

Delirium: Managing a Hospital Blind Spot with High Definition Care

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Introduction

Delirium (also known as encephalopathy) is a prevalent and dangerous state of confusion that is common among the 18 million elderly patients admitted to US hospitals each year, affecting 20–30% of general medicine patients and 70–80% of ICU patients¹. It may start a cascade of events including mortality, inpatient falls, further complications, and increased utilization of extended care facilities². Delirium is known to extend the hospital stay by a mean of 7.8 days³. The annual estimated cost to the US healthcare system to care for elderly patients with delirium is over \$150 billion⁴. Much of this expense is for additional care due to undetected delirium that impedes early intervention. Although delirium has such a high incidence in the elderly hospitalized population and significant reimbursement is available, hospitals currently code for delirium in just 0.72% of all inpatient encounters, and just 1.2% of cases for encounters with patients greater than age 65⁵.

The Delirium Conundrum

Because delirium is nearly universally under-recognized and under-treated, hospitals are already paying for the cascading effects of delirium but failing to capture the available reimbursement.

Additionally, the failure to identify and surface the presence of delirium results in an inappropriately low case mix index, negatively affecting risk-adjustment in pay-for-performance initiatives.

High Definition Care provides a systematic approach to screening, documentation, and early intervention for delirium, which can result in improved reimbursement, decreased penalties, and better patient outcomes.

¹ Inouye, S.K., *Delirium in older persons*. N Engl J Med, 2006. **354**(11): p. 1157-65.

² Leslie DL, Inouye SK. The importance of delirium: economic and societal costs. J Am Geriatr Soc. 2011;59 Suppl 2(Suppl 2):S241-3.

³ McCusker, J., et al., *Does delirium increase hospital stay?* J Am Geriatr Soc, 2003. 51(11): p. 1539-46.

⁴ Leslie, D.L., et al., *One-year health care costs associated with delirium in the elderly population*. Arch Intern Med, 2008. **168**(1): p. 27-32.

⁵ The Advisory Board, *Better delirium screening offers significant LOS and cost opportunity*. January 2016.

The Value and Limitations of Conventional Delirium Screening

Successful screening for delirium results in:

1. The opportunity for early intervention to prevent the dangerous and costly cascade of events that may ensue
2. Surfaces the presence of potential delirium to clinicians for confirmation and documentation, leading to appropriate reimbursement for such high-acuity patients.

Unfortunately, current methods of screening fall short. Several manual screening tools such as CAM-ICU, DOSS, and numerous others have been developed and are in widespread use by care providers. These methods require staff to gather information from the patient and medical record, calculate a score, and document in the EMR. Unfortunately, these methods are highly subjective. In highly controlled clinical trials, they demonstrate acceptable performance, but in real-world use they have been documented to have very poor sensitivity for detection. The most used such screening tool, CAM-ICU, has been demonstrated to have a sensitivity as low as 47% for detecting the presence of delirium under real-world conditions⁶.

Additionally, when delirium is detected through screening, many hospitals lack a systematic and evidence-based approach to both documenting and mitigating it. A systematic approach to screening and intervention demonstrated a 47% reduction in length-of-stay and 78% reduction in mortality for patients with delirium⁷.

The Potential Revenue Effects of Systematic Delirium Screening

Undetected delirium has a substantial detrimental economic impact on hospitals caring for these patients. Whether diagnosed or not, hospitals are expending resources for the care of these patients. 70-90% of patients with delirium are not coded appropriately for reimbursement. In a DRG-based payment model, appropriately coding the presence of delirium (encephalopathy) could provide approximately \$2,700–\$5,400 in additional Medicare reimbursement per patient through the resulting CC/MCC adjustment (see Table 1 for example of reimbursement differences for appropriate capture of CC/MCC codes).

⁶ van Eijk, M. M., et al. (2011). *Routine use of the confusion assessment method for the intensive care unit: a multicenter study*. *American Journal of Respiratory and Critical Care Medicine*, 184(3), 340–344.

⁷ Lundström, M. et al. (2005). A multifactorial intervention program reduces the duration of delirium, length of hospitalization, and mortality in delirious patients. *Journal of the American Geriatrics Society*, 53(4), 622–628.

DRG Definition	Average Medicare Payments
177 - RESPIRATORY INFECTIONS & INFLAMMATIONS W MCC	\$12,238.06
178 - RESPIRATORY INFECTIONS & INFLAMMATIONS W CC	\$8,573.37
179 - RESPIRATORY INFECTIONS & INFLAMMATIONS W/O CC/MCC	\$5,868.26

Table 1. Example of reimbursement difference based on billing code used for potentially same condition

The High Definition Care Approach to Delirium

High Definition Care provides a systematic, reliable, and sustainable approach to managing delirium, reducing costs of care, improving outcomes, reducing nursing workload, and capturing appropriate reimbursement. The HDC-Delirium module consists of a machine learning model that consumes EHR data and continuously monitors hospitalized adult patients. The module automatically recreens patients for delirium whenever new data is available in the electronic health record. Our screening tool has been trained on more than 13,000 patient encounters and validated to have an accuracy of 80%. By removing routine delirium screening from the nursing workflow, nurses may spend more time providing patient care rather than administering low-value tests.

When a patient screens positive for potential delirium, our decision support tool guides staff to begin a hospital-approved delirium treatment bundle which is deployed within the EHR workflow. Simultaneously, decision support is also sent to appropriate clinicians in a predetermined workflow to confirm and document presence and management plan for delirium using templated language.

HDC automates the integration of clinical screening and billing data to allow reporting and visualization of the impact of HDC-Delirium on coding, reimbursement, and other outcome measures. This feedback loop is then used to promote ongoing engagement with the system.