

# Validating rates of nursing-sensitive adverse events in administrative healthcare data in Ireland: A retrospective chart review study



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HEALTHCARE  
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Cost2care

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## Introduction

Adverse events (AEs) present an ongoing patient safety challenge for health systems. They are disproportionately experienced by patients aged over 65 given the complexity of their care due to co-morbidities and emergency admissions. Pneumonia, urinary tract infections, pressure ulcers and delirium, known collectively as failure to maintain (F2M) events, commonly occur in older patients when the demand for nursing care exceeds supply (Bail and Grealish, 2016). Hospital in-patient enquiry (HIPE) data, Ireland’s primary source of information on hospital discharges, is used to inform the planning, provision and measurement of acute hospital services. Accurate monitoring and measurement of AEs is key to improving patient safety and healthcare quality and reducing the economic and human cost of these events. Retrospective chart reviews are commonly used to validate administrative healthcare data as medical charts are often considered a gold standard source of patient information (Vassar and Holzmann, 2013).

## Objectives

- To determine prevalence of F2M events in older adults in Ireland.
- To quantify the rates of F2M events in HIPE data in one model 4 hospital in Ireland.
- To validate F2M event rates by comparing the chart review findings to HIPE data.

## Co-production

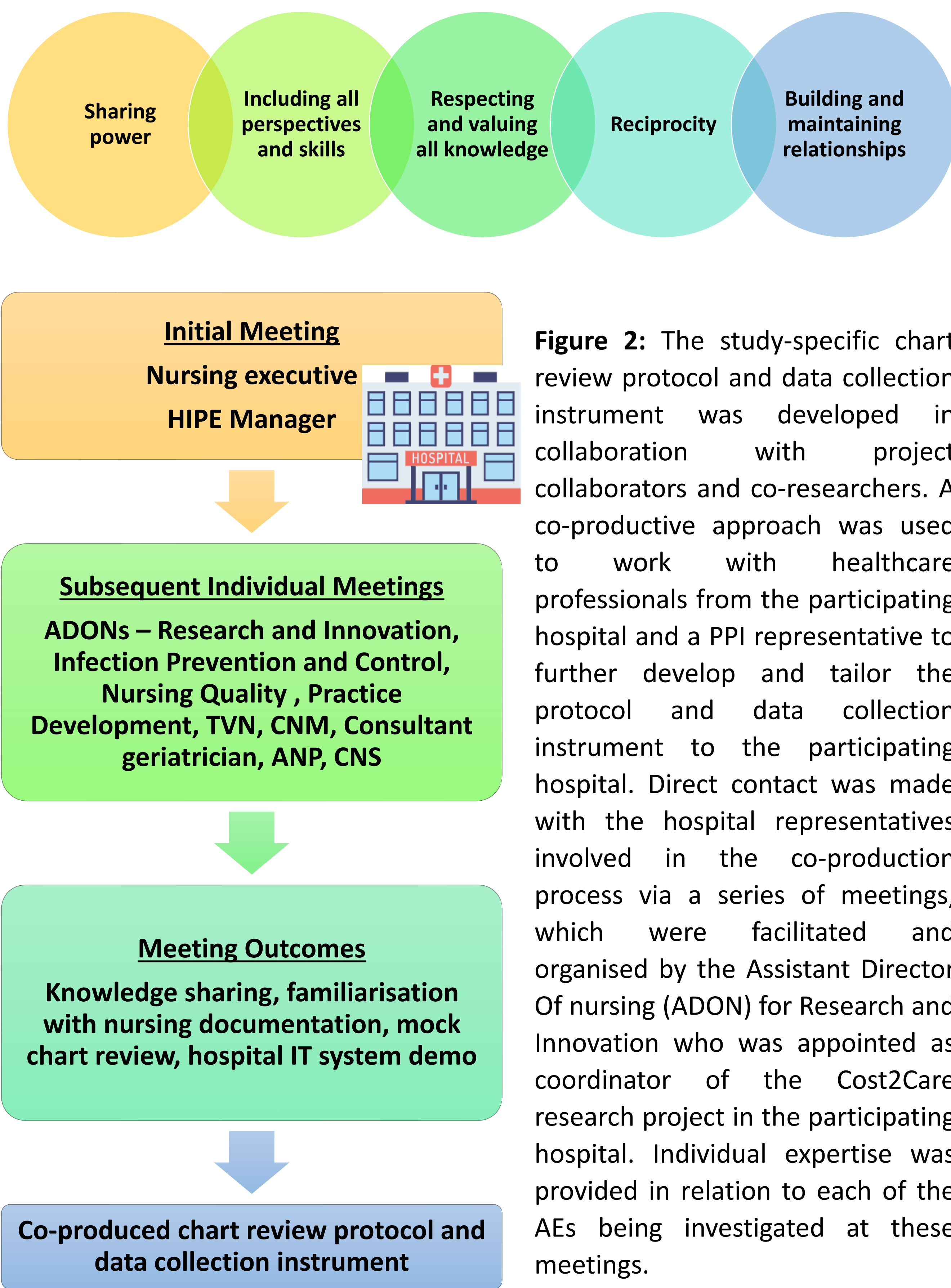


**Figure 2:** The study-specific chart review protocol and data collection instrument was developed in collaboration with project collaborators and co-researchers. A co-productive approach was used to work with healthcare professionals from the participating hospital and a PPI representative to further develop and tailor the protocol and data collection instrument to the participating hospital. Direct contact was made with the hospital representatives involved in the co-production process via a series of meetings, which were facilitated and organised by the Assistant Director Of nursing (ADON) for Research and Innovation who was appointed as coordinator of the Cost2Care research project in the participating hospital. Individual expertise was provided in relation to each of the AEs being investigated at these meetings.

## Methodology

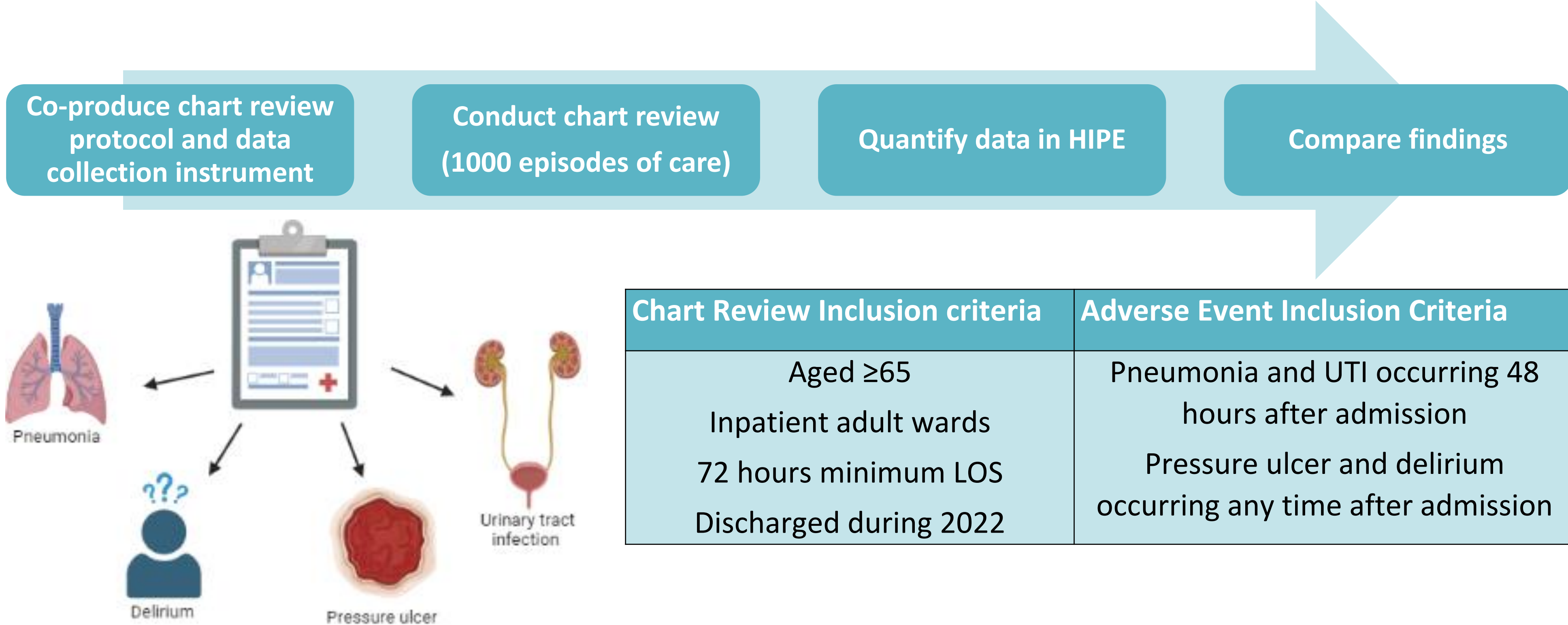


**Figure 1:** A total of 1000 randomly selected episodes of care from a model 4 hospital in Ireland were reviewed using a two-stage retrospective chart review. A co-productive approach was used to design and develop a data collection instrument and structured protocol to guide the chart review. Each chart underwent a primary review to identify evidence of one or more F2M event. If a potential event was identified a secondary review was conducted to confirm its presence and gather further information. The corresponding HIPE data was received from the HIPE department in the participating hospital and the rates of the F2M events were validated by comparing the chart review data to the HIPE data.

## Results

| Table 1: Chart Review Demographics |              |                |               |
|------------------------------------|--------------|----------------|---------------|
|                                    | Total n=1000 | Surgical n=505 | Medical n=495 |
| Female n=                          | 466          | 227            | 239           |
| Male n=                            | 534          | 278            | 256           |
| Age, Median                        | 76           | 75             | 77            |
| Age, Mean                          | 77.2         | 76.3           | 78.1          |
| LOS, Median                        | 9            | 10             | 9             |
| LOS, Mean                          | 17.4         | 18.6           | 15.9          |

|           |                         |                |          |
|-----------|-------------------------|----------------|----------|
| Pneumonia | Urinary tract infection | Pressure ulcer | Delirium |
| 84        | 55                      | 140            | 102      |

**381 adverse events in 233 (23.3%) episodes of care**

**Figure 3:** Of the 1000 episodes of care reviewed, 381 AEs were found in 233 (23.3%) episodes of care. There were 84 cases of pneumonia, 140 pressure ulcers, 55 UTIs and 102 cases of delirium identified during the retrospective chart review. A total of 257 of the 381 AEs occurred in surgical admissions and the remaining 124 occurred in medical admissions.

| Table 2: Presence of HADx flag for adverse events identified through chart review |                                                      |       |          |        |
|-----------------------------------------------------------------------------------|------------------------------------------------------|-------|----------|--------|
|                                                                                   | Available ICD Code documented in HIPE with HADx flag |       |          |        |
| Adverse event                                                                     | Yes n=                                               | No n= | Total n= | Rate%  |
| Pneumonia                                                                         | 31                                                   | 53    | 84       | 36.90% |
| UTI                                                                               | 10                                                   | 45    | 55       | 18.20% |
| Pressure Ulcer                                                                    | 10                                                   | 130   | 140      | 7.10%  |
| Delirium                                                                          | 43                                                   | 69    | 102      | 42.20% |
| Total n=                                                                          | 94                                                   | 297   | 381      | 24.70% |

An ICD-10 code along with a HADx flag in HIPE was found for 94 (24.7%) of the 381 AEs. The AE with the highest rate of ICD-10 codes within the HIPE data was delirium 43 of the 102 (42.2%) of AEs identified through the chart review coded with HADx flags. The AE with the lowest rate of codes was pressure ulcers, with only 10 (7.1%) cases identified through the chart review assigned codes in the HIPE data.

## Discussion and Conclusion

- The rates of AEs identified through this chart review are in line with international studies that estimate AE occurrence in 3-22% of admissions (Schwendimann *et al.*, 2018).
- Higher rates of AEs in older patients due to co-morbidities, emergency admissions and the clinical complexity of their care has previously been reported (Thomas and Brennan, 2000; Szejf *et al.*, 2012). Older patients are also particularly vulnerable to F2M events (Szejf *et al.*, 2012).
- Similar to previous findings (Cheng *et al.*, 2021; Valentine *et al.*, 2022), this study suggests that the ICD coding of these AEs within HIPE are currently a poor measure of hospital acquired AEs. Low visibility of these AEs in HIPE may be attributable to coding standards which state that HADx flags cannot be assigned without clear clinical documentation.
- HADx flags demonstrate the potential of HIPE to accurately measure rates of F2M events. Improved documentation may enhance the visibility of these AE in HIPE.
- Education of junior doctors, who are responsible for completing clinical documentation, on diagnoses and procedural coding and the importance of clear and accurate documentation on HACs is key to improving the visibility of HACs in HIPE data (Hughes *et al.*, 2019).
- Further research to improve the visibility of these AE within HIPE will allow improvements in care by informing research and policy with high quality and reliable data (HIQA, 2018).
- Furthermore, inaccurate data has a negative impact on hospital reimbursement (Hughes *et al.*, 2019) therefore, improved accuracy will facilitate accurate activity-based funding.

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