**Supplemental digital content for “Impact of Family Presence on Delirium in Critically Ill Patients: A Retrospective Cohort Study**

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# **eTable 1.** Strengthening the Reporting of Observational studies in Epidemiology (STROBE) and Reporting of studies Conducted using Observational Routinely-collected Data (RECORD) items checklists

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Item No.** | **STROBE items** |  | **RECORD items** | **Paper** |
| **Title and abstract** | | | | | |
|  | 1 | (a) Indicate the study’s design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found |  | RECORD 1.1: The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included.  RECORD 1.2: If applicable, the geographic region and timeframe within which the study took place should be reported in the title or abstract.  RECORD 1.3: If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract. | Abstract |
| **Introduction** | | | | | |
| Background rationale | 2 | Explain the scientific background and rationale for the investigation being reported |  |  |  |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses |  |  |  |
| **Methods** | | | | | |
| Study Design | 4 | Present key elements of study design early in the paper |  |  |  |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection |  |  |  |
| Participants | 6 | *(a) Cohort study* - Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up  *Case-control study* - Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls  *Cross-sectional study* - Give the eligibility criteria, and the sources and methods of selection of participants  *(b) Cohort study* - For matched studies, give matching criteria and number of exposed and unexposed  *Case-control study* - For matched studies, give matching criteria and the number of controls per case |  | RECORD 6.1: The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be provided.  RECORD 6.2: Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided.  RECORD 6.3: If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage. | Methods and Appendix 4  Methods and Appendix 2-4    Figure 1 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable. |  | RECORD 7.1: A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided. | Appendix 2-4 |
| Data sources/ measurement | 8 | For each variable of interest, give sources of data and details of methods of assessment (measurement).  Describe comparability of assessment methods if there is more than one group |  |  |  |
| Bias | 9 | Describe any efforts to address potential sources of bias |  |  |  |
| Study size | 10 | Explain how the study size was arrived at |  |  |  |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why |  |  |  |
| Statistical methods | 12 | (a) Describe all statistical methods, including those used to control for confounding  (b) Describe any methods used to examine subgroups and interactions  (c) Explain how missing data were addressed  (d) *Cohort study* - If applicable, explain how loss to follow-up was addressed  *Case-control study* - If applicable, explain how matching of cases and controls was addressed  *Cross-sectional study* - If applicable, describe analytical methods taking account of sampling strategy  (e) Describe any sensitivity analyses |  |  |  |
| Data access and cleaning methods |  | .. |  | RECORD 12.1: Authors should describe the extent to which the investigators had access to the database population used to create the study population.  RECORD 12.2: Authors should provide information on the data cleaning methods used in the study. | Appendix 5  Appendix 4 & 5 |
| Linkage |  | .. |  | RECORD 12.3: State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided. | Methods &  Appendix 5 |
| **Results** | | | | | |
| Participants | 13 | (a) Report the numbers of individuals at each stage of the study (*e.g.*, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed)  (b) Give reasons for non-participation at each stage.  (c) Consider use of a flow diagram |  | RECORD 13.1: Describe in detail the selection of the persons included in the study (*i.e.,* study population selection) including filtering based on data quality, data availability and linkage. The selection of included persons can be described in the text and/or by means of the study flow diagram. | Figure 1 |
| Descriptive data | 14 | (a) Give characteristics of study participants (*e.g.*, demographic, clinical, social) and information on exposures and potential confounders  (b) Indicate the number of participants with missing data for each variable of interest  (c) *Cohort study* - summarise follow-up time (*e.g.*, average and total amount) |  |  |  |
| Outcome data | 15 | *Cohort study* - Report numbers of outcome events or summary measures over time  *Case-control study* - Report numbers in each exposure category, or summary measures of exposure  *Cross-sectional study* - Report numbers of outcome events or summary measures |  |  |  |
| Main results | 16 | (a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included  (b) Report category boundaries when continuous variables were categorized  (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period |  |  |  |
| Other analyses | 17 | Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses |  |  |  |
| **Discussion** | | | | | |
| Key results | 18 | Summarize key results with reference to study objectives |  |  |  |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias |  | RECORD 19.1: Discuss the implications of using data that were not created or collected to answer the specific research question(s). Include discussion of misclassification bias, unmeasured confounding, missing data, and changing eligibility over time, as they pertain to the study being reported. | Discussion |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence |  |  |  |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results |  |  |  |
| **Other Information** | | | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based |  |  |  |
| Accessibility of protocol, raw data, and programming code |  | .. |  | RECORD 22.1: Authors should provide information on how to access any supplemental information such as the study protocol, raw data, or programming code. | Appendix 2-5 |

\*Reference: Benchimol EI, Smeeth L, Guttmann A, Harron K, Moher D, Petersen I, Sørensen HT, von Elm E, Langan SM, the RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. *PLoS Medicine* 2015; in press.

**eTable 2.** Sub-category and category of algorithm code

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Dataset** | **Category** | **Sub-Category** | **Granularity** | **Occurrences Class “False”** | **Occurrences Class “True”** | **Dataset**  **Status** |
| 1 | Documented family or friends | Any family documented? | macro | 129 | 151 | Included |
| 2 | Documented family or friends | Significant other | macro | 206 | 74 | Included |
| 3 | Documented family or friends | Significant other – man | macro | 252 | 28 | Included |
| 4 | Documented family or friends | Significant other – woman | macro | 235 | 45 | Included |
| 5 | Documented family or friends | Significant other – unknown | macro | 279 | 1 | Excluded |
| 6 | Documented family or friends | Child | macro | 203 | 77 | Included |
| 7 | Documented family or friends | Child – boy/man | macro | 241 | 39 | Included |
| 8 | Documented family or friends | Child – girl/woman | macro | 235 | 45 | Included |
| 9 | Documented family or friends | Child – unknown | macro | 277 | 3 | Excluded |
| 10 | Documented family or friends | Parent | macro | 258 | 22 | Included |
| 11 | Documented family or friends | Parent – man | macro | 271 | 9 | Excluded |
| 12 | Documented family or friends | Parent – woman | macro | 263 | 17 | Included |
| 13 | Documented family or friends | Parent – unknown | macro | 279 | 1 | Excluded |
| 14 | Documented family or friends | Siblings | macro | 250 | 30 | Included |
| 15 | Documented family or friends | Siblings – boy/man | macro | 267 | 13 | Included |
| 16 | Documented family or friends | Siblings – girl/woman | macro | 259 | 21 | Included |
| 17 | Documented family or friends | Siblings – unknown | macro | 280 | 0 | Excluded |
| 18 | Documented family or friends | Other | macro | 244 | 36 | Included |
| 19 | Documented family or friends | Other – boy/man | macro | 274 | 6 | Excluded |
| 20 | Documented family or friends | Other – girl/woman | macro | 255 | 25 | Included |
| 21 | Documented family or friends | Other – unknown | macro | 269 | 11 | Included |
| 22 | Documented family or friends | Not specified | macro | 276 | 4 | Excluded |
| 23 | Visits | Any documented visit? | macro | 50 | 230 | Included |
| 24 | Visits | Any documented visit? | micro | 52 | 1621 | Included |
| 25 | Visits | Significant other | macro | 149 | 131 | Included |
| 26 | Visits | Significant other | micro | 1180 | 493 | Included |
| 27 | Visits | Significant other – man | macro | 234 | 46 | Included |
| 28 | Visits | Significant other – man | micro | 1515 | 158 | Included |
| 29 | Visits | Significant other – woman | macro | 195 | 85 | Included |
| 30 | Visits | Significant other – woman | micro | 1341 | 332 | Included |
| 31 | Visits | Significant other – unknown | macro | 277 | 3 | Excluded |
| 32 | Visits | Significant other – unknown | micro | 1670 | 3 | Excluded |
| 33 | Visits | Child | macro | 149 | 131 | Included |
| 34 | Visits | Child | micro | 1140 | 533 | Included |
| 35 | Visits | Child – boy/man | macro | 201 | 79 | Included |
| 36 | Visits | Child – boy/man | micro | 1423 | 250 | Included |
| 37 | Visits | Child – girl/woman | macro | 185 | 95 | Included |
| 38 | Visits | Child – girl/woman | micro | 1346 | 327 | Included |
| 39 | Visits | Child – unknown | macro | 266 | 14 | Included |
| 40 | Visits | Child – unknown | micro | 1653 | 20 | Included |
| 41 | Visits | Parent | macro | 242 | 38 | Included |
| 42 | Visits | Parent | micro | 1532 | 141 | Included |
| 43 | Visits | Parent – man | macro | 260 | 20 | Included |
| 44 | Visits | Parent – man | micro | 1613 | 60 | Included |
| 45 | Visits | Parent – woman | macro | 247 | 33 | Included |
| 46 | Visits | Parent – woman | micro | 1562 | 111 | Included |
| 47 | Visits | Parent – unknown | macro | 280 | 0 | Excluded |
| 48 | Visits | Parent – unknown | micro | 1673 | 0 | Excluded |
| 49 | Visits | Siblings | macro | 205 | 75 | Included |
| 50 | Visits | Siblings | micro | 1427 | 246 | Included |
| 51 | Visits | Siblings – boy/man | macro | 243 | 37 | Included |
| 52 | Visits | Siblings – boy/man | micro | 1534 | 139 | Included |
| 53 | Visits | Siblings – girl/woman | macro | 228 | 52 | Included |
| 54 | Visits | Siblings – girl/woman | micro | 1550 | 123 | Included |
| 55 | Visits | Siblings – unknown | macro | 276 | 4 | Excluded |
| 56 | Visits | Siblings – unknown | micro | 1669 | 4 | Excluded |
| 57 | Visits | Other | macro | 158 | 122 | Included |
| 58 | Visits | Other | micro | 1289 | 384 | Included |
| 59 | Visits | Other – boy/man | macro | 225 | 55 | Included |
| 60 | Visits | Other – boy/man | micro | 1566 | 107 | Included |
| 61 | Visits | Other – girl/woman | macro | 209 | 71 | Included |
| 62 | Visits | Other – girl/woman | micro | 1458 | 215 | Included |
| 63 | Visits | Other – unknown | macro | 222 | 58 | Included |
| 64 | Visits | Other – unknown | micro | 1566 | 107 | Included |
| 65 | Visits | Pet | macro | 278 | 2 | Excluded |
| 66 | Visits | Pet | micro | 1670 | 3 | Excluded |
| 67 | Visits | Not specified | macro | 163 | 117 | Included |
| 68 | Visits | Not specified | micro | 1299 | 374 | Included |
| 69 | Visits | Not specified – boy/man | macro | 276 | 4 | Excluded |
| 70 | Visits | Not specified – boy/man | micro | 1668 | 5 | Excluded |
| 71 | Visits | Not specified – unknown | macro | 163 | 117 | Included |
| 72 | Visits | Not specified – unknown | micro | 1317 | 356 | Included |
| 73 | Visits | Not specified – girl/woman | macro | 277 | 3 | Excluded |
| 74 | Visits | Not specified – girl/woman | micro | 1659 | 14 | Excluded |
| 75 | Visits | Did social work speak with family? | macro | 235 | 45 | Included |
| 76 | Visits | Did social work speak with family? | micro | 1595 | 78 | Included |
| 77 | Visits | Is this a family meeting / conference? | macro | 241 | 39 | Included |
| 78 | Visits | Is this a family meeting / conference? | micro | 1608 | 65 | Included |
| 79 | Visits | Does this discuss goals of care? | macro | 249 | 31 | Included |
| 80 | Visits | Does this discuss goals of care? | micro | 1631 | 42 | Included |
| 81 | Visits | Did a doctor speak with the family? | macro | 188 | 92 | Included |
| 82 | Visits | Did a doctor speak with the family? | micro | 1503 | 170 | Included |
| 83 | Visits | Did allied health speak with the family? | macro | 275 | 5 | Excluded |
| 84 | Visits | Did allied health speak with the family? | micro | 1668 | 5 | Excluded |
| 85 | Visits | Did bedside nurse speak with the family? | macro | 229 | 51 | Included |
| 86 | Visits | Did bedside nurse speak with the family? | micro | 1595 | 78 | Included |
| 87 | Visits | Is family meeting at beside? | macro | 270 | 10 | Excluded |
| 88 | Visits | Is family meeting at beside? | micro | 1661 | 12 | Excluded |
| 89 | Visits | Is family meeting at the conference room? | macro | 278 | 2 | Excluded |
| 90 | Visits | Is family meeting at the conference room? | micro | 1669 | 4 | Excluded |
| 91 | Visits | Is family meeting unspecified? | macro | 265 | 15 | Included |
| 92 | Visits | Is family meeting unspecified? | micro | 1657 | 16 | Included |
| 93 | Visits | Did the meeting discuss organ donation? | macro | 278 | 2 | Excluded |
| 94 | Visits | Did the meeting discuss organ donation? | micro | 1670 | 3 | Excluded |
| 95 | Visits | Did family attend rounds? | macro | 260 | 20 | Included |
| 96 | Visits | Did family attend rounds? | micro | 1648 | 25 | Included |
| 97 | Phone calls | Any documented phone calls? | macro | 128 | 152 | Included |
| 98 | Phone calls | Any documented phone calls? | micro | 129 | 437 | Included |
| 99 | Phone calls | Significant other | macro | 233 | 47 | Included |
| 100 | Phone calls | Significant other | micro | 447 | 119 | Included |
| 101 | Phone calls | Significant other – man | macro | 268 | 12 | Included |
| 102 | Phone calls | Significant other – man | micro | 539 | 27 | Included |
| 103 | Phone calls | Significant other – woman | macro | 245 | 35 | Included |
| 104 | Phone calls | Significant other – woman | micro | 474 | 92 | Included |
| 105 | Phone calls | Significant other – unknown | macro | 280 | 0 | Excluded |
| 106 | Phone calls | Significant other – unknown | micro | 566 | 0 | Excluded |
| 107 | Phone calls | Child | macro | 220 | 60 | Included |
| 108 | Phone calls | Child | micro | 439 | 127 | Included |
| 109 | Phone calls | Child – boy/man | macro | 258 | 22 | Included |
| 110 | Phone calls | Child – boy/man | micro | 528 | 38 | Included |
| 111 | Phone calls | Child – girl/woman | macro | 241 | 39 | Included |
| 112 | Phone calls | Child – girl/woman | micro | 479 | 87 | Included |
| 113 | Phone calls | Child – unknown | macro | 279 | 1 | Excluded |
| 114 | Phone calls | Child – unknown | micro | 564 | 2 | Excluded |
| 115 | Phone calls | Parent | macro | 263 | 17 | Included |
| 116 | Phone calls | Parent | micro | 542 | 24 | Included |
| 117 | Phone calls | Parent – man | macro | 275 | 5 | Excluded |
| 118 | Phone calls | Parent – man | micro | 561 | 5 | Excluded |
| 119 | Phone calls | Parent – woman | macro | 266 | 14 | Included |
| 120 | Phone calls | Parent – woman | micro | 546 | 20 | Included |
| 121 | Phone calls | Parent – unknown | macro | 280 | 0 | Excluded |
| 122 | Phone calls | Parent – unknown | micro | 566 | 0 | Excluded |
| 123 | Phone calls | Siblings | macro | 244 | 36 | Included |
| 124 | Phone calls | Siblings | micro | 490 | 76 | Included |
| 125 | Phone calls | Siblings – boy/man | macro | 264 | 16 | Included |
| 126 | Phone calls | Siblings – boy/man | micro | 543 | 23 | Included |
| 127 | Phone calls | Siblings – girl/woman | macro | 255 | 25 | Included |
| 128 | Phone calls | Siblings – girl/woman | micro | 513 | 53 | Included |
| 129 | Phone calls | Siblings – unknown | macro | 280 | 0 | Excluded |
| 130 | Phone calls | Siblings – unknown | micro | 566 | 0 | Excluded |
| 131 | Phone calls | Other | macro | 245 | 35 | Included |
| 132 | Phone calls | Other | micro | 509 | 57 | Included |
| 133 | Phone calls | Other – boy/man | macro | 275 | 5 | Excluded |
| 134 | Phone calls | Other – boy/man | micro | 559 | 7 | Excluded |
| 135 | Phone calls | Other – girl/woman | macro | 255 | 25 | Included |
| 136 | Phone calls | Other – girl/woman | micro | 526 | 40 | Included |
| 137 | Phone calls | Other – unknown | macro | 271 | 9 | Excluded |
| 138 | Phone calls | Other – unknown | micro | 555 | 11 | Excluded |
| 139 | Phone calls | Not specified | macro | 253 | 27 | Included |
| 140 | Phone calls | Not specified | micro | 524 | 42 | Included |
| 141 | Phone calls | Not specified – boy/man | macro | 279 | 1 | Excluded |
| 142 | Phone calls | Not specified – boy/man | micro | 565 | 1 | Excluded |
| 143 | Phone calls | Not specified – girl/woman | macro | 278 | 2 | Excluded |
| 144 | Phone calls | Not specified – girl/woman | micro | 564 | 2 | Excluded |
| 145 | Phone calls | Not specified – unknown | macro | 255 | 25 | Included |
| 146 | Phone calls | Not specified – unknown | micro | 527 | 39 | Included |
| 147 | Phone calls | Did social work speak with the family? | macro | 276 | 4 | Excluded |
| 148 | Phone calls | Did social work speak with the family? | micro | 562 | 4 | Excluded |
| 149 | Phone calls | Did a doctor speak with the family? | macro | 276 | 4 | Excluded |
| 150 | Phone calls | Did a doctor speak with the family? | micro | 561 | 5 | Excluded |
| 151 | Phone calls | Did bedside nurse speak with the family? | macro | 273 | 7 | Excluded |
| 152 | Phone calls | Did bedside nurse speak with the family? | micro | 558 | 8 | Excluded |
| 153 | Phone calls | Did allied health speak with the family? | macro | 280 | 0 | Excluded |
| 154 | Phone calls | Did allied health speak with the family? | micro | 566 | 0 | Excluded |
| 155 | Phone calls | Was a message left for the family? | macro | 267 | 13 | Included |
| 156 | Phone calls | Was a message left for the family? | micro | 551 | 15 | Included |

# **eTable 3.** Summary of inclusion and exclusion criteria for the rule-based classifier

|  |  |  |
| --- | --- | --- |
| **Category / Sub-Category** | **Inclusion Criteria** | **Exclusion Criteria** |
| Documented family or friends | [note parameter = Family Quick View Summary  OR note parameter = Contact Information Family] | Not applicable |
| Visits | [note parameter = OLD\_Family Visit Comment  OR note parameter = Comment Family In  OR note parameter = Comment Family Conference  OR note parameter = MD Comment Family Conference  OR note parameter = OLD\_MD Present During Family Conference  OR note parameter = Comment Family Out]  OR  [token = accompanied  OR token = accompanying  OR token = appear  OR token = appeared  OR token = appears  OR token = arrive  OR token = arrived  OR token = arrives  OR token = assisted to chair  OR token = at bedside  OR token = at the bedside  OR token = attain  OR token = attained  OR token = attains  OR token = aware of transfer  OR token = bringing  OR token = brought in  OR token = came by  OR token = check in  OR token = checked in  OR token = come by  OR token = conference room  OR token = discharged  OR token = discussion with family  OR token = drop by  OR token = drop in  OR token = drop over  OR token = dropped by  OR token = dropped in  OR token = dropped over  OR token = enter  OR token = entered  OR token = enters  OR token = explained to pt family  OR token = explained to the family  OR token = family appreciative  OR token = family aware  OR token = family conference  OR token = family is in  OR token = family is requesting  OR token = family meeting  OR token = family room  OR token = family wanting  OR token = for pt  OR token = found cry outside  OR token = given to #any known relation#  OR token = given to pt s  OR token = giving encouragement to pt  OR token = goal of care  OR token = gold bracelet taken  OR token = hearing aid  OR token = in the room  OR token = in to  OR token = in waiting room  OR token = introduced  OR token = left  OR token = look around  OR token = look in on  OR token = look up  OR token = looked around  OR token = looked in on  OR token = looked up  OR token = met with  OR token = out to  OR token = packed all valuable in room  OR token = parking pas  OR token = patient and #any known relation#  OR token = patient s #any known relation#  OR token = patient sent home via wheelchair with  OR token = plan of care  OR token = pop in  OR token = pop up  OR token = popped in  OR token = popped up  OR token = present  OR token = presently in  OR token = provided the patient s  OR token = pt s #any known relation#  OR token = pt #any known relation#  OR token = reviewed with both pt and his  OR token = show up  OR token = showed up  OR token = spoke to family  OR token = stay with  OR token = stayed with  OR token = step in  OR token = stepped in  OR token = stop by  OR token = stop off  OR token = stopped by  OR token = stopped off  OR token = swing by  OR token = swung by  OR token = take in  OR token = to discus  OR token = to speak with  OR token = took belonging  OR token = took in  OR token = updated  OR token = visit  OR token = visited  OR token = wa here  OR token = were here  OR token = will return  OR token = with #any known relation#  OR token = writer discussed  OR token = writer explained  OR token = writer provided  OR token = writer supporting family] | [note parameter = Comment Family Phone Call] |
| Phone calls | [note parameter = Comment Family Phone Call]  OR  [token = called  OR token = calling  OR token = telephoned] | [note parameter = OLD\_Family Visit Comment  OR note parameter = Comment Family In  OR note parameter = Comment Family Conference  OR note parameter = MD Comment Family Conference  OR note parameter = OLD\_MD Present During Family Conference  OR note parameter = Comment Family Out]  OR  [token = blue called  OR token = called ems  OR token = code called  OR token = ems called  OR token = met call  OR token = met called  OR token = research coordinator called  OR token = writer called] |
| Significant other | Any occurrence of significant other – male, significant other – female or significant other - unknown | Not applicable |
| Significant other – male | [token = boyfriend  OR token = ex\_boyfriend  OR token = ex\_husband  OR token = fiance  OR token = husband] | Not applicable |
| Significant other – female | [token = ex\_girlfriend  OR token = ex\_wife  OR token = fiancee  OR token = girlfriend  OR token = wife] | Not applicable |
| Significant other – unknown | [token = common\_law  OR token = partner  OR token = significant\_other  OR token = spouse] | Not applicable |
| Child | Any occurrence of child – male, child – female or child – unknown | Not applicable |
| Child – male | [token = son] | Not applicable |
| Child – female | [token = daughter] | Not applicable |
| Child – unknown | [token = child] | Not applicable |
| Parent | Any occurrence of parent – male, parent – female or parent - unknown | Not applicable |
| Parent – male | [token = father] | Not applicable |
| Parent – female | [token = mother] | Not applicable |
| Parent – unknown | [token = parent] | Not applicable |
| Siblings | Any occurrence of siblings – male, siblings – female or siblings - unknown | Not applicable |
| Siblings – male | [token = brother] | Not applicable |
| Siblings – female | [token = sister] | Not applicable |
| Siblings – unknown | [token = sibling] | Not applicable |
| Other | Any occurrence of other – male, other – female or other – unknown | Not applicable |
| Other – male | [token = brother\_in\_law  OR token = father\_in\_law  OR token = grandfather  OR token = grandson  OR token = great\_grandfather  OR token = great\_grandson  OR token = great\_great\_grandfather  OR token = great\_great\_grandson  OR token = half\_brother  OR token = nephew  OR token = son\_in\_law  OR token = stepbrother  OR token = stepfather  OR token = stepson  OR token = uncle] | Not applicable |
| Other – female | [token = aunt  OR token = daughter\_in\_law  OR token = granddaughter  OR token = grandmother  OR token = great\_granddaughter  OR token = great\_grandmother  OR token = great\_great\_granddaughter  OR token = great\_great\_grandmother  OR token = half\_sister  OR token = mother\_in\_law  OR token = niece  OR token = sister\_in\_law  OR token = stepdaughter  OR token = stepmother  OR token = stepsister] | Not applicable |
| Other – unknown | [token = cousin  OR token = friend  OR token = godparent  OR token = grandchild  OR token = grandparent  OR token = guardian  OR token = other  OR token = roommate  OR token = visitors] | Not applicable |
| Not specified | Any occurrence of not specified – male, not specified – female or not specified – unknown | Not applicable |
| Not specified – male | [Documented family or friends = True  OR Visits = True  OR Phone Calls = True]  AND  [Unknown male name = True] | [Any other relation = True] |
| Not specified – female | [Documented family or friends = True  OR Visits = True  OR Phone Calls = True]  AND  [Unknown female name = True] | [Any other relation = True] |
| Not specified – unknown | [Documented family or friends = True  OR Visits = True  OR Phone Calls = True] | [Any other relation = True  OR Not specified – male = True  OR Not specified – female = True] |
| Pet | [token = cat  OR token = dog  OR token = pet] | Not applicable |
| Did a doctor speak with the family? | [token = doctor  OR token = dr  OR token = md  OR token = physician] | Not applicable |
| Did allied health speak with the family? | [token = ot  OR token = physio  OR token = rt] | Not applicable |
| Did bedside nurse speak with the family? | [token = bedside nurse  OR token = nurse  OR token = rn] | Not applicable |
| Did family attend rounds? | [token = round] | Not applicable |
| Did social work speak with family? | [token = social work  OR token = sw] | Not applicable |
| Did the meeting discuss organ donation? | [token = donation  OR token = organ  OR token = organ donation] | Not applicable |
| Does this discuss goals of care? | [token = C1  OR token = C2  OR token = comfort care  OR token = end of life  OR token = end of life care  OR token = goal of care  OR token = GOC  OR token = M1  OR token = M2  OR token = palliative  OR token = R1  OR token = R2  OR token = R3] | Not applicable |
| Is family meeting at beside? | Is this a family meeting / conference? = True  AND  [token = at bedside  OR token = at the bedside] | Not applicable |
| Is family meeting at the conference room? | Is this a family meeting / conference? = True  AND  [token = conference room  OR token = family room] | Not applicable |
| Is family meeting unspecified? | Is this a family meeting / conference? = True | [token = at bedside  OR token = at the bedside  OR token = conference room  OR token = family room] |
| Is this a family meeting / conference? | [note parameter = MD Comment Family Conference  OR note parameter = Comment Family Conference  OR note parameter = OLD\_MD Present During Family Conference]  OR  [token = explained to the family  OR token = family conference  OR token = family meeting  OR token = in waiting room] | Not applicable |
| Was a message left for the family? | [token = message] | Not applicable |

\*Reference: Lucini FR, Krewulak K, Stelfox HT. Natural language processing to evaluate documented family presence and mode of communication in Alberta ICUs. In Press.

**Appendix 1.** Supplement text for data handling and merging

Data was received de-identified with scrambled unique identifiers from Alberta Health Services (AHS, data custodian). Deterministic data linkage was used to link the two patient-level databases (eCritical and DAD) via a unique identifier [20], which was assigned to each patient by the custodian. Given that all administrative data were recorded for administration of health services, the study anticipated missing variables to be missing at random or due to random human error. However, if missing data exceeded 10% for covariates, listwise deletion was used when applicable [33]. Covariate cell sizes less than 5 were excluded from the analysis described below to prevent over-fitting the models [34]. All patients had complete outcome and exposure data.

# **eTable 4.** Variables and covariates included in study objectives and their coding

|  |  |  |
| --- | --- | --- |
| Variable | Description of Parameter | Coding |
| *Source: eCritical (electronic medical record)* | | |
| Age | Age recorded upon ICU admission  Older Adults | Continuous  Categorical (dichotomous):  >65=1  <65=0 |
| Sex | Identified patient sex as female or male. | Female=1  Male=0 |
| Admission Type | Elective post-surgery, Emergency post-surgery, and Nonsurgical | Categorical:  Elective-surgical =0  Medical=1  Emergency-surgical =2 |
| Comorbidities | Patient chronic health conditions upon admission dichotomized as ever (1)/never (null), which included: diabetes, heart failure, respiratory insufficiency, metastatic cancer immune suppression, cirrhosis, hepatic failure. | Diabetes  Yes=1  No=0  Heart failure  Yes=1  No=0  Respiratory insufficiency  Yes=1  No=0  Metastatic cancer  Yes=1  No=0  Immune suppression  Yes=1  No=0  Cirrhosis  Yes=1  No=0  Hepatic failure  Yes=1  No=0 |
| Richmond Agitation Sedation Scale (RASS) | An instrument designed to assess the level of alertness and **agitated** behavior in critically-ill patients. Scores between -5 to +4 | Categorical:  Agitated +1 to +4  Alert and Calm 0  Sedated -1 to -4  Comatose -5 |
| Acute Physiology and Chronic Health Evaluation II score (APACHE-II ) | Illness severity score at ICU admission | Ordinal  Categorical (score, by quartile):  Quartile 1 <25%  Quartile 2 >25% and <50%  Quartile 3 >50% & <75%  Quartile 4 >75% |
| Sequential Organ Failure assessment (SOFA) | Illness severity score at ICU admission | Ordinal |
| Charlson Comorbidity Index (CCI) | Score at ICU admission | Ordinal |
| Clinical Frailty Scale | Scores ranging from 0-9 | Continuous |
| Glasgow Coma Scale (GCS) | Assessment of consciousness at admission.  Dichotomous, intact GCS (GCS=15), impaired GCS (GCS <15) | Categorical:  Glasgow Coma Scale15  Glasgow Coma Scale 15 |
| Invasive mechanical ventilation | In minutes at admission, binary variable formed | Minutes >0 = 1  Minutes 0 = 0 |
| Non-Invasive mechanical ventilation | In minutes at admission, binary variable formed | Minutes >0 = 1  Minutes 0 = 0 |
| Vasoactive medication | If patient is administered any of the following drugs upon admission (dopamine, dobutamine, epinephrine, isoproterenol, milrinone, norepinephrine, phenylephrine or vasopressin) flagged for 1. Variable in minutes; therefore, cleaned to compose one binary yes/no variable that is inclusive of any of the above drugs. | Yes=1  No=0 |
| Dialysis | Flagged 1 for present or Null for not present. | Yes=1  No=0 |
| Continuous renal replacement therapy | In minutes at admission, binary variable formed | Minutes >0 = 1  Minutes 0 = 0 |
| Hospital Type | A key is used to create a variable that translates ICU site to hospital type (Tertiary, Community, Regional ) | Tertiary=0  Community=1  Regional=2 |
| Hospital length of stay | Total length of stay in days in first admission | Continuous |
| Teaching hospital | A key is used to create a variable that translates ICU site to teaching hospital (binary) | Yes=1  No=0 |
| Number of ICU beds | A key is used to create a variable that translates ICU site to number of ICU beds | Continuous |
| Number of hospital beds | A key is used to create a variable that translates ICU site that translates ICU site to number of hospital beds | Continuous |
| Length of ICU stay | Total length of stay in days in first admission | Continuous  Categorical (score, by quartile):  Quartile 1 <25%  Quartile 2 >25% and <50%  Quartile 3 >50% & <75%  Quartile 4 >75% |
| Length of hospital stay | Total length of stay in days in first admission | Continuous |
| Died in ICU | Anytime during ICU stay | Yes=1  No=0 |
| Died in hospital | Anytime during hospital stay | Yes=1  No=0 |
| Objective outcomes and exposure |  |  |
| ICDSC, Obj 1 | Intensive Care Delirium Screening Checklist, delirium identified after family visit. | Score of ≥4 = 1  Score of <4 = 0 |
| ICDSC, Obj 2 | Count of days during ICU admission with a delirium present (ICDSC, Obj 1). Variable created to calculate total number of delirium days during ICU stay. | Ordinal |
| Family presence | Algorithm code was used to explore eCritical and determine if family member was present via call, in person, or not present. | Mutually exclusive three variable exposure:  Family physical presence [in- person]  Family telephone call  No in-person family presence or telephone call |
| *Source: DAD* |  |  |
| Patient residency | Province of patient residency | Alberta (AB)=1  Other=0 |

Abbreviations: DAD, Discharge Abstract Database; ICDSC, Intensive Care Delirium Checklist; ICU, Intensive Care Unit

# **eTable 5.** Demographic and clinical characteristics of the study population (secondary outcome)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Family presence** | | | |
| **Characteristics** | **Total**  **(n=26,100)** | **Physical presence1**  **(n= 23,657)** | **Family**  **Telephone call only2**  **(n= 618)** | | **No**  **visit3**  **(n= 1,825)** |
| Age, yr, median (IQR) | 59 (46-67) | 58 (47-67) | 59 (49-68) | | 58 (47-57) |
| 65 years, n (%) | 9,789 (37.5) | 8,988 (38.0) | 211 (34.1) | | 590 (32.3) |
| Sex, female, n (%) | 11,059 (42.4) | 10,181 (43.0) | 213 (34.5) | | 665 (36.4) |
| Patient admitting type, n (%)q |  |  | |  |  |
| Elective-surgical | 2,051 (7.9) | 1,629 (7.0) | | 66 (11.0) | 356 (21.5) |
| Emergency-surgical | 4,374 (16.8) | 3,991 (17.2) | | 109 (18.2) | 274 (16.5) |
| Medical | 19,032 (72.9) | 17,580 (75.8) | | 423 (70.7) | 1,029 (62.0) |
| Comorbidities, n (%) |  |  | |  |  |
| Diabetes | 5,330 (20.4) | 4,855 (29.5) | | 132 (21.4) | 343 (18.8) |
| Cirrhosis | 1,473 (5.6) | 1,368 (5.8) | | 48 (7.8) | 57 (3.1) |
| Heart failure | 1,487 (5.7) | 1,396 (5.9) | | 37 (6.0) | 40 (2.2) |
| Hepatic failure | 816 (3.3) | 773 (3.3) | | 15 (2.4) | 28 (1.5) |
| Metastatic cancer | 904 (3.5) | 813 (3.4) | | 24 (3.9) | 67 (3.7) |
| Immune suppression | 2,083 (8.0) | 1,927 (8.2) | | 46 (7.4) | 110 (6.0) |
| Respiratory insufficiency | 3,139 (12.0) | 2,889 (12.3) | | 80 (13.0) | 160 (8.8) |
| Acute Physiology and Chronic Health Disease Classification System II4 |  |  | |  |  |
| Score, median (IQR) | 19 (14-25) | 19 (14-25) | | 17 (12-22) | 14 (10-19) |
| Score, by quartile, n (%) |  |  | |  |  |
| Quartile 1 (14) | 6,414 (24.6) | 5,373 (22.7) | | 184 (29.8) | 857 (47.0) |
| Quartile 2 (19 & 14) | 7,300 (28.0) | 6,552 (27.7) | | 207 (33.5) | 541 (29.6) |
| Quartile 3 (25 & 19) | 5,506 (21.1) | 5,136 (21.7) | | 117 (18.9) | 253 (13.9) |
| Quartile 4 (25) | 6,880 (26.4) | 6,596 (27.9) | | 110 (17.8) | 174 (9.5) |
| Charlson Comorbidity Index, median (IQR) 4 | 1 (0-3) | 1 (0-3) | | 1 (0-2) | 0 (0-2) |
| Sequential Organ Failure Assessment, median (IQR) 4 | 6 (4-9) | 6 (4-9) | | 5 (3-8) | 4 (2-6) |
| Glasgow Coma Scale, median (IQR) 4 | 14 (10-15) | 14 (10-15) | | 14 (12-15) | 15 (14-15) |
| Score, by severity, n(%) |  |  | |  |  |
| Glasgow Coma Scale 15 | 10,888 (41.7) | 9,430 (39.9) | | 312 (50.5) | 992 (54.4) |
| Glasgow Coma Scale 15 | 15,213 (58.3) | 14,227 (60.1) | | 306 (49.5) | 833 (45.6) |
| Frailty Score, median (IQR)4,b | 3 (2-5) | 3 (2-5) | | 3 (2-4) | 4 (2-4) |
| ICU interventions, n (%)5,c |  |  | |  |  |
| Dialysis | 654 (2.5) | 585 (2.5) | | 19 (3.1) | 50 (2.7) |
| Vasoactive medication | 11,224 (47.4) | 10,645 (45.0) | | 210 (34.0) | 369 (20.2) |
| Invasive mechanical ventilation | 16,837 (64.5) | 15,858 (67.0) | | 326 (52.8) | 653 (35.8) |
| Non-invasive ventilation | 3,714 (14.2) | 3,504 (14.8) | | 74 (12.0) | 136 (7.5) |
| Continuous renal replacement therapy | 1,552 (6.0) | 1,529 (6.5) | | 5 (0.8) | 18 (1.0) |
| Hospital length of stay, days, median (IQR) | 12 (6-27) | 13 (6-27) | | 10 (5-20.5) | 9 (4-17) |
| ICU length of stay, median (IQR) days | 4.2 (2.4-8.1) | 4.6 (2.6-8.6) | | 2.7 (1.9-4.4) | 2.1 (1.6-3.4) |
| Score, by quartile, n (%) |  |  | |  |  |
| Quartile 1 (<2.4) | 6,533 (25.0) | 5,250 (22.2) | | 257 (41.6) | 1,026 (56.2) |
| Quartile 2 (4.2 & 2.4) | 6,537 (25.1) | 5,838 (25.0) | | 202 (32.7) | 497 (27.2) |
| Quartile 3 (<8.1 & >4.2) | 6,513 (25.0) | 6,179 (26.1) | | 126 (20.4) | 208 (11.4) |
| Quartile 4 (8.1) | 6,518 (25.0) | 6,390 (27.0) | | 33 (5.3) | 94 (5.2) |
| Patient mortality, n (%) |  |  | |  |  |
| Died in ICU | 2,188 (8.4) | 2,157 (9.1) | | 11 (1.8) | 20 (1.1) |
| Died in hospital | 3,701 (14.2) | 3,599 (15.2) | | 35 (5.7) | 68 (3.7) |
| Hospital characteristicsd |  |  | |  |  |
| Teaching hospital, n (%) | 20,394 (78.1) | 18,603 (78.6) | | 487 (78.8) | 1,304 (71.5) |
| Number of hospital beds, median (IQR) | 695 (367-890) | 695 (365-890) | | 695 (367-890) | 695 (288-695) |
| Number of ICU beds, median (IQR) | 18 (10-28) | 18 (10-28) | | 25 (10-28) | 14 (10-28) |
| Hospital type, n (%) |  |  | |  |  |
| Community | 8,527 (34.8) | 7,968 (35.7) | | 158 (26.2) | 401 (25.6) |
| Regional | 3,496 (14.3) | 2,965 (13.3) | | 100 (16.6) | 431 (27.5) |
| Tertiary | 12,461 (50.9) | 11,378 (51.0) | | 346 (57.3) | 735 (46.9) |

1Family physical presence as defined by physical presence at any time during ICU stay

2Family call only as defined by telephone communication, without physical presence

3No visit means that the patient did not receive any physical presence or phone call with their family members

4Score reported from assessment during admission to the ICU

5At any point during ICU admission

a657 missing admission category

b643 missing admission type

c23,502 missing frailty score

dTwo missing ICU interventions

eTwo missing all hospital characteristics

Abbreviations: ICU, Intensive Care Unit; IQR, Interquartile Range

**eTable 6.** Intensive Care Delirium Screening Checklist and Richmond Agitation-Sedation Scale upon ICU admission

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Family presence** | | | |
| **Characteristics** | | **Total**  **(n=25,537)** | **Physical presence1**  **(n= 23,121)** | **Family Telephone call only2**  **(n= 591)** | | **No**  **visit3**  **(n= 1,825)** |
| Delirium Prevalence4 | 56.9%  (95%CI: 56.3-57.4) |  |  | |  |
| Intensive Care Delirium Screening Checklist5 |  |  |  | |  |
| Score, median (IQR) | 4 (2-6) | 4 (2-6) | 3 (1-6) | | 1 (2-4) |
| Score, by severity, n (%) |  |  |  | |  |
| Scores of 0 | 1,144 (4.5) | 901 (3.9) | 35 (5.9) | 208 (11.4) | |
| Scores of 1-3 | 10,109 (39.6) | 8,772 (37.9) | 294 (50.0) | | 1,043 (57.2) |
| Scores of 4-5 | 5,184 (20.3) | 4,830 (20.9) | 106 (17.9) | | 248 (13.6) |
| Scores of 6-8 | 9,100 (35.6) | 8,618 (37.3) | 156 (26.4) | | 326 (17.9) |
| Richmond Agitation Sedation Scale, n (%) |  |  |  | |  |
| Agitated (scores of +1 to +4) | 3,374 (13.2) | 3,141 (13.6) | 71 (12.0) | | 162 (8.9) |
| Alert and calm (score of 0) | 11,966 (46.9) | 10, 506 (45.4) | 299 (50.6) | | 1,161 (63.6) |
| Sedated (scores of -1 to -4) | 9,484 (37.1) | 8,786 (38.0) | 209 (35.4) | | 489 (26.8) |
| Comatose (scores of -5) | 713 (2.8) | 688 (3.0) | 12 (2.0) | | 13 (0.7) |

1Family physical presence as defined by physical presence at any time during ICU stay

2Family call only as defined by telephone, without physical presence

3No visit means that the patient did not receive any physical presence or phone call with their family members

4Intensive Care Delirium Screening Checklist ≥4

5Maximum score reported from assessment during admission to the ICU

Abbreviations: ICU, Intensive Care Unit; IQR, Interquartile Range

# **eTable 7.** Secondary analysis for diagnosis upon admission to ICU by patient admission type

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Patient Admission** | | | |
| **Admission Diagnosis1,a** | **Total**  **(n=24,736)** | **Elective- surgical**  **(n= 1,948)** | **Emergency-surgical**  **(n= 4,208)** | | **Medical admission**  **(n= 18,575)** |
| Cancer | 1,060 (4.3) | 705 (36.2) | 205 (4.9) | 148 (0.80) | |
| Cardiovascular | 3,189 (12.9) | 274 (14.21) | 420 (10.0) | 2,493 (13.4) | |
| Gastrointestinal | 2,927 (11.8) | 187 (9.7) | 1,421 (33.8) | 1,319 (7.1) | |
| Medical other | 2,259 (9.1) | 270 (13.9) | 613 (14.6) | 1,375 (7.4) | |
| Neurological other | 1,564 (6.3) | 66 (3.4) | 209 (5.0) | 1,289 (6.9) | |
| Overdose, withdrawal, seizures, or metabolic coma | 2,653 (10.7) | 7 (0.4) | 8 (0.19) | 2,638 (14.2) | |
| Pneumonia | 3,530 (14.3) | 11 (0.6) | 22 (0.5) | 3,499 (18.9) | |
| Pregnancy or genitourinary | 843 (3.4) | 90 (4.6) | 252 (6.0) | 501 (2.7) | |
| Respiratory other | 2,947 (11.9) | 127 (6.5) | 243 (5.8) | 2,577 (13.8) | |
| Trauma | 1,814 (7.3) | 87 (4.5) | 659 (15.7) | 1,068 (5.8) | |
| Orthopedic | 247 (1.0) | 116 (5.9) | 122 (2.9) | 9 (0.05) | |
| Sepsis | 1,703 (6.9) | 8 (0.4) | 36 (0.86) | 1,659 (8.9) | |

1Diagnosis upon admission to ICU

a801 missing admission category

Abbreviations: ICU, Intensive Care Unit

# **eTable 8.** Prevalent delirium and family presence in the intensive care unit

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Adjusted Odds Ratios\*\* (95% CI)** | | | | | | |
| **Family presence** | **Crude Odds Ratio (95% CI) (n=25,537)** | **Adjusted Odds Ratios\* (95% CI) (n=25,537)** | **Elective-surgical**  **Admission**  **(n=2,018)** | | **Emergency-surgical**  **Admission**  **(n=4,285)** | | **Medical**  **admission**  **(n=** **18,600)** | |
|  |  |  | GCS 15 | GCS < 15 | GCS 15 | GCS < 15 | GCS 15 | GCS < 15 |
| Physical Presence1  (n=23,121) | 4.20 (3.63-4.78)  *p<0.001* | 1.19 (1.11-1.27)  *p=0.02* | 0.60 (0.39-0.97)  *p=0.02* | 1.00 (0.49-2.08)  *p=0.88* | 1.10 (0.67-1.80)  *p=0.13* | 1.39 (0.80-2.42)  *p=0.78* | 1.27 (0.96-1.68)  *p=0.77* | 1.22 (0.94-1.57)  *p=0.13* |
| Family Telephone call only2  (n=591) | 2.00 (1.58-2.52)  *p<0.001* | 1.14 (0.87-1.48)  *p=0.34* | 0.84 (0.35-1.79)  *p=0.61* | 0.75 (0.03-1.88)  *p=0.90* | 1.28 (0.52-2.69)  *p=0.59* | 0.92 (0.30-2.84)  *p=0.89* | 1.28 (0.52-1.40)  *p=0.59* | 1.31 (0.81-1.88) *p=0.32* |
| No visit3  (n=1,825) | -- | -- | -- | | -- | | -- | |

1Family physical presence as defined by physical presence at any time during ICU stay

2Family call only as defined by telephone, without physical presence

3No visit means that the patient did not receive any physical presence or phone call with their family members

\*Adjusted for age, sex, hospital type, admission type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission, and Glasgow Coma Scale score at admission

\*\*Adjusted for age, sex, hospital type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission

Dashes indicate reference group for multivariable logistic regression analyses

Multilevel mixed effect model accounts for patient repeated ICU admission

Abbreviations: ICU, Intensive Care Unit; IQR, Interquartile Range; GCS, Glasgow Coma Scal

# **eTable 9.** Sensitivity analysis of prevalent delirium and family presence in the intensive care excluding those who died in the ICU

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Adjusted Odds Ratios\*\* (95% CI)** | | | | | | |
| **Family presence** | **Crude Odds Ratio (95% CI) (n=21,958)** | **Adjusted Odds Ratios\* (95% CI) (n=21,958)** | **Elective-surgical**  **admission**  **(n=21,920)** | | **Emergency-surgical**  **admission**  **(n=3,710)** | | **Medical**  **admission**  **(n=** **15,745)** | |
|  |  |  | GCS 15 | Low < 15 | GCS 15 | GCS <15 | GCS 15 | GCS <15 |
| Physical presence1  (n=19,642) | 4.18 (3.95-4.41)  *p<0.001* | 1.18 (1.11-1.27)  *p<0.001* | 0.59(0.38-0.92)  *p=0.02* | 0.83 (0.41-1.72)  p*=0.62* | 0.92 (0.58-1.48)  *p=0.74* | 1.37 (0.82-2.31  *p=0.007* | 1.16 (0.87-1.54)  *p=0.31* | 1.04 (0.82-1.33)  *p=0.72* |
| Family Telephone call only2  (n=559) | 1.99 (1.80-2.21)  *p<0.001* | 1.29 (1.80-2.21)  *p<0.001* | 0.58 (0.25-1.37)  *p=0.22* | 0.63 (0.16-2.54)  *p*=*0.52* | 1.13 (0.53-2.40)  *p=0.75* | 1.10 (0.43-2.80)  *p=0.007* | 1.39 (0.85-2.3)  *p=0196* | 0.99 (0.67-1.47) *p=0.96* |
| No visit3  (n=1,757) | -- | -- | -- | | -- | | -- | |

1Family physical presence as defined by physical presence at any time during ICU stay

2Family call only as defined by telephone, without physical presence

3No visit means that the patient did not receive any physical presence or phone call with their family members

\*Adjusted for age, sex, hospital type, admission type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission, and Glasgow Coma Scale score at admission

\*\* Adjusted for age, sex, hospital type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission

Dashes indicate reference group for multivariable logistic regression analyses

Abbreviations: ICU, Intensive Care Unit; CI, Confidence Intervals

**eTable 10.** Sensitivity analysis of delirium duration and family presence, excluding those who died in the ICU

**Adjusted Model\* (95% CI)**

|  |  |  |
| --- | --- | --- |
| **Family presence** | **Crude Model (95% CI) (n=13,153)** | **All patient admissions (n=13,153)** |
| Physical presence1  (n= 12,313) | 1.25 (1.26-2.30)  *p<0.001* | -1.58 (-1.94 to -1.40)  *p<0.001* |
| Family Telephone call only2  (n= 182) | -0.70 (-0.50 to -0.91)  *p<0.001* | -1.00 (-2.18 to -1.80)  *p<0.001* |
| No visit3  (n=558) | -- | -- |

1Family physical presence as defined by physical presence at any time during ICU stay

2Family call only as defined by telephone, without physical presence

3No visit means that the patient did not receive any physical presence or phone call with their family members

\*Adjusted for age, sex, hospital type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission, and Glasgow Comma Scale score at admission

Dashes indicate reference group for multivariable linear regression analyses

Abbreviations: ICU, Intensive Care Unit; CI, Confidence Intervals

**eTable 11.** Sensitivity analysis of delirium duration and family presence (coded as binary) in the ICU

**Adjusted Models\* (95% CI)**

|  |  |  |
| --- | --- | --- |
| **Family presence** | **Crude Model (95% CI) (n=14,847)** | **All patient admissions (n=14,847)** |
| Physical presence and call1  (n= 13,984) | 1.35 (1.26-2.30)  p= <0.001 | -1.90 (-2.13 to -0.73)  *p=0.004* |
| No visit2  (n= 893) | -- | -- |

1Family physical presence as defined by physical presence at any time during ICU stay and family call as defined by telephone call.

2No visit means that the patient did not receive any physical presence or phone call with their family members

\*Adjusted for age, sex, hospital type, Acute Physiology and Chronic Health Disease Classification System II score at ICU admission, Richmond Agitation Sedation Scale score at ICU admission, hospital length of stay, ICU length of stay, number of ICU beds, any receipt of invasive mechanical ventilation, Charlson Comorbidity Index score at ICU admission, Sequential Organ Failure Assessment score at admission, and Glasgow Comma Scale score at admission

Dashes indicate reference group for multilevel mixed-effects linear regression analyses

Abbreviations: ICU, Intensive Care Unit

**eTable 12.** Secondary analysis for percentage days of delirium and family presence

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Family Presence | | |
| Percentage Days of Delirium1 | **Total**  **(n=26,100)** | **Physical presence2**  **(n= 23,657)** | **Family call only3**  **(n= 618)** | **No**  **Visit4**  **(n= 1,825)** |
| Percentage, by quartile, n (%) |  | | | |
| Quartile 1 (25%) | 16,587 (63.6) | 14,763 (62.4) | 402 (65.1) | 1,422 (77.9) |
| Quartile 2 (50% & 25%) | 3,212 (12.3) | 3,075 (13.0) | 57 (9.2) | 80 (4.4) |
| Quartile 3 (75% & 50%) | 3,722 (14.3) | 3,722 (14.3) | 73 (11.8) | 165 (9.0) |
| Quartile 4 (75%) | 2,579 (9.9) | 2,579 (9.9) | 86 (13.9) | 158 (8.7) |

1Total days delirium divided by total ICU length of stay

2Family physical presence as defined by physical presence at any time during ICU stay

3Family call only as defined by telephone, without physical presence

4No visit means that the patient did not receive any physical presence or phone call with their family members