patients who required haematology laboratory tests over the first week in March 2023 and 2024 respectively. Patients were selected retrospectively and randomly from routine, extended day and on-call hours across each seven-day period, excluding those where a collection time was unrecorded, add on-requests, or requests ordered by inpatient teams. Times tests were requested, received and resulted from the laboratory system were manually matched with the times each patient was registered, triaged, seen by a clinician, referred if relevant, and admitted or discharged. Time intervals were presented as medians (interquartile ranges) as the data was non-parametrically distributed. No other process changes occurred during the periods evaluated.

The median time from patients commencing triage to tests being requested reduced by 56% from 69 (36-131.5) to 30.4 (16.2-64.8) min, and from commencing triage to results being reported reduced by 29% from 143.5 (109-204.3) to 102 (72.5-162) min.

26/50 patients had orders requested prior to clinician review using paper-based ordering. This increased to 31/50 after electronic ordering was introduced. If requested after clinician review, the median time from request placement to result availability reduced by 32% from 103 (64.5-128) to 70 (40.5-121.5) min.

Overall median patient LOS reduced from 26.9 (14.7-53.4) hours to 21.4 (14.6-52.9) hours.

These data suggest that electronic laboratory ordering can reduce two bottlenecks in the ED patient journey. Ease of use of electronic systems means that relevant laboratory investigations can be efficiently front-loaded at the time of triage, with results available much sooner than if using a paper-based system. If investigations are ordered after first clinician review, the time for results to be available is also much shorter, reflecting the process efficiency of electronically populating a duty phlebotomist's worklist. While there was a reduction in overall patient LOS, this is likely multifactorial rather than due to electronic ordering alone.

Gilligan et al reported that patients who had blood tests in their ED had significantly increased lengths of stay (LOS) (an additional 6 hours and 30 minutes) and called for improved turnaround times for investigations.⁴ While their site used electronic ordering, many other Irish EDs are reliant on inefficient paper-based ordering systems. The experience in SVUH ED suggests that other Irish EDs can expect improvements in laboratory turnaround times and potentially reduced ED LOS if they invest in the systems required for electronic ordering, and adds weight to the Health Service Executive's digital transformation agenda.

Declarations of Conflicts of Interest:

None declared.

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