UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI SCIENZE CLINICHE
E DI COMUNITÀ

Fondazione IRCCS Ca' Granda
Ospedale Maggiore Policlinico

Sistema Socio Sanitario
Regione Lombardia

REGIONE TOSCANA
GRC Gestione Rischio Clinico
SICUREZZA DEL PAZIENTE

WHO Collaborating Centre
in Human Factors and Communication
for the Delivery of Safe and Quality care

CONVEGNO

"ATTUALITÀ IN TEMA DI FATTORI PSICOSOCIALI DEL LAVORO"

Venerdì 13 Ottobre 2017
Ore 8.45 – 17.30

Aula Magna "Cappellini"
Clinica Del Lavoro 'Luigi Devoto'
Università degli Studi di Milano
Fondazione IRCCS Ca' Granda
Ospedale Maggiore Policlinico
Via San Barnaba n°8, Milano

Fattore umano
e
sicurezza del paziente

Riccardo Tartaglia, MD, PH, OM, Eur-Erg
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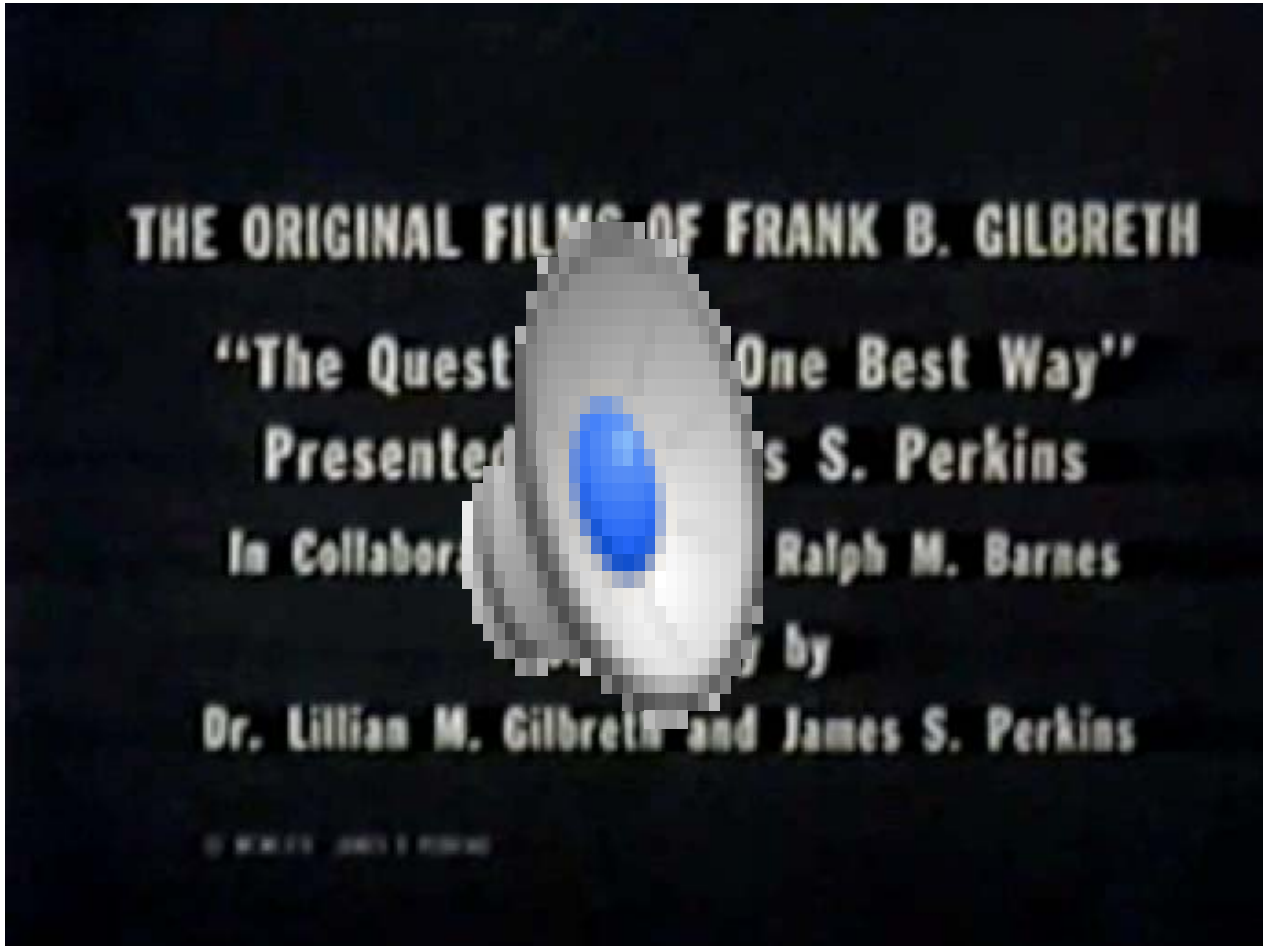
The invention of theatre nurse

Frank Lillian Gilbreth, 1910



Interruptions and multitasking

ERGONOMICS, 2017
https://doi.org/10.1080/00140139.2017.1349934

Interruptions and multitasking in surgery: a multicentre observational study of the daily work patterns of doctors and nurses*

Tommaso Bellandi[a], Alessandro Cerri[a], Giulia Carreras[b], Scott Walter[c], Cipriana Mengozzi[a], Sara Albolino[a], Eleonora Mastrominico[d], Fernando Renzetti[d], Riccardo Tartaglia[a] and Johanna Westbrook[c]

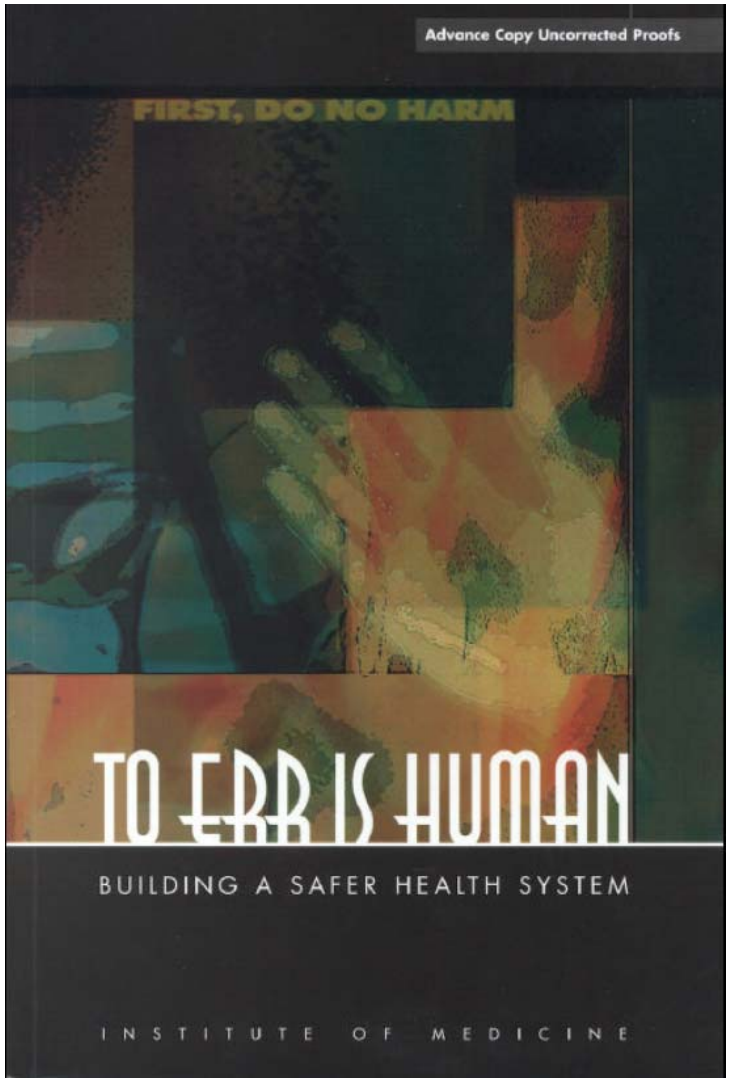
[a]Center for Patient Safety and Clinical Risk Management, Florence, Italy; [b]Cancer Prevention and Research Institute (ISPO), Florence, Italy; [c]Centre for Health Systems and Safety Research, Australian Institute of Health Innovation, Macquarie University, Sydney, Australia; [d]National Institute for Insurance against Accidents at Work (INAIL), Florence, Italy

The time dedicated to patient care is relatively limited for both professions (37.21%, 95% CI 34.95–39.60% for doctors, 27.22%, 95% CI 25.18–29.60% for nurses) compared to the time spent for registration of data and professional communication, that accounts for two-thirds of doctors' time and nearly half of nurses' time.

The Doctor based on memory

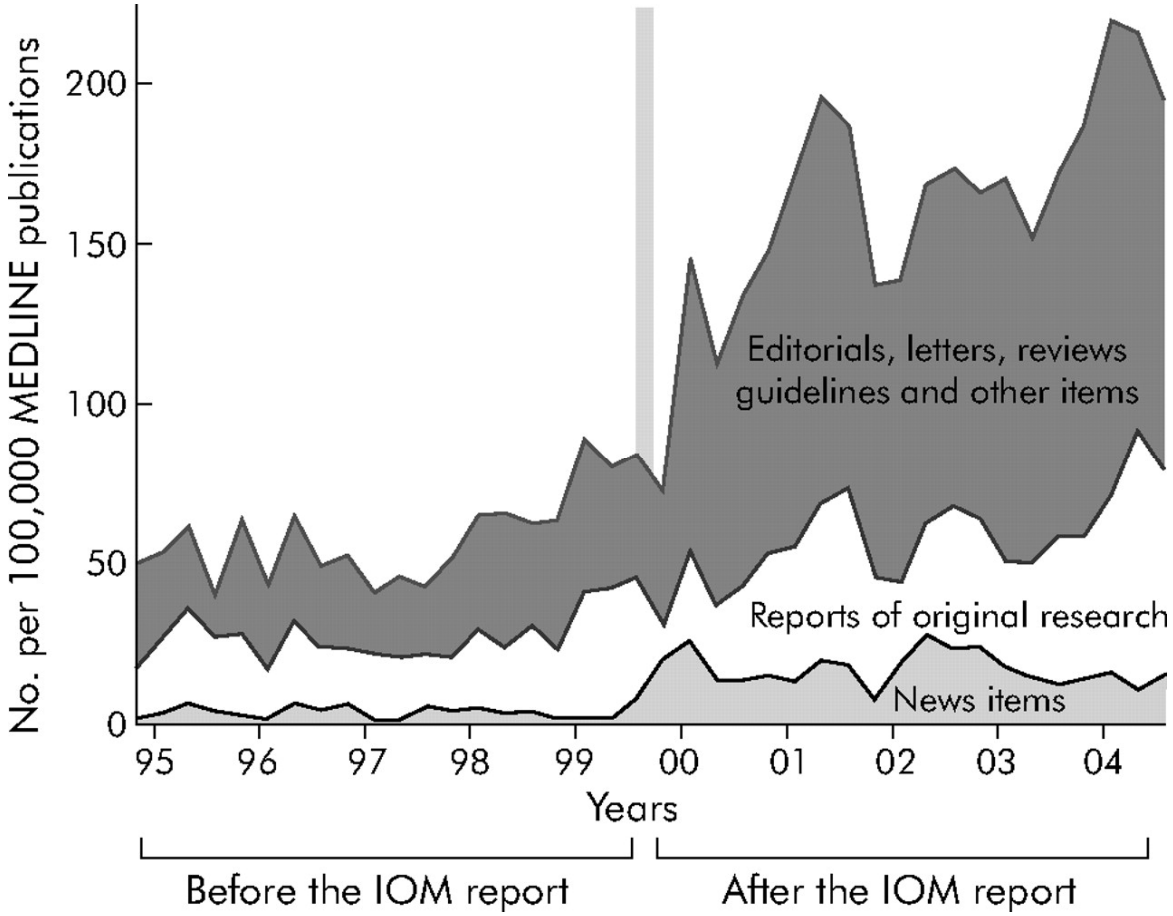
Not As a Stranger
Stanley Kramer, 1955
Frank Sinatra and Robert Mitchum

The beginning



The report was based upon analysis of multiple studies by a variety of organizations and concluded that between 44,000 to 98,000 people die each year as a result of preventable medical errors. For comparison, fewer than 50,000 people died of Alzheimer's disease and 17,000 died of illicit drug use in the same year.

The research before and after to Err is Human



Stelfox H T et al. Qual Saf Health Care 2006;15:174-178

BMJQS

Adverse Event

The incidence and nature of in-hospital adverse events: a systematic review

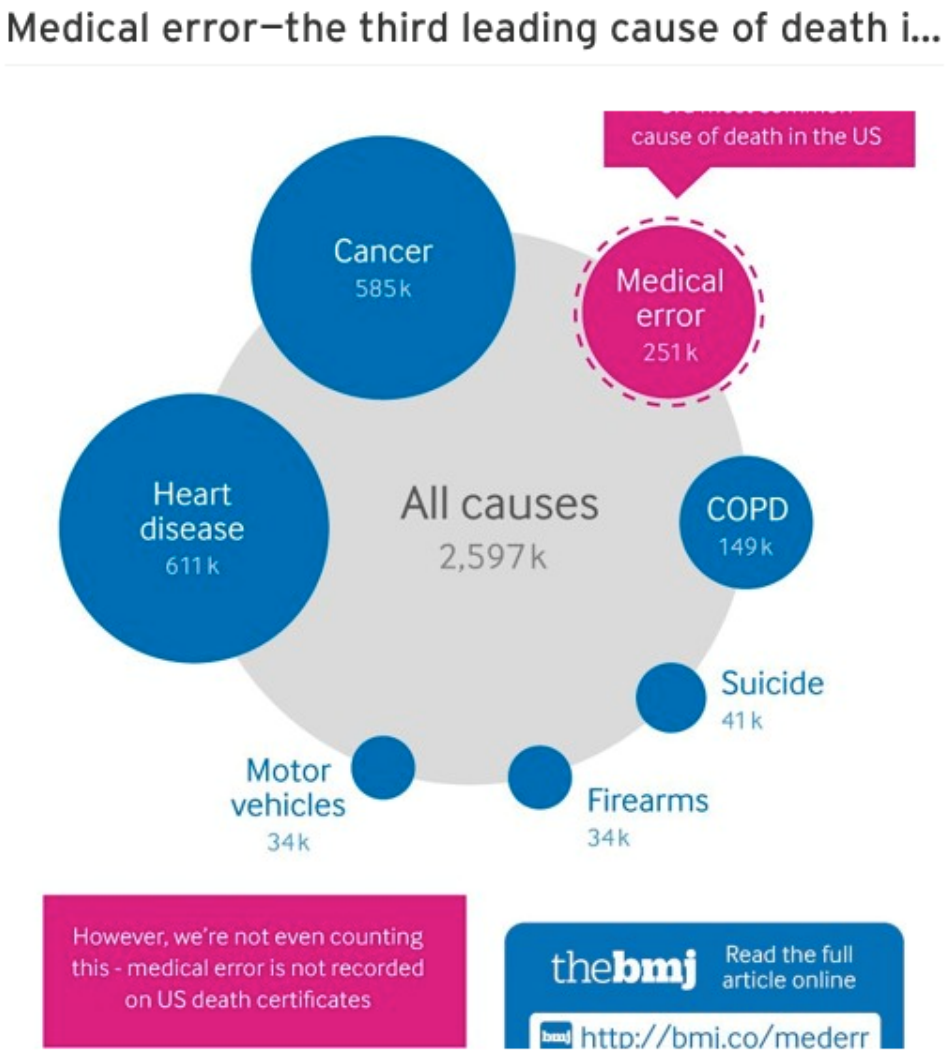
E N de Vries, M A Ramrattan, S M Smorenburg, D J Gouma and M A Boermeester

Qual. Saf. Health Care 2008;17;216-223
doi:10.1136/qshc.2007.023622

Eight studies including a total of 74 485 patient records were selected. The median overall **incidence of inhospital adverse events was 9.2%,** with a median percentage of preventability of 43.5%. More than half (56.3%) of patients experienced no or minor disability, whereas **7.4% of events were lethal**. Operation- (39.6%) and medication-related (15.1%) events constituted the majority.

Third cause of death

British Medical Journal, 2016



Adverse Event in different kind of hospital

Intern Emerg Med
DOI 10.1007/s11739-017-1698-5

HTA - ORIGINAL

Variability of adverse events in the public health-care service of the Tuscany region

Sara Albolino[1] · Riccardo Tartaglia[1] · Tommaso Bellandi[1] · Elisa Bianchini[2] · Giancarlo Fabbro[2] · Silvia Forni[3] · Giulia Cernuschi[4] · Annibale Biggeri[2]

There was a significant higher incidence of AEs in the male and elderly ([65 years) population, and the incidence of AEs was more relevant in the THs (5.3, 95% CI 4.7–6.1) than in the LTs (1.8, 95% CI 1.5–2.2). AEs related to falls were significantly more preventable in THs (OR 19.22, 95% CI 2.45–151.02), while in LTs, AEs related to infections were the most preventable (OR 6.22, 95% CI 1.35–28.67). In conclusion, the study shows a higher risk of incurring adverse events for the THs compared to the LTs, presumably connected with a major complexity of the clinical cases. Furthermore, the preventability of AEs is higher in the LTs (56.1 vs 42.2%), and this might be associated with lower expertise in managing complications in these settings.

Incidence of adverse events in Italy

Retrospective record review of 7573 hospital admissions in 5 hospitals. 5,3 % of adverse events. 9,5 % of AE resulting in death.

WWW.EPIPREV.IT

Rassegne e Articoli

e&p anno 36 (3-4) maggio-agosto 2012

Eventi avversi e conseguenze prevenibili: studio retrospettivo in cinque grandi ospedali italiani

Adverse events and preventable consequences: retrospective study in five large Italian hospitals

[1]Centro gestione rischio clinico e sicurezza del paziente, Regione Toscana

Riccardo Tartaglia,[1] Sara Albolino,[1] Tommaso Bellandi,[1] Elisa Bianchini,[2] Annibale Biggeri,[2] Giancarlo Fabbro,[2] Luciana Bevilacqua,[3] Alessandro Dell'Erba,[4] Gaetano Privitera,[5] Lorenzo Sommella[6]

AE incidence = 5,3%

Epidemiol Prev 2012; 36 (3-4): 151-161

I- NHS	5,3%	x	10.257.796	x	11	x	€ 902	=	€ 5.394.226.151,34

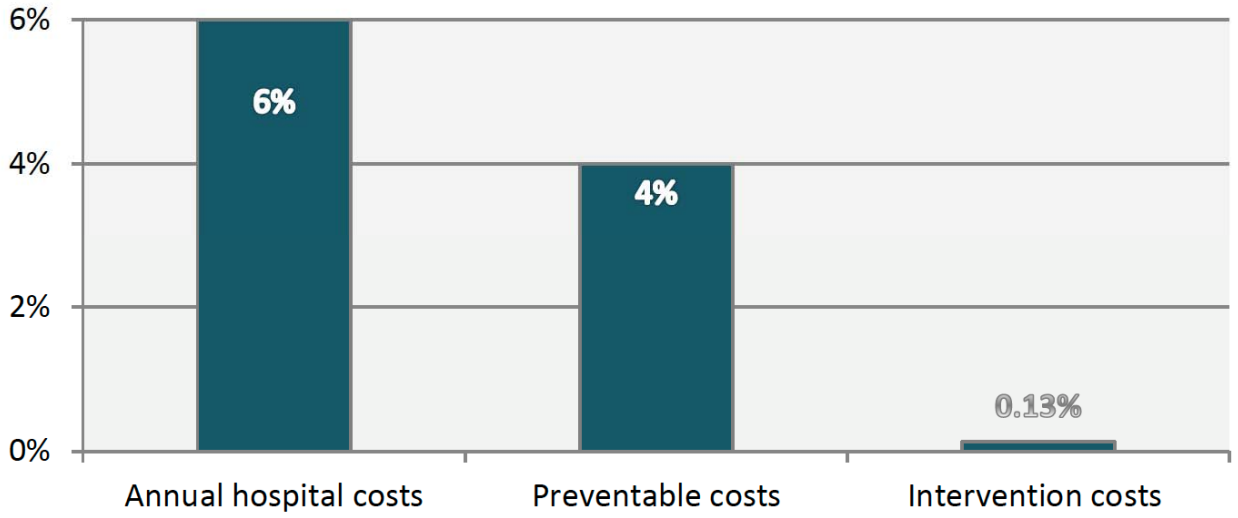
Preventable adverse events 53,2%

Costs for extra hospital days € 2.869.728.312,51

The cost of adverse events

The available evidence suggests that 15% of hospital expenditure and activity in OECD countries can be attributed to treating safety failures.

Figure 6. Annual hospital costs of venous thromboembolism dwarf the costs of prevention



Source: Mahan et al, 2011

OECD-OCSE 2017: The Economics of Patient Safety

Most Frequently Identified Root Causes of Sentinel Events Reviewed by The Joint Commission by Year

The majority of events have multiple root causes
(Please refer to subcategories listed on slides 5-7)

2012 (N=901)		2013 (N=887)		Jan to Jun 2014 (N=394)	
Human Factors	614	Human Factors	635	Human Factors	290
Leadership	557	Communication	563	Leadership	269
Communication	532	Leadership	547	Communication	248
Assessment	482	Assessment	505	Assessment	208
Information Management	203	Information Management	155	Physical Environment	53
Physical Environment	150	Physical Environment	138	Care Planning	38
Continuum of Care	95	Care Planning	103	Information Management	36
Operative Care	93	Continuum of Care	97	Continuum of Care	33
Medication Use	91	Medication Use	77	Operative Care	29
Care Planning	81	Operative Care	76	Health information technology-related	27

The Joint Commission

The reporting of most sentinel events to The Joint Commission is voluntary and represents only a small proportion of actual events. Therefore, these root cause data are not an epidemiologic data set and no conclusions should be drawn about the actual relative frequency of root causes or trends in root causes over time.

Commonly Identified Root Cause Categories and Subcategories *continued…*

- **Human Factors**

  Staffing levels, staffing skill mix, staff orientation, in-service education, competency assessment, staff supervision, resident supervision, medical staff credentialing/privileging, medical staff peer review, other (e.g., rushing, fatigue, distraction, complacency, bias)

- **Leadership**

  Organizational planning, organizational culture, community relations, service availability, priority setting, resource allocation, complaint resolution, leadership collaboration, standardization (e.g., clinical practice guidelines), directing department/services, integration of services, inadequate policies and procedures, non-compliance with policies and procedures, performance improvement, medical staff organization, nursing leadership

- **Communication**

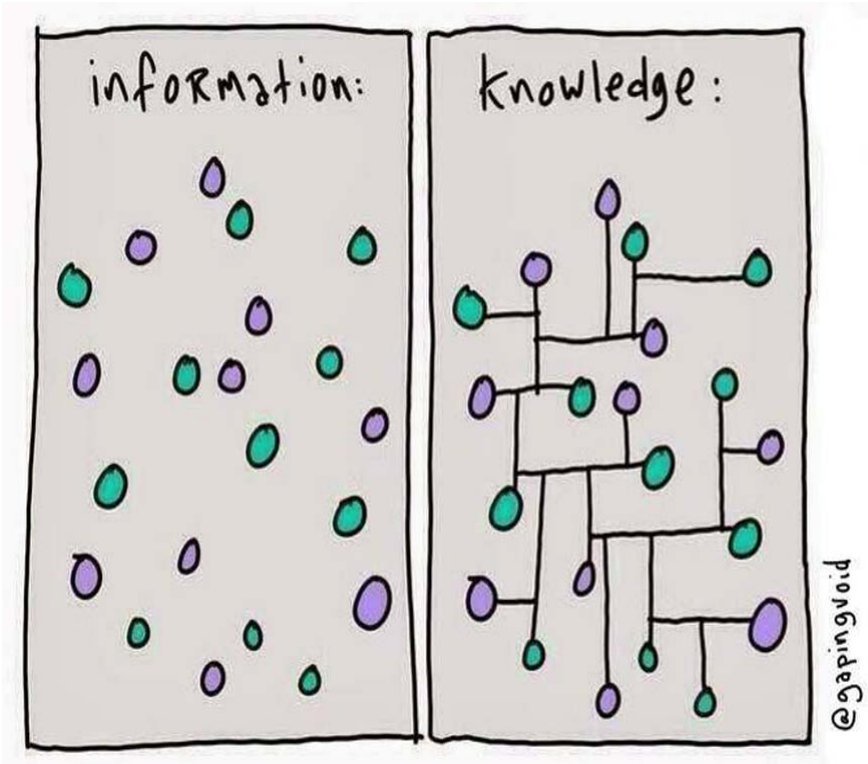
  Oral, written, electronic, among staff, with/among physicians, with administration, with patient or family

- **Assessment**

  Adequacy, timing, or scope of; assessment; pediatric, psychiatric, alcohol/drug, and/or abuse/neglect assessments; patient observation; clinical laboratory testing; care decisions

Organizational ergonomics

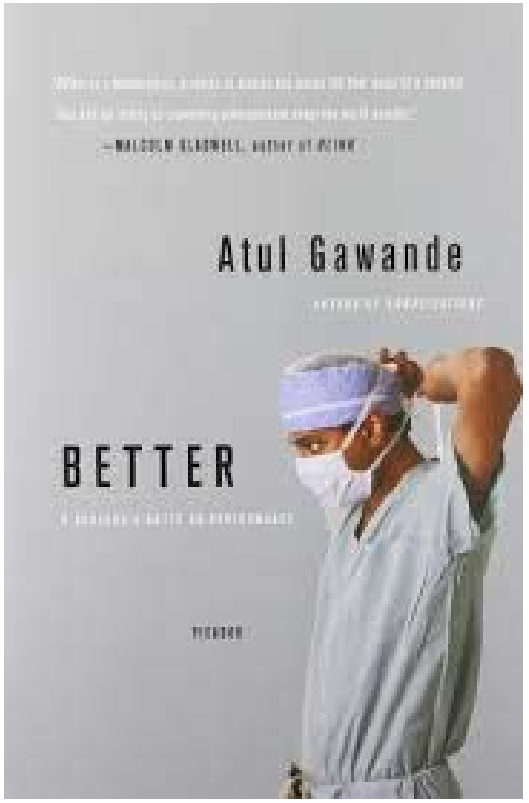
knowledge develops thanks to the social interactions and good performance is the result of an effective communication and coordination between professionals, teams, units and with patients



Community of practice Practice: The Organizational Frontier Etienne C. Wenger, William M. Snyder, Harvard Business Review Jan-Feb 2000

Non technical skills

"you enter into profession convinced that it is only a matter of technical capability, diagnostic acumen, handle it with patients, instead find out later that you have to contend with the resources, the system, the relationships with colleagues and patients and your own limits" .



New problem of complexity

Today, medicine is more complex than in the past
(more than 4,000 medical and surgical procedures; thousands of drugs and hundreds of laboratory tests).
We need to introduce support tools cognitive in clinical practice to help the decision making (surgical checklist, MEWS, sepsis score, handover etc.)

In 70’ a couple of doctors per day followed a single patient, today a patient may be followed by more than 10 specialists. The "must" today is the "teamwork", the NTS become essential in complex systems, not knowing how to work with others can be a problem

Atul Gawande, www.ted.com 2012

The contribute of human factors to complexity

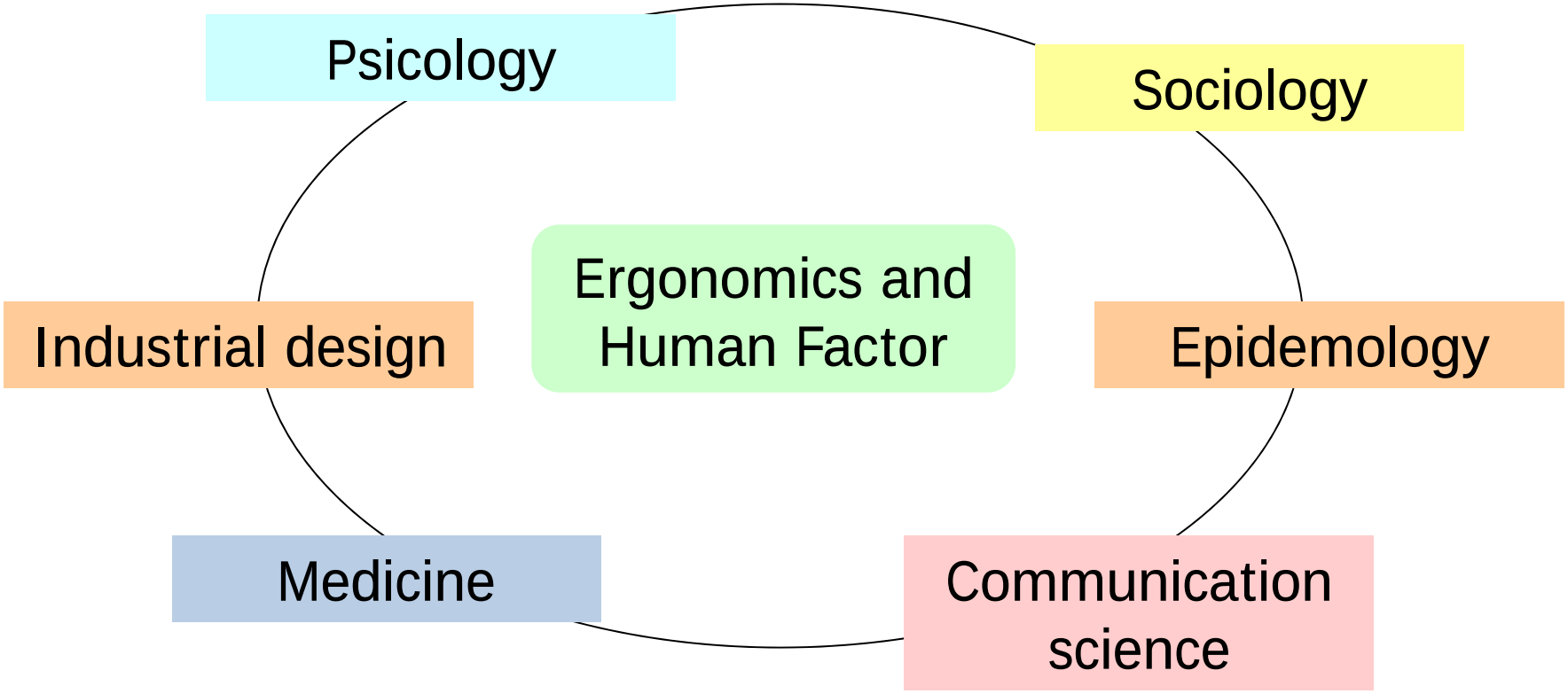
- Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system in order to optimize human well-being and overall system performance.

- The human factors and ergonomics science (HFE) has its focus on interactions between humans, technologies and organizations within a physical and cultural environment.

IEA, 2009

Multidisciplinarity for the complexity of care

Intenational Conference HEPS
Firenze, 2005 – Strasburgo, 2008 - Oviedo, 2011 - Taipei, 2014



Multidisciplinary centre for safety and quality improvement: learning from climate changing science (Vincent C, BMJ QSHC, 2010)

Aviation vs medicine

Aviation safety principle	**Application to medicine**
Error-free environments do not exist	Design of systems to absorb errors through **redundancy, standardisation and checklists**
In most cases, errors do *not* result from negligence or discipline related problems but from faulty system design. "Pilot error is not all pilot"	Movement from placing blame to designing safe processes and procedures, i.e. applying **a systems approach**
Mishap reporting is aimed to encourage open and full reporting	Assurance of full immunity while implementing a **non-punitive approach**
Adverse event definition is a leading factor in organisational learning: major accidents are viewed as the "tip of the iceberg"	Debriefing of all events, including near misses, that have learning potential. **Focus on the severity of the potential risk** rather than on the severity of the event's final outcome is more conducive to establishing effective prevention programmes
The prevention of accidents is a long term ongoing process rather than an episodic effort	Institutionalisation of a **permanent programme for risk identification, analysis, and dissemination of the lessons** learnt throughout the professional community

Wilf-Miron et Al., QSHC, 2005

Embodied cognition

THE MANUAL ACTIVITIES: "BOUND TO THE GROUND"

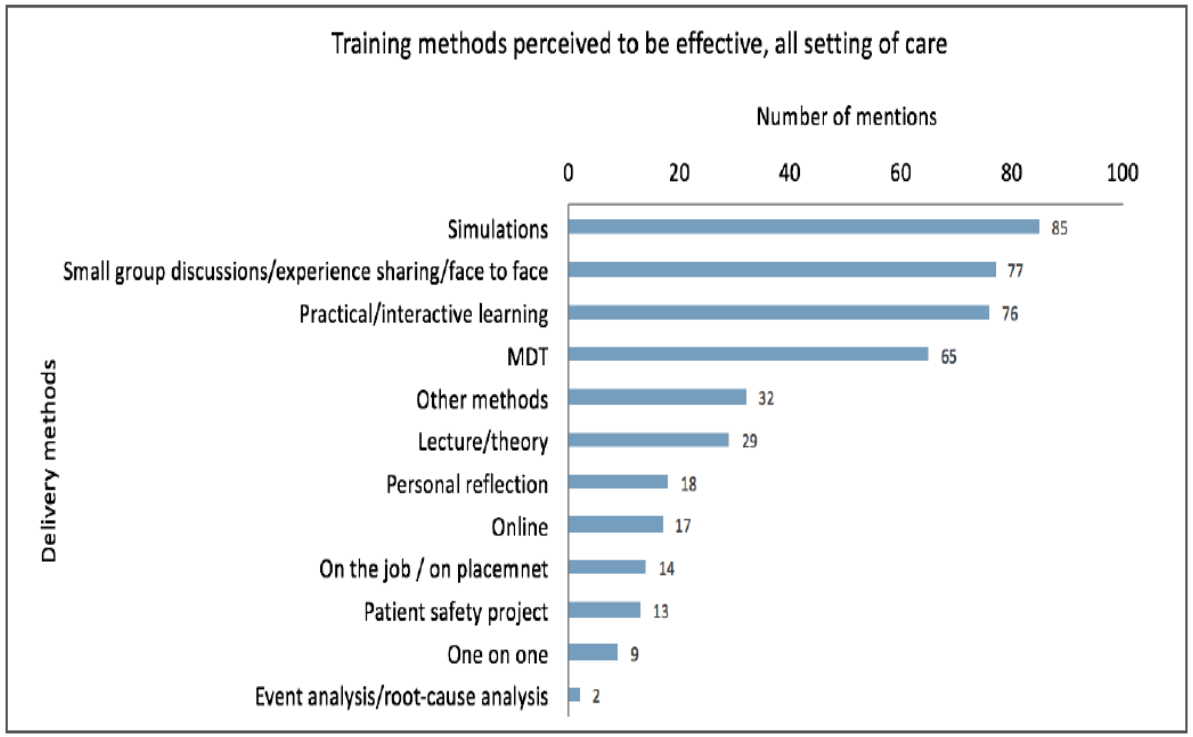
To understand the role played by our body in cognition, showing the ways in which the body characteristics affect cognitive activities.

The embodied nature of cognition of humans, though healthcare workers, is one of the main reasons why healthcare services are missing a key leverage for reform.

In the work of doctors and nurses, manual activities are at the basis of the delivery of care, especially in surgery and nursing. These manual activities shape the way doctors and nurse think, elaborate a diagnosis and enact a treatment.

Bagnara and Pozzi, J Ergonomics, 2015

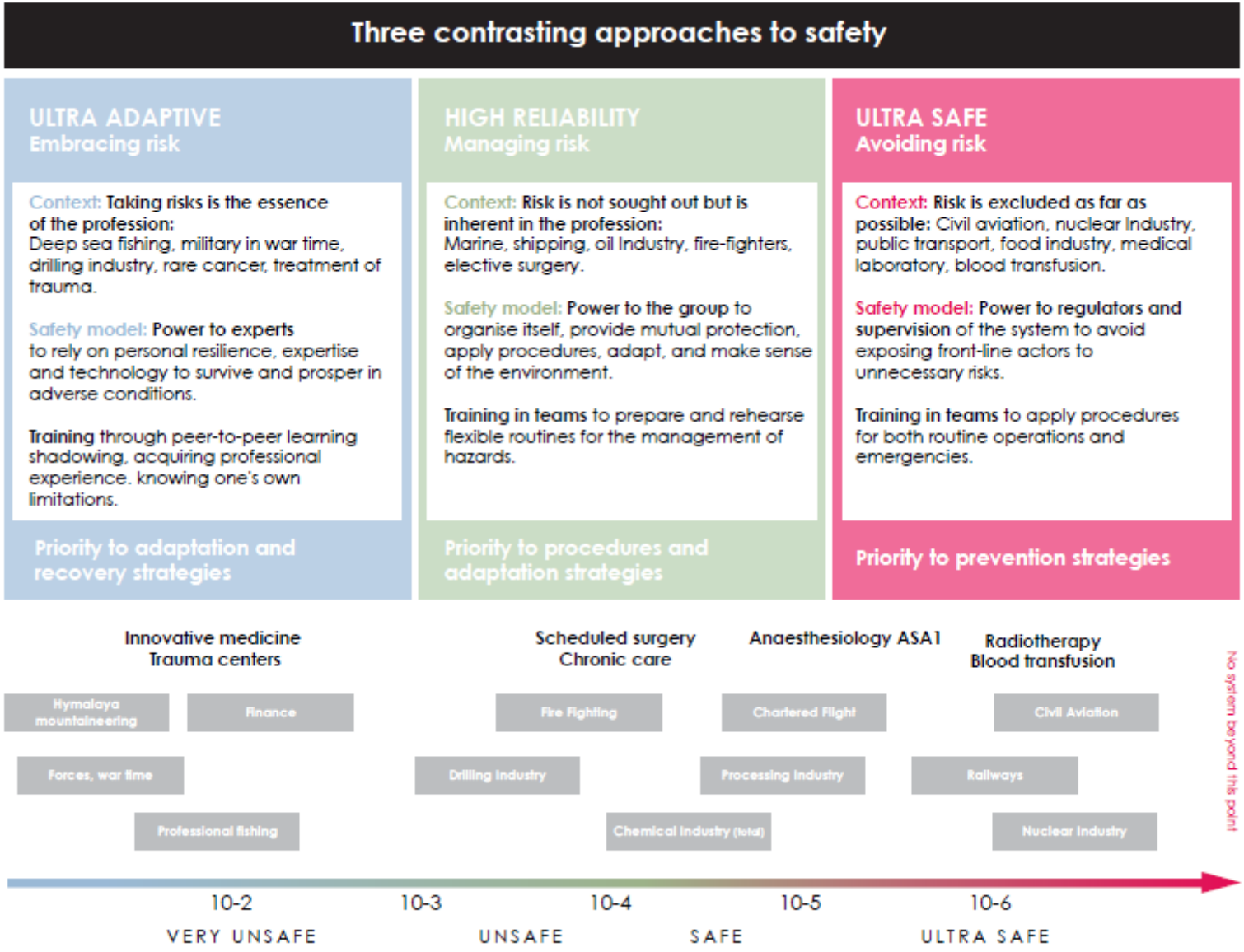
Training by simulation



Centre for Health Policy at Imperial College London, Commission on Education and Training for Patient Safety 2016

World Health Organization | Patient Safety

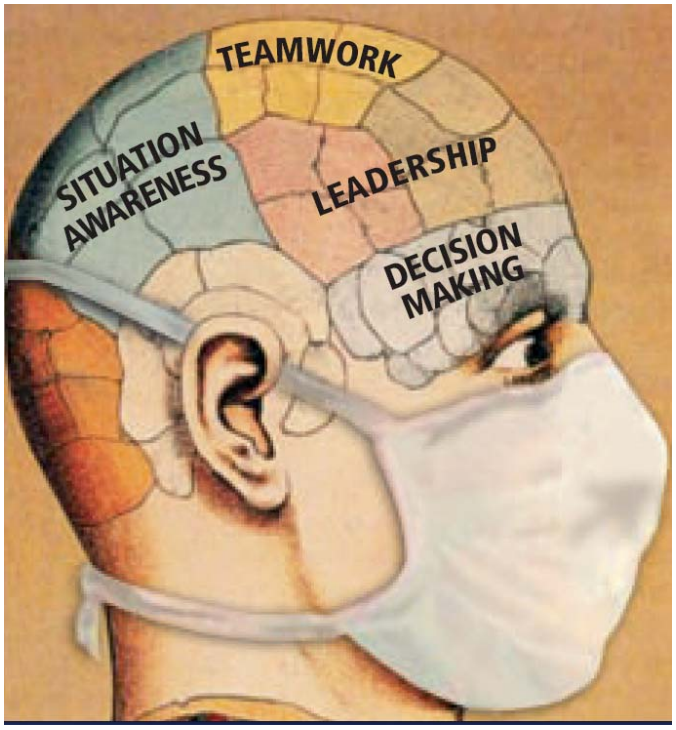
Not only an approach



Safer Healthcare (Vincent&Amalberti, 2016 – Ed. Springer)

Non technical skills

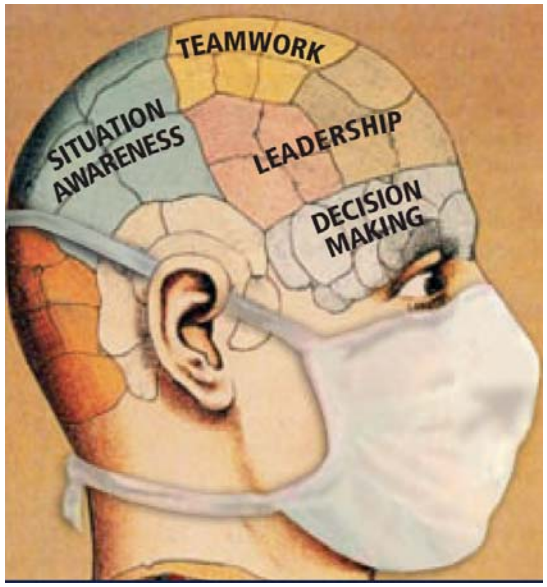
- Communication Teamwork
- Leadership
- Decision making
- Stress management
- Situation awareness



S. Yule, R. Flin, S. Paterson-Brown, N. Maran
Non-technical skills for surgeons in the operating room: A review of the literature. Surgery, 2009, 139 (2): 140-149

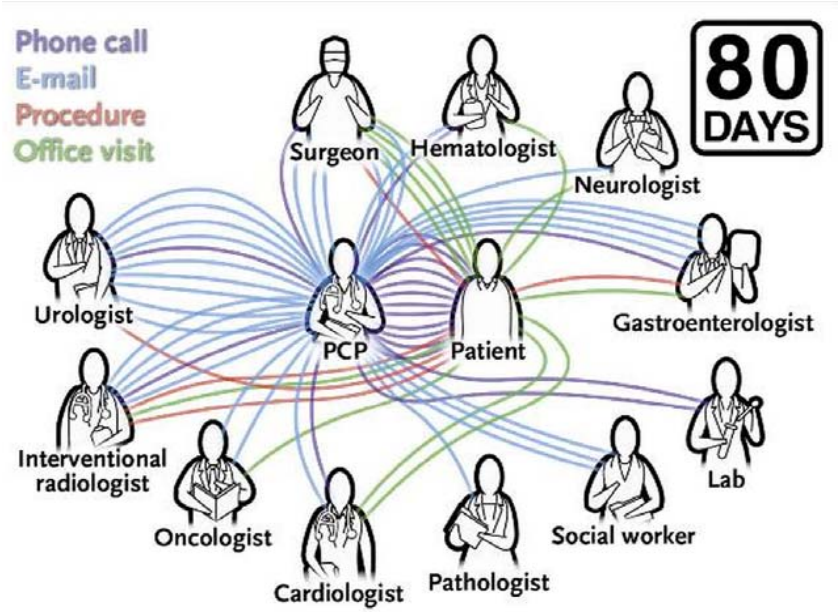
Non technical skills

- Situation awareness



The perception of environmental elements and events with respect to time or space, the comprehension of their meaning, and the projection of their status after some variable has changed, such as time, or some other variable, such as a predetermined event.

Teamworking



A Quarterback's View of Care Coordination
Matthew J. Press, M.D.
N Engl J Med 2014; 371:489-491August 7, 2014

Ambulatory Care Coordination for One Patient. Over an 80-day period, 12 clinicians were involved in the care of the patient. The patient's primary care physician (PCP) communicated with the other clinicians 40 times (32 e-mails and 8 phone calls) and with the patient (or his wife) 12 times. The patient underwent 5 procedures and had 11 office visits (none of them with his PCP).

Matthew J. Press, M.D.
N Engl J Med 2014; 371:489-491August 7, 2014

Applied ergonomics

The principles of Human Factors are applied in many activities for preventing the adverse events in medicine

- teamworking
- crisis resource management
- stress control
- training simulation
- interactions with medical devices (design)

Tartaglia, 2013

Non technical skills

Behavioural skills

Leadership

Communication

Team working (communication, coordination, and collaboration)

Cognitive skills

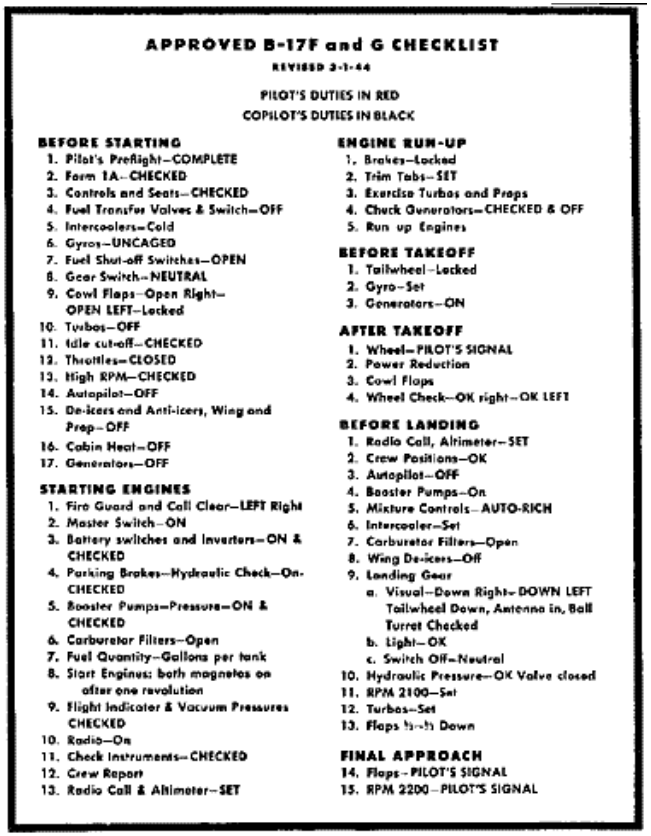
Situational awareness

Planning

Decision making

Svedalis, 2013

Surgical checklist



APPROVED B-17F and G CHECKLIST

REVISED 3-1-44

PILOT'S DUTIES IN RED

COPILOT'S DUTIES IN BLACK

BEFORE STARTING
1. Pilot's Preflight—COMPLETE
2. Form 1A—CHECKED
3. Controls and Seats—CHECKED
4. Fuel Transfer Valves & Switch—OFF
5. Intercoolers—Cold
6. Gyros—UNCAGED
7. Fuel Shut-off Switches—OPEN
8. Gear Switch—NEUTRAL
9. Cowl Flaps—Open Right—OPEN LEFT—Locked
10. Turbos—OFF
11. Idle cut-off—CHECKED
12. Throttles—CLOSED
13. High RPM—CHECKED
14. Autopilot—OFF
15. De-icers and Anti-icers, Wing and Prop—OFF
16. Cabin Heat—OFF
17. Generators—OFF

STARTING ENGINES
1. Fire Guard and Call Clear—LEFT Right
2. Master Switch—ON
3. Battery switches and Inverters—ON & CHECKED
4. Parking Brakes—Hydraulic Check—On—CHECKED
5. Booster Pumps—Pressure—ON & CHECKED
6. Carburetor Filters—Open
7. Fuel Quantity—Gallons per tank
8. Start Engines: both magnetos on after one revolution
9. Flight Indicator & Vacuum Pressures CHECKED
10. Radio—On
11. Check Instruments—CHECKED
12. Crew Report
13. Radio Call & Altimeter—SET

ENGINE RUN-UP
1. Brakes—Locked
2. Trim Tabs—SET
3. Exercise Turbos and Props
4. Check Generators—CHECKED & OFF
5. Run up Engines

BEFORE TAKEOFF
1. Tailwheel—Locked
2. Gyro—Set
3. Generators—ON

AFTER TAKEOFF
1. Wheel—PILOT'S SIGNAL
2. Power Reduction
3. Cowl Flaps
4. Wheel Check—OK right—OK LEFT

BEFORE LANDING
1. Radio Call, Altimeter—SET
2. Crew Positions—OK
3. Autopilot—OFF
4. Booster Pumps—On
5. Mixture Controls—AUTO-RICH
6. Intercooler—Set
7. Carburetor Filters—Open
8. Wing De-icers—Off
9. Landing Gear
   a. Visual—Down Right—DOWN LEFT Tailwheel Down, Antenna in, Ball Turret Checked
   b. Light—OK
   c. Switch Off—Neutral
10. Hydraulic Pressure—OK Valve closed
11. RPM 2100—Set
12. Turbos—Set
13. Flaps [illegible] Down

FINAL APPROACH
14. Flaps—PILOT'S SIGNAL
15. RPM 2200—PILOT'S SIGNAL

Surgical checklist from B17 to OR

Surgical Safety Checklist

World Health Organization | Patient Safety

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

Medicine today has entered its B-17 phase (P. Pronovost, The New Yorker, 2008)

With the checklist in hand, the pilots went on to fly the Model 299 a total of 1.8 million miles without one accident.

Handover

SPECIAL ARTICLE

Changes in Medical Errors after Implementation of a Handoff Program

A.J. Starmer, N.D. Spector, R. Srivastava, D.C. West, G. Rosenbluth, A.D. Allen, E.L. Noble, L.L. Tse, A.K. Dalal, C.A. Keohane, S.R. Lipsitz, J.M. Rothschild, M.F. Wien, C.S. Yoon, K.R. Zigmont, K.M. Wilson, J.K. O'Toole, L.G. Solan, M. Aylor, Z. Bismilla, M. Coffey, S. Mahant, R.L. Blankenburg, L.A. Destino, J.L. Everhart, S.J. Patel, J.F. Bale, Jr., J.B. Spackman, A.T. Stevenson, S. Calaman, F.S. Cole, D.F. Balmer, J.H. Hepps, J.O. Lopreiato, C.E. Yu, T.C. Sectish, and C.P. Landrigan, for the I-PASS Study Group*

N Engl J Med 2014;371:1803-12.

In 10,740 patient admissions, the medical-error rate decreased by 23% from the pre intervention period to the post intervention period (24.5 vs. 18.8 per 100 admissions,P<0.001), and the rate of preventable adverse events decreased by 30% (4.7vs. 3.3 events per 100 admissions, P<0.001).

The data were collected through **review of medical records**, **incident reporting, nurse reportin, daily post shift surveys** .

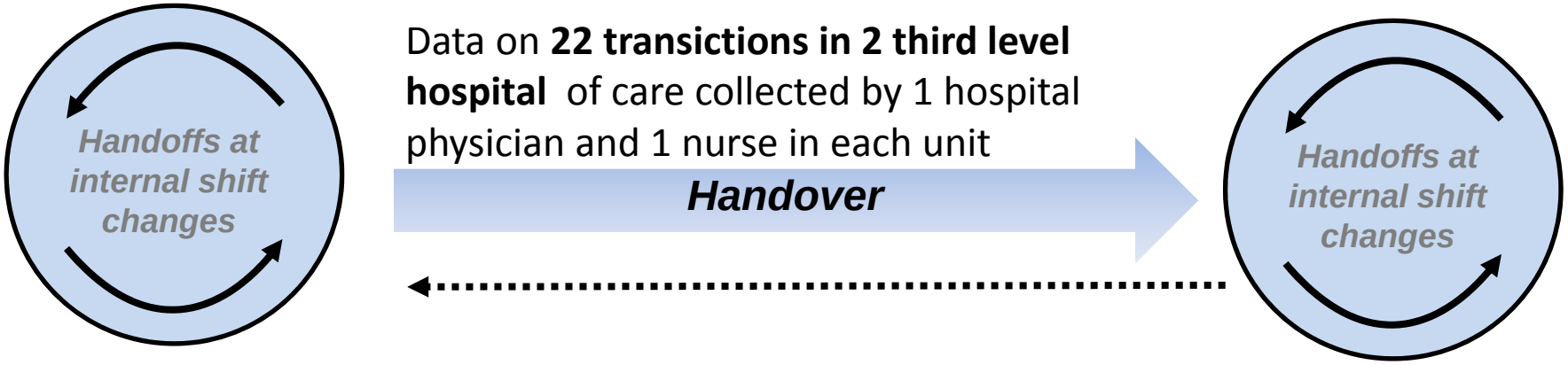
Handover

The importance of supportive context

SENDER UNIT - High Acuity

RECEIVING UNIT- Low Acuity

Our study highlighted that the handover process is shaped more by the information **needs of the sender units** than by those of the recipients.



Patient safety practice – handover

(Toccafondi, Albolino, Tartaglia Bmj Quality and Safety, 2012)

SBAR

Randmaa M, Mårtensson G, Leo Swenne C, Engström M. SBAR improves communication and safety climate and decreases incident reports due to communication errors in an anaesthetic clinic: a prospective intervention study. BMJ Open. 2014 Jan 21;4(1)

BMJ 2017;357:j2277 doi: 10.1136/bmj.j2277 (Published 2017 May 22)

EDITORIALS

Italy recognises patient safety as a fundamental right

A new law takes a bold step towards enhancing patient safety

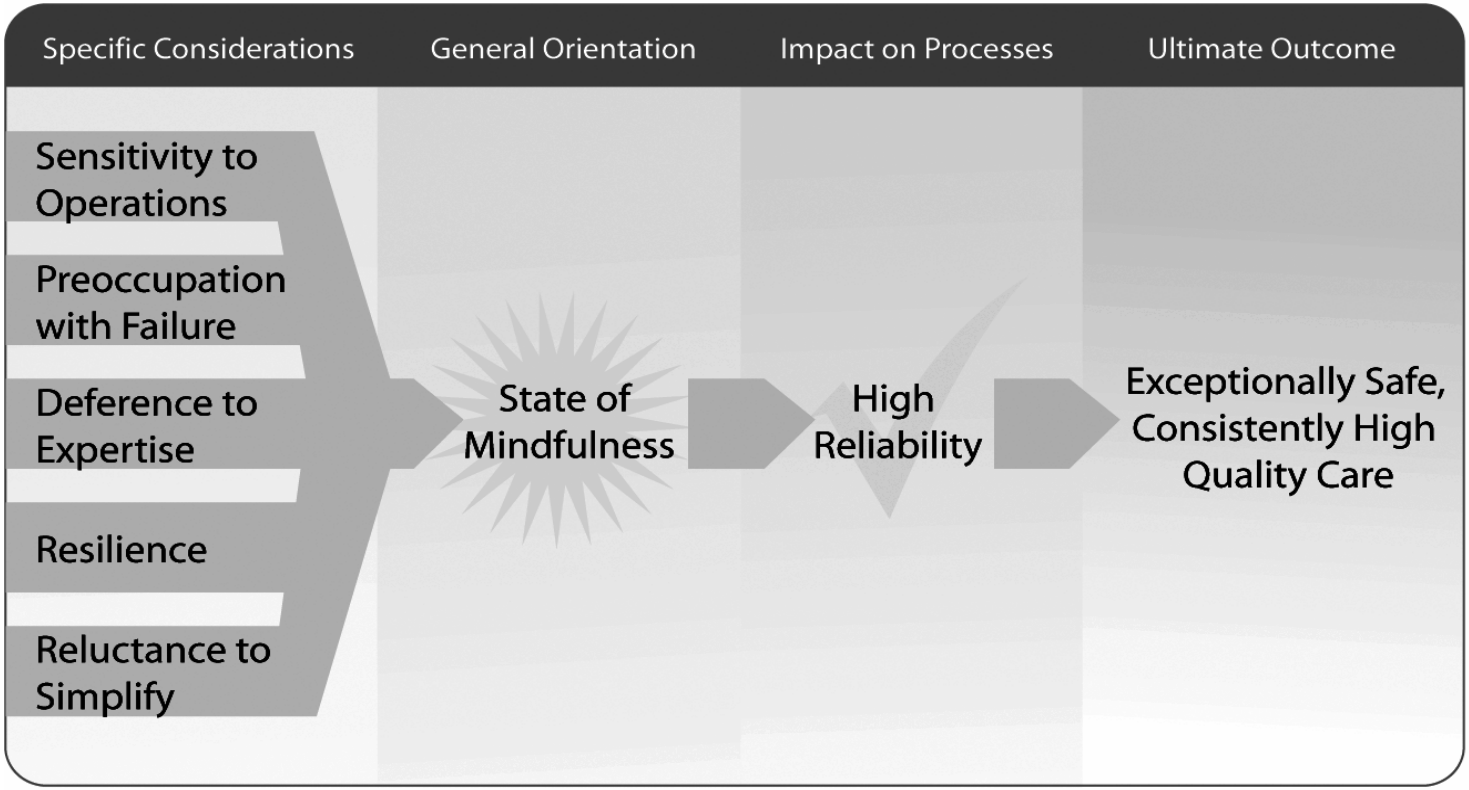
Tommaso Bellandi *deputy director*[1], Riccardo Tartaglia *director*[1], Aziz Sheikh *professor of primary care research and development*[2] *co-director*[2], Liam Donaldson *professor of public health*[3]

[1]Centre for Clinical Risk Management and Patient Safety, Florence, Italy; [2]Centre of Medical Informatics, Usher Institute of Population Health and Informatics, University of Edinburgh, UK; [3]London School of Hygiene and Tropical Medicine, London, UK

To embody the safety in clinical practice

Present and future research should look into this knowledge gap, in order to re-think the organization of the healthcare services, the traning of clinicians and the way services are co-designed and co-delivered with patients and informal caregivers.

HROs



Hines S, Luna K, Lofthus J, et al. Becoming a High Reliability Organization: Operational Advice for Hospital Leaders. (Prepared by the Lewin Group under Contract No. 290-04-0011.) AHRQ Publication No. 08-0022. Rockville, MD: Agency for Healthcare Research and Quality. February 2008.

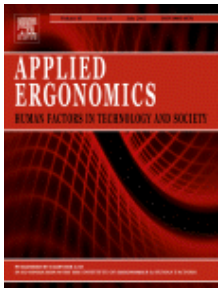
Resilience able to quickly return to a previous good condition, "positive adaptation" after a stressful or adverse situation.

Can hospitals become HROs?

Many improvements are possible.

However, some barriers, seem elements of the system.

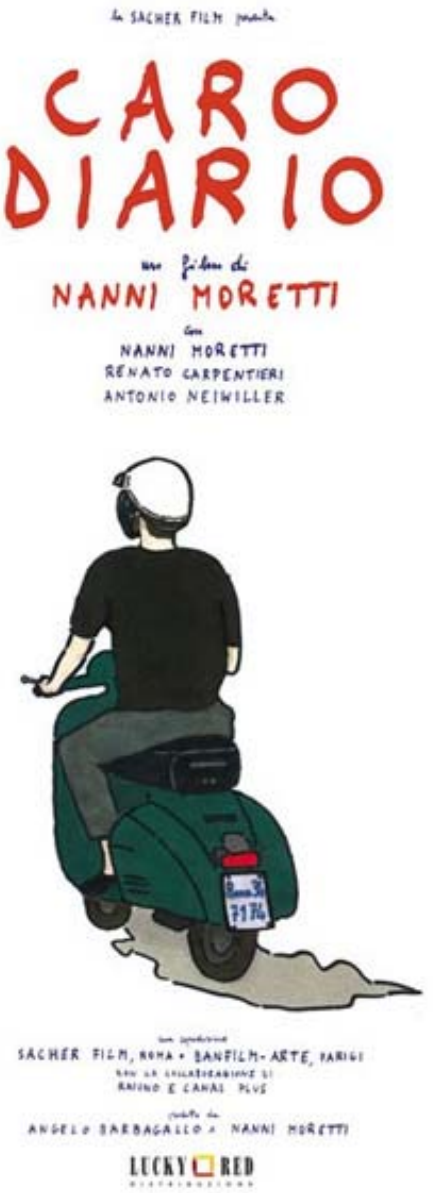
Bagnara, Parlangeli, Tartaglia. Applied Ergonomics 2010



Can hospitals become HROs?

- It is hard
- It is slow
- It is stressful
- It is a matter of cultural transformation
- …but it is mostly a war against Negligence and Established Power

Nanni Moretti, famous Italian Director, Prix de la mise en scène 1993 Festival Cannes.
Nanni tells the story of his disease, Hodgkin's lymphoma.



Grazie per l’attenzione

“So that to believe in medicine would be the height of folly, if not to believe in it were not greater folly still, for from this amass of errors, there have emerged in the course of time many truths ”.

Marcel Proust, 1920