PlanetHealth

Il team operatorio al completo
Chirurgo, Strumentista,
Coordinatore del B.O. e Anestesista

Sale Operatorie

Allestire, programmare e riorganizzare le S.O. per ridurre il rischio clinico e avviarsi verso una Chirurgia 2.0

PlanetHealth

Ergonomia in sala operatoria: ingrediente chiave della Chirurgia 2.0

Roberto L. Castellani, MD

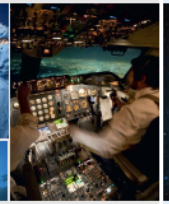
Milano, 17 novembre 2016

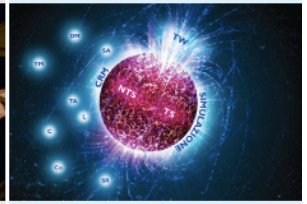
XI MASTER HRM CINEAS
Hospital Risk Management
Politecnico di Milano 2014

CHIRURGIA 2.0 : macroergonomia. Modello di implementazione della sicurezza in sala operatoria

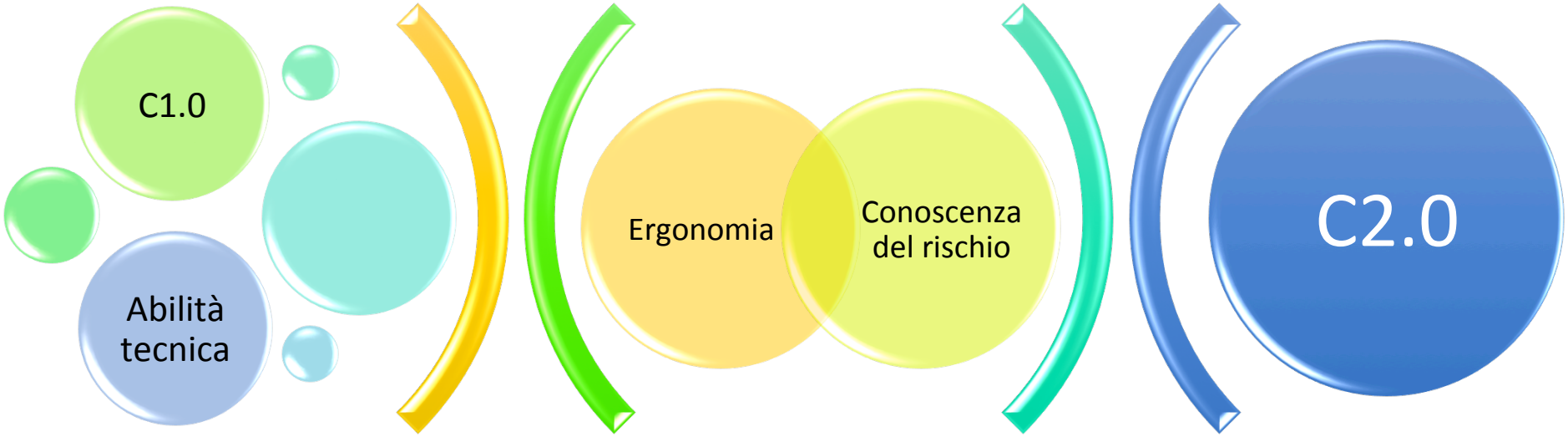
Dr. Roberto L. Castellani

Relatore
Dr. Francesco Venneri
Clinical Risk Manager
Azienda Sanitaria Firenze



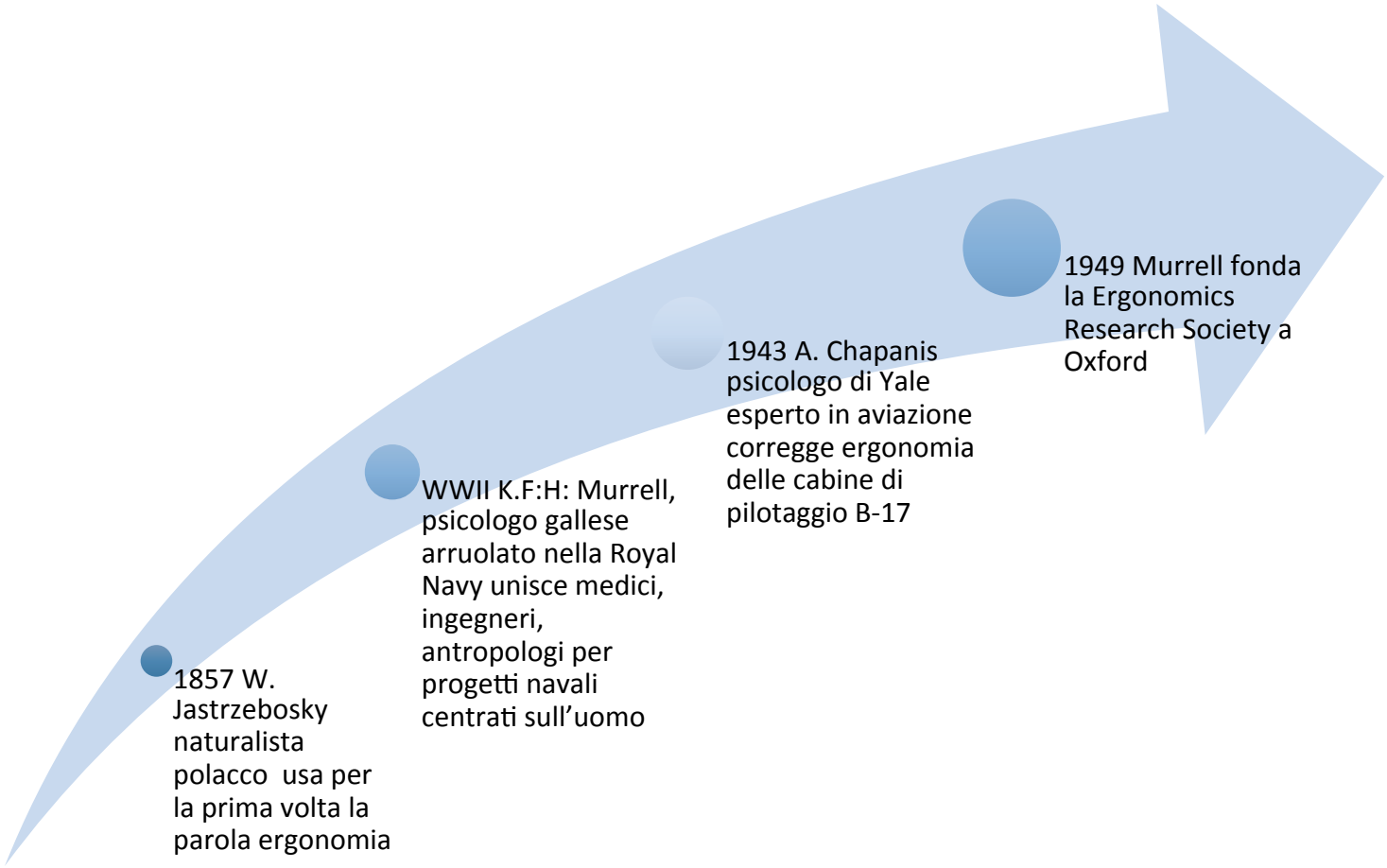


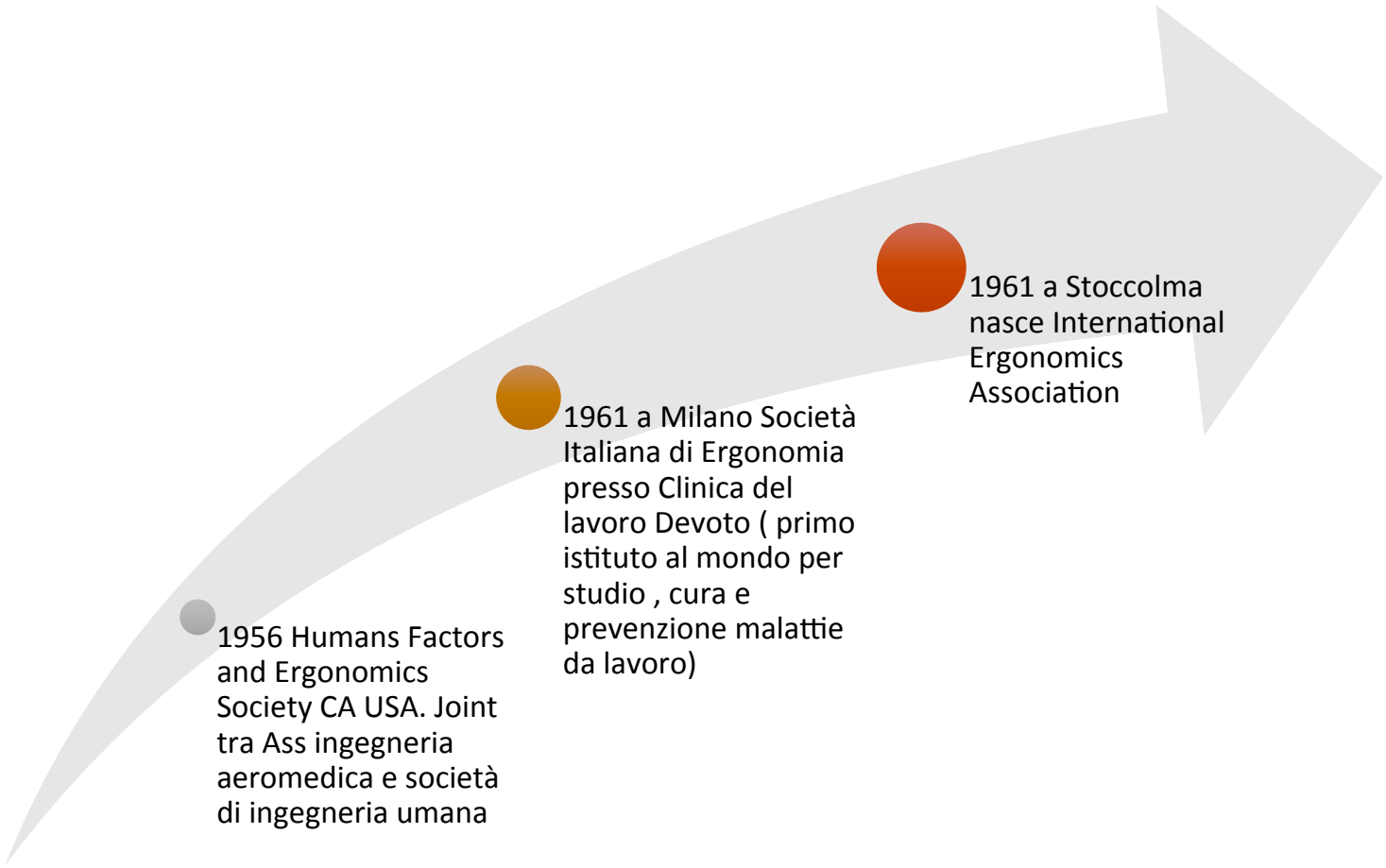

Culturale
Giuridica
Filosofica
Organizzativa


C1.0
Abilità tecnica
Ergonomia
Conoscenza del rischio
C2.0


Εργονομία

Time-line dell’ Ergonomia

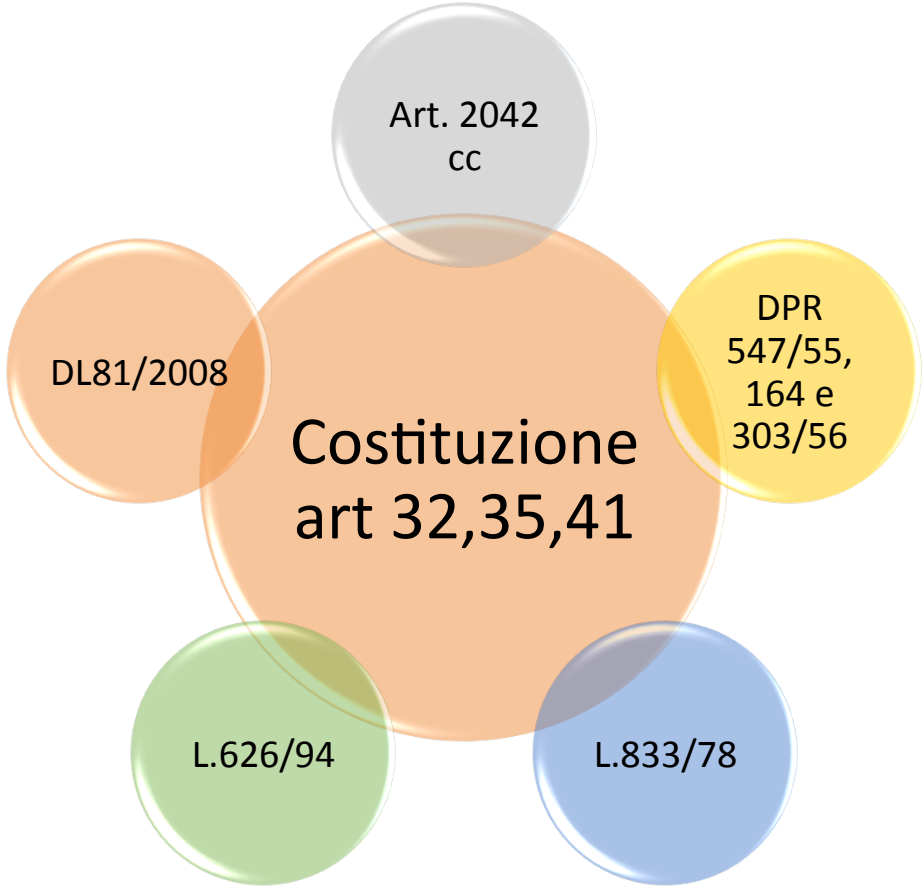



1956 Humans Factors and Ergonomics Society CA USA. Joint tra Ass ingegneria aeromedica e società di ingegneria umana
1961 a Milano Società Italiana di Ergonomia presso Clinica del lavoro Devoto (primo istituto al mondo per studio , cura e prevenzione malattie da lavoro)
1961 a Stoccolma nasce International Ergonomics Association

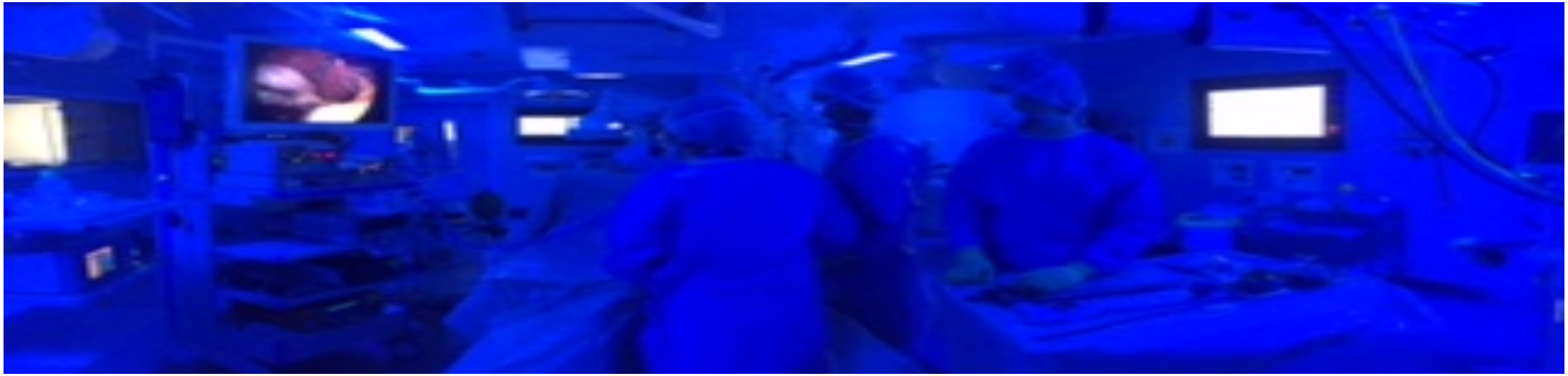
Definizione generale

Disciplina scientifica che si occupa dei problemi relativi al lavoro umano, e che, assommando, elaborando e integrando le ricerche e le soluzioni offerte da varie discipline (medicina generale, medicina del lavoro, fisiologia, psicologia, sociologia, fisica, tecnologia) tende a realizzare un adattamento ottimale del sistema uomo-macchina-ambiente di lavoro alle capacità e ai limiti psico-fisiologici dell'uomo.

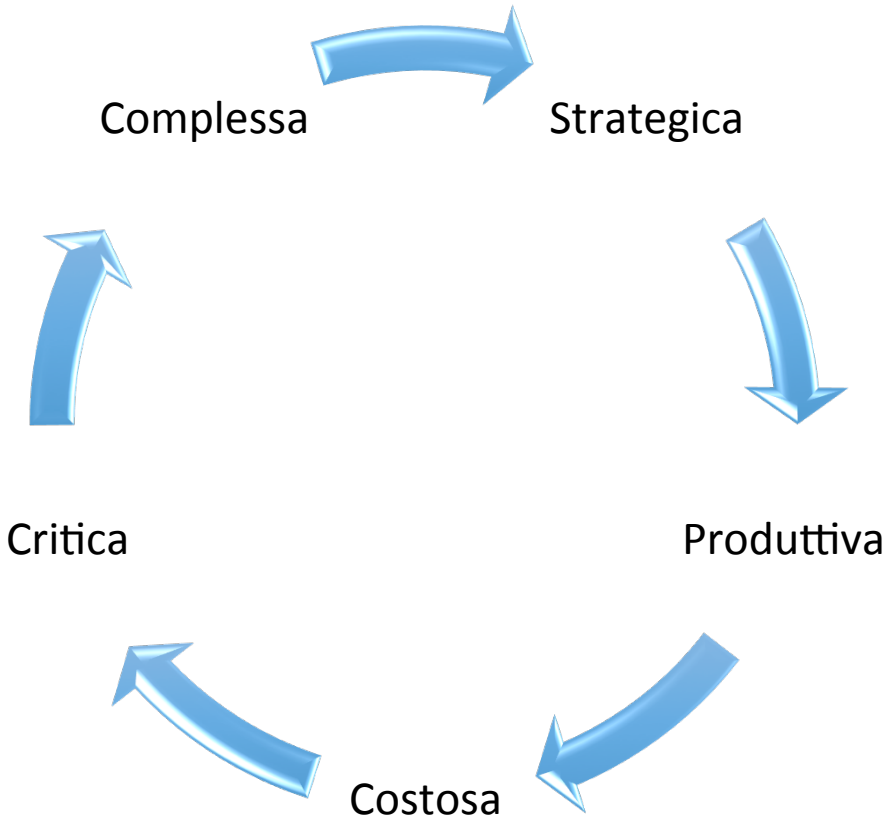

Progettualità
Sicurezza
Salute
Benessere


Art. 2042 cc
DL81/2008
DPR 547/55, 164 e 303/56
Costituzione art 32,35,41
L.626/94
L.833/78

Ergonomia in area Chirurgica



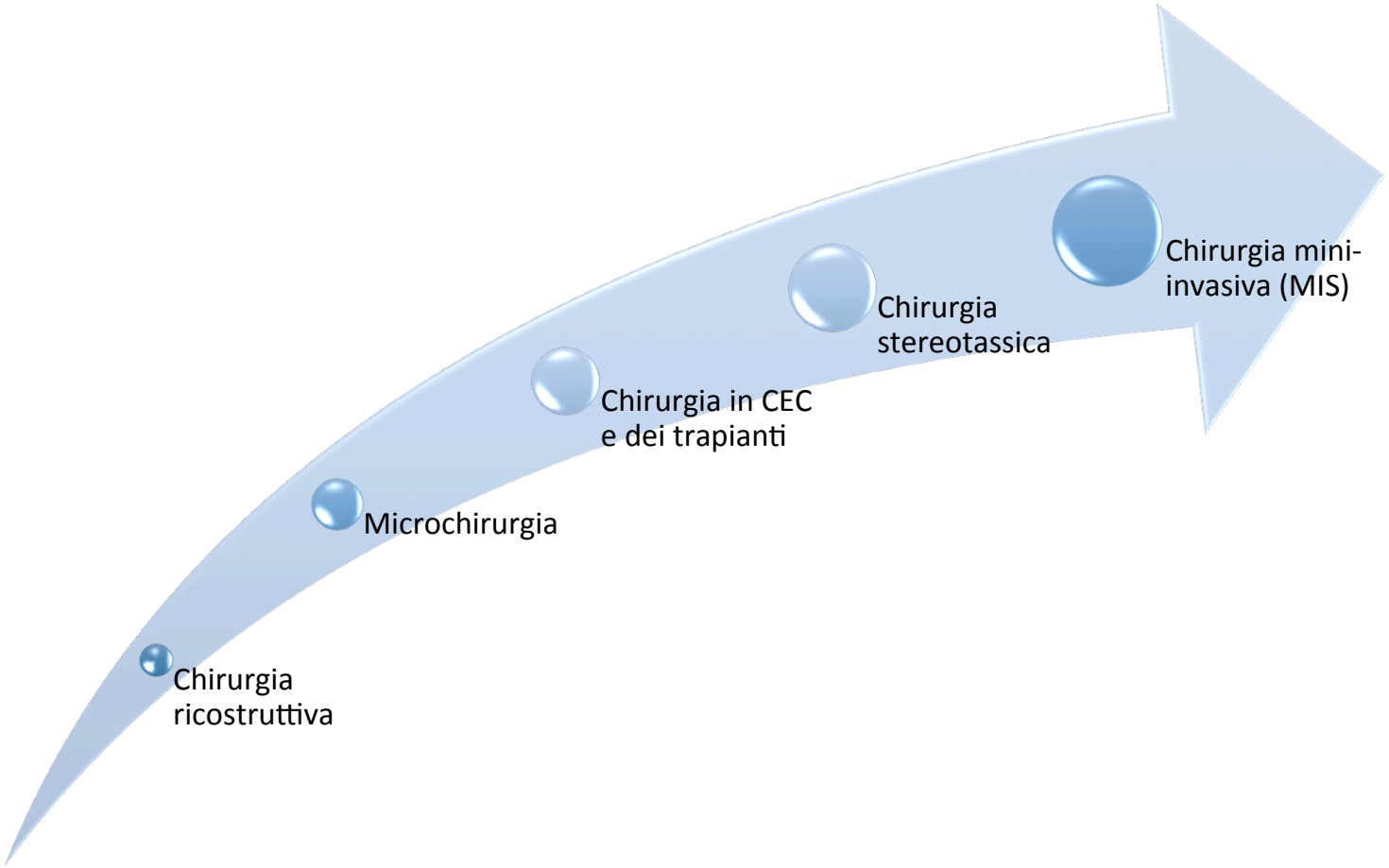
Area Chirurgica



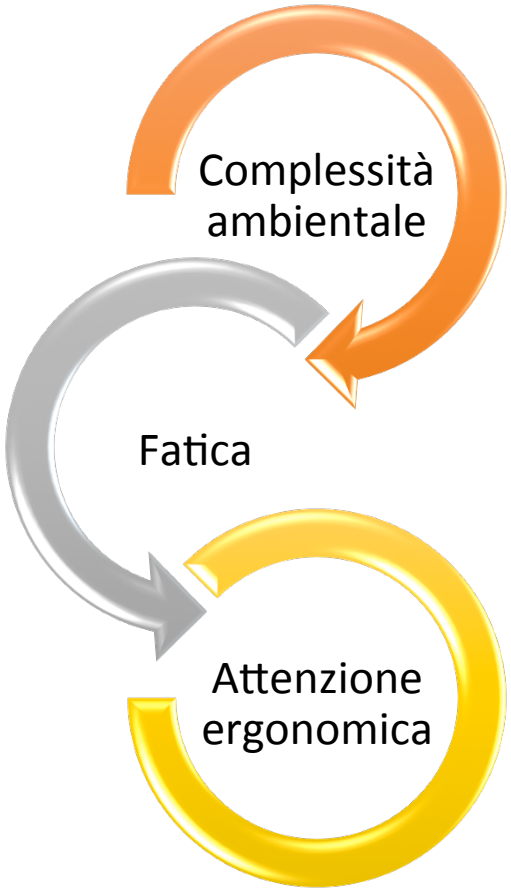
Requisiti


Preparazione intellettuale
Spazio di lavoro efficiente e controllato
Abilità motoria
Resistenza fisica
Abilità di problem-solving

Time-line


Chirurgia ricostruttiva
Microchirurgia
Chirurgia in CEC e dei trapianti
Chirurgia stereotassica
Chirurgia mini-invasiva (MIS)

Chirurgia mini-invasiva



Ergonomia


Scienza del fattore umano
Scienza "giovane"
Influenza i processi di realizzazione di una struttura
Sostenuta da sviluppo di tecnologia e comunicazione

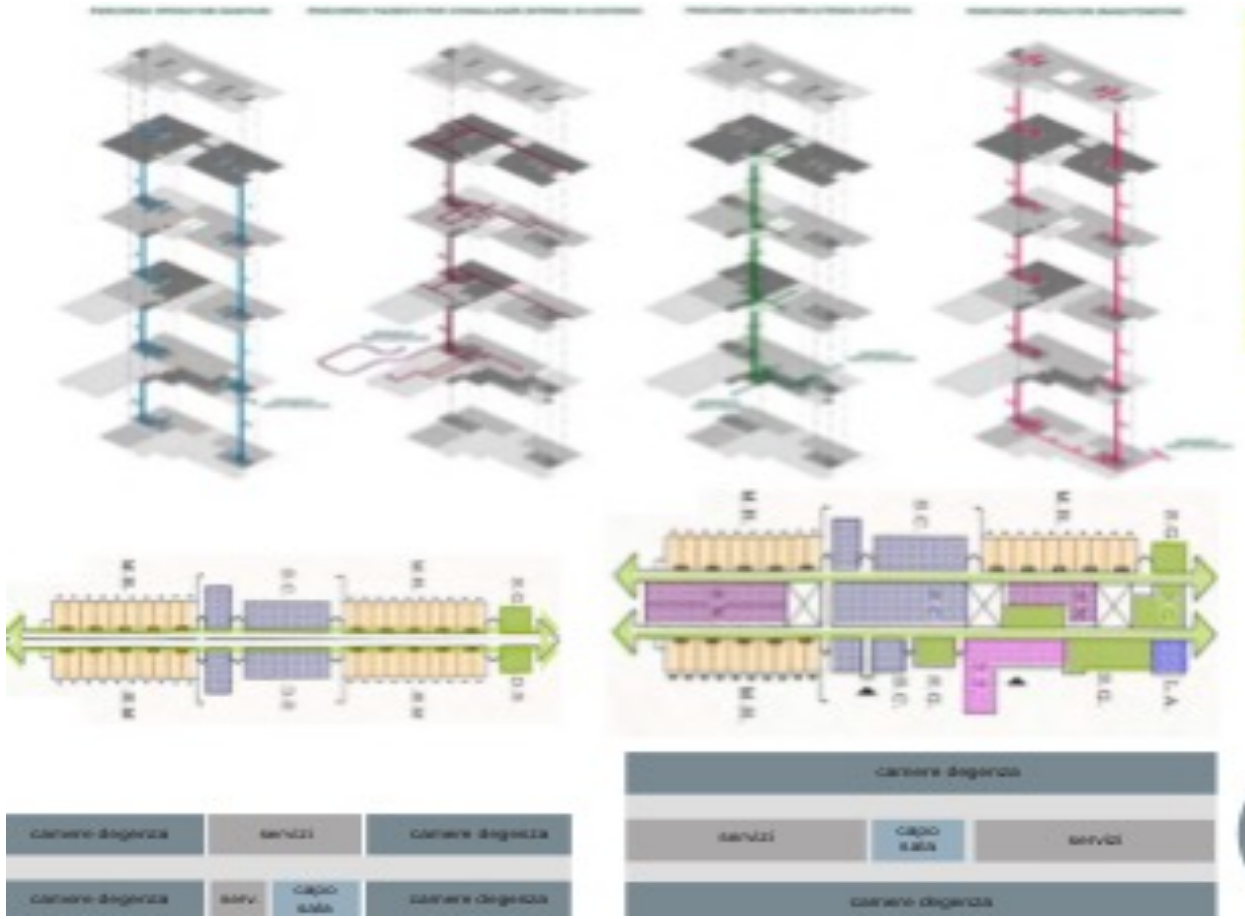
Tassonomia


Fisica
Percettivo-
cognitiva
Organizzativa
Macroergonomia

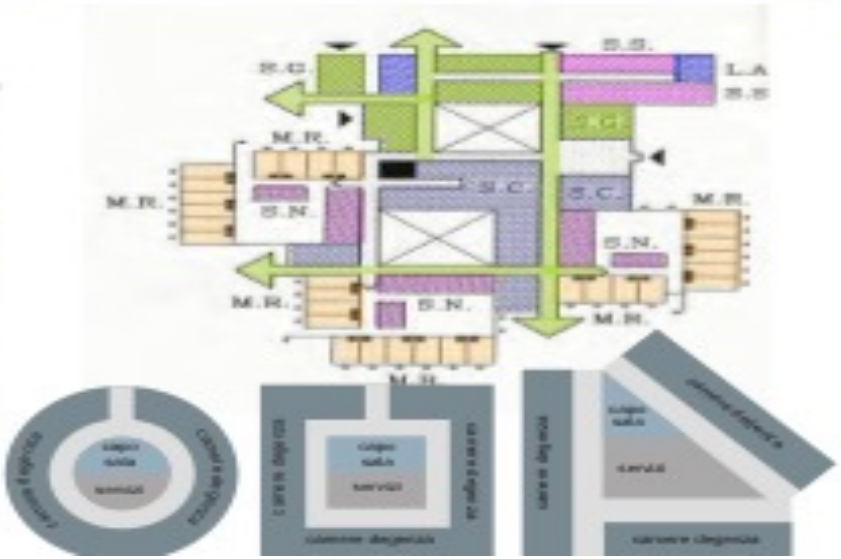
Ergonomia Fisica

Spazi lavorativi

Progettazione Integrata negli edifici ospedalieri
Prof.ssa Teresa Villani
La sicurezza antincendio nelle strutture sanitarie, Bastia Umbra 12/4/2014
Dipartimento di Pianificazione Design Tecnologia dell'Architettura
Sapienza, Università di Roma



L'edilizia ospedaliera rappresenta un esempio emblematico di complessità organizzativa e tecnologica fortemente influenzata da innovazioni costanti indotte da **rinnovate forme di bisogni di salute e tutela.**



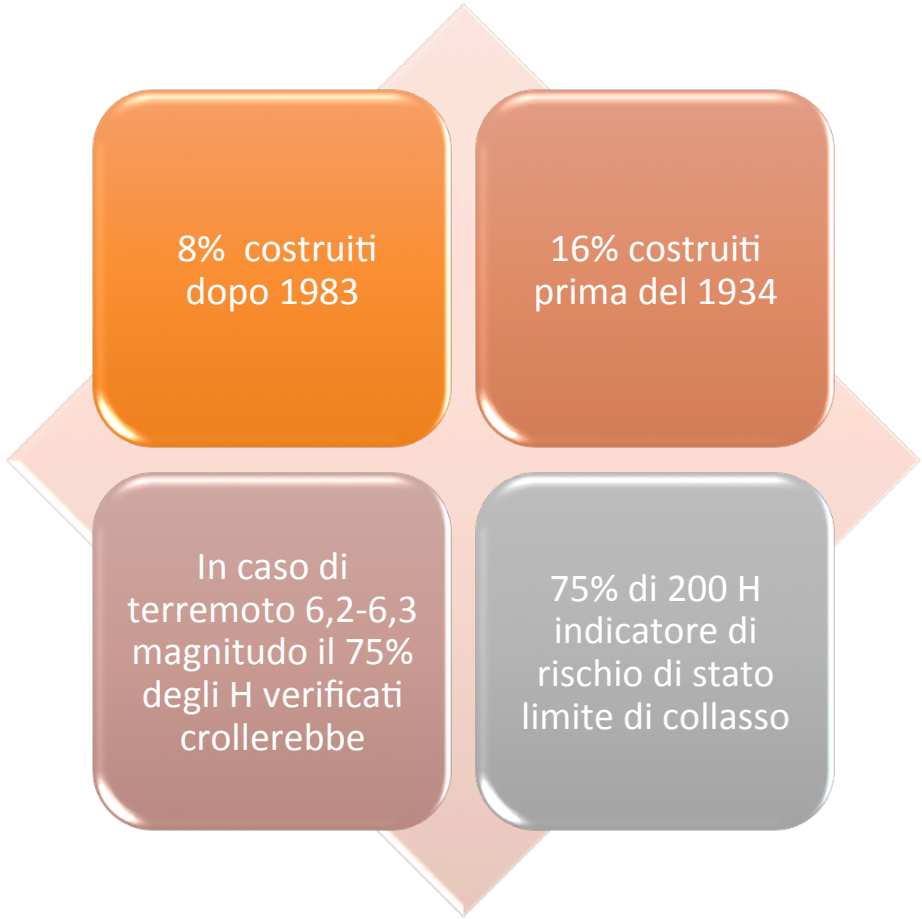
Progettazione Integrata negli edifici ospedalieri
Prof.ssa Teresa Villani
La sicurezza antincendio nelle strutture sanitarie, Bastia Umbra 12/4/2014
Dipartimento di Pianificazione Design Tecnologia dell'Architettura
Sapienza, Università di Roma

Gli ospedali e più in generale le strutture sanitarie sono tradizionalmente ritenute **luoghi di rifugio e di sicurezza**, considerando le condizioni di estrema vulnerabilità degli utenti.

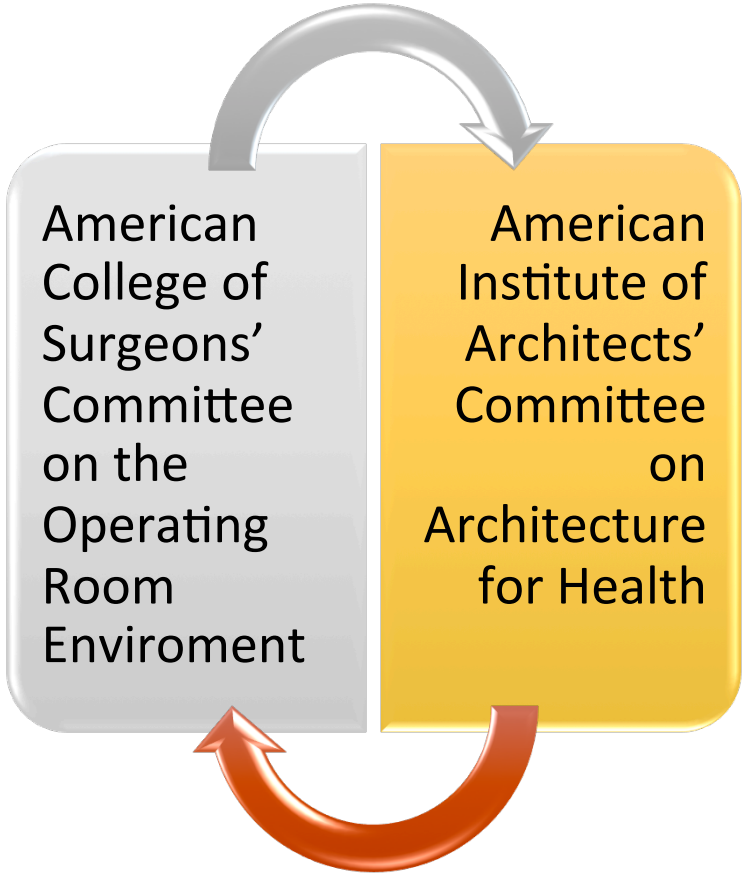
Requisiti per un approccio integrato alla progettazione ospedaliera

Commissione di Studio presso Ministero della Salute istituita dal ministro U. Veronesi e diretta dall' Architetto Renzo Piano
luglio-ottobre 2000
"Nuovo modello di ospedale per acuti ad alto contenuto tecnologico ed assistenziale"

Censimento strutture ospedaliere al 2013
Commissione parlamentare d'inchiesta sul SSN
Presidente Ignazio Marino

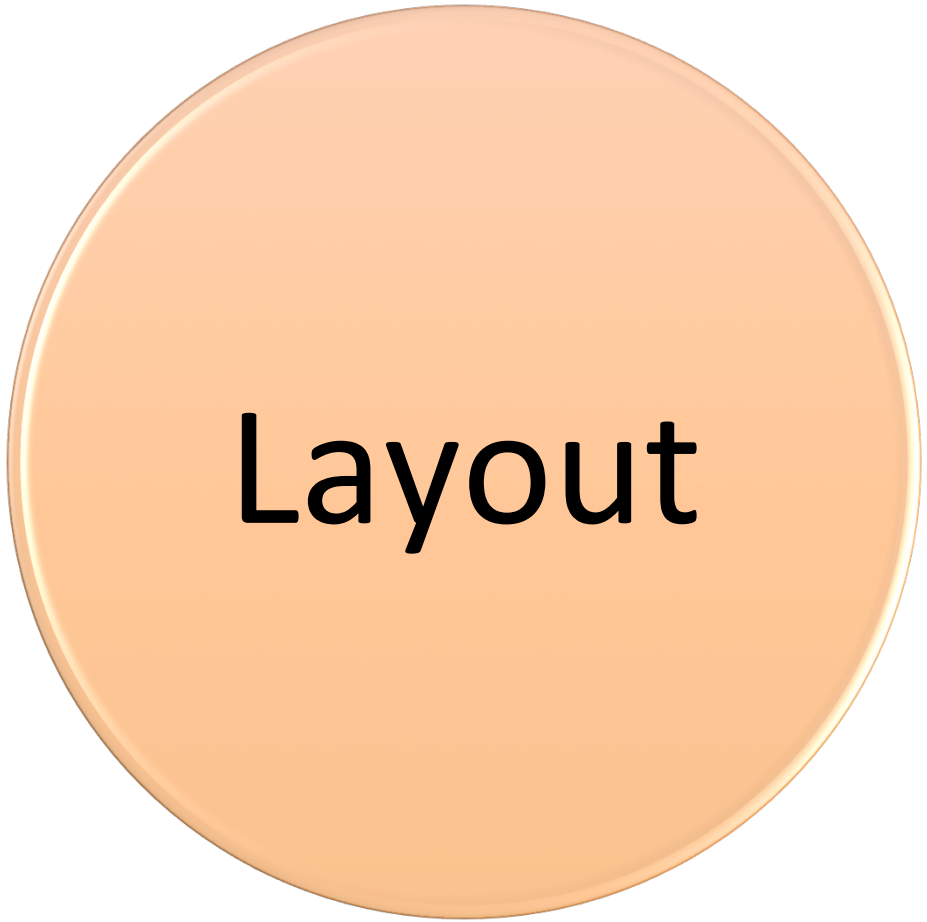


Pubblicazioni congiunte



Type of Surgical Procedure Room	Minimum Clear Floor Area (Net Square Feet)	Minimum Room Dimension (Feet)	Comments
Operating Room (General)	**400 NSF**	**20 Feet**	*Minimum clear floor area of 360 NSF and minimum clear dimension of 18 feet allowed for renovation work.*
Operating Room (Specialty and/or Image-Guided Surgery)	**600 NSF**	**20 Feet**	*Minimum clear floor area of 500 NSF and minimum clear dimension of 20 feet allowed for renovation work.*
Hybrid Operating Room	**650 NSF**	**24 Feet**	*Minimum clear floor area of 600 NSF and minimum clear dimension of 22 feet allowed for renovation work.*
Control Room	**120 NSF** *(including fixed work surfaces)*	**Varies**	*Should be physically separated from the hybrid operating room with walls and a door and windows to allow full view of the patient and the surgical team.*
Imaging Equipment Room	**150 NSF** *(vendor specific)*	**Varies**	*Should be physically separated from the hybrid operating room with walls and a door; size will vary depending on specific equipment and vendor.*

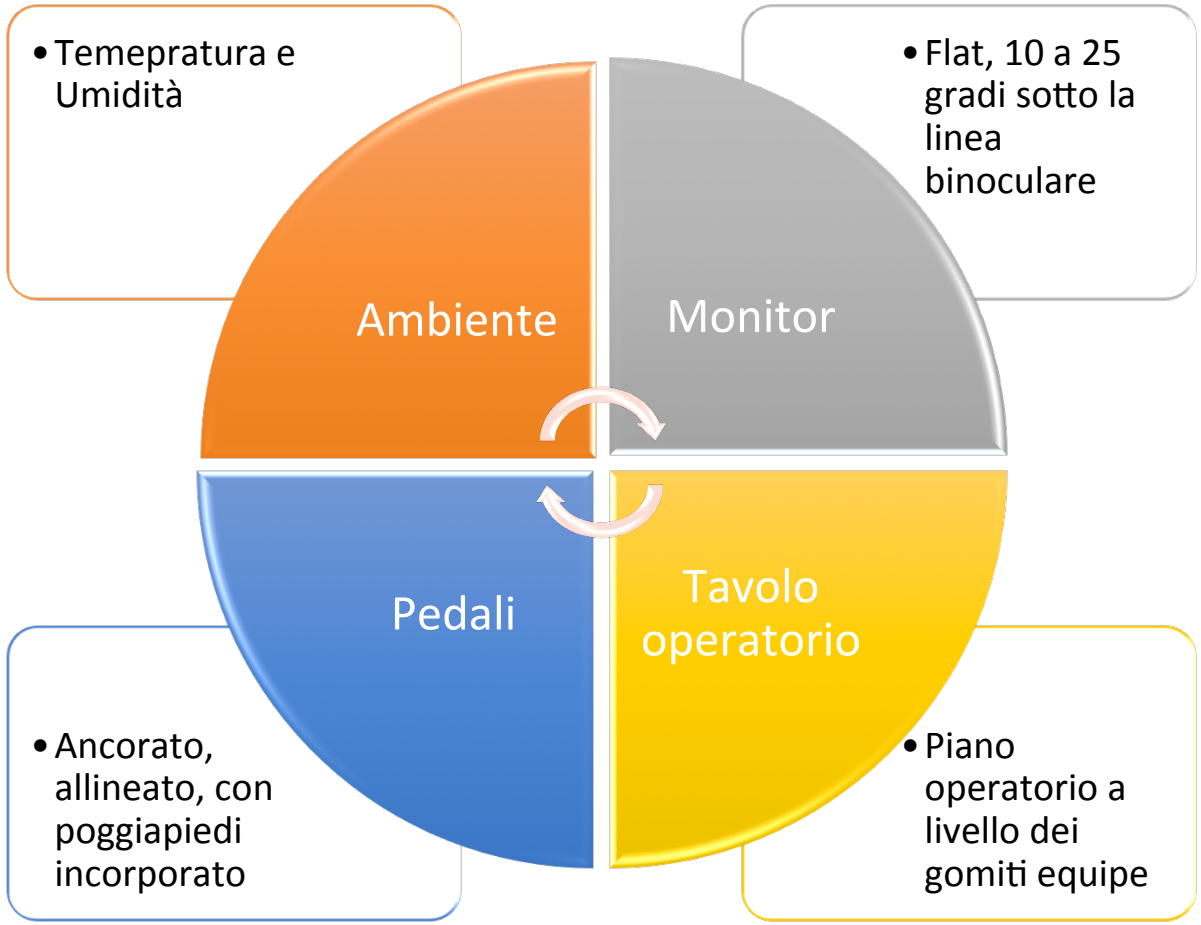
Source: *Guidelines for Design and Construction of Hospitals and Outpatient Facilities*, The Facility Guidelines Institute, 2014 Edition.

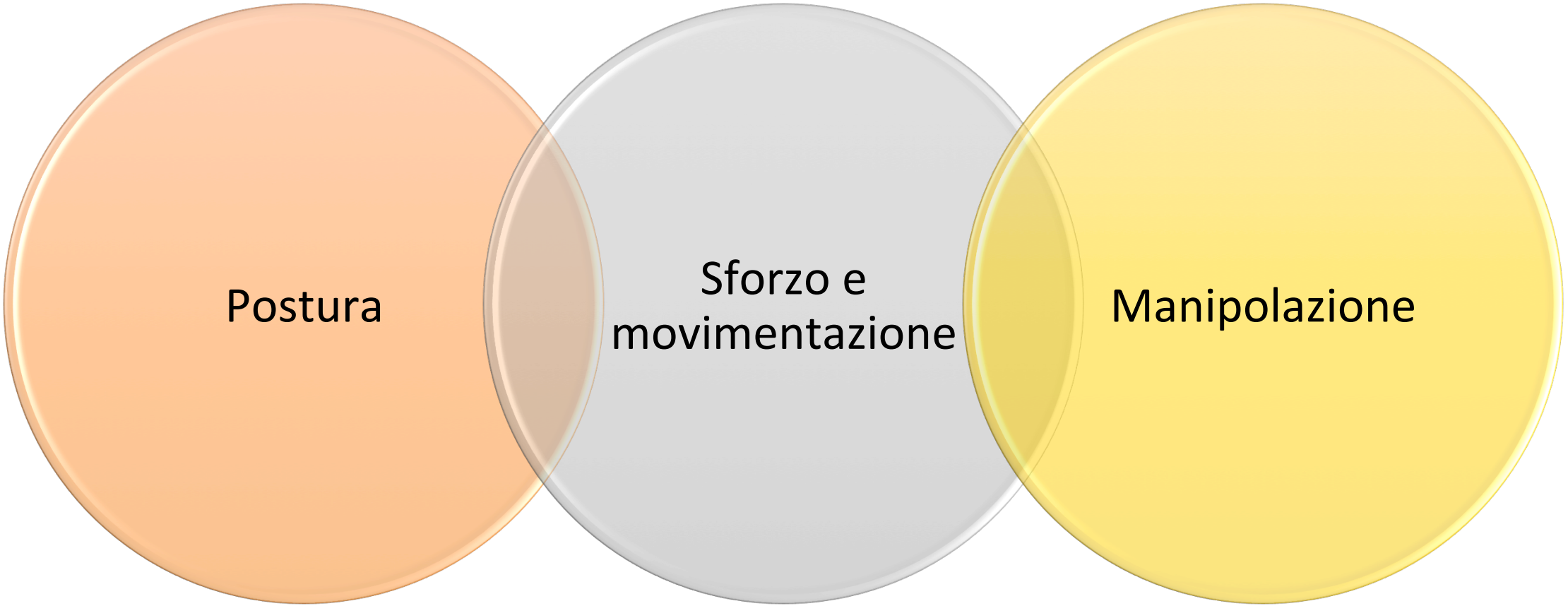

Layout

Layout vs Work design

Ergonomia Fisica

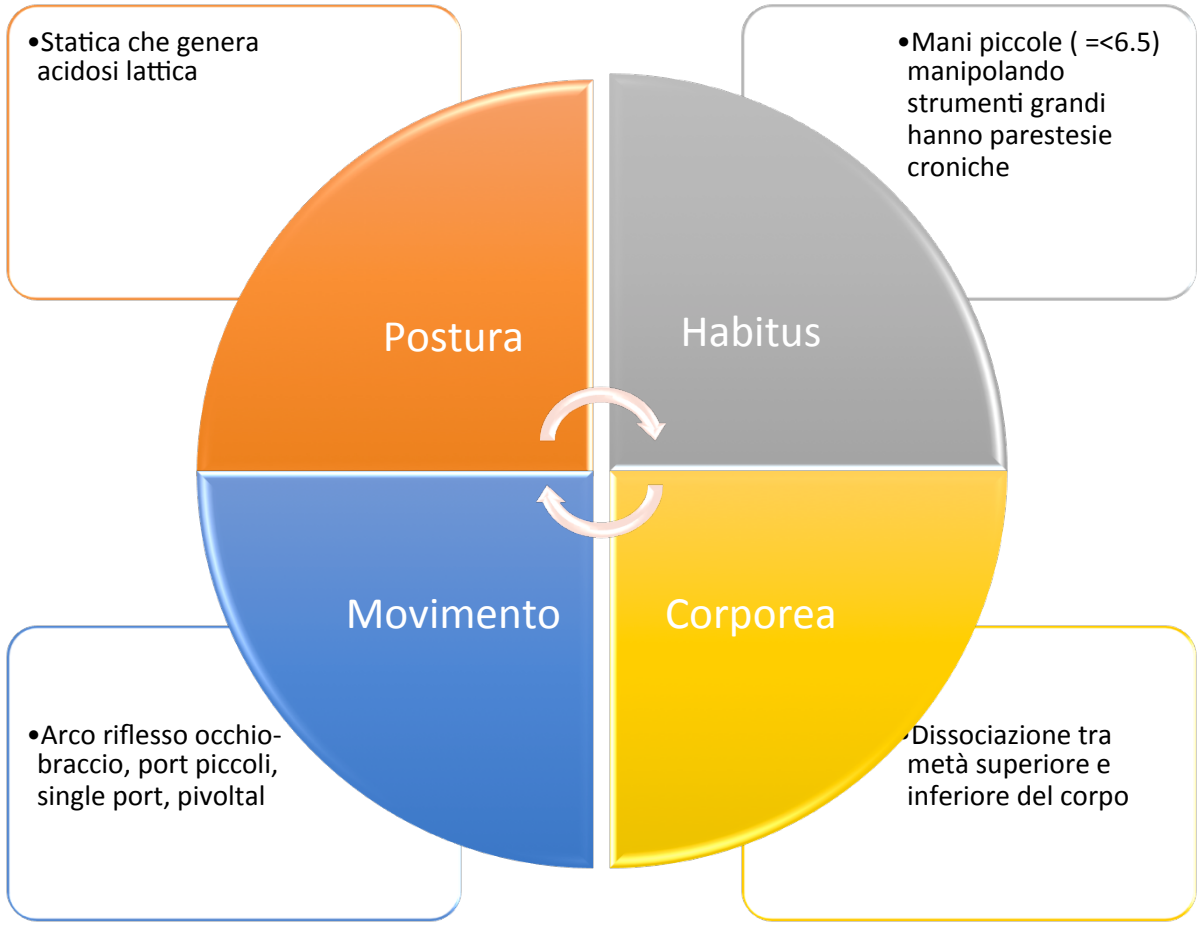
bulletin.facs.org/2012/04/surgeons-experience-more-ergonomic-stress-in-the-or/
BULLETIN – American College of Surgeons




Postura
Sforzo e movimentazione
Manipolazione

Ergonomia Fisica

bulletin.facs.org/2012/04/surgeons-experience-more-ergonomic-stress-in-the-or/
BULLETIN – American College of Surgeons




Salute -
Benessere

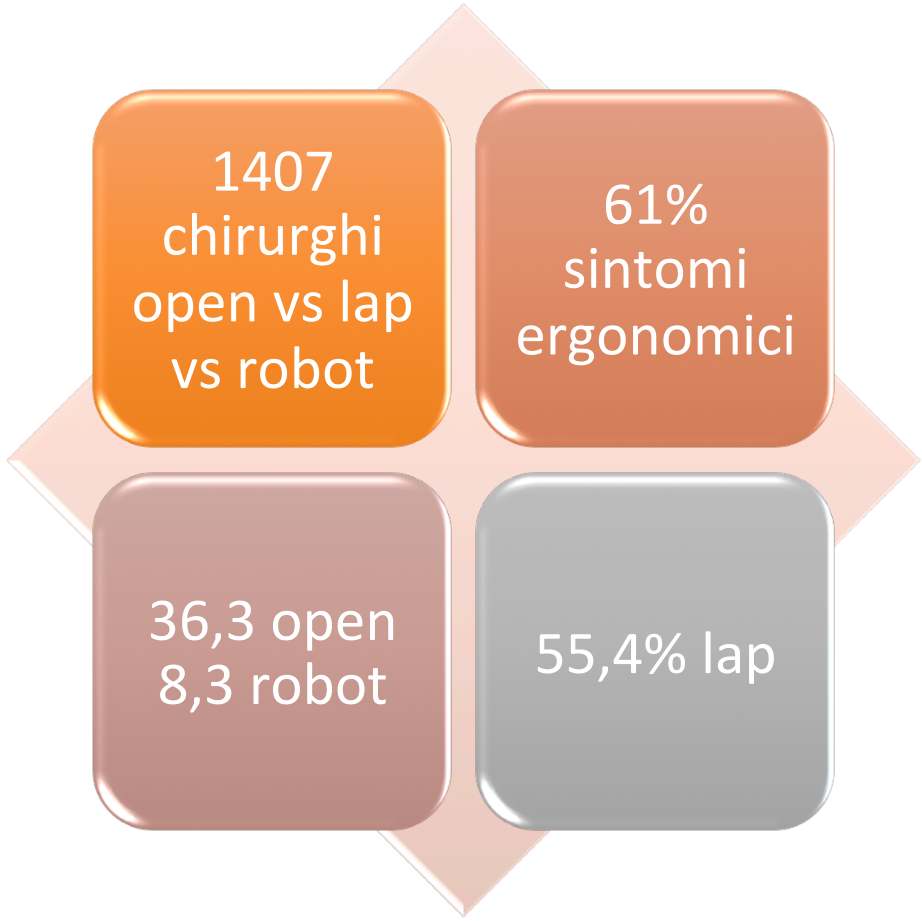

Stress
Tolerance level
Work requirements
Age
20
30
40
50

Ergonomia Fisica

bulletin.facs.org/2012/04/surgeons-experience-more-ergonomic-stress-in-the-or/
BULLETIN – American College of Surgeons

La chirurgia mini-invasiva determina una maggiore fatica psico-fisica dovuta alla combinazione di posizione statica corporea che riflette una maggiore concentrazione richiesta per effettuare una chirurgia con visione indiretta, abbinata ad un movimento amplio degli arti superiori dovuto ai mini-accesso/i e l'effetto pivot.

Survey2011
Stanford University Medical Center
Discomfort in chirurgia



Survey2011 Stanford University Medical Center Discomfort in chirurgia

Ergonomy in mini-invasive OR:safe performance saves lives –R.Castellani, F.Venneri, M.Vescia ISCOME2015 Poster presentation

Affaticamento/stanchezza da acido lattico muscolare

Cervicalgia da monitor

Sforzo visivo su monitor

Lombalgia da dissociazione corporea (base fissa, tronco e arti movim)

Mano < 6,5 di guanto più esposta a parestesia per discrepanza con strumentazione

Ergonomia Fisica
bulletin.facs.org/2012/04/surgeons-experience-more-ergonomic-stress-in-the-or/
BULLETIN – American College of Surgeons

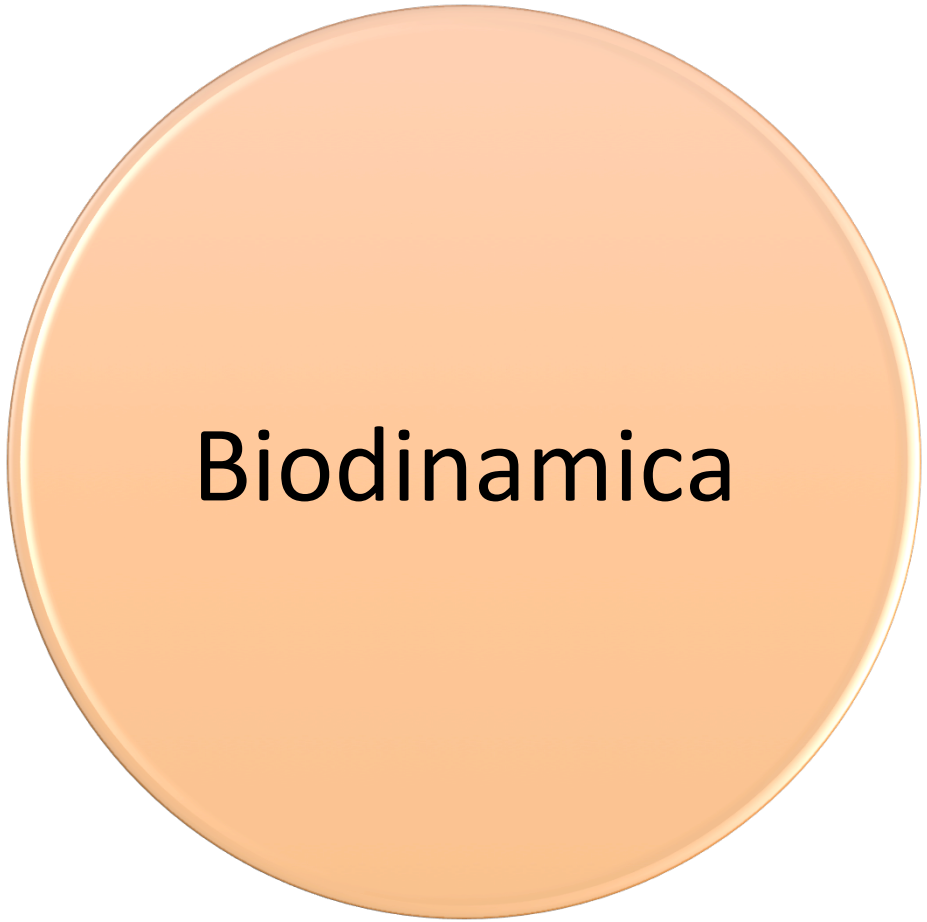
AZIONI CORRETTIVE

Ogni 30-40 minuti distogliere lo sguardo dal monitor per 30''

Riposo per rigenerare efficienza psico-fisica

Attività pesistica 2 volte a settimana

Attività aerobica 30' al giorno


Biodinamica

Operating room ergonomics

C. Pennington – School of Medicine and dental Medicine
University of Connecticut – 2012 Experiment with Don Peterson Head of biodynamic laboratory and Dr. Kueck medical director of the health Center's robotic surgery program

" During the experiment, electrodes were placed on the surgeon that recorded muscle activity and fatigue of the forearm muscles that control hand movements. Additionally, thin film force sensors were mounted on the surgical devices to measure grip force, and a force plate was used to measure the push and pull forces of the surgeon on the devices.

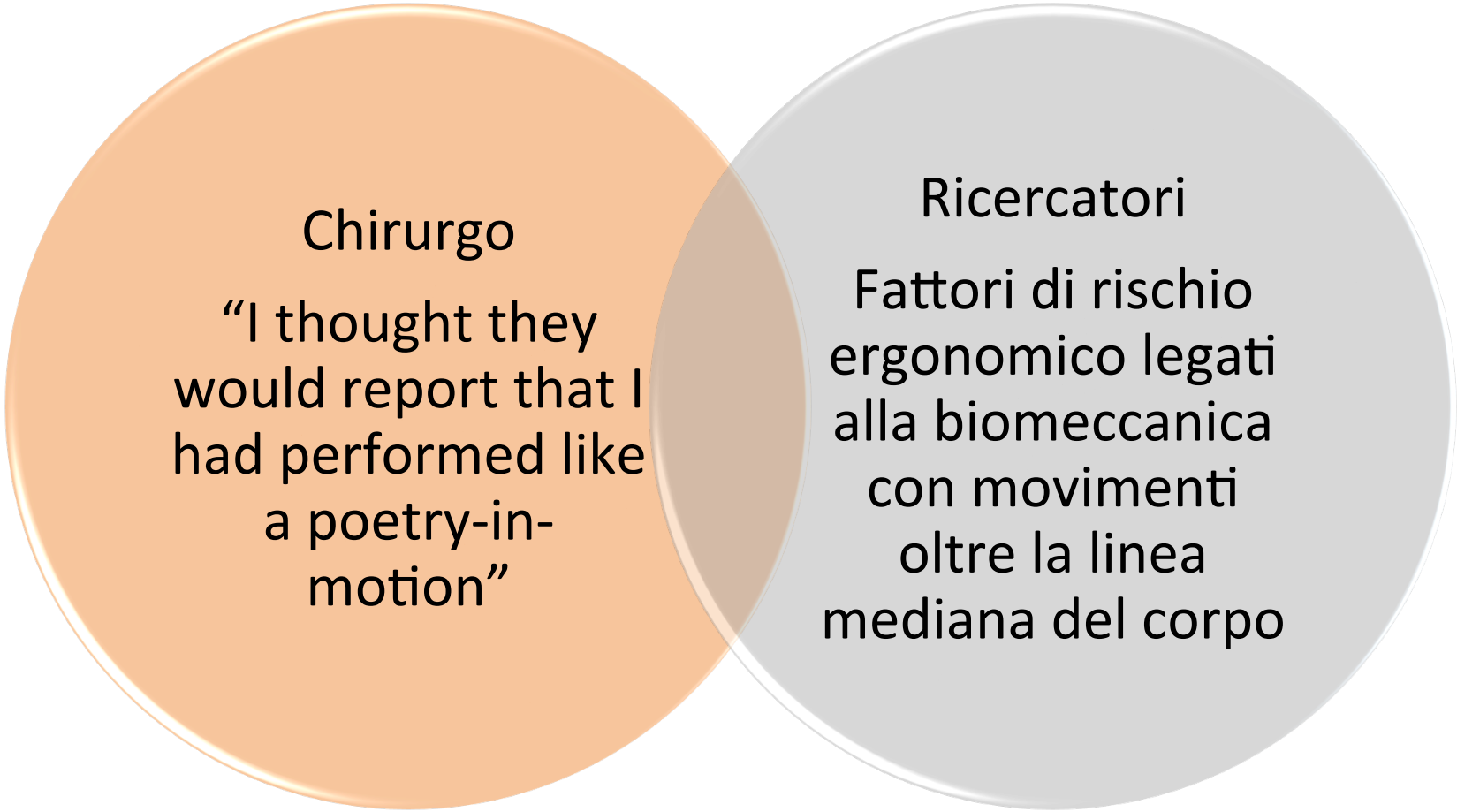
We found that the surgeons are pushing the instruments constantly as they're using them,about three pounds of pressure, and about three to four pounds of torking. That can lead to numbness and tingling in their hands and arms and an inability to fire the devices"

“….surgeons could learn more about motion study, time study, waste elimination, and scientific management from industries than the industries could learn from hospitals”

Frank Bunker Gillbreth 1916

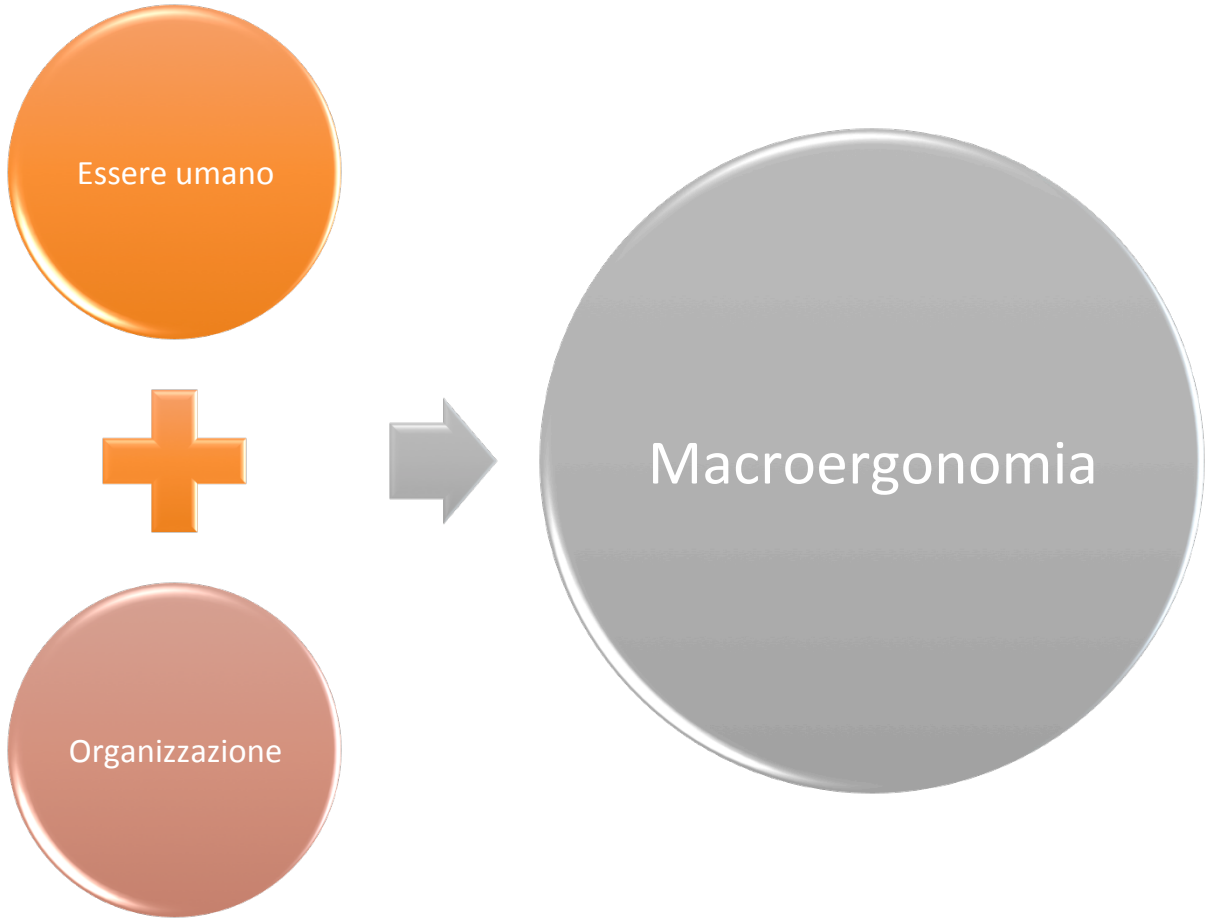
University of Kentucky – Lexington
(quasi 100 anni dopo l' esperimento di Gillbreth!)

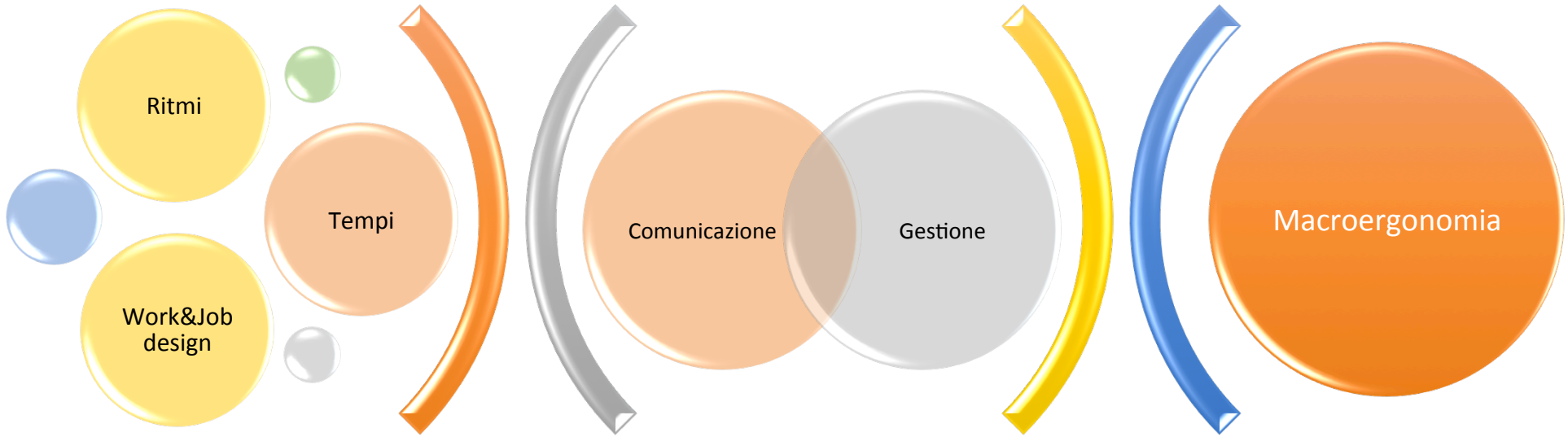
University of Kentucky - Lexington



Ergonomia percettivo-cognitiva


Comprensione dei segnali
Attivazione controlli in rapporto al carico di lavoro
Percezione stimoli
Ergonomia percettivo-cognitiva
Decision making


Essere umano
Organizzazione
Macroergonomia


Ritmi
Tempi
Work&Job design
Comunicazione
Gestione
Macroergonomia

Job&work design

Job&Work Design

Capitale cognitivo

- Efficace
- Efficiente

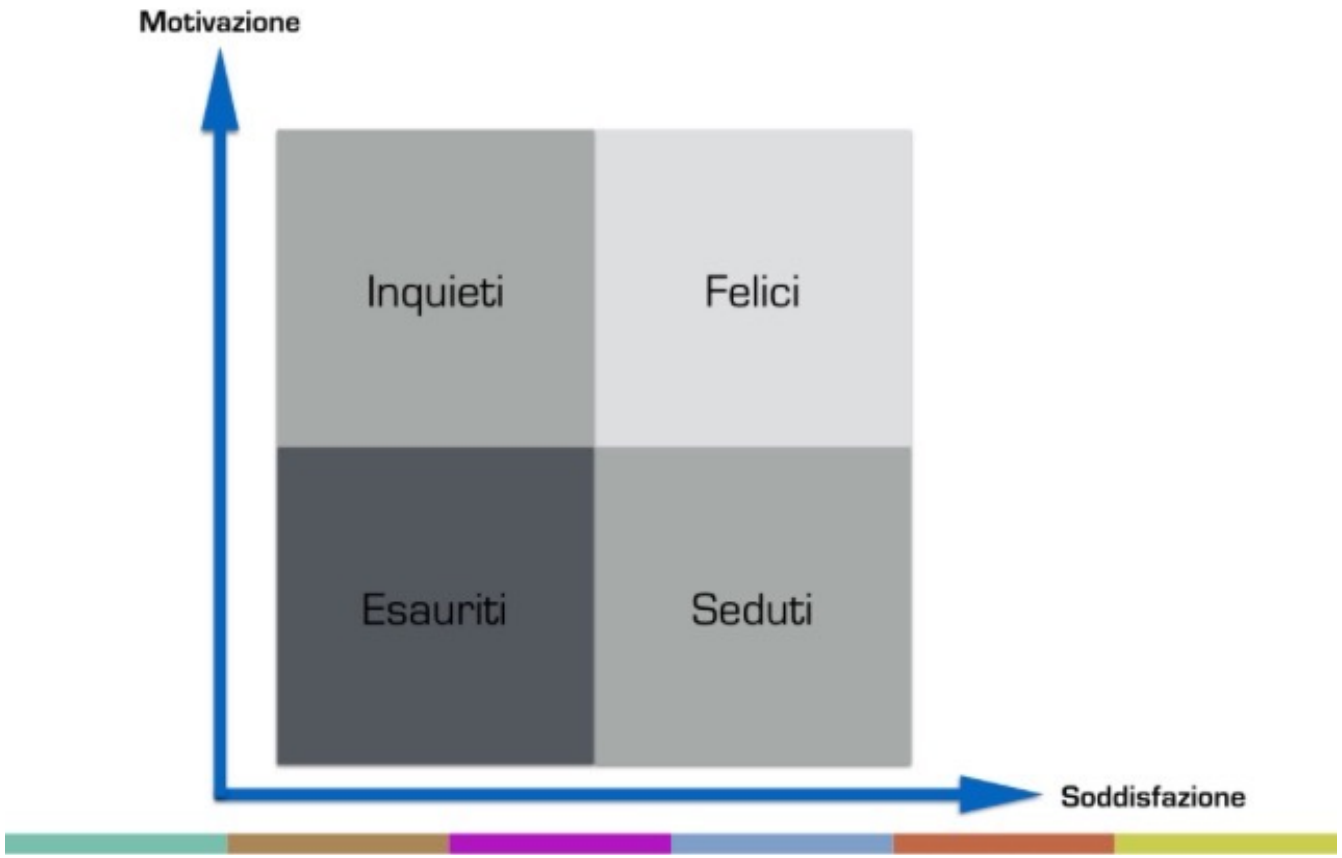
Fattori

- Di mantenimento
- Motivazionali

Comunicazione

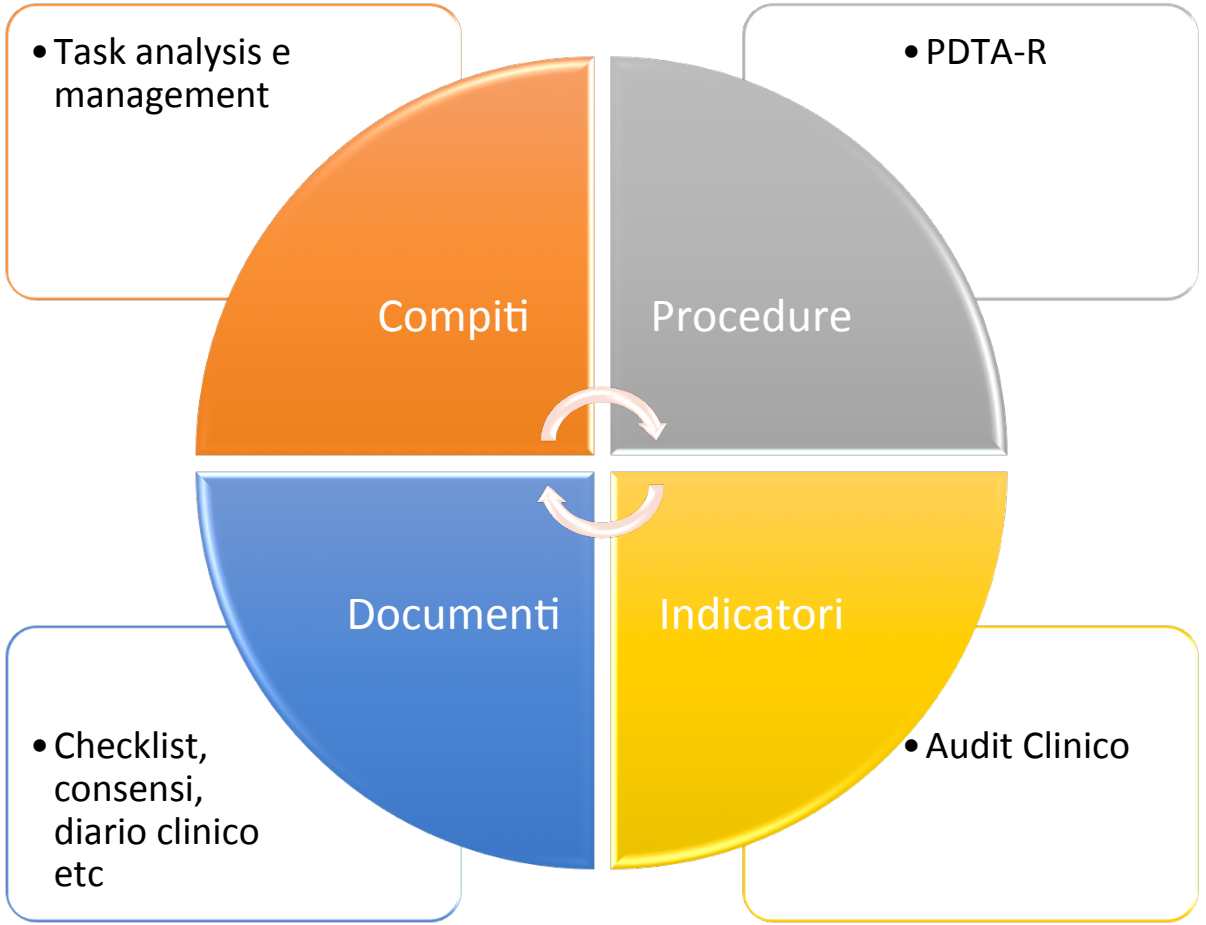
- Dpt Risorse umane
- Dipendenti/ Collaboratori

Fattori motivazionali

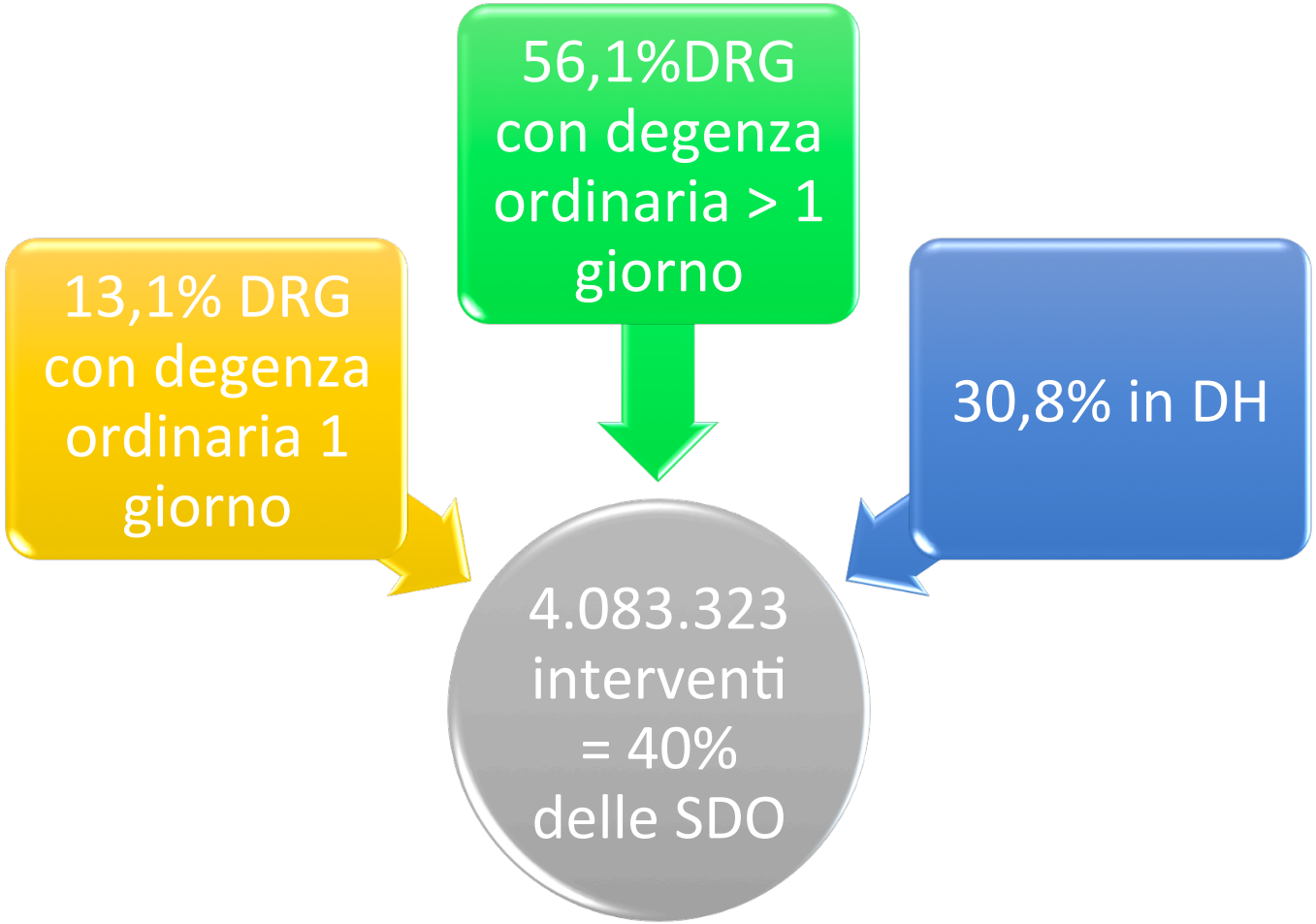

Motivazione
Inquieti
Felici
Esauriti
Seduti
Soddisfazione

Gestione

Gestione


• Task analysis e management
• PDTA-R
Compiti
Procedure
Documenti
Indicatori
• Checklist, consensi, diario clinico etc
• Audit Clinico

SDO2012Ministero della Salute.
Rapporto annuale sull'attività di ricovero ospedaliero
www.salute.gov.it/ricoveriospedalieri/ricoveriospedalieri.jsp



Identification and categorization of technical errors by observational clinical human reliability assessment (OCHRA) during Laparoscopic Cholecystectomy

B Tang,MD; GB Hanna PhD,FRCS; P. Joice,MA,MB,ChB; A. Cuschieri, MD,FRSE

Arch Surg. 2004;139:1215-1220

" SURGERY contributes to almost 50% of all adverse events and to 13% of all hospital deaths[1]"

[1] Leape LL, Brennan TA, Laird N et al *The nature of adverse events in hospitalized patients: results of the Harvard Medical Practice Study II* New Engl J Med 1991:324:377-384

Contesto

La sicurezza in chirurgia è un serio problema di salute pubblica.

Ogni anno si eseguono circa 234milioni di interventi nel mondo con un tasso di mortalità di 0.4-0.8% e 3-16% di eventi disabilitanti; questo significa che le morti sono almeno 1 milione e gli eventi 7 milioni.

An estimation of the global volume of surgery: a modelling strategy based on available data Weiser TG, Regenbogen E,Thompson KD,HaynesAB,Lipsitz SR,Berry WR,Gawande AA - The Lancet, v.372,no9633,p139-144, 12 July 2008 Finanziamento WHO

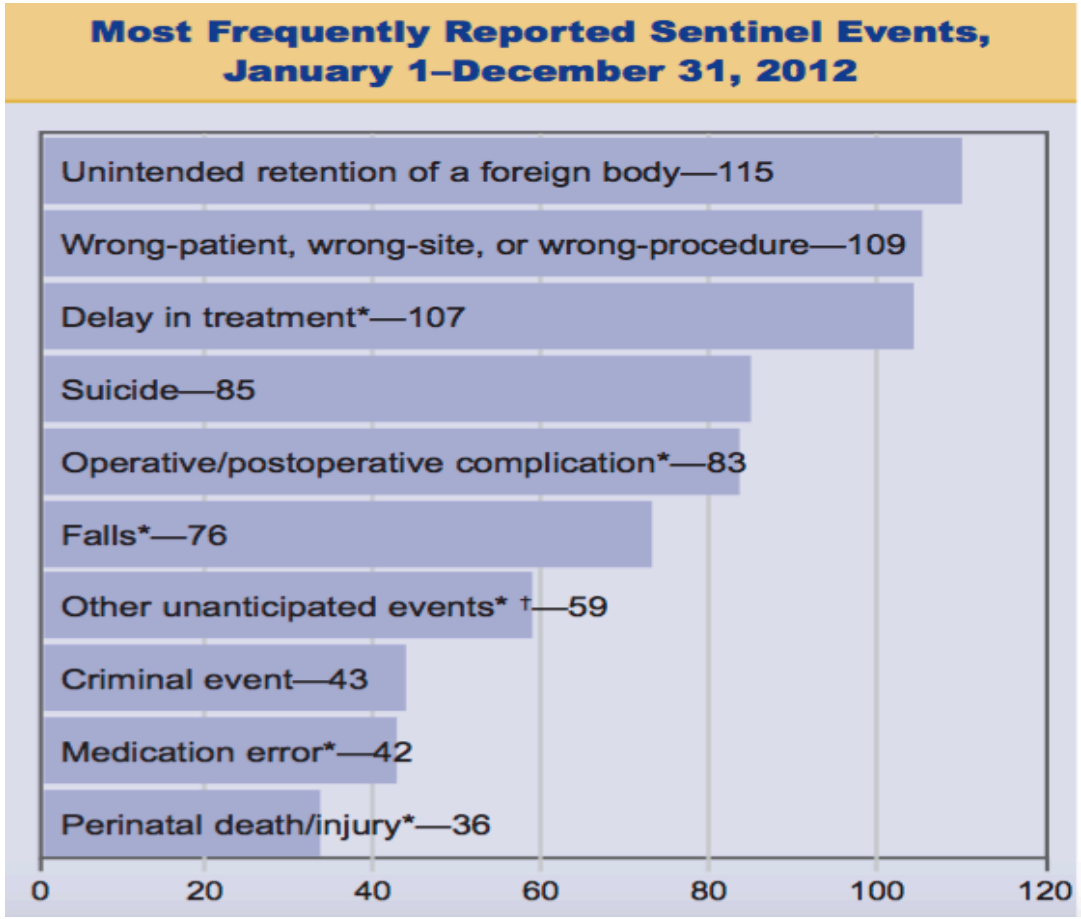
A SURGICAL SAFETY CHECKLIST TO REDUCE MORBIDITY AND MORTALITY IN A GLOBAL POPULATION

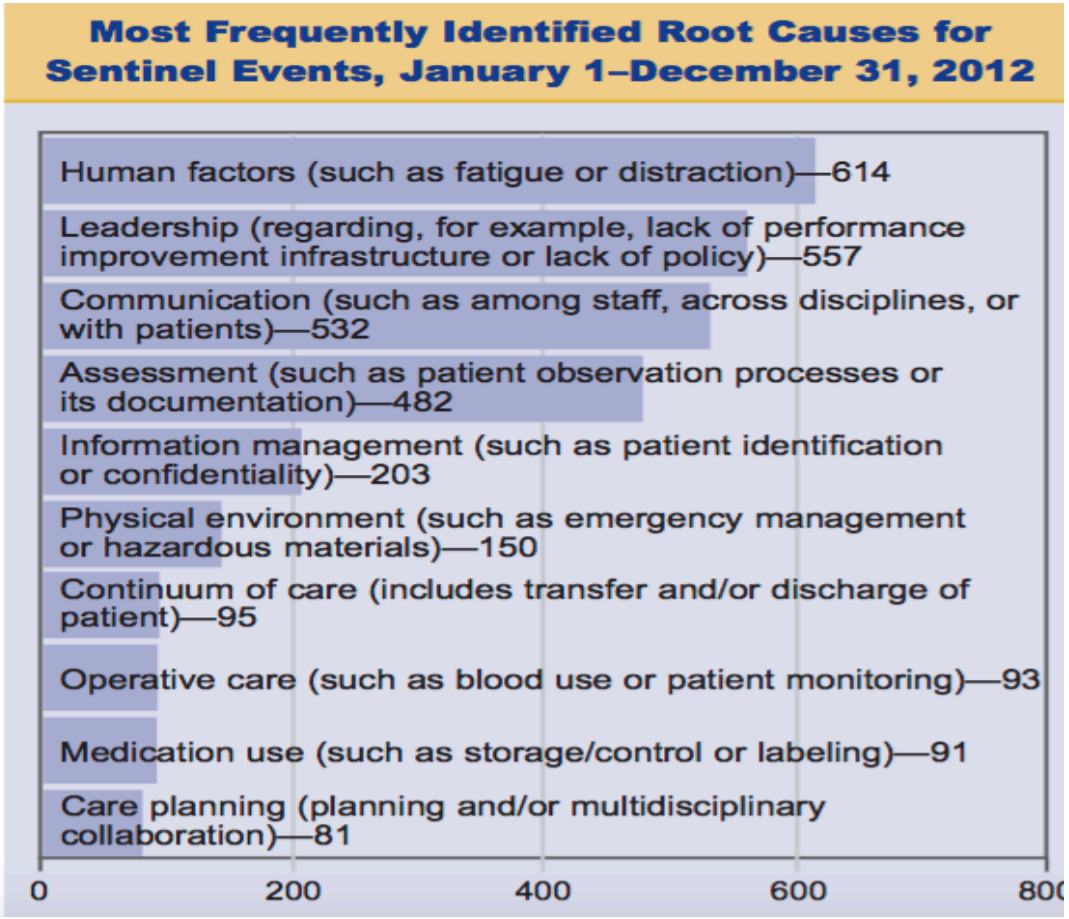
Haynes AB, Weiser TG,Berry WT, Lipsitz SR, Breizat AH, Dellinger EP,Herbosa T, Joseph S, Kibatala PL, Lapitan MC,Merry AF, Moothly K, Reznick RK,Taylor B, Gawande AA Safe Suregry Saves Lives Study Group

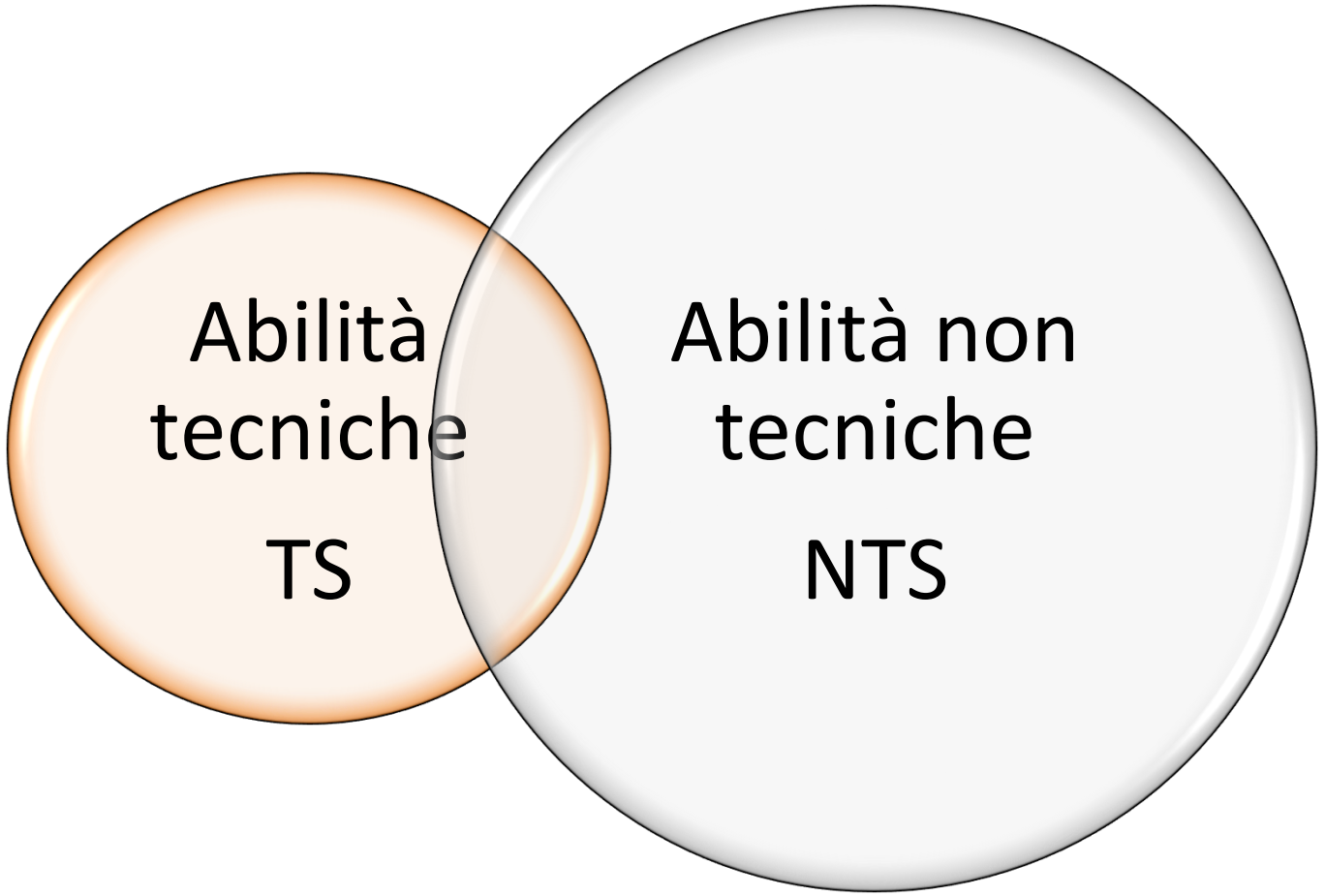
New England Journal of Medicine 360:491-9(2009)

	BASELINE	CHECKLIST	P Value
CASI	3733	3955	-
MORTI	1,5%	0,8%	0.003
COMPLICANZE	11%	7%	<0.001
INFEZIONE SITO CHIRURGICO	6,2%	3,4%	<0.001
REINTERVENTO NON PROGR	2,4%	1,8%	0.047
	Variazione complicanze	**Variazione mortalità**	
PAESI ALTO SVILUPPO	10,3% ->7,1%*	0,9% -> 0,6%	* <0.05
PAESI MEDIO/BASSO SVILUPPO	11,7% -> 6,8%*	2,1% -> 1,0%*	* <0.05

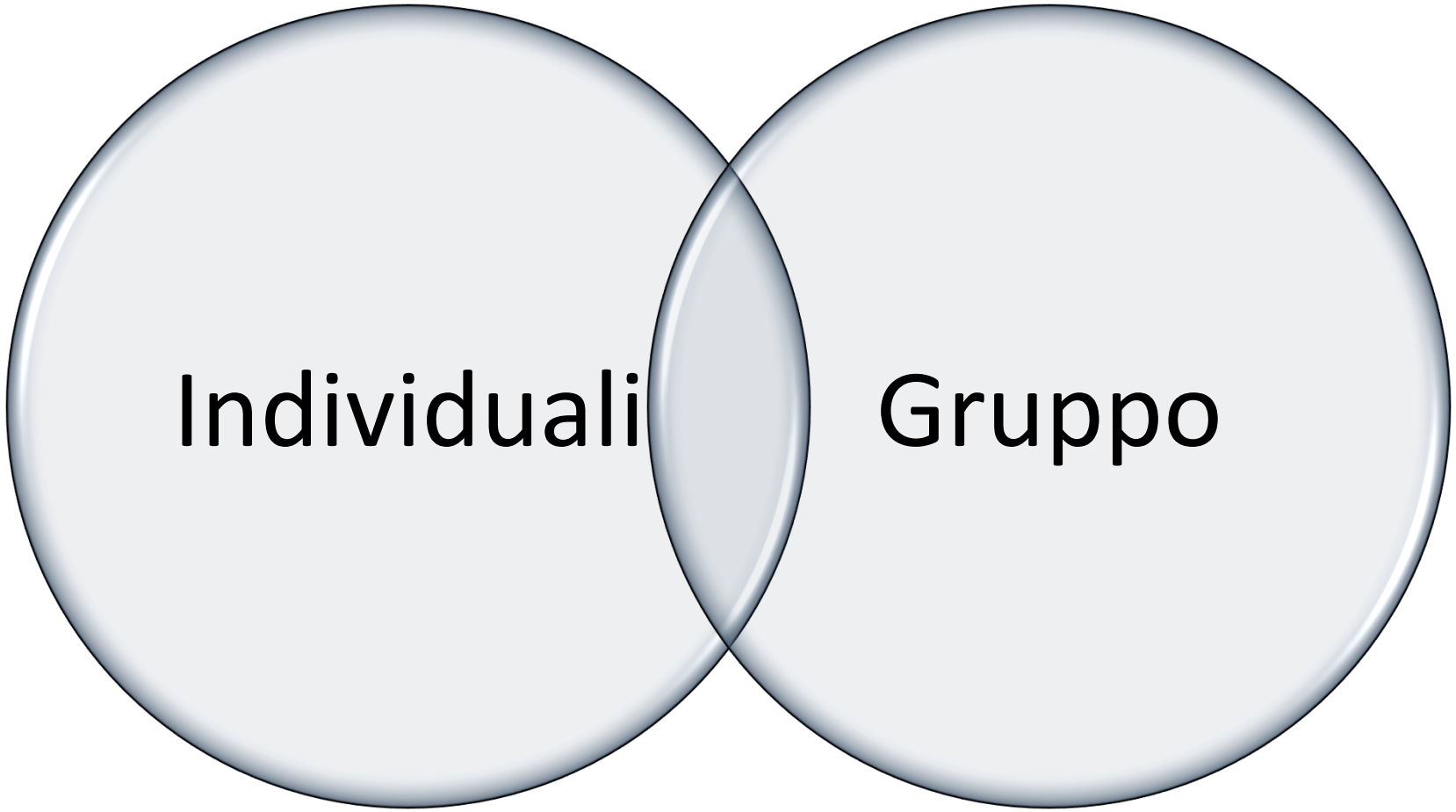
The Joint Commission Perspectives
The officiale Newsletter of the Joint Commission
March 2013 – Volume 33 – Number 3



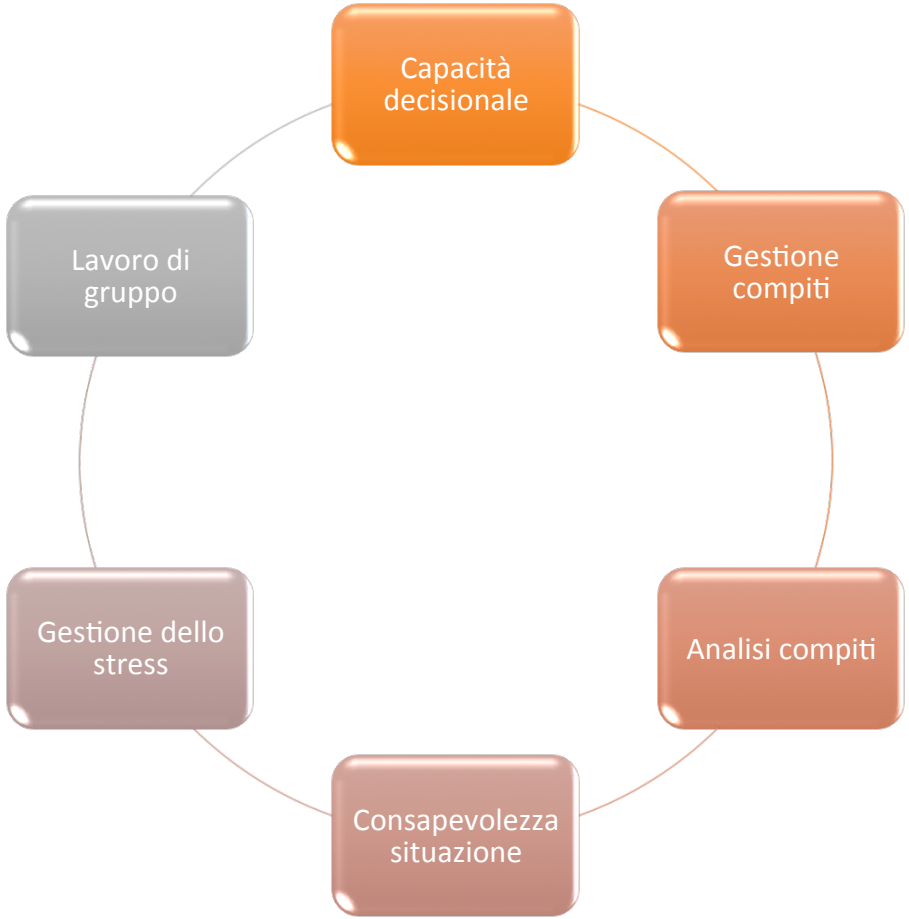



Abilità tecniche
TS
Abilità non tecniche
NTS

Tassonomica NTS



Individuali



Gruppo

Es VHA

Original research

The Oxford NOTECHS System: reliability and validity of a tool for measuring teamwork behaviour in the operating theatre

A Mishra, K Catchpole, P McCulloch

ABSTRACT

Introduction: The frequency of adverse events in the operating theatre has been linked to the quality of teamwork and communication. Developing suitable measures of teamwork may play a role in reducing errors in surgery. This study reports on the development and evaluation of a method for measuring operating theatre teamwork quality.

Methods: The Oxford Non-Technical Skills (NOTECHS) scale was developed from an aviation instrument for assessment of non-technical skills. Consultation with experts and task analysis led to modifications reflecting the complexities of the theatre teamwork, particularly the coexistence of three subteams (surgeons, anaesthetists and nurses). The scale was then evaluated using teams performing laparoscopic cholecystectomy ($n = 65$) before and after teamwork training. Attitudes to teamwork and surgical error rates were assessed by questionnaire and direct observation methods, and used to assess the reliability and validity of the Oxford NOTECHS scale.

Results: The interobserver reliability was excellent in 24 operations independently assessed by two observers ($R_{wg} = 0.89$), confirmed by a third observer in 17 cases ($R_{wg} = 0.89$). Validity was demonstrated through improved scores after teamwork training ($t = -3.019$, $p = 0.005$), concurrent with improved attitudes to teamwork after training; inverse correlation between NOTECHS scores and surgical errors ($\rho = -0.267$, $p = 0.048$); strong inverse correlation between surgical subteam score and surgical errors ($\rho = -0.412$, $n = 65$, $p = 0.001$); and strong correlation with teamwork scores from an alternative system ($n = 5$, $r = 0.896$, $p = 0.040$).

Conclusion: The Oxford NOTECHS scale appears to be a reliable and valid instrument for assessing teamwork in the operating theatre, and is ready for further application.

Within hospitals, the operating theatre is reportedly the most common site for adverse events to occur,[1] probably because it represents a complex environment where technology, competence and resources require coordination under time pressure. This combination of factors has previously been identified in teams working in other complex, high-risk environments,[2] and analogies between healthcare and other industries have been frequently and plausibly made,[3 4] supported by observations of the relationship in the operating theatre between potential adverse events and deficiencies in teamwork, behaviour and coordination.[5 6] Thus, an ability to measure teamwork and communication performance is essential if we wish to investigate the role of these "non-technical" skills in influencing the quality and safety of healthcare.

Several methods have been developed for measuring, training or diagnosing teamwork and cognitive skills in the operating theatre.[7–10] Our own research in this area has built upon extensive work in aviation by developing a scale to evaluate the behaviour of the operating team in relation to other intraoperative events, processes and outcomes.[11 12] While taking advantage of a field where 30 years of research have been spent on understanding teamwork and communication, it is important to remember that concepts cannot be simply transplanted from aviation to surgery but have to be translated. In this paper, we describe the development of the Oxford Non-Technical Skills (NOTECHS) system for evaluating operating teams, seek to confirm that acceptable levels of reliability can be achieved and formally examine the validity of this scale, with the wider aim of establishing a clear evidential link between teamwork training programmes and improvements in surgical care.

METHOD

Development of Oxford NOTECHS system

The NOTECHS evaluation system used in aviation was developed in response to requirements for the training and assessment of teamwork and cognitive skills in the civil airline cockpit.[13] It was structured along four behavioural dimensions: leadership and management; teamwork and cooperation; problem-solving and decision-making; and situation awareness. The extensive expertise and evaluation investments that validated this scale,[14] combined with a recognised need for validated, performance-related behavioural markers in surgery,[4] led to the adaptation of NOTECHS for operating theatre teams. Following usual practice,[15] a task analysis defined the domain in which the scale would be used, and consultation took place with content experts (two cardiac surgeons, one vascular surgeon, one orthopaedic surgeon, two anaesthetists, one human-factors expert and two aviation-crew resource-management trainers) to confirm the scoring system and translate skills from aviation to the operating-theatre context. The resultant NOTECHS scale for use in surgery (table 1), was found to be useful in early studies in paediatric cardiac surgery and orthopaedic surgery.[16 17] In order to further examine the contribution of nursing, anaesthetic and surgical subteams to the functioning of the team, a refinement was then made which provided this extra layer of definition (table 2). This range of adapted markers

Tabella 1 - Strumento di valutazione NOTECHS del team di sala operatoria

Categorie	Elementi	Descrizione
Leadership e gestione	Leadership	Coinvolge, crea motivazione etc
	Mantenimento degli standard	Desiderio di raggiungere elevati standard
	Pianificazione e programmazione	Pianificazione condivisa, compresa etc
	Gestione del carico di lavoro	Distribuzione compiti, risponde allo stress
	Autorevolezza e assertività	Effettua controllo continuo
Lavoro di gruppo e cooperazione	Costruzione/mantenimento del team	Rilassato, gentile, aperto, inclusivo etc
	Supporto agli altri	Aiuta gli altri, da assistenza e feedback
	Comprensione delle necessità del team	Ascolta, riconosce abilità etc
	Risoluzione dei conflitti	Calma nei conflitti, suggerisce soluzione
Risoluzione dei problemi e capacità decisionale	Definizione e diagnosi	Usa tutte le risorse, analizza tutto con team
	Produzione di opzioni	Suggerisce alternative, chiede conferma etc
	Valutazione dei rischi	Rischio capacità team correlato,
	Revisione degli esiti	Nuove opzioni/obiettivi
Consapevolezza della situazione	Osservazione	Stimola la vigilanza, considera tutto
	Comprensione	Aggiorna il team, sa le capacità
	Prevedere	Identifica problemi futuri, anticipa

Sotto lo standard = 1	Standard basale = 2	Standard=3	Eccellente=4
Comportamento che compromette sicurezza paziente e efficacia teamwork	Comportamento che in altre condizioni potrebbe direttamente minare sicurezza paziente e team	Comportamento che mantiene un efficace livello di sicurezza paziente e team	Comportamento che rinforza sicurezza e teamwork; modello per altri team

Table 2 Oxford Non-Technical Skills (NOTECHS) subteam modifiers

	Surgical subteam	Anaesthetic subteam	Nursing subteam
Leadership and management			
Positive modifiers	⇒Raises team morale	⇒Takes control when required	⇒Scrub provides clear instructions to circulating nurse(s)
	⇒Intervenes if deviation	⇒Demonstrates desire for high standard	⇒Senior nurse makes sure protocols are followed
	⇒Prioritises tasks	⇒Appropriately distributes tasks b/w rest of team	⇒Speaks up when unhappy
Negative modifiers	⇒Deflates or fails to motivate team	⇒Does not take control when required	⇒Senior nurse does not support juniors
	⇒Does not attempt to build cohesion	⇒Does not set standards	
		⇒Inappropriate task distribution	
Teamwork and cooperation			
Positive modifiers	⇒Open	⇒Supportive of other subteams	⇒Nurses cooperate and support each other well
	⇒Appropriate use of abilities within team	⇒Appreciates functions of other subteams	⇒Senior nurse covers for junior scrub
	⇒Supportive of other subteams when necessary		
Negative modifiers	⇒Aggressive in conflicts	⇒Remains idle when problems arise	⇒Poor coordination between equipment needs and those provided
	⇒Does not appreciates others' abilities	⇒Functions separately from other subteams	
Problem-solving and decision-making			
Positive modifiers	⇒Demonstrates generation of options	⇒Participates in solving problems	⇒Takes an active part in decision-making
	⇒Open discussion and agreement over anatomy	⇒Raises suggestions	⇒Suggests solutions to problems—eg, alternative equipment
	⇒Incorporates other subteam issues		
Negative modifiers	⇒Decisions made unsystematically	⇒Does not consider anaesthetic options when met with problem	⇒Blames the surgeons when faced with problems
	⇒Does not utilise team where it may benefit		
Situation awareness			
Specific to subteams			
Positive modifiers	⇒Periodically gathers awareness of surroundings	⇒Anticipates surgical and process needs	⇒Anticipates equipment needs
Negative modifiers	⇒Is fixated on operative field	⇒Is not present at important stages of the operation or for long periods of time	⇒Absent at stages when needed to provide service
For all subteams			
Positive modifiers	⇒Patient: Has awareness of patient condition/comorbidity		
	⇒Procedure: Appreciates stage of operation		
	⇒People: Who is present in theatre, what skills they have and what they are doing		

Studio retrospettivo con contemporaneo caso controllo

Disegno ed obiettivo dello studio

CRM: gestione delle risorse di equipaggio, mutuato dal mondo aeronautico e adattato a quello sanitario per le abilità non tecniche Notechs - NTS

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

JAMA. 2010;304(15):1693-1700. doi:10.1001/jama.2010.1506

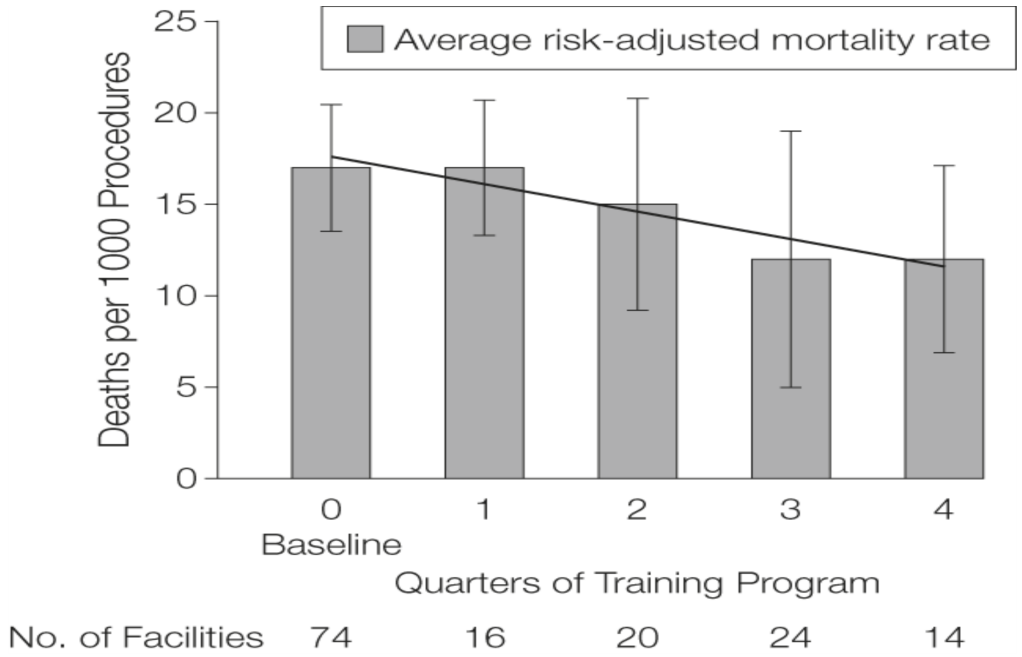


Figure Legend:

Linear trend line was fitted to the average risk-adjusted mortality rate (n = 5). Error bars indicate 95% confidence intervals.

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

JAMA. 2010;304(15):1693-1700. doi:10.1001/jama.2010.1506

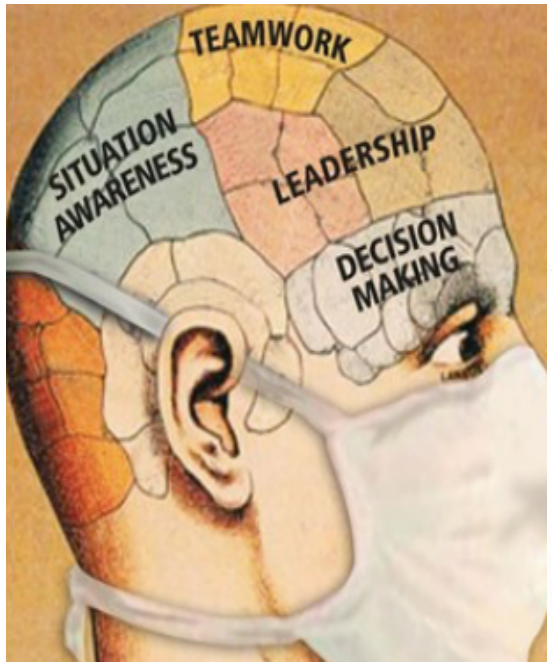
Table 3. Improvements Reported by Medical Team Training Facilities From Structured Interviews

Reported Improvements	No. (%) of Facilities (n = 74)
Communication among operating room staff	35 (47.2)
Staff awareness	34 (46.0)
Overall efficiency	49 (66.2)
Equipment use during surgery	44 (59.9)
Reduced length of procedures	15 (20.3)
Improved first-case start times	30 (40.5)
Other types of efficiency improvements[a]	6 (8.1)

[a] For example, reduced delays for surgical consent, decreased turnover time between cases, reduction in staff overtime hours.

Figure Legend:

Le condizioni di forte stress attivano l'asse ipotalamo-ipofisario che "riduce" l'attività cerebrale frontale sede della ragione e del pensiero



ENG RESTART

Altitude below 30000 ft	CHECK	All
Throttle	IDLE	1
FUEL Lever	OFF	3
Fuel TANK PUMP Sws	ON	3
ENG HYD PUMP Sws	OFF	3
ENG PNEU SUPPLY Sel	OFF	3
NOTE: Review restart items before proceeding.		
OVRD & AIR START Sw	OVRD & AIR START	1
N_2 RPM	CHECK	All
Less than 10 %		
Max One Pack per Operating Pneu Supply	VERIFY	3
WING & ANT ANTI-ICE Sw	OFF	3
ISOL VALVE Sws	OPEN	3
ENG START Sw	PUSH/LT ON	3
10% or more		
FUEL Lever	ON	3
Clock	START	3
Start Indications	MONITOR	All
Abnormal or no EGT rise within 45 sec		
FUEL Lever	OFF	3
OVRD & AIR START Sw	OFF	1
NOTE: Other start attempts may be made with ENG IGNITION sel in START A or B. If not successful, restore Eng Hyd Pumps and apply Abn Proc, ENG SHUTDOWN IN FLIGHT. **(END)**		
Normal and stabilized at idle		
NOTE: Observe 1 min warmup time unless flight safety is endangered.		
ENG HYD PUMP Sws	ON	3
ENG PNEU SUPPLY Sel	AUTO	3
OVRD & AIR START Sw	AS RQD	1
Hyd, Elec, Fuel, Pneu Sys	RESTORE	3


GLI INCIDENTI AEREI AI RAGGI X
Percentuale di incidenti*
per fasi, sulla base di un volo
di 1 ora e 30 minuti
*Esclusi:
sabotaggio,
azioni militari,
turbolenza o
evacuazione
d'urgenza
6%
12%
5%
9%
6%
5%
5%
8%
46%
1
2
3
4
5
6
7
8
9
1 Carico e rolleggio
2 Decollo
3 Salita iniziale
4 Salita in quota
5 Crociera
6 Discesa
7 Approccio iniziale per l'atterraggio
8 Approccio finale
9 Atterraggio e rolleggio
P&G Infograph
Fonte: Boeing

The Oxford NOTECHS system:reliability and validity of a tool for measuring teamwork behaviour in the operating theatre

A.Mishra, K. Catchpole, P. McCulloch

Qual. Saf Health Care 2009;18:104-108

"Laparoscpic cholecystectomy was chosen, as it is performed frequently, requires both advanced technology and considerable teamwork, is moderately complex, and has recognisable complications which can be monitored".

ORIGINAL ARTICLE

Identification and Categorization of Technical Errors by Observational Clinical Human Reliability Assessment (OCHRA) During Laparoscopic Cholecystectomy

B. Tang, MD; G. B. Hanna, PhD, FRCS; P. Joice, MA, MB ChB; A. Cuschieri, MD, FRSE

Hypothesis: Surgical operative performance benefits from analysis of the mechanisms underlying technical errors committed during surgery.

Design: Prospective study using the Observational Clinical Human Reliability Assessment (OCHRA) system and complete unedited videotapes of the operations.

Setting: Three National Health Service hospitals within the United Kingdom.

Patients: Two hundred consecutive patients with symptomatic gallstone disease.

Interventions: Elective laparoscopic cholecystectomy for symptomatic gallstone disease by surgeons, who were blind to the nature and objectives of the study, using their usual operative technique.

Main Outcome Measures: Surgical consequential and inconsequential operative errors.

Results: The analysis of 38 062 steps of the 200 laparoscopic cholecystectomies performed by 26 surgeons identified 2242 errors. The mean±SD total, inconsequential, and consequential errors per surgical procedure were 11.0±8.0, 8.0±6.0, and 4.0±3.0, respectively. Dissection of the Calot triangle (second task zone of the operation) incurred more total errors (6.3±5.4) compared with the first (2.9±2.8, $P<.001$) and third (3.1±3.9, $P<.05$) task zones. This translated to a higher error probability (6.9% vs 3.3% for the first and 3.3% for third task zones). The combined sharp and blunt dissection method had fewer errors than the blunt/teasing dissection technique (9.43±7.6 vs 13.9±7.3, $P<.001$) although different surgeons were involved. The most serious consequences were encountered during dissection with the electrosurgical hook knife.

Conclusion: This study has confirmed that the Observational Clinical Human Reliability Assessment system provides a comprehensive objective assessment of the quality of surgical operative performance by documenting the errors, the stage of the operation in which errors are enacted most frequently, and where these errors have serious consequences (hazard zones).

Arch Surg. 2004;139:1215-1220

Author Affiliations: Surgical Skills Unit, Ninewells Hospital and Medical School, University of Dundee, Dundee, Scotland (Drs Tang, Joice, and Cuschieri); and the Department of Oncology and Technology, St Mary's Hospital, Imperial College, London England (Dr Hanna).

Surgery contributes to almost 30% of all adverse events and to 13% of all hospital deaths.[1-3] If the Institute of Medicine is right,[3] 100 patients die from iatrogenic injuries in US hospitals each day.[4] Some 40% of these injuries are committed in the operating room.[1,2] Population-based studies have indicated that most of these adverse events are preventable.[1-7] Therefore, prescriptive error-reduction systems are important in ensuring a good surgical outcome. However, these error-reduction systems have to be based on objective information about the nature of intraoperative technical errors and their mechanisms.

Morbidity and mortality data (MMD) cannot provide this information. Apart from the problems in reporting complications,[8,9] there are other limitations to the use of MMD as the sole indicators of surgical performance. Morbidity and mortality data identify the consequences of rather than the specifics of the adverse events. Not surprisingly, MMD studies overlook 83% to 90% of the adverse events.[10,11] In addition, they do not differentiate the exact role of technical skills from other components of clinical competence and factors related to teamwork and dynamics.

For all of these reasons, MMD cannot provide prescriptive information that specifies how the execution of an operation can be improved. This requires analysis of the mechanisms underlying technical errors and human factors that shape the performance of surgeons. The hu-

Task analysis

Task 1= division of adhesions involving gallbladder

Task 2= dissection of Calot triangle

Task 3= separation and extraxtion of gallbladder

I (easy) – III (most difficult)

Task 0 = Laplist

Task 1= division of adhesions involving gallbladder

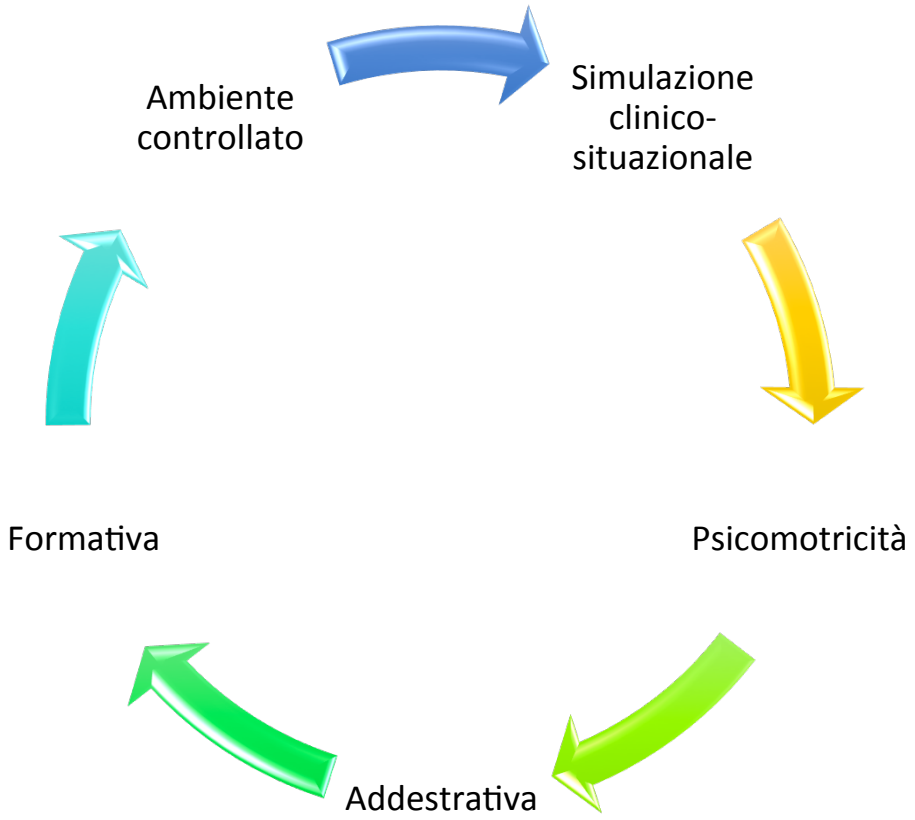
Task 2= dissection of Calot triangle

Task 3= separation and extraxtion of gallbladder

Razionale scientifico della laplist

- Chirurgia mini-invasiva è gold standard nel trattamento di molte patologie
- L'approccio di induzione di una camera operatoria virtuale con CO2 è comune
- Questo ha comportato complicazioni potenzialmente fatali peculiari
- Tra queste, l' embolia gassosa (EG) che presenta maggiore frequenza in alcune fasi (nella Lap-chole è all' induzione e durante la fase Task 3)
- Incidenza clinicamente manifesta 1 ogni 5000 interventi
- Incidenza sub-clinica stimata in letteratura 68%
- Patologie concomitanti come il PFO devono essere considerate
- Trattamento complesso che prevede alta competenza e coordinazione del Team

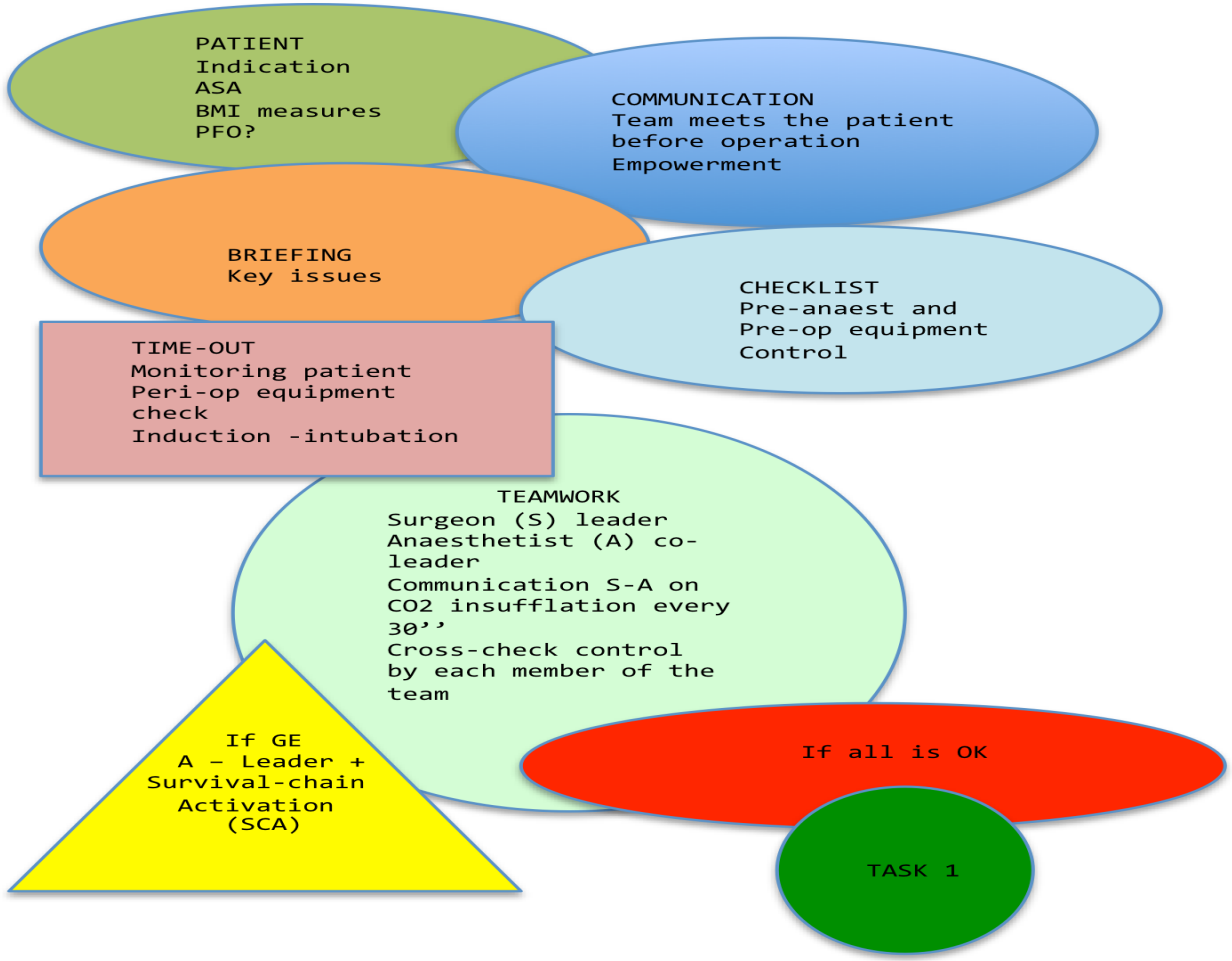
Ciclo di apprendimento
Università – Formazione continua - Azienda

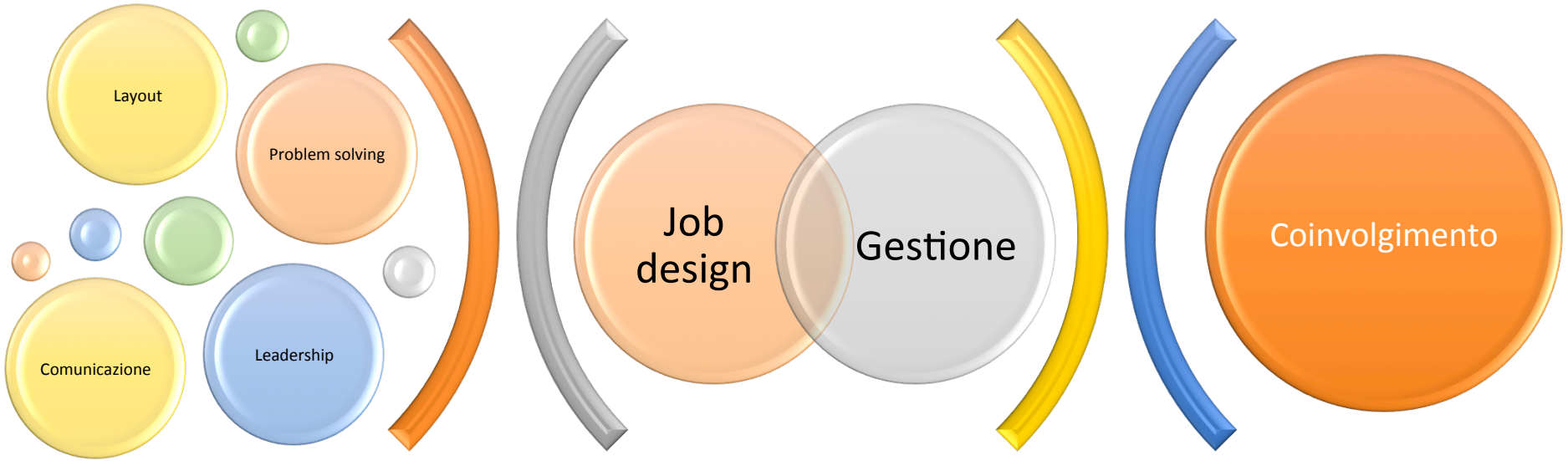


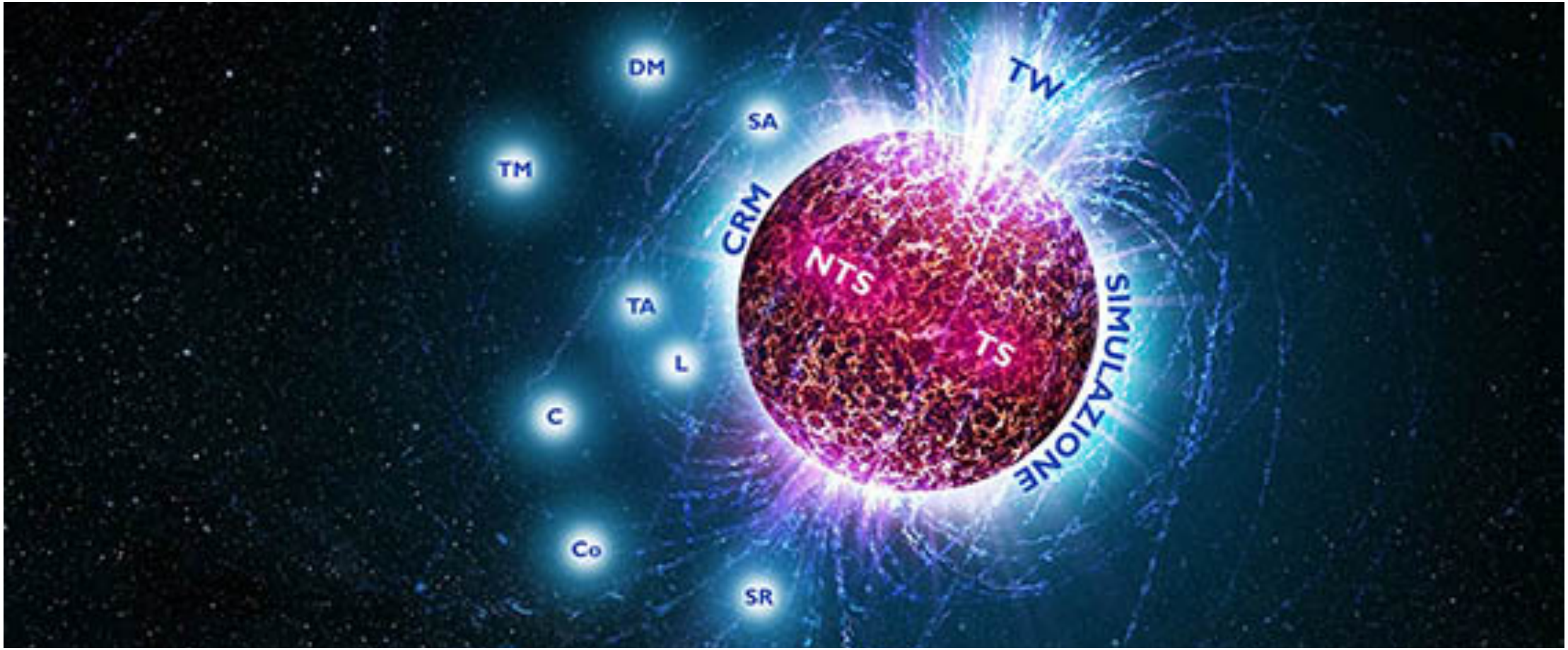
Lap-list (presentazione nel 2015)

Task 0 LapChole's framework

ISCOME
International Society for Communication Science and Medicine




Layout
Problem solving
Comunicazione
Leadership
Job design
Gestione
Coinvolgimento


DM
SA
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Chirurgia3.0

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Sitografia

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Milano, StarHotel Business Palace I 16 e 17 novembre 2016

ERGONOMIA IN SALA OPERATORIA: INGREDIENTE CHIAVE DELLA CHIRURGIA 2.0

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Master in Hospital Risk Management

Albo Esperti AGENAS area 4

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