

Supplementary File C Multivariable models adjusted for additional groups of explanatory factors

		OR (95% CI) Adjusted for: (cumulative left to right) Age, sex, year	& Individual co- morbidities	& frailty factors [†]	& medications/ vaccinations [‡]
Male		1	1	1	1
Female		0.71 (0.66 - 0.76)	0.8 (0.75 - 0.85)	0.81 (0.76 - 0.87)	0.82 (0.76 - 0.87)
Age (grouped)	65-69	1	1	1	1
	70-74	1.41 (1.24 - 1.61)	1.31 (1.16 - 1.49)	1.34 (1.17 - 1.52)	1.35 (1.18 - 1.53)
	75-79	1.45 (1.28 - 1.65)	1.39 (1.23 - 1.57)	1.43 (1.26 - 1.62)	1.44 (1.27 - 1.63)
	80-84	1.6 (1.41 - 1.81)	1.58 (1.39 - 1.78)	1.62 (1.43 - 1.84)	1.65 (1.45 - 1.87)
	85-89	1.33 (1.18 - 1.51)	1.44 (1.28 - 1.63)	1.52 (1.34 - 1.73)	1.56 (1.37 - 1.77)
	90+	0.88 (0.78 - 1)	1.02 (0.9 - 1.16)	1.13 (0.99 - 1.28)	1.18 (1.03 - 1.34)
Year of CAP (grouped)	1998-2000	0.52 (0.47 - 0.58)	0.56 (0.51 - 0.62)	0.55 (0.5 - 0.6)	0.54 (0.48 - 0.59)
	2001-2003	1	1	1	1
	2004-2006	1.91 (1.73 - 2.1)	1.81 (1.65 - 1.98)	1.99 (1.81 - 2.19)	1.94 (1.76 - 2.14)
	2007-2008	2.77 (2.48 - 3.1)	2.34 (2.1 - 2.6)	2.64 (2.36 - 2.95)	2.51 (2.23 - 2.82)
	2009-2010	4.38 (3.87 - 4.96)	3.63 (3.22 - 4.09)	4.16 (3.67 - 4.71)	3.86 (3.38 - 4.4)
Individual co- morbidities					
Ischaemic heart disease	pre-MI	1.64 (1.5 - 1.78)	1.38 (1.26 - 1.5)	1.35 (1.24 - 1.47)	1.34 (1.23 - 1.46)
	post MI	1.73 (1.55 - 1.92)	1.37 (1.23 - 1.52)	1.35 (1.21 - 1.5)	1.31 (1.17 - 1.46)
Congestive heart failure		1.68 (1.55 - 1.82)	1.22 (1.13 - 1.33)	1.25 (1.15 - 1.36)	1.25 (1.15 - 1.36)
Peripheral vascular disease		1.59 (1.43 - 1.77)	1.26 (1.13 - 1.4)	1.27 (1.14 - 1.41)	1.27 (1.14 - 1.41)
Dementia		0.45 (0.41 - 0.5)	0.56 (0.51 - 0.62)	0.69 (0.62 - 0.75)	0.71 (0.65 - 0.78)
Chronic lung disease		1.85 (1.71 - 1.99)	1.62 (1.51 - 1.74)	1.59 (1.48 - 1.71)	1.62 (1.47 - 1.78)
Connective tissue disease		1.53 (1.36 - 1.72)	1.34 (1.19 - 1.5)	1.35 (1.2 - 1.52)	1.21 (1.07 - 1.37)
Peptic ulcer		1.32 (1.18 - 1.49)	1.17 (1.04 - 1.31)	1.17 (1.05 - 1.32)	1.17 (1.05 - 1.32)
Liver disease	Mild	1.92 (1.22 - 3.03)	1.68 (1.08 - 2.61)	1.7 (1.09 - 2.65)	1.71 (1.09 - 2.66)
	Severe	2.12 (1.2 - 3.76)	1.81 (1.03 - 3.16)	1.78 (1.01 - 3.11)	1.8 (1.03 - 3.15)
Diabetes	Diabetes	1.4 (1.27 - 1.55)	1.26 (1.14 - 1.39)	1.28 (1.16 - 1.42)	1.27 (1.14 - 1.4)
	With complications	1.81 (1.5 - 2.19)	1.41 (1.17 - 1.7)	1.34 (1.1 - 1.62)	1.31 (1.08 - 1.59)
Cancer	Solid cancer	1.24 (1.13 - 1.36)	1.24 (1.13 - 1.37)	1.26 (1.14 - 1.38)	1.26 (1.15 - 1.38)
	Metastatic	1.6 (1.3 - 1.98)	2.55 (2.05 - 3.18)	2.55 (2.04 - 3.18)	2.46 (1.97 - 3.07)
Leukaemia/ lymphoma		1.93 (1.53 - 2.42)	1.95 (1.56 - 2.44)	1.91 (1.52 - 2.39)	1.94 (1.55 - 2.43)
Severe renal disease		2.24 (2.01 - 2.49)	1.84 (1.66 - 2.05)	1.85 (1.66 - 2.05)	1.82 (1.64 - 2.03)
Cerebrovascular disease		0.85 (0.79 - 0.92)	0.91 (0.84 - 0.98)	0.98 (0.91 - 1.06)	0.98 (0.91 - 1.06)

Neurological disease		0.74 (0.66 - 0.83)	0.95 (0.85 - 1.05)	1.05 (0.95 - 1.18)	1.08 (0.97 - 1.21)
Disorders of the immune mechanism		3.4 (2.01 - 5.74)	2.35 (1.41 - 3.92)	2.49 (1.49 - 4.15)	2.49 (1.49 - 4.15)
Terminal illness		0.34 (0.29 - 0.4)	0.27 (0.23 - 0.32)	0.3 (0.25 - 0.36)	0.3 (0.25 - 0.35)
Frailty factors					
Recent carer		1.37 (1.15 - 1.63)		1.18 (0.97 - 1.42)	1.17 (0.97 - 1.41)
Living arrangements	Not recorded	1		1	1
	Lives alone	1.32 (1.11 - 1.58)		1.17 (0.97 - 1.41)	1.17 (0.97 - 1.4)
	Sheltered accommodation	1.21 (0.91 - 1.61)		1.09 (0.82 - 1.45)	1.11 (0.83 - 1.48)
	Residential Care	0.33 (0.3 - 0.37)		0.45 (0.4 - 0.5)	0.46 (0.41 - 0.51)
Visual impairment		1.3 (1.21 - 1.4)		1.1 (1.02 - 1.18)	1.1 (1.02 - 1.18)
Bedsore/ulcer		0.38 (0.32 - 0.45)		0.51 (0.43 - 0.6)	0.52 (0.44 - 0.61)
Low weight/ poor nutrition		0.72 (0.65 - 0.79)		0.84 (0.77 - 0.93)	0.84 (0.77 - 0.93)
Incontinence/ catheter		0.66 (0.59 - 0.73)		0.81 (0.73 - 0.9)	0.83 (0.75 - 0.92)
Medications					
Immunosuppressants (other than steroids) in last 120 days		1.65 (1.26 - 2.17)			1.1 (0.84 - 1.45)
Inhaled corticosteroids	None pre CAP	1			1
	Within 60 days	1.73 (1.57 - 1.9)			0.99 (0.88 - 1.12)
	Within 61-180 days	1.46 (1.24 - 1.71)			0.83 (0.69 - 0.98)
	Within 181-365 days	1.56 (1.21 - 2.03)			0.93 (0.72 - 1.21)
	More than 365 days ago	1.29 (1.12 - 1.5)			0.82 (0.7 - 0.95)
Antibiotics	None in previous 28 days	1			1
	In previous 1-7 days	1.02 (0.93 - 1.11)			1.04 (0.95 - 1.14)
	In previous 8-28 days	0.69 (0.63 - 0.76)			0.69 (0.63 - 0.76)
Statins in previous 6 months		1.57 (1.43 - 1.72)			1.12 (1.01 - 1.23)
Steroids in previous 90 days		1.8 (1.62 - 2)			1.42 (1.27 - 1.58)
Influenza vaccine	No vaccine pre CAP	1			1

	Vaccinated 14-365 days pre CAP	0.87 (0.8 - 0.96)			0.75 (0.68 - 0.83)
	Vaccinated last season	0.84 (0.75 - 0.94)			0.76 (0.67 - 0.85)
	Vaccinated 2-5 years pre CAP	0.88 (0.75 - 1.03)			0.82 (0.71 - 0.96)
	Vaccinated >5 years pre CAP	1.05 (0.81 - 1.34)			0.9 (0.7 - 1.15)
Pneumococcal vaccine	No vaccine pre CAP	1			1
	Vaccinated 14-365 days pre CAP	1.01 (0.88 - 1.17)			1.02 (0.89 - 1.18)
	Vaccinated 1-2 years pre CAP	1.07 (0.93 - 1.22)			1.02 (0.89 - 1.17)
	Vaccinated 2-5 years pre CAP	1.24 (1.13 - 1.36)			1.07 (0.97 - 1.18)
	Vaccinated >5 years pre CAP	1.57 (1.42 - 1.74)			1.16 (1.04 - 1.29)
Factors not included in later models					
Hemiplegia		0.85 (0.72 - 1.01)			
Mild renal disease		0.97 (0.7 - 1.34)			
Self-care problems		0.79 (0.57 - 1.08)			
Anxious/depressed		1.07 (0.95 - 1.2)			
Mobility issues		1.00 (0.87 - 1.15)			
Tired		0.94 (0.83 - 1.07)			
History of falling		1.06 (0.97 - 1.16)			
Excessive alcohol consumption	Any excess alcohol code	1.10 (0.93 - 1.29)			

† frailty factors: recent carer, place of residence, vision problems, bed ulcer, underweight/nutritional replacement, incontinence/catheter.

¥ medication/vaccination: Immunosuppressants (not steroids), steroids, inhaled steroids, statins, antibiotics in previous 28 days, influenza vaccine

All categorised as in (main text) Table 1.