

## Supplementary Data

### **Observational, longitudinal study of delirium in consecutive unselected acute medical admissions: age-specific rates and associated factors, mortality and re-admission**

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Appendix Table 1. Factors associated with prevalent delirium (n=67) in patients aged ≥65 years (OR and p values shown unadjusted and adjusted for age) **bold values are those significant at the p=0.001 level.**

Risk factor	Delirium	No delirium	OR	p	OR adj	p adj
<b>Demographic factors</b>						
Age >75 years	57	177	2.06 (0.99-4.28)	0.052		
Female Sex	33	135	0.76 (0.44-1.31)	0.33	0.68 (0.39-1.19)	0.18
<b>Past medical history</b>						
Dementia	15	36	1.53 (0.78-3.01)	0.22	1.29 (0.64-2.59)	0.48
Falls	29	63	1.99 (1.13-3.51)	0.017	1.78 (1.00-3.19)	0.051
TIA/stroke	22	47	1.87 (1.02-3.42)	0.041	1.71 (0.93-3.14)	0.087
Depression	15	41	1.39 (0.71-2.70)	0.34	1.40 (0.71-2.74)	0.33
Other psychiatric history	3	15	0.65 (0.18-2.33)	0.51	0.73 (0.20-2.63)	0.63
Visual/hearing impairment	8	32	0.83 (0.36-1.89)	0.65	0.64 (0.27-1.52)	0.31
Charlson score >3	6	31	0.62 (0.25-1.56)	0.31	0.60 (0.24-1.52)	0.28
Medications >3	55	176	1.36 (0.66-2.81)	0.40	1.26 (0.61-2.61)	0.54
Medications >7	21	91	0.68 (0.38-1.22)	0.20	0.65 (0.36-1.17)	0.15
<b>Previous dependency</b>						
Care Home/care package	27	57	2.01 (1.14-3.57)	0.017	1.73 (0.95-3.17)	0.074
Care Home/Comm. Hosp.	14	19	2.89 (1.36-6.14)	0.0057	2.43 (1.11-5.33)	0.026
<b>Clinical parameters</b>						
<b>Low cognitive score</b>	<b>25</b>	<b>31</b>	<b>3.91 (2.09-7.32)</b>	<b>&lt;0.0001</b>	<b>3.71 (1.97-6.97)</b>	<b>&lt;0.0001</b>
Clinical dehydration	31	78	1.68 (0.96-2.94)	0.068	1.63 (0.93-2.87)	0.088
Low oxygen saturation	20	33	2.48 (1.30-4.71)	0.0056	2.47 (1.29-4.72)	0.0063
Abnormal temperature	34	73	2.28 (1.30-4.00)	0.0039	2.18 (1.24-3.85)	0.0068
Abnormal WCC	30	55	1.33 (0.78-2.25)	0.30	1.17 (0.54-2.52)	0.70
Na <135 mm/L	80	133	3.21 (1.73-5.95)	0.0002	3.04 (1.23-7.57)	0.017
CRP>6 mm/L	25	51	1.13 (0.65-1.98)	0.66	1.08 (0.46-2.56)	0.86
BUN:Cr ratio	31	60	2.64 (1.50-4.65)	0.0007	2.47 (1.40-4.38)	0.0019
<b>SIRS ≥2</b>	<b>24</b>	<b>27</b>	<b>4.20 (1.98-8.88)</b>	<b>0.0002</b>	<b>3.80 (1.77-8.15)</b>	<b>0.0006</b>
PSPS ≥6 <sup>†</sup>	7	16	1.52 (0.54-4.29)	0.43	1.41 (0.49-4.12)	0.53
<b>MUST &gt;0<sup>‡</sup></b>	<b>25</b>	<b>31</b>	<b>3.91 (2.09-7.32)</b>	<b>&lt;0.0001</b>	<b>3.71 (1.97-6.97)</b>	<b>&lt;0.0001</b>
<b>Diagnosis</b>						
<b>Infection</b>	<b>44</b>	<b>65</b>	<b>5.23 (2.91-9.40)</b>	<b>&lt;0.0001</b>	<b>5.07 (2.81-9.15)</b>	<b>&lt;0.0001</b>
Cardiac	6	44	0.43 (0.18-1.07)	0.069	0.40 (0.16-0.99)	0.048
Stroke	5	9	2.06 (0.67-6.37)	0.21	2.25 (0.72-7.04)	0.16
<b>Other</b>	<b>16</b>	<b>127</b>	<b>0.27 (0.15-0.51)</b>	<b>&lt;0.0001</b>	<b>0.28 (0.15-0.52)</b>	<b>&lt;0.0001</b>
<b>During admission</b>						
<b>Urinary incontinence</b>	<b>33</b>	<b>45</b>	<b>3.98 (2.22-7.12)</b>	<b>&lt;0.0001</b>	<b>3.71 (2.05-6.70)</b>	<b>&lt;0.0001</b>
Faecal incontinence	20	28	3.11 (1.61-6.01)	0.0007	2.90 (1.49-5.64)	0.0018
<b>Bedbound</b>	<b>23</b>	<b>33</b>	<b>3.11 (1.66-5.82)</b>	<b>0.0004</b>	<b>2.92 (1.55-5.50)</b>	<b>0.0009</b>
Sleep deprivation	12	33	1.32 (0.64-2.73)	0.46	1.24 (0.60-2.59)	0.56
Constipation	11	34	1.12 (0.53-2.35)	0.77	0.99 (0.46-2.10)	0.97
Falls	4	11	1.28 (0.39-4.15)	0.69	1.22 (0.37-3.99)	0.75
CT brain scanning	12	32	1.35 (0.65-2.79)	0.42	1.42 (0.68-2.98)	0.35
<b>Urinary catheter insertion</b>	<b>18</b>	<b>22</b>	<b>3.44 (1.71-6.92)</b>	<b>0.0005</b>	<b>3.16 (1.56-6.40)</b>	<b>0.0014</b>
<b>Outcome</b>						
Stay> 7days	29	81	1.51 (0.87-2.63)	0.15	1.33 (0.76-2.35)	0.32
New placement	10	20	2.03 (0.89-4.62)	0.091	1.93 (0.84-4.41)	0.12
Increased care	16	39	1.72 (0.88-3.37)	0.11	1.65 (0.84-3.25)	0.15
Death	8	12	2.59 (1.01-6.62)	0.047	2.45 (0.95-6.35)	0.064

Comm. Hosp.=community hospital, Low cognitive score = AMTS<9 or MMSE<24, low oxygen saturation=<95% on air, abnormal temperature=temperature>38 or < 36° C, abnormal WCC (white cell count)=<4x10<sup>9</sup> or >12x10<sup>9</sup> cells per litre, SIRS=systemic inflammatory response syndrome, PSPPS=pressure score prediction score, MUST=malnutrition universal screening tool. <sup>†</sup>missing total n=146, <sup>‡</sup>missing total n=201

Appendix Table 2. Factors associated with incident delirium (n=28) in patients aged  $\geq 65$  years (OR and p values shown unadjusted and adjusted for age) **bold values are those significant at the p=0.001 level.**

Risk factor	Delirium	No delirium	OR	p	OR adj	p adj
<b>Demographic factors</b>						
Age >75 years	28	206	20.60 (1.24-341.1)	0.035		
Female Sex	17	151	1.32 (0.60-2.92)	0.49	1.13 (0.50-2.54)	0.77
<b>Past medical history</b>						
Dementia	11	40	3.66 (1.59-8.38)	0.0022	2.83 (1.20-6.67)	0.017
Falls	16	76	3.25 (1.47-7.18)	0.0037	2.68 (1.19-6.03)	0.017
TIA/stroke	8	61	1.34 (0.56-3.20)	0.50	1.14 (0.47-2.74)	0.78
Depression	7	49	1.55 (0.62-3.85)	0.34	1.63 (0.65-4.13)	0.30
Other psychiatric history	1	17	0.54 (0.07-4.19)	0.55	0.67 (0.08-5.36)	0.71
Visual/hearing impairment	8	32	2.92 (1.19-7.19)	0.019	2.10 (0.82-5.39)	0.12
Charlson score >3	6	31	2.03 (0.76-5.40)	0.16	2.02 (0.75-5.44)	0.17
Medications >3	21	210	0.74 (0.30-1.84)	0.52	0.63 (0.25-1.60)	0.33
Medications >7	12	100	1.21 (0.55-2.67)	0.63	1.15 (0.52-2.57)	0.73
<b>Previous dependency</b>						
Care Home/care package	16	68	3.88 (1.75-8.62)	0.0009	3.00 (1.30-6.93)	0.010
Care Home/Comm. Hosp.	6	27	2.41 (0.90-6.47)	0.080	1.63 (0.58-4.60)	0.36
<b>Clinical parameters</b>						
Low cognitive score	15	92	7.01 (1.56-31.56)	0.011	5.66 (1.22-26.17)	0.027
Clinical dehydration	7	49	1.45 (0.58-3.60)	0.42	1.26 (0.50-3.19)	0.62
Low oxygen saturation	12	97	1.34 (0.60-2.99)	0.47	1.27 (0.56-2.85)	0.57
Abnormal temperature	5	48	1.00 (0.36-2.78)	0.99	0.98 (0.35-2.74)	0.97
Abnormal WCC	12	95	1.32 (0.60-2.90)	0.49	1.19 (0.53-2.66)	0.67
Na <135 mm/L	19	59	0.65 (0.36-1.17)	0.15	0.56 (0.11-2.78)	0.48
CRP>6 mm/L	48	149	0.44 (0.27-0.72)	0.0012	0.39 (0.09-1.67)	0.20
BUN:Cr ratio	48	50	3.33 (2.00-5.56)	<0.0001	3.21 (0.61-16.82)	0.17
SIRS $\geq 2$	8	83	0.93 (0.40-2.21)	0.88	0.81 (0.34-1.95)	0.64
PSPS $\geq 6^{\dagger}$	7	44	5.30 (1.31-21.47)	0.019	4.59 (1.11-18.91)	0.035
MUST $>0^{\ddagger}$	5	18	5.00 (1.22-20.53)	0.026	3.72 (0.87-15.92)	0.077
<b>Diagnosis</b>						
Infection	14	95	1.87 (0.86-4.09)	0.12	1.71 (0.77-3.79)	0.19
Cardiac	3	47	0.58 (0.17-1.99)	0.38	0.50 (0.14-1.77)	0.29
Stroke	1	13	0.74 (0.09-5.88)	0.78	0.89 (0.11-7.20)	0.91
Other	10	133	0.58 (0.26-1.31)	0.19	0.63 (0.28-1.43)	0.27
<b>During admission</b>						
Urinary incontinence	11	67	1.88 (0.84-4.22)	0.12	1.58 (0.69-3.60)	0.28
Faecal incontinence	8	40	2.21 (0.91-5.36)	0.080	1.89 (0.76-4.68)	0.17
Bedbound	11	45	3.13 (1.38-7.14)	0.0065	2.78 (1.20-6.43)	0.017
<b>Sleep deprivation</b>	<b>14</b>	<b>31</b>	<b>7.45 (3.25-17.09)</b>	<b>&lt;0.0001</b>	<b>7.26 (3.11-16.96)</b>	<b>&lt;0.0001</b>
Constipation	8	37	2.43 (1.00-5.93)	0.050	2.03 (0.82-5.04)	0.13
<b>Falls</b>	<b>6</b>	<b>9</b>	<b>7.67 (2.50-23.52)</b>	<b>0.0004</b>	<b>7.67 (2.42-24.34)</b>	<b>0.0005</b>
<b>CT brain scanning</b>	<b>9</b>	<b>35</b>	<b>3.10 (1.30-7.39)</b>	<b>0.011</b>	<b>3.65 (1.48-9.00)</b>	<b>0.0049</b>
Urinary catheter insertion	9	31	3.53 (1.47-8.49)	0.0048	3.01 (1.23-7.35)	0.016
<b>Outcome</b>						
<b>Stay &gt; 7days</b>	<b>23</b>	<b>87</b>	<b>9.94 (3.66-27.02)</b>	<b>&lt;0.0001</b>	<b>8.61 (3.14-23.62)</b>	<b>&lt;0.0001</b>
New placement	6	24	3.32 (1.20-9.23)	0.021	3.10 (1.10-8.72)	0.032
Increased care	10	45	3.50 (1.45-8.49)	0.0055	3.35 (1.37-8.20)	0.0082
Death	5	15	3.84 (1.28-11.52)	0.016	3.65 (1.18-11.25)	0.024

Comm. Hosp.=community hospital, Low cognitive score = AMTS<9 or MMSE<24, low oxygen saturation=<95% on air, abnormal temperature=temperature>38 or < 36° C, abnormal WCC (white cell count)=<4x10<sup>9</sup> or >12x10<sup>9</sup> cells per litre, SIRS=systemic inflammatory response syndrome, PSPS=pressure score prediction score, MUST=malnutrition universal screening tool. <sup>†</sup>missing total n=146, <sup>‡</sup>missing total n=201.

Cognitive screen	
<b>MUST</b> be completed on <b>ALL</b> patients ≥65 years	
AMTS	
Age	Recognise 2 people
Time (nearest hr)	DOB
Recall (42 West Street)	WW2 (start or end year)
Year	Monarch
Location	20 to 1 backwards
<b>AMTS Total= /10.</b>	
AMTS not done <input type="checkbox"/> Reason:	
Does the patient have known dementia?	
Does the patient have delirium (CAM+ve OR clinical diagnosis)?	
<input type="checkbox"/> Y	<input type="checkbox"/> N <input type="checkbox"/> uncertain
<input type="checkbox"/> Y	<input type="checkbox"/> N <input type="checkbox"/> uncertain

  

CAM (aid to identifying delirium)	
1.	Acute onset &/or fluctuating confusion/altered behaviour
2.	Inattention e.g. unable to do 20 - 1 or distractable
3.	Altered conscious level e.g. agitated or sleepy
4.	Disordered thinking (e.g. rambling)
Delirium = 1+2+(3 or 4) but NOTE that CAM sensitivity is not 100% particularly for hypoactive (SLEEPY) delirium	

### Appendix figure 1.

Figure legend. Cognitive screen as administered by junior staff to all patients aged ≥/ = 65 years old (the MMSE was used in place of the AMTS in the first cohort).