Christopher P. Landrigan MD, MPH is Research Director of the Inpatient Pediatrics Service at Boston Children’s Hospital, Director of the Sleep and Patient Safety Program at Brigham and Women’s Hospital, and Associate Professor of Pediatrics and Medicine at Harvard Medical School. Chris did his internship, residency, and fellowship at Boston Children’s from 1995-2000, and has been working at Boston Children’s Hospital ever since, as a pediatric hospitalist and patient safety researcher. In addition, Chris was the founding chair and is currently an Executive Council Member of the Pediatric Research in Inpatient Settings (PRIS) Network, a collaboration of over 100 pediatric hospitals, which has conducted a series of major multi-center research and improvement projects in pediatric hospitals. Chris has led numerous landmark studies on the epidemiology of medical errors and adverse events, and interventions designed to reduce their incidence. His most important work has been focused on developing reliable patient safety measurement tools, and improving the organization of residency programs and academic medical centers. His work on the relationship between resident work hours, sleep, and patient safety contributed to national changes in resident work hour standards. More recently, concerned with improving communication in hospitals, he led the development of I-PASS, a multi-faceted teamwork and handoff improvement program. He has authored over 100 publications in the medical literature, including more than a dozen in the New England Journal of Medicine and JAMA. He has received numerous awards for his research, teaching, leadership, and innovation.

Annual Quality Congress Plenary Session, Sunday, October 4, 2015
Better Handoffs, Safer Care! Optimizing Communication and Teamwork
Objective:
Identify 3 key factors that contribute to variability in the quality and accuracy of patient handoffs in your NICU setting.
Better Handoffs, Safer Care! Optimizing Communication and Teamwork
Christopher P. Landrigan MD, MPH

Disclosures

- Dr. Landrigan has consulted with multiple academic medical centers regarding work schedule design and handoff programs.
- Dr. Landrigan has consulted with Virgin Pulse on development of a Sleep Health program, and has served as an expert witness in cases regarding sleep deprivation and safety.
- The presentation will not involve discussion of unapproved or off-label, experimental or investigational use.
- The presentation will show copyrighted materials for which permission has been obtained from Boston Children's Hospital and the I-PASS Study Group.

Patient Safety in the U.S.: Ongoing Challenges

Institute of Medicine, 1999
- 44,000-98,000 deaths per year due to adverse events
Office of the Inspector General, 2010
- 180,000 deaths per year due to adverse events
North Carolina Patient Safety Study, 2010
- 2341 randomly selected admissions from 10 randomly selected hospitals statewide

Advances in Patient Safety

- Progress reducing specific types of adverse events
  - Catheter related bloodstream infections
    - Pronovost et al
  - Surgical Safety Checklists
    - Gawande et al

Intern Sleep and Patient Safety Study

Randomized Controlled Trial of extended shifts (24-30h) vs. 16h limit

- Shorter shifts increased frequency of handoffs

Shorter Shifts - Increased Frequency of Handoffs

- 2008 IOM Report on Resident Duty Hours concluded that it was unsafe for residents to work more than 16 hours without sleep.
- 2011 ACGME Duty Hour Standards restricted interns to 16 consecutive hours of work and requires programs to:
  - Ensure and monitor structured handoffs
  - Teach resident handoff skills and ensure competence.
Better Handoffs, Safer Care! Optimizing Communication and Teamwork

Christopher P. Landrigan MD, MPH

Communication Failures are the Leading Cause of Sentinel Events in Hospitals

<table>
<thead>
<tr>
<th>Percentage of Sentinel Events involving various Root Causes</th>
<th>(Joint Commission 2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Orientation</td>
<td></td>
</tr>
<tr>
<td>Patient Assessment</td>
<td></td>
</tr>
<tr>
<td>Staffing</td>
<td></td>
</tr>
<tr>
<td>Availability of Info</td>
<td></td>
</tr>
<tr>
<td>Competency/Understanding</td>
<td></td>
</tr>
<tr>
<td>Provocative compliance</td>
<td></td>
</tr>
<tr>
<td>Errors, safety/security</td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
</tr>
<tr>
<td>Continuity of care</td>
<td></td>
</tr>
<tr>
<td>Care planning</td>
<td></td>
</tr>
<tr>
<td>Organization culture</td>
<td></td>
</tr>
</tbody>
</table>

Handoff Video Clip

Handoff Bundle Intervention: Boston Children’s Hospital

Communication and handoff skills training + Mnemonic + Redesigned Verbal Handoff Process = Resident Handoff Bundle (RHB)


Results: Medical Error and Preventable Adverse Events

<table>
<thead>
<tr>
<th>Rates per 100 Admissions</th>
<th>Pre-RHB</th>
<th>Post-RHB</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Errors</td>
<td>33.8</td>
<td>18.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Preventable Adverse Events</td>
<td>3.3</td>
<td>1.5</td>
<td>0.04</td>
</tr>
</tbody>
</table>


From Pilot Study to Multi-center Intervention Project...

I-IPE-PRIS Accelerating Safe Sign-outs

• Multisite study to implement refined handoff bundle for resident physician change of shift handoffs at 9 pediatric institutions

Handoff Bundle Intervention: I-PASS

Communication and handoff skills training + Mnemonic + Redesigned Verbal Handoff Process + Printed Handoff Tool + Campaign and Culture Change = I-PASS Handoff Bundle

- For Residents
- For Faculty
- Adult Learning Principles
- Multimodal Delivery
- Simplified after pilot testing
- Emphasizes most essential elements of handoff
- Quiet, Private, Group Handoff
- Continual Reinforcement
- Faculty Engagement
Better Handoffs, Safer Care! Optimizing Communication and Teamwork
Christopher P. Landrigan MD, MPH

3-hour Core Resident Workshop

2-Hour Session of Didactic and Interactive Exercises
- TeamSTEPPSTM training
- Communication skills
- Briefs, debriefs, huddles
- Learning styles exercise
- Handoff skills training
- Verbal Mnemonic
- Written Handoff Document

1-Hour Handoff Simulation Exercise
- 3 Role Play Scenarios that will allow residents the opportunity to be
  - Giver
  - Receiver
  - Observer
- 1 Role Play Scenario
  - Developing a Shared Mental Model

Followed by

1-Hour Handoff Simulation Exercise

Faculty Champions Guide

- Reference for faculty
- Contents
  - Background/Curricular goals
  - Resident workshop
  - Resident observations
  - Using observation tools
  - Benefits for faculty

Study Design

Results - Process Measures:
% of Verbal Handoffs with Key Elements Present

I = Illness Severity
- Stable, “watcher” unstable

P = Patient Summary
- Summary statement
- Events leading up to admission
- Hospital course
- Ongoing assessment
- Plan

A = Action List
- To do list
- Timeline and ownership

S = Situation Awareness and Contingency Planning
- Know what’s going on
- Plan for what might happen

S = Synthesis by Receiver
- Receiver summarizes what was heard
- Asks questions
- Restates key action/to do items


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Results - Process Measures:
% of Written Handoffs with Key Data Elements

![Graph showing process measures comparison with p-value](image)

* P < 0.001

N = 432 written handoff documents, 5752 unique patient entries


Results - Primary Outcome:
Medical Error Rates

<table>
<thead>
<tr>
<th></th>
<th>Number of errors (rate per 100 patient admissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre- (n=5516 admissions)</td>
</tr>
<tr>
<td>Overall rate of medical errors</td>
<td>24.5</td>
</tr>
<tr>
<td>Preventable adverse events</td>
<td>4.7</td>
</tr>
<tr>
<td>Near misses / non harmful medical errors</td>
<td>19.7</td>
</tr>
<tr>
<td>Non-preventable adverse events</td>
<td>3.0</td>
</tr>
</tbody>
</table>


Results - Balancing Measures:
Resident Workflow

<table>
<thead>
<tr>
<th>Activity</th>
<th>% of time per 24h period spent in activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre- n = 3510 hours</td>
</tr>
<tr>
<td>Patient family contact</td>
<td>11.8%</td>
</tr>
<tr>
<td>Creating written or computerized handoff document</td>
<td>1.6%</td>
</tr>
<tr>
<td>Other computer time</td>
<td>16.2%</td>
</tr>
</tbody>
</table>

Mean duration of verbal handoff per patient 2.4 min 2.5 min 0.55


I-PASS for Nurses

BCH Handoff Related Care Failures

![Graph showing BCH handoff related care failures](image)

Quality of Verbal Handoff
Preliminary Results

![Graph showing quality of verbal handoff results](image)

October 4, 2015
I-PASS Website and MedEdPORTAL

- Downloads as of July 2015
  - 2457 individual requests
  - 500 unique institutions
  - 50 states
  - 45 countries

I-PASS Use by Providers and Clinical Settings

- Providers:
  - Physicians: 18.5%
  - Nurses: 6.3%
  - Medical students: 4.9%
  - Other: 17.0%
  - Unspecified: 71.0%

- Clinical Settings:
  - Pediatrics: 2.9%
  - Neurology: 2.6%
  - Orthopedics: 2.4%
  - Emergency Medicine: 2.3%
  - Critical Care/Intensive Care: 2.3%
  - Internal Medicine: 2.1%
  - Surgery: 1.9%
  - Other: 16.5%

Adapting I-PASS For Other Providers

- Internal Medicine, Surgery

- Society for Hospital Medicine Mentored Implementation Program
  - Funded by AHRQ
  - Mentored implementation and data collection at 32 sites across North America
  - All materials adapted for adult providers

Patient and Family Centered I-PASS

- 7-center study
- Funded by PCORI
- Integration of I-PASS into Family-Centered Rounds and other communications throughout the day
- Health Literacy Principles
- Strong Family / Nurse Input

Better Handoffs. Safer Care.
Better Handoffs, Safer Care! Optimizing Communication and Teamwork

Christopher P. Landrigan MD, MPH

I-PASS Consultation Program

• Adaptation of I-PASS for implementation across other disciplines
• Institution wide I-PASS implementation

Funding and Resources

• Primary funding
  – Department of Health and Human Services
• Additional funding for I-PASS provided by:
  – Oregon Comparative Effectiveness Research K12 Program, Agency for Healthcare Research and Quality (AHRQ)
  – Medical Research Foundation of Oregon
  – Physician Services Incorporated Foundation (of Ontario)
  – Pfizer (unrestricted medical education grant)
• Pediatric Research in Inpatient Settings (PRIS) Network
• Initiative for Innovation in Pediatrics Education (IIPE)
• AHRQ and PCORI – future work

Acknowledgements

I-PASS Study Group

Questions? clandrigan@partners.org

All handoff materials are available at www.ipasshandoffstudy.com

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