



# L'Erreur en Chirurgie Constat, Causes et Solutions

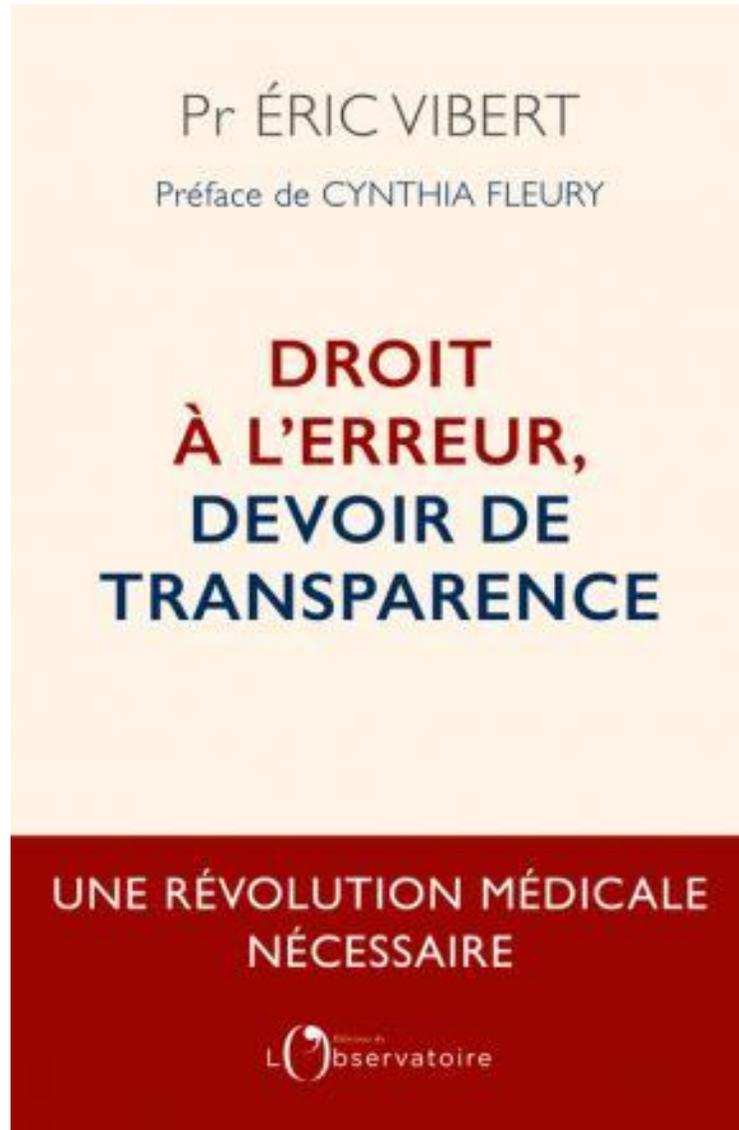
Eric Vibert



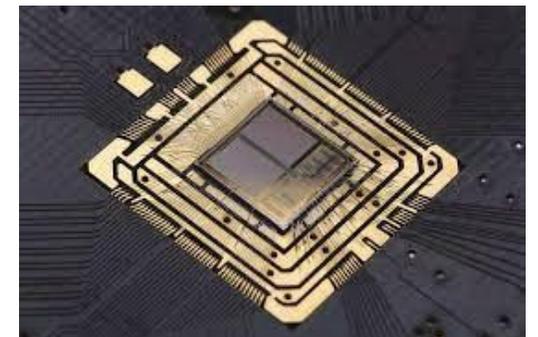
Constat : Des expériences personnelles

Questions : Comprendre pourquoi

Innovation : Apporter des Solutions

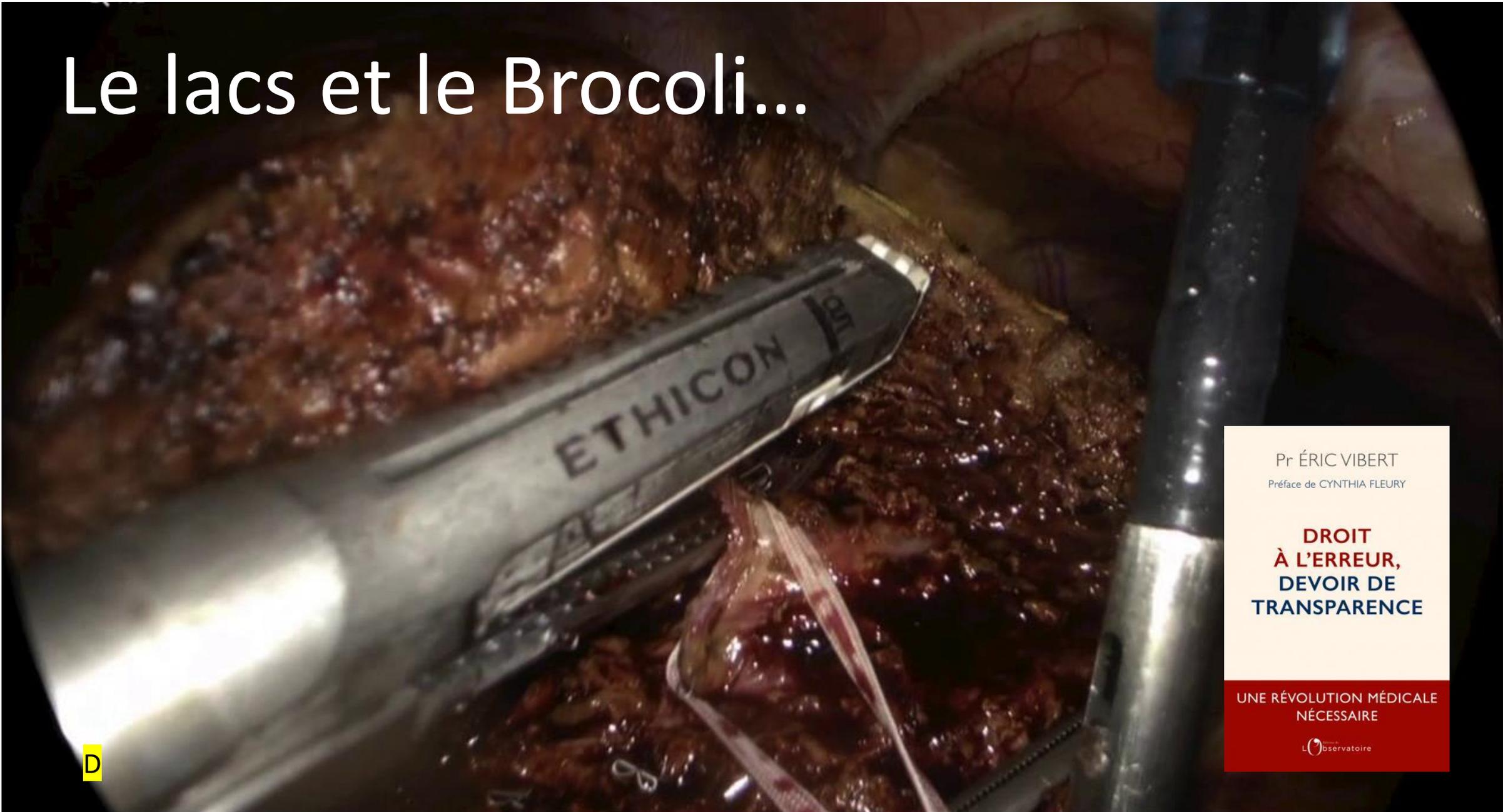


1. Humaine



2. Technologique

# Le lacs et le Brocoli...



D

Pr ÉRIC VIBERT  
Préface de CYNTHIA FLEURY

**DROIT  
À L'ERREUR,  
DEVOIR DE  
TRANSPARENCE**

UNE RÉVOLUTION MÉDICALE  
NÉCESSAIRE

L'Observatoire

« L'illusion qui reconforte est préférable à la vérité qui dérange. » Spinoza

Un « événement indésirable » due à un « aléa thérapeutique »...

**Ou**

Une complication post-opératoire due à une ou plusieurs erreurs...

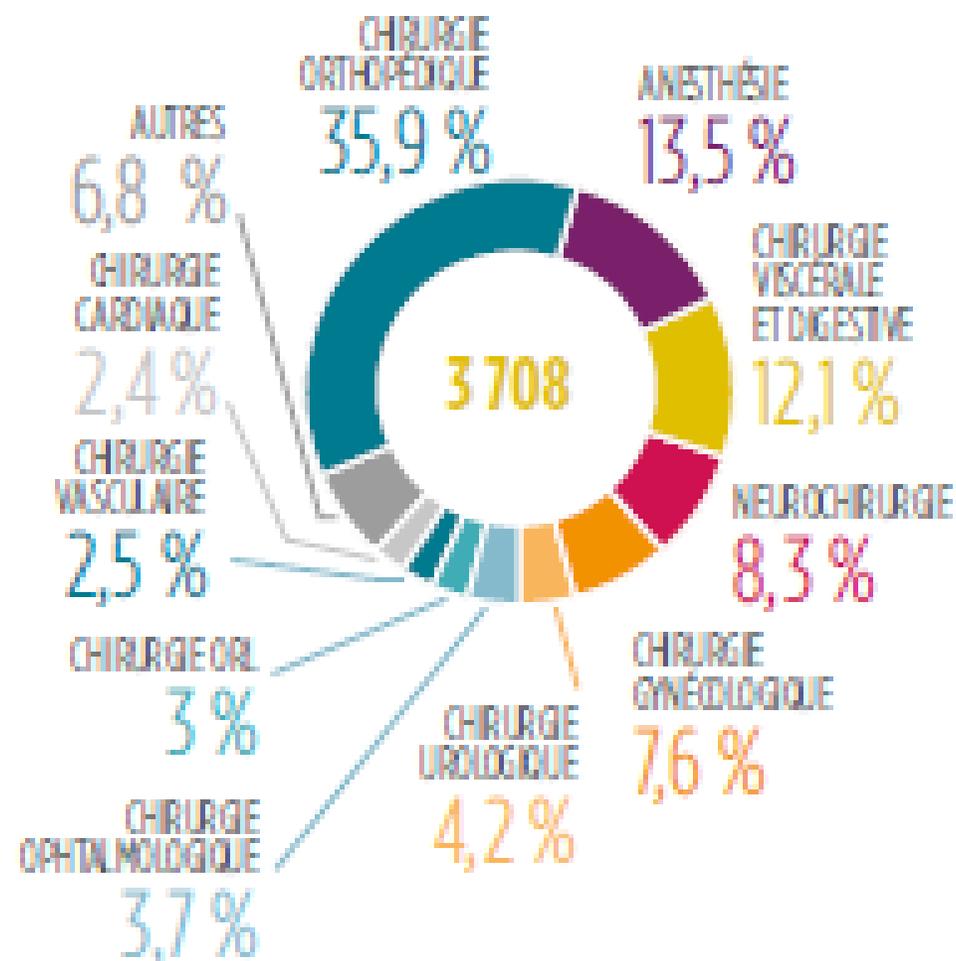
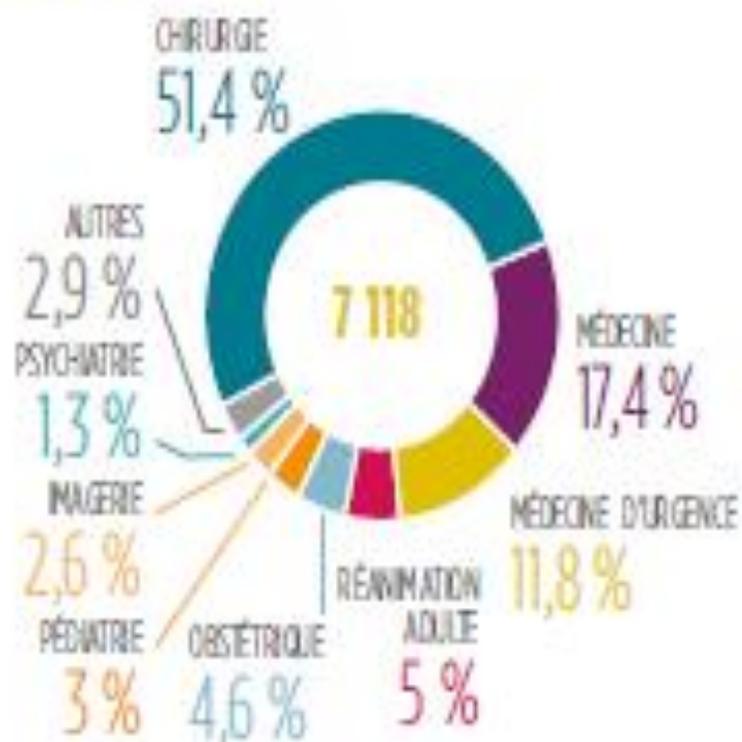
# La définition d'une Erreur

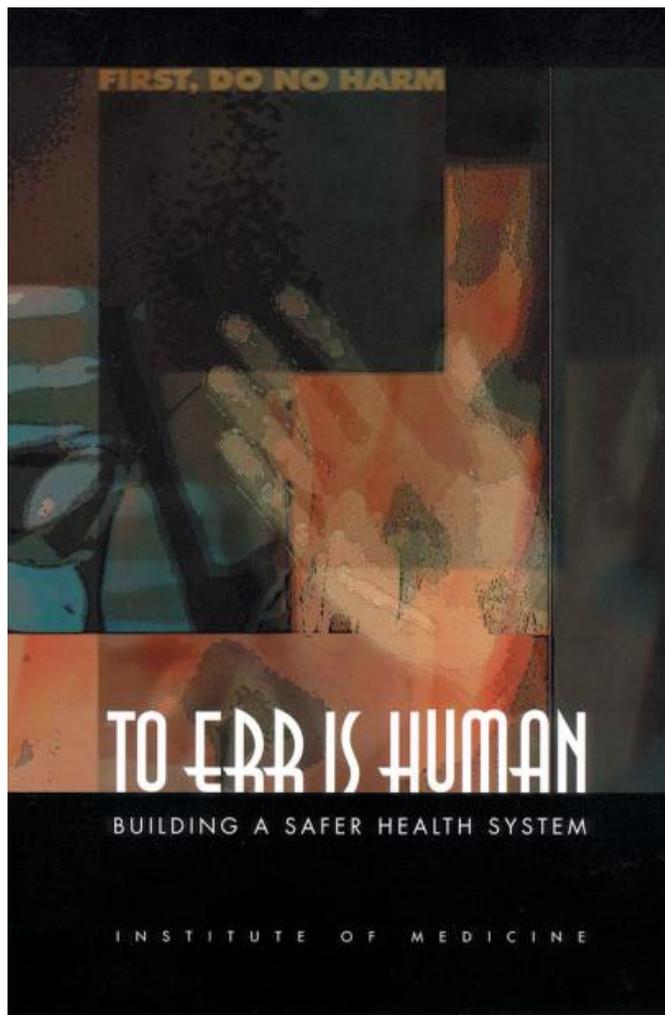
« Acte involontaire ou volontaire qui n'a pas permis d'améliorer la qualité ou la quantité de vie d'un patient. La conséquence d'une erreur d'exécution ou de planification ou d'une déviation par rapport au processus de soins »

JAMA 1994

## Spécialités concernées par les griefs patiem nés à des préjudices corporels

### Répartition en nombre





?

1999 : Report from Institute of Medecine – IOM  
 44 000 to 98 000 Décès Annuels ds les Hôpitaux US  
 8<sup>ème</sup> Cause de Décès aux US mais...

## Medical error—the third leading cause of death in the US

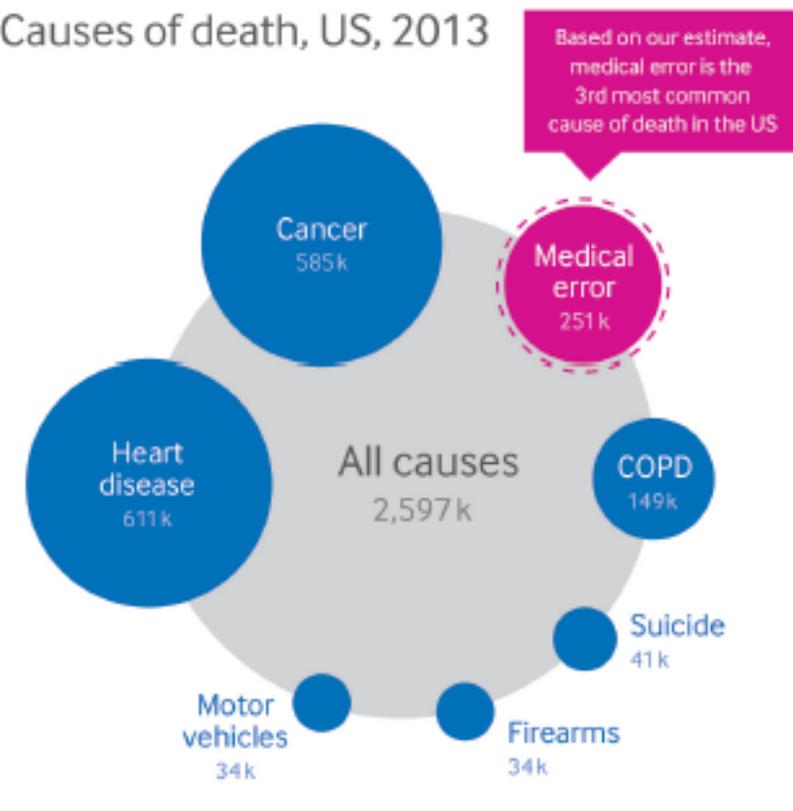
Medical error is not included on death certificates or in rankings of cause of death. Martin Makary and Michael Daniel assess its contribution to mortality and call for better reporting

Martin A Makary *professor*, Michael Daniel *research fellow*

Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD 21287, USA

BMJ 2016

### Causes of death, US, 2013



However, we're not even counting this - medical error is not recorded on US death certificates

© 2016 BMJ Publishing group Ltd.

Data source:  
[http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64\\_02.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf)

SPECIAL ARTICLE

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

Alex B. Haynes, M.D., M.P.H., Thomas G. Weiser, M.D., M.P.H.,  
William R. Berry, M.D., M.P.H., Stuart R. Lipsitz, Sc.D.,  
Abdel-Hadi S. Breizat, M.D., Ph.D., E. Patchen Dellinger, M.D.,  
Teodoro Herbosa, M.D., Sudhir Joseph, M.S., Pascience L. Kibatala, M.D.,  
Marie Carmela M. Lapitan, M.D., Alan F. Merry, M.B., Ch.B., F.A.N.Z.C.A., F.R.C.A.,  
Krishna Moorthy, M.D., F.R.C.S., Richard K. Reznick, M.D., M.Ed., Bryce Taylor, M.D.,  
and Atul A. Gawande, M.D., M.P.H., for the Safe Surgery Saves Lives Study Group\*

We enrolled 3733 patients during the baseline period and 3955 patients after implementation of

## 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 ( $P<0.001$ ).

Table 1. Elements of the Surgical Safety Checklist.\*

Sign in
Before induction of anesthesia, members of the team (at least the nurse and an anesthesia professional) orally confirm that:
The patient has verified his or her identity, the surgical site and procedure, and consent
The surgical site is marked or site marking is not applicable
The pulse oximeter is on the patient and functioning
All members of the team are aware of whether the patient has a known allergy
The patient's airway and risk of aspiration have been evaluated and appropriate equipment and assistance are available
If there is a risk of blood loss of at least 500 ml (or 7 ml/kg of body weight, in children), appropriate access and fluids are available
Time out
Before skin incision, the entire team (nurses, surgeons, anesthesia professionals, and any others participating in the care of the patient) orally:
Confirms that all team members have been introduced by name and role
Confirms the patient's identity, surgical site, and procedure
Reviews the anticipated critical events
Surgeon reviews critical and unexpected steps, operative duration, and anticipated blood loss
Anesthesia staff review concerns specific to the patient
Nursing staff review confirmation of sterility, equipment availability, and other concerns
Confirms that prophylactic antibiotics have been administered $\leq 60$ min before incision is made or that antibiotics are not indicated
Confirms that all essential imaging results for the correct patient are displayed in the operating room
Sign out
Before the patient leaves the operating room:
Nurse reviews items aloud with the team
Name of the procedure as recorded
That the needle, sponge, and instrument counts are complete (or not applicable)
That the specimen (if any) is correctly labeled, including with the patient's name
Whether there are any issues with equipment to be addressed
The surgeon, nurse, and anesthesia professional review aloud the key concerns for the recovery and care of the patient

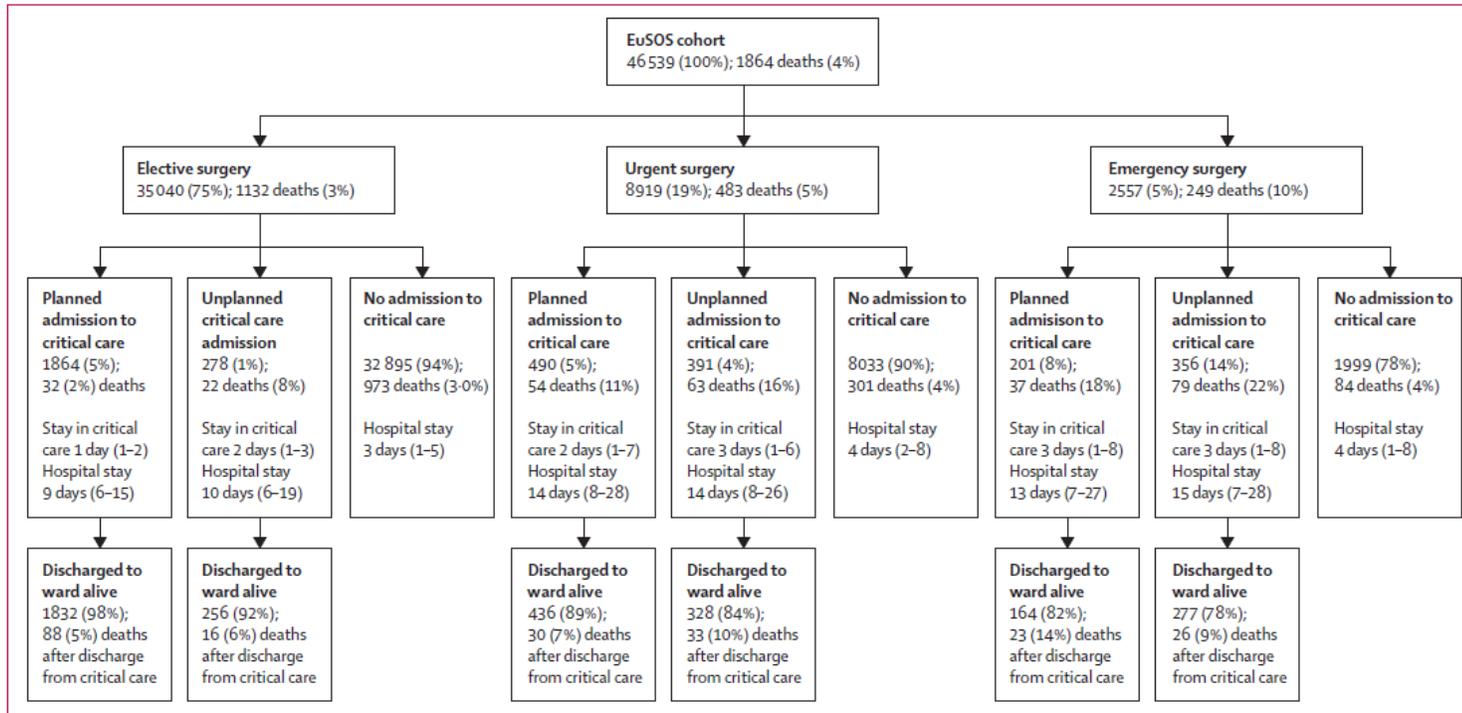
\* The checklist is based on the first edition of the WHO Guidelines for Safe Surgery.<sup>15</sup> For the complete checklist, see the Supplementary Appendix.

# Mortality after surgery in Europe: a 7 day cohort study

Lancet 2012; 380: 1059-65

Rupert M Pearse, Rui P Moreno, Peter Bauer, Paolo Pelosi, Philipp Metnitz, Claudia Spies, Benoit Vallet, Jean-Louis Vincent, Andreas Hoeft, Andrew Rhodes, for the European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology\*

4 Avril au 11 Avril 2011 / > 16 ans / 28 Hôpitaux / 46539 pts Opérés (Sauf Chir Cardiaque)



52 Semaines : 58 000 morts par an après une chirurgie électorive ...

Mortalité Hospitalière dans les 2 mois... Impact des Erreurs ?

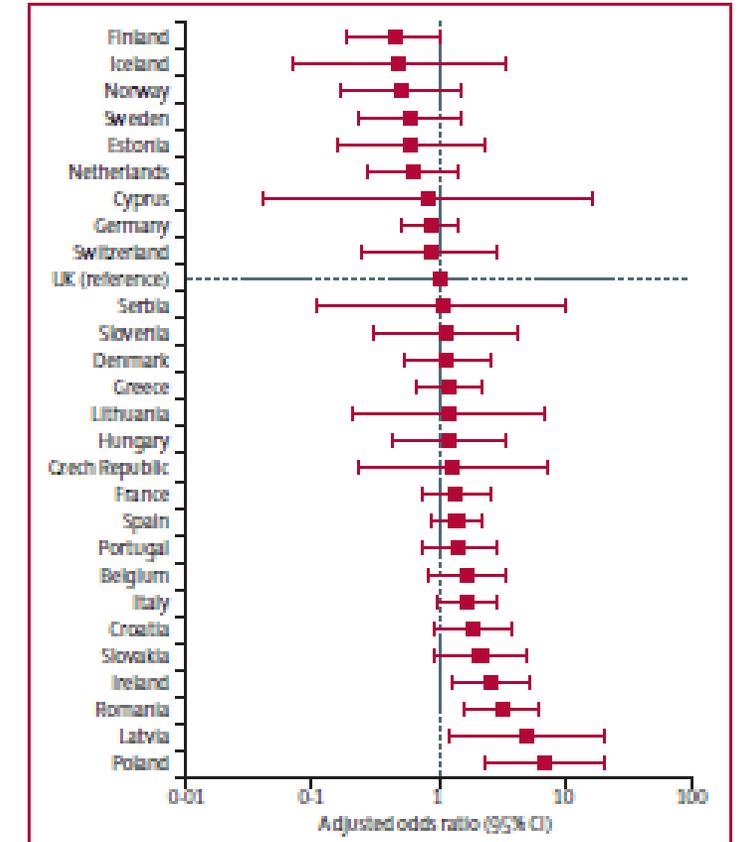
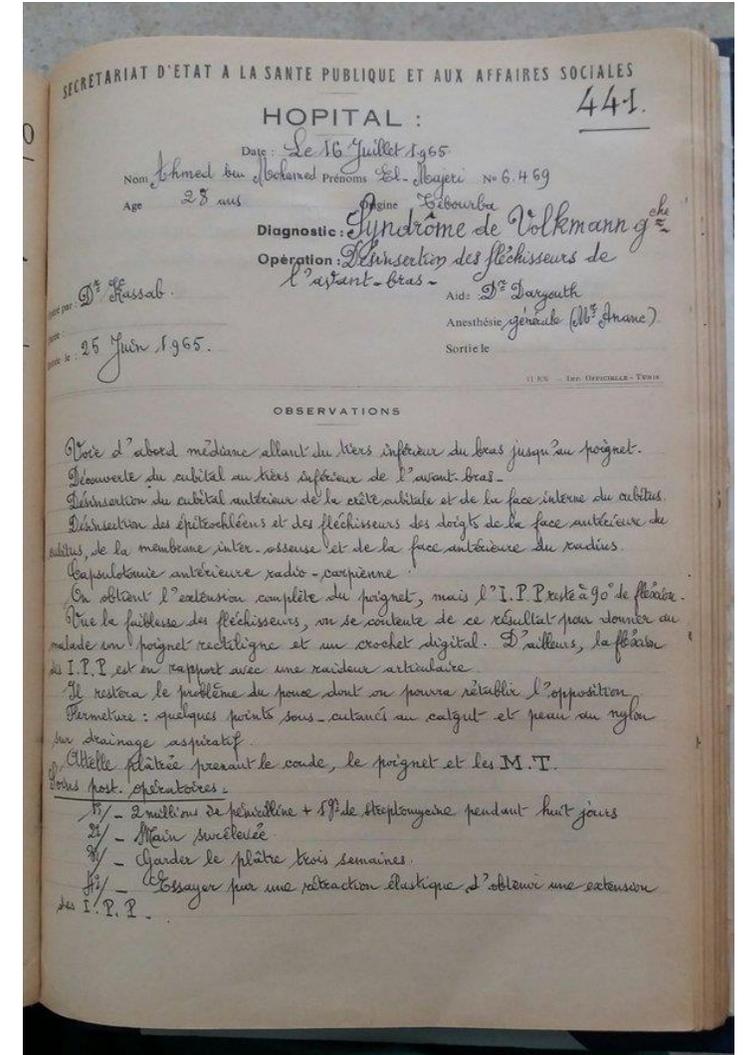


Figure 3: Adjusted odds ratio for death in hospital after surgery for each country

# La Réalité Per-Opératoire : Le CRO...



René Magritte, *La condition humaine*, 1948, collection particulière



# L'Erreur et la Faute

Faute : Deux fois la même erreur par la même personne ou par quelqu'un de son entourage...

Pas compris, pas dit, pas vu, pas regardé ce qui s'est passé...

Des « Aléas Thérapeutiques » dont on a conscience ou pas...

Peut-être parfois... Les regards de l'équipage ou la peur du procès

Un monde chirurgical de plus en plus complexe...

Des alternatives thérapeutique curative à la chirurgie

Qualité de Vie ET Quantité de Vie

Obligation de Résultats de plus en plus présente

Difficultés à définir la « Norme » mais...

# Les Biais Cognitifs Pré-Opératoires

Décisions Irrationnelles initialement décrites dans le domaine de la finance  
→ Mauvaise Interprétation de la réalité du fait des circonstances

Biais Ancrage : On réfléchit dans un cadre souvent dogmatique

Biais de Confirmation : Ne considérer que ce qui confirme notre opinion

Biais de Halo : Le Chef a toujours raison

Effet Dunning Kruger : Ne pas être pas suffisamment instruit pour savoir que l'on ne sait pas... Le « Bon Sens » au commande...

# Les Biais Cognitifs Per-Opératoire

Les Enchainements Diaboliques : Le même chirurgien qui « répare » ses erreurs... L'artère, l'hématome, la prothèse portale... STOP

L'effet Tunnel : Une trop grande foi dans la stratégie adoptée... L'anastomose artérielle que l'on refait 5 fois sans pouvoir stabiliser ses coudes

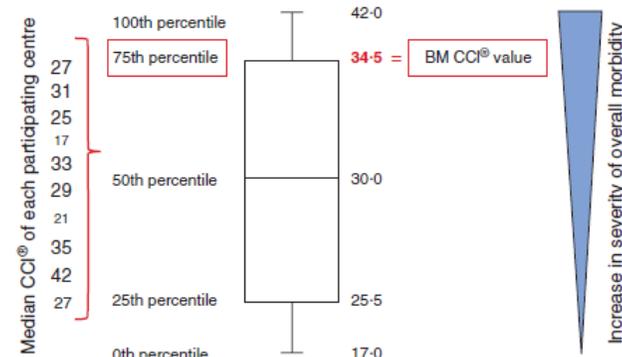
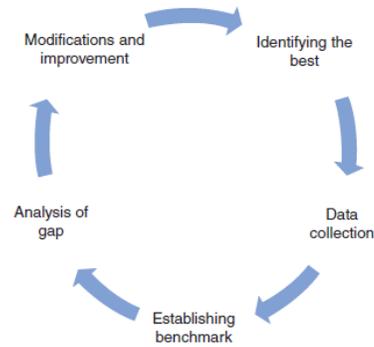


# Improving surgical outcomes through benchmarking

R. D. Staiger<sup>1</sup>, H. Schwandt<sup>2,4</sup>, M. A. Puhon<sup>3</sup> and P.-A. Clavien<sup>1</sup>

<sup>1</sup>Department of Surgery and Transplantation, University Hospital Zurich, and <sup>2</sup>Department of Economics and <sup>3</sup>Epidemiology, Biostatistics and Prevention Institute, University of Zurich, Zurich, Switzerland, and <sup>4</sup>School of Education and Social Policy, Northwestern University, Evanston, Illinois, USA

Correspondence to: Professor P.-A. Clavien, Department of Surgery, University Hospital Zurich, Raemistrasse 100, 8091 Zurich, Switzerland (e-mail: clavien@access.uzh.ch)



## Defining Benchmarks in Liver Transplantation

### A Multicenter Outcome Analysis Determining Best Achievable Results

Xavier Müller, MD,\* Francesca Marcon, MD,† Gonzalo Sapiochin, MD,‡ Max Marquez, MD,‡ Federica Dondero, MD,§ Michel Rayat, MD,\* Majella M. B. Doyle, MD,|| Lauren Callans,\*\* Jun Li, MD,†† Greg Nowak, MD,‡‡ Marc-Antoine Allard, MD,§§ Ina Jochmans, MD, PhD,\*¶ Kyle Jacskon, MD,||| Magali Chahdi Beltrame, MD,\*\*\* Marjolein van Reeve, MD,††† Samuele Iesari, MD,‡‡‡ Alessandro Cucchetti, MD,§§§ Hemant Sharma, MD,\*¶¶¶ Roxane D. Staiger, MD,\* Dimitri A. Raptis, MD, PhD,\* Henrik Petrowsky, MD,\* Michelle de Oliveira, MD,\* Roberto Hernandez-Alejandro, MD,\*¶¶¶ Antonio D. Pinna, MD,§§§ Jan Lerut, MD, PhD,‡‡‡ Wojciech G. Polak, MD, PhD,††† Eduardo de Santibañes, MD,\*\*\* Martín de Santibañes, MD,\*\*\* Andrew M. Cameron, MD, PhD,||| Jacques Pirenne, MD, PhD,\*¶ Daniel Cherqui, MD,§§ René A. Adam, MD, PhD,§§ Bô-Göran Ericzon, MD, PhD,‡‡ Bjoern Nashan, MD, PhD,†† Kim Olthoff, MD,\*\* Avi Shaked, MD,\*\* William C. Chapman, MD,|| Karim Boudjema, MD,\* Olivier Soubrane, MD, PhD,§ Catherine Paugam-Burtz, MD, PhD,§ Paul D. Greig, MD,‡ David R. Grant, MD,‡ Amanda Carvalheiro, MD,‡ Paolo Muijsan, MD,‡ Philipp Dutkowski, MD,‡ Milo Puhon, MD, PhD,\*\*\*\* and Pierre-Alain Clavien, MD, PhD\*

## TABLE 1. Benchmark Cutoffs in Liver Transplantation

### Perioperative Course

OP duration	≤ 6 hours
Intraoperative blood transfusions	≤ 3U RBC
Renal replacement therapy	≤ 8%
ICU stay	≤ 4 days
Hospital stay	≤ 18 days

Table 1 Ten steps to create a valid benchmark

Step	Description
1: Intervention	Select intervention desired to benchmark
2: Patients	Specify requirements (benchmark criteria) of patients to represent the lowest risk for complications
3: Outcome	Define specific key indicators of outcome (benchmarks) and how they can be measured
4: Centres	Find eligible centres for benchmark determination: <ol style="list-style-type: none"> <li>High-volume centres</li> <li>Centres with prospective database</li> <li>Literature search: centres involved in frequent research in the field of interest</li> </ol>
5: Number	Number of centres needed: <ol style="list-style-type: none"> <li>Include centres from at least three continents</li> <li>A sufficient number of centres must be included. When there is high variability within each key indicator (determined by literature research), more centres are needed</li> </ol>
6: Contact	Research leaders contact candidate centres for collaboration inquiry
7: Extract	Extract the predefined patients with the lowest expected postoperative morbidity of each centre
8: Collect	Collect data (patient characteristics, benchmark values) for the chosen intervention of each included centre
9: Calculate	Calculate the median (continuous benchmark values) or the proportion (binary benchmark values) of each benchmark value individually for each centre
10: Benchmark	Compute the 75th percentile by taking each centre's median to determine the benchmark value

# Liver Surgery for PHCK : 13% of 3-Month Mortality

**TABLE 1. Inclusion and Exclusion Criteria for the Low-Risk Cohort Treated in High-Volume Centers**

**Inclusion criteria**

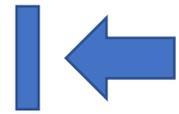
- Age  $\geq 18$  y
- Resectable perihilar cholangiocarcinoma
- Major hepatectomy (right or left-sided hepatectomy)

**Surgical exclusion criteria**

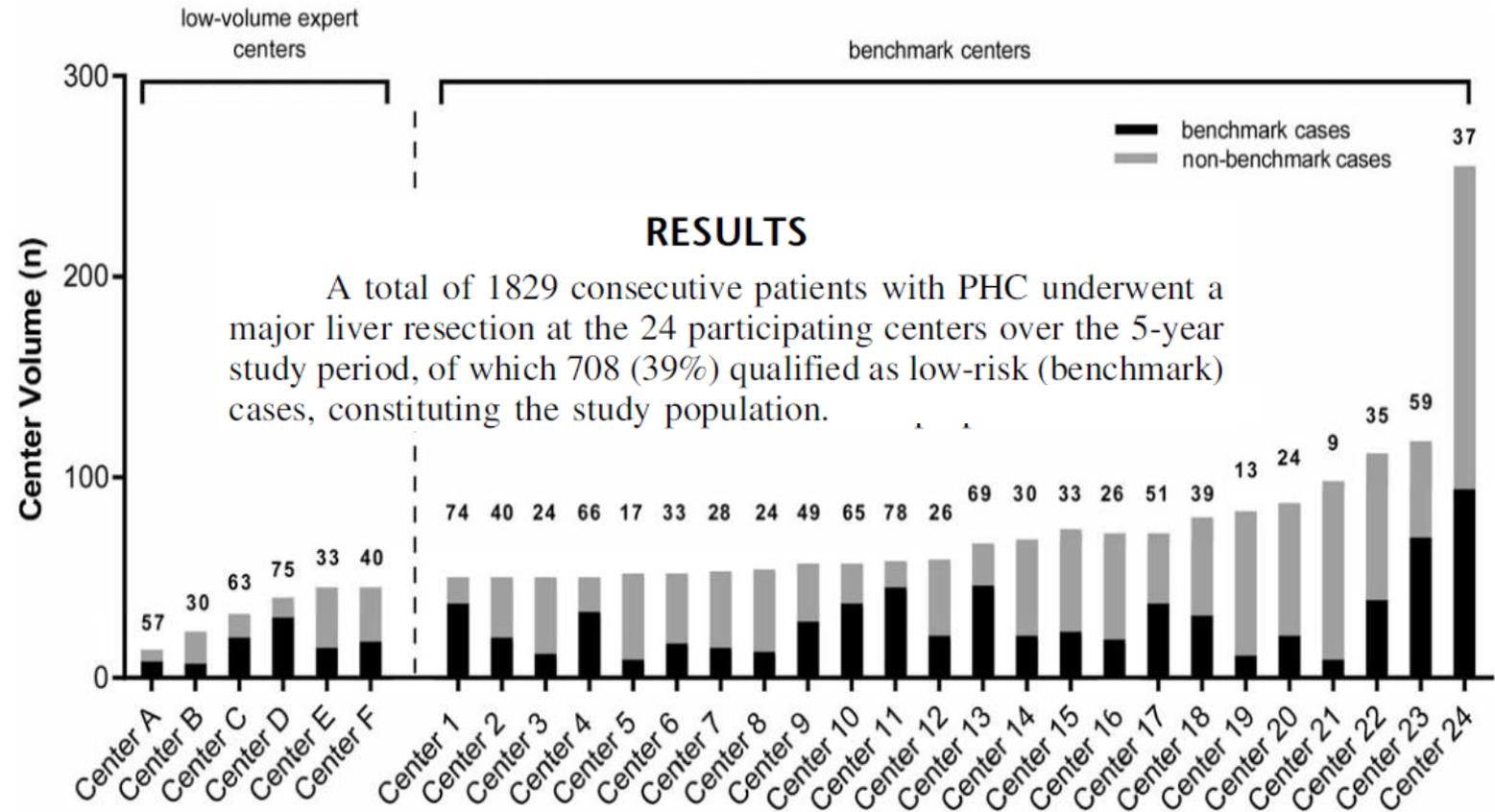
- Central liver resections
- Distant or intrahepatic metastases (based on final pathology)
- Vascular invasion with need of vascular resection (HA or PV). (routine-PV-resection as part of standard PHC surgery are included)
- Liver transplantation
- PHC with distal extension with need for pancreaticoduodenectomy

**Medical exclusion criteria**

- American Society of Anesthesiologists (ASA) classification  $\geq 3$
- Body mass index  $\geq 35$  kg/m<sup>2</sup>
- Cardiac disease defined as:*
  - Congestive heart failure onset or exacerbation in 30 days before surgery
  - History of angina pectoris within 1 mo before surgery
  - Myocardial infarct within 6 mo before surgery
  - History of percutaneous coronary intervention or cardiac surgery.
  - Atrial fibrillation
- Chronic renal failure MDRD  $\geq$  Stage 3: GFR $<60$  mL/min/1.73 m<sup>2</sup> or serum creatinine  $>1.8$  mg/dL or 160 mmol/L
- Chronic obstructive pulmonary disease with FEV1 $<80\%$
- Use of anticoagulants:*
  - Non-vitamin K antagonist oral anticoagulants (NOACs)
  - Vitamin K antagonist
  - Clopidogrel
- Diabetes mellitus  $\geq 2$  oral antidiabetic drugs or insulin



FEV, forced expiratory volume; GFR, glomerular filtration rate; HA, hepatic artery, MDRD, modification of diet in renal disease; PV, portal vein, PHC, perihilar cholangiocarcinoma.



Perihilar Cholangiocarcinoma – Novel Benchmark Values for Surgical and Oncological Outcomes From 24 Expert Centers. Mueller et al. Ann Surg 2021



Original Investigation | Surgery

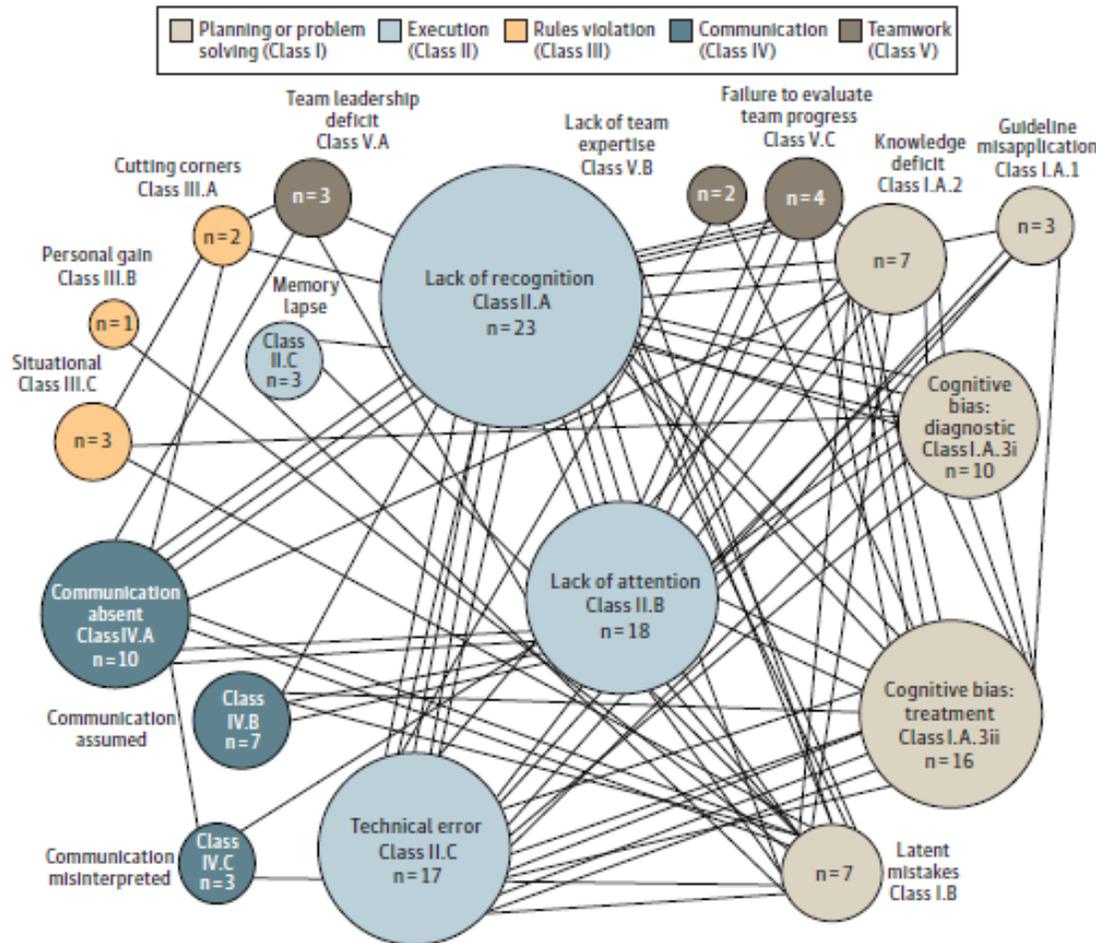
# Analysis of Human Performance Deficiencies Associated With Surgical Adverse Events

James W. Suliburk, MD; Quentin M. Buck, BS; Chris J. Pirko, MD; Nader N. Massarweh, MD, MPH; Neal R. Barshes, MD, MPH; Hardeep Singh, MD, MPH; Todd K. Rosengart, MD

5300 pts opérés, 182 complications et 14 décès

**Findings** In a quality improvement study including 5365 operations, 188 adverse events were recorded. Of these, 106 adverse events (56.4%) were due to human error, of which cognitive error accounted for 99 of 192 human performance deficiencies (51.6%).

**Meaning** Current systems-based approaches to improve surgical safety should be supplemented with additional focus on cognitive errors associated with surgical care.



# Ne pas faire d'erreur : Ne rien faire

- Chirurgien : Problème → Décision → Action
- Décider et Agir, c'est prendre le risque de faire une erreur
- Opportunité de découvrir par la hasard

Du latin [error](#) (« [course](#) à l'[aventure](#) »), visiblement dérivé du verbe [errare](#), signifiant « [errer](#) » - Wikipedia

Les Sœurs Tatins : Expertes en Pâtisserie qui font tomber une tarte aux pommes...

# Mélange d'Audace et de Lucidité



## Solution Humaine : Resilience + Surgery

NIH National Library of Medicine  
National Center for Biotechnology Information

Log in

PubMed.gov

resilience AND surgery

Advanced Create alert Create RSS User Guide

Save Email Send to Sorted by: Best match Display options

MY NCBI FILTERS 1,804 results

RESULTS BY YEAR

1897 2021

TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

ARTICLE ATTRIBUTE

- Associated data

ARTICLE TYPE

- Books and Documents
- Clinical Trial
- Meta-Analysis
- Randomized Controlled Trial
- Review
- Systematic Review

1 **Burnout and Stress Among US Surgery Residents: Psychological Distress and Resilience.**

Cite Lebares CC, Guvva EV, Ascher NL, O'Sullivan PS, Harris HW, Epel ES. J Am Coll Surg. 2018 Jan;226(1):80-90. doi: 10.1016/j.jamcollsurg.2017.10.010. Epub 2017 Oct 26. PMID: 29107117

Share

BACKGROUND: Burnout among physicians affects mental health, performance, and patient outcomes. **Surgery** residency is a high risk time for burnout. We examined burnout and the psychological characteristics that can contribute to burnout vulnerability and **resilience** in ...

2 **Stress and psychological resilience among general surgery residents during COVID-19 pandemic.**

Cite Aljehani YM, Othman SA, Telmesani NK, Alghamdi RA, AlBuainain HM, Alghamdi ZM, Zakaria HM, Alreshaid FT, Busbait SA, Alqarzaie AA, Alharbi TM, Alnajim RK. Saudi Med J. 2020 Dec;41(12):1344-1349. doi: 10.15537/smj.2020.12.25577. PMID: 33294893 [Free PMC article.](#)

Share

OBJECTIVES: To evaluate the impact of coronavirus 19 (COVID-19) pandemic and its consequences on **general surgery** residents. Methods: Cross sectional, survey based study including **surgical** residents in Kingdom of Saudi Arabia and Kingdom of Bahrain. RESULTS: ...

3 **The Association Between Psychological Resilience and Physical Function Among Older Adults With Hip Fracture Surgery.**

Cite Lim KK, Matchar DB, Tan CS, Yeo W, Ostbye T, Howe TS, Koh JSB. J Am Med Dir Assoc. 2020 Feb;21(2):260-266.e2. doi: 10.1016/j.jamda.2019.07.005. Epub 2019 Sep 12. PMID: 31522877

Share

OBJECTIVES: To examine the associations of prefracture psychological **resilience** and prefracture **general** mental health with physical function among older adults with hip fracture **surgery**. ...CONCLUSIONS AND IMPLICATIONS: Psychological **resilience** is asso ...

## Solution Technologique : IA + Surgery

NIH National Library of Medicine  
National Center for Biotechnology Information

Log in

PubMed.gov

Intelligence Artificial AND surgery

Advanced Create alert Create RSS User Guide

Save Email Send to Sorted by: Best match Display options

MY NCBI FILTERS 18,608 results

RESULTS BY YEAR

1963 2021

TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

ARTICLE ATTRIBUTE

- Associated data

ARTICLE TYPE

- Books and Documents
- Clinical Trial
- Meta-Analysis
- Randomized Controlled Trial
- Review
- Systematic Review

1 **Artificial Intelligence in Surgery: Promises and Perils.**

Cite Hashimoto DA, Rosman G, Rus D, Meireles OR. Ann Surg. 2018 Jul;268(1):70-76. doi: 10.1097/SLA.0000000000002693. PMID: 29389679 [Free PMC article.](#) [Review.](#)

Share

OBJECTIVE: The aim of this review was to summarize major topics in **artificial intelligence** (AI), including their applications and limitations in **surgery**. ...Their current and future applications to **surgical** practice were introduced, including big data ...

2 **Artificial intelligence in cornea, refractive, and cataract surgery.**

Cite Siddiqui AA, Ladas JG, Lee JK. Curr Opin Ophthalmol. 2020 Jul;31(4):253-260. doi: 10.1097/ICU.0000000000000673. PMID: 32487811 [Review.](#)

Share

As demands on the modern ophthalmologist grow, **artificial intelligence** can be utilized to help address increased demands of modern medicine and ophthalmology by adding to the physician's clinical and **surgical** acumen. ...In cataract **surgery**, a ...

3 **Artificial intelligence in medicine.**

Cite Hamet P, Tremblay J. Metabolism. 2017 Apr;69S:S36-540. doi: 10.1016/j.metabol.2017.01.011. Epub 2017 Jan 11. PMID: 28126242 [Review.](#)

Share

**Artificial Intelligence** (AI) is a **general** term that implies the use of a computer to model intelligent behavior with minimal human intervention. ...The term derives from the Czech word robota, meaning biosynthetic machines used as forced labor. In this field, ...

4 **Artificial intelligence and robotic surgery: current perspective and future directions.**

Cite Bhandari M, Zeffiro T, Reddiboina M. Curr Opin Urol. 2020 Jan;30(1):48-54. doi: 10.1097/MOU.0000000000000692.

**bopA**

bloc opératoire  
augmenté



Institut Mines-Télécom

ASSISTANCE  
PUBLIQUE  HÔPITAUX  
DE PARIS

université  
PARIS-SACLAY

*Inria*



le **cnam**

# Une vision sur le futur du bloc opératoire

Marier intelligemment l'Humain et la Technologie

## “Les Gens du Bloc Op”



***Améliorer La Qualité des Soins au Bloc Opératoire  
Par une Approche Humaine et Technologique***

***Recherche en Sciences Humaine Sociale au Bloc Opératoire  
Innovation Numérique au Bloc Opératoire.... Progrès ?***

**De l'Intelligence Augmentée plus qu'Artificielle**

**Augmentation Chirurgiens et des Anesthésistes  
Par la Vue, Par la Voix, Par le Toucher, Par la Lumière...**

**Bloc Opératoire Hyper-Connecté  
Ordinateur Co-pilote et Intégrateur de Données Massives**

www.chaire-bopa.fr

**PARTICIPER**

# WEBINAIRE

*organisé par la Chaire innovation Bloc OPérateur Augmenté*

## SÉCURITÉ AU BLOC OPÉRATEUR : quelles similitudes/différences avec le modèle aéronautique ?

Présentation des travaux anthropologiques  
du Pr Gérard DUBEY, sociologue à l'Institut Mines-Telecom

**Mercredi 2 février 2022**  
**de 16h à 17h**

*Portée par l'AP-HP, l'Institut Mines-Télécom et l'Université Paris-Saclay,  
la Chaire innovation BOPa est dédiée à l'innovation au bloc opératoire, au sens large.*



AP-HP  
@APHP

Tend  
Pascal  
5000 T  
Tend  
Le Dri  
2000 T  
Tend  
Charie  
1000 T  
Tend  
#Gend  
2000 T  
Pascal  
Olivier  
2000 T

Participez au webinar  
organisé par la Chaire  
innovation Bloc OPérateur  
Augmenté :  
17 Mercredi 2 février à 16h  
Lien de connexion :  
[aphp-  
fr.zoom.us/j/97250306457](https://aphp-fr.zoom.us/j/97250306457)

1:51 PM · 27 janv. 2022 · Twitter Web App

15 Retweets 28 J'aime

Mess

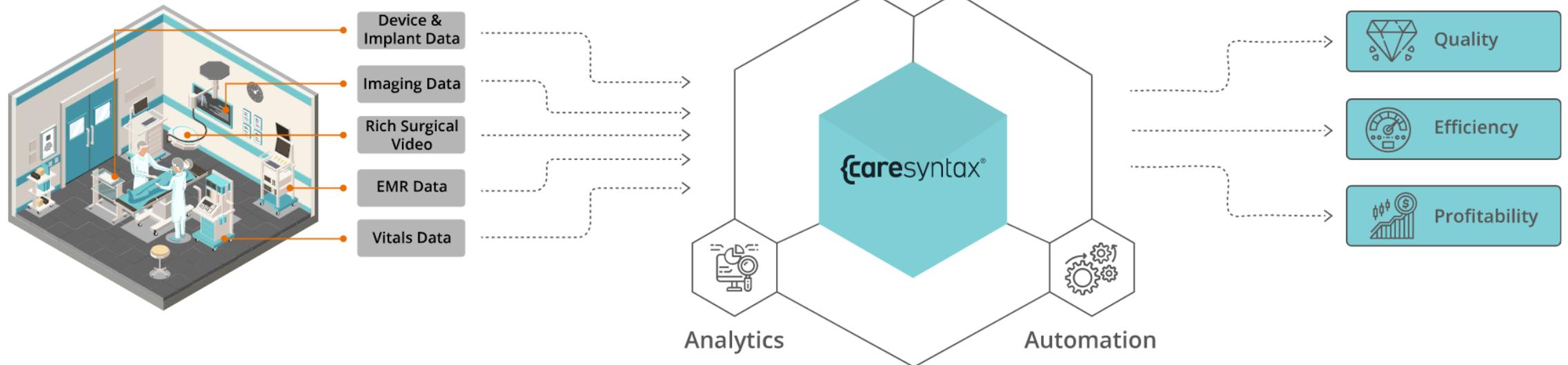
# Un lieu dédié dans Hôpital Paul Brousse à 500 m du CHB



# Le nouveau hub de données du bloc opératoire



Caméras pour filmer le Champs Opératoire (Coelio / Laparotomie)  
Caméras Ambiance : Activité humaines en salle du Coté Anesthésique / Chirurgical  
Synchronisation des Flux avec les Données des Scopes Anesthésique (En cours)  
Stockage LOCAL dans un cadre de recherche / Aucun donnée sur le Cloud



## De BOpA au Bloc du CHB

L'innovation agile



{caresyntax®



# Enjeux socio-anthropologiques de BOpA

Production de connaissance pour favoriser l'innovation

PhD Student : **Nicolas EL HAIK-WAGNER**

Direction : Eric VIBERT, Cynthia FLEURY (CNAM)

Financement : Contrat doctoral avec le Groupe Relyens

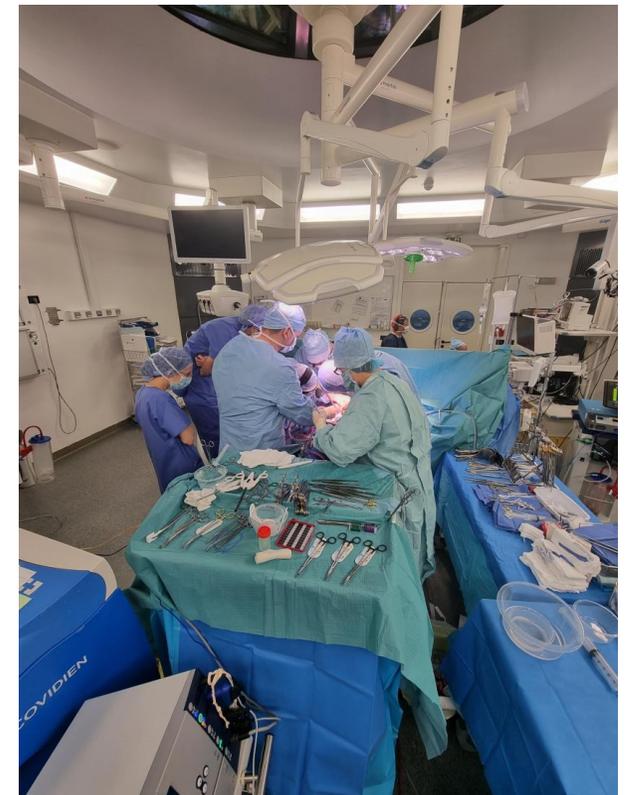


**{caresyntax<sup>®</sup>}**



Analyse Qualitative  
Avant / Apres Caresyntax

Comprendre et faciliter  
le déploiement des  
usages





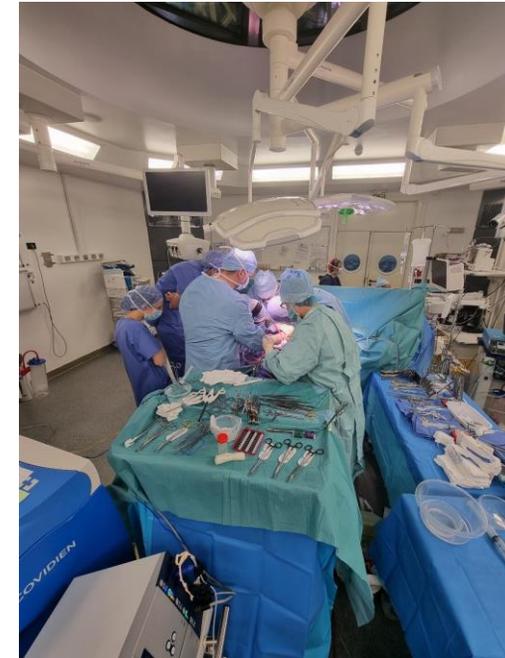
# Evaluation et intervention automatisées pour maximiser la conscience de la situation dans l'interaction homme-machine

Production de connaissance pour favoriser l'innovation

PhD Student : **Arnaud ALLEMANG-TRIVALLE**

Direction : Eric VIBERT, Caroline CAO (IMT)

Financement : Contrat doctoral IMT + divers matériels



Comprendre et faciliter  
le déploiement des  
usages

## Un projet valorisable et valorisé

La Chaire innovation BOPa est attractive



Vidéo de présentation de la Chaire



Communiqué de presse & relais réseau sociaux  
Page web



Site internet dédié : [chaire-bopa.fr](http://chaire-bopa.fr)

Mieux vaut prendre le  
changement par la main plutôt  
qu'il ne nous prenne à la gorge

Winston Churchill