The Elderly Patient in Intensive Care: UK perspective

NEICS Spring Meeting, Lumley Castle, 23 March 2010

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icnarc | Intensive care national audit & research centre

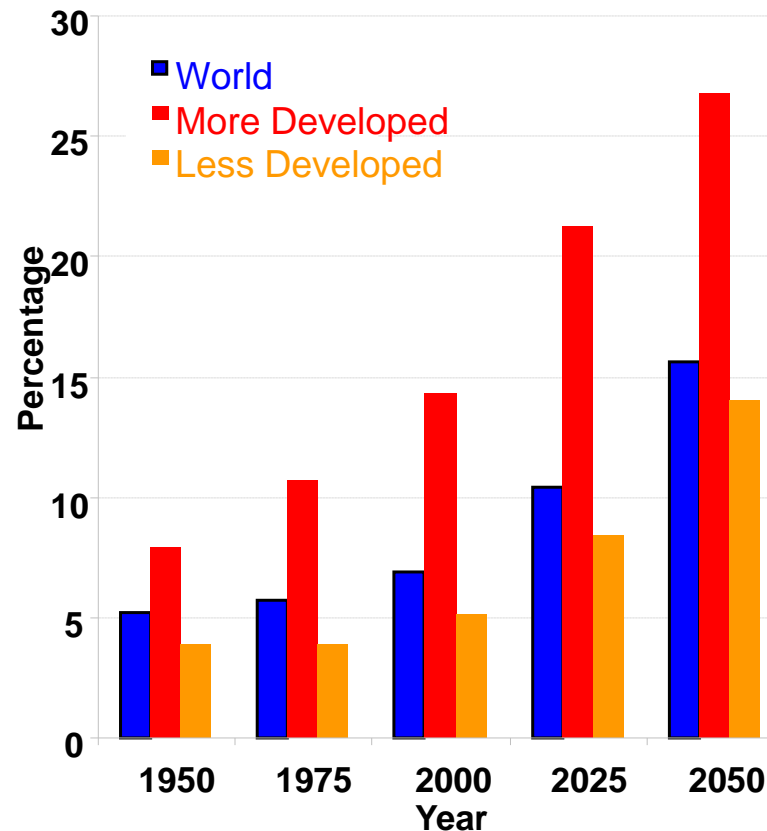# The Elderly Patient in Intensive Care: UK perspective

Cathy Welch

David Harrison

Kathy Rowan

Members of the ICNARC CMP

The aging population

- According to UN estimates, the proportion of elderly people in the world will double by 2050
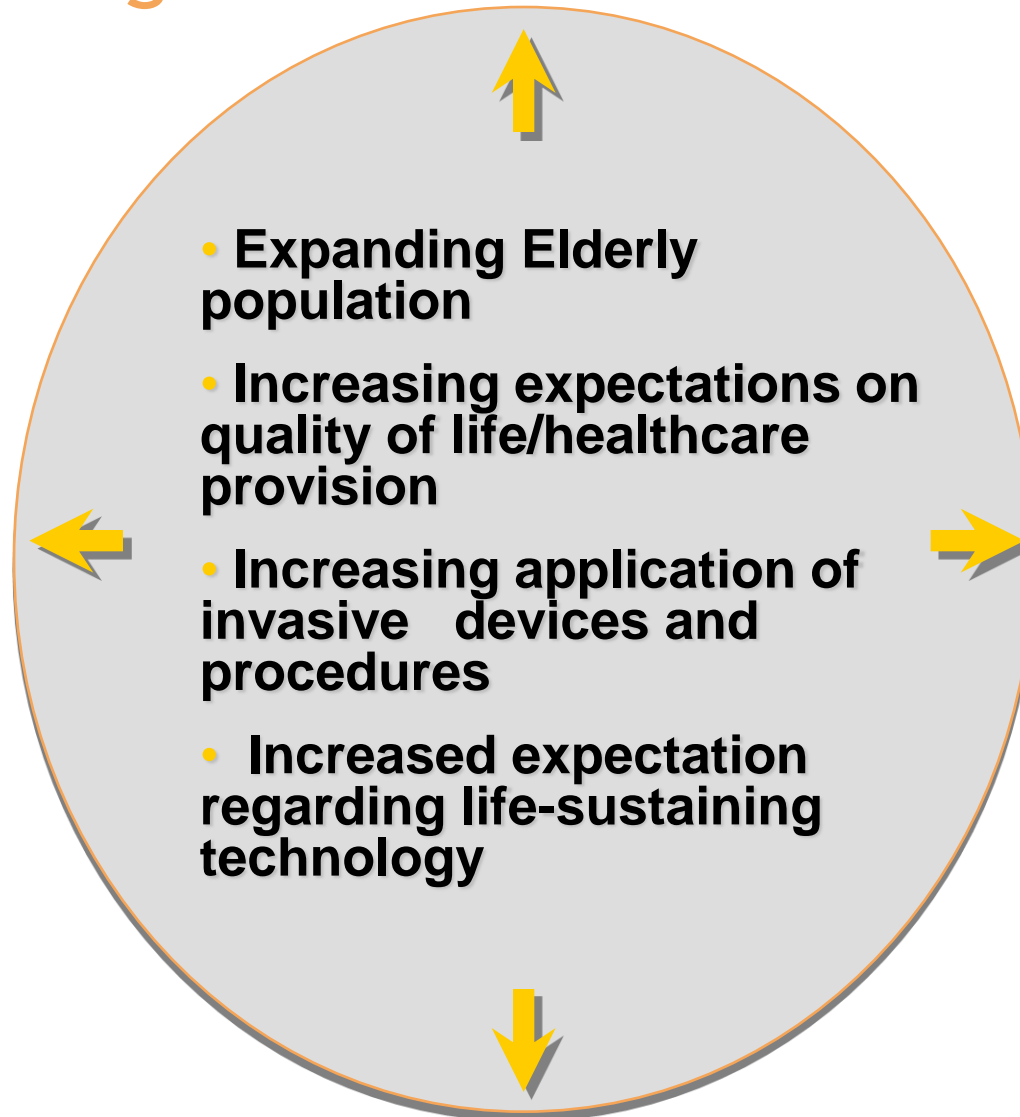
The aging population

- According to UN estimates proportion of elderly people in the world will double by 2050

- In the UK:
  - 20% of the population is presently over the age of 60.
  - Estimates predict - people over the age of 80 and 90 almost double by 2025
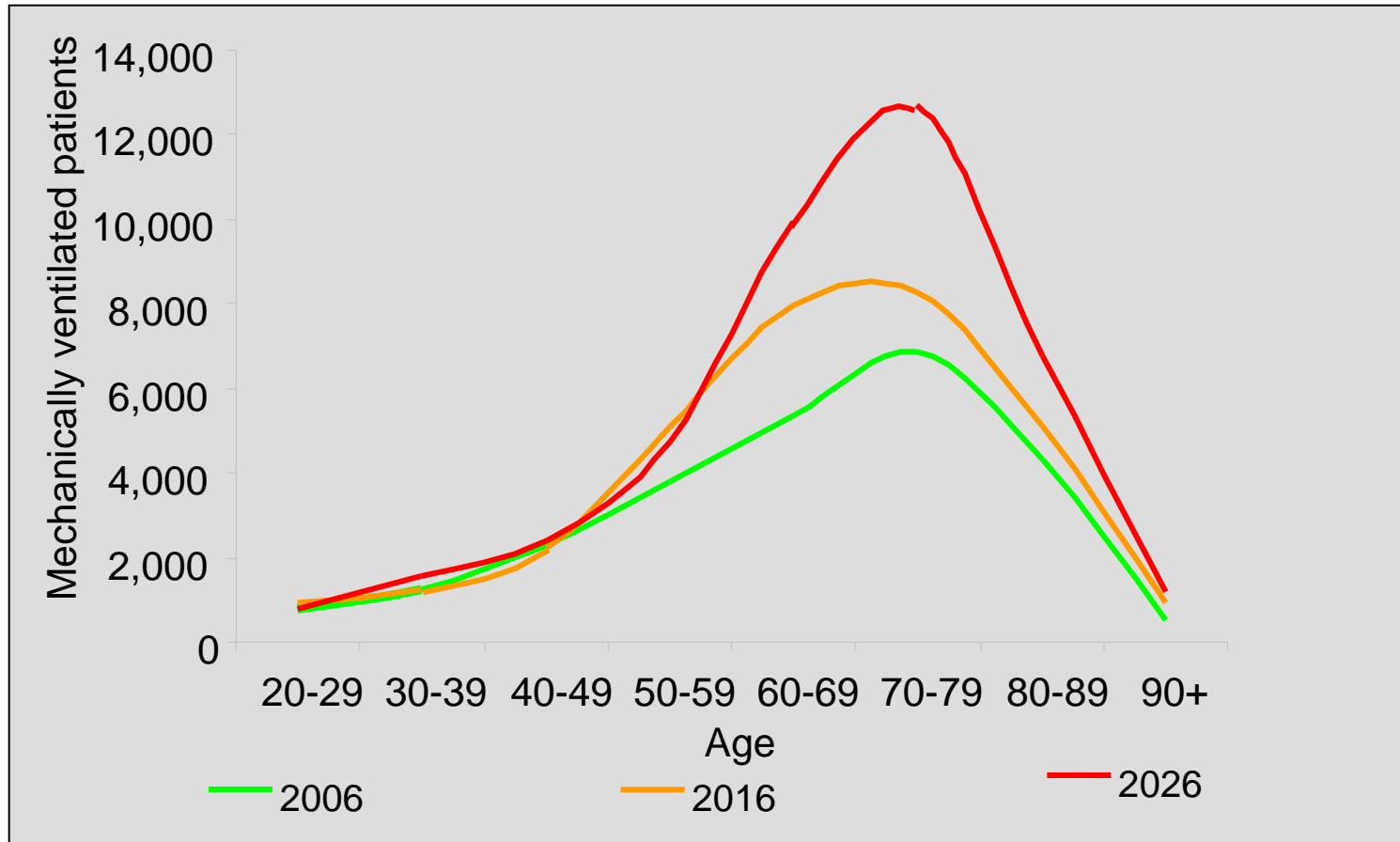
Aging population and the ICU

- In the USA over 50% of all ICU bed days are for patients older than 65 *(Angus et al. JAMA 2000)*

- In SAPS 3 database (35 countries worldwide) ~47% patients were older 65 *(Metnitz et al. ICM 2005)*

- Serial databases show increase proportion of elderly patients with time. *(Boumendil et al. ICM 2007)*

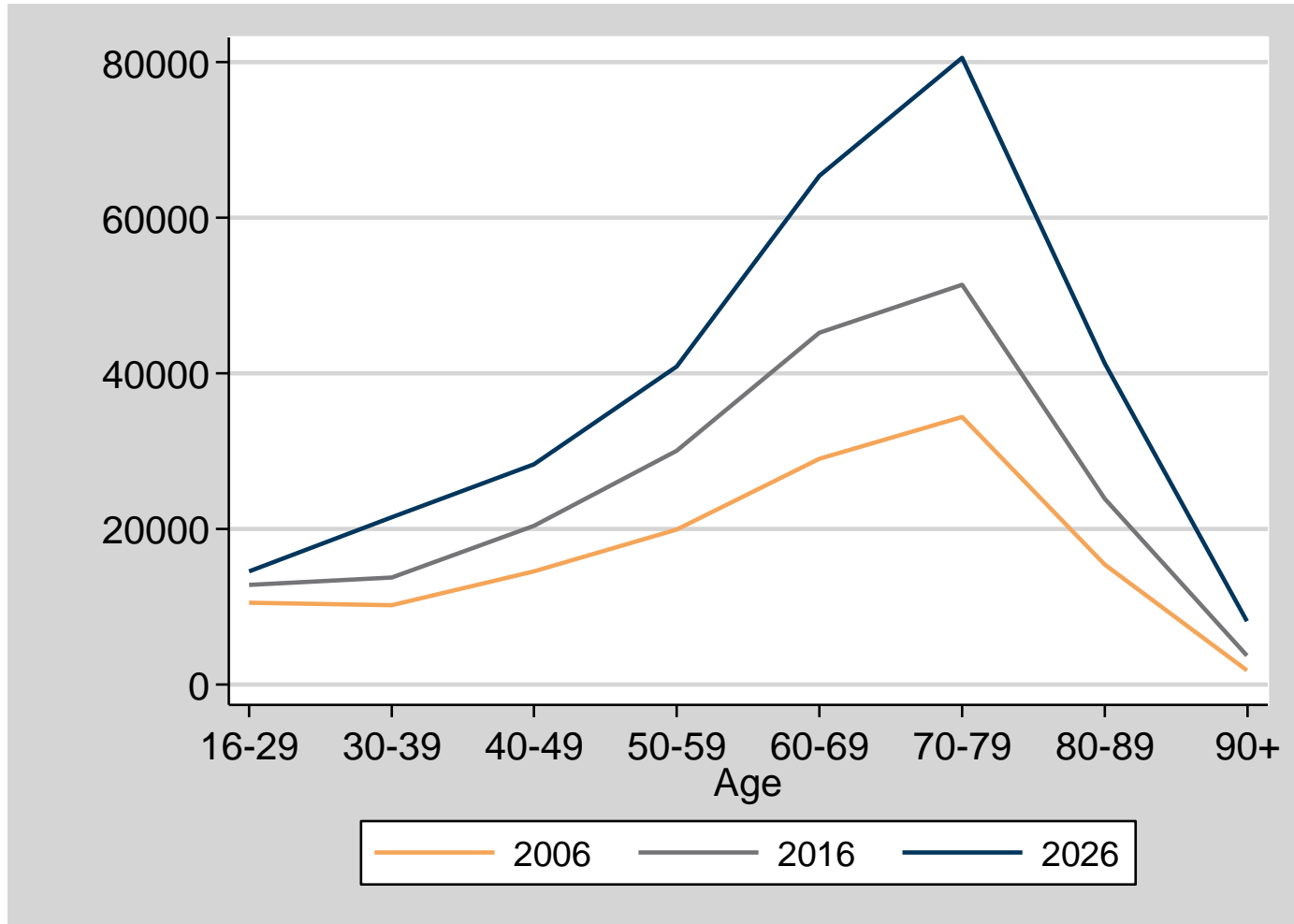# Elderly Patients in Intensive Care: A Growing Concern

- **Expanding Elderly population**

- **Increasing expectations on quality of life/healthcare provision**

- **Increasing application of invasive   devices and procedures**

- **Increased expectation regarding life-sustaining technology**

Aging population and the ICU

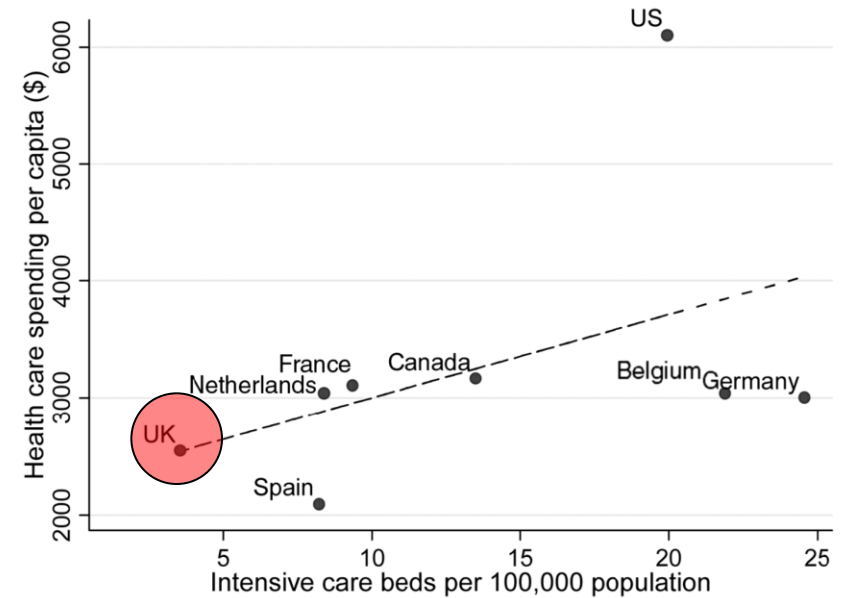**Projected future requirements for mechanical ventilation in Ontario (2001 to 2026)**

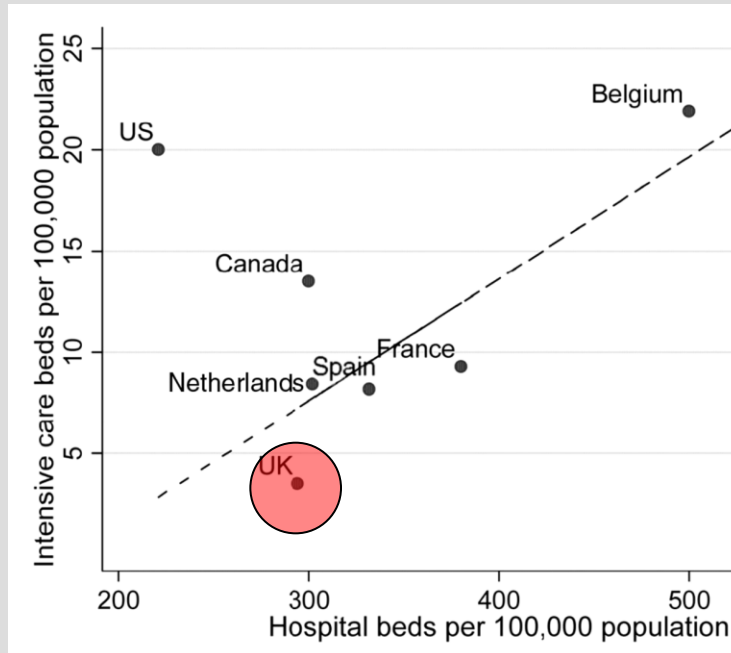Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

Aging population and the ICU

Projected requirements for Critical Care provision in the UK: ICNARC

Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

UK Particularly Vulnerable?

Modern Standards and Service Models

Older People

national service framework

National Service Framework for Older People

DH Department of Health

"aim to provide person-centred care, remove age discrimination, promote older people's health and independence and to fit the services around people's needs"

NSF . 2001

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Aims

- Describe the UK experience:
  - are demographic changes translating into increasing resource use?

  - understanding present provision and outcomes is likely to best determine
    - future needs and how to meet them
    - areas for future research/improvement

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Intensive Care National Audit and Research Centre Case Mix Programme Database (ICNARC:CMPD)

- Established in 1995

- ~ 80% of Critical Care Units in England, Wales and Northern Ireland

- Case mix, physiology and outcome data collected on consecutive admissions

- Following validation process, units receive regular comparative reports

- Admission records pooled into CMPD

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Methods

- Examination of ICNARC:CMPD Jan 1996- Dec 2007

- 633,482 admissions to 193 ICUs in England, Wales and Northern Ireland

- Admissions were divided into 4 groups (16-64; 65-74; 75-84; 85+) based on their age on admission to the ICU

- To examine resource trends the estimated number of admissions aged 75+ were compared number people in population aged 75 and over (ONS)

- 153,803 admissions to 175 adult, general critical care units from 1st January 2006 to 31st December 2007 were selected for descriptive analysis
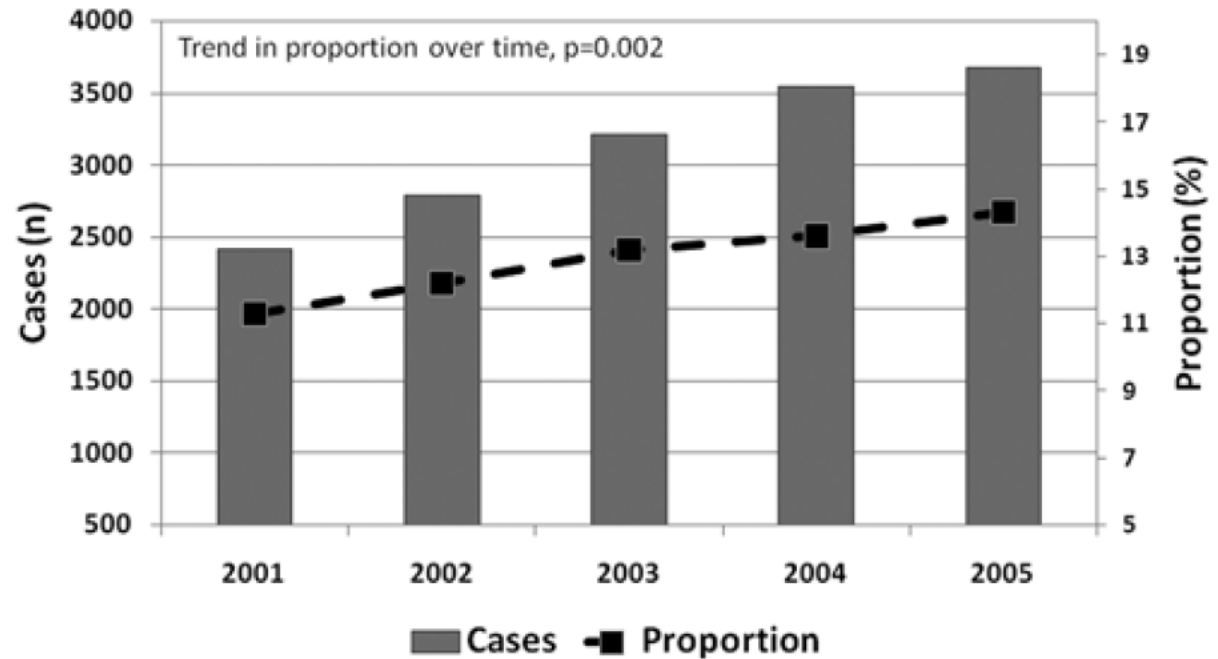
What are existing trends?

Population/Resource trends

Population/Resource trends
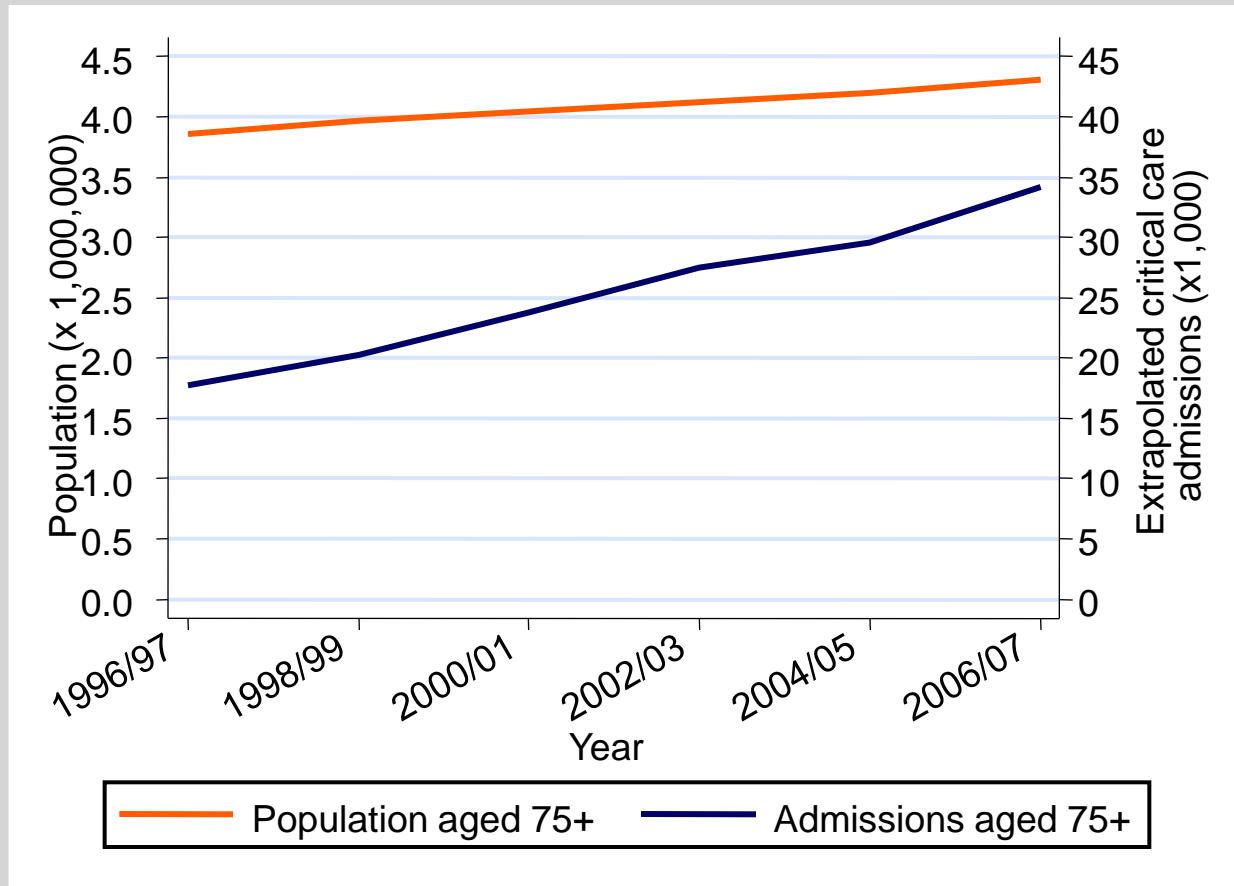
Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones
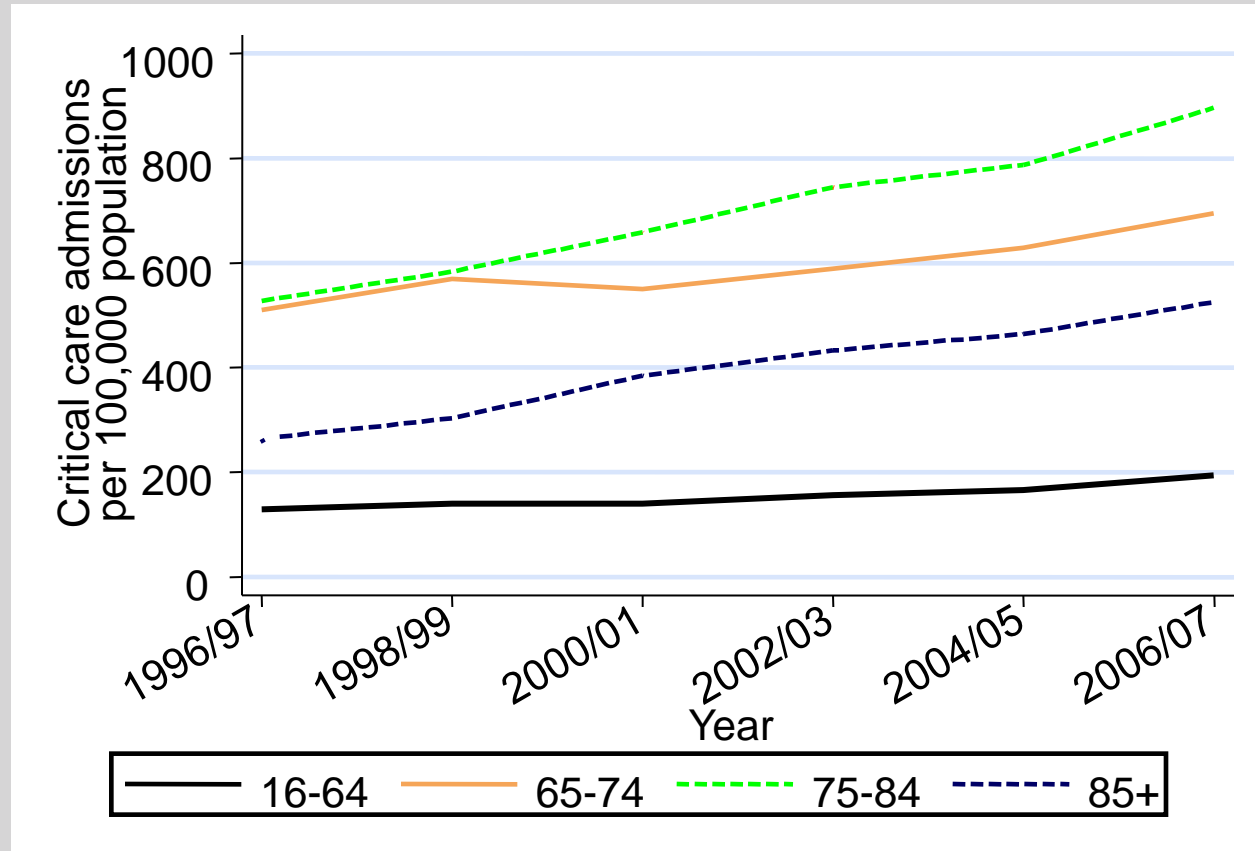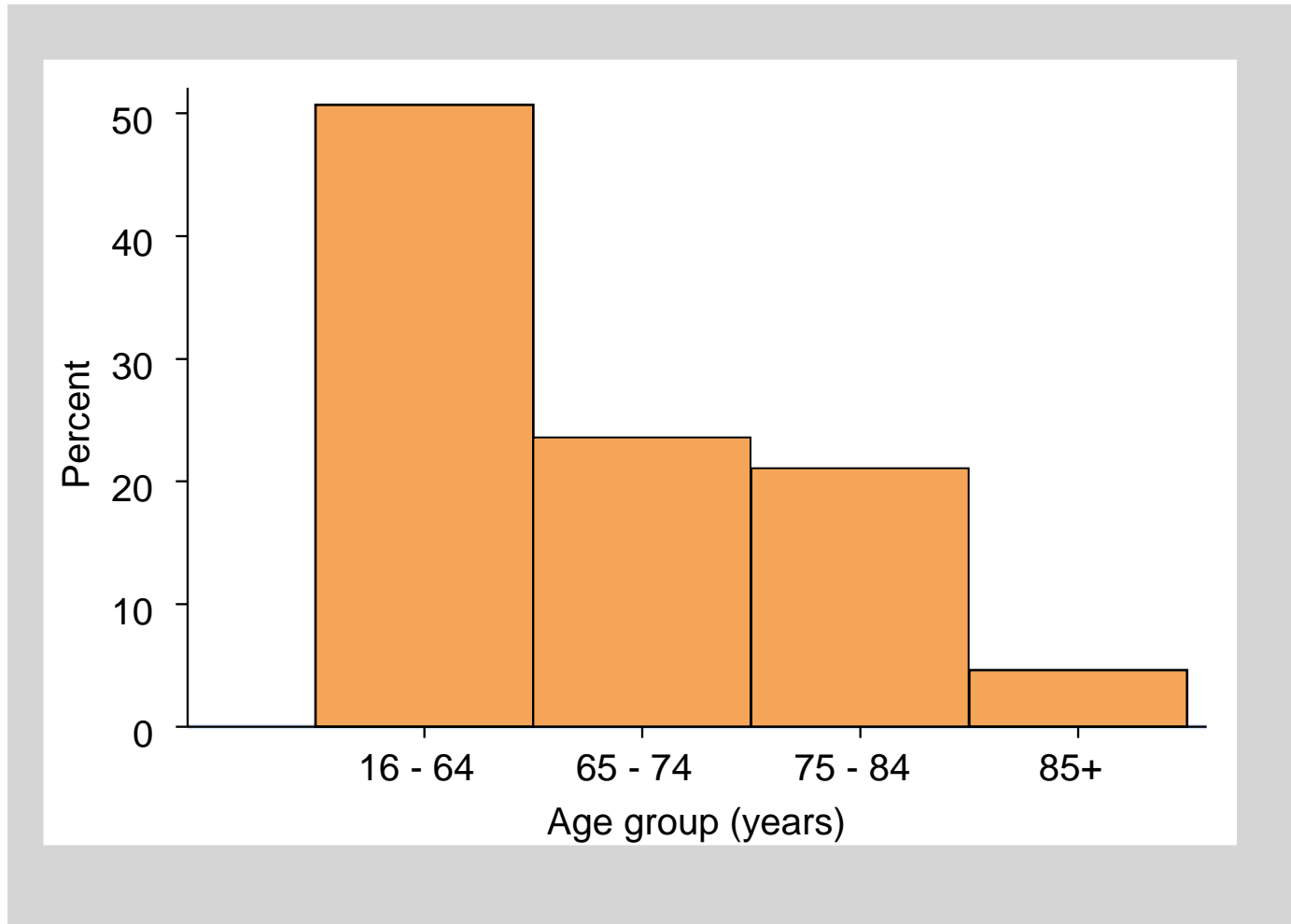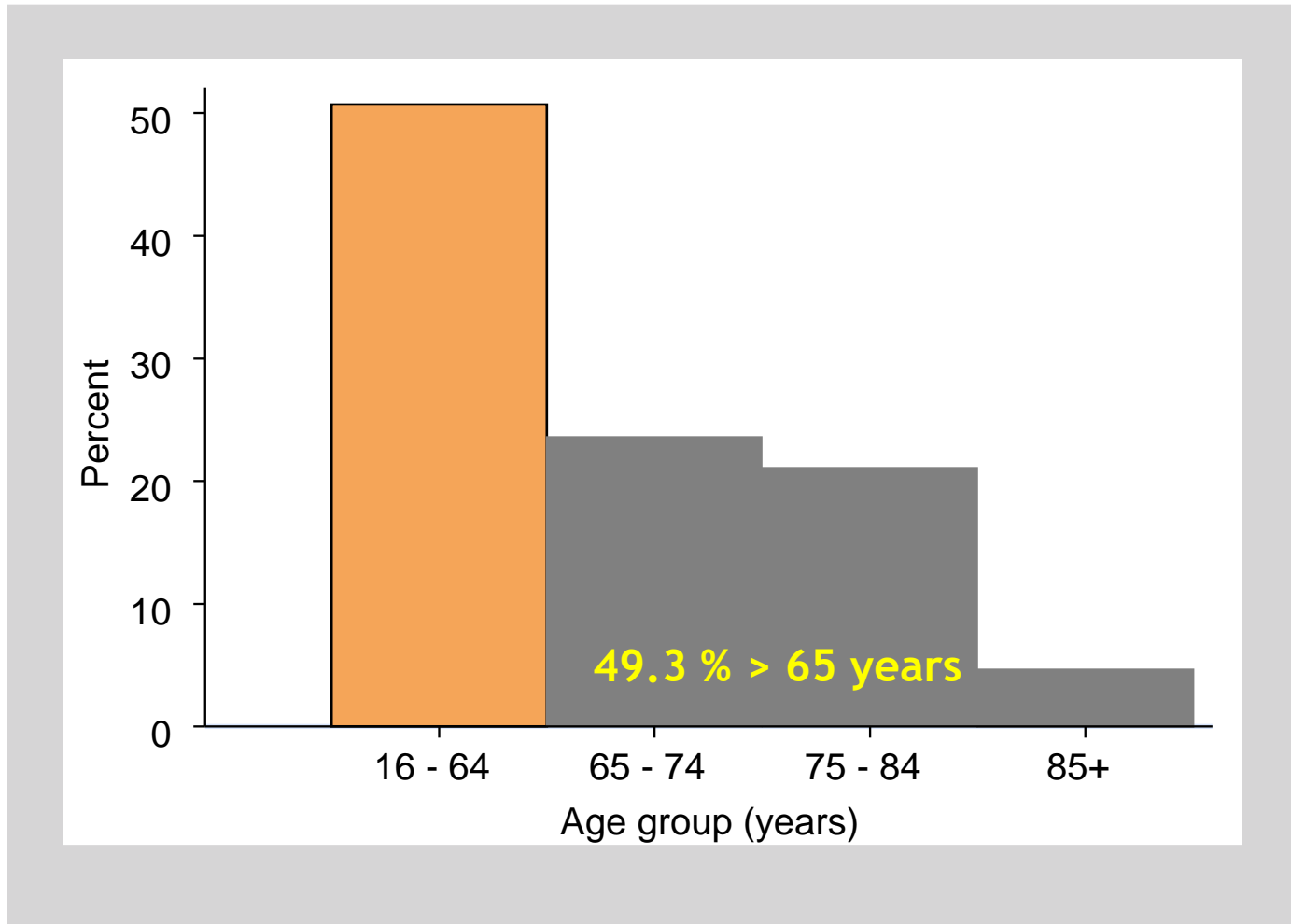
Trends in ICU admissions: ANZICS

Figure 1

Bagshaw et al Crit Care 2009

Who are the elderly in UK ICUs
– and what do they look like?

2006/07 All admissions: n= 153,803

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2006/07 All admissions: n= 153,803

49.3 % > 65 years

Percent

Age group (years)

16 - 64   65 - 74   75 - 84   85+

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2006/07 All admissions: n= 153,803

26 % > 75 years

Age group (years): 16 - 64, 65 - 74, 75 - 84, 85+

Percent

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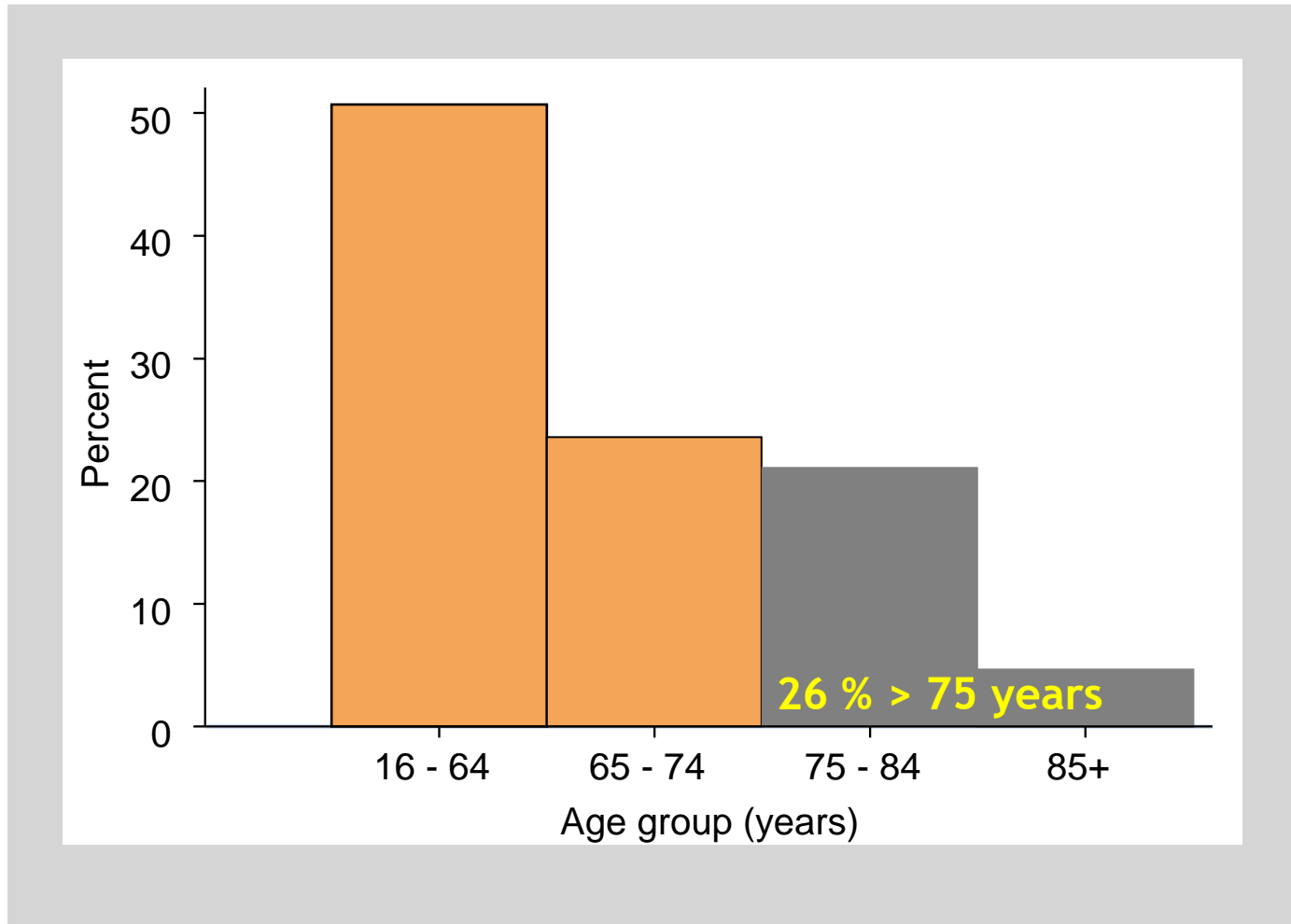
Gender: n= 153,803

a) CMPD

b) Corrected CMPD

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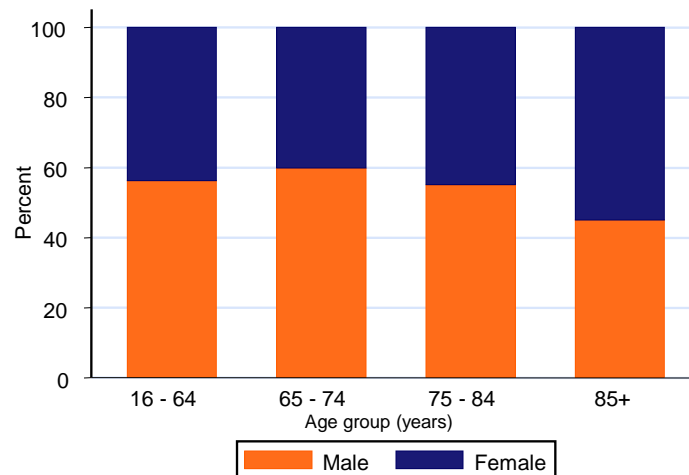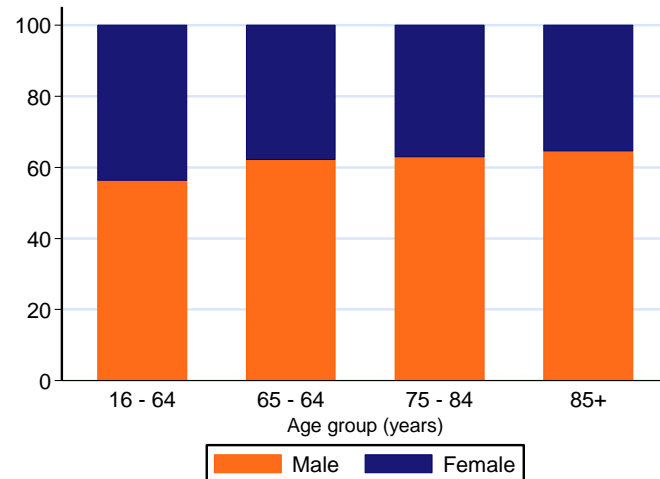
Admission source: n= 153,803

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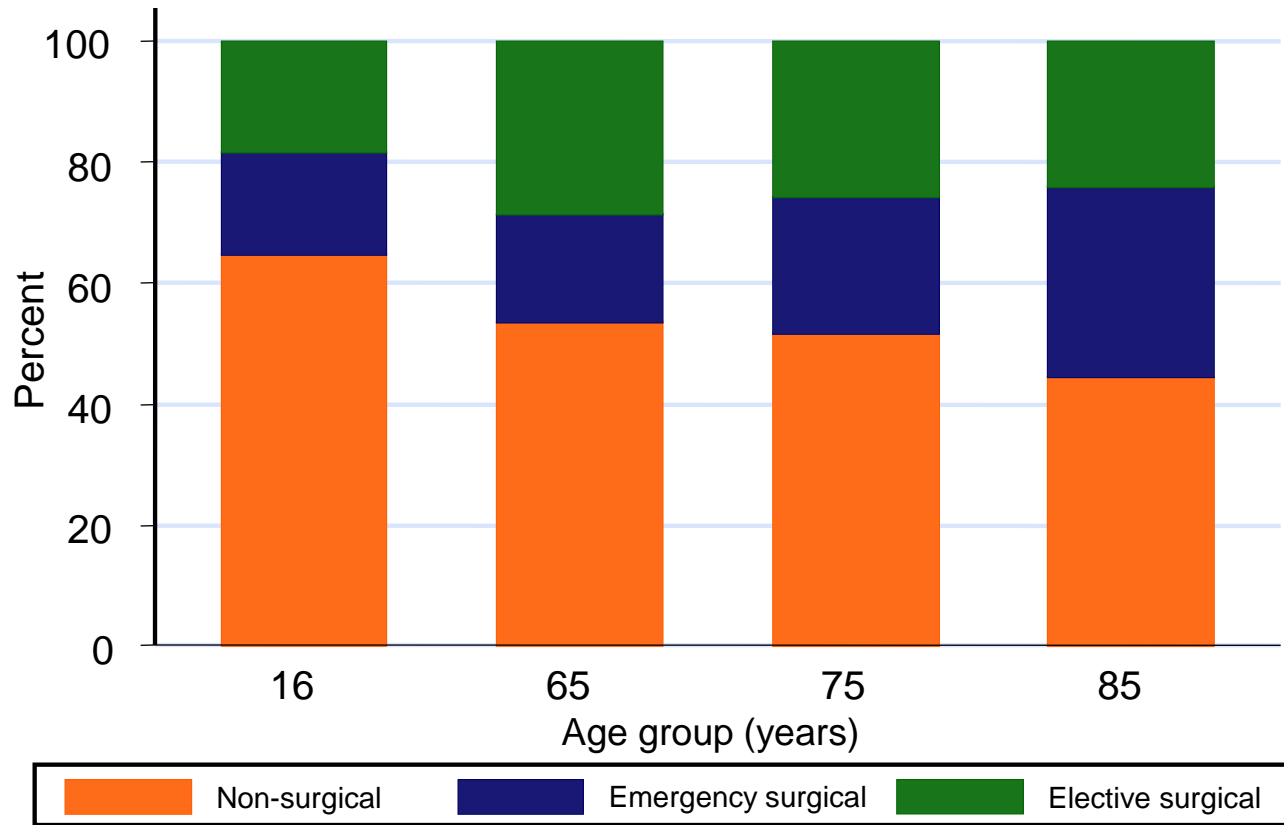
Organ Failure: n= 153,803

a) ICNARC Physiology /APACHE II Score
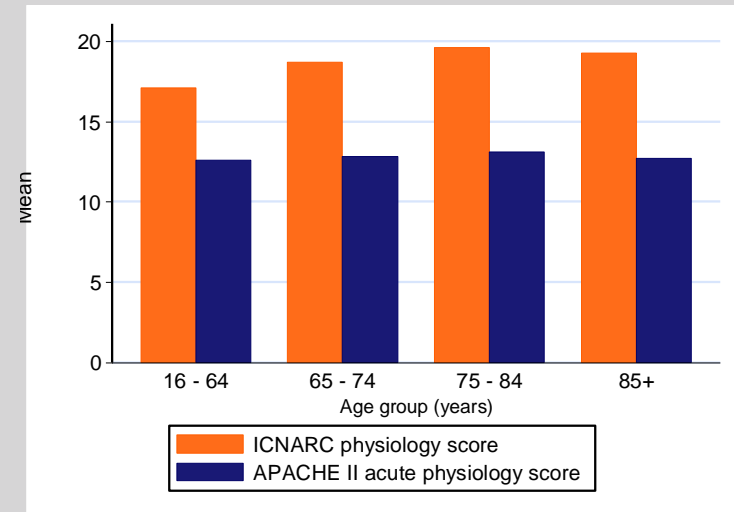
b) Organ Failure
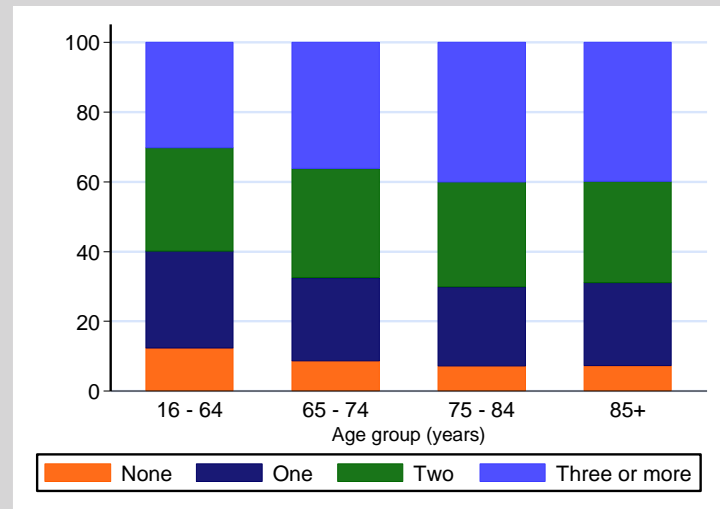
Co-morbidities: n= 153,803

a) Severe co-morbidities

*Excluding admissions with no evidence to assess past medical history

b) Categories

*Excluding admissions with no evidence to assess past medical history

Legend: Very severe cardiovascular disease, Respiratory, Chronic renal replacement therapy, Liver
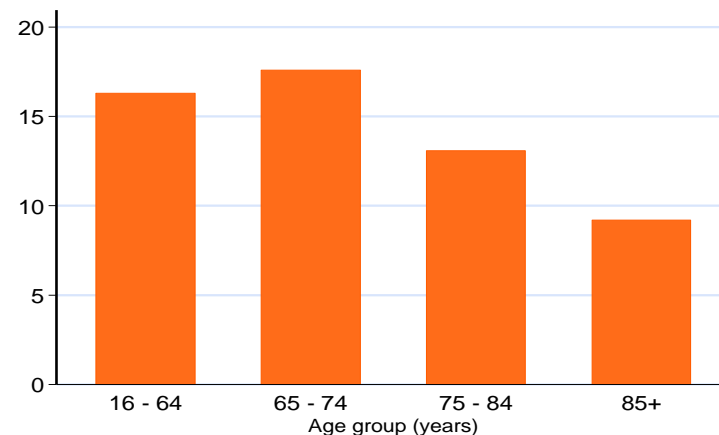
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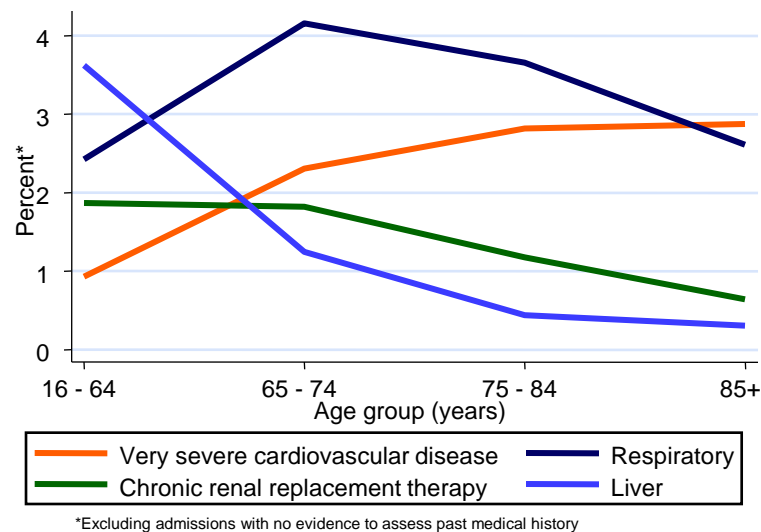
ICU Mortality

Mortality: n= 153,803

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ICU Mortality: n= 153,803

Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

ICU Mortality: n= 153,803

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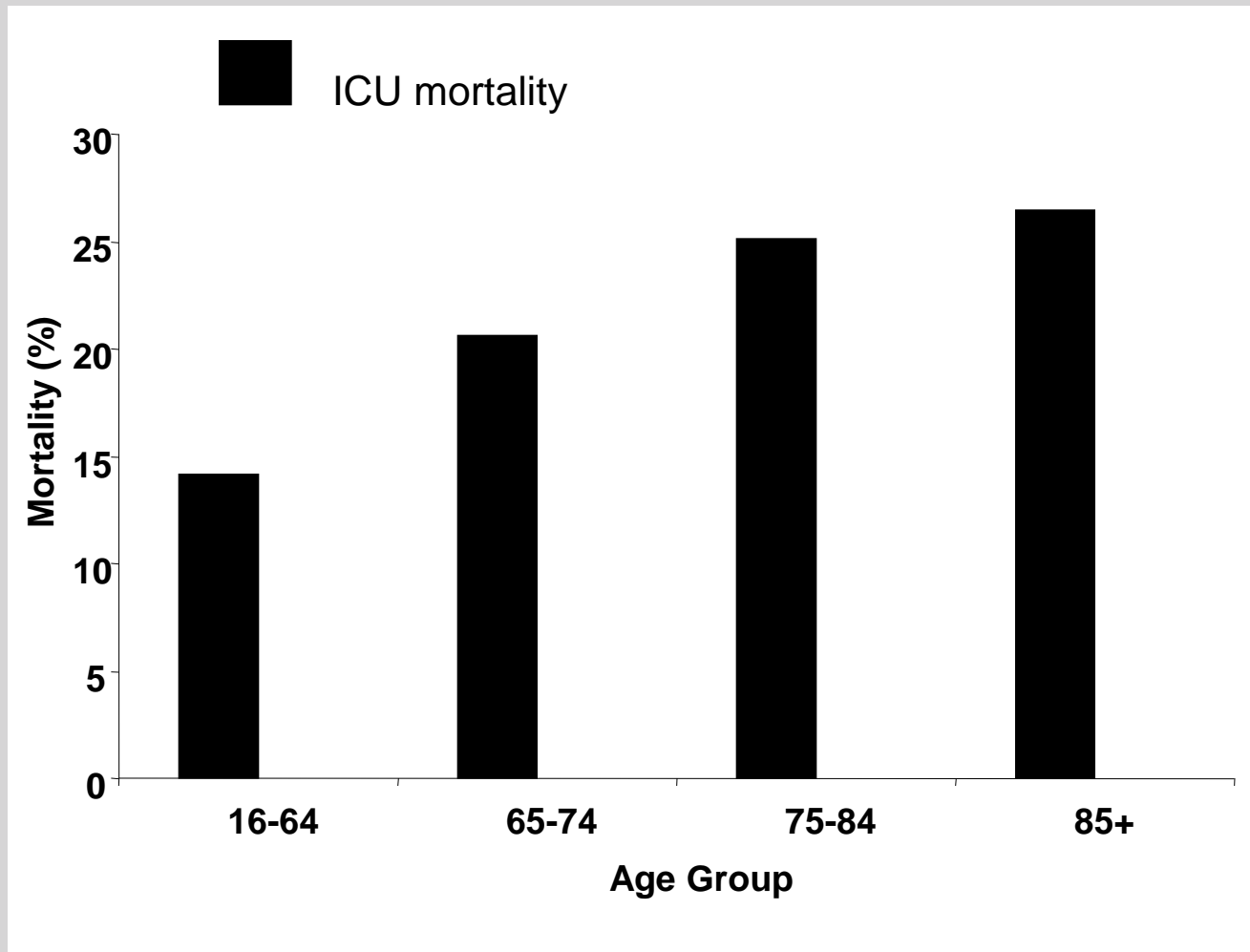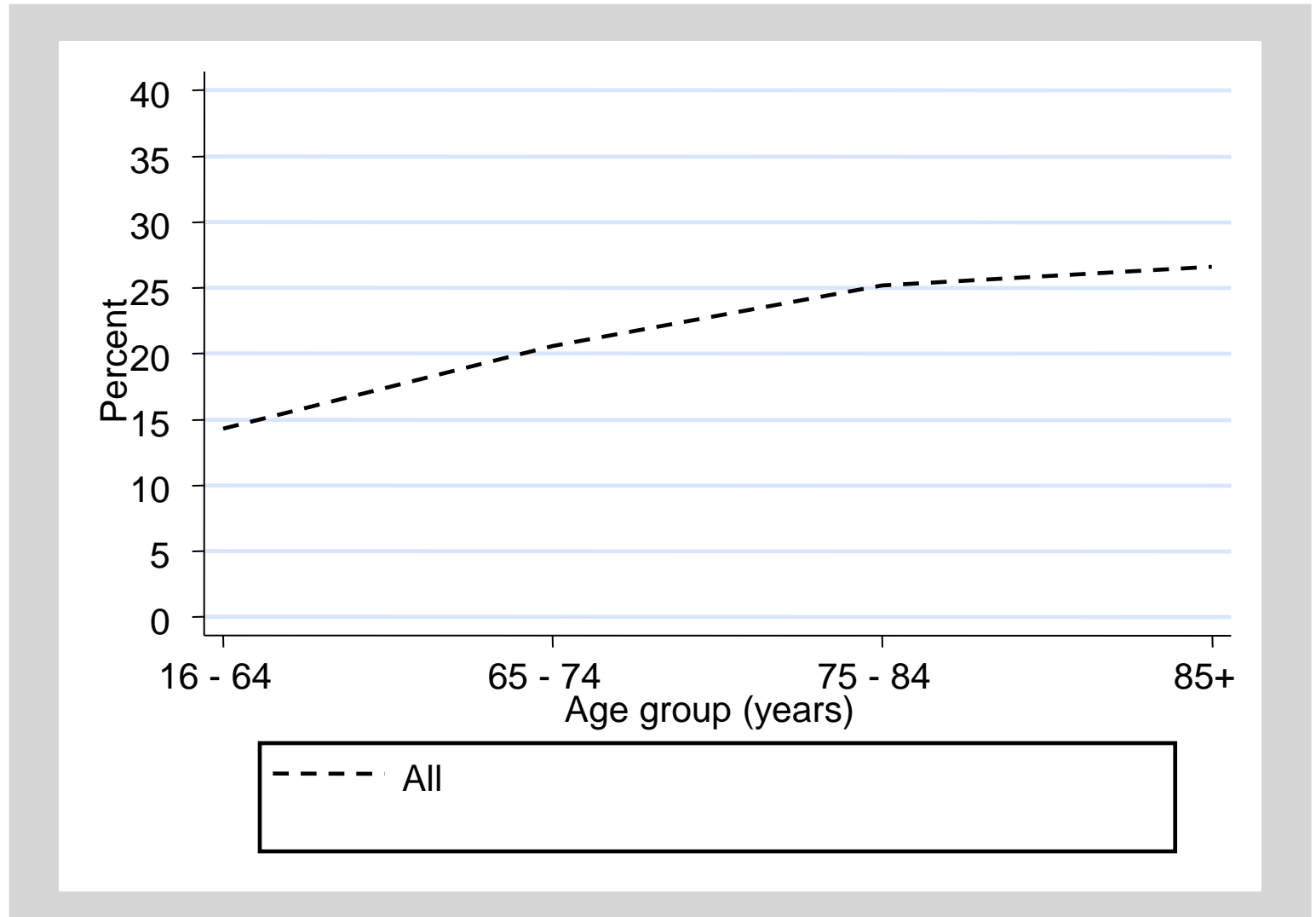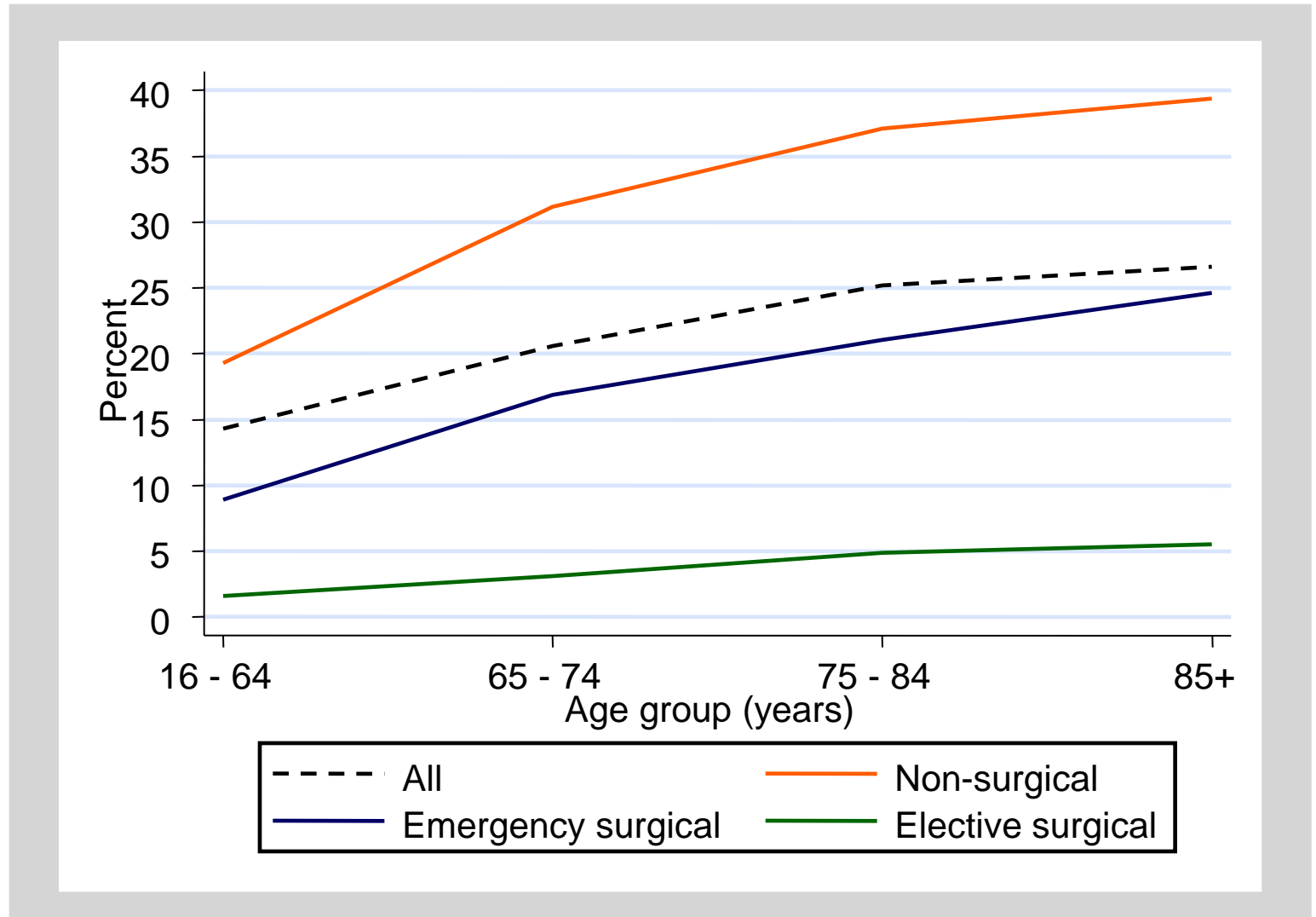
Age and ICU Mortality

- The importance of "age" as an independent risk factor for ICU outcome remains controversial
  - Strong associations [Dragsted 1992; Lemeshow JAMA 1993; Boumendil 2005; de Rooj 2006; Bagshaw 2009]
  - Minimal or no association [Aegerter 2005; Kleinpell 1998; Somme 2003; Torres 2006].
- Differences are almost certainly multi factorial
  - study design
    - much of the discrepancy explained by increased burden of chronic disease and pre-existing co-morbidities on admission to the ICU
    - population studied
    - Differences in clinician behaviour
  - Elderly patients may be more susceptible to specific ICU complications known to adversely effect outcome;
    - delirium
    - nosocomial infection

Post- ICU Mortality: n= 153,803

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Post-ICU Mortality: n= 153,803

Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

Post-ICU Mortality: n= 153,803

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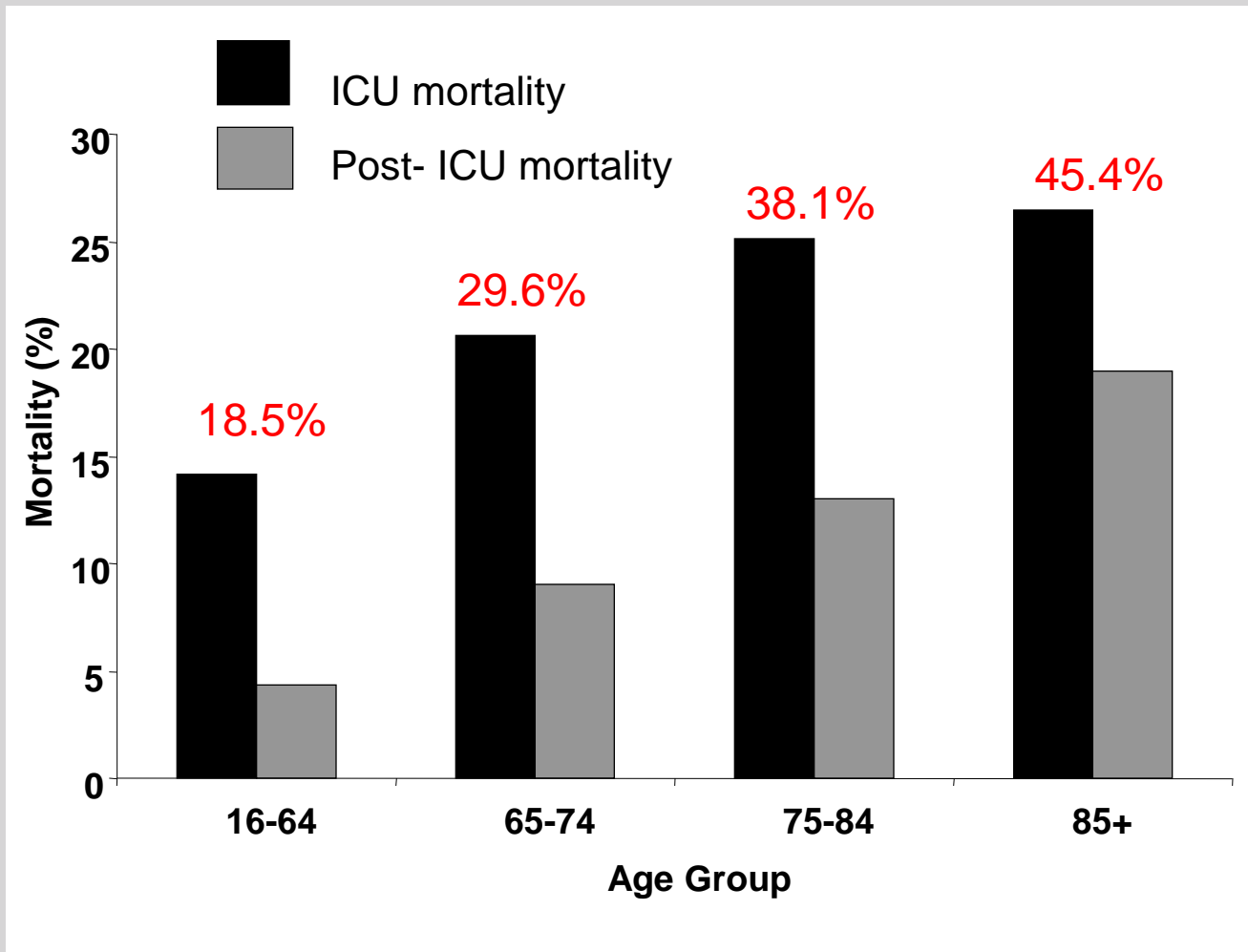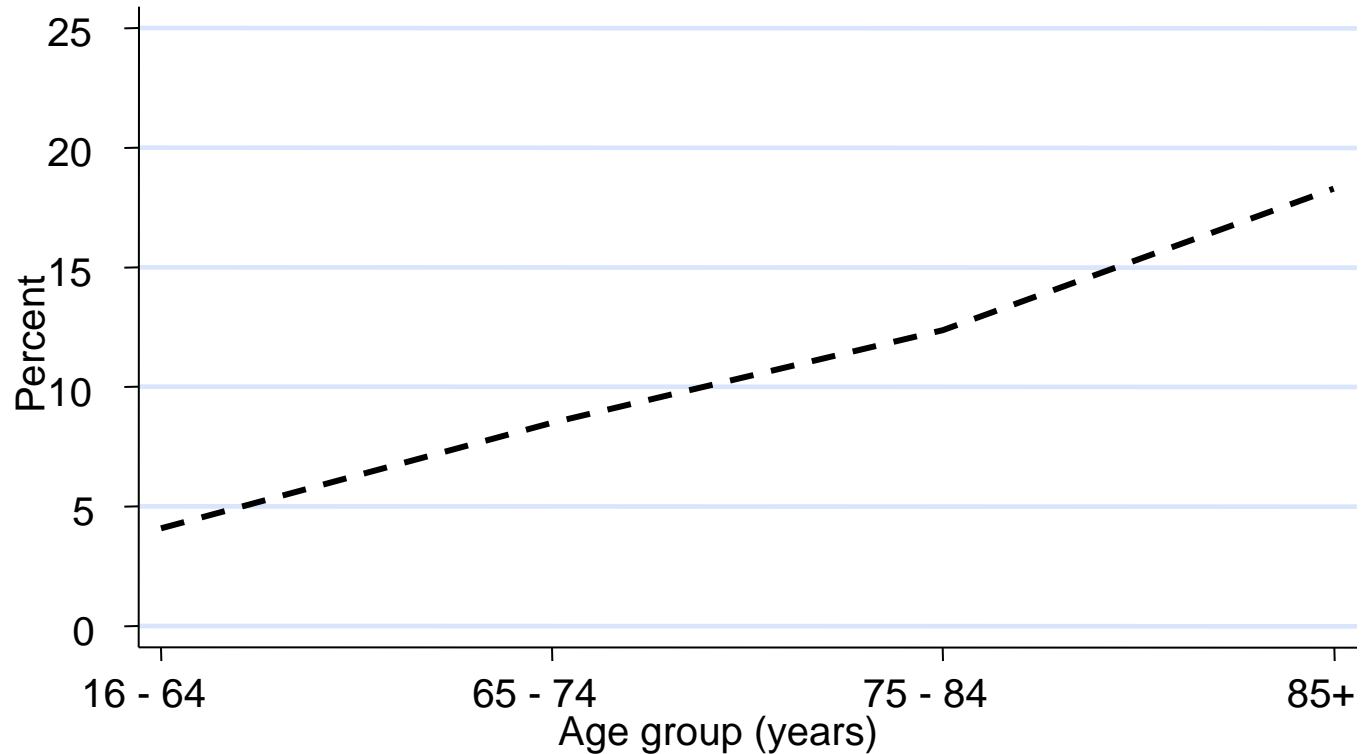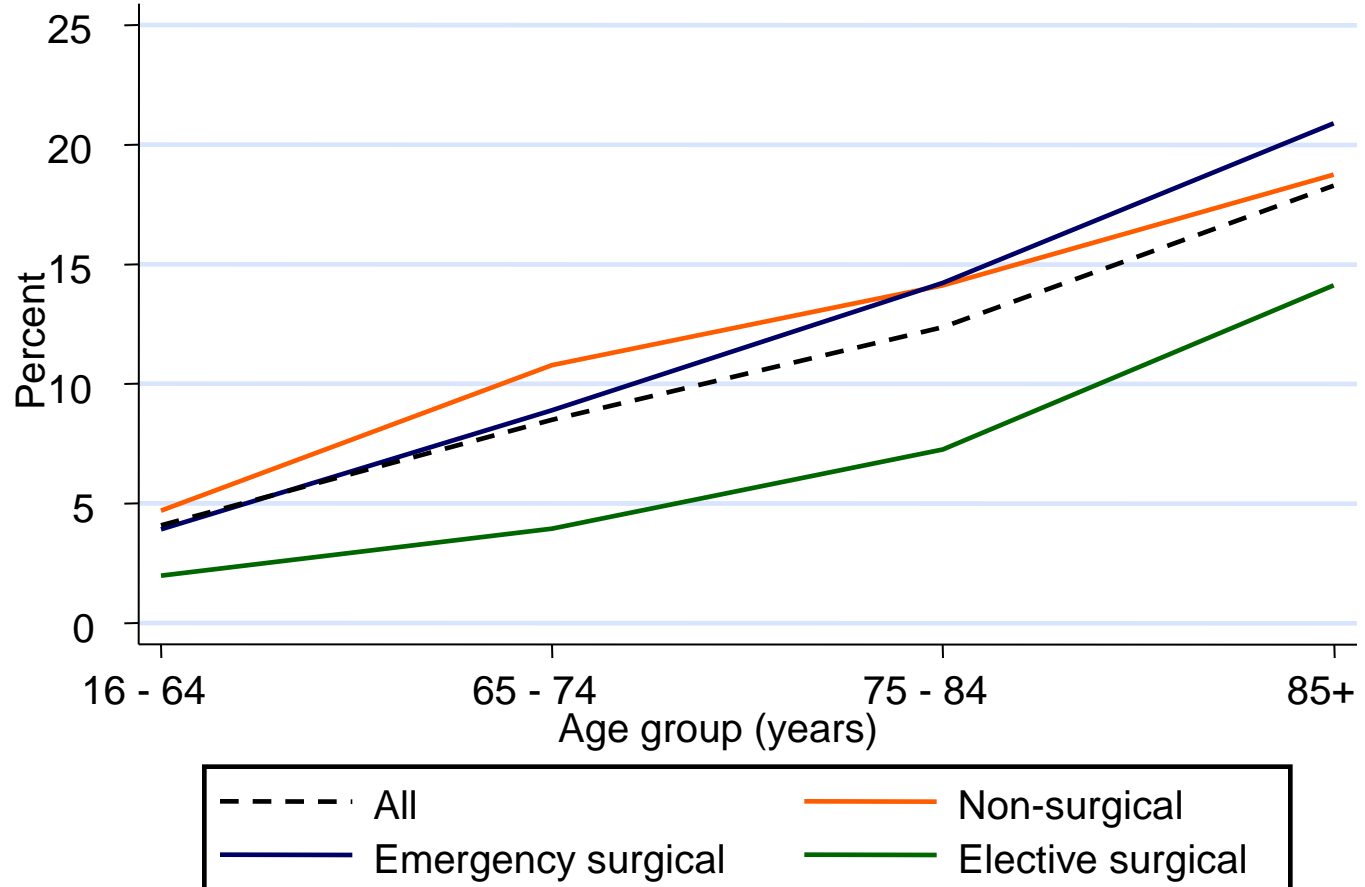
Age and Post-ICU Mortality

- Post ICU mortality varies from 2.7-27%
- Believed by many to be modifiable index of "quality of critical care provision"
- Age is only one of several factors related to post ICU mortality
  - preexisting functional status [Fernandez 2006]
  - admission diagnosis [Sakr 2008; Azoulay 2005]
  - severity of organ dysfunction/organ support required
  - timing of ICU discharge [Goldfrad 2000]
  - infection during ICU stay [Azoulay ICM 2005]
  - persisting infection/inflammation at time of discharge

?Target Group

Introduction of the medical emergency team (MET) system:
a cluster-randomised controlled trial

*MERIT study investigators**

?Target Group

BMJ

RESEARCH

The PRaCTICaL study of nurse led, intensive care follow-up programmes for improving long term outcomes from critical illness: a pragmatic randomised controlled trial

B H Cuthbertson, chief of critical care medicine and professor of anaesthesia,[1] J Rattray, senior lecturer,[2] M K Campbell, director and professor,[3] M Gager, intensive care follow-up nurse,[4] S Roughton, intensive care follow-up nurse,[3,5] A Smith, intensive care follow-up nurse,[2] A Hull, consultant pyschiatrist,[6] S Breeman, trial manager,[3] J Norrie, professor of biomedical statistics,[7] D Jenkinson, statistician,[3] R Hernández, health psychologist,[3,8] M Johnston, professor of health psychology,[9] E Wilson, consultant in anaesthesia and intensive care ,[10] C Waldmann, consultant in anaesthesia and intensive care[4] on behalf of the PRaCTICaL study group

What resources do they use?

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ICU LOS: n=153,803

a) ICU LOS
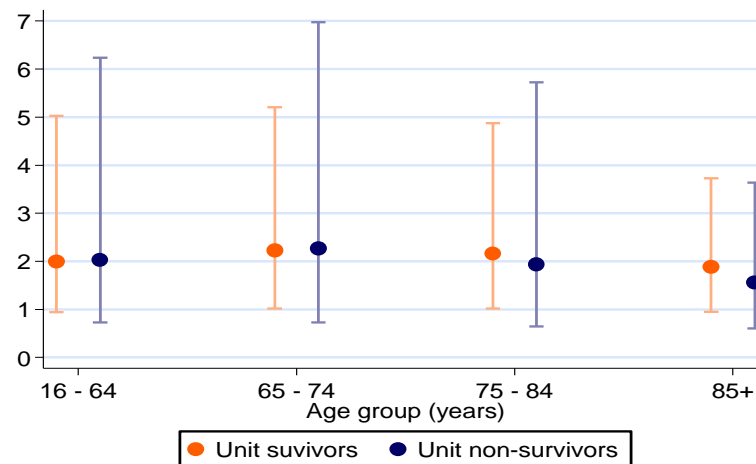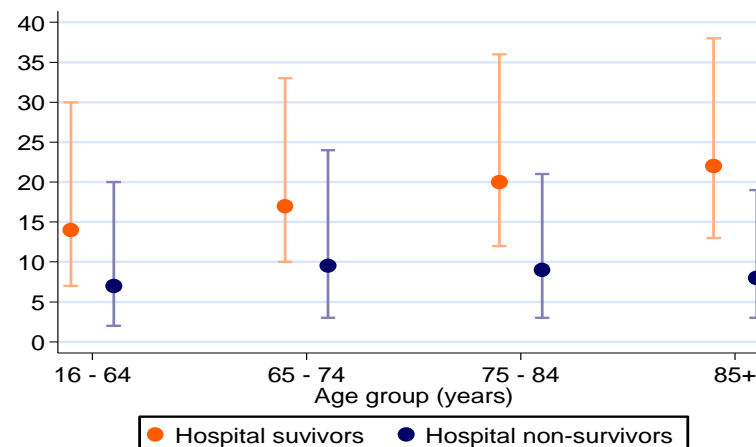
Age group (years)

Unit suvivors ● Unit non-survivors ●

b) Acute Hospital LOS

Age group (years)

Hospital suvivors ● Hospital non-survivors ●

*Excluding readmissions within the same acute hospital stay

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Longer Term Outcomes

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Discharge Destination

a) Normal residence

*Excluding readmissions within the same acute hospital stay

b) Other Destinations

Another acute hospital — Hospice or equivalent
Long-term institutional care — Rehabilitation unit

*Excluding readmissions within the same acute hospital stay
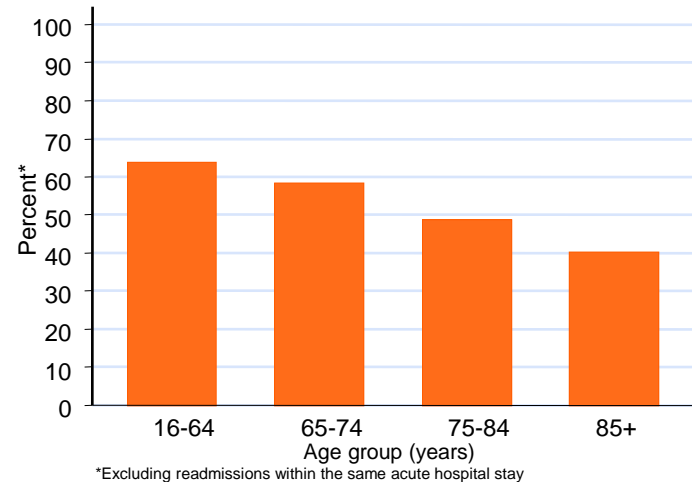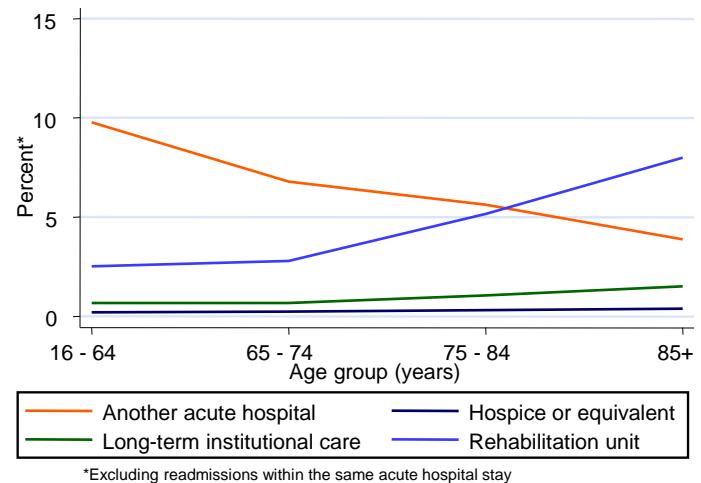
ICU Outcome: Rehab/Long-term Care Unit
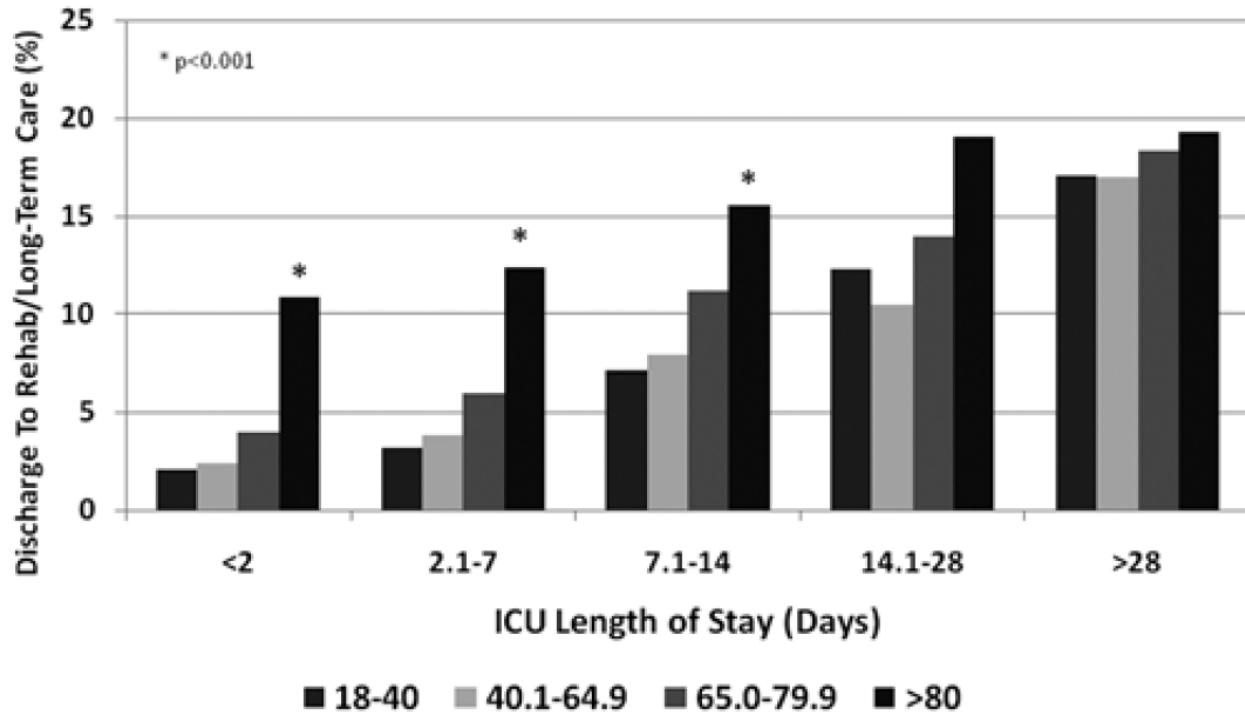
Bagshaw et al Crit Care 2009

Normal Residence:

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Discharge Destination

Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

Discharge Destination

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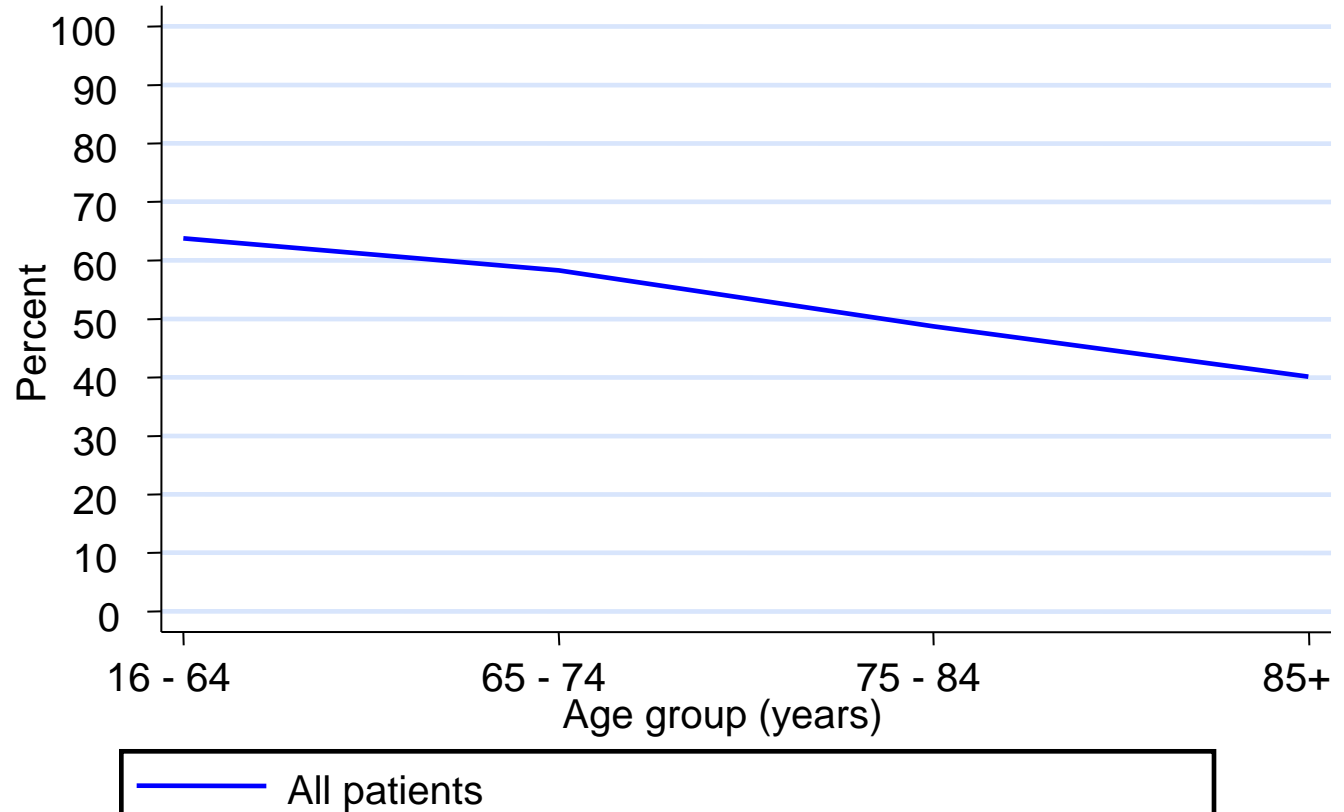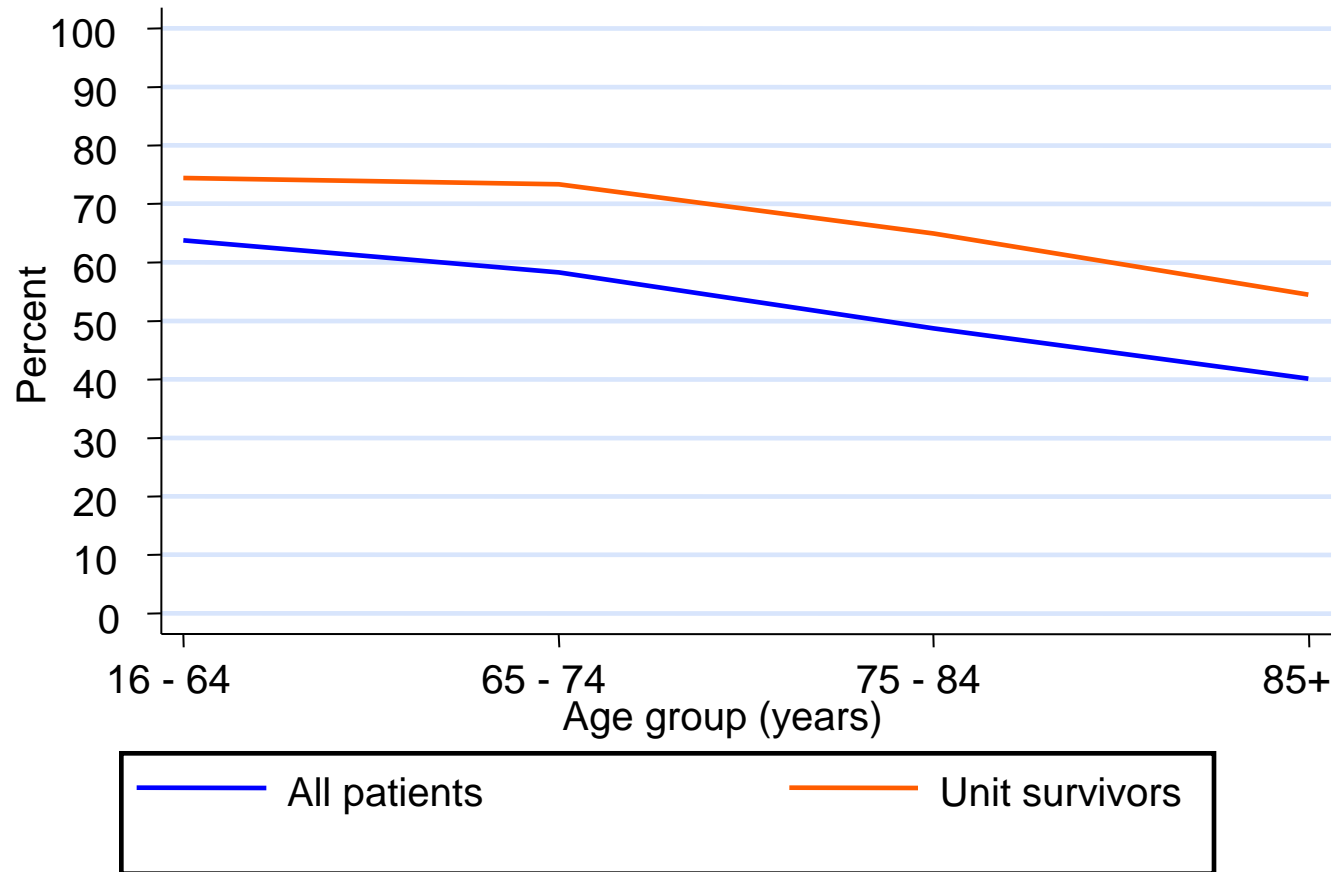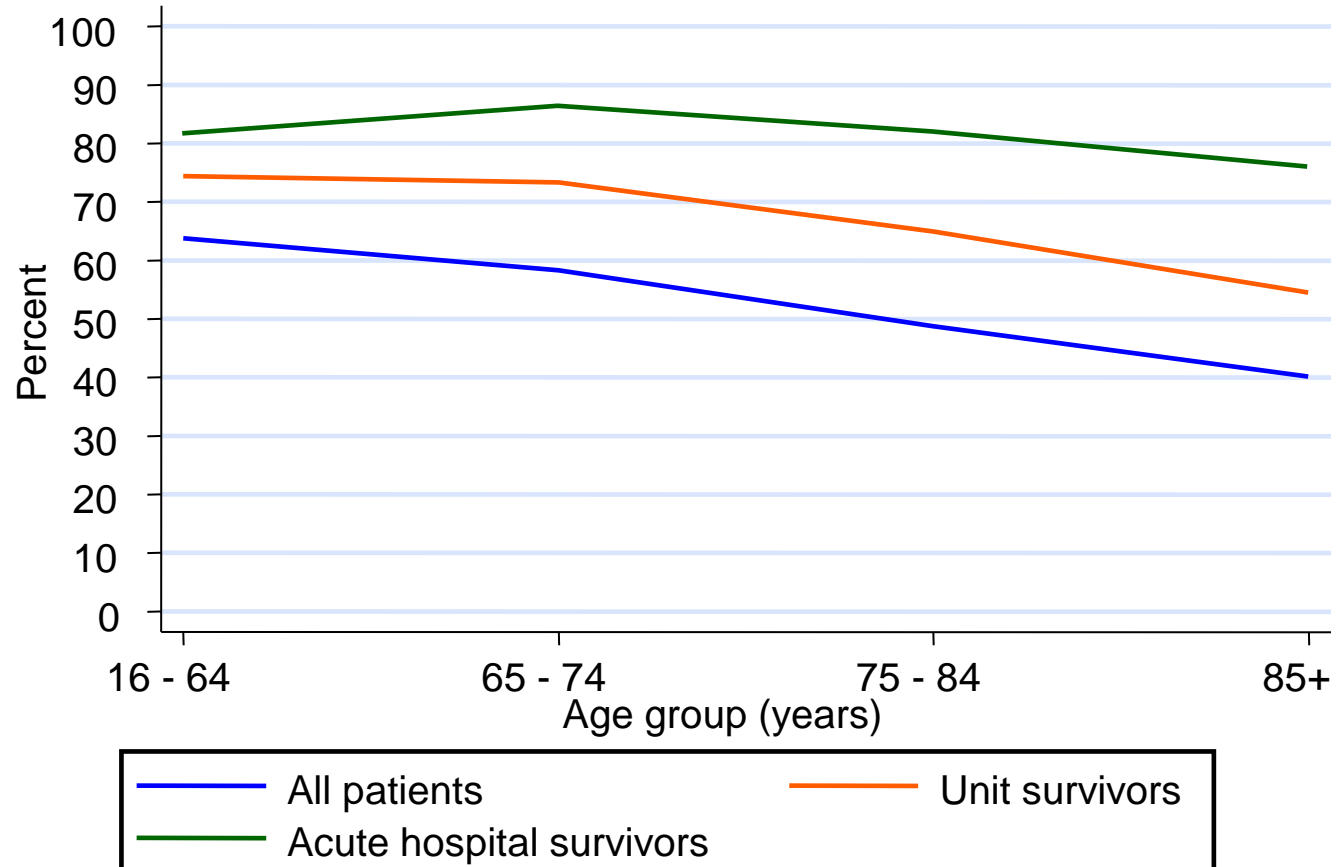
Outcomes: Long-term Survival

Reference	Age category (years)	n	ICU LOS (days)	Hospital LOS (days)	Severity score used	Severity score (points)	Mechanical ventilation (%)	Workload scoring system	Workload (points)	ICU mortality (%)	Hospital mortality (%)	Long-term mortality (%) (length of follow-up)
Kass 1984–1986 [38]	> 85	105	5	16.1		NA	NA		NA	29.5		64 (1 year)
Rockwood 1990 [73]	< 65	478	4.1	11.2	APACHE II	17	67		NA	12.9		31 (1 year)
	≥ 65	406	4.2	5.4		21	77		NA	16		49 (1 year)
Euricus I 1994–1996 (personal data)	< 80	14,733	5.2	16.4	SAPS II	31.4	42.1	NEMS	23.4	11	16	
	≥ 80	1,326	4.7	15.5		42.9	35.2		23.3	20	31	
Euricus II 1997–1999 (personal data)	< 80	14,740	5	15.6	SAPS II	29	47.1	NEMS	23.3	13	18.6	
	≥ 80	2,738	5	16.1		42.4	48.4		23.9	20	32	
Boumendil 1998–1999 [36]	< 80	1,224	5.7	NA	SAPS II	32.8	38.9	Omega	70.4	13.3		
	≥ 80	233	6.3			45.1	45.5		72.5	16.3		67 (2 years)
CUB-REA 1998 (personal data)	< 80	16,963	7.7	15.7	SAPS II	35.7	46.5	Omega	104.5	15.4	18.9	
	≥ 80	1,870	7.2	15.6		49.6	53.6		94.3	27.7	36.1	
Somme 1991–1996 [35]	< 80	184	9.9	NA	APACHE II	20.5	53.9	Omega	115.7	20		46 (3 months)
	≥ 80 – < 85	137	8.1			19.8	42.3		88	25		44 (3 months)
	≥ 85	91	6			20.5	30.8		67.1	31		49 (3 months)
Demoule 1995–2001 [82]	20–69	72	6	21.4	SAPS II	39	50		NA	18	27	
	≥ 90	36	5.1	27.3		52	50			28	47	
BO 2000–2001 [40]	> 65	659	7.1	19.4	APACHE II	13.2	NA		NA			
Montuclard 1993–1998 [72]	> 70	75	5.3		SAPS II	46	100		NA	33	53	
Levy 1992–1993 [74]	< 75	7,733			APS	11.6	38.6	TISS	21.2	15.3	19.3	
	≥ 75	1,105				11.6	32.3		19.8	21.9	30.8	
Boumendil 1997–2000 [37]	65–79	3,175	7.7	18.7	Corrected	23.2	39.3	Omega/day	11.2	14.4	21.8	
	≥ 80	3,175	6	15.5	SAPS II	23.3	33.5		10.6	17.1	28	
De Rooij et al. [75]	≥ 80	578	–	–	–	–	–	–	–	21.6	31.6	40.8 (1 year)
Torres et al. [76]	< 65	158	3.1	13.9	APACHE II without age points	8.1		TISS – 28 first day	18.7	5.1	10.1	10.6
	65–80	186	4.3	18.2		8.8			20.5	8.1	15.1	33.5
	≥ 80	68	2.9	13.6		8.9			20.2	13.2	20.6	37.5 (2 years)

- Long-term mortality 40-65%
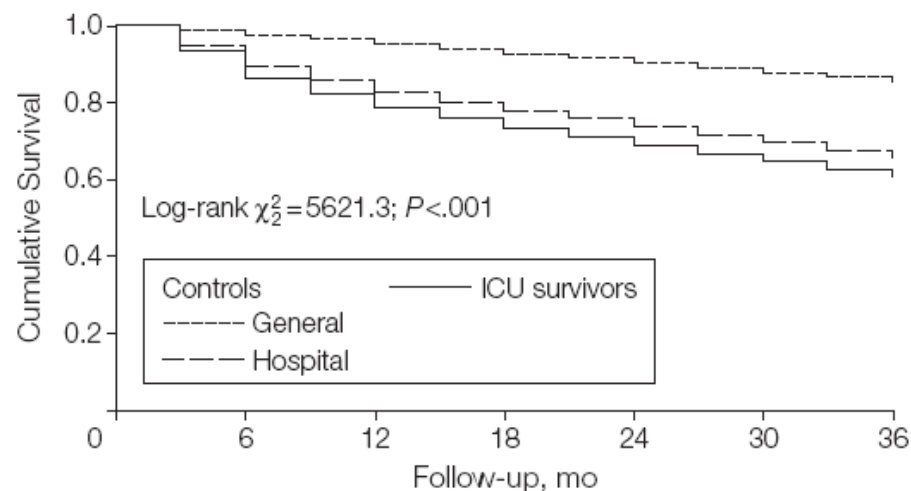- Includes in-hospital mortality

Boumendil et al ICM, 2007

Three-Year Outcomes for Medicare Beneficiaries Who Survive Intensive Care

Hannah Wunsch; Carmen Guerra; Amber E. Barnato; et al.

Figure 1. Three-Year Follow-up of Intensive Care Unit (ICU) Survivors and Their Matched Hospital and General Population Controls

No. at risk							
General controls	35 308	34 360	33 513	32 625	31 815	30 847	30 042
Hospital controls	35 308	31 466	29 161	27 444	25 906	24 536	23 135
ICU survivors	35 308	30 347	27 730	25 875	24 217	22 752	21 358

Three-Year Outcomes for Medicare Beneficiaries Who Survive Intensive Care

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JAMA. 2010;303(9):849-856 (doi:10.1001/jama.2010.216)

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Figure 3. Intensive Care Unit (ICU) Survivors and Their Matched Hospital and General Population Controls by Discharge Destination
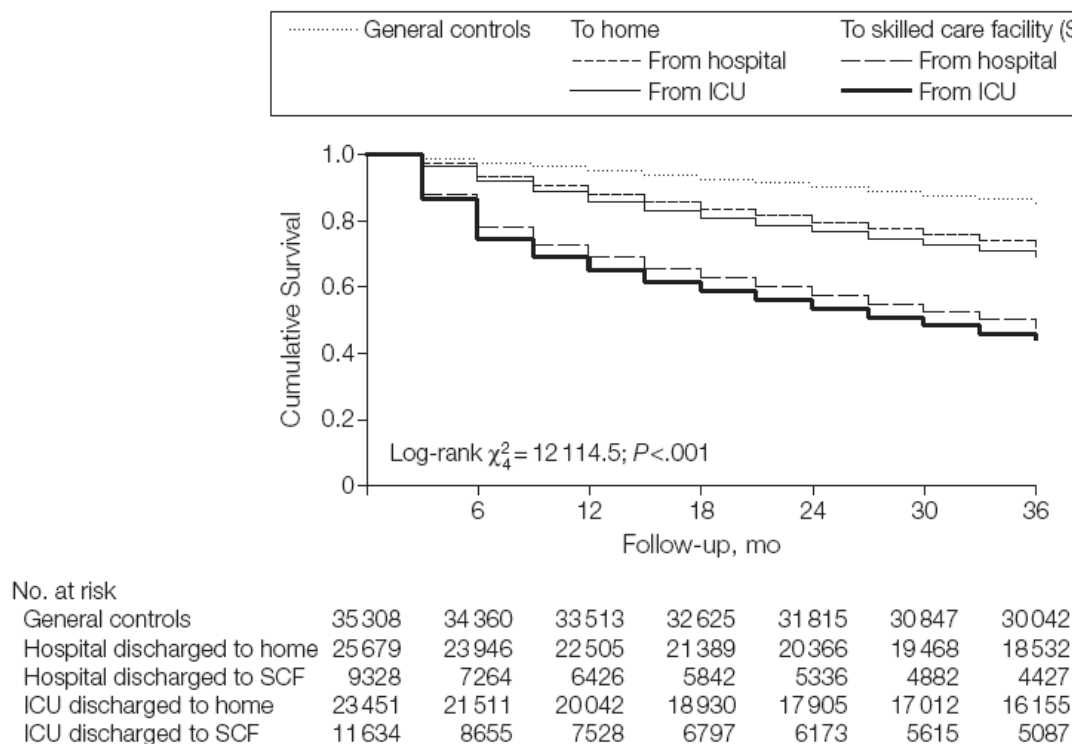
Outcomes: QOL in survivors

- Difficult area
  - Small, single centre studies
  - Differences in LOS/case-mix
  - Mixed methodologies
  - Instruments design for general population

Outcomes: QOL in survivors

Most studies report;

- reductions in ADL/physical function – though this is not universal

- stable or only slight reduction in quality of life as measured by existing scores – some increased

- Worse scores in respect to
    - Isolation
    - Emotional health

- Most importantly, an acceptable quality of life when viewed from the patients perspective [Henessey 2005].

- ~50-75% of elderly ICU survivors would consider further ICU if need arose

QOL in survivors - perspectives

- Quality of life has differing meaning for older patients than it does for younger ones
  - Importance of material values declined
  - Social relationships/self esteem increased
- Indeed evidence that it changes with both age and severity of baseline dysfunction/symptoms
- Value of a long life vs healthier but shorter life not as clear as we might think
  - 41% unwilling to trade any "life"
  - 28% unwilling to trade more than 1 month/year for excellent health
  - Preferences correlated poorly with "perceived" QOL

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Mean age: 72 +/- SD 72.8 years
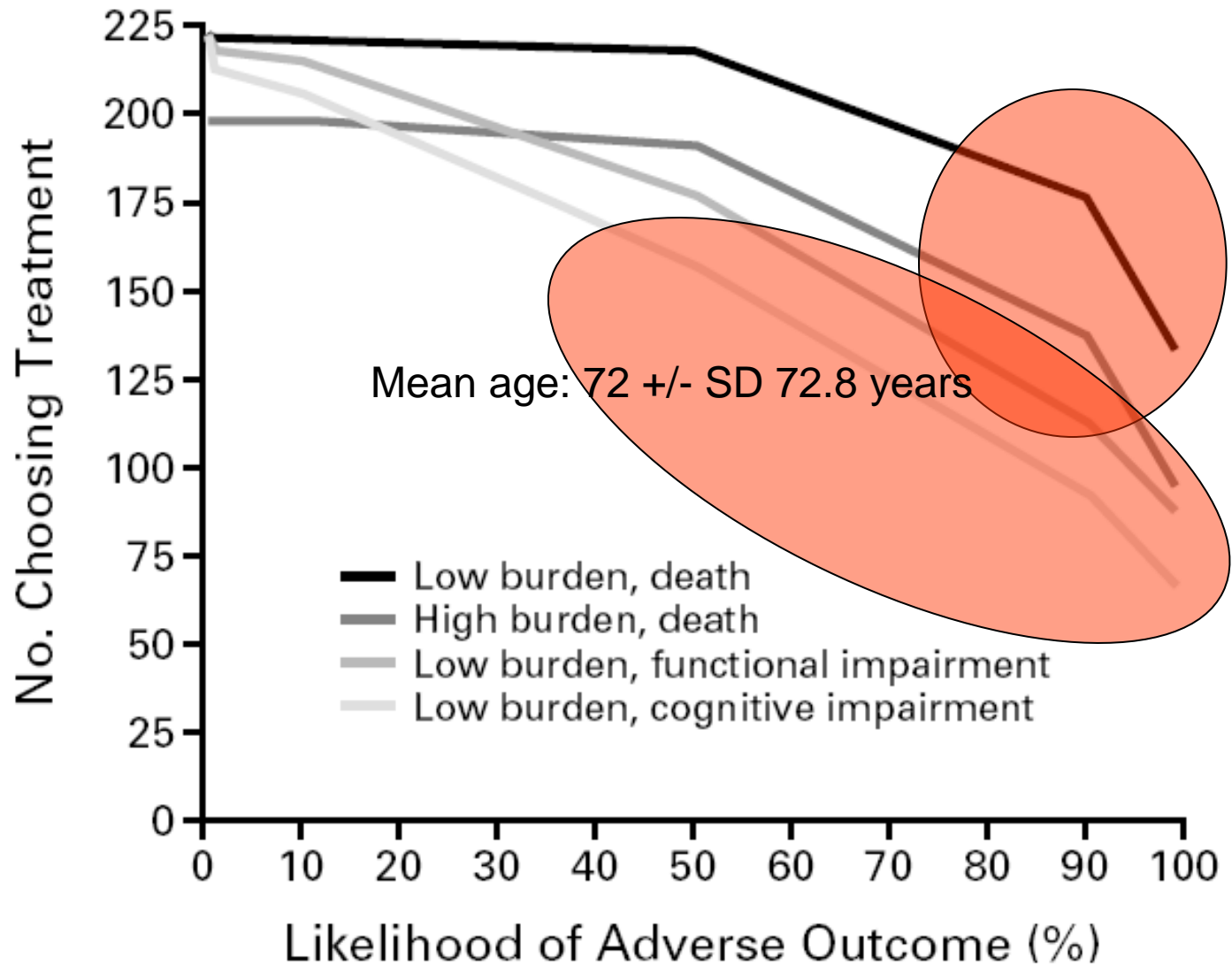
Fried et al. NEJM 2002

QOL in survivors - other perspectives

- Majority of critically-ill patients lack capacity when treatment decisions are being made

- Poor correlation between patients' estimates of QOL and preferences compared to
  - Family/friend surrogates
  - Medical staff

Table 4. Multivariate Analysis of Factors Associated with the Withdrawal of Mechanical Ventilation.*

Independent Factor	Hazard Ratio (95% CI)	P Value
Use of inotropes or vasopressors	1.78 (1.20–2.66)	0.004
Physician's prediction of the likelihood of patient's survival in ICU		0.002
<10%	3.49 (1.39–8.79)	
10–40%	1.60 (0.63–4.04)	
41–60%	0.95 (0.30–2.96)	
>60%†	1.00	
Physician's prediction of patient's cognitive function 1 mo after discharge		0.04
Will not leave hospital	2.51 (1.28–4.94)	
Will be severely limited	1.45 (0.58–3.63)	
Will be somewhat limited	1.36 (0.69–2.69)	
Will be totally independent†	1.00	
Physician's perception of patient's preferences about the use of life support‡		<0.001
No advanced life support	4.19 (2.57–6.81)	
Partial advanced life support	2.02 (1.13–3.60)	
All advanced life support as necessary†	1.00	

Cook et al. NEJM 2003

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Triaging Admission to ICU

- Refusal associated with increased risk of mortality
- Few studies (units) have specific guidelines
- Factors associated with decreased admission
  - **Age**
  - Performance status
  - Medical diagnosis
    - Malignancy
    - Chronic respiratory or cardiac failure
  - Bed availability
  - Phone versus bedside assessment
  - Experience of reviewing Dr
  - Time of day
  - Illness severity

Triaging Admission to ICU

Maité Garrouste-Orgeas
Jean-François Timsit
Luc Montuclard
Alain Colvez
Olivier Gattolliat
François Philippart
Guillaume Rigal
Benoit Misset
Jean Carlet

Decision-making process, outcome, and 1-year quality of life of octogenarians referred for intensive care unit admission

	Odds ratio for refusal	95% CI	p
Medical patient	5.96	1.26–28.2	0.02
Examination by an ICU physician	5.75	1.21–27.2	0.02
Full unit	4.72	1.37–16.2	0.01
Age > 85 years	4.16	1.44–12.0	0.008
No help needed for toileting	0.04	0.21	<0.0001

	Hosp mortality	1year mortality
Admitted	62.5	
Too sick	70.8	
Too well	17.9	

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Triaging Admission to ICU

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Full unit	4.72	1.37–16.2	0.01
Age > 85 years	4.16	1.44–12.0	0.008
No help needed for toileting	0.04	0.21	<0.0001

	Hosp mortality	1year mortality
Admitted	62.5	70.8
Too sick	70.8	87.3
Too well	17.9	47

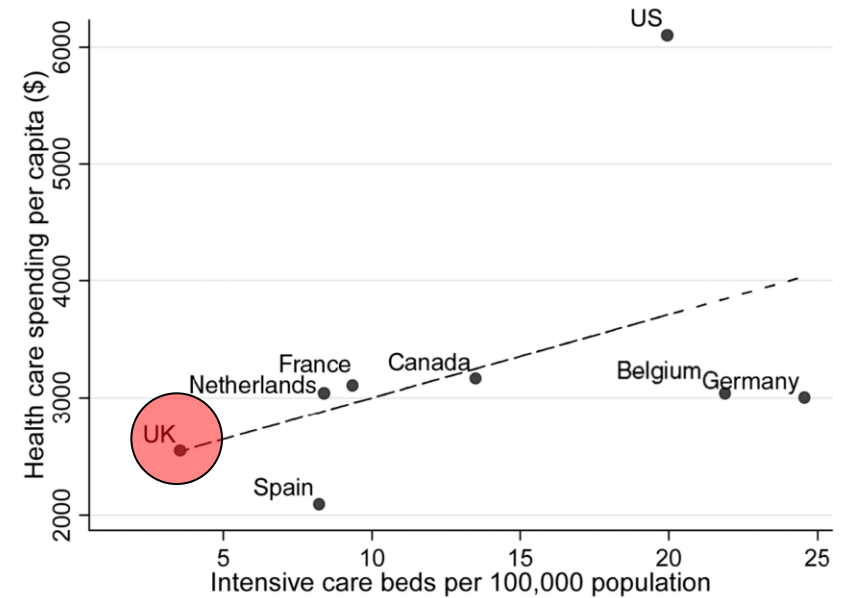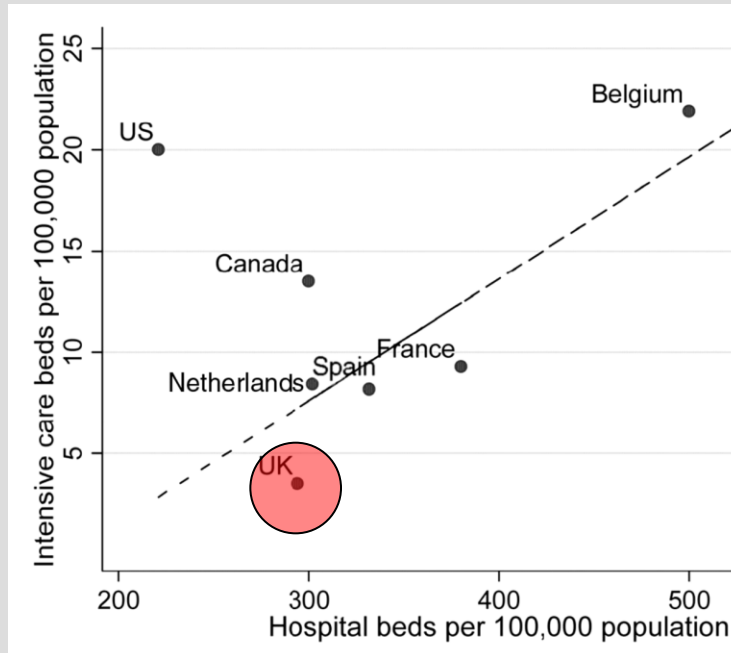Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones

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Triaging Admission to ICU
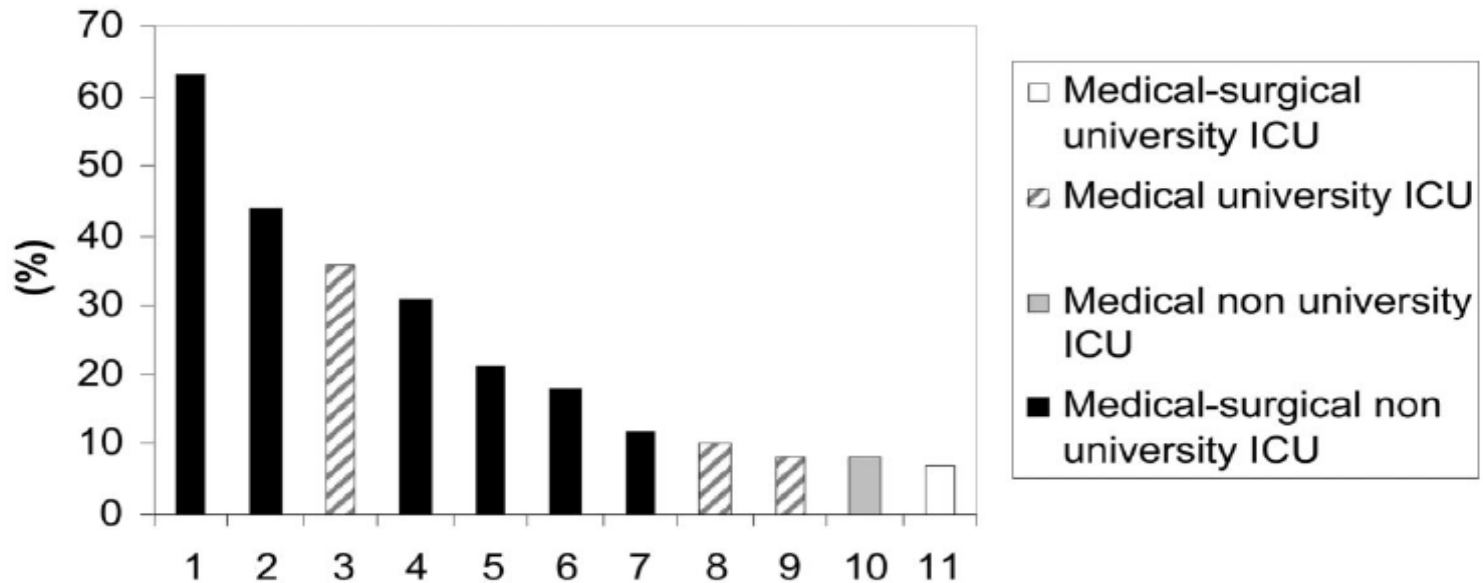
Garrouste-Orregas CCM 2005

- Subjectivity of decision making consistently raised as a concern

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UK Particularly Vulnerable?

BMJ

Implications of prognostic pessimism in patients with chronic obstructive pulmonary disease (COPD) or asthma admitted to intensive care in the UK within the COPD and asthma outcome study (CAOS): multicentre observational cohort study

Martin J Wildman, consultant chest physician,[1] Colin Sanderson, reader in health services research,[2] Jayne Groves, research nurse,[3] Barnaby C Reeves, reader in epidemiology,[2] Jon Ayres, professor,[4] David Harrison, senior statistician,[5] Duncan Young, consultant intensivist,[6] Kathy Rowan, director[5]
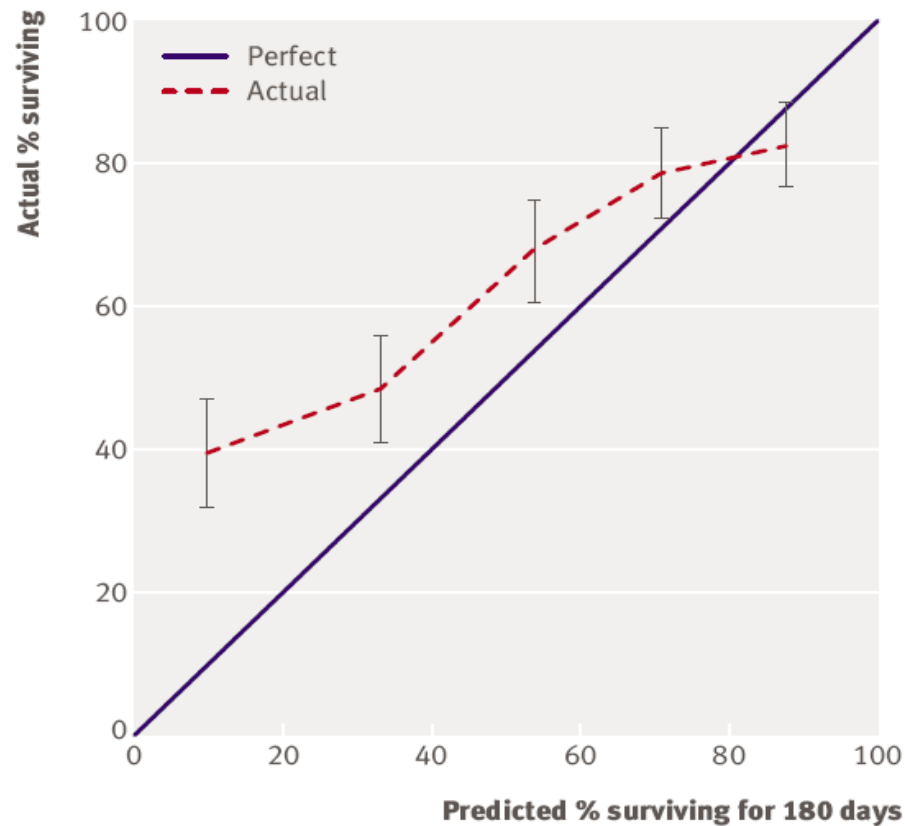
Function in 2 weeks before admission	Function reported in 180-day questionnaire				
	Fully mobile	Independent	Housebound	Bed/chairbound	Total
Fully mobile	58 44.3%	49 37.4%	23 17.6%	1 0.8%	131 100.0%
Independent	26 16.3%	65 40.6%	67 41.9%	2 1.3%	160 100.0%
Housebound	7 5.8%	26 21.7%	74 61.7%	13 10.8%	120 100.0%
Bed/chairbound	0 0.0%	1 11.1%	7 77.8%	1 11.1%	9 100.0%
Total	91	141	171	17	420

Wildman et al, 2008. Thorax

Help in the Future?
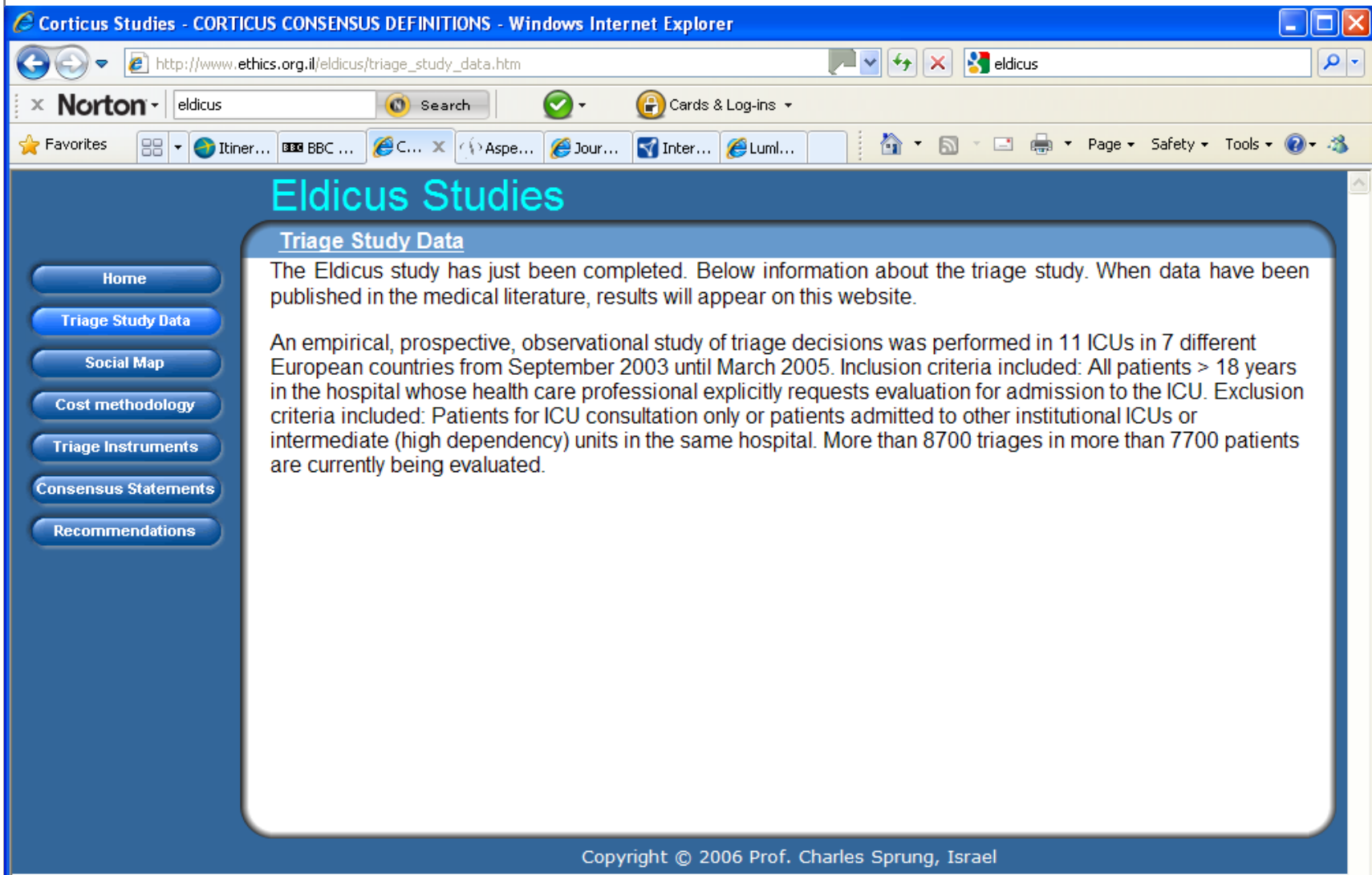
Conclusions

- Elderly patients compose a significant and increasing proportion of patients receiving critical care in the UK

- They have both an increased ICU *and* post-ICU mortality – but the relationship with age is not straightforward

- Elderly patients are not a homogeneous group

- In those surviving their ICU/hospital admission - the majority return to their normal residence and longer term outcomes are acceptable

- UK elderly patients may be more vulnerable than similar patients in other healthcare systems

Conclusions

- Efforts to understand outcomes may aid clinicians in making appropriate decisions re this vulnerable group

- Understanding present provision and outcomes is likely to help determine future needs and areas for further research and quality improvement

    – Outreach/Follow-up services

    – Critical Care Rehabilitation

    – Pre-optimization

Alternative Approach??

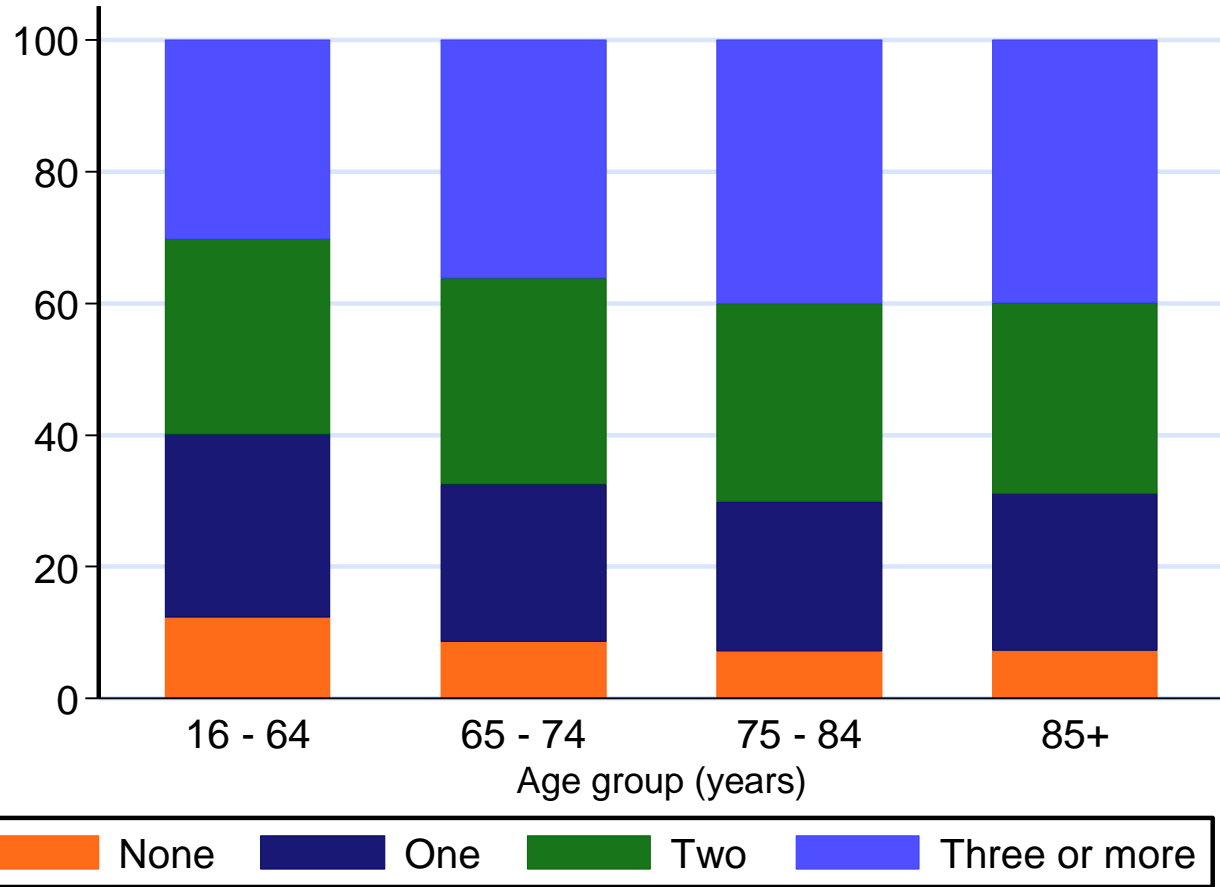Elderly Patients in Intensive Care: NEICS March 2010 | Dr Andy Jones
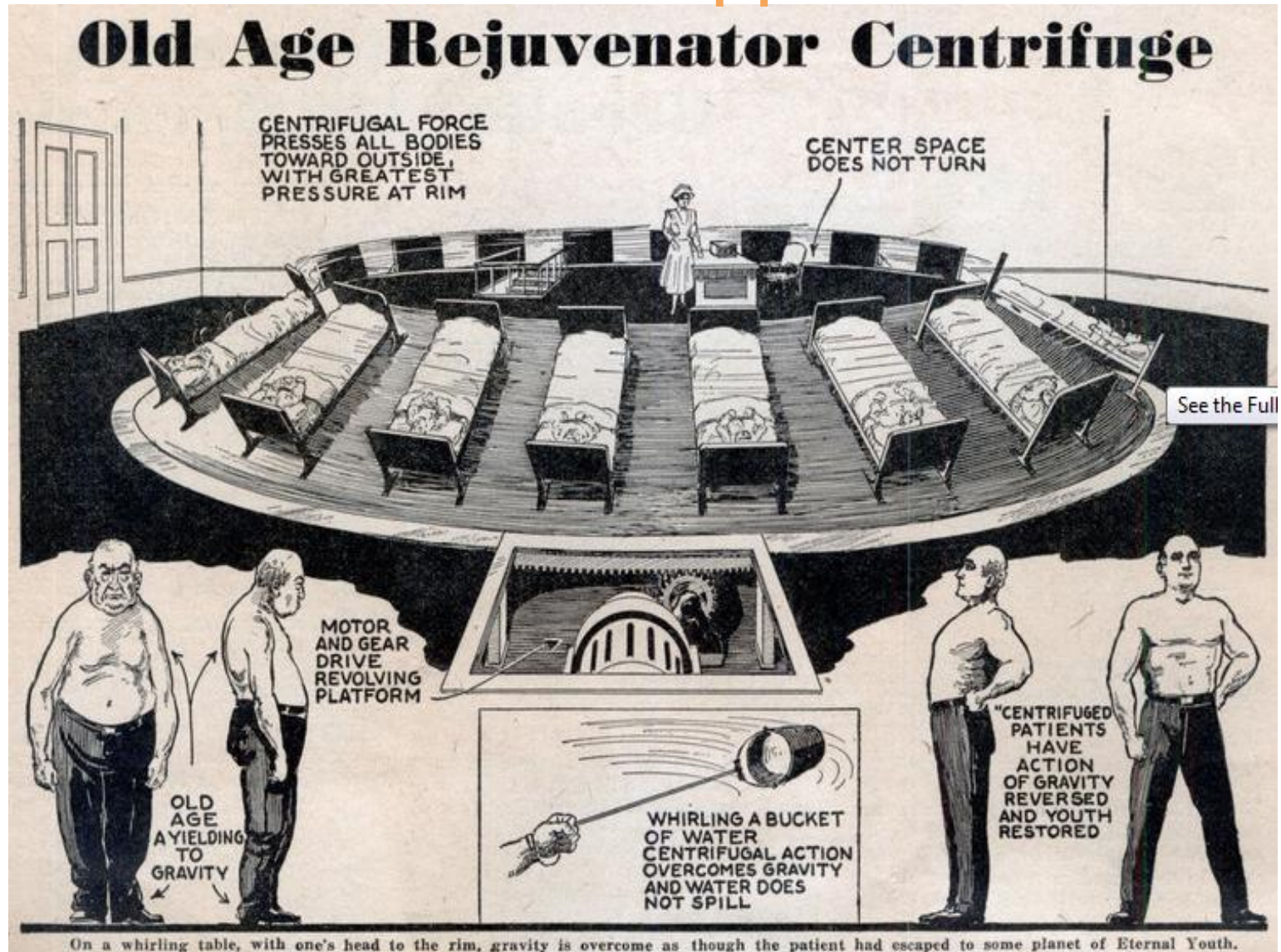
Acknowledgements

- *Cathy Welch*
- *David Harrison*
- *Kathy Rowan*
- *Members of the ICNARC CMP*

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Organe Failure: n= 153,803

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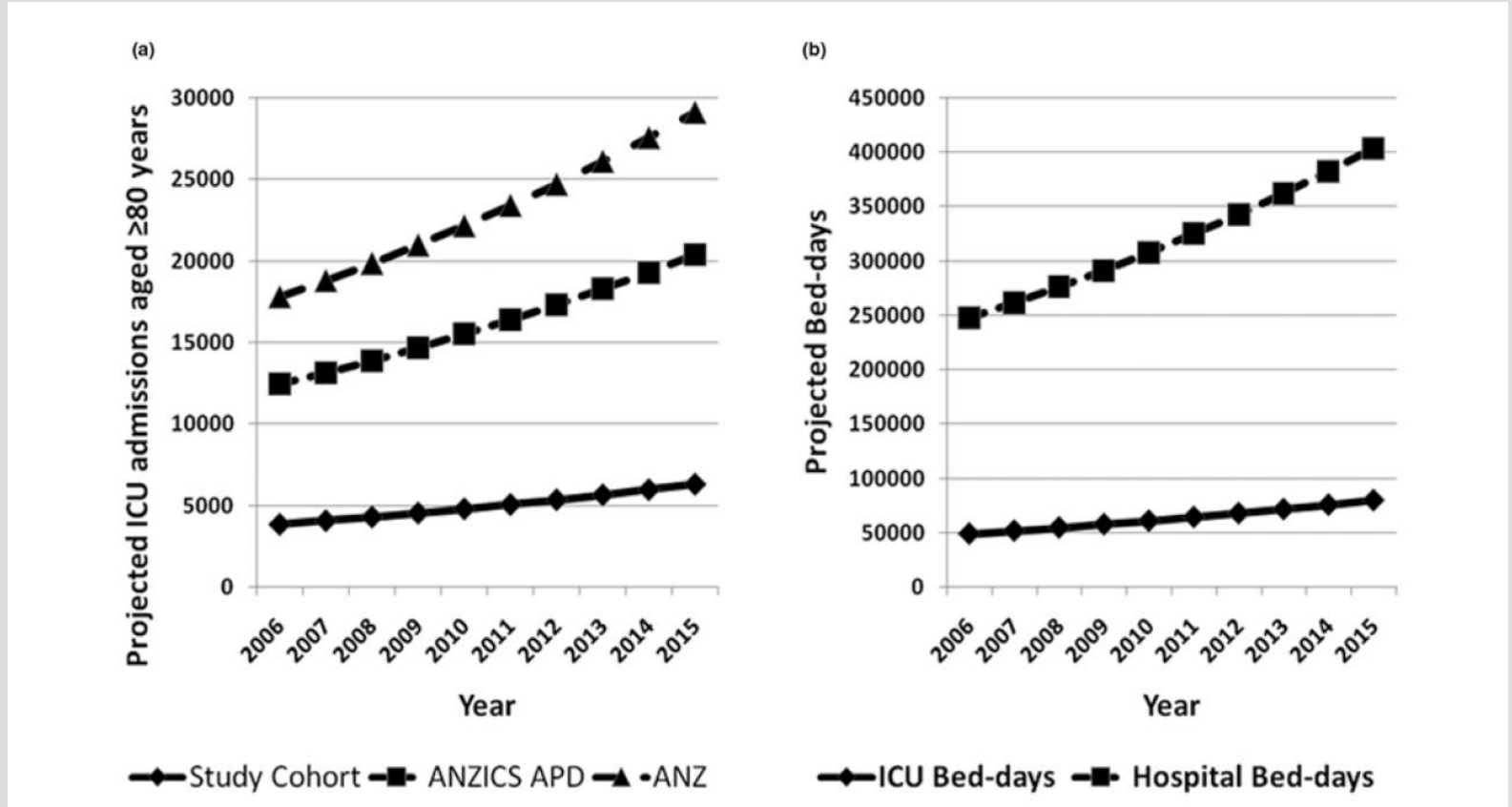
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Ground to be covered

- What are the trends in ICU resource use in elderly patients - are projections relevant

- Describe the population – who are "the elderly" in UK ICUs

- What are there outcomes
  - ICU
  - Hospital
  - Beyond

- What about the future

Resource Use

		Intubation not needed		Intubated		Not to be intubated	Overall	p[6]
		COPD ±	'pure' asthma	COPD ±	'pure' asthma			
	n recruited	179	22	394	56	181	832	
% admitted directly to ICU[1]		60.3	77.3	99.5	100.0	56.9	81.3	
On admission	Age: mean (std)	67.7 (9.2)	59.1 (10.6)	66.8 (8.9)	57.9 (9.7)	70.3 (9.4)	67 (9.7)	
	CAPS[2] mean (std)	23.9 (9.9)	22.4 (10.6)	31 (10.8)	26.4 (9.8)	26.4 (10.2)	27.9 (10.8)	
	MAC[3]: mean (std)	27.7 (5)	31.4 (5.2)	28.9 (5.2)	30.5 (5.3)	27.4 (5.9)	28.5 (5.4)	
	% house/bedbound	34.6	13.6	31.2	12.5	67.4	38.1	
	% long-term oxygen[4]	12.9	9.1	10.4	5.4	38.1	16.6	
Ventilation	% non-invasive only	74.7	13.6	0.0	0.0	91.7	36.6	< 0.0001
Length of stay	In ICU, median (IQR)	3 (1.5, 5)	2 (1, 3)	9 (4. 16)	6.5 (3, 15)	3 (1, 4)	4 (2, 10)	0.0001
	In hospital, median (IQR)	12 (7, 19)	8.5 (6, 12)	20 (10, 36)	15 (8, 26)	10 (5, 17)	14 (8, 27)	0.0001
Survival[5]	% surviving IC/HDU	98.9 (96 to 99.9)	100 (84.6 to 100)	74.9 (70.3 to 79.1)	89.3 (78.1 to 96.0)	72.4 (65.3 to 78.7)	81.1 (78.3 to 83.7)	< 0.0001
	% surviving hospital	93.9 (89.3 to 96.9)	95.5 (77.2 to 99.9)	61.2 (56.2 to 66)	85.7 (73.8 to 93.6)	59.7 (52.1 to 66.9)	70.4 (67.2 to 73.5)	< 0.0001
	% surviving 180 days	81.6 (75.1 to 87)	95.5 (77.2 to 99.9)	54.6 (49.5 to 59.6)	85.7 (73.8 to 93.6)	48.1 (40.6 to 55.6)	62.1 (58.7 to 65.4)	< 0.0001

Wildman et al, 2008. Thorax

Aging population and the ICU

Bagshaw et al Crit Care 2009