Accuracy of documented administration times for intravenous antimicrobial drugs

Roydhouse S.A.[1, 2], Carland J.E.[1, 2], Debono D.S.[3], Baysari M.T.[4], Staciwa A.[5], Sandhu A.[5], Day R.O.[1,2,6], Stocker S.L.[1, 2]

1. St Vincent's Clinical School, The University of New South Wales, Sydney, Australia.
2. Department of Clinical Pharmacology and Toxicology, St Vincent's Hospital Sydney, Sydney, Australia
3. Centre for Health Services Management, Faculty of Health, The University of Technology Sydney, Sydney, Australia
4. Sydney School of Health Sciences, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia
5. Pharmacy Department, St Vincent's Hospital Sydney, Sydney, Australia
6. School of Medical Sciences, The University of New South Wales, Sydney, Australia

Background: An accurate record of medication administration time is imperative for many therapeutic decisions, including for dosing of intravenous antimicrobials. Anecdotal evidence suggests that documented administration time is not accurate. The study aims were (1) to determine the discrepancy between actual and documented administration times for intravenous antimicrobial medications subject to therapeutic drug monitoring and (2) to determine whether day of the week, time of day, nurse-to-patient ratio and drug type impacted the accuracy of documented administration times.

Methods: Patient (e.g. location) and dosing (e.g. medication) data were collected from the electronic medication management system (EMMS) between June and August 2019 for 55 inpatients receiving intravenous antimicrobials at a metropolitan teaching hospital. "Documented" administration time was ascertained from the EMMS. "Actual" administration time was determined from infusion pump time-event logs for 660 infusions. Actual and documented administration times were compared. Influence of day of the week (weekday, weekend), time of day (day 0700-1459, evening 1500-2159, night 2200-0659), nurse-to-patient ratio (high 1:1, low 1:5), and drug type on administration time discrepancies was examined.

Results: The median discrepancy between the actual and documented administration time was 16 min (range, 2-293 min), with discrepancies greater than 60 min occurring in 7.7% of administrations. Overall, discrepancies (median [range]) were similar on weekends (17 [2-293] min) and weekdays (16 [2-188] min), and for high (16 [2-157] min) and low nurse-to-patient ratio wards (16 [2-293] min). The smallest discrepancies were observed for night administrations ($p<0.05$), and antimicrobials with shorter half-lives ($p<0.0001$).

Conclusion: There was little difference between actual and documented intravenous antimicrobial administration times. Further work is required to determine whether these discrepancies will impact interpretation and clinical decision making and thus patient safety.

Key words: Therapeutic drug monitoring, medication administration error, medication documentation, smart pump