ICU beds:
Do bed numbers drive care?

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COI/Funding

- No Conflicts of Interest
- Grant funding from NIA/NIH, Columbia University
Yes
Not going to talk about...

Individual bed in an individual ICU
ICU beds driving care at the individual level...

*Figure.* Adjusted odds ratios for intensive care unit (ICU) admission within 2 hours of medical emergency team (MET) activation, change in patient goals of care, and hospital mortality according to ICU bed availability. Vertical lines indicate 95% CIs.
Stepping back…
Many aspects of ‘bed numbers’

• ICU beds as an absolute number
• ICU beds per capita
• ICU beds as a percentage of hospital beds
• Distribution of beds (across a region)
• Types of beds
Many aspects of ‘bed numbers’

• ICU beds as an absolute number

• **ICU beds per capita**

• ICU beds as a percentage of hospital beds

• Distribution of beds (across a region)

• Types of beds
How many beds do we have?
Bed numbers (per capita)

Wunsch et al. CCM 2008
The question of “definition”

- ICU
- CCU
- Intermediate ICU
- PACU
Difference in beds

United Kingdom

United States
UK and US ICU

UK:
• Level 3: 1:1 nurse to patient ratio, ability to provide mechanical ventilation
• Level 2: 1:2 nurse to patient ratio, ability to provide single organ support (except mechanical ventilation)

US:
• Mostly 1:2 nurse to patient ratio, ability to provide mechanical ventilation
How does care differ?
Who gets admitted?
Occupancy across 97 US ICUs

Wunsch et al, CCM 2013
53.2% of patients admitted to the ICU from the ER had a predicted mortality of <2%
Triage decisions:

Figure 2.

- **US**
  - MV in first 24 hours: 6.3%
  - MV on admission: 21.1%
  - No MV: 72.6%

- **UK**
  - MV in first 24 hours: 14.3%
  - MV on admission: 53.7%
  - No MV: 32.0%

Wunsch et al *AJRCCM*, 2011
Severity of illness of patients in the ICU

Wunsch et al, AJRCCM 2011
‘Delays’ in admission

Wunsch et al AJRCCM 2011
‘Risk’ adjusted hospital mortality for ICU patients

Adjusted Odds Ratio for hospital mortality (UK compared with US)

Whole cohort

Adjusted Odds Ratio for hospital mortality (UK compared with US)

Wunsch et al AJRCCM 2011
>70% of deaths occurred without intubation & mechanical ventilation
ICU use among hospital deaths

Wunsch et al AJRCCM 2009
Back to this...
Death in England?

“Kingsley [Amis] has ‘the old man ’s friend’: pneumonia. He is on morphine and antibiotics. When pneumonia recurs, which it will, the morphine will remain but the antibiotics will go. This is the English way...”

- Martin Amis
Braintree Hospital, 1949
ICU use among hospital deaths

Wunsch et al AJRCCM 2009
## Potential admissions...

<table>
<thead>
<tr>
<th>Age</th>
<th>Medical History</th>
<th>Admission Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>56 yo M</td>
<td>Liver transplant 4 days prior, large GI bleed on the general ward, hypotensive, tachycardic</td>
<td>Accepted</td>
</tr>
<tr>
<td>66 yo M</td>
<td>Metastatic cholangiocarcinoma, septic shock on floor from drain change, pH 6.9, lactate 15, bicarbonate 5</td>
<td>Accepted</td>
</tr>
<tr>
<td>103 yo M</td>
<td>In OR for hip pinning for fractured femur, briefly bradycardic to HR of 30s prior to induction, surgery cancelled</td>
<td>Accepted</td>
</tr>
<tr>
<td>72 yo F</td>
<td>Cancelled whipple due to metastatic disease, 2 days later with ARDS, 100% O2 with 88% O2 sat</td>
<td>Accepted</td>
</tr>
<tr>
<td>58 yo M</td>
<td>In OR for whipple. Minimal blood loss, no complications</td>
<td>Accepted</td>
</tr>
<tr>
<td>87 yo F</td>
<td>Severe dementia, negative ex lap for possible SBO, urosepsis, no vasopressors</td>
<td>Accepted</td>
</tr>
</tbody>
</table>
Conclusions

- ICU beds do drive care
- Cannot dis-entangle this from the cultural acceptance/preferences that also drive care
  - Currently, this driver only goes one-way over time
- Individual ICU/hospital variation may shift you one direction or the other
  (probably less than you think)
Thank you!

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