ICU Discharge
An Improvement Target

Critical Care Canada Forum
October 27, 2015
No disclosures or conflicts of interest

Many acknowledgements
Objectives

1. Review whether ICU discharge should be an improvement target
2. Review potential improvement strategies
3. Propose an approach to reengineer ICU discharge
Introduction

- Transitions of care are common & vulnerable periods in healthcare

- ICU discharge is high risk
  - Severely ill frail elderly patients
  - Transition to environment with fewer resources

- The optimal structure & process for ICU discharge is unknown
Do We Have a Problem?
Patient & Community Engagement Researchers (PACER)
Critical Care Journey

Total shock, I'm helpless by myself. I don't know what is going on.

I felt like I should have been there. It was such a major change and they didn't even phone me!

When we had to make the decision at the end, they did a wonderful job!

There was no information about what would happen when he got home. He didn't know what he was able to do... I mean, do you see a doctor if you have chest pains? What is normal after being so ill?

You know him best. If you see anything different let us know.

The doctors asked if I had any questions. They were really good.

I felt there was a coldness in ICU. You are not part of the team. There's just something missing.

They left us alone in a room for hours, not telling us anything.

It was a nightmare for me after the transition. I couldn't get any questions answered and I couldn't go back to ICU.

GAP OF COMFORT AND TRUST
I’m trying to understand the picture of the future and the people in ICU had no idea about rehab. The ability of people to look down the chain would have been helpful.

Husband of surviving patient
<table>
<thead>
<tr>
<th>Provider/Decision-Maker</th>
<th>Patient/Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium screening</td>
<td>Family navigator</td>
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<tr>
<td>Early mobilization</td>
<td>Fragility of trust</td>
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<td>Transitions of patient care</td>
<td>Transitions of patient care</td>
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<tr>
<td>End of life care</td>
<td>Improve communication</td>
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<tr>
<td>Daily sedation interruption</td>
<td>Long-term effects of illness</td>
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</tbody>
</table>

Stelfox et al. PLOS One 2015
Stakeholder views regarding patient discharge from intensive care: Suboptimal quality and opportunities for improvement

Pin Li MD MSc\textsuperscript{1,2,*}, Jamie M Boyd BA\textsuperscript{3,*}, William A Ghali MD MPH\textsuperscript{1,2,3}, Henry T Stelfox MD PhD\textsuperscript{1,2,3,4}

- **Survey**
  - 118 ICU administrators representing 114 adult medical-surgical ICUs in Canada
  - 737 providers Canada, United States & United Kingdom
Quality

Quality of Current ICU Discharge Practices

- **Very Low**
- **Low**
- **Medium**
- **High**
- **Very High**

**Percentage of Respondents**

- **Administrator**
- **Physician**
- **Nurse**
Discharge Process

- Formal RN-RN Communication
- Formal MD-MD Communication
- Medication Reconciliation
- Discharge Protocol
- Discharge Checklist
- Written Information for Patients

Percentage of Respondents

- Administrators High/Very High
- Administrators Very Low/Low
- Provider High/Very High
- Provider Very Low/Low
Opportunities for Improvement

- Patient & family participation
- Collaboration between units
- Completeness of information transferred
Well Documented in the Literature

A Scoping Review of Patient Discharge From Intensive Care
Opportunities and Tools to Improve Care

Henry T. Stelfox, MD, PhD; Dan Lane, MSc; Jamie M. Boyd, BA; Simon Taylor, BSc; Laure Perrier, MEd, MLIS; Sharon Straus, MD; David Zygun, MD; and Danny J. Zuege, MD, FCCP

- Scoping review - 224 studies
- 30 factors associated with quality of care
  - e.g., critical care transition program
- 48 tools to facilitate discharge
  - e.g., risk stratification
Candidate Discharge Strategy Elements

- Guidelines/policies to standardize practice
- Risk stratification to evaluate readiness
- Inform/educate/activate patient/family
- Communicate data to receiving team
- Follow-up post discharge
- Measure outcomes
What to Measure?

- Structure of care
  - e.g., tools employed

- Process of care
  - e.g., quality of communication

- Outcomes of care
  - e.g., readmission
  - e.g., mortality
### Readmission after ICU Discharge

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>No. Readmissions</th>
<th>Sample Size</th>
<th>Readmission (95% CI)</th>
<th>% Fixed Effect Wgt.</th>
<th>% Random Effects Wgt.</th>
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<td>Cohn</td>
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<td>Brown</td>
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<td>7.27</td>
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<td>Joskowiak</td>
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<td>0.08 (0.07, 0.08)</td>
<td>0.19</td>
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<td>71</td>
<td>409</td>
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<td>1.32</td>
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</table>

Hosein et al. Crit Care 2014
### Death after ICU Discharge

**Author** | **Year** | **No. Deaths** | **Sample Size** | **Hospital Mortality (95% CI)** | % Fixed Effect Wgt. | % Random Effects Wgt.  
--- | --- | --- | --- | --- | --- | ---  
Strauss | 1986 | 90 | 912 | 0.10 (0.08, 0.12) | 0.03 | 1.96  
Rubins | 1988 | 7 | 2256 | 0.03 (0.01, 0.05) | 0.05 | 1.95  
Chen | 1989 | 284 | 5127 | 0.06 (0.05, 0.06) | 0.25 | 2.23  
Cohn | 1999 | 22 | 2228 | 0.01 (0.01, 0.01) | 0.01 | 1.47  
Smith | 1995 | 319 | 293 | 0.10 (0.07, 0.15) | 0.23 | 2.22  
Goldfrad | 2000 | 2176 | 12742 | 0.17 (0.16, 0.18) | 0.39 | 2.24  
Daly | 2003 | 100 | 5475 | 0.04 (0.03, 0.04) | 0.10 | 2.17  
Morris | 2001 | 253 | 2958 | 0.09 (0.08, 0.10) | 0.04 | 2.04  
Rosenberg | 2001 | 319 | 3310 | 0.10 (0.09, 0.11) | 0.19 | 2.22  
Beck | 2002 | 208 | 1654 | 0.13 (0.11, 0.14) | 1.10 | 2.25  
Calafiore | 2002 | 4 | 1194 | 0.00 (0.00, 0.01) | 0.57 | 2.25  
Azoulay | 2003 | 150 | 1385 | 0.00 (0.00, 0.01) | 0.10 | 2.17  
Bardell | 2003 | 6 | 1613 | 0.00 (0.00, 0.01) | 0.04 | 2.04  
Kogan | 2003 | 60 | 20636 | 0.10 | 0.10 | 0.11  
Uusaro | 2004 | 92 | 1870 | 0.05 (0.04, 0.06) | 0.10 | 2.18  
Duke | 2004 | 13 | 286 | 0.15 (0.08, 0.23) | 0.00 | 0.68  
Fortis | 2004 | 354 | 1929 | 0.17 (0.16, 0.19) | 0.03 | 2.03  
Yoon | 2005 | 195 | 1872 | 0.10 (0.09, 0.12) | 0.11 | 2.22  
Azoulay | 2006 | 1020 | 10840 | 0.09 | 0.09 | 0.10  
Alban | 2006 | 111 | 1159 | 0.10 | 0.09 | 0.10  
Fernandez | 2006 | 111 | 1159 | 0.10 | 0.09 | 0.10  
Mayo | 2006 | 144 | 2347 | 0.04 (0.04, 0.05) | 0.04 | 2.04  
Pristap | 2006 | 4375 | 47163 | 0.00 | 0.00 | 0.10  
Tobias | 2006 | 496 | 19963 | 0.04 | 0.04 | 0.05  
Pilcher | 2007 | 4442 | 76690 | 0.06 | 0.06 | 0.06  
Campbell | 2007 | 475 | 4763 | 0.11 | 0.10 | 0.12  
Gajic | 2008 | 5 | 1242 | 0.00 | 0.00 | 0.01  
Hanane | 2008 | 528 | 11659 | 0.05 | 0.04 | 0.05  
Ha | 2008 | 26 | 603 | 0.04 | 0.03 | 0.06  
Kablen | 2008 | 137 | 2852 | 0.05 | 0.04 | 0.06  
Laupland | 2008 | 1205 | 17864 | 0.07 | 0.06 | 0.07  
Szek | 2009 | 122 | 1726 | 0.07 | 0.06 | 0.07  
Chrusch | 2009 | 24 | 8222 | 0.00 | 0.00 | 0.00  
Litmathe | 2009 | 70 | 3374 | 0.02 | 0.02 | 0.03  
Al-Sabah | 2010 | 34 | 1185 | 0.02 | 0.02 | 0.04  
Fernandez | 2010 | 342 | 3567 | 0.07 | 0.06 | 0.08  
Silvestro | 2010 | 10 | 156 | 0.10 | 0.12 | 0.25  
Utzollino | 2010 | 79 | 2114 | 0.04 | 0.03 | 0.05  
Fernandez | 2011 | 45 | 291 | 0.22 | 0.17 | 0.28  
Laupland | 2011 | 355 | 5992 | 0.06 | 0.05 | 0.07  
Franton | 2011 | 13089 | 247103 | 0.05 | 0.05 | 0.05  
Araujo | 2012 | 67 | 2967 | 0.23 | 0.18 | 0.27  
Badawi | 2012 | 21747 | 704063 | 0.03 | 0.03 | 0.03  
Joskowiak | 2012 | 88 | 7106 | 0.01 | 0.01 | 0.01  
Mehees | 2012 | 29 | 1014 | 0.00 | 0.00 | 0.00  
Quaroni | 2012 | 111 | 3462 | 0.03 | 0.03 | 0.04  
Ranzani | 2012 | 75 | 409 | 0.18 | 0.15 | 0.22  
Rani | 2012 | 29 | 354 | 0.08 | 0.05 | 0.11  
Yip | 2013 | 178 | 1446 | 0.10 | 0.11 | 0.23  

**Fixed effect estimate (I²= 99.7%, p<0.001)** | 0.03 (0.03, 0.03)  
**Random effects estimate (I²=99.7%, p<0.001)** | 0.07 (0.06, 0.08)  

Hosein et al. Crit Care 2014
Sample Impact – Province of Alberta

- >10,000 ICU discharges / year
- 1 in 2 patients communication failure
- 1 in 4 patients preventable medical error
- 10 adverse events per 1000 hospital days
- ~ 28 days in hospital post life support
- 5 readmissions to ICU per 100 patients
- 16 readmissions to hospital per 100 patients
- ~$19,000 hospital costs per patient after ICU
Critical Care Transition Programs

- **Structure & Role**
  - MET, outreach teams & liaison nurse programs, that follow patients after discharge from ICU

- **Rationale**
  - Continuity of care, expertise in resolution of critical illness & early identification of clinical deterioration

- **Widely implemented**
  - National Health Service
    - 3% hospitals in 1996
    - 78% in 2004

McDonnell et al J Crit Care 2007
Risk of Readmission after Implementing a Critical Care Transition Program

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>RR (95% CI)</th>
<th>Intervention</th>
<th>Control</th>
<th>Weight</th>
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<td>Ball</td>
<td>2003</td>
<td>0.48 (0.26, 0.87) 16/269</td>
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<td>Leary</td>
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<td>Pittard</td>
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<td>49/547</td>
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<td>Green</td>
<td>2004</td>
<td>0.81 (0.58, 1.11) 222/4375</td>
<td>41/652</td>
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<td>154/1510</td>
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<td>Elliott</td>
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<td>49/709</td>
<td>11.40</td>
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<tr>
<td>Williams</td>
<td>2010</td>
<td>0.95 (0.71, 1.29) 77/1435</td>
<td>88/1566</td>
<td>18.39</td>
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<td>Overall</td>
<td></td>
<td>0.87 (0.76, 0.99) 564/9895</td>
<td>470/6538</td>
<td>100.00</td>
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72 h Readmission after Implementing a Critical Care Transition Program

Program Implementation

- Study Group
- Control Group
14 Day Mortality after Implementing a Critical Care Transition Program
How Do We Reengineer Patient Discharge from ICU?

**Improved Discharge Structure**
- Risk stratification
- Goals of care reconciliation
- Provider handover
- Patient/family handover
- Transfer checklist
- Real time feedback

**Improved Processes of Care**
- Right time & location
- Right treatment plan
- Providers informed
- Patients/families informed
- Standardized
- Near misses identified

**Improved Outcomes of Care**
- ↓ Errors/adverse events
- ↓ readmissions
- ↓ ICU/hospital stay
- ↓ Duplication of tests
- ↑ Patient/family experience
- ↑ Efficiency & ↓ costs
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