10 years of Evidence – From Information to Implementation

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September 20, 2017

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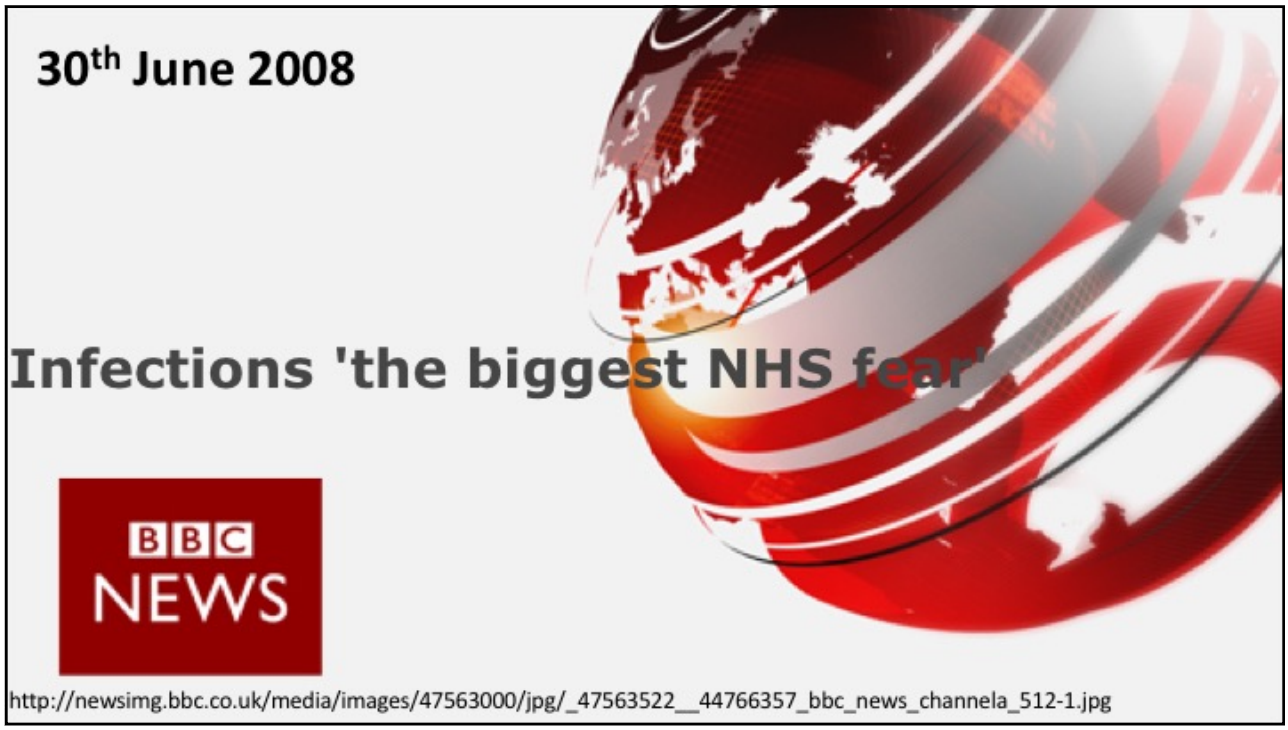
Disclosures

- RWR is in receipt of unencumbered research grant funding from GAMA Healthcare to investigate patient hand hygiene;
- I have not chosen 10 most cited papers…
- This is a personal reflection and choice of papers/ publications that I think have had an impact on how we have developed infection prevention and control practice.



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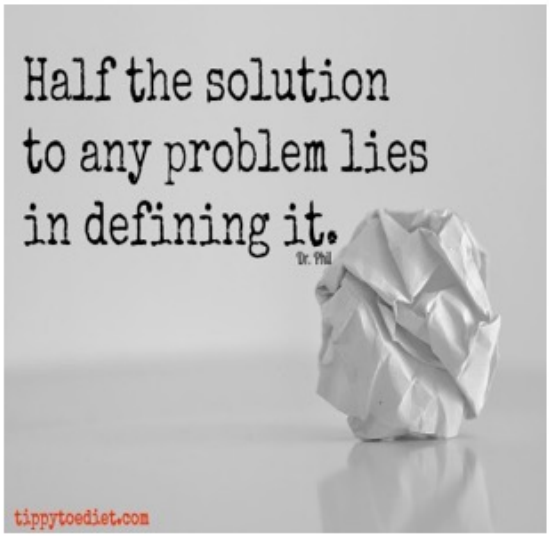

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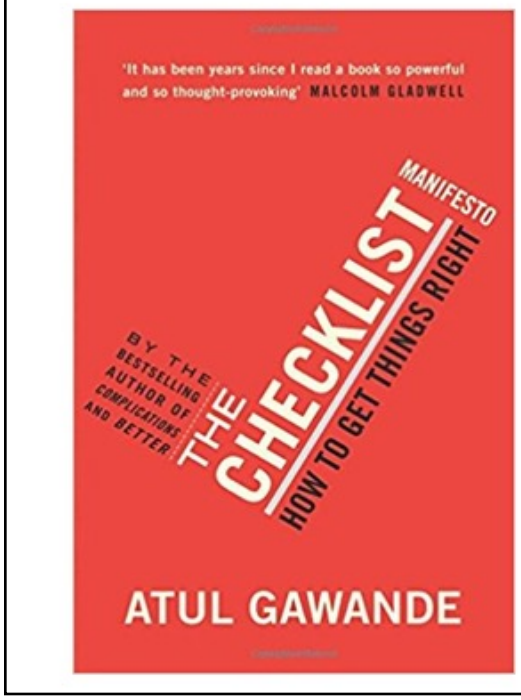

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SPECIAL ARTICLE

A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

ABSTRACT

BACKGROUND

Surgery has become an integral part of global health care, with an estimated 234 million operations performed yearly. Surgical complications are common and often preventable. We hypothesized that a program to implement a 19-item surgical safety checklist designed to improve team communication and consistency of care would reduce complications and deaths associated with surgery.

METHODS

Between October 2007 and September 2008, eight hospitals in eight cities (Toronto, Canada; New Delhi, India; Amman, Jordan; Auckland, New Zealand; Manila, Philippines; Ifakara, Tanzania; London, England; and Seattle, WA) representing a variety of economic circumstances and diverse populations of patients participated in the World Health Organization's Safe Surgery Saves Lives program. We prospectively collected data on clinical processes and outcomes from 3733 consecutively enrolled patients 16 years of age or older who were undergoing noncardiac surgery. We subsequently collected data on 3955 consecutively enrolled patients after the introduction of the Surgical Safety Checklist. The primary end point was the rate of complications, including death, during hospitalization within the first 30 days after the operation.

RESULTS

The rate of death was 1.5% before the checklist was introduced and declined to 0.8% afterward (P=0.003). Inpatient complications occurred in 11.0% of patients at baseline and in 7.0% after introduction of the checklist (P<0.001).

CONCLUSIONS

Implementation of the checklist was associated with concomitant reductions in the rates of death and complications among patients at least 16 years of age who were undergoing noncardiac surgery in a diverse group of hospitals.

The New England Journal of Medicine

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Original Research

'Matching Michigan': a 2-year stepped interventional programme to minimise central venous catheter-blood stream infections in intensive care units in England

THE MATCHING MICHIGAN COLLABORATION & WRITING COMMITTEE

ABSTRACT

INTRODUCTION

UNLOCKED

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IMPLEMENTATION SCIENCE

RESEARCH Open Access

Explaining *Matching Michigan*: an ethnographic study of a patient safety program

Abstract

Background

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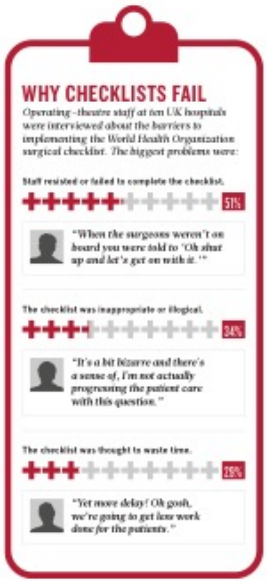
The trouble with CHECKLISTS

An easy method that promised to save lives in hospitals worldwide may not be so simple after all.

BY EMILY ANTHES

516 | NATURE | VOL 523 | 30 JULY 2015



Original work: Russ, S. J. *et al. Ann. Surg.* **261,** 81–91 (2015).

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to
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USE DATA and STORIES

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ORIGINAL ARTICLE

A Multicenter Qualitative Study on Preventing Hospital-Acquired Urinary Tract Infection in US Hospitals

Sanjay Saint, MD, MPH; Christine P. Kowalski, MPH; Isac Forman, S.D., MHS; Lucas Damschroder, MS, MPH; Timothy P. Hofer, MD, MSc; Samuel R. Kaufman, MA; John W. Cornwell, PhD; Sarah L. Krein, PhD, RN

Infections acquired during hospitalization are common, costly, and associated with significant morbidity.[1,2] Urinary tract infection (UTI) is the most common hospital-acquired infection, accounting for about 40% of all nosocomial infections.[3] Many hospital-acquired UTIs are caused by the use of a urinary catheter, a commonly used device among hospitalized patients.[4,5] Hospital-acquired UTIs can be prevented by using indwelling catheters only when necessary, implementing reminder systems to get catheters removed as soon as possible, using antimicrobial-impregnated catheters in high-risk patients, and considering alternatives to Foley catheterization (such as condom catheters for men).[6,7]

While numerous reviews have been published evaluating UTI preventive practices and recommending which methods to use,[8–11] the use of these practices varies considerably across the United States.[12] What accounts for this variation? We conducted a multicenter study that employed both quantitative and qualitative methods to answer this question. In the qualitative phase of the study, we identified recurrent and unifying themes that characterize how US hospitals have addressed hospital-acquired UTI. We used qualitative methods because they are oriented toward understanding, rather than measuring, phenomena. Because data collections in open-ended—research participants are free to express themselves in their own words—qualitative studies involve a process of discovery. Through detailed, in-depth analysis of the resulting data, we can find out what takes place in complex healthcare environments. Therefore, qualitative studies are appropriate for describing how hospitals have addressed hospital-acquired UTI.

METHODS

Study Design and Sample

As part of a larger 3-phase sequential study employing both quantitative and qualitative methods,[13,14] we first collected and analyzed quantitative data on a national sample of hospitals to report what hospitals are doing to prevent hospital-acquired infections, including UTI. Details of this study are explained elsewhere.[15,16] Briefly, the quantitative phase of the

A Program to Prevent Catheter-Associated Urinary Tract Infection in Acute Care

Sanjay Saint, M.D., M.P.H., M. Todd Greene, Ph.D., M.P.H., Sarah L. Krein, Ph.D., R.N., Mary A.M. Rogers, Ph.D., David Ratz, M.S., Karen E. Fowler, M.P.H., Barbara S. Edson, R.N., M.B.A., M.H.A., Sam R. Watson, M.S.A., C.P.P.S., Barbara Meyer-Lucas, M.D., M.H.S.A., Marie Mayuga, R.N., M.S.N., Kelly Faulkner, M.S.P.A., Carolyn V. Gould, M.D., M.S.C.R., James Battles, Ph.D., and Mohamad G. Fakih, M.D., M.P.H.

ABSTRACT

BACKGROUND
Catheter-associated urinary tract infection (UTI) is a common device-associated infection in hospitals. Both technical factors — appropriate catheter use, aseptic insertion, and proper maintenance — and socioadaptive factors, such as cultural and behavioral changes in hospital units, are important in preventing catheter-associated UTI.

METHODS
The national Comprehensive Unit-based Safety Program, funded by the Agency for Healthcare Research and Quality, aimed to reduce catheter-associated UTI in intensive care units (ICUs) and non-ICUs. The main program features were dissemination of information to sponsor organizations and hospitals, data collection, and guidance on key technical and socioadaptive factors in the prevention of catheter-associated UTI. Data on catheter use and catheter-associated UTI rates were collected during three phases: baseline (3 months), implementation (2 months), and sustainability (12 months). Multilevel negative binomial models were used to assess changes in catheter use and catheter-associated UTI rates.

RESULTS
Data were obtained from 936 units (59.7% were non-ICUs, and 40.3% were ICUs) in 603 hospitals in 42 states, the District of Columbia, and Puerto Rico. The unadjusted catheter-associated UTI rate decreased overall from 2.82 to 2.19 infections per 1000 catheter-days. In an adjusted analysis, catheter-associated UTI rates decreased from 2.60 to 2.05 infections per 1000 catheter-days (incidence rate ratio, 0.86; 95% confidence interval [CI], 0.76 to 0.98; P=0.019). Among non-ICUs, catheter use decreased from 20.7% to 18.8% (incidence rate ratio, 0.93; 95% CI, 0.90 to 0.96; P<0.001), and catheter-associated UTI rates decreased from 2.28 to 1.54 infections per 1000 catheter-days (incidence rate ratio, 0.68; 95% CI, 0.56 to 0.82; P<0.001). Catheter use and catheter-associated UTI rates were largely unchanged in ICUs. Tests for heterogeneity (ICU vs. non-ICU) were significant for catheter use (P=0.004) and catheter-associated UTI rates (P=0.002).

CONCLUSIONS
A national prevention program appears to reduce catheter use and catheter-associated UTI rates in non-ICUs. (Funded by the Agency for Healthcare Research and Quality.)

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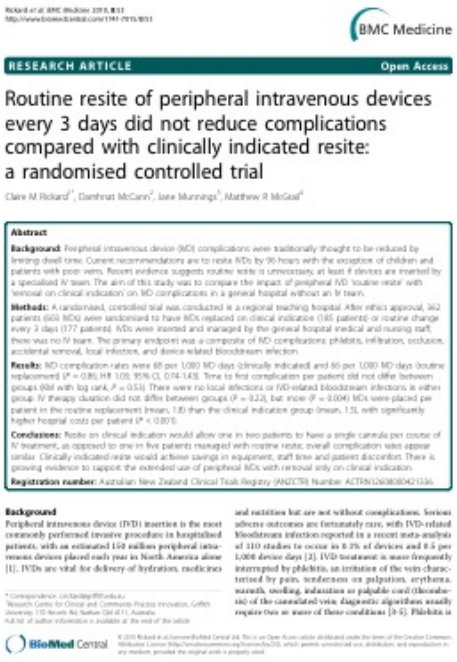

BMC Medicine

RESEARCH ARTICLE Open Access

Routine resite of peripheral intravenous devices every 3 days did not reduce complications compared with clinically indicated resite: a randomised controlled trial

Claire M Rickard[1*], Damhnat McCann[2], Jane Munnings[3], Matthew R McGrail[4]

Abstract

Background: Peripheral intravenous device (IVD) complications were traditionally thought to be reduced by limiting dwell time. Current recommendations are to resite IVDs by 96 hours with the exception of children and patients with poor veins. Recent evidence suggests routine resite is unnecessary, at least if devices are inserted by a specialised IV team. The aim of this study was to compare the impact of peripheral IVD 'routine resite' with removal on clinical indication on IVD complications in a general hospital without an IV team.

Methods: A randomised, controlled trial was conducted in a regional teaching hospital. After ethics approval, 362 patients (658 IVDs) were randomised to have IVDs replaced on clinical indication (185 patients) or routine change every 3 days (177 patients). IVDs were inserted and managed by the general hospital medical and nursing staff; there was no IV team. The primary endpoint was a composite of IVD complications: phlebitis, infiltration, occlusion, accidental removal, local infection, and device-related bloodstream infection.

Results: IVD complication rates were 88 per 1,000 IVD days (clinically indicated) and 86 per 1,000 IVD days (routine replacement) (IRR = 0.86; IVR 1.03; 95% CI, 0.74-1.43). Time to first complication per patient did not differ between groups (KM with log rank, $P = 0.53$). There were no local infections or IVD-related bloodstream infections in either group. IV therapy duration did not differ between groups ($P = 0.22$), but more ($P = 0.004$) IVDs were placed per patient in the routine replacement (mean, 1.8) than the clinical indication group (mean, 1.5), with significantly higher hospital costs per patient ($P < 0.001$).

Conclusions: Resite on clinical indication would allow one in two patients to have a single cannula per course of IV treatment, as opposed to one in five patients managed with routine resite; overall complication rates appear similar. Clinically indicated resite would achieve savings in equipment, staff time and patient discomfort. There is growing evidence to support the extended use of peripheral IVDs with removal only on clinical indication.

Registration number: Australian New Zealand Clinical Trials Registry (ANZCTR) Number: ACTRN12608000421336.

Background

Peripheral intravenous device (IVD) insertion is the most commonly performed invasive procedure in hospitalised patients, with an estimated 150 million peripheral intravenous devices placed each year in North America alone [1]. IVDs are vital for delivery of hydration, medicines and nutrition but are not without complications. Serious adverse outcomes are fortunately rare, with IVD-related bloodstream infection reported in a recent meta-analysis of 110 studies to occur in 0.3% of devices and 0.5 per 1,000 device days [2]. IVD treatment is more frequently interrupted by phlebitis, an irritation of the vein characterised by pain, tenderness on palpation, erythema, warmth, swelling, induration or palpable cord (thrombosis) of the cannulated vein diagnostic algorithms usually require two or more of these conditions [3-5]. Phlebitis is

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Intervention Review

Clinically-indicated replacement versus routine replacement of peripheral venous catheters

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Editorial group: Cochrane Vascular Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 8, 2015.

Citation: Webster J, Osborne S, Rickard CM, New K. Clinically-indicated replacement versus routine replacement of peripheral venous catheters. *Cochrane Database of Systematic Reviews* 2015, Issue 8. Art. No.: CD007798. DOI: 10.1002/14651858.CD007798.pub4.

ABSTRACT

Background

US Centers for Disease Control guidelines recommend replacement of peripheral intravenous (IV) catheters no more frequently than every 72 to 96 hours. Routine replacement is thought to reduce the risk of phlebitis and bloodstream infection. Catheter insertion is an unpleasant experience for patients and replacement may be unnecessary if the catheter remains functional and there are no signs of inflammation. Costs associated with routine replacement may be considerable. This is an update of a review first published in 2010.

Objectives

To assess the effects of removing peripheral IV catheters when clinically indicated compared with removing and re-siting the catheter routinely.

Search methods

For this update the Cochrane Vascular Trials Search Co-ordinator searched the Cochrane Vascular Specialised Register (March 2015) and CENTRAL (2015, Issue 3). We also searched clinical trials registries (April 2015).

Selection criteria

Randomised controlled trials that compared routine removal of peripheral IV catheters with removal only when clinically indicated in hospitalised or community dwelling patients receiving continuous or intermittent infusions.

Data collection and analysis

Two review authors independently assessed trial quality and extracted data.

Main results

Seven trials with a total of 4895 patients were included in the review. The quality of the evidence was high for most outcomes but was downgraded to moderate for the outcome catheter-related bloodstream infection (CRBSI). The downgrade was due to wide confidence intervals, which created a high level of uncertainty around the effect estimate. CRBSI was assessed in five trials (4806 patients). There

Clinically-indicated replacement versus routine replacement of peripheral venous catheters (Review)

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JIP

Infection outbreaks in acute hospitals: a systems approach

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Accepted for publication: 14 September 2009

Key words: Acute hospitals, healthcare-associated infections, healthcare ergonomics, systems analysis, sociotechnical systems, organizational change

Abstract

This paper puts forward the case for applying a systems approach to the analysis of hospital-based infection outbreaks. A major advantage of the systems approach is that it affords insights into how actions or occurrences at one system level (e.g. individual error) collectively interact with learn (e.g. leadership styles) and organizational (e.g. safety culture) levels of analysis. Most of the research concerned with behavioural aspects of infection control has focused on a single level of analysis (e.g. interventions to improve hand washing). The infection outbreaks at the Maidstone and Tunbridge Wells NHS Trust are used as a case study in order to demonstrate the usefulness of the systems approach. The paper further outlines the human and organizational issues raised by the analysis and provides a means through which these aspects of infection can be highlighted as part of a future research agenda.

Introduction

Over the past few years the subject of hospital infection control has become the subject of much media attention (e.g. Guardian, 2007; BBC's Newsnight, 2008). A number of high-profile hospital outbreaks within the United Kingdom (UK) involving bacterium such as Clostridium difficile and methicillin-resistant Staphylococcus aureus (MRSA) and the number of mortalities resulting from these outbreaks, has made infection control into a central priority for the NHS and other healthcare systems worldwide (Pittet et al., 2007). Much of the debate so far has concentrated on improving hygiene within hospitals (e.g. hand-washing). Very little research has been conducted on the wider behavioural, social and organizational factors that may also determine infection control outbreaks (Griffith et al., 2008). The intention of the present study is to outline the potential of adopting a systems ergonomics perspective towards hospital-based infections.

The systems approach and systems ergonomics

Systems approaches, explains large-scale cases such as the analysis and improvement of work environments that involve social and technical (sociotechnical) elements including organizational structures, policies and procedures. Likewise, the systems approach involves a detailed examination of how these factors interact with one another and how they are distributed across a range of system levels and subsystems (e.g. management, staff and individual levels). A number of different types of accidents (human error, large-scale system failures have been analysed in the past, spanning a range of domains including transportation (e.g. the Paddington rail accident – Santos-Reyes and Beard, 2008; Wilson et al. 2007), nuclear power (e.g. the Chernobyl disaster – Reason, 1987, 2008) and patient safety (Vincent, 2004).

Reception represent good examples of complex large-scale sociotechnical systems because they involve a large diversity of professionals that span a range of roles and specialisms as well as individuals and artefacts ranging from the latest eHealth applications (e.g. electronic patient record systems) to more established physical design components (e.g. wards and buildings). Within systems ergonomics, a number of modelling frameworks exist (e.g. Rasmussen, 1997) for understanding the dynamic interaction between levels within large-scale sociotechnical systems (figure 1).

Hignett and Christopherson (2006) have used the framework to identify the factors leading to the May 2006 outbreak of Escherichia coli that occurred in Wilkerton, Canada. They analyse used a graphical representation of the contributing factors that led up to the Wilkerton outbreak. These ranged from decisions made at governmental levels (e.g. privatization initiatives), the action of actors within the system (e.g. failure to take water sampled, as well as equipment failures (e.g. shallow water wells). In order to demonstrate the value of applying the systems approach and three types of modelling frameworks to infection control this paper focuses on a specific case study namely the Maidstone and Tunbridge Wells NHS Trust outbreaks in the UK, which occurred between 2004 and 2007 (Healthcare Commission (HC), 2007).

Clostridium difficile outbreaks in the Maidstone and Tunbridge Wells NHS Trust

Background to the outbreaks and timeline

During the period between April 2004 and September 2006 in addition 90 people died at the Maidstone and Tunbridge Wells NHS

Peer reviewed paper

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DOI: 10.1177/1757901609356924

VOL. 6 NO. 1 JANUARY 2010 Journal of Infection Prevention 19

Ergonomics, 2013

http://dx.doi.org/10.1080/00140139.2013.838643

Taylor & Francis

SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients

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(Received 19 June 2013; accepted 22 August 2013)

Healthcare practitioners, patient safety leaders, educators and researchers increasingly recognise the value of human factors/ergonomics and make use of the discipline's person-centred models of sociotechnical systems. This paper first reviews one of the most widely used healthcare human factors systems models, the Systems Engineering Initiative for Patient Safety (SEIPS) model, and then introduces an extended model, 'SEIPS 2.0'. SEIPS 2.0 incorporates three novel concepts into the original model: configuration, engagement and adaptation. The concept of *configuration* highlights the dynamic, hierarchical and interactive properties of sociotechnical systems, making it possible to depict how health-related performance is shaped at 'a moment in time'. *Engagement* conveys that various individuals and teams can perform health-related activities separately and collaboratively. Engaged individuals often include patients, family caregivers and other non-professionals. *Adaptation* is introduced as a feedback mechanism that explains how dynamic systems evolve in planned and unplanned ways. Key implications and future directions for human factors research in healthcare are discussed.

Practitioner Summary: SEIPS 2.0 is a new human factors/ergonomics framework for studying and improving health and healthcare. It describes how sociotechnical systems shape health-related work done by professionals and non-professionals, independently and collaboratively. Work processes, in turn, shape patient, professional and organisational outcomes. Work systems and processes undergo planned and unplanned adaptations.

Keywords: healthcare; work system; patient-centred care; patient and family engagement; SEIPS model

1. Introduction

Human factors/ergonomics is a discipline increasingly recognised, promoted and applied by healthcare leaders and stakeholders, including practitioners, patient safety leaders, educators and researchers (Gurses, Ozok, and Pronovost 2012; Norris 2012; Buss et al. 2013; World Health Organization 2009). At the same time, the science and practice of human factors in the healthcare domain continue to evolve (Carayon 2012). Within the healthcare industry, major system redesign efforts and paradigm shifts are also evident worldwide (de Savigny and Adam 2009; Institute of Medicine 2009; Magnusson, Wyngbuck, and Soliman 2009). For example, the 'doctor-knows-best' philosophy in the American Medical Association's (AMA) original Code of Medical Ethics is being replaced by a paradigm of doctor–patient partnership and actively engaged patients, as illustrated below:

- AMA Code of Medical Ethics, 1847 (original): The obedience of a patient to the prescriptions of his physician should be prompt and implicit. He should never permit his own crude opinions . . . to influence his attentions to them.
- AMA Code of Medical Ethics, 2012–2015: Physician and patient are bound in a partnership that requires both individuals to take an active role in the healing process.

Recognising that both the human factors discipline and healthcare domain are evolving, this article introduces a next-generation healthcare human factors model, 'SEIPS 2.0', which incorporates contemporary human factors concepts –

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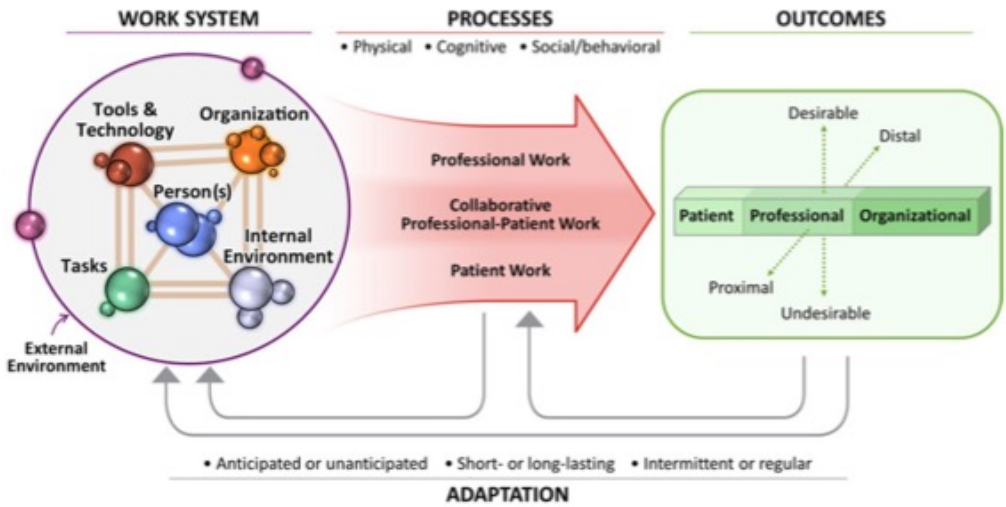

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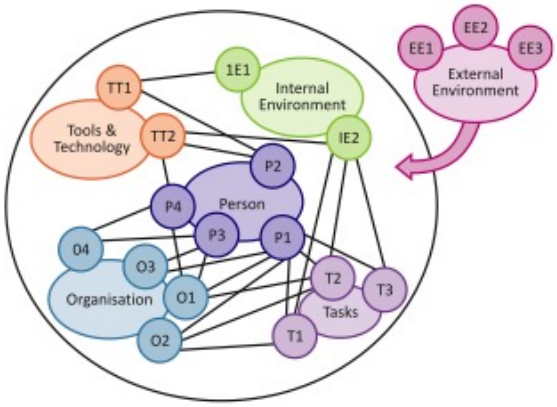

External Environment
EE1 Economic impact of glove use
EE2 Impact of clinical waste on climate change
EE3 National policy

Internal environment
IE1 Location of glove dispensers
IE2 Location of alcohol handrub

Tools & Technology
TT1 Gloves accessible at point of care
TT2 Alcohol handrub available at point of care

Organisation
O1 Agreed standard for use of gloves & alcohol handrub
O2 Clear policy on use of gloves & alcohol handrub
O3 Compliance with standards measured
O4 Hazards of inappropriate glove use explicit

Tasks
T1 Decision points for hand hygiene defined
T2 Appropriate use of gloves defined
T3 Use of gloves during contact precautions defined

Person
P1 Staff trained & competent
P2 Signposting for patients on appropriate glove use
P3 Challenge of poor practice facilitated
P4 Clinical team agree standards of practice

Wilson J. Bak A, & HP Loveday. (2017) Applying human factors and ergonomics to the misuse of nonsterile clinical gloves in acute care. *AJIC*. 45(7) 779 - 786

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SOUNDING BOARD

Balancing "No Blame" with Accountability in Patient Safety

Robert M. Wachter, M.D., and Peter J. Pronovost, M.D., Ph.D.

This year marks the 10th anniversary of the Institute of Medicine's report *To Err Is Human*,[1] the document that launched the modern patient-safety movement. Although the movement has spawned myriad initiatives, its main theme, drawn from studies of other high-risk industries that have impressive safety records, boils down to this: Most errors are committed by good, hardworking people trying to do the right thing. Therefore, the traditional focus on identifying who is at fault is a distraction. It is far more productive to identify error-prone situations and settings and to implement systems that prevent caregivers from committing errors, catch errors before they cause harm, or mitigate harm from errors that do reach patients.[2,3]

Most health care providers embraced the "no blame" model as a refreshing change from an errors landscape previously dominated by a malpractice system that was generally judged as punitive and arbitrary. And this shift has unquestionably borne fruit. For example, rather than trying to perfect doctors' handwriting and memories, computerized systems catch medication errors before they reach patients.[4] Implementing simple checklists markedly increases the use of evidence-based prevention strategies, leading to fewer surgical complications and bloodstream infections associated with central venous catheters.[5,6]

But beginning a few years ago, some prominent health care leaders began to question the singular embrace of the "no blame" paradigm. Leape, a patient-safety pioneer and early proponent of systems thinking,[7] described the need for a more aggressive approach to poorly performing physicians,[8] and the Joint Commission has made addressing the problem of disruptive caregivers a priority.[9] Goldmann identified the need to create accountability for failure to perform hand hygiene.[6] Rather than a "no blame" culture, Marx promoted a "just culture," which differentiates blameworthy from blameless acts.[10,11]

Many health care organizations (including our own) have recognized that a unidimensional focus on creating a blame-free culture carries its own safety risks. But despite this recognition, finding the appropriate balance has been elusive, and few organizations have implemented meaningful systems of accountability, particularly for physicians. In this article, we describe some of the barriers to physician accountability, enumerate patient-safety practices that are ready for an accountability approach, and suggest penalties for the failure to adhere to such practices. We focus on situations in which the actions (or inaction) of individual physicians pose a clear risk to patients, rather than on the broader issues of clinical competence or disruptive behavior; readers who are interested in the latter issues are referred to other sources.[7,10,11]

"NO BLAME" VERSUS ACCOUNTABILITY

A decade ago, rates of hand hygiene in most American hospitals were shameful, often below 20%. As attention began to focus on unacceptably high rates of health care–associated infections, most organizations treated low hand-hygiene rates as a systems problem.[12] Many launched "hand hygiene campaigns," accompanied by internal dissemination of hand-hygiene rates and admonitions by senior administrators to improve the rates (sometimes accompanied by financial incentives). Hand-gel dispensers were placed in or near every patient's room. A few institutions even brought in human-factors engineers to assess the overall hand-hygiene system and recommend process changes. To the degree that the failure to clean hands was due to flawed systems or provider ignorance, these actions made sense.

Despite these efforts, most hospitals continue to have hand-hygiene rates that range from 30 to 70%, and few have sustained rates over 80%. We have had the experience of asking frustrated hos-

From Safety-I to Safety-II: A White Paper

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Professor Robert L Wears
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Current approach – Safety I

Resilience Engineering-Building a Culture of Resistance – Erik Hollnagel 2013

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Work-as-imagined

Professor Erik Hollnagel

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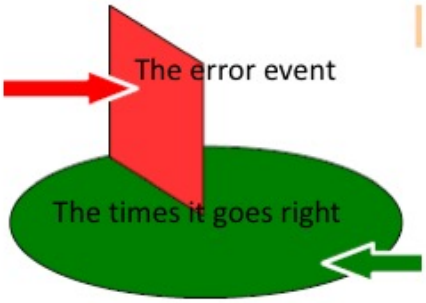
Work-as-done

- Safety II, defines safety as the ability to make things go right and not merely the absence of failures or adverse outcomes
  - Human Factors Ergonomics
  - Resilience Engineering
- Proactive Safety based on System Resilience
  - the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions.

How do we do this?

Everyone actually doing the work knows it is only possible to work by continually adjusting what they do in a given situation.



Work-as-done

- People adapt and adjust to actual demand and change their performance accordingly
- People interpret policies and procedures and apply them to match conditions
- People can detect and correct when something goes wrong or when it is about to go wrong and intervene to prevent

Suzette Woodward – Oxford Patient Safety Conference May 2017

Look through a different lens

- Avoid treating failures (incidents) as unique, individual events, and see them as an expression of everyday performance variability.
  - Start by studying everyday performance
  - Find out what the every day adjustments are to help explain how things occasionally go wrong
  - What went right during the incident?
  - How do things usually go right?
  - Why do things sometimes go exceptionally well?

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HAPPY BIRTHDAY IPS!

10 years of Evidence – From Information to Implementation
Prof. Heather Loveday, University of West London
Broadcast live from the 2017 Infection Prevention Society conference

www.webbertraining.com/schedulep1.php

September 28, 2017	HOW TO PUBLISH IN THE JOURNALS AND WHY IT MATTERS Speaker: **Prof. Elaine Larson**, Columbia University, Mailman School of Public Health
October 5, 2017	*(FREE Teleclass)* INFECTION CONTROL GUIDELINES THAT DID NOT WORK AGAINST EBOLA Speaker: **Prof. Bjørg Marit Andersen**, Oslo University Hospital
October 12, 2017	*(FREE Teleclass)* STRENGTHENING IPAC STRUCTURES THROUGH EDUCATION IN LOW-INCOME OR MIDDLE-INCOME COUNTRIES Speaker: **Prof. Shaheen Mehtar**, Infection Control Africa Network, and Stellenbosch University, Cape Town
October 26, 2017	INFECTION CONTROL IN PARAMEDIC SERVICES Speaker: **Jennifer Amyotte**, City of Greater Sudbury Paramedic Services, Canada
	(FREE European Teleclass)

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