Hospitals told to use surgical checklists to reduce safety risks

July 1, 2010

Human error is behind the vast majority of operating room mistakes leading to death or injury, and that's precisely why all B.C. hospitals must now use surgical checklists to cut down on infections and other complications.
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... a spokeswoman for the B.C. government said checklists are a relatively simple and inexpensive way to improve patient safety.
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“It has been years since I read a book so powerful and so thought-provoking.... Gawande is a gorgeous writer and storyteller, and the aims of this book are ambitious.”

—MALCOLM GLADWELL, author of Outliers

IN HIS LATEST BESTSELLER, Atul Gawande shows what the simple idea of the checklist reveals about the complexity of our lives and how we can deal with it.

The modern world has given us stupendous know-how. Yet avoidable failures continue to plague us in health care, government, the law, the financial industry—in almost every realm of organized activity. And the reason is simple: the volume and complexity of knowledge today has exceeded our ability as individuals to properly deliver it to people—consistently, correctly, safely. We train longer, specialize more, use ever-advancing technology, and still we fail. Atul Gawande makes a compelling argument that we can do better, using the simplest of methods: the checklist. In riveting stories, he reveals what checklists can do, what they can’t, and how they could bring about striking improvements in a variety of fields, from medicine and disaster recovery to professions and businesses of all kinds. And the insights are making a difference. Already, a simple surgical checklist from the World Health Organization designed by following the ideas described here has been adopted in more than twenty countries as a standard for care and has been heralded as “the biggest clinical invention in thirty years” (The Independent).

“I read The Checklist Manifesto in one sitting, which is an amazing tribute to the book that Gawande has crafted. Not only is the book loaded with fascinating stories, but it honestly changed the way I think about the world. It is the best book I’ve read in ages.”

—STEVEN D. LEVITT, coauthor of Freakonomics

“Packed with vivid writing, heart-stopping anecdotes, and statistical surprises... a compelling argument.” —HEIDI MOORE, Los Angeles Times

“Thoughtfully written and soundly defended, this book calls for medical professionals to improve patient care by adopting a basic, commonsense approach.”

—SARAH HALZACK, The Washington Post

WWW.PICADORUSA.COM/THECHECKLISTMANIFESTO

COVER DESIGN BY LISA FYFE

PICA DOR
JUST DO IT.
“Sure, we did the big launch, the training, the leadership walk-abouts. And something called a checklist is being counted as ‘done’ here. But honestly, there’s such variability in terms of who’s there, what they bother to talk about, how seriously they take the whole thing ... we’ve had surgical site errors twice in the last month, both in cases where the checklist was ‘done’. Who’s kidding who? “
Outline

- **Review** the history of the checklist
- **Reveal** dimensions of the checklist paradox
- **Reaffirm** the point: collective competence
- **Reorient** our efforts via complexity theory
A note on terminology

Checklist

Briefing
Review

the history of the checklist
Rate of postoperative deaths and complications fell by > 1/3.
Similarly positive results. Lower complication rates associated with more complete checklists.
A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

74 VA hospitals. Formal team training & checklist implementation. 18% reduction in mortality.

Effect of a Comprehensive Surgical Safety System on Patient Outcomes

Association Between Implementation of a Medical Team Training Program and Surgical Mortality

Context There is insufficient information about the effectiveness of medical team training on surgical outcomes. The Veterans Health Administration (VHA) implemented a formalized medical team training program for operating room personnel on a national level.

Objective To determine whether an association existed between the VHA Medical Team Training program and surgical outcomes.

Design, Setting, and Participants A retrospective health services study with a contemporaneous control group was conducted. Outcome data were obtained from the VHA Surgical Quality Improvement Program (VASQIP) and from structured interviews in fiscal years 2006 to 2008. The analysis included 182,409 sampled procedures from 108 VHA facilities that provided care to veterans. The VHA’s nationwide training program required briefings and debriefings in the operating room and in...
A KT Success Story
# Surgical Safety Checklist

**Briefing**  
Before induction of anesthesia

- Attending surgeon or fully informed designate initiates briefing. Attending surgeon initiates briefing for stat cases.
  - Nurse verifies:
    - The patient was seen and site marked by surgeon or designate and the patient has confirmed his/her identity, site, procedure and consent.
    - Surgeon or Designate confirms with nurses:
      - Are all necessary equipment and implants available and sterile?
      - Positioning confirmed if necessary?
      - Is essential imaging displayed?
    - Anesthesiologist verifies:
      - Does the patient have a known allergy?
      - Lab data reviewed, grouped and screened?
      - Anesthesia equipment available and packaged?
      - Are there any patient-specific concerns?
      - Does anyone have any questions?

**Time Out**  
Before skin incision

- Surgeon verifies:
  - All team members have introduced themselves by name and role.
  - The patient’s name, procedure, and the site and side marking of the incision.
  - Has Antibiotic Prophylaxis been given within the last 60 minutes?
    - Yes
    - Not applicable
  - Has VTE / DVT Prophylaxis been provided?
    - Yes
    - Not applicable
  - Anticipated Critical Events
    - Surgeon verifies:
      - Are there any critical surgical or unexpected steps that the team should know about?
      - How long will the case take, and what is the anticipated blood loss?
      - Does anyone have any questions?

**Debriefing**  
Before patient leaves the OR

- Nurse verifies:
  - What is the name of the procedure to be recorded?
  - Are all counts complete?
  - Is specimen labeling accurate? (Read specimen labels aloud, including patient name)
  - Do any equipment problems need to be addressed?

  - To Surgeon, Anesthesiologist, and Nurse:
    - What are the key concerns for recovery and management of this patient?
    - What is the post-operative destination?
    - Who will be responsible for post-operative analgesic orders?
    - Have the Surgeon, Anesthesiologist and Nursing reviewed the case to follow?
      - Yes
      - Not applicable

- Does anyone have any questions?
A KT Success Story

Canadian Health Accreditation Report
Required Organizational Practices: Emerging Risks, Focused Improvements
Reveal

the paradox of surgical checklists
Paradox

A statement that apparently contradicts itself and yet might be true
Paradox 1:
Simple checklists are not simple.
Paradox 1

• The tool – *a checklist* – is simple
• The act – *a briefing* – is less simple

• And the social process of *implementing and sustaining briefing practice* is complex
Dr. Atul Gawande, TEDtalk 2012

http://video.ted.com/talk/podcast/2012/None/AtulGawande_2012.mp4
Why aren’t briefings simple?

• Because the multiple professional values and identities in the OR create tensions (2005)
Why aren’t briefings simple?

- Because team members sometimes don’t share what they know; speaking up can be dangerous (2009)
Why aren’t briefings simple?

- Because participation in or rejection of team briefings is driven by local/individual motives and attitudes more than by organizational imperatives (2009)
Why aren’t briefings simple?

Because briefings sometimes do the opposite of what they’re intended to do (2008)
Paradox 1:
Simple checklists are not simple.

Because
while the tool is deceptively simple,
the practice is not.
Paradox 2: Compliance rates signify something, and nothing.
Surgical Safety Checklist (by Hospital), 2012/13 QIPs

Most Ontario hospitals have already achieved 99-100% compliance; any hospital that has not achieved this yet should be aiming for full (100%) compliance.
BC compliance rates June 2013
Clinical Care Management Initiative

Surgical Checklist Province

Target line 95%
Are checklist compliance rates higher in Ontario than in BC?

☐ Yes
☐ No
☐ ??
Are checklist briefings better in Ontario than in BC?

☐ Yes
☐ No
☐ ??
Are surgical teams safer in Ontario than in BC?

- [ ] Yes
- [ ] No
- [ ] ??
- [ ] ???
So what *do* compliance rates signify?
• An audit culture

• Where documentation of a practice becomes more important than the practice itself

• Fostering a *tick and flick* attitude to checklist practice (C. Hayes 2012, *Healthcare Quarterly* Vol. 15)
• 1440 surgical procedures observed
• Mean checklist compliance rate: 90.2%
• Mean item completion rate: 61%
Implementing a surgical checklist: More than checking a box

Shauna M. Levy, MD, Casey E. Senter, BS, Russell B. Hawkins, BA/BBA, Jane Y. Zhao, BA, Kaitlin Doody, Lillian S. Kao, MD, MS, Kevin P. Lally, MD, MS, and KuoJen Tsao, MD, Houston, TX

Surgery (September 2012), 152 (3), pg. 331-336

- 142 pediatric surgical cases observed
- Hospital compliance data: 100%
- Average # of checklist items performed: 4/13
Compliance and quality in administration of a surgical safety checklist in a tertiary New Zealand hospital

Nicole Vogts, Jacqueline A Hannam, Alan F Merry, Simon J Mitchell

<table>
<thead>
<tr>
<th></th>
<th>Sign In</th>
<th>Time Out</th>
<th>Sign Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checklist Domain Administration (rate per 100 cases)</td>
<td>99</td>
<td>94</td>
<td>2</td>
</tr>
<tr>
<td>Mean Checklist Item Compliance</td>
<td>56</td>
<td>69</td>
<td>40</td>
</tr>
</tbody>
</table>
Only 13% of Time Outs and 3% of Sign Outs were properly checked (all items validated).

Time Out validation was better during highest risk surgeries (29%) than during lower risk surgeries (15%).
Paradox 2: Compliance rates signify something, and nothing.

Compliance rates are not a transparent record of checklist performance; in fact, they obscure key problems.
Paradox 3: Safer surgery checklists may threaten safety
• “the benefits of surgical checklists could wane over time as they lose their novelty and become a perfunctory component of care”
“bureaucratic use of the checklist was of no benefit and might even have a negative impact”
Checklists are a “weak type of safety barrier vulnerable to normalizations of deviance”

Checklist practice may replace other barriers against patient harm
“When both premises are true at the same time – when compliance with the checklist is flawed and other safety checks are omitted because they are thought of as being handled by the checklist – then we have a new safety threat because we have induced a false sense of safety into the healthcare system."
There is a lack of rich data regarding what happens to a team’s communication when checklists are introduced. This lack perpetuates the assumption that, if checklists are in place, then team communication must, of course, be better. And this assumption signals a serious threat to safety: “the complacency induced when an organisation thinks that a problem is solved” (Bosk 2009).

Paradox 3: Safer surgery checklists may threaten safety.

Checklists may create a false sense of safety – of complacency – by signalling that the problem is solved.
The Checklist Paradox

Simple checklists are not simple.

Checklist compliance rates signify something, and nothing.

Safer surgery checklists may threaten safety.
Reaffirm the original point: collective competence
Healthcare is full of highly competent individuals
We think of competence
Competent as an individualist phenomenon
Competent individuals acquire knowledge and skill.
Competent which is performed and assessed
The role of communication

• The ability of a team to be collectively competent relies in large part on shared knowledge and expectations

• These aspects of collective competence are achieved through team communication
Do checklists = collective competence?

• Checklists are merely a tool, a means to prompt a salient communicative act

• The communicative act, not the checklist tool, fosters collective competence

• But the means – checklists, checkboxes – has become the end
Evidence Gap

• Checklist research is mostly a ‘counting’ exercise
• There are few systematic studies of what briefing communication is, and does, on OR teams
  – What happens before, during & after briefing?
  – Do briefings influence within-case handover?
  – Do team members ‘prepare’ to brief?
  – How do briefings inter-relate across the team’s day?
  – How do briefings influence other practices, like OR bookings or surgical training?
• Beyond compliance and completion data
• Explore *what happens* to system dynamics when a checklist routine is introduced
• Watch how existing barrier systems are affected by the new routine
How do we move forward?

...past checklist fatigue
...past organizational cynicism
...past the checklist paradox
Reorient our efforts via complexity theory
Current checklist science

• “The science of how to do checklists is in its infancy” (Pronovost 2012)
Current checklist science

• Emphasizes linear fixes to the checklist implementation challenge
  – Make the checklist shorter

A Simplified WHO Checklist Improves Compliance and Time Efficiency for Urological Surgery
John Henderson, Timothy Fung, Jaimin Bhatt and Amarjit Bdesha
British Journal of Medical and Surgical Urology 2012 5: 120
DOI: 10.1016/j.bjmsu.2011.08.003
Current checklist science

• Emphasizes linear fixes to the implementation challenge
  – Make the checklist shorter
  – Commit more resources
  – Adapt checklist items to local contexts
  – Train, retrain till personnel get it right
Linear approaches

Requirements for the design and implementation of checklists for surgical processes

E. G. G. Verdaasdonk · L. P. S. Stassen · P. P. Widhiasmara · J. Dankelman
Fig. 1 Flow diagram of checklist implementation
Linear approaches

• These aren’t bad ideas

• They just don’t bring us any closer to predicting what will happen when teams brief

• Why?
Change in this setting doesn’t look like this
Change looks more like this
Because the surgical team is a complex adaptive system (CAS)

Other CAS:
- a neighbourhood,
- a political event, a spreading virus,
- a weather system, a military campaign
Key features of CAS

• Non-linearity
• Emergence
• Self-organization

(Capra 1996; Stacey 2006; Lewin 1999; Fenwick 2012; Bennett 2010)
Non-linearity

- No clear lines of causation or intention can be traced from interactions to their outcomes

- Order at higher levels is not reducible to (or predictable from) patterns at local levels
Emergence

- Agents in the system interact in apparently random ways, through a few simple rules that produce abundant possibilities.

- As these interactions feedback into the system, patterns may emerge.
Self-organization

• No hierarchy of command/control

• Just constant re-organising among agents to find the best fit with the environment, in response to perturbations or disturbances

• Small disturbances can have big effects through amplification in the feedback loop (the butterfly effect)
What does CAS mean for us?

• Linear, mechanistic approaches to intervention are unlikely to have predictable effects
• You can’t explain or alter the whole by studying its parts
What does this mean?

• A CAS often presents ‘wicked problems’
  – Dimensions/agents constantly shifting
  – Intervening "here" often has unanticipated effects "over there“ because parts are interdependent
  – Each attempt to solve the problem changes the nature of the problem
What does this mean?

• Small, positive ‘disturbances’ can be as valuable as large-scale efforts

• By amplifying small positive changes, we may be able to create desirable butterfly effects
Small disturbances

• Since early 90s, organizational science has used complexity to explain

  “how small disturbances can provoke changes that are generative and sustainable, through amplification and feedback loops”

(Tsoukas 2004)
Small disturbances

As a way forward from the checklist paradox...
What small disturbances have you seen in your checklist practices?

Activities that seem random, are not patterns yet, but could encourage the system to re-organise in a positive way.
How might those small disturbances be amplified?

Feedback loops that might amplify the disturbance so that it grows to be an emergent pattern at the system level.
An example from my experience
Surgeon is uncomfortable leading team briefings. She could:

- Carry on as usual, regardless of discomfort
- Start arriving to OR too late to participate
- Participate minimally/do incomplete briefing
- Refuse to do briefing at all
- Devise strategy to delegate briefing to resident
Surgeon devises educational strategy to delegate briefing to resident by linking checklist with ITER
Resident could respond variously:

- By leading briefing but not changing prep routine
- By preparing for briefing as evaluative performance
- By doing everything possible to wiggle out of briefing
Resident preps in order to acquire knowledge required to lead briefing effectively.
Other team members could respond variously:

- Appreciate the resident’s preparation and participate fully
- Perceive the surgeon as sidestepping duty and refuse to participate
- Participate reluctantly and resentfully
Team members appreciate resident effort at effective briefing leadership and participate fully.
• This small disturbance could remain in one OR
• Or the resident could give other trainees a heads up to be prepared for checklist/ITER link
• Or surgeon could share ITER strategy with program director
Resident gives other trainees a heads up about ITER strategy
Complexity can help

- To see precisely *how* openings become available in a system full of alternatives
- To focus on the everyday disturbances so that we can analyze what emerges and how
- To consider how amplification can work to support emergence

(Bennett 2010)
What causes this surgeon to seek an educational strategy instead of ‘checking out’ of the checklist initiative? How can this impetus be encouraged in others?

What is it that prompts the resident to take the task seriously and prepare? Can we amplify this motive?

How does the resident alert other trainees? Can this be formalized to encourage more feedback loops?

Amplifying this small disturbance
A caution

Complexity shows how systems emerge in unpredictable ways through non-linear dynamics of mutual interaction and influence, producing a whole that is greater than the sum of its parts.

It doesn’t give us more control! It gives us more understanding.

(Fenwick, 2013)
Implications
Moving forward

• Be alert to small disturbances in the system
• Try to amplify those disturbances
  – Share the knowledge thru rounds (‘Unexpected Brilliance; Unexpected Barriers”)
  – Foster favorable conditions
  – Don’t squash disturbance with linearity or control
• Be prepared to collect imperfect data
• Be creative about costs
  – Trainees, student projects, etc
In summary
Beyond The Checklist Manifesto

- **Review** the history of the checklist
- **Reveal** dimensions of the checklist paradox
- **Reaffirm** the point: collective competence
- **Reorient** our efforts via complexity theory
Organizational change is a long, long road.

It takes generations.

Surgical checklists are a critical step forward in the quest for safer patient care.
Reducing surgical briefings to checklists and compliance rates is no longer moving us forward.

We need to grapple better with the complexity of system change in the OR.
A proposal:

Let’s try to identify & amplify small disturbances
Complexity theory: a short reading list

Acknowledgements

• Canadian Institutes of Health Research
• My research team
• The many OR team members around the world who are engaged in surgical briefing innovation and who have shared their experiences with me
Thank you
Connections are critical; individual agents much less so.  +  Simple rules result in complex & adaptive responses.  +  Agents have latitude of response within the rules.  = Complex

Elements & their connections are equally important.  +  Simple algorithms produce simple & predictable responses.  +  Components response is fully determined.  = Complicated

http://www.beyondintractability.org/essay/complex-adaptive-systems