NEW SOURCES OF DATA
THE OR BLACK BOX

VANESSA PALTER, MD, FRCS, PhD
INTERNATIONAL CENTER FOR SURGICAL SAFETY, ST MICHAEL'S HOSPITAL, TORONTO

DISCLOSURE

• Director Analytics Surgical Safety Technologies

AGENDA

• Safety in the operating room
• The OR Black Box
• How can data reduce risk, improve education, quality and safety?
ADVERSE EVENTS IN THE OR

- Iatrogenic events occur in 4-10% of hospitalized patients
- Surgical care contributes to 50% of adverse events
- 75% of these occur in the operating room
- More than 50% of these events are preventable

WE RELY ON DATA BASED ON REPORTING AND RECALL
SURGEON RECALL IS LIMITED

<table>
<thead>
<tr>
<th>Participant</th>
<th>1-3 h postoperatively, No. (%)</th>
<th>3-8 h postoperatively, No. (%)</th>
<th>Do not remember</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>13 (87.5)</td>
<td>4 (25)</td>
<td></td>
</tr>
<tr>
<td>Fellow</td>
<td>9 (28)</td>
<td>12 (38)</td>
<td>10 (33)</td>
</tr>
<tr>
<td>Medical</td>
<td>13 (89)</td>
<td>4 (29)</td>
<td>13 (89)</td>
</tr>
</tbody>
</table>
UNDERREPORTING IN SURGERY

![Diagram showing chart review vs. direct observation for needle injuries and near misses.]

Direct observation is more accurate and provides insights of near-misses.

UNDERREPORTING IN ANESTHESIA

![Diagram showing 5% medication errors, with 81% directly observed and 19% chart reviewed.]

5% medication errors
193 out of 3671 medication administration, from 277 operations

TEAMWORK AND NON TECHNICAL SKILLS

56% of intraoperative and post-operative complications are due to communication failures.
The operating room remains one of the least understood environments in healthcare.

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ARTIFICIAL INTELLIGENCE AND
BIG DATA

AGENDA

• Safety in the operating room
• The OR Black Box
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Distractions

• North York General Hospital, Toronto
• 1 operating room
• Trbovich et al.
• Human factors analysis of distractions at critical steps of an operation across 3 professional groups
Distractions

- St Michael’s Hospital, Toronto
- Gil et al.
- How can distractions for surgeons in the operating room be reliably quantified and assessed?

Team Debriefing

- Academic Medical Centre, Amsterdam
- Schijven et al.
- Team debriefing: How can we use big data to assist with situational awareness and team debriefing?

Mean Number of Events in the Performance Report

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Upper-GI procedures (n=24)</th>
<th>Colorectal procedures (n=7)</th>
<th>Adrenal procedures (n=4)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of events (95% CI)</td>
<td>50.0 (48.4–51.6)</td>
<td>61.4 (55.2–67.7)</td>
<td>67.8 (57.3–78.3)</td>
<td>0.001</td>
</tr>
<tr>
<td>Threats (95% CI)</td>
<td>10.4 (9.9–11.0)</td>
<td>11.9 (10.7–13.0)</td>
<td>17.8 (16.9–18.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Positive communication events (95% CI)</td>
<td>7.4 (5.4–9.4)</td>
<td>6.4 (4.8–7.6)</td>
<td>6.5 (4.1–7.9)</td>
<td>0.70</td>
</tr>
<tr>
<td>Negative communication events (95% CI)</td>
<td>1.9 (1.4–2.4)</td>
<td>1.7 (1.1–2.4)</td>
<td>1.8 (1.3–2.3)</td>
<td>0.55</td>
</tr>
</tbody>
</table>
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All Participants (N=151)  Yes  NO
Do you feel that it should be possible to use an OR
Black Box® performance report when the operating
room team wants to debrief the particular surgical
procedure?
88.6%  1.4%

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Defining Competence

• Li Ka Shing Knowledge Institute, St. Michael’s
  Hospital, Toronto
• Goldenberg et al.
• Examining how different levels of technical
  competence can affect patient outcomes

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Surgery Performance Predicts Early Continence
After Robotic-Assisted Radical Prostatectomy

• Retrospective and Prospective Cohort Studies
• Video analyzed using GRS

GRS scores independent predictors of
clinically significant outcomes

References

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THANK YOU