HOW DOES A SURGICAL CHECKLIST WORK- TO IMPROVE PATIENT OUTCOMES?

Hilde Valen Wæhle
RNA, MSc, PhD Fellow
Dept. of Research and Development, Haukeland University Hospital, Bergen, Norway
Department of Clinical Science, Faculty of Medicine, University of Bergen, Bergen, Norway

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Nasjonal kompetansetjeneste for antibiotikabruk i spesialisthelsetjenesten

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Surgical Safety Checklist

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

Before induction of anaesthesia

(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?
- ☐ Yes

Is the site marked?
- ☐ Yes
- ☐ Not applicable

Is the anaesthesia machine and medication check complete?
- ☐ Yes

Is the pulse oximeter on the patient and functioning?
- ☐ Yes

Does the patient have a:

Known allergy?
- ☐ No
- ☐ Yes

Difficult airway or aspiration risk?
- ☐ No
- ☐ Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ☐ No
- ☐ Yes, and two IVs/central access and fluids planned

Before skin incision

(with nurse, anaesthetist and surgeon)

- ☐ **Confirm all team members have introduced themselves by name and role.**
- ☐ **Confirm the patient's name, procedure, and where the incision will be made.**

Has antibiotic prophylaxis been given within the last 60 minutes?
- ☐ Yes
- ☐ Not applicable

Anticipated Critical Events

To Surgeon:
- ☐ What are the critical or non-routine steps?
- ☐ How long will the case take?
- ☐ What is the anticipated blood loss?

To Anaesthetist:
- ☐ Are there any patient-specific concerns?

To Nursing Team:
- ☐ Has sterility (including indicator results) been confirmed?
- ☐ Are there equipment issues or any concerns?

Is essential imaging displayed?
- ☐ Yes
- ☐ Not applicable

Before patient leaves operating room

(with nurse, anaesthetist and surgeon)

Nurse Verbally Confirms:
- ☐ The name of the procedure
- ☐ Completion of instrument, sponge and needle counts
- ☐ Specimen labelling (read specimen labels aloud, including patient name)
- ☐ Whether there are any equipment problems to be addressed

To Surgeon, Anaesthetist and Nurse:
- ☐ What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 1 / 2009

WHO`s SSC has been reported to reduce morbidity and mortality[1,2]

[1] Borchard A, Schwappach DLB, Barbir A, et al.. ***Ann Surg.*** 2012
[2] Bergs J, Hellings J, Cleemput I, et al. ***Br J Surg***. 2014

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SURGICAL SAFETY CHECKLIST (SSC) IMPLEMENTATION

FEATURE

OPEN

Effect of the World Health Organization Checklist on Patient Outcomes

A Stepped Wedge Cluster Randomized Controlled Trial

Arvid Steinar Haugen, MSc,† Eirik Søfteland, MD, PhD,* Stian K. Almeland, MD,‡ Nick Sevdalis, PhD,§ Barthold Vonen, MD, PhD,¶ Geir E. Eide, PhD,||** Monica W. Nortvedt, PhD,†† and Stig Harthug, MD, PhD‡‡†*

Objectives: We hypothesized reduction of 30 days' in-hospital morbidity, mortality, and length of stay postimplementation of the World Health Organization's Surgical Safety Checklist (SSC).

Background: Reductions of morbidity and mortality have been reported after SSC implementation in pre-/postdesigned studies without controls. Here, we report a randomized controlled trial of the SSC.

Methods: A stepped wedge cluster randomized controlled trial was conducted in 2 hospitals. We examined effects on in-hospital complications registered by *International Classification of Diseases, Tenth Revision* codes, length of stay, and mortality. The SSC intervention was sequentially rolled out in a random order until all 5 clusters—cardiothoracic, neurosurgery, orthopedic, general, and urologic surgery had received the Checklist. Data were prospectively recorded in control and intervention stages during a 10-month period in 2009–2010.

Results: A total of 2212 control procedures were compared with 2263 SCC procedures. The complication rates decreased from 19.9% to 11.5% ($P < 0.001$), with absolute risk reduction 8.4 (95% confidence interval, 6.3–10.5) from the control to the SSC stages. Adjusted for possible confounding factors, the SSC effect on complications remained significant with odds ratio 1.95 (95% confidence interval, 1.59–2.40). Mean length of stay decreased by 0.8 days with SCC utilization (95% confidence interval, 0.11–1.43). In-hospital mortality decreased significantly from 1.9% to 0.2% in 1 of the 2 hospitals post-SSC implementation, but the overall reduction (1.6%–1.0%) across hospitals was not significant.

Conclusions: Implementation of the WHO SSC was associated with robust reduction in morbidity and length of in-hospital stay and some reduction in mortality.

Keywords: checklist, morbidity, mortality, randomized controlled trial, surgery

(*Ann Surg* 2015;261:821–828)

As global surgical volume increase and exceed 234 million surgical procedures annually,[1] surgical mortality has declined over the previous decades.[2] Still, crude mortality rates are reported to vary between 0.4% and 4% in high-income countries.[3–5] Increased risk of mortality is associated with major complications in hospitals with higher overall mortality.[6] In-hospital complications occur in 3% to 22% of admitted patients, with 36% to 54% related to surgery.[7–9] Prevention of complications and incidents of iatrogenic harm are deemed feasible for nearly 50% of such incidents.[3,9] Introduction of checklists in surgery can intercept and prevent such incidents[10–12] and may reduce both morbidity and mortality.[13–16]

In 2008, the World Health Organization (WHO) introduced the Surgical Safety Checklist (SSC) designed to improve consistency of care.[17] The pilot pre-/postevaluation of the WHO SSC across 8 countries worldwide, which found reduced morbidity and mortality after SSC implementation,[14] constituted the first scientific evidence of the WHO SSC effects. A number of subsequent

Variations in SSC effects[3,4]

[3] Urbach DR, Govindarajan A, Saskin R, et al.. ***N Engl J Med.*** 2014

[4] Haugen, A.S., Søfteland, E. et al. ***Ann Surg*** 2015

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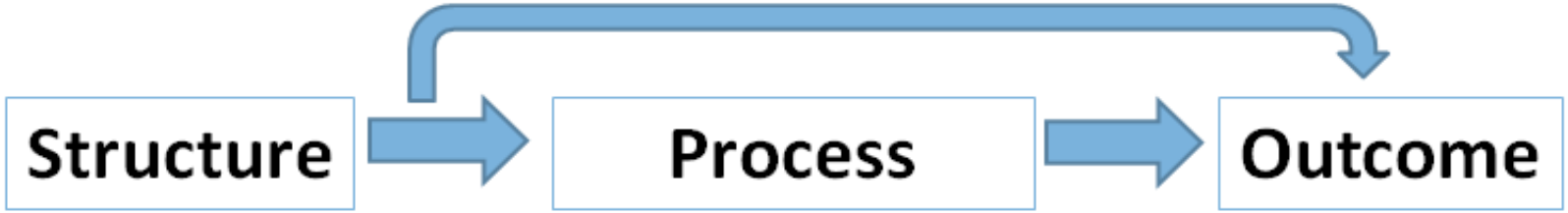
AIM

To investigate impact of SSC implementation on operating room care-processes, and patient outcomes.



Hypothesis

High-quality implementation of the WHO's SSC lead to improved care processes and subsequently the reduction of peri- and post-operative complications

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A SECONDARY ANALYSIS FROM THE SSC STUDY (N=3702)

Operating room care processes:

- Preoperative site marking
- Normothermia protection
- Antibiotics before incision

Patient outcomes:

- Infections
- Wound rupture
- Cardiac- and respiratory complications
- Blood loss and -transfusions

Statistics:

Pearson’s exact x2-test and binary logistic regression

CARE PROCESS METRICS

Care Process Metrics Category	Control (n = 1398) Cases (%)	Intervention* (n = 2304) Cases (%)	*P* Value†	All SSC Parts Used vs. Control (n = 1743) Cases (%)	*P* Value†
Site marking	971 (69.4)	1689 (73.3)	0.012	1336 (76.6)	<0.001
Prewarmed intravenous fluid	766 (54.8)	1477 (64.1)	<0.001	1152 (66.1)	<0.001
Prewarmed regular blankets	1049 (75.0)	1856 (80.6)	<0.001	1439 (82.6)	<0.001
Forced air warming blankets	494 (35.3)	977 (42.4)	<0.001	815 (46.8)	<0.001
Antibiotics			<0.001		<0.001
Antibiotics before incision	762 (54.5)	1454 (63.1)		1194 (68.5)	
Antibiotics after incision	174 (12.5)	228 (9.8)		143 (8.2)	
No antibiotics	462 (33.0)	624 (27.1)		406 (23.3)	

From Table 2; Haugen A.S, Wæhle H.V, Almeland, S.K, et al. ***Ann Surg*** 2017

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PATIENT OUTCOMES

Main Complications	Control (n = 1398) Cases (%)	*Intervention (n = 2304) Cases (%)	*P* Value	Used All Parts of the WHO SSC vs. Control (n = 1743) Cases (%)	*P* Value
Cardiac	112 (8.0)	116 (5.0)	<0.001	81 (4.6)	<0.001
Respiratory	116 (8.3)	93 (4.0)	<0.001	60 (3.4)	<0.001
Infection	104 (7.4)	82 (3.6)	<0.001	57 (3.3)	<0.001
Wound rupture	25 (1.8)	5 (0.2)	<0.001	5 (0.3)	<0.001
Bleeding†	36 (2.6)	24 (1.0)	<0.001	17 (1.0)	<0.001
Blood transfusions‡	95 (6.8)	123 (5.3)	0.072	78 (4.5)	0.005

From Table 4; Haugen A.S, Wæhle H.V, Almeland, S.K, et al. ***Ann Surg*** 2017

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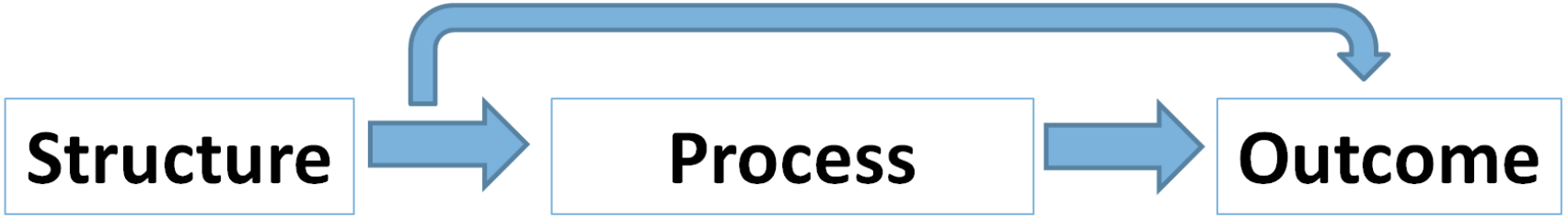

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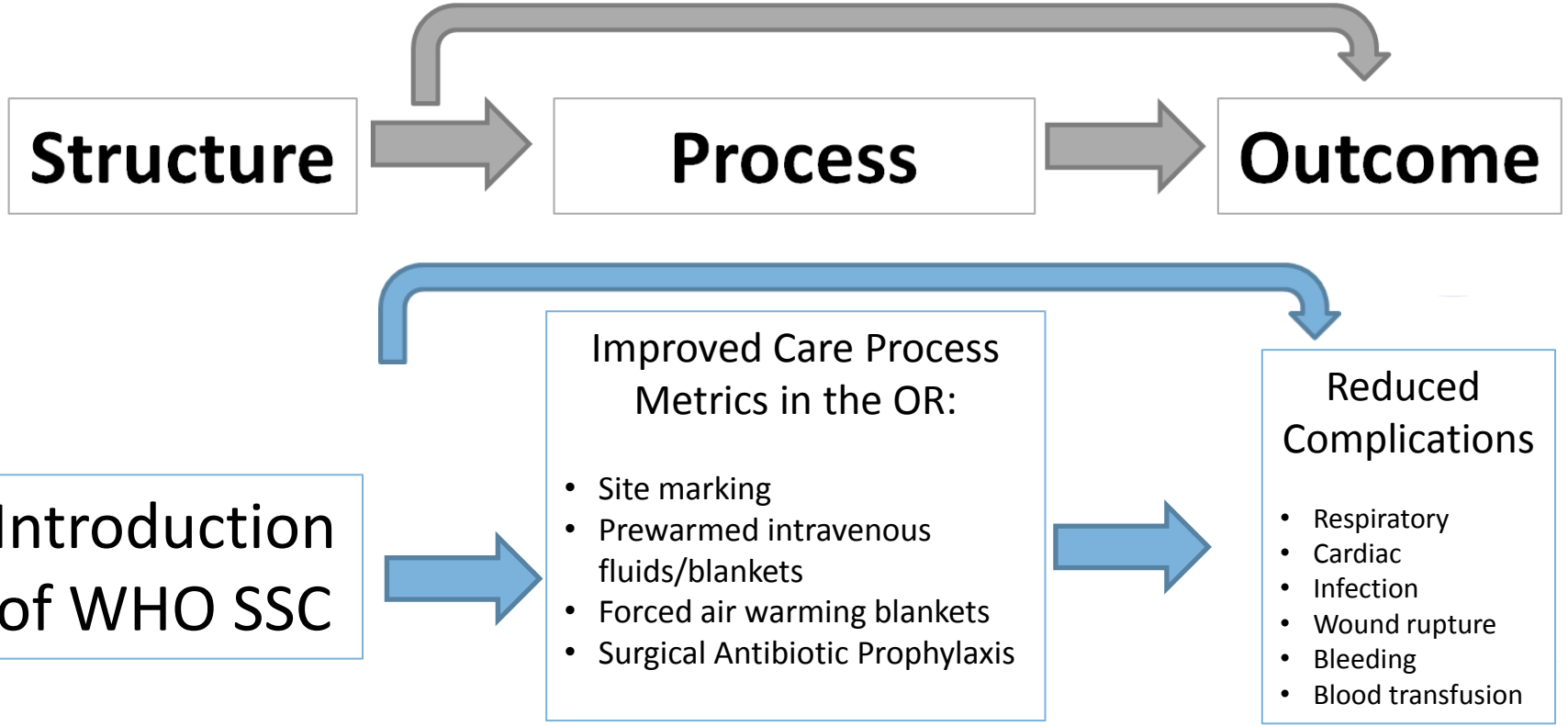

DAGENS Medisin

Nyheter Debatt DM Arena DMTV Om

FORSKERNE: Hilde Valen Wæhle, Stian Kreken Almeland og Arvid Haugen ved Haukeland universitetssjukehus har forsket på effektene ved å bruke kirurgiske sjekklister. **Foto:** Helse Bergen

FORSKNING

Derfor virker sjekklister

Ny forskning fra Haukeland universitetssjukehus gir svar på hvorfor kirurgiske sjekklister virker.

ORIGINAL ARTICLE

OPEN

Causal Analysis of World Health Organization's Surgical Safety Checklist Implementation Quality and Impact on Care Processes and Patient Outcomes

Secondary Analysis From a Large Stepped Wedge Cluster Randomized Controlled Trial in Norway

Arvid Steinar Haugen, MSc, PhD,† Hilde Valen Wæhle, MSc,‡§ Stian Kreken Almeland, MD,¶‖ Stig Harthug, MD, PhD,‡§ Nick Sevdalis, PhD,† Geir Egil Eide, PhD,**†† Monica Wammen Nortvedt, MSc, PhD,§‡‡ Ingrid Smith, MD, PhD,‡§ and Eirik Søfteland, MD, PhD**

Objective: We hypothesize that high-quality implementation of the World Health Organization's Surgical Safety Checklist (SSC) will lead to improved care processes and subsequently reduction of peri- and postoperative complications.

Background: Implementation of the SSC was associated with robust reduction in morbidity and length of in-hospital stay in a stepped wedge cluster randomized controlled trial conducted in 2 Norwegian hospitals. Further investigation of precisely how the SSC improves care processes and subsequently patient outcomes is needed to understand the causal mechanisms of improvement.

Methods: Care process metrics are reported from one of our earlier trial hospitals. Primary outcomes were in-hospital complications and care process metrics, e.g., patient warming and antibiotics. Secondary outcome was quality of SSC implementation. Analyses include Pearson's exact χ^2 test and binary logistic regression.

Results: A total of 3702 procedures (1398 control vs. 2304 intervention procedures) were analyzed. High-quality SSC implementation (all 3 checklist parts) improved processes and outcomes of care. Use of forced air warming blankets increased from 35.3% to 42.4% ($P < 0.001$). Antibiotic administration postincision decreased from 12.5% to 9.8%, antibiotic administration preincision increased from 54.5% to 63.1%, and nonadministration of antibiotics decreased from 33.0% to 27.1%. Surgical infections decreased from 7.4% (104/1398) to 3.6% ($P < 0.001$). Adjusted SSC effect on surgical infections resulted in an odds ratio (OR) of 0.52 (95% confidence interval (CI): 0.38–0.72) for intervention procedures, 0.54 (95% CI: 0.37–0.79) for

From the *Department of Anesthesia and Intensive Care, Haukeland University Hospital, Bergen, Norway; †Centre for Implementation Science, Health Service and Population Research Department, King's College London, London, UK; ‡Department of Clinical Science, Faculty of Medicine, University of Bergen, Bergen, Norway; §Department of Research and Development, Haukeland University Hospital, Bergen, Norway; ¶Department of Surgery, Førde Central Hospital, Førde, Norway; ‖Department of Plastic and Reconstructive

HELSE BERGEN
Haukeland University Hospital

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Supervisors:

Stig Harthug: Professor 2: Department of Research and Development, Haukeland University Hospital, Bergen, Norway; Department of Clinical Science, Faculty of Medicine, University of Bergen, Bergen, Norway.

Arvid Steinar Haugen: RNA, PhD: Department of Anaesthesia and Intensive Care, Haukeland University Hospital, Bergen, Norway.

Eirik Søfteland: Professor 1: Department of Anaesthesia and Intensive Care, Haukeland University Hospital, Bergen, Norway; Department of Clinical Medicine, Faculty of Medicine, University of Bergen, Bergen, Norway.

Ingrid Smith: MD, PhD: WHO, Geneve, Switzerland.

Co authors:

Stian Kreken Almeland: *Department of Surgery, Førde Central Hospital, Førde, Norway; Department of Plastic and Reconstructive Surgery, Haukeland University Hospital, Norway,*

Nick Sevdalis: *Centre for Implementation Science, Health Service & Population Research Department, King's College London, United Kingdom,*

Geir Egil Eide: *Centre for Clinical Research, Haukeland University Hospital, Bergen, Norway; Department of Global Public Health and Primary Care, Faculty of Medicine, University of Bergen, Bergen, Norway,*

Monica Wammen Nortvedt: *Department of Health and Care, Agency for Health services, City of Bergen, Norway, Centre for Evidence Based Practice, Western Norway University of Applied Sciences, Bergen, Norway.*

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