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ICD-10-coded dementia was present in 3,779/22,013 older unplanned admissions (17.2%) and identified a high-complexity inpatient phenotype characterised by care-home residence, delirium, infection, comorbidity, frailty-risk and poorer survival.

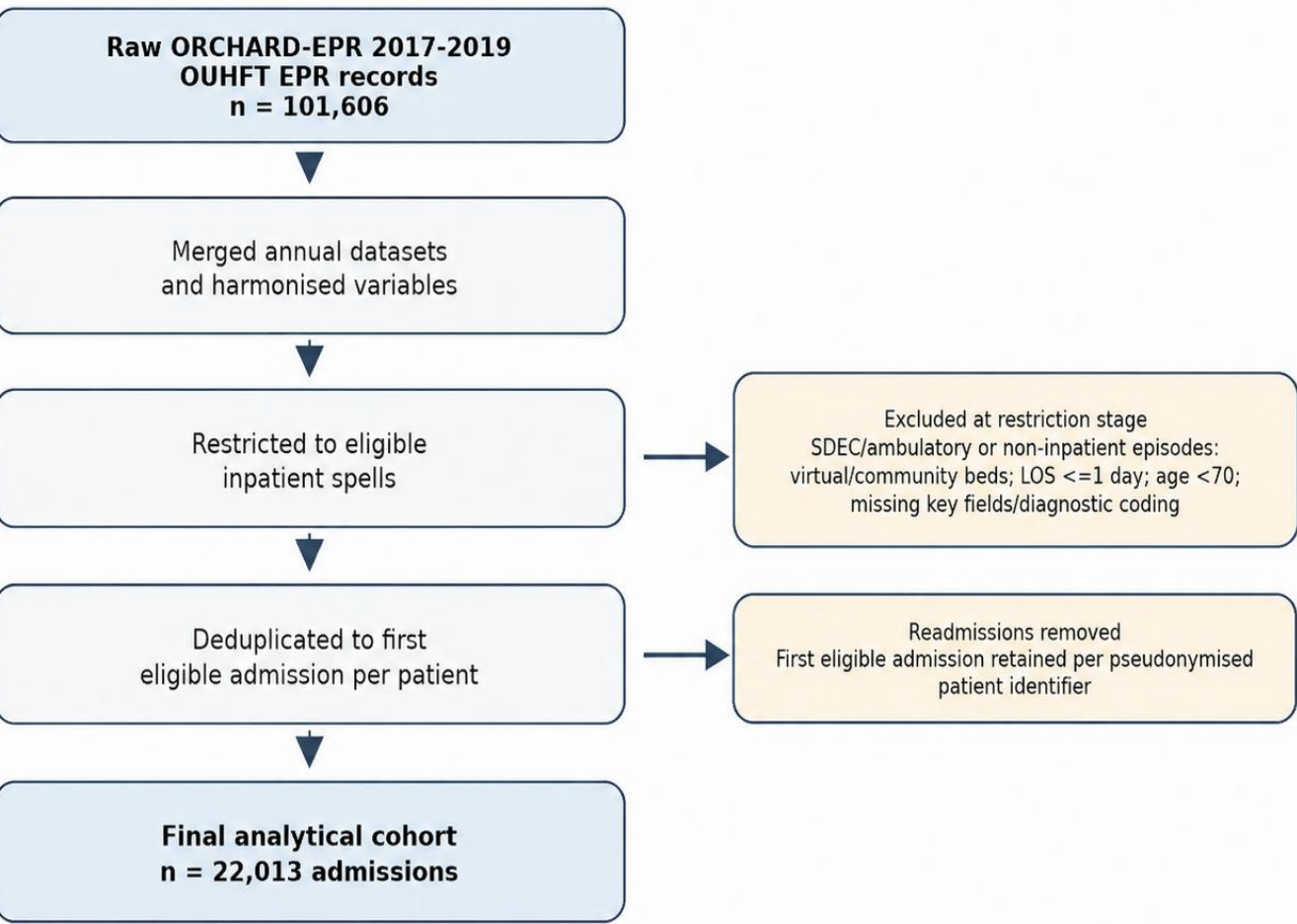
INTRODUCTION

Existing hospital studies report widely varying dementia prevalence, partly because they measure different constructs: some actively screen for undiagnosed dementia, whereas others capture only clinically recognised or administratively coded dementia. Few large routine-care datasets have described how ICD-10-coded dementia and dementia subtypes cluster with delirium, infection, frailty, comorbidity, acute illness severity and mortality in older unplanned admissions. Using ORCHARD-EPR, we examined coded dementia prevalence, subtype distribution and associated acute hospital case-mix in a large real-world inpatient cohort.

METHODS

**Design/data source:** Retrospective observational cohort study using pseudonymised routinely collected Cerner Millennium EPR data from Oxford University Hospitals NHS Foundation Trust. **Cohort:** First eligible unplanned inpatient admission between 1 January 2017 and 31 December 2019 among adults aged ≥70 years with length of stay >1 day. **Analysis population:** 22,013 index admissions; survival analyses excluded four admissions with implausible death dates. **Dementia ascertainment:** ICD-10 diagnostic codes only; estimates therefore reflect clinically recognised/coded dementia, not systematic case-finding for undiagnosed dementia. **Clinical variables:** Dementia subtype, EPR clinician-screen/ICD-10 delirium, ICD-10 infection groupings, care-home residence, Charlson Comorbidity Index, modified Hospital Frailty Risk Score, National Early Warning Score, Systemic Inflammatory Response Syndrome Score, and C-reactive protein. **Analysis:** Baseline characteristics and outcomes were summarised descriptively. Thirty-day mortality and length-of-stay thresholds were analysed using logistic regression; 365-day and 3-year mortality were analysed using Cox regression.

COHORT DERIVATION



LOS = length of stay; SDEC = same day emergency care. Exclusion categories may overlap in raw EPR extracts.

RESULTS

Cohort: 22,013 index admissions; dementia n=3,779; no dementia n=18,234.

Table 1. Selected baseline characteristics by dementia status

| Characteristic                           | No dementia<br>N = 18,234 <sup>1</sup> | Dementia<br>N = 3,779 <sup>1</sup> |
|------------------------------------------|----------------------------------------|------------------------------------|
| Age, mean (SD)                           | 81.4 (7.4)                             | 85.1 (6.6)                         |
| Female sex, n (%)                        | 9,403 (51.6%)                          | 2,128 (56.3%)                      |
| Care-home resident at admission, n (%)   | 3,140 (17.2%)                          | 1,892 (50.1%)                      |
| Charlson Comorbidity Index, median [IQR] | 7.0 [0.0, 14.0]                        | 17.0 [14.0, 26.0]                  |
| Modified HFRS, median [IQR]              | 4.7 [1.8, 8.5]                         | 8.3 [5.0, 11.8]                    |
| Any delirium, n (%)                      | 3,290 (18.0%)                          | 1,867 (49.4%)                      |
| Any infection, n (%)                     | 7,512 (41.2%)                          | 2,015 (53.3%)                      |
| NEWS ≥5, n (%)                           | 2,999 (16.7%)                          | 722 (19.3%)                        |
| SIRS ≥ 2, n (%)                          | 5,879 (32.4%)                          | 1,300 (34.4%)                      |
| CRP, median [IQR]                        | 32.5 [7.2, 104.5]                      | 34.9 [7.4, 108.3]                  |

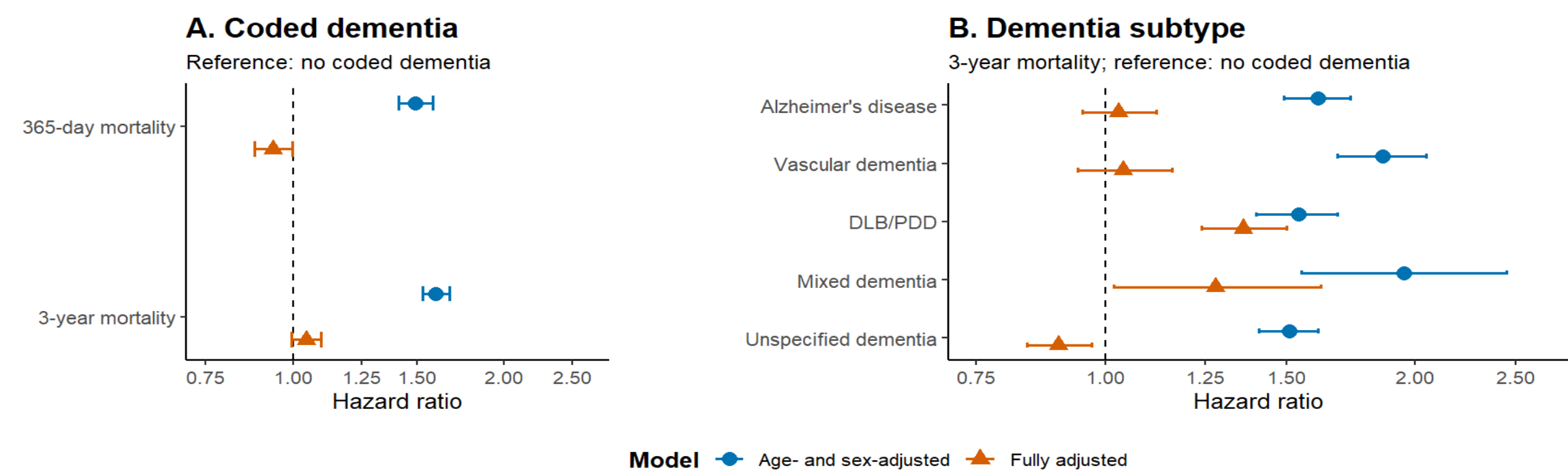
Table 2: Mortality outcomes by dementia status

| Outcome                            | No dementia<br>N = 18,230 <sup>1</sup> | Dementia<br>N = 3,779 <sup>1</sup> |
|------------------------------------|----------------------------------------|------------------------------------|
| 30-day mortality, n (%)            | 1,957 (10.7%)                          | 664 (17.6%)                        |
| 365-day mortality, n (%)           | 5,370 (29.5%)                          | 1,702 (45.0%)                      |
| 3-year mortality, n (%)            | 8,629 (47.3%)                          | 2,708 (71.7%)                      |
| Length of stay ≥7 days, n (%)      | 8,140 (44.7%)                          | 2,100 (55.6%)                      |
| Length of stay ≥14 days, n (%)     | 3,795 (20.8%)                          | 1,138 (30.1%)                      |
| Death during full follow-up, n (%) | 10,969 (60.2%)                         | 3,240 (85.7%)                      |

Table 3. Selected baseline characteristics by common dementia subtype

| Characteristic                           | Alzheimer's<br>N = 977 | Vascular<br>N = 507 | DLB/PDD<br>N = 723 | Mixed<br>N = 95  | Unspecified<br>N = 1,451 |
|------------------------------------------|------------------------|---------------------|--------------------|------------------|--------------------------|
| Age, mean (SD)                           | 85.9 (6.2)             | 85.2 (6.3)          | 81.8 (6.2)         | 83.6 (6.4)       | 86.3 (6.6)               |
| Female sex, n (%)                        | 605 (61.9%)            | 273 (53.8%)         | 286 (39.6%)        | 44 (46.3%)       | 912 (62.9%)              |
| Care-home resident, n (%)                | 557 (57.0%)            | 263 (51.9%)         | 291 (40.2%)        | 57 (60%)         | 712 (49.1%)              |
| Charlson Comorbidity Index, median [IQR] | 17.0 [14.0-25.0]       | 22.0 [14.0-29.0]    | 11.0 [0.0-16.0]    | 18.0 [14.0-25.0] | 18.0 [14.0-27.0]         |
| Modified HFRS, median [IQR]              | 8.4 [5.1-11.8]         | 8.7 [5.4-11.9]      | 9.4 [6.0-12.6]     | 9.1 [6.0-13.0]   | 7.6 [4.3-11.0]           |
| Any delirium, n (%)                      | 567 (58.0%)            | 279 (55.0%)         | 277 (38.3%)        | 48 (50.5%)       | 681 (46.9%)              |
| Any infection, n (%)                     | 538 (55.1%)            | 287 (56.6%)         | 346 (47.9%)        | 44 (46.3%)       | 791 (54.5%)              |
| NEWS ≥5, n (%)                           | 186 (19.3%)            | 105 (20.9%)         | 111 (15.5%)        | 13 (13.7%)       | 304 (21.2%)              |
| SIRS ≥ 2, n (%)                          | 337 (34.5%)            | 191 (37.7%)         | 196 (27.1%)        | 30 (31.6%)       | 535 (36.9%)              |
| CRP, median [IQR]                        | 36.6 [7.7, 107.0]      | 35.2 [8.1, 115.0]   | 29.1 [5.3, 88.2]   | 29.2 [4.2, 88.1] | 37.8 [8.2, 114.3]        |

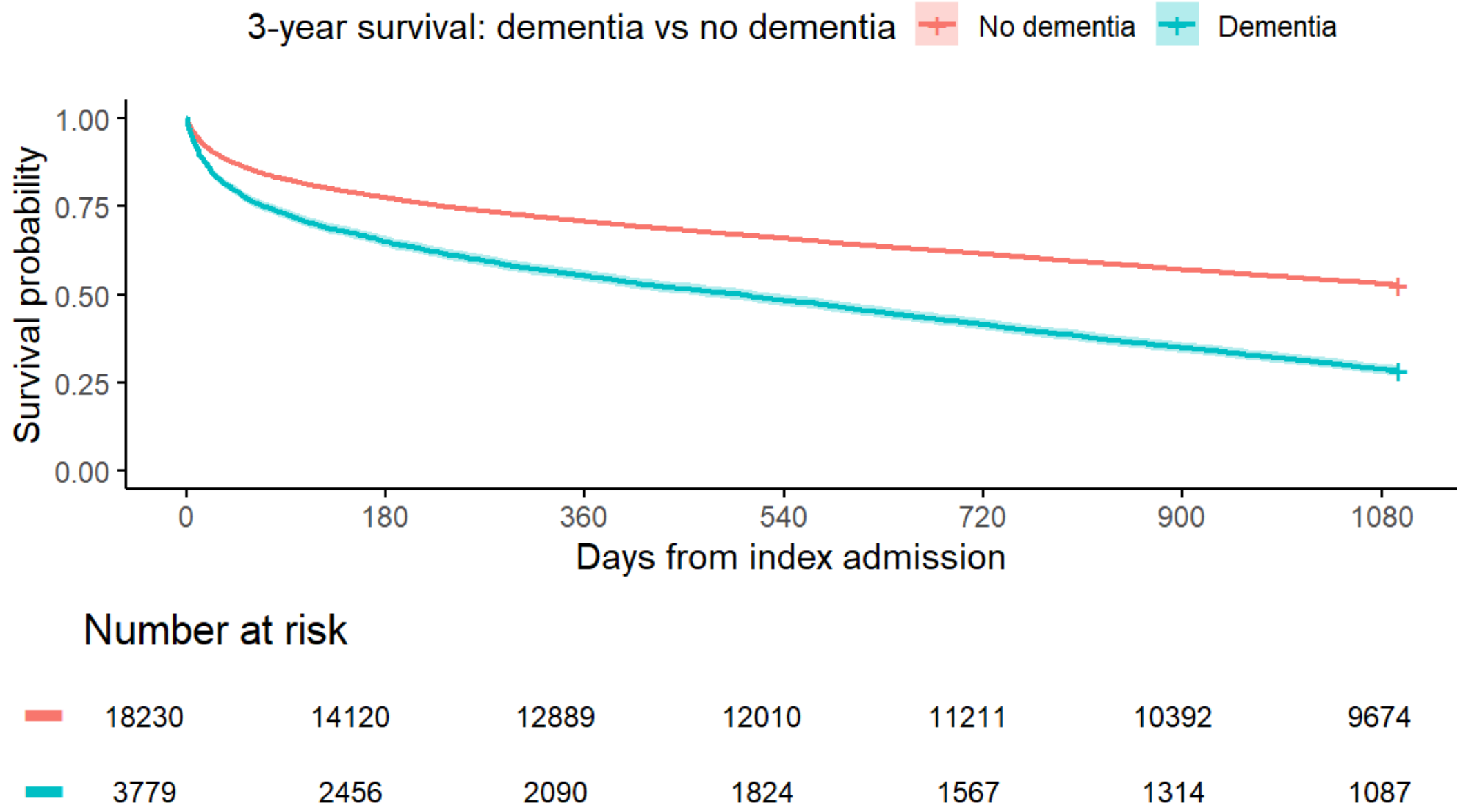
Figure 1: Cox regression mortality hazard ratios  
Age- and sex-adjusted and fully adjusted models



Fully adjusted models included age, sex, Charlson Comorbidity Index, modified HFRS and NEWS.

Kaplan-Meier survival curves

Figure 2: Three-year survival by dementia status



CONCLUSIONS

- ICD-10-coded dementia affected one in six older unplanned admissions and identified a high-complexity inpatient phenotype.
- Coded dementia clustered with care-home residence, delirium, infection, comorbidity, frailty-risk and poorer survival.
- Routine EPR data can characterise clinically recognised dementia at scale, but coded dementia underestimates true dementia burden because undiagnosed dementia is not captured.

LIMITATIONS

- Dementia ascertainment was based on ICD-10 coding and will miss undiagnosed dementia.
- Coding practice may vary by clinician documentation, hospital workflow and admission context.

REFERENCES

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