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Emergency Department Electronic Billing Algorithm Increases Charges Per Patient Encounter

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Study objective: Emergency Department (ED) visit charges may be affected by many factors including supporting documentation, perceived acuity, and coding practice. Decreased charges resulting from inadequate documentation or inconsistent coding may result in revenue loss. In this study, we sought to measure the impact of an automated electronic algorithm that monitors documentation and provides real-time support on ED facility visit charge capture.

Methods: This cross-sectional study was performed at an urban, academic ED. The integrated coding software (LYNX E/Code®) was added to the existing ED information system (Picis, PulseCheck®) on March 4, 2008. Physicians, nurses, and coders received brief training just prior to implementation. The E/Code system auto-populates coding-related fields from clinical data, which become available to facility coders after the patient visit is complete. The system also prompts nursing staff to provide specific documentation and provides assistance to determine the level of acuity and appropriate visit level charge (5-point scale, with 5 as highest score). We analyzed charges and visit level codes for the 6 weeks before and after E/Code system implementation. We included only patients that were discharged or transferred from the ED and excluded those that were admitted (because inpatient services are included in facility charge) or left prior to treatment. Analysis included chi-square and student's t-test for univariate comparisons and multivariate linear regression for evaluation of the independent effect of E/Code implementation on the primary outcome of facility charges.

Results: Of the 12,023 ED visits during the study period, we analyzed 9,193 (76%) eligible visits during the study period (4,407 before and 4,786 after E/Code implementation). Characteristics of patients, including age, sex, race/ethnicity, and mode of transport were similar before and after implementation. The mean per patient facility charges increased from $1,327 (95% confidence interval [CI], 1,303 to 1,351) to $1,890 (95%CI, 1,861 to 1,919) after algorithm implementation, representing an increase of $563 (95%CI, 525 to 601) per patient visit ($p<0.001$). After controlling for demographic and visit characteristics, E/Code implementation retained a strong association with increased facility charges (=553 [95%CI, 509 to 598]). Corresponding to the increased facility charges, there was a decrease in visits billed as level 3, from 53% to 36%, and an increase at higher levels visits (4 and 5), from 23% to 36% and from 2% to 15%, respectively (all $p<0.001$).

Conclusion: In our ED, introduction of an automated coding algorithm, linked to an ED information system, was associated with an immediate 42% increase in ED facility charges. Since patient demographics and acuity appeared to be stable, this increase is likely attributable to higher coding levels from enhanced documentation and improved assessment of intensity of services provided.