



IST

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Anestesia e Sedazione al di fuori della sala operatoria

Angelo Gratarola

Direttore Dipartimento Emergenza

Direttore U.O. Anestesia e Rianimazione

I.R.C.C.S. AOU San Martino-IST- Genova

Anesthesia : where do we come from ?



Safety era

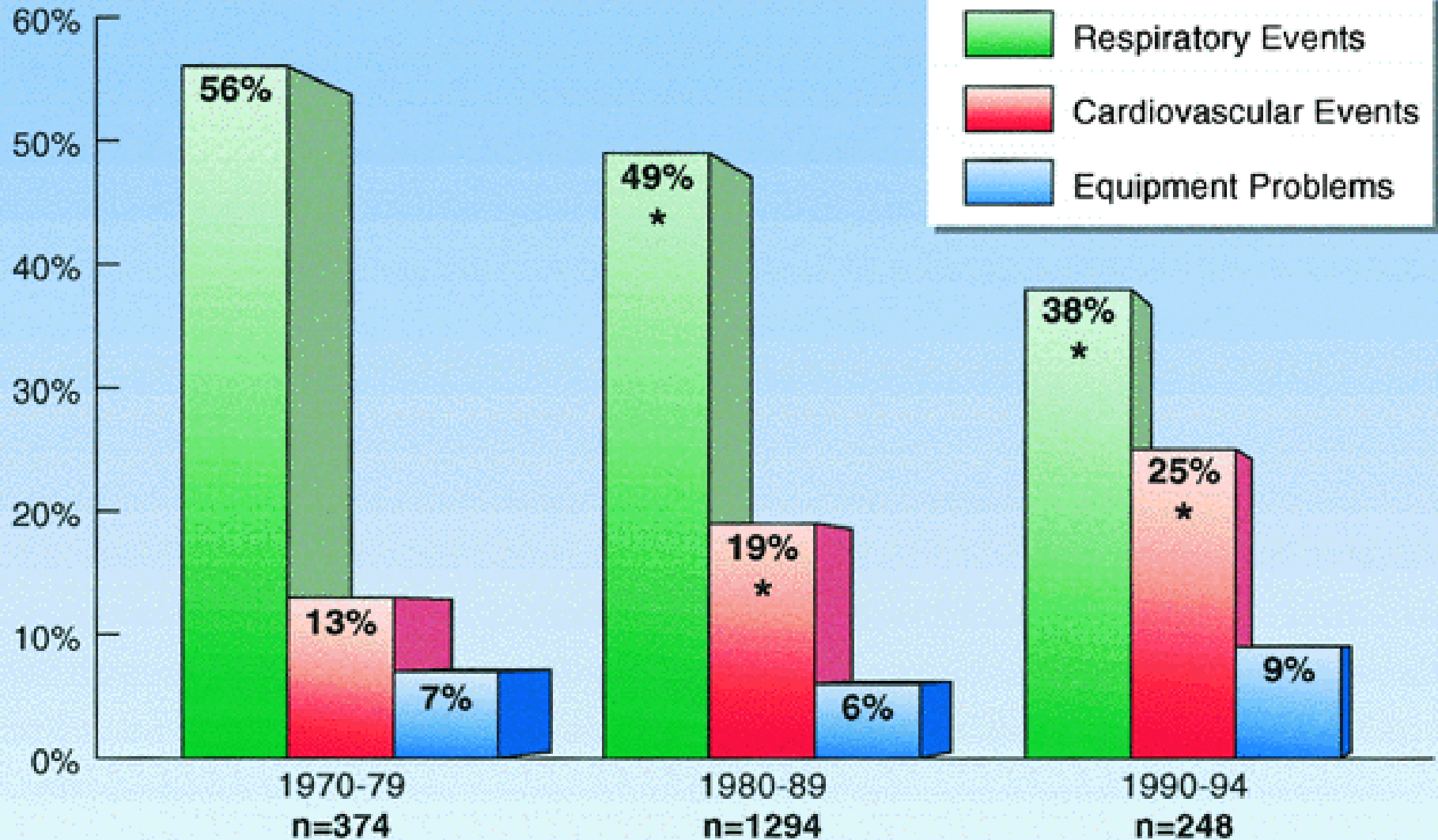
**Preop assessment
Monitoring
PACU**

Quality era

**On/Off Anesthetic agents
PONV**

ASA CLOSED CLAIMS ANALYSIS

% OF DEATH AND BRAIN DAMAGE CLAIMS IN TIME PERIOD

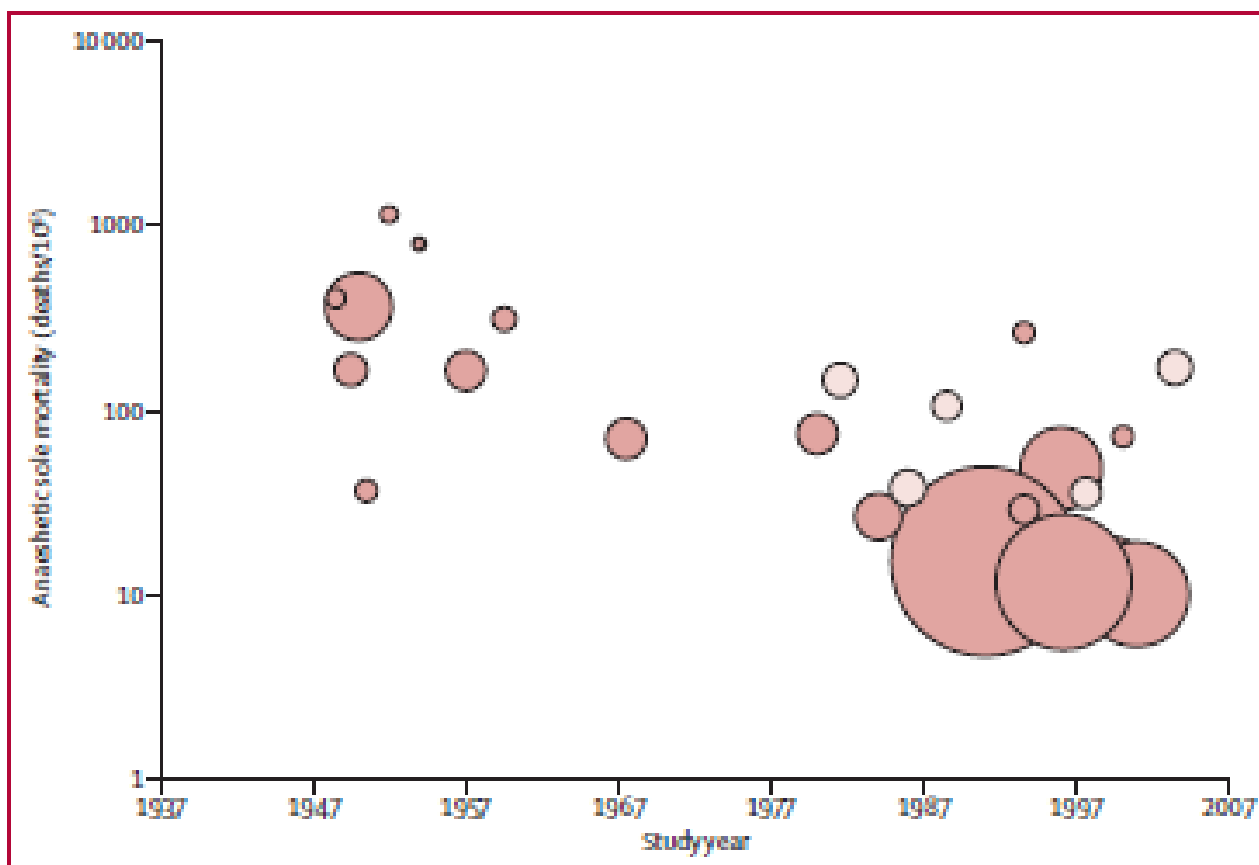


Perioperative and anaesthetic-related mortality in developed and developing countries: a systematic review and meta-analysis



Daniel Bainbridge, Janet Martin, Miguel Arango, Davy Cheng, for the Evidence-based Peri-operative Clinical Outcomes Research (EPiCOR) Group

www.thelancet.com Vol 380 September 22, 2012



Future anesthesiologists will be as much outside as inside operating theaters

S. G. E. LINDAHL

Department of Surgical Sciences, Karolinska Hospital and Institute, Stockholm, Sweden

Our expansion

...

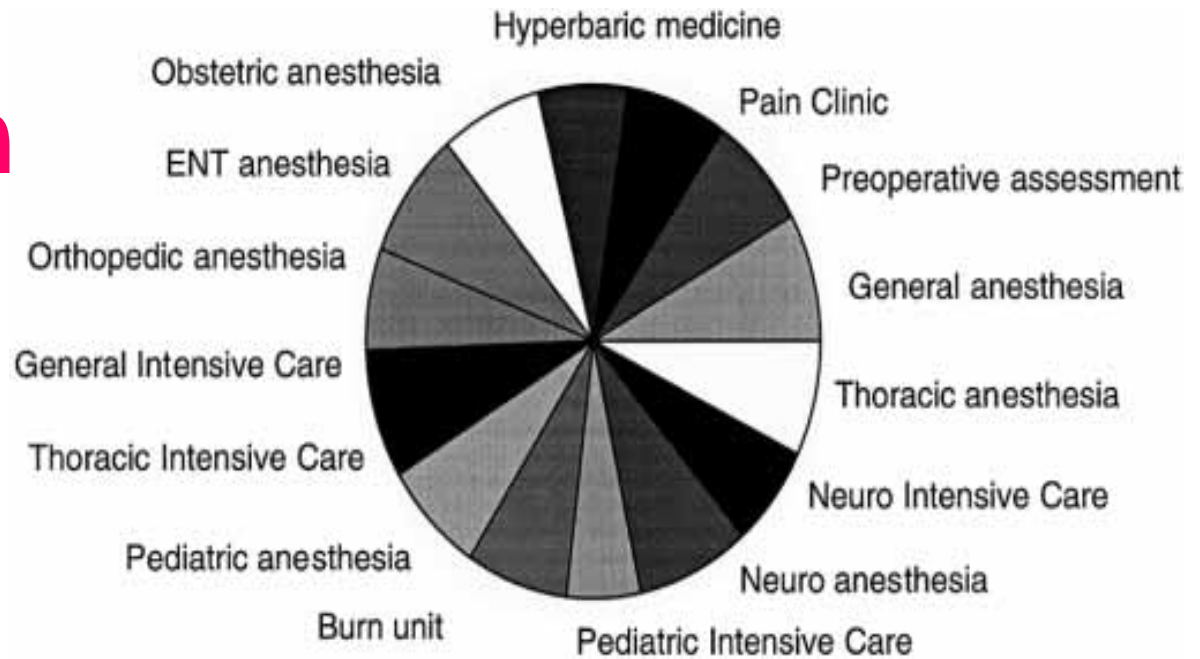


Fig. 1. Subspecialties in anesthesiology and intensive care medicine.

Anesthesia : where do we come from ?

Safety era

**Preop assessment
Monitoring
PACU**

Quality era

**On/Off Anesthetic agents
PONV**

**Consumption/fulfilment
era**

**New techniques / new needs
Anesthesia « in the package »**

Some terms

- Nonoperating room anesthesia (NORA)
- Anesthesia at remote location
- Outpatient anesthesia
- Office-based anesthesia (OBA)

**THE PRINCIPLES OF ANAESTHESIA FOR
NEURORADIOLOGY
ANAESTHESIA TUTORIAL OF THE WEEK
308**

23RD JUNE 2014

Dr Elizabeth Perritt, Dr Gautam Mahalingam
The Walton Centre, Liverpool, UK
Correspondence to elizabethperritt@nhs.net



- Careful patient assessment
- Maintenance of physiological stability
- Recognition and swift management of complications

Special problem of NORA

- Limited working place, limited access to the patient,
- Electrical interference with monitors and phones, lighting and temperature inadequacy,
- Use of outdated ,old equipment
- Less familiar with the management of patients
- Lack of skilled personnel, drugs and supplies

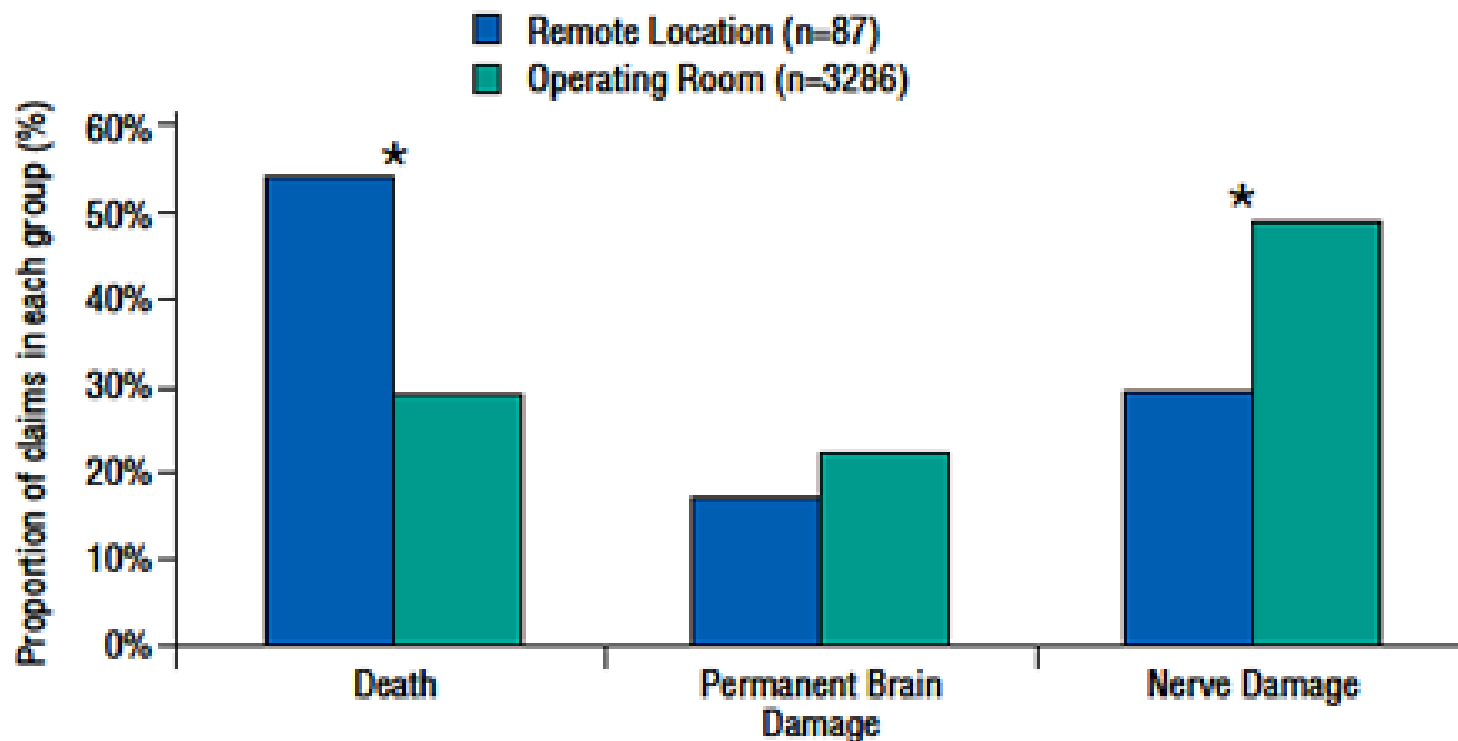


Figure 1. Severity of Injury in Remote Location vs. Operating Room Claims

*p<0.001

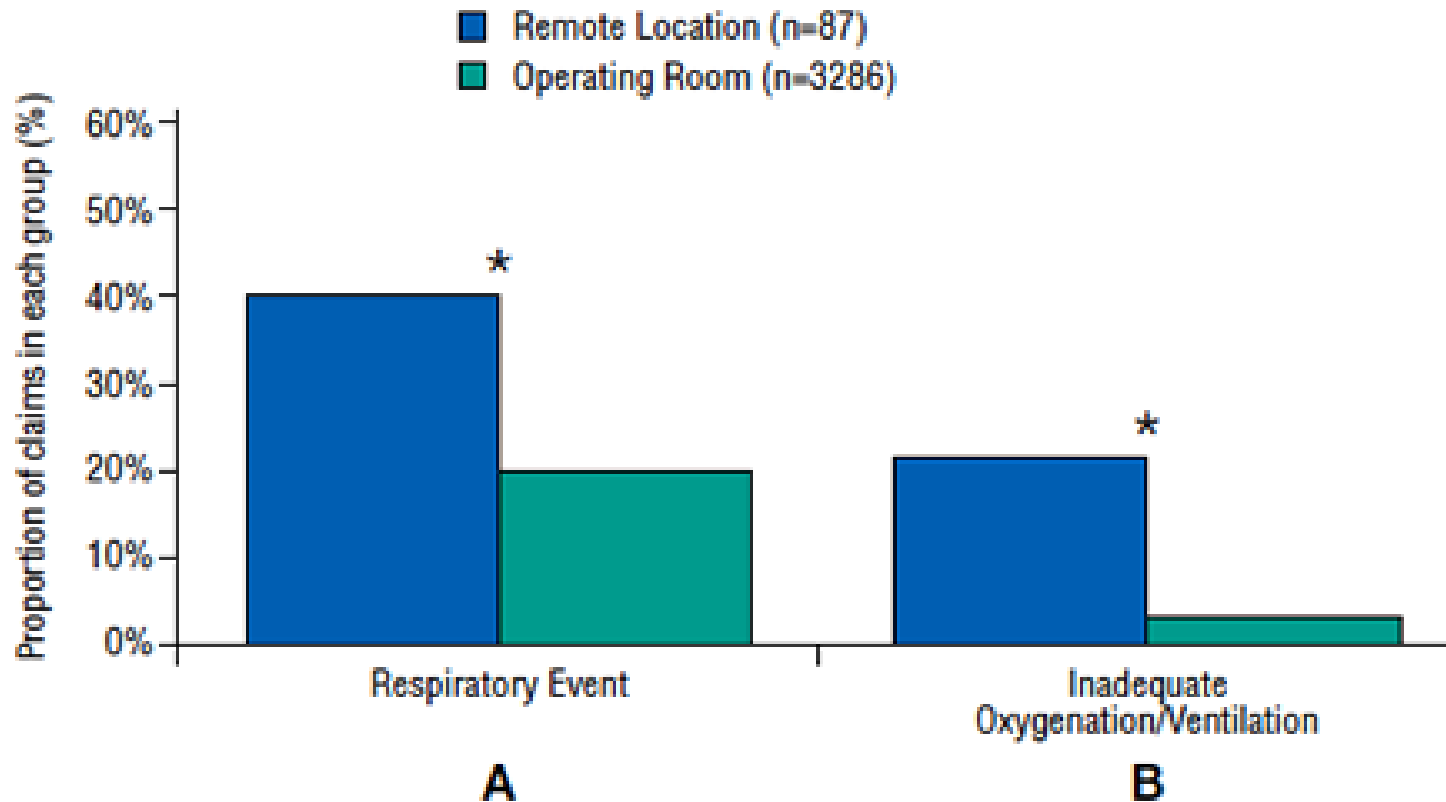


Figure 2A-B. Mechanisms of Injury in Remote Location vs. Operating Room Claims

*p < 0.001

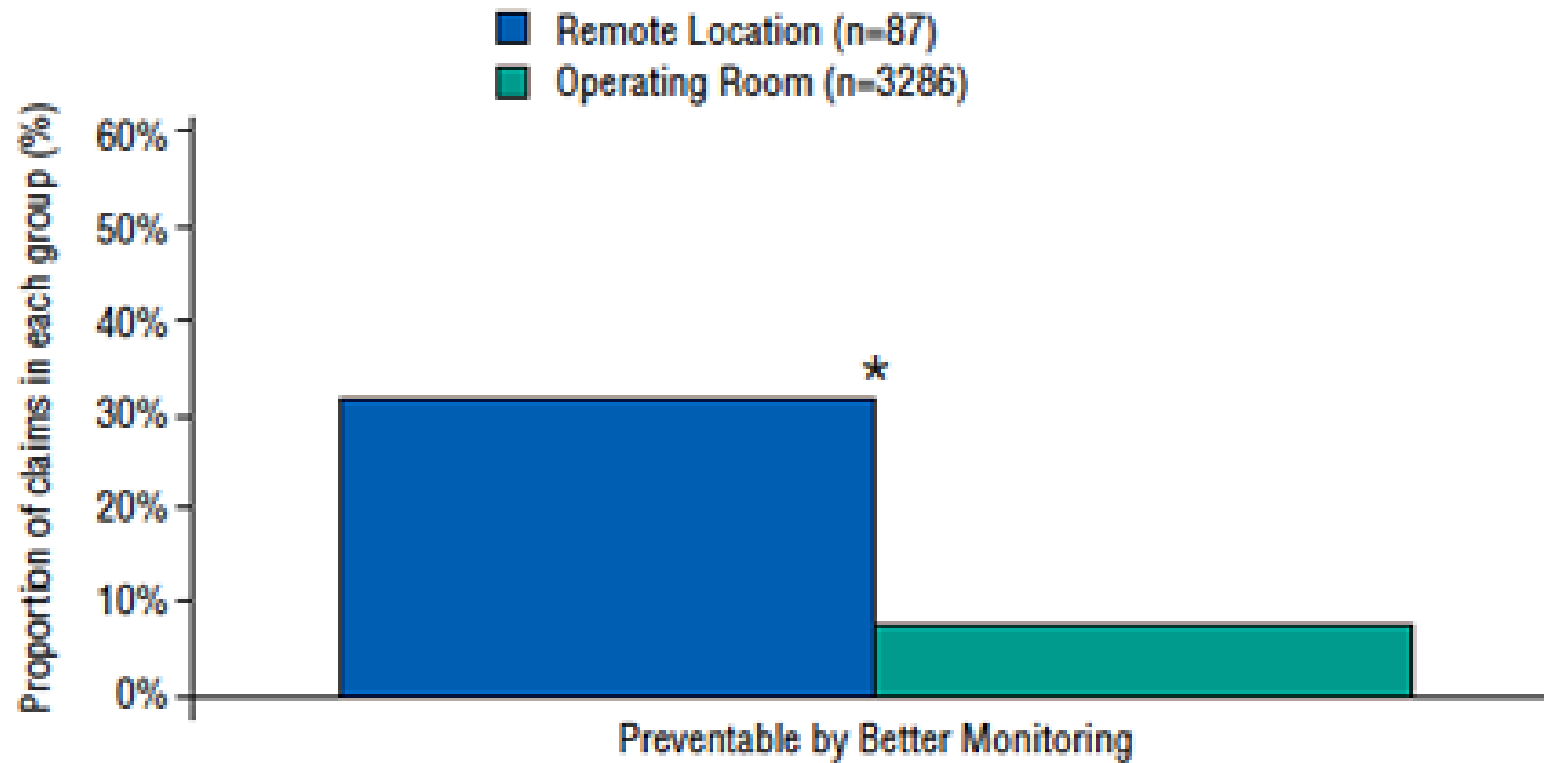


Figure 3. Proportion of Claims Preventable by Better Monitoring

*p < 0.001

Closed claims review of anesthesia for procedures outside the operating room

Reinette Robbertze, Karen L. Posner and Karen B. Domino

Current Opinion in Anaesthesiology 2006, 19:436-442

Table 7 Injuries in nonoperating room anesthesia (NORA) and operating room claims

Specific injuries	NORA (<i>n</i> = 24) [<i>n</i> (%)]	OR (<i>n</i> = 1927) [<i>n</i> (%)]
Death	13 (54)*	453 (24)*
Airway injury	2 (8)	195 (10)
Permanent brain damage	2 (8)	164 (9)
Burn injury	2 (8)	89 (5)
Stroke	2 (8)	62 (3)
Nerve damage	1 (4)*	416 (22)*
Eye damage	1 (4)	127 (7)
Myocardial infarction	1 (4)	52 (3)
Aspiration pneumonitis	1 (4)	54 (3)
Pneumothorax	1 (4)	42 (2)

Table 8 Standard of care and payment

	Nonoperating room anesthesia (NORA) (<i>n</i> = 24)	Operating room (<i>n</i> = 1927)
Substandard care (%)	15 (63)*	559 (29)*
Preventable by better monitoring (%)	6 (25)**	140 (7)**
Payment made (%)	10 (42)	905 (52)
Median payment (\$)ª	132 003	136 275

Complications of Non-Operating Room Procedures: Outcomes From the National Anesthesia Clinical Outcomes Registry

Beverly Chang, MD, Alan D. Kaye, MD, PhD,† James H. Diaz, MD, MPH,†‡ Benjamin Westlake, BS,§
Richard P. Dutton, MD, MBA,§|| and Richard D. Urman, MD, MBA**

J Patient Saf • Volume 00, Number 00, Month 2015

12.252.846 cases 65.45% OR 30.31% NORA

Conclusions: Non-OR anesthesia procedures have lower morbidity and mortality rates than OR procedures, contrary to some previously published studies. However, the increased complication rates in both the cardiology and radiology locations may need to be the target of future safety investigations. Providers must ensure proper monitoring of patients, and NORA locations need to be held to the same standard of care as the main operating room. Further studies need to identify at-risk patients and procedures that may predispose patients to complications.

Anaesthetists and Sedation in the Radiology Department: Involved or left behind?

Anaesthesia, 2005, 60, pages 423–425

National Confidential Enquiry into Perioperative Deaths 2000 for
Radiology and Interventional Neuroradiology:

303 deaths, among them :

19 not monitored at all

60 did not have pulse oximetry monitoring

40 did not have their blood pressure taken

16 died who were monitored by a radiographer

97 died who were monitored by the operator alone

- the gold standard for patient monitoring during interventional vascular procedures should be pulse oximetry, blood pressure and ECG.

- someone other than the radiologist should be responsible for the patient



Commentary

The role of anaesthesia in interventional radiology

© The British Institute of Radiology

A F Watkinson, FRCR, FRCS¹, I S Francis, FRCR, FRCS¹, P Torrie, FRCR², and A D Platts, FRCR, FRCS¹,

¹Department of Radiology, Royal Free Hospital, Pond Street NW3 2QG, London and ²Department of Radiology, Royal Berkshire Hospital, Reading, UK

DOI: <http://dx.doi.org/10.1259/bjr.75.890.750105>

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Published Online: March 05, 2014

“out of hours with a very sick patient, and no anesthetic cover, the radiology department can feel like being in a far flung corner of the British Empire – with a level of airway and pain control that would not be out of keeping with the time of Queen Victoria”.

Anaesthetists and Sedation in the Radiology Department: Involved or left behind?

Anaesthesia, 2005, 60, pages 423–425

Only 46% of interventional radiologists had received resuscitation training in the previous year, and 5% had received no training for more than 10 years.

OPEN

Perioperative and Anesthesia-Related Mortality

An 8-Year Observational Survey From a Tertiary Teaching Hospital

Wangles Pignaton, MD, PhD, José Reinaldo C. Braz, MD, PhD, Priscila S. Kusano, MD, Marília P. Módolo, MD, Lídia R. de Carvalho, PhD, Mariana G. Braz, PhD, and Leandro G. Braz, MD, PhD

Medicine • Volume 95, Number 2, January 2016

Anesthesia Technique	Anesthetics		Deaths		
	N	%	N	Rate per 10,000 Anesthetics*	95% CI
General anesthesia	33,296	60.6	73	21.9 ^b	16.9–26.9
Neuraxial anesthesia [†]	17,380	31.6	2	1.1 ^c	0.0–2.7
Plexus blocks	2089	3.8	0	0.0 ^c	0.0–0.0
Sedation	1804	3.2	0	0.0 ^c	0.0–0.0
Other [†]	433	0.8	13	300.2 ^a	139.5–460.9

TABLE 5. Triggering Factors Contributing to Mortality in 55,002 Anesthetics

Triggering Factors	N	Deaths	
		Rate Per 10,000 Anesthetics*	95% CI
Patient disease/condition	76	13.8 ^a	10.7–16.9
Surgery	12	2.2 ^b	1.0–3.4
Anesthesia	0	0.0 ^c	0.0–0.0

Non-operating Room Anesthesia



The Principles of Patient Assessment and Preparation

Beverly Chang, MD^a, Richard D. Urman, MD, MBA^{b,*}

Anesthesiology Clin 34 (2016) 223–240

KEY POINTS

- Non-operating room (OR) anesthetics are becoming increasingly commonplace, which often entails taking care of patients who are more medically challenging than patients in the OR.
- Preoperative assessment may require a greater degree of resource coordination.
- Non-OR procedures present significantly different challenges for anesthesiologists during preprocedure, intraprocedure, and postprocedure periods.
- There are significant ways in which anesthesiologists can add value and optimize efficiency in the non-OR realm.



The Royal College of Anaesthetists

Educating, Training and Setting Standards in
Anaesthesia, Critical Care and Pain Medicine

Intercollegiate working party chaired by the Royal College of Anaesthetists.
Implementing and ensuring Safe Sedation Practice for Healthcare procedures
in adults.

London: Royal College of Anaesthetists, 2001.

When conscious sedation is employed, the agents and doses chosen must be adjusted to the patient's requirements and ensure that verbal contact is possible at all times. **If verbal responsiveness is lost the patient requires a level of care identical to that needed for general anaesthesia.**

ASA GUIDELINES



Approved by the ASA House of Delegates on October 15, 2003 and amended on October 22, 2008)

- a reliable oxygen source with backup
- a suction source
- waste gas scavenging
- adequate monitoring equipment to meet the standards for basic anesthetic monitoring
- a self-inflating hand resuscitator bag
- sufficient safe electrical outlets
- adequate patient and anesthesia machine illumination with battery-powered backup
- sufficient space for the anesthesia care team
- emergency cart with a defibrillator
- emergency drugs, and other emergency equipment
- a means of reliable two-way communication to request assistance
- compliance of the facility with all applicable safety and building codes
- Appropriate postanesthesia management should be provided
- Adequately trained staff to support anesthesia team

Recommendations for anesthesia and sedation in nonoperating room locations

SIAARTI STUDY GROUP FOR SAFETY IN ANESTHESIA AND INTENSIVE CARE

Patients who *may not* be good candidate for sedation : risk stratification

Morbid obesity

Sleep apnea

Symptomatic gastro-esophageal reflux disease

Pregnancy

Neonates and infants

Advanced lung / cardiac diseases

SOAP - ME

Suction

Oxygen

Airway

Positioning

Meds

Equipment / EtCO₂



Monitoring and delivery of sedation

C. G. Sheahan² and D. M. Mathews^{1*}

Table 1 Standards and guidelines concerning sedation from national organization

	American Society of Anesthesiologists ⁴	The Association of Anaesthetists of Great Britain and Ireland ⁵	European Society of Anesthesiologists ⁶	Australian and New Zealand College of Anaesthetists ⁸
Level of statement	Standards	Standards and guidance	Guidelines	Guidelines
Year written/ updated	2011	2013	2007	2014
Assessment of depth of sedation	Required	Required	Required	Required
Arterial pressure measurement	Required, at least Q 5 min	Required*	Required	Required
Pulse oximetry	Required	Required*	Required	Required
Electrocardiogram	Required	'Conscious sedation' with continuous verbal contact: not required. Deep sedation: required	Required	May be required according to the clinical status of the patient
Capnometry	Moderate and deep sedation: required unless precluded or invalidated by the nature of the patient, procedure, or equipment	'Recommended' for moderate and deep sedation and when (a) ventilation cannot be directly observed, for example MRI/CT, (b) multiple drugs/anaesthetic drug techniques are used, or (c) pre-assessment highlights increased clinical risk	Not required	May be required according to the clinical status of the patient
Notes		* Document states that monitoring for minimal sedation/anxiolysis is 'dictated by co-morbidity'	Guidelines are for non-anaesthesiologists. Taskforce currently updating ⁷	

Protocols are required

- **Fasting and NPO times**
- **Patient / Family information**
- **Preop evaluation**
- **Staff and equipments requirements**
- **Per-procedure vital signs and drugs administration recording**
- **PACU facilities**
- **Discharge criteria**
- **Follow up procedure (On call anesthesiologist)**

Recovery Phase

- PACU unit
- Dedicated area with dedicated personnel
- Standard discharge criteria (Aldrete score)
- Ambulatory procedure as required (needs an escort home and cannot drive)

Sedation outside the OR : what are the issues ?

Medical

Organisational



Sedation outside the OR

Technical
environment

Economic
pressure

Unsolved questions

- Will we be able to provide enough anesthesiologists and/or CRNA for this purpose ?
- Creation of a Sedation department (trained nurses, CRNA, anesthesiologists) ?
- Delegate the sedation but delegate also the responsibility ?
- Anesthesiologists employed as « fireman » in case of incident/accident ? Who is responsible ?

Anesthesia Outside the Operating Room in Adults: A Matter of Safety?

Journal of PeriAnesthesia Nursing, Vol 30, No 1 (February), 2015: pp 82-84

- Activity at remote locations 12-15% of total
- Procedural sedation
- Sedation and analgesia
- Monitored anesthesia care



False sense that fewer complications are expected during this «light» anesthesia

The most common complications

- Respiratory depression
- Apnea
- Airway obstruction
- Pulmonary aspiration
- Hypoxia and cerebral damage
- Severe hypotension
- Arrhythmias
- Myocardial ischemia
- Hypothermia
- PONV
- Disorientation/agitation



Their expansion and increased needs :

**Radiology
Gastroenterology
Cardiology**

...



Is the anesthesiologist necessary in the endoscopy suite? A review of patients, payers and safety

Expert Rev. Gastroenterol. Hepatol. 9(7), 883–885 (2015)



*World Journal of
Gastrointestinal Endoscopy*

Submit a Manuscript: <http://www.wjgnet.com/esps/>
Help Desk: <http://www.wjgnet.com/esps/helpdesk.aspx>
DOI: 10.4253/wjge.v7.i10.981

World J Gastrointest Endosc 2015 August 10; 7(10): 981-986
ISSN 1948-5190 (online)
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MINIREVIEWS

Current role of non-anesthesiologist administered propofol sedation in advanced interventional endoscopy

Daniela Elena Burtea, Anca Dimitriu, Anca Elena Maloş, Adrian Săftoiu



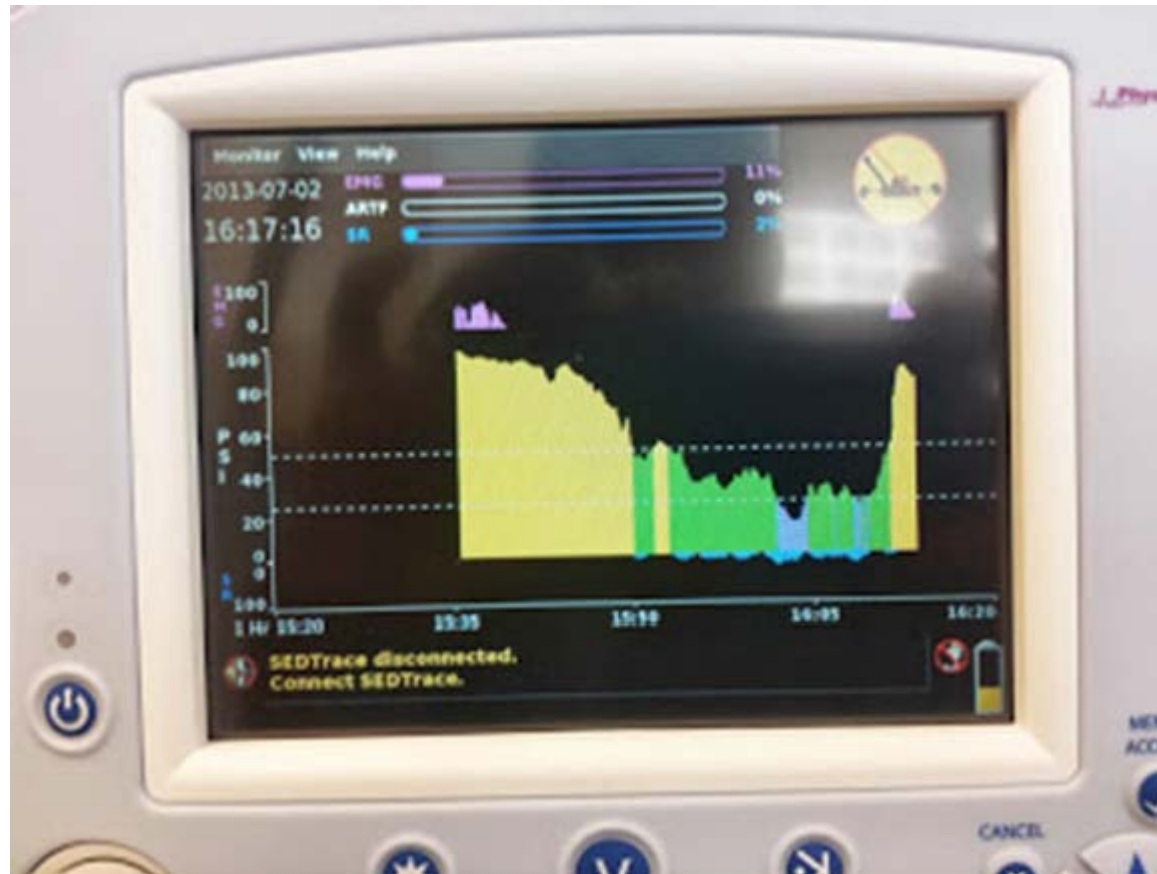
Bispectral index monitoring as an adjunct to nurse-administered combined sedation during endoscopic retrograde cholangiopancreatography

Se Young Jang, Hyun Gu Park, Min Kyu Jung, Chang Min Cho, Soo Young Park, Seong Woo Jeon, Won Young Tak, Young Oh Kweon, Sung Kook Kim, Young Hoon Jeon

CONCLUSION: BIS monitoring trend to slightly reduce the mean propofol dose. Nurse-administered propofol sedation under the supervision of a gastroenterologist may be considered an alternative under anesthesiologist.

Propofol and non-propofol based sedation for outpatient colonoscopy-prospective comparison of depth of sedation using an EEG based SEDLine monitor

Basavana Goudra¹ · Preet Mohinder Singh² · Gowri Gouda³ ·
Anuradha Borle² · Augustus Carlin¹ · Avantika Yadwad¹





Cochrane
Library

Cochrane Database of Systematic Reviews

Physician anaesthetists versus non-physician providers of anaesthesia for surgical patients (Review)

Physician anaesthetists versus non-physician providers of anaesthesia for surgical patients (Review)
Copyright © 2014 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Conclusion

As none of the data were of sufficiently high quality and the studies presented inconsistent findings, we concluded that it was not possible to say whether there were any differences in care between medically qualified anaesthetists and nurse anaesthetists from the available evidence.

Endoscopy. 2016 Apr 21. [Epub ahead of print]

Non-anesthesiologist administration of propofol sedation for colonoscopy is safe in low risk patients: results of a noninferiority randomized controlled trial.

Ferreira AO¹, Torres J¹, Barias E¹, Nunes J¹, Glória L¹, Ferreira R¹, Rocha M¹, Pereira S¹, Dias S¹, Santos AA¹, Cravo M¹.

Conclusions: NAAP is equivalent to anesthesiologist-administered sedation in the rate of adverse events in a low risk population

Balanced propofol sedation administered by nonanesthesiologists: The first Italian experience

Alessandro Repici, Nico Pagano, Cesare Hassan, Alessandra Carlino, Giacomo Rando, Giuseppe Strangio, Fabio Romeo, Angelo Zullo, Elisa Ferrara, Eva Vitetta, Daniel de Paula Pessoa Ferreira, Silvio Danese, Massimo Arosio, Alberto Malesci

Dig Dis Sci (2012) 57:2243–2245
DOI 10.1007/s10620-012-2268-3

EDITORIAL

Non-anesthesiologist Administered Propofol With or Without Midazolam for Moderate Sedation—the Problem Is Not “Which Regimen” but “Who’s Regimen”

Suck-Ho Lee

Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists

An Updated Report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists

ANESTHESIOLOGISTS possess specific expertise in the pharmacology, physiology, and clinical management of patients receiving sedation and analgesia. For this reason, they are frequently called on to participate in the development of institutional policies and procedures for sedation and analgesia for diagnostic and therapeutic procedures. To assist in this process, the American Society of Anesthesiologists (ASA) has developed these “Guidelines for Sedation and Analgesia by Non-Anesthesiologists.”

Practice guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints. Practice guidelines are not intended as standards or absolute requirements. The use of practice guidelines cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. The guidelines provide basic recommendations that are supported by analysis of the current literature and by a synthesis of expert opinion, open forum commentary, and clinical feasibility data.

Table 1 – Interventional neuroradiologic procedures and primary anesthetic considerations.^{5–11}

Procedure	Possible anesthetic considerations
<i>Therapeutic embolization of vascular malformation</i> Intracranial AVMs Dural AVM Extracranial AVMs Carotid cavernous fistula (CCF) Cerebral aneurysms	Deliberate hypotension, post-procedure NPPB Existence of venous hypertension; deliberate hypercapnia Deliberate hypercapnia Deliberate hypercapnia, post-procedure NPPB Aneurysmal rupture, blood pressure control ^a
<i>Ethanol sclerotherapy of arteriovenous or venous malformations</i>	Brain swelling, airway swelling, hypoxemia, hypoglycemia, intoxication from ethanol, cardiorespiratory arrest
<i>Balloon angioplasty & stenting of occlusive cerebrovascular disease</i>	Cerebral ischemia, deliberate hypertension, concomitant coronary artery disease, bradycardia, hypotension, NPPB
<i>Balloon angioplasty or pharmacological treatment of cerebral vasospasm secondary to aneurysmal SAH</i>	Cerebral ischemia, blood pressure control ^a
<i>Therapeutic carotid occlusion for giant aneurysms and skull base tumors</i>	Cerebral ischemia, blood pressure control ^a
<i>Thrombolysis of acute thromboembolic stroke</i>	Post-procedure ICH (NPPB), concomitant coronary artery disease, blood pressure control ^a

Anaesthetists and Sedation in the Radiology Department: Involved or left behind?

Anaesthesia, 2005, 60, pages 423–425

RCR guidelines make a number of suggestions:

- Radiologists should **invite** anaesthetists to their department to show them the current scope of work
- Anaesthetic departments should be **involved** in the training of junior radiologists to perform sedation and resuscitation
- There should be liaison over the production of local **protocols**
- Fixed **anaesthetic sessions** in radiology may be necessary in some departments
- Paediatric and neuroradiology requirements for sedation, analgesia and anaesthesia **must be considered** when developing services
- The **quality of cooperation** between the departments should be assessed in 'training and accreditation' visits by the respective Royal Colleges.

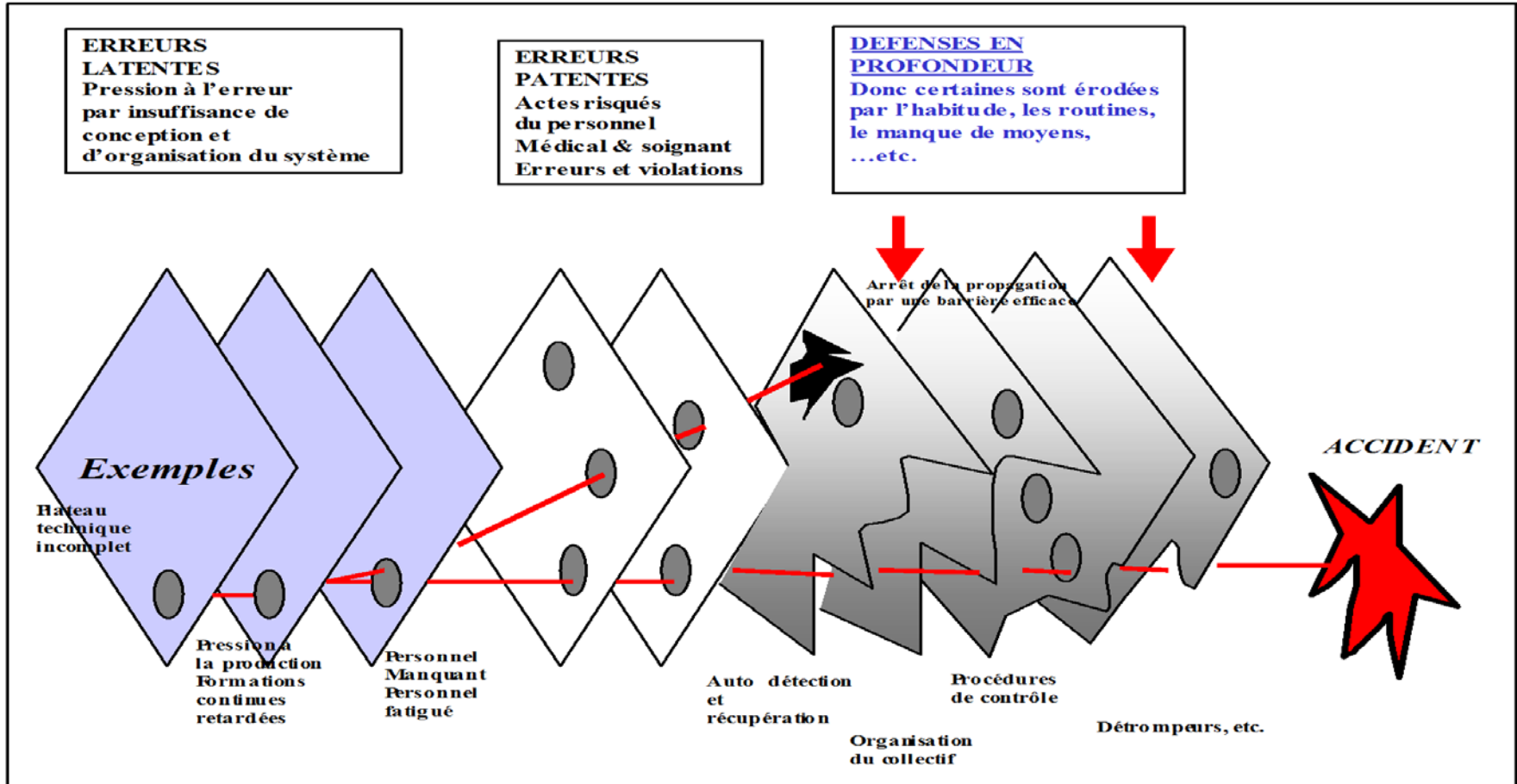
Anesthesia and sedation outside the operating room: how to prevent risk and maintain good quality

Claudio Melloni

Current Opinion in Anaesthesiology 2007, 20:513–519

- Skills
- Experience
- Organization
- Operating room standards

Swiss cheese model



NO assessment

No staff

No predefined strategy

No equipment

No equipment

Threats to safety during sedation outside of the operating room and the death of Michael Jackson.

Webster CS¹, Mason KP, Shafer SL.

«What might go wrong ?»

- Development
 - Safety culture
 - Reactive culture (taking measures after a mishap)
 - Proactive culture (thinking how to prevent mishaps)
 - Generative culture (risk management)

To summarize : sedation outside the operating room

- ✚ Organisation is mandatory
- ✚ Involvement since the beginning of the procedure is capital
- ✚ Cooperation between specialists is essential
- ✚ Periodic evaluation is required (quality insurance)

SEDATION IS ALREADY ANESTHESIA



Be careful

**Sedation requires
expertise**