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**COST2CARE: Addressing the economic and human cost of hospital acquired and nursing-sensitive adverse events in older patients through optimal use of routine discharge data and measurement of missed nursing care.**

Data Collection Protocol

16th November 2023

Table of Contents

Contents

[**Project introduction** 1](#_Toc168662436)

[**Ethical Considerations** 1](#_Toc168662437)

[**Nursing-Sensitive Adverse Events** 1](#_Toc168662438)

[Urinary tract infection - UTI 1](#_Toc168662439)

[Delirium 2](#_Toc168662440)

[Pressure Ulcer 3](#_Toc168662441)

[Pneumonia 4](#_Toc168662442)

[**Inclusion/exclusion criteria for hospital wards/units, patients and events** 6](#_Toc168662443)

[**Chart Review - F2M adverse events** 8](#_Toc168662444)

[**Sample size** 8](#_Toc168662445)

[**Interrater-reliability** 9](#_Toc168662446)

[**Review template** 10](#_Toc168662447)

[Primary review 10](#_Toc168662448)

[Secondary Review 16](#_Toc168662449)

[**Pneumonia** 16](#_Toc168662450)

[**UTI** 18](#_Toc168662451)

[**Pressure ulcer** 20](#_Toc168662452)

[**Delirium** 23](#_Toc168662453)

[**4AT Delirium Assessment Tool** 27](#_Toc168662454)

[**CAM-ICU Delirium Assessment Tool** 28](#_Toc168662455)

[**Nurse and Patient Reported Surveys** 29](#_Toc168662456)

[**The MISSCARE Survey** 30](#_Toc168662457)

[**MISSCARE Survey - Patient** 33](#_Toc168662458)

[**Determining the cost associated with F2M events and missed nursing care.** 39](#_Toc168662459)

[**Cost2Care Data Protection Considerations** 40](#_Toc168662460)

[**References** 47](#_Toc168662461)

# **Project introduction**

Older patients make up the largest proportion of acute hospital inpatient populations across all countries. Common hospital acquired adverse events in this group contribute to higher healthcare costs, lower quality care, and less satisfactory patient experiences overall. Pneumonia, delirium, urinary tract infections and pressure ulcers are four commonly acquired complications that occur in older patients, known collectively as ‘Failure to Maintain (F2M)’ events. Nursing-Sensitive Adverse Events (NSAE) are outcomes that are affected, provided and/or influenced by processes or structures of nursing care but for which nurses are not solely responsible. The F2M events under examination in this study are nursing-sensitive patient outcomes, predominantly affected by the quality of nursing care provided.

In this study, we will determine how these nursing-sensitive outcomes (NSAEs) are currently represented in routinely available national discharge (HIPE) data in Ireland. A structured chart review will be conducted in one hospital site to validate the rates of NSAEs available in the HIPE data. The cost of these events to the Irish health service will be calculated using ICD10 data, length of stay, and other variables associated with Cost of Illness calculations. Through surveys, the human costs of missed care to both patients and caregivers will be further examined. The overall aim of this study is to demonstrate the potential for safer hospital care and reduced healthcare costs associated with older patients in acute hospitals in Ireland through routine measurement of missed nursing care in hospitals, and sustainable and accurate reporting of nursing-sensitive adverse events using routinely collected hospital discharge data.

## **Ethical Considerations**

Ethical approval has been granted from the DCU Research Ethics Committee and from the Institutional Review Board for the Mater Misericordiae University Hospital. A consent waiver for the chart review element of this study has been granted by the Health Research Consent Declaration Committee based on the public interest associated with carrying out this research.

## **Nursing-Sensitive Adverse Events**

This study will focus on four nursing-sensitive adverse events (NSAEs) otherwise described as Failure to Maintain (F2M) events.

Definition of ‘Failure to Maintain’: The failure to prevent avoidable hospital-acquired urinary tract infection, pressure ulcers, pneumonia and delirium. 'F2M' provides a framework for understanding that implicit nurse care rationing of basic and essential cares of mobility, communication, skin care, hydration and nutrition leads to functional and cognitive decline in complex older patients, which may lead to these measurable hospital-acquired complications.

Defining the four F2M events: An episode is identified with a complication (urinary tract infection, pneumonia, delirium, pressure ulcers) using a set of secondary ICD10 diagnoses.

Where a complication is matched then further checks are made against an exclusion list of ICD10 codes and Major Diagnostic Groupings (MDC). This is a process of risk adjustment, removing the complications that had a higher risk of co-existing (pre or within-hospital episode) due to comorbidities.

## Urinary tract infection - UTI

An episode is identified as having a UTI complication when it has secondary diagnosis of N39.0 or T82.5.

|  |  |
| --- | --- |
| **Inclusion**  **ICD Code (Secondary)** | **Description** |
| N39.0 | Urinary tract infection, site not specified |
| T83.5 | Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system |

And it doesn’t have a Principal Diagnosis of:

|  |  |
| --- | --- |
| **Exclusion**  **ICD Code (Principal)** | **Description** |
| A40 | Streptococcal sepsis |
| A42 | Actinomycosis |
| A49.9 | Bacterial infection, unspecified |
| N39.0 | Urinary tract infection, site not specified |
| T83.5 | Infection and inflammatory reaction due to prosthetic device, implant and graft in urinary system |

Or have ANY diagnosis (principal or secondary) of:

|  |  |
| --- | --- |
| **Exclusion**  **DiagCode (Any)** | **Description** |
| O08.8 | Other complications following abortion and ectopic and molar pregnancy |
| O23.4 | Unspecified infection of urinary tract in pregnancy |
| O23.9 | Other and unspecified genitourinary tract infection in pregnancy |
| O86.2 | Urinary tract infection following delivery |
| O86.3 | Other genitourinary tract infections following delivery |

Or an MDC of the following

|  |  |
| --- | --- |
| **Exclusion MDC** | **Description** |
| 11 | Diseases & Disorders of the Kidney & Urinary Tract |
| 12 | Diseases & Disorders of the Male Reproductive System |
| 13 | Diseases & Disorders of the Female Reproductive System |
| 14 | Pregnancy, Childbirth & the Puerperium |
| 15 | Newborns & Other Neonates |

## Delirium

An episode is identified as having a delirium complication when it has secondary diagnosis in the following table:

|  |  |
| --- | --- |
| **ICD10 Inclusion - Secondary Diagnosis**  **Exclude – Principal Diagnosis** | **Description** |
| F05.0 | Delirium not superimposed on dementia, so described\* |
| F05.1 | Delirium superimposed on dementia\* |
| F05.8 | Other delirium\* |
| F05.9 | Delirium, unspecified |
| R40.1 | Stupor |
| R40.2 | Coma, unspecified |
| \*Recommended update (not in original Needleman approach) | |

And it doesn’t have a principal diagnosis of:

|  |  |
| --- | --- |
| **ICD10 Exclusion - Principal Diagnosis** | **Description** |
| F43.2 | Adjustment disorders |
| F43.9 | Reaction to severe stress, unspecified |
| F44.88 | Other specified dissociative [conversion] disorders |
| F05.9 | Delirium, unspecified |
| R40.1 | Stupor |
| R40.2 | Coma, unspecified |

And it doesn’t have an MDC in the following list:

|  |  |
| --- | --- |
| **Exclusion MDC** | **Description** |
| 1 | Diseases & Disorders of the Nervous System |
| 19 | Mental Diseases & Disorders |
| 20 | Alcohol/Drug Use & Alcohol/Drug Induced Organic Mental Disorders |

## Pressure Ulcer

An episode is identified as having a Pressure Ulcer complication when it has secondary diagnosis in the following table:

|  |  |
| --- | --- |
| **ICD10 Inclusion - Secondary Diagnosis**  **Exclude – Principal Diagnosis** | **Description** |
| L89^ | Pressure ulcer |
| ^Includes all subsets of L89, eg L89.0, L89.1, L89.2 etc | |

And it doesn’t have a principal diagnosis of:

|  |  |
| --- | --- |
| **ICD10 Exclusion - Principal Diagnosis** | **Description** |
| L89 | Pressure ulcer |

And it doesn’t have any diagnosis of

|  |  |
| --- | --- |
| **ICD10 Exclusion - Any Diagnosis** | **Description** |
| G80 | Cerebral palsy |
| G81 | Hemiplegia |
| G82 | Paraplegia and tetraplegia |
| G83 | Other paralytic syndromes |

And it doesn’t have an MDC of 9

|  |  |
| --- | --- |
| **Exclusion MDC** | **Description** |
| 9 | Diseases & Disorders of the Skin, Subcutaneous Tissue & Breast |

## Pneumonia

An episode is included as having a pneumonia complication when it has secondary diagnosis in the following table:

|  |  |
| --- | --- |
| **ICD10 Inclusion - Secondary Diagnosis**  **Exclude – Principal Diagnosis** | **Description** |
| J14 | Pneumonia due to Haemophilus influenzae |
| J15 | Bacterial pneumonia, not elsewhere classified |
| J18 | Pneumonia, organism unspecified |
| J69.0 | Pneumonitis due to food and vomit |
| J95.8 | Other postprocedural respiratory disorders |
| J95.9 | Postprocedural respiratory disorder, unspecified |

And it doesn’t have a principle diagnosis of:

|  |  |
| --- | --- |
| **ICD10 Exclusion - Principal Diagnosis** | **Description** |
| DiagCode | Description |
| J10 | Influenza due to other identified influenza virus |
| J11 | Influenza, virus not identified |
| J12 | Viral pneumonia, not elsewhere classified |
| J13 | Pneumonia due to Streptococcus pneumoniae |
| J14 | Pneumonia due to Haemophilus influenzae |
| J15 | Bacterial pneumonia, not elsewhere classified |
| J17 | Pneumonia in bacterial diseases classified elsewhere |
| J18 | Pneumonia, organism unspecified |
| J69.0 | Pneumonitis due to food and vomit |
| J95.8 | Other postprocedural respiratory disorders |
| J95.9 | Postprocedural respiratory disorder, unspecified |

And it doesn’t have a diagnosis of

|  |  |
| --- | --- |
| **ICD10 Exclusion - Any Diagnosis** | **Description** |
| B20 | Human immunodeficiency virus [HIV] disease resulting in infectious and parasitic diseases |
| B21 | Human immunodeficiency virus [HIV] disease resulting in malignant neoplasms |
| B22 | Human immunodeficiency virus [HIV] disease resulting in other specified diseases |
| B23 | Human immunodeficiency virus [HIV] disease resulting in other conditions |
| B24 | Unspecified human immunodeficiency virus [HIV] disease |
| D80 | Immunodeficiency with predominantly antibody defects |
| D81 | Combined immunodeficiencies |
| D82 | Immunodeficiency associated with other major defects |
| D83 | Common variable immunodeficiency |
| D84 | Other immunodeficiencies |
| D86 | Sarcoidosis |
| D89 | Other disorders involving the immune mechanism, not elsewhere classified |
| M35.9 | Systemic involvement of connective tissue, unspecified |

And it doesn’t have an MDC of:

|  |  |
| --- | --- |
| **Exclusion MDC** | **Description** |
| 4 | Diseases & Disorders of the Respiratory System |

# **Inclusion/exclusion criteria for hospital wards/units, patients and events**

Only patients aged 65 years and older will be included in this study. Discharges for this group account for the largest proportion of total discharges from acute hospitals and for 55.4% of total inpatient bed days in acute hospitals in Ireland in 2021 (HPO, 2022). Average length of stay for patients in Irish hospitals is 7.1 days, however in this cohort the average length of stay is between 9 and 13 days (HPO, 2022). NSAEs occur more commonly in this group.

Common hospital acquired adverse events, especially for older people, contribute the highest system costs of all adverse events in the health sector (Rowell, Nghiem, Jorm, & Jackson, 2010), placing a high financial burden on the health sector (Slawomirski, Auraaen, & Klazinga, 2017). ‘Failure to Maintain (F2M)’ events are associated with 25% costs of above-average length of stay for people aged over 65 and are associated with missed or rationed nursing care (Bail et al., 2015).

|  |  |
| --- | --- |
| **Chart Review** | |
| **Inclusion criteria** | **Exclusion criteria** |
| Charts of patients aged 65 and over | Charts of patients aged below 65 |
| Charts of patients who have been admitted to inpatient adult wards | Chart of patients admitted to wards other than inpatient adult wards |
| Only patients with a length of stay (LOS) of 72 hours minimum will have their chart reviewed.  There will be no cut off for maximum length of stay therefore chart will be reviewed for patient who stayed for 72 hours in hospital up until their discharge | LOS shorter than 72 hours will be excluded |
| Charts of patients admitted during 2022 will be included | Charts of patient discharged in any year other than 2022 will be excluded |

* Exclude adverse events that occurred on earlier admission
* Exclude follow up adverse events (after discharge)
* Include adverse events that occurred and were detected within admission
* Different criteria at patient level and at adverse event level
* Include pressure ulcers and delirium deemed to have occurred at any time during the episode of care
* Include deterioration of existing PU or delirium.
* Only include infection (UTI and Pneumonia) that is deemed to have occurred 48 hours after admission

|  |  |
| --- | --- |
| **Nurse Survey** | |
| **Inclusion criteria** | **Exclusion criteria** |
| Nurses employed in inpatient adult wards and emergency departments in the same hospital site where the chart review will take place | Nurses employed only on day wards, outpatient departments or in operating theatres. |
| Being a fully qualified nurse | Nurses that are not fully qualified eg. Student nurses |

|  |  |
| --- | --- |
| **Patient Survey** | |
| **Inclusion criteria** | **Exclusion criteria** |
| Patients aged 65 and over who have been admitted to inpatient adult wards. | Patients aged below 65 and admitted to wards other than inpatient adult wards. |
| Being capable of completing the survey independently | Patients who are unable to complete the survey independently. |
| Ability to read and speak English. | Patients who are unable to read and speak English. |

# **Chart Review - F2M adverse events**

Data collection for this study will be carried out in the Mater Misericordiae University Hospital (MMUH) in Dublin. A retrospective record review will be carried out in a two-stage procedure. Thorough descriptions of the four predefined NSAEs and a study manual will be used as review support in both the primary and secondary review stages.

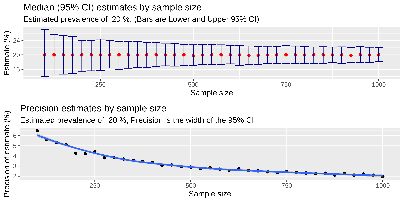
In the primary review, all randomized selected admissions i.e., index admissions will be reviewed. The reviewers screen for the presence of one or more of the predefined NSAEs. Only admissions indicating at least one potential NSAEs will be sent forward to secondary review.

In the primary review, each potential NSAE will be assessed separately. To qualify as a NSAE, a score of 3 or higher on a 4-point Likert Scale will be required (1=the potential NSAE was not related to healthcare, 2=the potential NSAE was probably not related to healthcare, 3=the potential NSAE was probably related to healthcare and 4=the potential NSAE was related to healthcare).

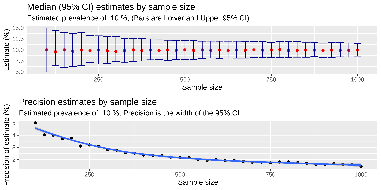
## **Sample size**

According to the Healthcare Pricing Office dataset, 6,500 Mater Misericordiae University Hospital (MMUH) patients met the study criteria in the year 2022.The aim of sampling charts and abstracting/ extracting data is to achieve a credible estimate of the overall adverse event rate and allow further analysis on major groups of adverse events. As discussed, the true adverse event rate is not known with any certainty, although the earlier work of Rafter et al (2017) suggest that it may not be very different from that reported in other countries. Based on a simple simulation study (Figs 1,2,3 demonstrate estimated prevalence for a 20%, 10% and 5% adverse event rate) it would seem that a sample size of 400 charts abstracted gives an acceptably precise estimate across a range of plausible F2M adverse effect rates, for the total rate.

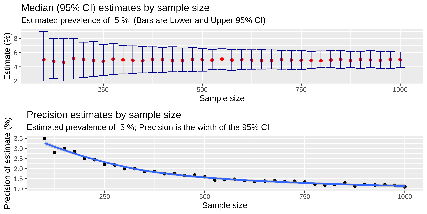
*Figure 1. Estimated Prevalence of 20% Adverse Event rate*

****

*Figure 2. Estimated Prevalence of 10% Adverse Event rate*

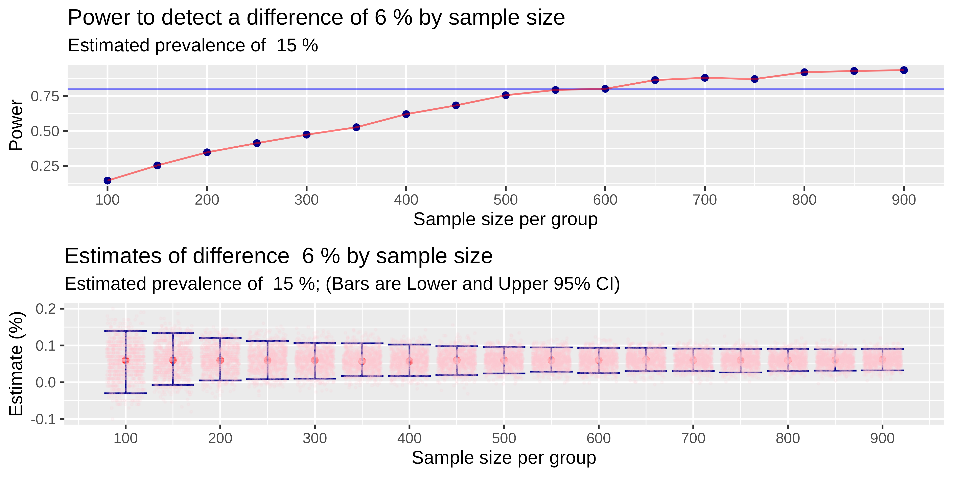
****

*Figure 3. Estimated Prevalence of 5% Adverse Event rate*

****

Nonetheless, to look at subgroups, larger numbers will be needed. We propose to stratify the sample into at least two categories (medical and surgical) but intend to cap the chart review at 1,000 charts. The relative size of the groups, and the expected differences between them in terms of prevalence are not known. Therefore, a sample size, per group, of approx. 500 charts gives reasonable power to detect moderately large differences between groups and will allow us to explore the range of likely outcomes (see Fig 4). It may be possible to stratify the sample of charts by a-priori risk (for example the Charlson index or similar) to improve power further, but this is not yet certain.

*Figure 4. Power calculations for group size*



## **Interrater-reliability**

The interrater reliability calculations will be based on 10% of the charts. The two primary chart reviewers will both review every 10th chart independently. The data extracted from each reviewer’s review of this chart will be inserted in Microsoft Excel and the data will be compared to see what has been identified or missed by either of the reviewers. In relation to monitoring the work of the chart review, the project PI will conduct a second review on 10% of all sampled charts. Where discrepancies are noted in the review findings or where uncertainty arises for any of the review team, selected staff members from MMUH have agreed to provide advice and context.

# **Review template**

The chart review will be conducted in a two-stage process consisting of a primary review stage and a secondary review stage.

## Primary review

Each chart included in the chart review sample will be included in the primary review. This stage of the review process will identify the cohort of patients who experienced a NSAE. The charts of patients who were identified as having experienced a NSAE at the primary review stage will then be subject to a secondary review. The instructions below will guide the process of extracting the relevant information from the charts.

|  |  |
| --- | --- |
| Variable | Instruction |
| MRN | The MRN as it appears on each chart should be extracted and inserted into the excel sheet in the provided space. |
| Encrypted MRN | The encrypted MRN that has been provided by the healthcare pricing office should be noted here. |
| Sex | The sex of the patient should be noted here. Reviewer can select male or female from the drop-down menu. |
| Date of first presentation to hospital (DDMMYY) | The date that the patient first presented at the hospital should be noted here. |
| Time of first presentation to hospital (24-hour clock) | The time that the patient first presented at the hospital should be noted here. |
| Elective/Emergency admission | Note should be taken here as to whether the patient was admitted as an elective admission or an emergency admission. Reviewer can select one option from the dropdown menu. |
| Time of triage in ER (24-hour clock) | The time that a patient was seen by a triage nurse in the emergency department should be noted here. |
| Date of admission to ward | The date that the patient was admitted to the ward should be noted here (not the date that they presented at the hospital but the date that they were officially admitted to the ward and given a bed). |
| Time of admission to ward (24-hour clock) | The time that the patient was admitted to hospital should be noted here. |
| Admitted from? | The reviewer must make note of where the patient was admitted from using the drop-down options – home (independent), nursing home, other hospital, home care package, rehab facility, other. |
| Other please specify | Free text – specify if admission source is different to those listed in the previous drop-down menu. |
| Time from presentation to admission | The time from when the patient presented at hospital and when they were admitted to the ward should be noted here. The reviewer will need to calculate the number of hours between the time that the patient presented at hospital and the time that they were officially admitted. |
| Number of ward moves during admission | The reviewer must make note of the number of ward moves that the patient experienced during their admission. Details of the number of ward moves can be found on patient centre |
| Number of bed moves during admission | The reviewer must make note of the number of bed moves that the patient experienced during their admission. Details of the number of bed moves can be found on patient centre |
| Age (at discharge) | The age of the patient should be noted here. Their date of birth is not required to be extracted therefore the reviewer may have to calculate the age of the patient by referring to their date of birth without extracting it in full. |
| Date of discharge (DD/MM/YY) | The date that the patient was discharged from hospital should be noted here. |
| Time of discharge (24-hour clock) | The time that the patient was discharged from hospital should be noted here |
| Place of discharge | Reviewers must make note of where the patient was discharged to following their stay in hospital – home, nursing home, other hospital, A&E, home care package, rehab facility, other. |
| Discharge situation changed from before admission? | Reviewers will have the option to select yes or no here. Reviewers must make note of whether the patient’s discharge situation differed from before their admission. If the patient was discharged to a different location to where they were admitted from or if they required additional care following their discharge that was not required prior to their admission then the reviewer must make a note of this. |
| Other? | If notable changes are not related to those listed in the drop-down categories above or other more complex cases |
| Was this patient in ITU during this admission? | Note should be made here if the patient was admitted to ITU during their hospital stay. The reviewers will have the option to select yes or no here. |
| Frailty Assessment Score | Reviewersshould make note of the frailty assessment score for each patient. Frailty scores can be found under comprehensive geriatric assessment or MaterFIT Triage Tool in the patient documents in Patient Centre. |
| Pneumonia | Reviewers will have the option to select yes or no here. Reviewer must first check the medication notes within the chart to see if the patient was prescribed any antibiotics. If the patient was prescribed antibiotics for a pneumonia, then the reviewer must check the start date of the antibiotics and compare this with the admission date. If the antibiotics were started 48 hours after admission, then then the reviewers must refer to the predefined criteria to make a judgement as to whether a hospital acquired pneumonia was present or not (Table A). To verify the presence of a pneumonia the reviewer will need to locate information using Patient Centre. |
| Assess the extent to which the event was healthcare associated? | Reviewers must make a judgement on the extent to which the event was healthcare associated. Reviewers must select one option from the drop-down menu – NOT healthcare associated, PROBABLY NOT healthcare associated, LIKELY associated, DEFINITELY associated. |
| UTI | Reviewers will have the option to select yes or no here. Reviewer must first check the medication notes within the chart to see if the patient was prescribed any antibiotics. If the patient was prescribed antibiotics for a UTI, then the reviewer must check the start date of the antibiotics and compare this with the admission date. If the antibiotics were started 48 hours after presentation, then then the Reviewers must refer to the predefined criteria in order to make a judgement as to whether UTI was present or not (Table B) |
| Assess the extent to which the event was healthcare associated? | Reviewers must make a judgement on the extent to which the event was healthcare associated. Reviewers must select one option from the drop-down menu – NOT healthcare associated, PROBABLY NOT healthcare associated, LIKELY associated, DEFINITELY associated. |
| Pressure Ulcer | Reviewers will have the option to select yes or no here. Reviewers must refer to the patient’s Waterlow score in order to make a judgement as to whether a pressure ulcer was present or not. |
| Assess the extent to which the event was healthcare associated? | Reviewers must make a judgement on the extent to which the event was healthcare associated. Reviewers must select one option from the drop-down menu – NOT healthcare associated, PROBABLY NOT healthcare associated, LIKELY associated, DEFINITELY associated. |
| Delirium | Reviewers will have the option to select yes or no here. Reviewer must first check the medication notes within the chart to see if the patient was prescribed any antipsychotics (marker for delirium as treatment for behavioural changes). Reviewers must also refer to 4AT scores and nursing notes in order to make a judgement as to whether delirium was present or not. |
| Assess the extent to which the event was healthcare associated? | Reviewers must make a judgement on the extent to which the event was healthcare associated. Reviewers must select one option from the drop-down menu – NOT healthcare associated, PROBABLY NOT healthcare associated, LIKELY associated, DEFINITELY associated. |
| Length of stay | The duration of the patient’s stay in hospital should be noted here in days. The reviewer must calculate the number of days that the patient stayed in hospital for by referring to their date of admission and date of discharge. |
| Covid-19 Positive during admission? | Reviewers must make note here of whether the patient tested positive for COVID-19 during their stay in hospital. The reviewer will have the option of selecting yes or no here. |
| Where in chart? | If an adverse event has been identified, the reviewer must make a note of where the adverse event was documented in the chart. |
| Surgical site or wound infection | Reviewers are required to make a note of whether a wound infection was documented in the clinical notes. |
| Moisture associated skin damage | Whilst reviewing the chart, the reviewer must make note of any moisture associated skin damage. Reviewer should look for TVN reports to find evidence of moisture associated skin damage. The details of TVN reports may be found in both patient’s charts and on patient centre. |
| Other wounds or skin breaks | Whilst reviewing the chart, the reviewer must also make note of any other wounds or skin breaks that are not classified as pressure ulcers. Reviewer must review the ‘Open Wound Assessment and Management Form’ (pink form) to locate this information. |

\*Attachment for identifying presence of pneumonia TABLE A



\*Attachment for identifying presence of UTI TABLE B



## Secondary Review

Charts of patients who were identified as having experienced one of the four NSAEs during the primary review stage will be sent forward to the secondary review stage. It is the same reviewer who carry out both review stages per patient. During this stage of the review process further information in relation to each experienced NSAE will be extract from the patients’ charts. Each NSAE (if more than one adverse event is experienced by an individual patient) will be investigated separately during the secondary review stage.

### **Pneumonia**

|  |  |
| --- | --- |
| **Variable** | **Instruction** |
| Date of first detection | The date that the pneumonia was first detected should be noted here. |
| Which ward first detected? | The ward where the pneumonia was first detected should be noted here. The name of the ward will not be retained but will be collected initially in order to construct categories associated with where the four “failure to maintain” events were identified (e.g. medical, surgical, general, ICU) |
| Confirmed? Radiology | Reviewer will be given the option of selecting yes or no here. (The reviewer should insert yes if they have confirmed the presence of a pneumonia by referring to the predefined criteria and have identified that the patient has a diagnosed case of pneumonia by reviewing their radiology reports). |
| Confirmed? Symptoms | Reviewer will be given the option of selecting yes or no here. The reviewer should insert yes if they have confirmed the presence of a pneumonia by referring to the predefined criteria and have identified that the patient has a diagnosed case of pneumonia their clinical symptoms. |
| Confirmed? Microbiology | Reviewer will be given the option of selecting yes or no here. The reviewer should insert yes if they have confirmed the presence of a pneumonia by referring to the predefined criteria and have identified that the patient has a diagnosed case of pneumonia by reviewing their microbiology results. |
| Date of commencement of treatment | The date that the patient first started receiving treatment for the pneumonia should be noted here. |
| Antibiotic treatment (name) | The details of the antibiotic treatment should be noted here. The reviewer must make note of the name of the antibiotic prescribed. |
| Antibiotic treatment (route) | The details of the antibiotic treatment should be noted here. The reviewer must select from the drop-down menu the route through which the antibiotic was administered. |
| Antibiotic (duration) | The details of the antibiotic treatment should be noted here. The reviewer must make note of the duration of time for which the patient has been prescribed to take the antibiotics. |
| Change to antibiotic (date) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of the date of any changes to the antibiotic treatment. |
| Change to antibiotic (name) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of any changes to the name of the drug being prescribed. |
| Change to antibiotic (route) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must select from drop-down menu any changes to the route through which the drug is being administered. |
| Change to antibiotic (duration) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of any changes to the duration of time for which the patient has been prescribed to take the antibiotics. |
| Extra tests | Any additional tests that were required due to the pneumonia should be noted here. |
| Extra procedures | Any additional procedures that were required due to the pneumonia should be noted here. |
| Changed nursing care | Any changes to the nursing care required by the patient as a result of the pneumonia should be noted here. |
| Referral for Consult (specialty) | If the patient was referred for a consult due to the pneumonia, the details of the consult should be noted here. The reviewer must detail what specialty consultation the patient was referred. |
| Referral for intervention (physio etc) | If the patient was given a referral for any type of intervention, then the details of the intervention must be noted here. The reviewer must detail what type of intervention that patient was referred (eg. Physiotherapy etc.) |
| Date pneumonia resolved | The date that the pneumonia resolved should be noted here, if resolved during admission. |
| Treatment on discharge | A note should be made here of any treatment that the patient was prescribed on discharge in relation to their pneumonia. |
| Referral on discharge  If yes – public health nurse, GP, OPD, other | Reviewer must make a note here of whether the patient was given a referral for pneumonia related treatment on discharge. Review must select yes or no here. |
| Referral PHN? | Yes/No |
| Referral GP? | Yes/No |
| Referral OPD | Yes/No |
| Referral (other) | Free text |
| Severity (dropdown categories) | The severity of the pneumonia should be noted here. The reviewer must select one option from the dropdown categories relating to the severity of the pneumonia. |
| Discharge plan if unresolved | If the pneumonia was unresolved at the time of discharge, then details of the patient’s discharge plan should be noted here. |
| Notes: Patient story/contextual details\* | Any relevant information relating to the patient and their stay in hospital should be noted here. Reviewers should make note of any information within the patient’s chart that provides context in relation to the pneumonia or explains the events of their stay in hospital. |
| Additional event | If patient has suffered any additional pneumonia, the details of this event will be recorded in a separate sheet on the Excel sheet. |

### **UTI**

|  |  |
| --- | --- |
| **Variable** | **Instruction** |
| Date of first detection | The date that the UTI was first detected should be noted here. |
| Which ward first detected? | The ward where the UTI was first detected should be noted here. The name of the ward will not be retained but will be collected initially in order to construct categories associated with where the four “failure to maintain” events were identified (e.g. medical, surgical, general, ICU) |
| Catheter in situ? | Reviewer must make note of whether the patient had a catheter in situ. Reviewer can select yes or no from the drop-down menu. |
| Confirmed? (Symptoms) | Reviewer will be given the option of selecting yes or no here. The reviewer should insert yes if they have confirmed the presence of a UTI by referring to the predefined criteria and have identified that the patient has a diagnosed case of UTI by reviewing their clinical symptoms. |
| Confirmed? (lab confirmation) | Reviewer will be given the option of selecting yes or no here. The reviewer should insert yes if they have confirmed the presence of a UTI by referring to the predefined criteria and have identified that the patient has a diagnosed case of UTI by reviewing their lab results. |
| Date of commencement of treatment | The date that the patient first started receiving treatment for the UTI should be noted here. |
| Antibiotic treatment (name) | The details of the antibiotic treatment should be noted here. The reviewer must make note of the name of the antibiotic prescribed, the route through which the antibiotic was administered and the duration of time for which the patient has been prescribed to take the antibiotics. |
| Antibiotic treatment (route) | The details of the antibiotic treatment should be noted here. The reviewer must select from the drop down menu the route through which the antibiotic was administered. |
| Antibiotic (duration) | The details of the antibiotic treatment should be noted here. The reviewer must make note of the name of the duration of time for which the patient has been prescribed to take the antibiotics. |
| Change to antibiotic (date) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of the date of any changes to the antibiotic treatment. |
| Change to antibiotic (name) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of any changes to the name of the drug being prescribed. |
| Change to antibiotic (route) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must select from the drop-down menu any changes to the route through which the drug is being administered. |
| Change to antibiotic (duration) | Any changes to the initially prescribed antibiotics should be noted here. Reviewers must make note of any changes to the duration of time for which the patient has been prescribed to take the antibiotics. |
| Extra tests | Any additional tests that were required due to the UTI should be noted here. |
| Extra procedures | Any additional procedures that were required due to the UTI should be noted here. |
| Changed nursing care | Any changes to the nursing care required by the patient as a result of the UTI should be noted here. |
| Referral for consult (specialty) | If the patient was referred for a consult due to the UTI, the details of the consult should be noted here. The reviewer must detail what specialty consultation the patient was referred. |
| Referral for intervention (physio etc) | If the patient was given a referral for any type of intervention, then the details of the intervention must be noted here. The reviewer must detail was type of intervention that patient was referred (eg. Physiotherapy etc.) |
| Date UTI resolved | The date that the UTI resolved should be noted here, if resolved during admission. |
| Treatment on discharge | A note should be made here of any treatment that the patient was prescribed on discharge in relation to their UTI. |
| Referral on discharge | Reviewer must make a note here of whether the patient was given a referral for UTI related treatment on discharge. Reviewer must select yes or no here. |
| Referral PHN | Yes/No |
| Referral GP | Yes/No |
| Referral OPD | Yes/No |
| Referral (other) | Free text |
| Severity ( dropdown categories) | The severity of the UTI should be noted here. The reviewer must select one option from the dropdown categories relating to the severity of the UTI. |
| Discharge plan if unresolved | If the UTI was unresolved at the time of discharge, then details of the patient’s discharge plan should be noted here. |
| Notes: Patient story/contextual details\* | Any relevant information relating to the patient and their stay in hospital should be noted here. Reviewers should make note of any information within the patient’s chart that provides context in relation to the UTI or explains the events of their stay in hospital. |
| Additional event | If patient has suffered any additional UTI, the details of this event will be recorded in a separate sheet on the Excel sheet. |

### **Pressure ulcer**

If more than one pressure ulcer, each shall be reviewed separately.

|  |  |
| --- | --- |
| Variable | Instruction |
| Initial Waterlow score | The initial Waterlow score that the patient received after being reviewed by the nurse within the first six hours of their admission should be noted here. |
| Waterlow score on detection | The Waterlow score that the patient received on detection of the pressure ulcer should be noted here. The Waterlow assessment will be repeated every 72 hours throughout the patient’s stay in hospital or if their condition worsens during their stay therefore their initial Waterlow score may differ to subsequent score. A score above 10 will result in a skin care plan for 7 days. |
| Location of pressure ulcer | Reviewer must make note of the location of the pressure ulcer. |
| Grade of pressure ulcer | Reviewer must select one option from the drop-down menu to categorize the pressure ulcer. Drop-down options include stage 1 - Nonblanchable Erythema, stage 2 - Partial Thickness Skin Loss, stage, 3 - Full Thickness Skin Loss or stage 4 - Full Thickness Tissue Loss. |
| Date of first detection (onset or confirmed worsening) | The date that the pressure ulcer was first detected should be noted here. The date should reflect either the development of a new pressure ulcer or the confirmed worsening of a pressure ulcer that was present on admission. If a pressure ulcer was initially categorised as a stage two pressure ulcer on admission but progressed into a stage three, then the reviewer must note the date that the worsening of the pressure ulcer was first detected. |
| Number of days from presentation to detection | The number of days between the patient’s first presentation to the hospital and the detection of their pressure ulcer should be noted here. |
| Which ward first detected? | The ward where the pressure ulcer was first detected should be noted here. The name of the ward will not be retained but will be collected initially in order to construct categories associated with where the four “failure to maintain” events were identified (e.g. medical, surgical, general, ICU) |
| Validated by TVN? | The reviewer must confirm whether the pressure ulcer was validated by the TVN. Reviewer must check Patient Centre to locate information on the patient’s referral to the TVN. |
| Date of commencement of treatment | The date that the patient first started receiving treatment for the pressure ulcer should be noted here. |
| Treatment type - Antibiotics | Yes/no |
| Treatment type – Specialised dressing | Yes/no |
| Treatment type – Analgesics | Yes/no |
| Interventions (mattresses, cushion, TVN, dressings) | Any and all interventions implemented as a result of the pressure ulcer should be noted here. Interventions may include mattresses, cushions, dressings, turning scheme, or consultations with the TVN. Evidence of such interventions documented in the chart should be noted here. Information relating to variances to nursing interventions can be found in the back of the Waterlow Risk and SKIN Assessment Chart. |
| Extra tests | Any additional tests that were required due to the pressure ulcer should be noted here |
| Extra procedures | Any additional procedures that were required due to the pressure ulcer should be noted here |
| Changed nursing care | Any changes to the nursing care required by the patient as a result of the pressure ulcer should be noted here. |
| Referral for consult (specialty) | If the patient was referred for a consult due to the pressure ulcer, the details of the consult should be noted here. The reviewer must detail what specialty consultation the patient was referred. |
| Referral for intervention (physio etc) | If the patient was given a referral for any type of intervention, then the details of the intervention must be noted here. The reviewer must detail was type of intervention that patient was referred (eg. Physiotherapy etc.) |
| Date resolved | The date that the pressure ulcer resolved should be noted here, if resolved during admission. |
| Treatment on discharge | A note should be made here of any treatment or interventions that the patient was prescribed on discharge in relation to their pressure ulcer. |
| Referral on discharge  If yes – public health nurse, GP, OPD, Other | Reviewer must make a note here of whether the patient was given a referral for pressure ulcer related treatment on discharge. Reviewer must select yes or no here. |
| Referral PHN? | Yes/No |
| Referral GP? | Yes/No |
| Referral OPD? | Yes/No |
| Referral (other) | Free text |
| Severity (dropdown categories) | The severity of the pressure ulcer should be noted here. The reviewer must select one option from the dropdown categories relating to the severity of the pressure ulcer. |
| Discharge plan if unresolved | If the pressure ulcer was unresolved at the time of discharge, then details of the patient’s discharge plan should be noted here. |
| Notes: Patient story/contextual details\* | Any relevant information relating to the patient and their stay in hospital should be noted here. Reviewers should make note of any information within the patient’s chart that provides context in relation to the UTI or explains the events of their stay in hospital. |
| Additional event | If patient has suffered any additional pressure ulcer, the details of this event will be recorded in a separate sheet on the Excel sheet. |

### **Delirium**

Note: As evident from a study conducted by Chuen et al., (2021) on the frequency and quality of delirium documentation in discharge summaries, the term “delirium” is not always used to document delirium in patients’ medical notes. Various other terms such as “confusion” may be deemed as acceptable for identifying delirium through patient chart review. Therefore, in this study, episodes of delirium confirmed through the presence of the term “delirium” will be included in addition to unconfirmed cases of delirium that are captured through the presence of alternative acceptable terms that allow the chart reviewers to document assumed episodes of delirium.

There is a complex and interconnected relationship between delirium and dementia. Patients with dementia are more susceptible to developing delirium than the general population (Fong and Inouye, 2022). Given their vulnerability of developing delirium, patients with dementia must be included in this study.

Previous studies have reported that nurses may have difficulty distinguishing between the declining cognitive impairment of dementia and the acute confusional state of delirium given the complexity of their overlapping symptoms (Steis and Fick, 2012). Due to the similarity of symptoms of both delirium and dementia such as confusion, memory impairment, disorientation and agitation (Voyer et al., 2008), under-capturing and under-reporting of delirium is common as patients with diagnosed dementia often have their delirium symptoms overlooked and therefore attributed to their dementia rather than an episode of delirium (Steis and Fick, 2012).

|  |  |
| --- | --- |
| **Variable** | **Instruction** |
| Pre-existing dementia or cognitive decline | Reviewer must make note of whether the patient has a pre-existing dementia or cognitive decline (Yes/No) |
| 4AT Baseline Score (first measurement) | The 4AT score that the patient initially received on their first screening should be noted here. This first measurement will be considered as the patient’s baseline in terms of their delirium status. |
| Where baseline 4AT carried out | The department/ward where the first 4AT measurement was carried out should be noted here. |
| Date of baseline score | The date of the patient’s first 4AT measurement should be noted here. |
| Changed 4AT Score indicating Delirium if relevant | Reviewers must make note of any 4AT score that indicates delirium after their patient’s initial 4AT assessment if relevant. If the patient’s initial 4AT scored did not indicate the presence of delirium but a subsequent 4AT assessment did then the review must make note of this. |
| Changed CAM-ITU Score if relevant | If the patient was admitted to ITU and assessed using the CAM-ITU then their changed CAM-ITU score must be noted here. |
| New confusion, agitation, or behavioural changes noted (also be aware of hypoactive delirium) | Yes/No |
| Hyperactive or hypoactive delirium? | Drop-down menu to select which |
| Date of first detection of delirium | The date on which the patient’s diagnosis of delirium was first detected should be noted here. |
| Which ward first detected? | The ward where the delirium was first detected should be noted here. The name of the ward will not be retained but will be collected initially in order to construct categories associated with where the four “failure to maintain” events were identified (e.g. medical, surgical, general, ICU) |
| Any falls associated with delirium episode? | Any falls that were associated with the patient’s delirium episode should be noted here. Select Yes or no. |
| Is delirium confirmed in chart? | Reviewer must make note here of whether the delirium was confirmed in the patient’s chart or not. |
| Rapid-sedation used? | Yes/no |
| Non-rapid sedation used? | Yes/no |
| Antipsychotics used? | Reviewers must select from the drop-down menu the antipsychotics used during the patient’s episode of delirium. |
| Haloperidol used? | Reviewers must make note here of whether Haloperidol was used or not. |
| Changes to nursing care? | Any changes to the nursing care required by the patient as a result of the delirium should be noted here. |
| Was this patient specialled 1:1? | Reviewers must make a note of whether the patient was specialled 1:1. A yes or no option can be selected from the drop-down list. |
| Duration of Specialling (number of days) | If the patient was specialled then note should be made here of the number of days that the patient was specialled for during their stay in hospital. |
| Referral for Consult (specialty) | If the patient was referred for a consult due to the delirium, the details of the consult should be noted here. The reviewer must detail what specialty consultation the patient was referred. |
| Referral for intervention (physio, OT, Social Worker etc) | If the patient was given a referral for any type of intervention, then the details of the intervention must be noted here. The reviewer must detail was type of intervention that patient was referred (eg. Physiotherapy etc.) |
| Date delirium resolved | The date that the delirium resolved should be noted here, if resolved during admission. |
| Discharge plan if unresolved | If the delirium was unresolved at the time of discharge, then details of the patient’s discharge plan should be noted here. |
| Referral on discharge | Reviewer must make a note here of whether the patient was given a referral for delirium related treatment on discharge. The details of the referral should be noted here e.g. PHN, GP, OPD, other. |
| Referral PHN? | Yes/No |
| Referral GP? | Yes/No |
| Referral OPD? | Yes/No |
| Referral (other) | Free text |
| Severity (dropdown categories) | The severity of the delirium should be noted here. The reviewer must select one option from the dropdown categories relating to the severity of the delirium. |
| Notes: Patient story/contextual details\*\*\*\* | Any relevant information relating to the patient and their stay in hospital should be noted here. Reviewers should make note of any information within the patient’s chart that provides context in relation to the UTI or explains the events of their stay in hospital. |
| Additional event | If patient has suffered any additional delirium, the details of this event will be recorded in a separate sheet on the Excel sheet. |
| Duration of secondary review (Total events) | Reviewer must make note of the time taken to complete the review in minutes. |

# **A document with text and a black text Description automatically generated with medium confidence4AT Delirium Assessment Tool**

# **A medical survey form with text Description automatically generatedCAM-ICU Delirium Assessment Tool**

# **Nurse and Patient Reported Surveys**

Primary data on patients’ and nurses’ experiences of missed nursing care will be collected through surveys.

Separate samples of both nurses and patients will be recruited for participation in the survey component of the research. The MISSCARE Survey instrument developed by Dr. Beatrice Kalisch at the University of Michigan will be used to measure nurse reported missed nursing care. A survey will be distributed to interested nurses and they will be asked to indicate how frequently necessary nursing work is missed in their experience and to estimate the potential reasons for that care being missed.

Missed nursing care impacts on overall quality and safety in an organisation, but ultimately it is experienced by the patient, therefore we will also carry out a patient survey. The MISSCARE Survey – Patient, also developed by Dr. Beatrice Kalisch, is specifically designed to elicit patient reports of the extent to which nursing care was provided. It will be used to measure patient reported missed nursing care. The survey will be distributed to interested patients and using Likert scales, three core areas found to be important to patients – communication, timeliness, and the provision of basic nursing care will be measured.

Research participants will be asked to participate in a paper-based and anonymous survey. The survey will take approximately 10 minutes to complete, and participants will be asked about their experiences of missed nursing care. The data collected through these surveys will be analysed using SPSS, a software platform that is used to perform statistical analysis on datasets.

Prior to participating in the survey, all participants will be provided with a plain language statement detailing all relevant information relation to the study. As no personal data will be collected through the surveys, participation in the survey will imply that the participant has given their consent to be involved in the research project.

**Sample size**

All patients and nurses who are deemed eligible for participation in this study, based on the inclusion and exclusion criteria that have previously been set by the researchers, will be invited to participated in the study. The researchers aspire to recruit as many participants as possible from those who are eligible to participate. The researchers will aim to recruit at least 300 nurses and 300 patients over the same time period for participation in the survey component of this research. The researchers aim to match the number of patients and nurses in order to capture the same care period.

# **The MISSCARE Survey**

Beatrice J. Kalisch

\*Note: An additional section relating to demographics will be included in the survey.

**Section A — Missed Care**

Direct care staff frequently encounter multiple demands on their time, requiring them to reset priorities. To the best of your knowledge, how frequently are the following care tasks MISSED by direct care staff on your unit? Check only one box for each item.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Always**  missed | **Frequently**  missed | **Occasionally** missed | **Rarely**  missed | **Never**  missed | **Not Applicable** |
| 1) Ambulation/mobilization |  |  |  |  |  |  |
| 2) Pressure relieving interventions |  |  |  |  |  |  |
| 3) Feeding residents while food is still at the proper temperature |  |  |  |  |  |  |
| 4) Setting up meals for residents who can feed themselves |  |  |  |  |  |  |
| 5) Medications administered as scheduled |  |  |  |  |  |  |
| 6) Assessment of vital signs |  |  |  |  |  |  |
| 7) Monitoring intake/output |  |  |  |  |  |  |
| 8) Full documentation of all care provided |  |  |  |  |  |  |
| 9) Bathing/Showering |  |  |  |  |  |  |
| 10) Oral care |  |  |  |  |  |  |
| 11) Glucose monitoring as ordered |  |  |  |  |  |  |
| 12) IV/central line site care and assessments according to facility policy |  |  |  |  |  |  |
| 13) Response to call light is initiated within 5 minutes |  |  |  |  |  |  |
| 14) PRN medication requests acted on within 15 minutes |  |  |  |  |  |  |
| 15) Attend interdisciplinary care conferences when held |  |  |  |  |  |  |
| 16) Assist with toileting needs within 5 minutes of request |  |  |  |  |  |  |
| 17) Skin/Wound care |  |  |  |  |  |  |
| 18) Adequate surveillance of confused/impaired residents |  |  |  |  |  |  |

**Section B—Reasons for Missed Care**

Thinking about the missed care on your unit/shift by direct care staff (as you indicated in Section A above), indicate the significance of the reasons care is MISSED on your unit. Check only one box for each item.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Significant**  reason | **Moderate**  reason | **Minor**  reason | **NOT** a  reason for missed care |
| 1) Inadequate number of staff |  |  |  |  |
| 2) Urgent patient situations (e.g., a patient’s condition worsening, resident fall) |  |  |  |  |
| 3) Unexpected rise in acuity on the unit |  |  |  |  |
| 4) Inadequate number of assistive personnel (e.g., nursing assistants, medication techs, etc.) |  |  |  |  |
| 5) Unbalanced patient assignments |  |  |  |  |
| 6) Medications not available when needed |  |  |  |  |
| 7) Inadequate hand-off from previous shift or sending unit |  |  |  |  |
| 8) Other departments did not provide the care needed (e.g., physical therapy did not ambulate) |  |  |  |  |
| 9) Supplies/ equipment not available when needed |  |  |  |  |
| 10) Supplies/ equipment not functioning properly when needed |  |  |  |  |
| 11) Lack of back up support from team members |  |  |  |  |
| 12) Tension or communication breakdowns with other ancillary staff/support departments |  |  |  |  |
| 13) Tension or communication breakdowns within the nursing team or with the medical staff |  |  |  |  |
| 14) Inadequate support from nursing leadership |  |  |  |  |
| 15) Heavy admission and discharge activity |  |  |  |  |
| 16) Emotional or physical exhaustion |  |  |  |  |
| 17) Inadequate supervision of nursing assistants |  |  |  |  |
| 18) Interruptions/Multitasking |  |  |  |  |
| 19) Lack of cues/reminders |  |  |  |  |

**THANK YOU FOR YOUR PARTICIPATION!**

# **MISSCARE Survey - Patient**

To the extent you can remember, please answer the following questions, if you cannot remember, leave the answer blank.

1. How often were you clear about which specific nurse was assigned to take care of you for the shift?

Never

Rarely

Sometimes

Usually

Always

1. How often did your nursing staff discuss your treatment with you?

Never

Rarely

Sometimes

Usually

Always

3. How often did your nursing staff give you information about tests (e.g. x-ray, MRI, CT scan) and/or procedures you received during this hospitalization (timing, what would be involved, etc.)?

Never

Rarely

Sometimes

Usually

Always

4. When you had a question or concern about your care or illness, did your nursing staff listen to you?

Never

Rarely

Sometimes

Usually

Always

5. When you had an opinion about what needed to be done relative to your care, did the nursing staff consider your opinions and ideas?

Never

Rarely

Sometimes

Usually

Always

6. How often did the nursing staff check with you to make sure your teeth were brushed and mouth rinsed (or provide the care if you could not do it yourself)?

Never

Rarely

Sometimes

Usually

Always

7. How often did the nursing staff check with you to make sure you had a bath or were kept clean throughout your hospitalization?

Never

Rarely

Sometimes

Usually

Always

8. If you could not feed yourself at any time during your hospitalization, did your nursing staff help (feed) you within 10 minutes after the arrival of the tray?

Never

Rarely

Sometimes

Usually

Always

I did not need help to feed myself

I could not eat

9. On average, how often did the nursing staff help you or monitor that you got out of bed and sat in a chair?

Never

Rarely

Sometimes

Usually

Always

Check here if you were unable to get out of bed

10. On average, how often did the nursing staff help you or monitor that you walked?

Never

Rarely

Sometimes

Usually

Always

Check here if you could not walk

11. On average, how often did the nursing staff reposition you in bed?

Never

Rarely

Sometimes

Usually

Always

Check here if you did not need help moving around in bed

12. On average, how often did your nurses check your IV or other line (central venous catheter, PICC line, or port)?

Never

Rarely

Sometimes

Usually

Always

Check here if you did not have an iv or other line

13. When a monitor or other machine beeped, how long did it usually take the nursing staff to respond?

Less than 5 minutes

5 to 10 minutes

11 to 20 minutes

21 to 30 minutes

More than 30 minutes

No machine beeped

14. When you pushed your call light, how long on average did it take the nursing staff to answer?

Less than 5 minutes

5 to 10 minutes

11 to 20 minutes

21 to 30 minutes

More than 30 minutes

I never pushed my call light

15. Once your call light was answered, how long on average did it take for you to receive the help you requested?

Less than 5 minutes

5 to 10 minutes

11 to 20 minutes

21 to 30 minutes

More than 30 minutes

I never pushed my call light

16. Did you ask for pain medication?

YES (if yes, go to question 17)

NO (if no, go to question 19)

17. If you answered yes to question 16, how long did it take you to get the pain medication?

Less than 5 minutes

5 to 10 minutes

11 to 20 minutes

21 to 30 minutes

More than 30 minutes

I never received the pain medication

18. If you answered yes to question 16, did the nursing staff check back to see if the medication helped reduce your pain?

Never

Rarely

Sometimes

Usually

Always

19. If you needed help to go to the bathroom, how long did it take the nursing staff to get into your room to help you?

Less than 5 minutes

5 to 10 minutes

11 to 20 minutes

21 to 30 minutes

More than 30 minutes

I did not request or need help

20. Overall, how would you rate your nursing care while you were a patient during this hospitalization?

Poor

Fair

Good

Very good

Excellent

21. Did you experience any of the following problems during this hospitalization?

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Yes** | **No** | **Unsure** |
| **Fall** |  |  |  |
| **Skin breakdown / Pressure ulcer** |  |  |  |
| **Medication Administration Error** |  |  |  |
| **New Infection** |  |  |  |
| **IV running dry** |  |  |  |
| **IV leaking into your skin** |  |  |  |
| **Other problem**  Explain:\_\_\_ |  |  |  |

\*Note: An addition section relating to patient demographics will be included in the survey. Demographics will be gathered based on the RN4CAST patient survey.

**THANK YOU FOR YOUR PARTICIPATION!**

# **Determining the cost associated with F2M events and missed nursing care.**

Currently the cost of missed nursing care is undetermined. Through calculating the costs of commonly occurring and costly nursing sensitive outcomes we aim to estimate the cost to the Irish health service. This will assist managers and policy makers plan the nurse workforce and care delivery to the largest cohort of patients in the acute hospital system. To this end the support of the healthcare pricing office (HPO) as a member of the advisory group is essential as well as input from a health economist.

The financial burden of adverse events in the Republic of Ireland was estimated to have an annual cost of €194 million, approximately 4% of the Irish acute health care budget (Rafter et al., 2017). Recent work in Ireland estimates the cost to the health service of nursing sensitive adverse events to be in the region of €91.3 million annually (Murphy et al., 2021). It is timely therefore that a surveillance cycle for these most expensive hospital-acquired adverse events be established. Costing of the nurse sensitive adverse events will be achieved using ICD10 data, length of stay, and other variables associated with Cost of Illness calculations.

Based on accurate rates of nursing-sensitive adverse events identified through the chart review, national Diagnosis-Related Groups (DRGs) systems and length of stay, we will calculate national specific cost of illness (COI) using social perspective and bottom-up approach. As the COI is defined as the value of the resources that are expended or forgone as a result of health problems, we will include direct costs (health sector costs – mainly extra length of stay) to provide accurate information on costs of F2M adverse events (and therefore missed nursing care for older patients) on a national level.

# **Cost2Care Data Protection Considerations**

**Overview of data and Processing:**

In this study, we will determine how these nursing-sensitive outcomes are currently represented in routinely available national discharge (HIPE) data in Ireland. A structured chart review will be conducted in one hospital site to validate the rates of nursing-sensitive events available in the HIPE data. The cost of these events to the Irish health service will be calculated using ICD10 data, length of stay, and other variables associated with Cost of Illness calculations. Through surveys, the human costs of missed care to both patients and caregivers will be further examined.

In order to carry out this work, two main sources of data patient data are required.

**Hospital Inpatient Enquiry (HIPE)**

The participating Model 4 hospital will generate a random sample of charts for audit in accordance with the criteria set out in the study description, this process will be conducted under the guidance of the Healthcare Pricing Office.

The first data source is the Hospital Inpatient Enquiry (HIPE) national data collection. The HIPE dataset is the only fully audited national data collection on patient admitted to public acute hospitals in Ireland. The HIPE system is managed and administered by the Healthcare Pricing Office (HPO). The HIPE dataset is a pseudonymised dataset which contains demographic, administrative and clinical information on patients. The demographic and administrative information is downloaded directly from hospital patient administration systems to the HIPE system while the clinical information is added by teams of clinical coders in the hospitals based on the documentation in the patient charts. It is intended that the HIPE data, accessed through the participating hospital, the Mater Misericordiae University Hospital, under the guidance of the Healthcare Pricing Office will be used for the following purposes.

1. Generation of a stratified sample of cases from the participating hospital for a retrospective chart review based on the criteria set out in the study protocol.
2. Source of demographic and administrative data on patients whose charts have been selected for the chart review .
3. Comparison of the chart review findings in terms of failure to maintain events with the HIPE record for those patients.
4. Generation of an aggregated stratified national data profile which can be used to generalise the results from the chart review.

**Patient Chart:**

The patient chart is the primary source of clinical information for patients treated in public acute hospitals in Ireland. The physical chart contains special category, identifiable, personal data on the patients including name, date of birth, medical record number (MRN) as well as clinical details. The use of patient charts for the identification of F2M events is for a number of reasons:

1. The chart review team need to work with the primary data source in order to be able to fully assess whether an event has occurred. In particular, the nursing notes will be of particular interest in relation to this study.
2. Although the HIPE dataset through the clinical coding guidelines can capture these events, the coded information on diagnoses and procedures is typically not detailed enough to allow for a comprehensive clinical review. Only the chart can provide this.
3. Clinical coding is carried out in accordance with strict coding guidelines as to what can and cannot be coded. In particular, diagnoses can only be coded if there is clear documentation of the diagnosis in the chart. However, for this particular work, the reviewers can potentially use the absence of information in the chart to infer data. This type of assessment is not possible through using HIPE data.
4. Part of the aim of the study is to assess the level of reporting of failure to maintain events on HIPE which is a current area of interest to the HSE.

**Detailed Description of Processing**

The following section describe the proposed processing steps in detail. In each step the type of data being processed (anonymised, pseudonymized, identifiable) are indicated along with the measures that will be put in place to ensure that the data are handles appropriately in a safe secure manner which will protect the rights of the data subjects.

1. The participating Model 4 hospital will generate a random sample of charts for audit in accordance with the criteria set out in the study description, this process will be conducted under the guidance of the Healthcare Pricing Office. This sampling process will result in a list of hospital stays identifiable by MRN, episode number, admission date and time, discharge date and time which can be used to identify the charts or portions thereof for . In addition to these core variables which will facilitate identification of the correct charts, the following additional information will be provided:

Patient sex, patient age, length of stay, type of admission (Elective, Emergency, Maternity), admission source, discharge destination, specialty, days spent in ICU, coded clinical diagnoses, coded procedures.

The demographic and administrative information will be used to stratify the sample to gain understanding on potential factors influencing reporting of F2M events while the clinical information will be used to compare the event rates from the chart review versus those identified through HIPE.

The final piece of information which will be provided with the chart review sample, will be an encrypted MRN which is generated by the hospital HIPE manager in line with processes used by the HPO as part of their routine data processes. This encrypted MRN will provide a means for the chart review team to provide data to the wider study team without identifying the patient.

The chart review team will be the only COST2CARE study team members who will have access to the unencrypted MRN.

1. The participating hospital (MMUH) will provide the review sample list directly to the chart review team (for chart retrieval purposes). This transfer will be facilitated via a secure fileshare which will be accessible only to one member of the hospital staff and one member of the chart review team. At this stage, the diagnosis and procedure information will not be included in the sample data so as not to bias the chart reviewers. This information can be supplied to and reattached by the study team based on the encrypted MRN once the chart audit has been completed.
2. The chart review team will agree a protocol with staff in the participating hospital in order to safely and securely access the charts. Although this will be agreed according to existing protocols in the participating hospital it is envisaged that the following items will be explicitly agreed and stated in that protocol.
   * + The purpose of the review
     + The duration of the review
     + The staff involved (study chart reviewers and hospital staff)
     + Principle contacts and phone numbers
     + Documentation requirements (paper chart and electronic records)
     + Location of review
     + Access times
     + Chart security
     + Query process
3. While conducting the chart review, the review team will record and store their findings on a password protected excel file on a password protected and preferably encrypted laptop.
4. On completion of the chart review, the reviewers will remove the unencrypted MRN from the excel file along with the admission and discharge dates and times to further ensure anonymity. At this point the data can be considered to be anonymised and can be provided to the wider study team for analysis. The chart review team must confirm in writing that that all instances of MRNs are removed from the study laptop(s) prior to releasing the anonymised data to the wider study team.
5. At this point the chart review team will inform the hospital HIPE manager that the chart review portion of the study is complete and they will then make the diagnoses and procedures as recorded on HIPE available to the study team. These will be provided via secure fileshare.
6. Once initial analysis of the study sample has been carried out, the HPO will provide the study team with a national summary data aggregated by the stratification factors used in the sampling methodology to generalise the results to the national hospital population. Given that the review sample will be taken from a single hospital, careful consideration will be given to the appropriateness of this step by experts in this field.

**Legal Basis:**

As detailed in the study protocol, the proposed study design contains a retrospective chart review. As per the 2021 amendments to Health Research Regulations 2018 (S.I. No. 314 of 2018) a retrospective chart review carried out for research purposes can be done without the consent of participants, subject to mandatory safeguards and specified governance mechanisms. These include:

1. The proposed research must be low risk
2. The research must be approved by a REC
3. Appropriate transparency requirement must be met
4. Only certain categories of individuals can carry out a chart review without obtaining explicit informed consent
5. The personal data accessed cannot be used for other purposes and cannot be shared with others without being fully anonymised.
6. If the retrospective chart review is not ow risk then the either explicit informed consent must be obtained or a decision must be sought from the HRCDC

The study team assessment is that the research is low risk and as such has been approved by the DCU REC and the IRB for MMUH. A consent waiver has been granted by the HRCDC for the chart review process. The HPO in the data protection statement explicitly mentions that HIPE data may be used for research purposes.

**Data Controller:**

The data controller of the data generated for the purposes of this research project will be Dr. Marcia Kirwan.

**Data Processors:**

No data processors will be employed for the purpose of this study.

**Data Minimization:**

In respect of the concept of data minimization, only the data fields required for the proposed analysis as listed in the “Detailed Description of Processing” will be made available.

**Data Supporting Assets:**

The main data supporting assets for the national HIPE file as held by the HPO are HSE servers, networks, encrypted laptops etc. All of the HSE infrastructure is password protected and access is restricted to named individuals. All laptops are hardware encrypted by default, however no identifiable personal data is held on these devices.

The data supporting assets for the local HIPE file in each hospital are the servers hosting the local HIPE instance and the local hospital network. Note that in the case of Statutory hospitals, and some voluntary hospitals the local HIPE instance is also hosted on central HSE infrastructure.

In the case of the study team, the data supporting assets will comprise a number of laptops which are password protected and accessible only to named individuals on the study team.

**Retention Period:**

The patient chart will only be accessible by the chart review team for the duration of the review portion of the study. The charts themselves will be retained by the participating hospital according to their retention policies. The identifiable review results including the MRN will only be available to the chart reviewers and will be retained in that identifiable format (i.e. including MRN) for the duration of the chart review. The anonymised chart review results, including only the encrypted MRN will be retained for the duration of the overall study and will then be destroyed.

**How are data subjects informed of the processing:**

The HSE data protection policy and service users privacy notice (https://www.hse.ie/eng/gdpr/hse-data-protection-policy/) inform patients that their data may be provided for research purposes. These documents only extend to the provision of anonymised data for research purposes therefore additional notification should be put in place by the participating hospital to inform patients that their charts may be made available for the retrospective chart review.

**Is personal data being shared:**

The chart review team will have temporary access to patient charts in order to carry out the review. However, the results of the review will only be made available to the wider study team in a fully anonymised fashion. Individual patient level data will not be shared by the study team. Only aggregated data and summaries will be published.

**Transfer to third country:**

There will be no transfer of personal data, either identifiable or pseudonymised, to third parties

**Data protection law training:**

All members of the research team from Dublin City University have completed an online data protection training course with Dublin City University.

**Anonymization processes:**

As part of the normal monthly processing of the national HIPE file, the HPO generate an anonymised MRN for inclusion on the file. MRN encryption in this study is carried out by the hospital HIPE manager in line with processes used by the HPO as part of their routine data processes. The anonymised MRN is generated such that multiple discharges relating to the same patient are identified using the same encrypted MRN, however the recipients of the data cannot identify the original MRN from the encrypted one.

**Technical and Organisational Measures:**

Technical Measures:

MRN encryption is carried out by the hospital HIPE manager in line with processes used by the HPO as part of their routine data processes

All DCU laptops are hardware encrypted and password protected.

Organisational Measures:

All members of the research team from DCU have completed an online course in data protection.

Encrypted Laptop to Network

Secure Fileshare

Encrypted Laptop

Secure Fileshare

Secure Fileshare

DCU Study Team

Chart Review Sample (HIPE)

**MRN** & Encrypted MRN

Episode Number

Sex

Age

Admission Source and Type

Discharge Destination

Specialty

Days in ICU

Chart Retrieval by Hospital Records Team

Chart Review by Study Review Team

Chart Review Results

**Encrypted MRN**

Episode Number

Sex

Age

Admission Source and Type

Discharge Destination

Specialty

Days in ICU

Review Findings

Study Results Analysis

(DCU Secure Network Drive)

**Encrypted MRN**

Episode Number

Sex, Age

Admission Source4 and Type

Discharge Destination

Specialty

Days in ICU

Review Findings

Clinical Details

Chart Review Sample

(HIPE Clinical Details)

**Encrypted MRN**

Episode Number

National Profile

(HIPE Aggregate Data)

Case numbers by each level of identified stratification factors

Participating Hospital

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