Association of Handoffs with Outcomes

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ANESTHESIA, CRITICAL CARE AND PAIN MEDICINE

Outline

- Handoffs and Adverse Outcomes in Healthcare
- Perioperative Handoffs and Outcomes
- Summary- What we know, and what we don't

Examples of Outcomes

- Handoff Process Outcomes
  - Information transfer, quality of communication, time
- Immediate/Short-term patient outcomes
  - Reduction in PACU LOS, reduction in ICU events (CPR, unplanned intubation)
- Intermediate/Long-term patient outcomes
  - 30-day morbidity (AKI, MACE), mortality

Joint Commission Sentinel Event Root Causes

2013 (N=887)		2014 (N=764)		2015 (N=936)	
Human Factors	635	Human Factors	547	Human Factors	999
Communication	563	Leadership	517	Leadership	849
Leadership	547	Communication	489	Communication	744
Assessment	505	Assessment	392	Assessment	545
Information Management	155	Physical Environment	115	Physical Environment	202
Physical Environment	138	Information Management	72	Health information technology-related	125
Care Planning	103	Care Planning	72	Care Planning	75
Continuum of Care	97	Health Information Technology-related	59	Operative Care	62
Medication Use	77	Operative Care	58	Medication Use	60
Operative Care	76	Continuum of Care	57	Information Management	52

The Joint Commission

https://hcupdate.files.wordpress.com/2016/02/2016-02-se-root-causes-by-event-type-2004-2015.pdf

Root Cause Information for Anesthesia-related

Evel Root Cause Information for Medication Error Events

Root Cause Information for Medical Equipment-related Events

Root Cause Information for Op/Post-op Complication

Ev Root Cause Information for Ventilator-related Events

Root Cause Information for Wrong-patient, Wrong-

Root Cause Information for Transfer-related Events Reviewed by The Joint Commission

(Resulting in death or permanent loss of function)

2004 through 2015 (N=28) *The majority of events have multiple root causes*	
Communication	37
Leadership	28
Human Factors	24
Continuum of Care	24
Assessment	22
Care Planning	7
Information Management	6
Physical Environment	5
Special Interventions	2
Anesthesia Care	1

The Joint Commission

Office of Quality and Patient Safety, 2016

https://hcupdate.files.wordpress.com/2016/02/2016-02-se-root-causes-by-event-type-2004

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Communication and Medical Errors

"It has been estimated that 80 percent of serious medical errors involve miscommunication during the hand-off between medical providers. The majority of avoidable adverse events are due to the lack of effective communication."

Joint Commission Center for Transforming Healthcare.

http://www.centerfortransforminghealthcare.org/projects/detail.aspx?Project=1

Handoffs and Medical Errors

Poor communication during handoffs can lead to:

- Delayed and missed diagnoses *(Lorincz et al., 2011, Gandhi et al., 2006)*
- Medical errors involving trainees *(Singh et al. 2007)*
- Omission of up to 40% of clinically important issues during morning sign-out *(Devlin et al., 2014)*
- Diagnostic testing errors *(Murphy et al., 2014)*

Handoffs and Patient Harm

Omission of key information during handoff is associated with:

- Repeated or unnecessary testing *(Horwitz et al., 2008)*
- Treatment delays and escalation of care *(Arora et al., 2005)*
- Minor and major harm *(Kitch et al., 2008; Saleem et al., 2015)*

- Multicenter, retrospective VA study: 230k patients who died or were discharged within 7 days of team handoff:
  - In-hospital, 30-day, and 90-day mortality increased by 64-95% compared to controls *(American Thoracic Society, 2016)*

What about Perioperative Handoffs?

The Evidence for Outcomes and Interventions

Preoperative: ICU to OR

Only one published study to date:

- Caruso et al., 2017
  - Single center, Pre/post, introduction of standardized protocol for patients from ICU to OR
  - Improved frequency of face-to-face handoff and readiness for transport, Improved anesthesia provider satisfaction

Caruso, et al. Int J Health Care Qual Assur. 2017 May 8;30(4):304-311

Intraoperative Duty Relief and Outcomes

- Cooper et al., 1982
  - 28 of 96 total incidents associated with intraoperative relief identified as favorable, 10 incidents identified as unfavorable

- Terekhov, et al., 2016
  - Short breaks associated with 6.7% decrease in adverse outcomes
  - No association with postoperative adverse outcomes

Intraoperative Handoff - Outcomes

- Arbous et al., 2005 - Retrospective, multi-center case-control study of >800k anesthetics
  - Intraop change of anesthesiologist associated with increased morbidity & mortality
- Saager et al., 2014 - Retrospective, single-center, propensity-matched study of 139k patients
  - Increased risk of complications by **8% for each additional anesthesia provider handoff**
- Hudson et al., 2015 - Retrospective, single-center, propensity-matched study of >14k cardiac surgery patients
  - **27%** greater risk of **major morbidity** and a **43%** greater risk of in-hospital **mortality** when handoff occurred
- Hyder et al., 2016 - Retrospective, single-center study of 900 colorectal surgery patients
  - 30-day postoperative **complications or death increased by 52%** as the number of attending anesthesiologists increased

Intraoperative Handoff – Intervention Data

- Agarwala et al., 2015
  - Prospective, single-center, pre/post study of checklist implementation
  - Significantly improved critical information transfer and retention
- Boat et al., 2013
  - Prospective, single-center, pre/post study of checklist implementation
  - Improved frequency/reliability of attending anesthesiologist handoffs
- Jullia et al. 2017
  - Prospective, two-center, interventional cohort study of checklist implementation
  - Improved quality of observed handoffs by 43% compared to controls

No known data about long-term patient outcomes with intraoperative handoff intervention

Pediatric Anesthesia 2007 17: 470–478

Pilot Implementation of a Perioperative Protocol to Guide Operating Room–to–Intensive Care Unit Patient Handoffs

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Advance Access Publication: 29 January 2013

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The effect of a checklist on the quality of post-anaesthesia patient handover: a

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Improving postoperative handover: a prospective observational study

The American Journal of Surgery®

Kamal Nagpal, M.S., M.R.C.S., Ph.D.*, May Abboudi, B.Sc., Chhavi Manchanda, F.R.C.A., Amit Vats, M.R.C.S., Nick Sevdalis, Ph.D., Colin Bicknell, M.D. F.R.C.S., Charles Vincent, Ph.D.,

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Pediatric Anesthesia ISSN 1155-5645

A Multimodal Intervention Improves Post-Anesthesia Care Unit Handovers

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Postoperative Handoff – Intervention Data

- Dozens of published studies of OR-to-PACU and OR-to-ICU handoff intervention
- Almost all are single-center, few are randomized
- Almost all include standardization of some type with checklist/template
- All the published transitions studies have shown standardization-related improvements in process outcomes such as information exchange and team communication; a few studies have suggested improvements in short-term patient outcomes

Postoperative Handoff – Intervention Outcomes

- Agarwal et al., 2012
  - Single-center, pre/post, study of structured post-op handoff process implementation in Pediatric CICU:
  - Nearly **50%** decrease in CPR, ECMO, reexploration, and incidence of metabolic acidosis
- Kaufman et al., 2013
  - Single-center, pre/post, study of structured post-op handoff protocol implementation in cardiac surgical ICU
  - **60%** decrease in unplanned intubations and **25%** decrease in mean ventilator times

No known data about long-term patient outcomes with postoperative handoff intervention

Summary – What ***do*** we know from the evidence?

- Communication errors are associated with adverse events
- Handoffs have been associated with worsened outcomes across healthcare
- In the perioperative setting, duty relief may help reduce AEs
- Intraop handoffs are associated with worsened patient outcomes
- Standardization is likely to improve information exchange, and may improve short-term outcomes in the ICU

Summary – What ***don't*** we know from the evidence?

- Does standardization of intraop or postop handoff improve longer-term patient outcomes?
- Which improvements to handoff processes have the greatest impact on outcomes?
- What are the effects of training and implementation processes related to handoff improvement that lead to better outcomes?

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