Improving Communication Between Providers, Patients, and Caregivers: Implementing Structured Handoffs Across a Variety of Settings

Amy J. Starmer, MD, MPH
Disclosures

- Dr. Starmer has
  - Received grant funding from the US Department of Health and Human Services, Agency for Healthcare Research and Quality (AHRQ), and Patient Centered Outcomes Research Institute.
  - Received consulting fees for helping various institutions implement I-PASS.
  - Co-founded, serves as a board member, holds equity interest, and serves as a consultant for the I-PASS Institute, a company which aims to assist institutions in the implementation of the I-PASS Handoff Program.
  - Documented that this presentation will not involve discussion of unapproved or off-label, experimental or investigational use.

- Dr. Starmer will
  - Present copyrighted materials and has obtained permission from Boston Children’s Hospital and the I-PASS Study Group.
Objectives

- Understand the role of communication failures in medical errors and preventable adverse events
- Review the development and implementation of the I-PASS Handoff Program for end of shift handoffs and its associated impact on medical errors and patient safety
- Identify strategies and benefits of successful adaptation and dissemination of the I-PASS handoff improvement program for additional handoff types and clinical settings
- Describe representative examples where the I-PASS framework has been successfully adapted
  - Different provider types
  - Transitions across different hospital locations
  - Focus on Patient and Family Centered Care
Background
Medical Error and Causes of Death in USA in 2013

- Cancer: 585k
- Heart Disease: 611k
- All Causes: 2,597k
- COPD: 149k
- Suicide: 41k
- Firearms: 34k
- Medical Error: 251k

*BMJ 2016; 353:i2139 (Published 03 May 2016)*
Communication Failures

Root Causes of Sentinel Events

Communication
Assesment
Physical Environment
Information Management
Operative Care
Care Planning
Continuum of Care
Medication Use
Special Interventions
Anesthesia Care

Resident Handoff Bundle: Boston Children’s Hospital

Communication and Handoff Skills Training

Standardization of Verbal Handoffs

Computerized Handoff Tool

= Resident Handoff Bundle (RHB)

Starmer AJ et al. JAMA 2013
Results: Medical Error and Preventable Adverse Events

Rates per 100 Admissions

<table>
<thead>
<tr>
<th></th>
<th>Pre-</th>
<th>Post-</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>

Starmer AJ et al. JAMA 2013
Next Step: The I-PASS Study

- Multisite study at 9 Children’s Hospitals
- Implemented I-PASS handoff bundle for resident physician change of shift handoffs
  - Funded by $3 million grant from U.S. Dept of Health and Human Services September 2010
Challenges of Improving Handoffs

Handoffs are

- Non-standardized processes typically
- Not formally taught
- Variable
  - Institution to institution
  - Within institutions
- Implementing a change in handoff practice is a transformational change

Association of Pediatric Program Directors Annual Meeting. April 1, 2011. Miami, FL
Handoffs Are A Complex Skill

**Concept Model For Handoffs**

- **Individual Factors**
  - Clinical expertise
  - Ownership
  - Interpersonal Skills

- **Organizational and Contextual Factors**
  - Urgency to Change
  - Leadership Support
  - Resources
  - Setting

- **Training Factors**
  - Implementation
  - Educational Strategies

**System Covariates and Confounders**
- Health Information Technology adoption
- Patient Safety Culture
- Patient volume
- Patient complexity

**Quality of Verbal and Written Handoff Process**

**Quality of Handoff**
- Shared Mental Model

**Outcomes**
- **Process**
  - Provider Workflow
  - Provider Satisfaction
  - Verbal and Written Communications
- **Patient**
  - Medical Error Rates

Development of the I-PASS Curriculum

Needs Assessment

Revision and Refinement

Writing Goals and Objectives

Developing Educational Activities

Implementation and Evaluation

# Standardized Structure for Communication: The I-PASS Mnemonic

<table>
<thead>
<tr>
<th>I</th>
<th>Illness Severity</th>
<th>• Stable, “watcher,” unstable</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Patient Summary</td>
<td>• Summary statement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Events leading up to admission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hospital course</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ongoing assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Plan</td>
</tr>
<tr>
<td>A</td>
<td>Action List</td>
<td>• To do list</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Timeline and ownership</td>
</tr>
<tr>
<td>S</td>
<td>Situation</td>
<td>• Know what’s going on</td>
</tr>
<tr>
<td></td>
<td>Awareness and</td>
<td>• Plan for what might happen</td>
</tr>
<tr>
<td></td>
<td>Contingency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Synthesis by</td>
<td>• Receiver summarizes what was heard</td>
</tr>
<tr>
<td></td>
<td>Receiver</td>
<td>• Asks questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Restates key action/to do items</td>
</tr>
</tbody>
</table>

More Than Just a Mnemonic: I-PASS Handoff Bundle Components

- I-PASS Structure
- Training Curriculum
- Verbal Handoff Process Improvements
- Simulation Exercises
- I-PASS Printed Handoff Document
- Faculty Development
- Structured Observation & Feedback
- I-PASS Campaign
“In 10,740 patient admissions, the medical-error rate decreased by 23% from the preintervention period to the postintervention period (24.5 vs. 18.8 per 100 admissions, P<0.001), and the rate of preventable adverse events decreased by 30% (4.7 vs. 3.3 events per 100 admissions, P<0.001). ...Across sites, significant increases were observed in the inclusion of all pre-specified key elements in written documents and oral communication during handoff ... There were no significant changes from the preintervention period to the postintervention period in the duration of oral handoffs (2.4 and 2.5 minutes per patient, respectively; P = 0.55) or in resident workflow, including patient–family contact and computer time.”
Disseminating and Adapting I-PASS
I-PASS Curricular Downloads

>4,000 US Curricular Downloads
>1,000 International Downloads
I-PASS By Provider Type And Clinical Setting

**Providers**
- Physician: 48%
- Registered Nurse: 15%
- Physician Assistant: 5%
- Pharmacist: 3%
- Nurse Practitioner: 8%
- Medical Student: 9%
- Other: 6%
- Unspecified: 6%

**Clinical Settings**
- Pediatrics: 17%
- Internal Medicine: 17%
- Intensive Care: 10%
- Other: 9%
- Orthopedics: 4%
- Obstetrics Gynecology: 6%
- Surgery: 8%
- Emergency Medicine: 9%
- Neurology: 3%
- Psychiatry: 4%
- Other: 6%
- Unspecified: 5%
Adapting I-PASS For Other Providers

- Nurses and Medical Students
- Specialties beyond Pediatrics
  - Society for Hospital Medicine Mentored Implementation Program
  - CRICO Mentored implementation Program
- Patient and Family I-PASS Study
  - Inter-professional patient-centered adaptation
Adapting For Other Providers

Nurses

Nursing I-PASS Implementation

- Increased inclusion of
  - Illness severity assessment (37% vs 67%)
  - Patient summary (81% vs 95%)
  - To do list (35% vs 100%)
  - Opportunity for receiving nurse to ask questions (34% vs 73%).

- Overall, 13/21 (62%) of verbal handoff data elements were more likely to be present following implementation

- Decrease in interruption frequency (67% vs 40% of handoffs with interruptions)

- No change in the median handoff duration (18.8 min vs 19.9 min, p=0.48) or other workflow activities
Adapting For Other Providers
Medical Students

- Handoffs are critical skills to acquire early in one’s medical training
- I-PASS program has adapted to fit the needs of novice learners
  - Incorporated both live and computer based training
- Results revealed a similar decrease in handoff miscommunications regardless of training modality
Adapting For Other Providers
I-PASS Mentored Implementation

• I-PASS Study Group partnered with the Society for Hospital Medicine: Mentored Implementation approach
• Selection of 32 institutions across North America
• Adaptation of all curricular materials
  – Materials for adult providers
  – Implementation guide specifying key milestones
  – Focus on more independent and flexible learning
• Mentorship team and QI collaborative
I-PASS Mentored Implementation Results

Adherence to All 5 I-PASS Mnemonic Elements (% Usually or Always)

Handoff-Related Adverse Event Rate (Mean Patients per Rotation Experiencing Any Harm)

- Compliance Rate (%)
- Handoff-Related Adverse Event Rate (Event/person year)
Adapting I-PASS For Other Types of Handoffs: Moving Beyond Inpatient Settings

- Vast majority of health care takes place in ambulatory setting, yet most research has focused on the inpatient setting
  - Post discharge adverse event rate may be as many as 5-6 times as high as in-hospital

- Recent Projects
  - Inpatient to Outpatient transitions (hospital to home) [ongoing]
  - Ambulatory care to the Emergency Room
    - “receiver driven” handoff
Handoffs to the Emergency Room at Boston Children’s

Handoffs to the ED at Boston Children’s

“Receiver-Driven” Handoff Intervention Bundle
Primary Care to ED transitions

What to Expect When You Call ED Expect

When calling ahead to the Emergency Department at Boston Children’s Hospital about a patient you are sending there, you will notice a new, standardized format for communication. This template was developed to help ensure reliable transfer of key information to support optimal patient care upon arrival to the ED. The Communication Center will ask you the following...

<table>
<thead>
<tr>
<th>ILLNESS SEVERITY</th>
<th>“Is the patient... Stable with normal vital signs, Stable with concern for clinical deterioration, or Unstable?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATIENT SUMMARY</td>
<td>“In a few words, what is the primary reason for referral?”</td>
</tr>
<tr>
<td></td>
<td>“Can you summarize the patient history?”</td>
</tr>
<tr>
<td>ACTION LIST</td>
<td>“Do you think this patient has specific care needs in the ED?”</td>
</tr>
<tr>
<td></td>
<td>“Are there any tests pending that the ED should be aware of?”</td>
</tr>
<tr>
<td>SITUATION</td>
<td>“Is there any other information that might help with management in the ED?”</td>
</tr>
<tr>
<td>AWARENESS</td>
<td>“Would you like a callback from the ED... Before they assess the patient, To discuss management, or On discharge?”</td>
</tr>
<tr>
<td>&amp; CONTINGENCY</td>
<td></td>
</tr>
<tr>
<td>PLANNING</td>
<td></td>
</tr>
<tr>
<td>SYNTHESIS</td>
<td>“I’m going to summarize what you told me to make sure I’ve got it right: You’re sending a [stable] patient for [reason] with a plan for emergency management [and additional care needs].”</td>
</tr>
</tbody>
</table>

- Key Handoff Data Elements identified through consensus building focus groups of key stakeholders

This template was developed with consensus of stakeholders in Primary Care, the ED, and Communication Center. If you have any questions or feedback, please contact kathleen.huth@childrens.harvard.edu
Handoffs to the Emergency Room at Boston Children’s

Review of ED Expect Audio Recordings (n=142)

Frequency of Miscommunications (n=142)

Perceptions of Handoff Process (n=196, RR 80%)
Hospital to Home Transitions: Background

- No studies have investigated epidemiology of post-discharge adverse event rates for pediatric patients

- During post-discharge period, patients may be at higher risk of errors, AEs, and miscommunications as they have experienced a change in their health

- This risk is potentially higher in medically complex patients
Hospital to Home Study Aims (Ongoing)

1. To determine the impact of a hospital-to-home transition bundle on rates of post-discharge medical errors and miscommunications.

2. To measure the impact of the transition bundle on the quality of discharge processes.

3. To assess the impact of the transition bundle on rates of overall as well as preventable re-admissions and ED visits following implementation.
Setting / Study Design

• Prospective pre-post intervention study
• All patients discharged from Boston Children’s Hospital (BCH) Complex Care Service (CCS) during the study period will be included
  – Second site includes MGH adult transplant patients
• Children within CCS average 3.7 (+/- 3.1) hospitalizations per year, with 32% of admissions experiencing a readmission within 30 days
Hospital to Home Core Interventions

I-PASS Structured Verbal Peri-Discharge Communication

I-PASS Structured Written Peri-Discharge Communication

Discharge Navigator and Registry Development

Creating a Shared Mental Model

Key Supporting Activities

- Education and Training Activities
- Implementation & Sustainment Activities to Ensure Practice Change
- Family-Centered Approach to Optimize Safety & Quality
Post-discharge Medical Errors and Adverse Events (primary outcome)

- Patient Report: Caregiver 7- and 30-day Post-Discharge Surveys
- Medical Record Review
- Inpatient Provider Check-ins
- Adverse events, medical errors, and miscommunications
- Outpatient Provider Survey

Medical Errors Database
Preliminary Results
BCH Post-discharge Incident Reports

Total Incident Reports: 157

Incident rate:
= 157 reports / 95 discharges
= 1.65

Out of 95 total discharges, 66 were found to have at least one incident:
= 69%
of subjects had a medical error, adverse event or communication error
International I-PASS Adaptation!

Mnemotécnica I-PASS

**Importancia de la enfermedad**
Estable, en observación, inestable

**Paciente (resumen)**
Situación resumida; acontecimientos que condujeron a la admisión; curso hospitalario; plan

**Acciones (lista)**
Lista de tareas, tiempo y responsabilidad

**Situaciones & planes de contingencia**
Saber qué está pasando, cuál es el plan si...

**Síntesis del receptor**
El receptor resume lo importante, hace preguntas y repite las acciones importance
International I-PASS Adaptation!
Communication Interventions

• Interventions to improve **intra-professional communication** have been shown to improve patient safety

• Communication interventions—including I-PASS—have not typically included families and other members of the **inter-professional** team
Lessons Learned
## Rounds and the Stakeholders

<table>
<thead>
<tr>
<th>Role</th>
<th>Opportunities</th>
</tr>
</thead>
</table>
| Medical Student | • Learning opportunity  
                   • Chance to show skill to faculty                                |
| Resident       | • Generate the to-do list  
                   • Learn about diagnosis and plan                                  |
| Nurse          | • Hear the plan  
                   • Clarify orders                                                     |
| Attending      | • Learn about the patient  
                   • Receive updates                                                    |
Parents and night-team residents lacked shared understanding 45.1% of the time.

“... They’re talking amongst themselves with you in the room. You’re trying to pick out what they’re talking about... They did ask me if I want to join rounds in the room, but now I think I would round outside the room because they are confusing... that’s what happens with all the talking.”
Families as Vigilant Partners in Care

- Intimate knowledge of historical background
- Motivation for a good outcome
- Availability
- Proximity
- Particularly in pediatrics
Adapting for Patients and Families: Bringing I-PASS to the Bedside

**Patient and Family Centered I-PASS Study**

Implemented Patient and Family Centered I-PASS across 7 institutions with an Intervention Bundle to

- Reduce serious medical errors
- Improve family centered rounds and daily communication between nurses, doctors, and patients
- Improve the shared understanding of care plans between providers and patients and families
- Improve the patient and provider experience
Partnered with parent advisors to develop interview guides

Oriented parents to error types/examples

- Medications
- Miscommunications
- Diagnosis
- Delays
- Complications
- Equipment

Asked about:

- Adverse events/harms
- Errors of omission, commission, non-harmful errors
- Other issues

Parent safety interviews at discharge and weekly
<table>
<thead>
<tr>
<th>I</th>
<th>Illness Severity</th>
<th>Better, worse, or about the same</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Patient Summary</td>
<td>Typically problem-based</td>
</tr>
<tr>
<td>A</td>
<td>Action List</td>
<td>To-do list</td>
</tr>
<tr>
<td>S</td>
<td>Situation Awareness &amp; Contingency Planning</td>
<td>Things family and patient should look out for</td>
</tr>
<tr>
<td>S</td>
<td>Synthesis by Receiver</td>
<td>Read-back by family or other team member</td>
</tr>
</tbody>
</table>
Key Objectives of Training

- Use principles of health literacy in all verbal communication with patients and families
- Encourage active participation of patients, family members, nurses and other team members on rounds
- Use the I-PASS structure for presentations
- Execute teach-back at the end of rounds
- Complete the rounds report utilizing the principles of health literacy
Curriculum Delivered to All Team Members

- Residents
- Medical students
- Faculty
- Nurses
- Patients and families

Family Brochure
Patient and Family Centered I-PASS Study: Results

38% reduction in harmful medical errors

Improvements in aspects of family experience and hospital communication processes

No change in rounds duration or teaching on rounds

Khan et al, BMJ 2018
What’s next....
SHM I-PASS SCORE Study

• Funded by AHRQ
• Mentored implementation and data collection at 21 institutions across North America
  • Wave 1 & 2 sites are currently underway
• Adaptation of all curricular materials
  • Materials for adult providers
  • Focus on more independent and flexible learning (e.g. “flipped classroom” approach)
Implementation of I-PASS: Lessons Learned
Successful Implementation of I-PASS

- **What does success look like?**
  - Everyone trained in I-PASS
  - Everyone using I-PASS consistently
  - Miscommunications, errors and patient harm reduced

- **What does success require?**
  - Core training (i.e. basic knowledge)
  - Observation/feedback in workplace to improve performance
  - Measure outcomes to improve and sustain
Lessons Learned About Change from I-PASS

#1: Resistance to Change is the Norm

- Front line providers
  - “We already know how to sign out”
  - “We use SBAR!”
  - It will increase the length of the handoff
- Senior Providers
  - It may work for the residents, but not for us
  - It doesn’t apply to our setting
  - Are there any data that it works?
- Institution or unit
  - IT department will not support this
  - It is disruptive to current workflow
    - Protected time for a handoff is problematic
    - Protected time for training is problematic

Implement I-PASS
Lessons Learned About Change from I-PASS

#2: Importance of a Diverse and Organized Team to Manage Change Effectively
Lessons Learned About Change from I-PASS

#3: Adaptation is Key to Success

• Sometimes modifications of the local environment are necessary in order to incorporate all components of the handoff program

• Sometimes elements of I-PASS need to be modified or adapted to fit the needs of a local environment

“All failure is failure to adapt, all success is successful adaptation.”

MAX MCKEOWN
Lessons Learned About Change from I-PASS

#4: Incorporate the Patient and Family
Final Lesson:
Don’t Forget to Celebrate Success!
Take Home Points

- High frequency of communication and handoff errors
- I-PASS Handoff Bundle → decreased rates of medical errors and adverse events
- Teamwork, planning, and anticipation of resistance to change are key components of successful handoff improvement efforts
Better Handoffs. Safer Care.
Any Questions?

Amy Starmer
(Amy.starmer@childrens.harvard.edu)