

# **Supplementary materials to “Excess mortality following severe infectious disease is present in long-term of hospital discharge: A Far North Queensland data-linkage study”**

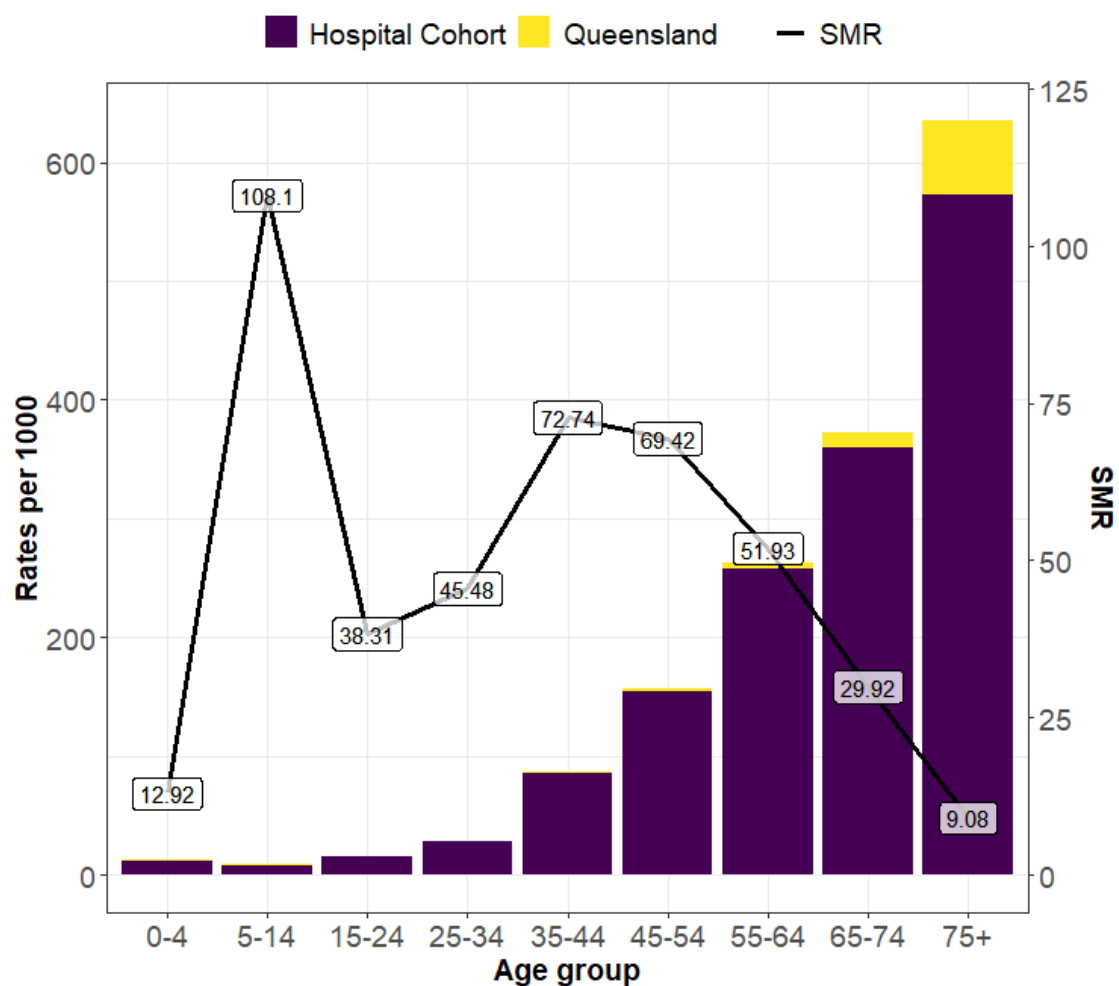
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**Figure S1.** Mortality of Townsville Hospital database TSV11 cohort patients compared with age and sex-matched Queenslanders.

**Table S1.** List of ICD-10-AM discharge codes for an infectious disease used to select the patient cohort[1]<sup>†</sup>

|  | ICD10 codes |
|--|-------------|
| Infectious and parasitic diseases  | A00–B99     |
| Bacterial meningitis, not elsewhere classified                                       | G00         |
| Encephalitis, myelitis and encephalomyelitis   | G04         |
| Intracranial and intraspinal abscess and granuloma                                   | G06         |
| Intracranial and intraspinal phlebitis and thrombophlebitis                          | G08         |
| Focal chorioretinal inflammation   | H30.0       |
| Purulent endophthalmitis   | H44.0       |
| Other endophthalmitis  | H44.1       |
| Disorders of vitreous body and globe   | H45         |
| Otitis Externa   | H60         |
| Mastoiditis  | H70         |
| Infective pericarditis   | I30.1       |
| Chronic constrictive pericarditis  | I31.1       |
| Pericarditis in diseases classified elsewhere  | I30.0       |
| Acute and subacute infective endocarditis  | I33.0       |
| Acute endocarditis unspecified   | I33.9       |
| Endocarditis and heart valve disorders in diseases classified elsewhere              | I39         |
| Infective myocarditis  | I40.0       |
| Myocarditis in diseases classified elsewhere   | I41         |
| Acute sinusitis  | J01         |
| Streptococcal pharyngitis  | J02.0       |
| Acute pharyngitis due to other specified organisms                                   | J02.8       |
| influenza and Pneumonia  | J09-J18     |
| Influenza due to certain identified influenza virus                                  | J09         |
| Influenza due to other identified influenza virus                                    | J10         |
| Influenza, virus not identified  | J11         |
| Viral pneumonia, not elsewhere classified  | J12         |
| Pneumonia due to Streptococcus pneumoniae  | J13         |
| Pneumonia due to Haemophilus influenzae  | J14         |
| Bacterial pneumonia, not elsewhere classified  | J15         |
| Pneumonia due to other infectious organisms, not elsewhere classified                | J16         |
| Pneumonia in diseases classified elsewhere   | J17         |
| Pneumonia, organism unspecified  | J18         |
| Peritonsillar abscess  | J36         |
| Retropharyngeal and parapharyngeal abscess   | J39.0       |
| Abscess of lung and mediastinum  | J85         |
| Pyothorax  | J86.9       |
| Acute peritonitis  | K65.0       |
| Disorders of peritoneum in infectious diseases classified elsewhere                  | K67         |
| Abscess of liver   | K75.0       |
| Granulomatous hepatitis not elsewhere classified                                     | K75.0       |
| Liver disorders in infectious and parasitic diseases classified elsewhere            | K77.0       |
| Acute Cholecystitis  | K81.0       |
| Cellulitis   | L03         |
| Pyoderma   | L08.0       |
| Pyogenic arthritis   | M00         |
| Direct infections of joint in infectious and parasitic diseases classified elsewhere | M01         |
| Post infective and reactive arthropathies in diseases classified elsewhere           | M03         |
| Necrotising Fasciitis  | M72.6       |
| Osteomyelitis  | M86         |

|   |       |
|---|-------|
| UTI                                       | N39.0 |
| Inflammatory disease of the prostate      | N41   |
| Orchitis and epididymitis                 | N45.9 |
| Fever of other and unknown origin         | R50   |
| Shock, not elsewhere classified           | R57   |
| Abnormal findings in cerebrospinal fluids | R83   |

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**Table S2:** Classification of major causes of deaths

| Cause of death                    | Description   | ICD-10 codes  |
|-----------------------------------|---|---|
| <i>Severe infection</i>           |   |   |
| Pneumonia/Sepsis                  | Chest infection, bronchopneumonia, lower respiratory tract infection, abscess, bacteraemia, bacteria, septicaemia, fasciitis, infective, influenza, septic, pyelonephritis  | J09-J18/A40-A42   |
| <i>Non-infective</i>              |   |   |
| Acute abdomen                     | Bowel obstruction, cholangitis, perforation, peritonitis, ischaemic bowel, ischaemic colitis  | K56.6   |
| Aspiration pneumonia              | Aspiration pneumonitis  | J69   |
| Cancer                            | Cancer, carcinoma, metastatic, metastasis, myeloma, leukaemia, astrocytoma, lymphoma, glioblastoma, melanoma, tumor, mesothelioma   | C00-C97   |
| Cardiac                           | ischaemic heart disease, cardiomyopathy, arrhythmia, cardiac failure, coronary, myocardial, asystole, ventricular failure<br>atherosclerosis, atrial fibrillation, cardiogenic shock,   | I05-I09, I10-I15, I20-I25, I42, I43, I50, P29   |
| Degenerative neurological disease | Alzheimer, parkinson, motor neurone disease   | F00 - F03, F05.1, G20-G22, G30-G32  |
| Haemorrhage                       | Bleed, haematemesis, varices, variceal, aneurysm, rupture, dissection, blood loss, exsanguination   | K27.4, K92, I60, I62, P50   |
| Liver                             | Hepatic, cirrhosis, alcoholic   | B18, K70.0 - K70.3, K70.9, K71.3 - K71.5, K71.7, K73, K74, K76.0, K76.2 - K76.4, K76.8, K76.9, Z94.4, I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5, K76.6, K76.7 |
| Multiple organ failure            | Multiple organ failure  | R68.8   |
| Pulmonary disease                 | Chronic lung disease, chronic pulmonary disease, airways disease, respiratory failure, respiratory failure emphysema, chronic bronchitis, interstitial lung,  | I27.8, I27.9, J40 - J47, J60 - J67, J68.4, J70.1, J70.3   |
| Renal failure                     | Kidney disease, tubular necrosis, uraemia   | I12, I13.1, N03.2 - N03.7, N05.2 - N05.7, N18, N19, N25, Z49.0 - Z49.2, Z94, Z99.2  |
| Stroke                            | Intracerebral haemorrhage, acute cerebrovascular accident (cerebrovascular accident stroke)<br>cerebral artery, brain infarct, cerebral haemorrhage, cerebral vascular, ischaemic attack, cerebrovascular, intracerebral, intracranial, transient | I64, I61, I63, I69  |

**Table S3.** The ICD-10 codes used by comorbidity to compute the Charlson's comorbidity index.

| Description   | ICD-10 codes  | Charlson score |
|---|---|----------------|
| Myocardial infarction   | I21.x, I22.x, I25.2   | 1              |
| Peripheral vascular disease   | I70.x, I71.x, I73.1, I73.8, I73.9, I77.1, I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9   | 1              |
| Congestive heart failure  | I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, I42.5 - I42.9, I43.x, I50.x, P29.0  | 1              |
| Cerebrovascular disease   | G45.x, G46.x, H34.0, I60.x - I69.x  | 1              |
| Dementia  | F00.x - F03.x, F05.1, G30.x, G31.1  | 1              |
| Chronic pulmonary disease   | I27.8, I27.9, J40.x - J47.x, J60.x - J67.x, J68.4, J70.1, J70.3   | 1              |
| Rheumatic disease   | M05.x, M06.x, M31.5, M32.x - M34.x, M35.1, M35.3, M36.0   | 1              |
| Peptic ulcer disease  | K25.x - K28.x   | 1              |
| Mild liver disease  | B18.x, K70.0 - K70.3, K70.9, K71.3 - K71.5, K71.7, K73.x, K74.x, K76.0, K76.2 - K76.4, K76.8, K76.9, Z94.4  | 1              |
| Diabetes without chronic complication   | E10.0, E10.1, E10.6, E10.8, E10.9, E11.0, E11.1, E11.6, E11.8, E11.9, E12.0, E12.1, E12.6, E12.8, E12.9, E13.0, E13.1, E13.6, E13.8, E13.9, E14.0, E14.1, E14.6, E14.8, E14.9 | 1              |
| Diabetes with chronic complication  | E10.2 - E10.5, E10.7, E11.2 - E11.5, E11.7, E12.2 - E12.5, E12.7, E13.2 - E13.5, E13.7, E14.2 - E14.5, E14.7  | 2              |
| Hemiplegia or paraplegia  | G04.1, G11.4, G80.1, G80.2, G81.x, G82.x, G83.0 - G83.4, G83.9  | 2              |
| Renal disease   | I12.0, I13.1, N03.2 - N03.7, N05.2 - N05.7, N18.x, N19.x, N25.0, Z49.0 - Z49.2, Z94.0, Z99.2  | 2              |
| Any malignancy, including lymphoma and leukaemia, except malignant neoplasm of skin | C00.x - C26.x, C30.x - C34.x, C37.x - C41.x, C43.x, C45.x - C58.x, C60.x - C76.x, C81.x - C85.x, C88.x, C90.x - C97.x   | 2              |
| Moderate or severe liver disease  | I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5, K76.6, K76.7   | 3              |
| Metastatic solid tumour   | C77.x - C80.x   | 6              |
| AIDS/HIV  | B20.x - B22.x, B24.x  | 6              |

**Table S4.** Characteristics of mortality by COD

| Characteristics                 | Overall           | Severe infection | Non-infective   | P-value              |
|---------------------------------|-------------------|------------------|-----------------|----------------------|
| Number                          | 8274              | 1279 (15.5)      | 6995 (84.5)     |                      |
| Days of follow-up: Median (IQR) | 1356 (499 – 2409) | 190 (13 – 967)   | 395 (65 – 1173) | <0.0001 <sup>a</sup> |
| Days to death: Median (IQR)     | 380 (59 – 1165)   | 191 (14 – 968)   | 396 (66 – 1174) | <0.0001 <sup>a</sup> |
| Age, continuous                 |                   | 74 (63 – 83)     | 73 (61 – 82)    | 0.1435 <sup>a</sup>  |
| Age group, years                |                   |                  |                 |                      |
| 0-4                             | 59 (0.7)          | 6 (0.9)          | 53 (0.7)        | 0.7987 <sup>b</sup>  |
| 5-14                            | 18 (0.2)          | 1 (0.2)          | 17 (0.2)        |                      |
| 15-24                           | 67 (0.8)          | 3 (0.5)          | 64 (0.8)        |                      |
| 25-34                           | 124 (1.5)         | 3 (0.5)          | 113 (1.5)       |                      |
| 35-44                           | 350 (4.2)         | 11 (1.7)         | 326 (4.3)       |                      |
| 45-54                           | 710 (8.6)         | 24 (3.7)         | 664 (8.7)       |                      |
| 55-64                           | 1237 (15.0)       | 46 (7.13)        | 1143 (15.0)     |                      |
| 65-74                           | 1823 (22.0)       | 145 (22.5)       | 1678 (22.0)     |                      |
| 75+                             | 3886 (47.0)       | 315 (48.8)       | 3571 (46.8)     |                      |
| Gender                          |                   |                  |                 |                      |
| Male                            | 4590 (55.5)       | 337 (62.3)       | 4253 (55.7)     | 0.0859 <sup>b</sup>  |
| Female                          | 3684 (44.5)       | 308 (47.7)       | 3376 (44.3)     |                      |
| Residential aged care           | 717 (8.7)         | 58 (9.0)         | 659 (8.6)       | 0.7588 <sup>b</sup>  |
| Indigenous status               |                   |                  |                 |                      |
| Non-Indigenous                  | 7421 (89.7)       | 569 (88.2)       | 6852 (89.8)     | 0.2000 <sup>b</sup>  |
| ATSI                            | 853 (10.3)        | 76 (11.8)        | 777 (10.2)      |                      |
| Comorbidity Index               |                   |                  |                 |                      |
| Score 0                         | 861 (10.4)        | 71 (11.0)        | 790 (10.4)      | 0.5192 <sup>b</sup>  |
| Score 1-2                       | 2083 (25.1)       | 147 (22.8)       | 1936 (25.4)     |                      |
| Score 3-4                       | 1973 (23.9)       | 161 (25.0)       | 1812 (23.8)     |                      |
| Score ≥ 5                       | 3357 (40.6)       | 266 (41.2)       | 3091 (40.5)     |                      |

<sup>a</sup>Based on Mann-Whitney U-test<sup>b</sup>Based on the Chi-square test

**Table S5.** Summaries of the crude mortality rates by sex, age and Indigenous status.

| Gender       | Age group<br>(years) | 11-year mortality, HC 2006-2016 |                |       |               |                |       | Crude<br>rates* |
|--------------|----------------------|---------------------------------|----------------|-------|---------------|----------------|-------|-----------------|
|              |                      | Patients                        |                |       | No. of deaths |                |       |                 |
|              |                      | ATSI                            | Non-Indigenous | Total | ATSI          | Non-Indigenous | Total |                 |
| Female       | 0-4                  | 553                             | 1690           | 2243  | 14            | 10             | 24    | 10.7            |
|              | 5-14                 | 255                             | 705            | 960   | 1             | 10             | 11    | 11.5            |
|              | 15-24                | 554                             | 2036           | 2590  | 6             | 19             | 25    | 9.7             |
|              | 25-34                | 468                             | 2010           | 2478  | 16            | 34             | 50    | 20.2            |
|              | 35-44                | 451                             | 1524           | 1975  | 71            | 86             | 157   | 79.5            |
|              | 45-54                | 392                             | 1730           | 2122  | 90            | 207            | 297   | 140.0           |
|              | 55-64                | 302                             | 1694           | 1996  | 111           | 346            | 457   | 229.0           |
|              | 65-74                | 165                             | 1944           | 2109  | 73            | 592            | 665   | 315.3           |
|              | 75+                  | 96                              | 3499           | 3595  | 53            | 1945           | 1998  | 555.8           |
| Male         | 0-4                  | 712                             | 1940           | 2652  | 14            | 21             | 35    | 13.2            |
|              | 5-14                 | 310                             | 895            | 1205  | 2             | 5              | 7     | 5.8             |
|              | 15-24                | 317                             | 1614           | 1931  | 12            | 30             | 42    | 21.8            |
|              | 25-34                | 328                             | 1670           | 1998  | 21            | 53             | 74    | 37.0            |
|              | 35-44                | 426                             | 1667           | 2093  | 73            | 120            | 193   | 92.2            |
|              | 45-54                | 385                             | 2082           | 2467  | 98            | 315            | 413   | 167.4           |
|              | 55-64                | 234                             | 2566           | 2800  | 90            | 690            | 780   | 278.6           |
|              | 65-74                | 148                             | 2808           | 2956  | 66            | 1092           | 1158  | 391.7           |
|              | 75+                  | 58                              | 3139           | 3197  | 42            | 1846           | 1888  | 590.6           |
| Overall      |                      | 6154                            | 35213          | 41367 | 853           | 7421           | 8274  | 200.0           |
| Crude rates* |                      |                                 |                |       | 138.6         | 210.7          |       |                 |

Notes: ATSI= Aboriginal, Torres Strait Islander; Non-Indigenous = Non- Aboriginal, Torres Strait Islander; HC=Hospital cohorts. \*Crude rates per 1000 persons

1. Eisen, D.P.; McBryde, E.S.; Vasanthakumar, L.; Murray, M.; Harings, M.; Adegboye, O. Linking administrative data sets of inpatient infectious diseases diagnoses in far North Queensland: a cohort profile. *BMJ Open* **2020**, *10*, e034845.