

Ministry of Health, Rome, Italy

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# Using benchmarking to improve hospital patient outcomes: National level interests from international comparisons

*An example based on the Patient Safety Indicator of postoperative pulmonary embolism and deep vein thrombosis occur in hospitalized patients undergoing hip arthroplasty*

Dr Jean-Marie Januel, PhD, MPH, RN  
Epidemiologist, Assistant Professor

University Institute for Graduate Studies and Research on Health Care (IUFRS)  
CHUV - Faculty of biology and medicine, University of Lausanne, Switzerland



HAS  
HAUTE AUTORITÉ DE SANTÉ



# SUMMARY

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- ❑ **Hospital quality assessment & public reporting in France**
  - Context and Strategies
  - Issues for PSI public reporting
  
- ❑ **International comparisons postoperative venous thromboembolism (VTE) using hospital routine data**
  - Presentation of the study
  - What we can learn for national-level



- ❑ **Objectives shared between the French Authority for Health (HAS) and the French Ministry of Health (DGOS)**
  - Provide tools and methods to hospitals for piloting and managing quality of care and patient safety
  - Support public reporting (demand for transparency) using a web platform: **SCOPE SANTE** ([www.scopesante.fr](http://www.scopesante.fr))
  - Help for reporting and for piloting intervention policies at both regional and national levels
  - To link national quality & safety indicators to national quality programs (e.g. hospital accreditation, financial incitation)

# »» Strategy for in-hospital PSI development

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- ❑ **Measure of in-hospital Quality & Safety process indicators**
- ❑ **Development of outcomes' indicators (*e.g.* PSI)**
  - Scientific adaptation of PSI to the French context (development, use, and reporting)<sup>1-3</sup>
  - Appropriate model to start with, combining safety issues for improving quality using the PSI 12 in hospitalized patients undergoing hip/knee surgery
  - Coordinate by the HAS, a public, scientific & independent body in collaboration with the French Agency for Information on Hospital Care (ATIH)
- ❑ **Development of process indicators on VTE prophylaxis**

1. Januel JM. DREES (Direction de la recherche, des études, de l'évaluation et des statistiques). SERIE ETUDES ET RECHERCHES - DOCUMENT DE TRAVAIL. Paris n° 20, 2011: 87p  
[http://www.has-sante.fr/portail/jcms/c\\_1055802/fr/rapport-psi-2011-patient-safety-indicators-indicateurs-de-securite-des-soins-mai-2011](http://www.has-sante.fr/portail/jcms/c_1055802/fr/rapport-psi-2011-patient-safety-indicators-indicateurs-de-securite-des-soins-mai-2011)
2. Le Pogam MA, Januel JM, Colin C. HAS (Haute Autorité de Santé). RECOMMANDATIONS ET GUIDES. ETUDES ET RAPPORTS. Paris, 2012: 132p.  
[http://www.has-sante.fr/portail/jcms/c\\_1262821/modalites-dutilisation-et-de-diffusion-des-psi-indicateurs-de-securite-des-soins-hospitaliers-dans-les-pays-de-locde-2012?xtmc=&xtcr=1](http://www.has-sante.fr/portail/jcms/c_1262821/modalites-dutilisation-et-de-diffusion-des-psi-indicateurs-de-securite-des-soins-hospitaliers-dans-les-pays-de-locde-2012?xtmc=&xtcr=1)
3. CLARTE report 2013.

# »» Issues for PSI public reporting

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- ❑ **PSI, as a warning system contributing to care quality, safety and patient outcomes' improvement**
- ❑ **For purpose of benchmarking, between regions, or hospitals**
  - Risk-adjusted to factors related to the patient case-mix, hospital characteristics and quality of coding, with valid PSI (*e.g.*, PPV  $\geq 75\%$ )
  - Using trend time study design, for comparing to a national, regional and/or hospital category
- ❑ **Preliminary steps for public reporting in France (not currently done)**
  - Confidence and motivation of hospitals
  - The variability of indicators reflects difference in quality of care between hospitals
  - Preliminary work to health professionals, press and general public

# »» International Comparisons of VTE

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- ❑ **Data from 5 countries (3 consecutive years)**
  - Switzerland, France, Canada, New-Zealand, State of California (US)
  
- ❑ **Using the ICD-10 adaptation of the AHRQ PSI #12 (Postoperative Pulmonary Embolism / Deep Vein Thrombosis)**
  
- ❑ **OBJECTIVES**
  - To compare VTE against an external benchmark
  - To explore potential factors that could explain differences between countries



# PSI Algorithm<sup>1,2</sup> for Postoperative VTE

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**ICD Codes for Secondary Diagnoses of PE and DVT**

**PSI 12 =**

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**Any fields procedure codes for hip arthroplasty**

1 Januel JM, Couris CM, Luthi JC, et al. For the International Methodology Consortium for Coded Health Information (IMECCHI). *Adaptation au codage CIM-10 de 15 indicateurs de la sécurité des patients proposés par l'Agence étasunienne pour la recherche et la qualité des soins de santé (AHRQ)*. Rev Epidemiol Sante Publique 2011; 59: 341-350.

2 OECD Health Technical Report. Drosler S. Facilitating cross-national comparisons of indicators for patient safety at the health-system level in OECD countries. Health Care Quality Indicators N°19. DELSA/ELSAWD/http 2008.

# »» What is a Valid Benchmarks ?

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- ❑ **Statistical benchmark ?**
  - Risk-adjusted observed vs. expected rate (Funnel plots)
  - Benchmark vs. « best in class » (Forest plots)
- ❑ **Targeted “zero risk” (no event)?**
- ❑ **Clinical relevant estimate?**
  - According state of art practice of healthcare
  - Defining baseline risk (excluding preventable events)





# “Evidence-Based Practice” Benchmark using a Meta-Analysis

CLINICAL REVIEW

CLINICIAN'S CORNER

## Symptomatic In-Hospital Deep Vein Thrombosis and Pulmonary Embolism Following Hip and Knee Arthroplasty Among Patients Receiving Recommended Prophylaxis A Systematic Review

Jean-Marie Januel, RN, MPH

Guanmin Chen, MD, PhD

Christiane Ruffieux, PhD

Hude Quan, MD, PhD

James D. Douketis, MD, FRCPC

Mark A. Crowther, MD, MSc, FRCPC

Cyrille Colin, MD, PhD

William A. Ghali, MD, MPH

Bernard Burnand, MD, MPH

for the IMECCHI Group

**Context** Symptomatic venous thromboembolism (VTE) after total or partial knee arthroplasty (TPKA) and after total or partial hip arthroplasty (TPHA) are proposed patient safety indicators, but its incidence prior to discharge is not defined.

**Objective** To establish a literature-based estimate of symptomatic VTE event rates prior to hospital discharge in patients undergoing TPHA or TPKA.

**Data Sources** Search of MEDLINE, EMBASE, and the Cochrane Library (1996 to 2011), supplemented by relevant articles.

**Study Selection** Reports of incidence of symptomatic postoperative pulmonary embolism or deep vein thrombosis (DVT) before hospital discharge in patients who received VTE prophylaxis with either a low-molecular-weight heparin or a subcutaneous factor Xa inhibitor or oral direct inhibitor of factors Xa or IIa.

**Data Extraction and Synthesis** Meta-analysis of randomized clinical trials and observational studies that reported rates of postoperative symptomatic VTE in patients



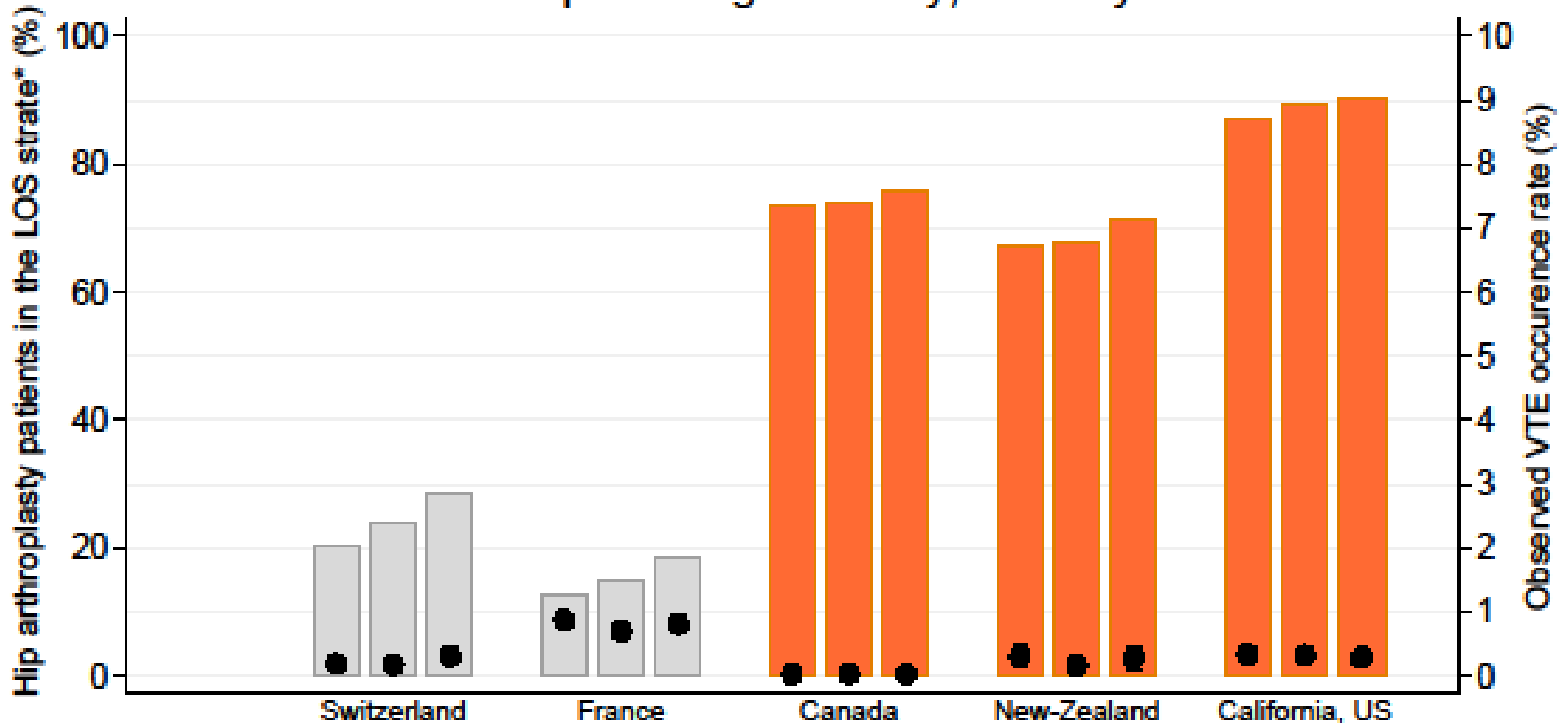
# Selection of the Baseline Risk of VTE

	Hip Arthroplasty			
	%	(95% CI)	<i>f</i>	<i>P-value</i>
Total LMWH ( <i>Observ. Studies + RCT</i> )	0.58	(0.35-0.81)	51.8%	0.001
LMWH ( <i>Observ. Studies</i> )	0.83	(0.19-1.48)	67.3%	0.230
LMWH ( <i>RCT</i> )	0.51	(0.26-0.76)	45.4%	0.010
Direct Inhibitor of Factors IIa/Xa ( <i>RCT</i> )	0.31	(0.03-0.59)	32.8%	0.070
Indirect Inhibitor of Factors IIa/Xa ( <i>RCT</i> )	0.68	(0.26-0.97)	0.0%	0.380
TOTAL	0.53	(0.35-0.70)	49.4%	<0.001



# VTE and Hospital Length of Stay

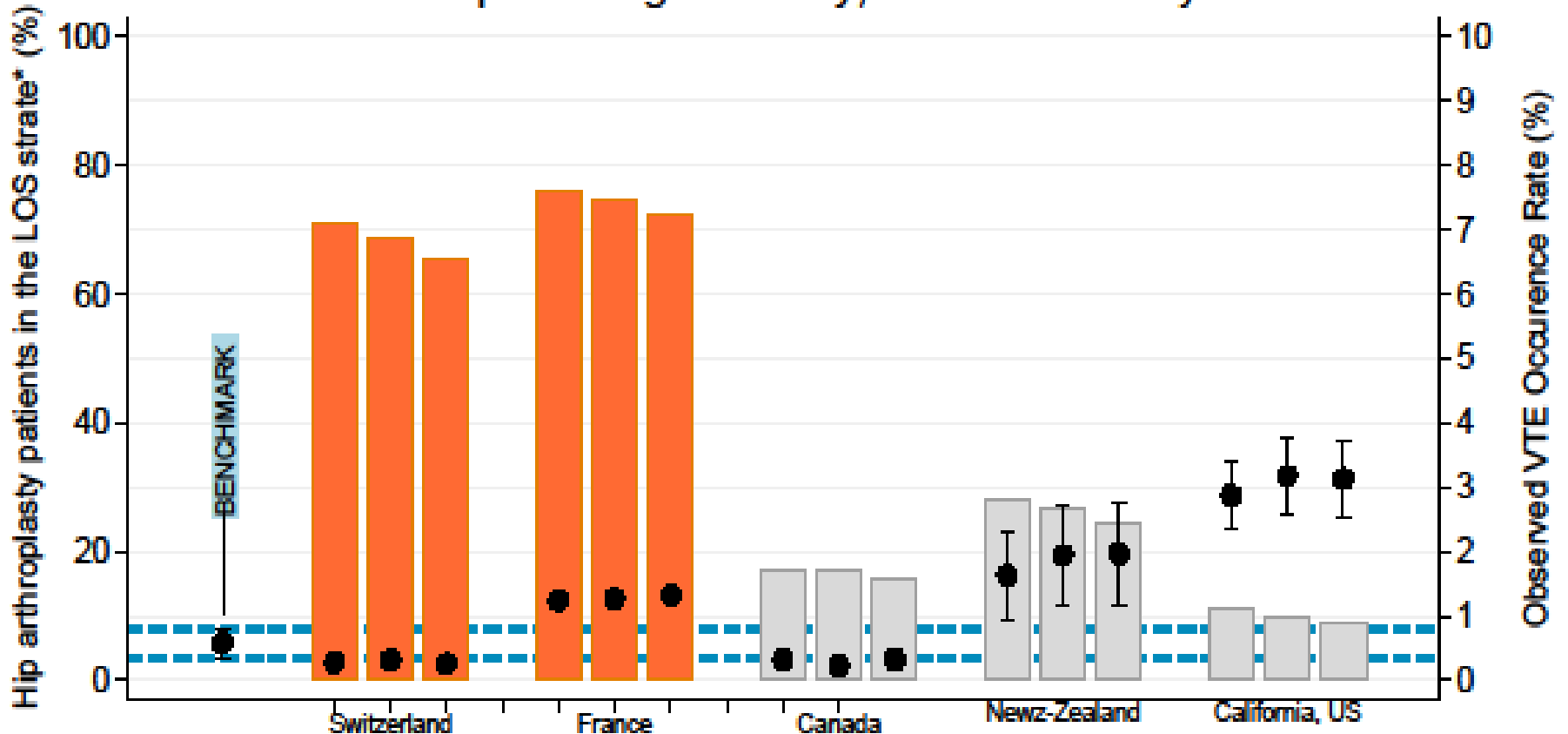
## A. Hospital Length of Stay, $\leq 7$ days





# VTE and Hospital Length of Stay

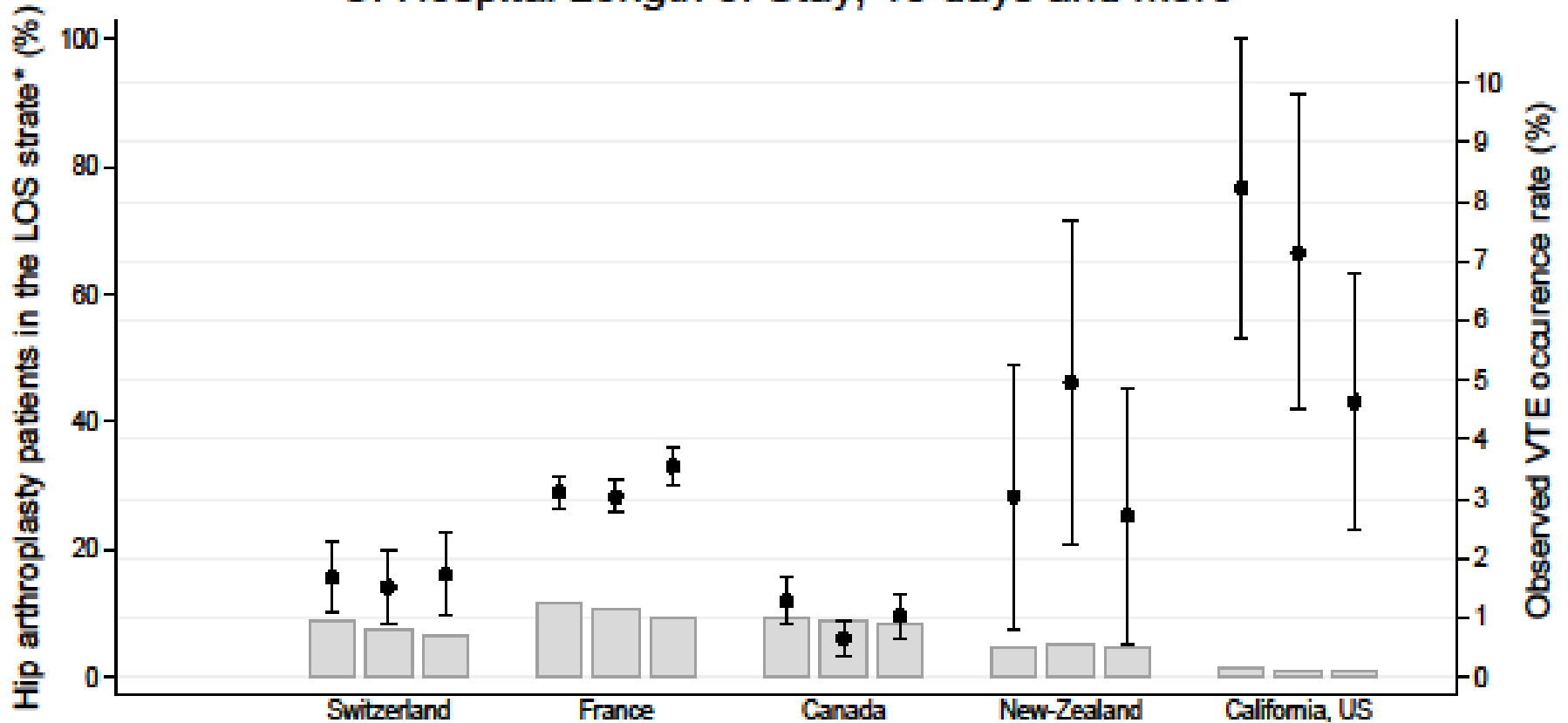
## B. Hospital Length of Stay, from 8 to 17 days



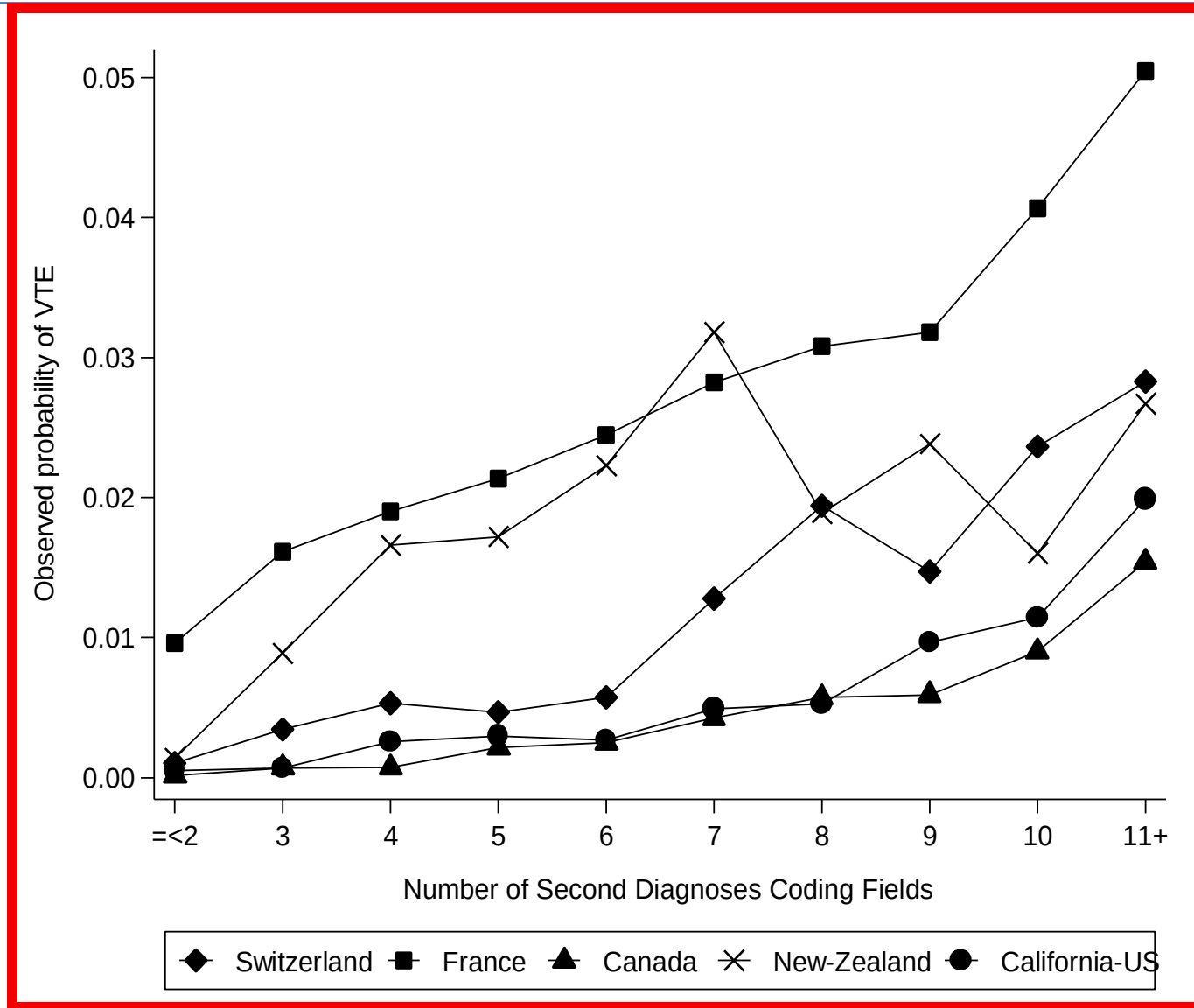


# VTE and Hospital Length of Stay

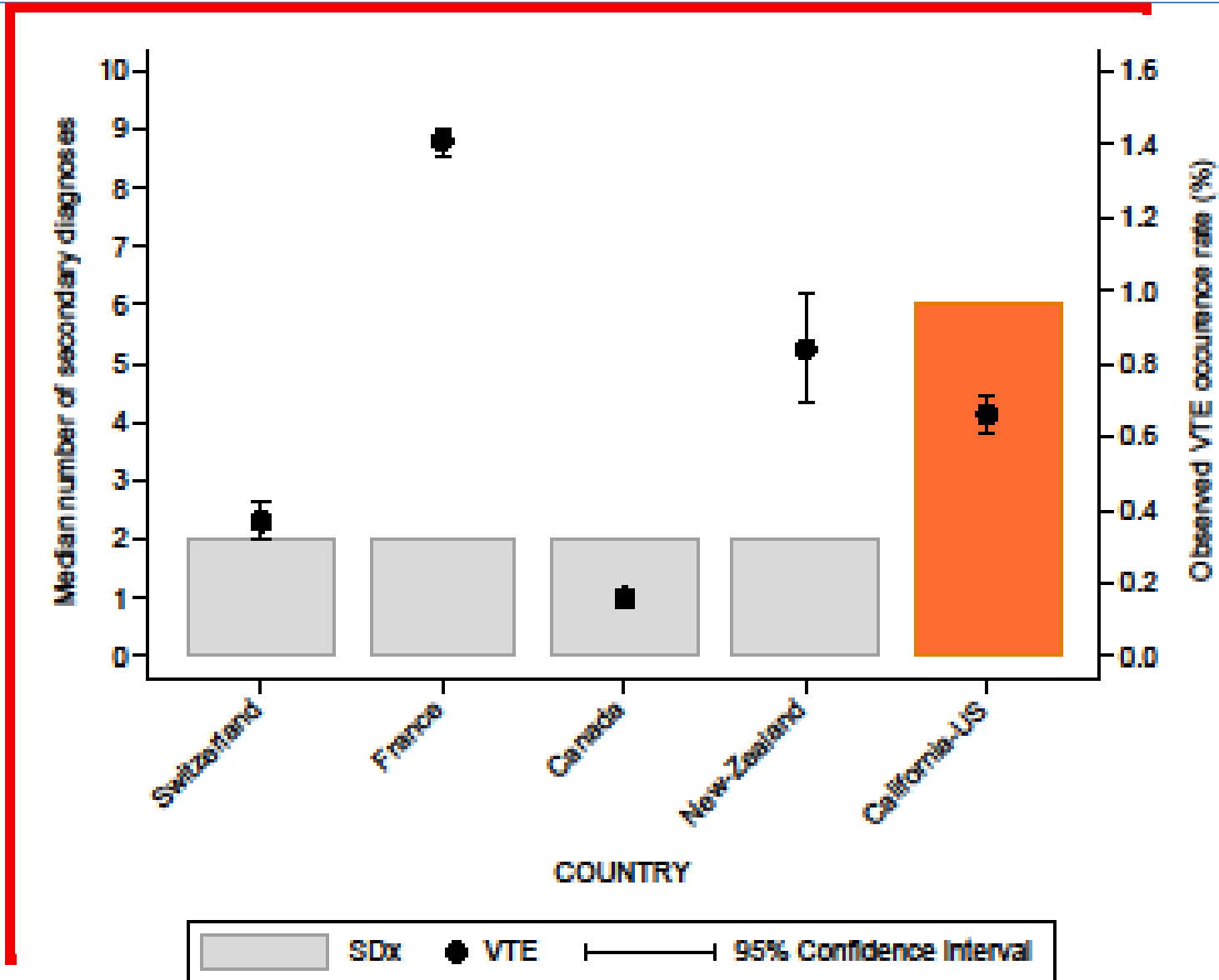
## C. Hospital Length of Stay, 18 days and more



# VTE and Number of Secondary Diagnoses (SDx)



# VTE and Number of Secondary Diagnoses (SDx)





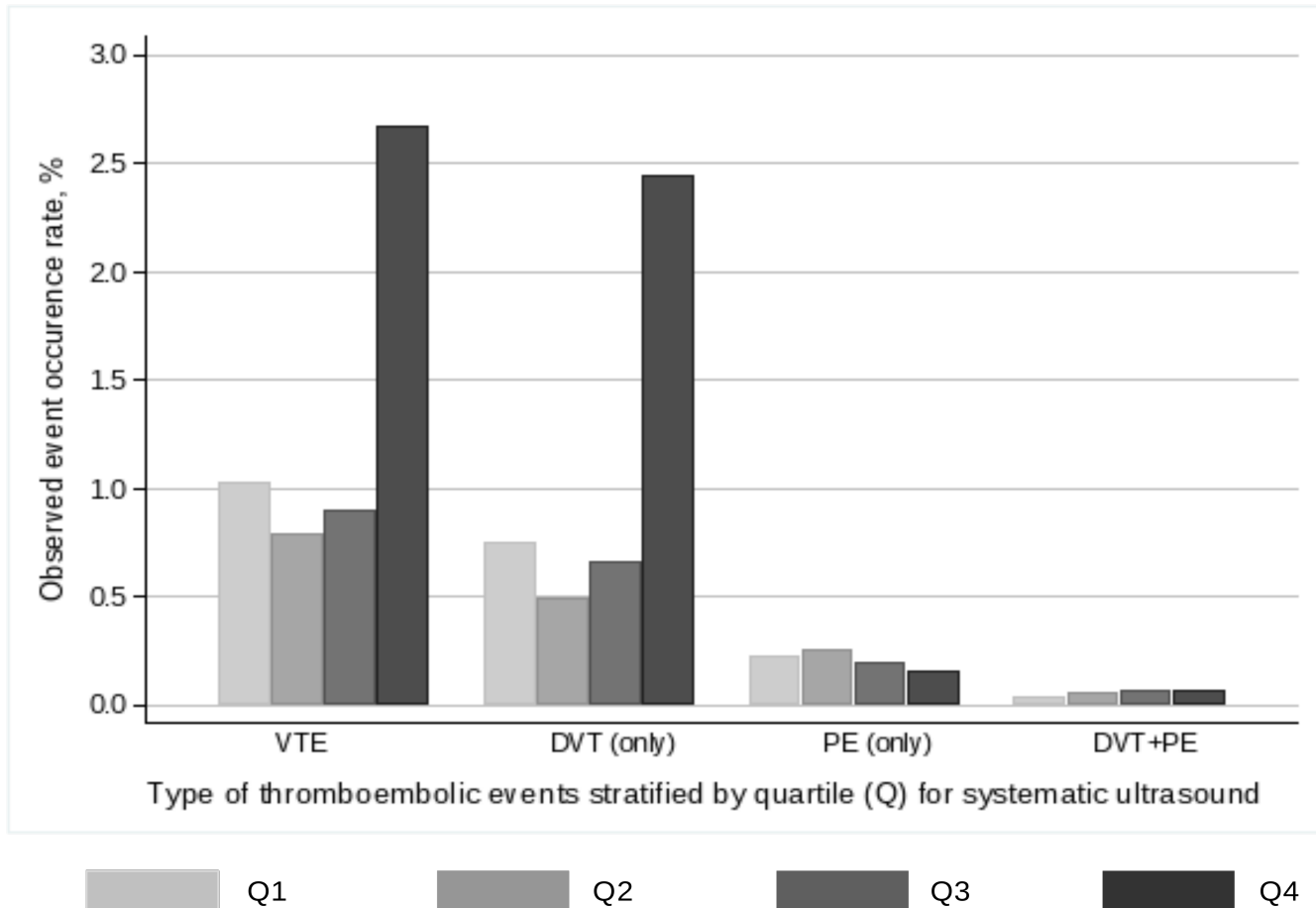
# VTE and Hospital Factors by Quartiles Stratification on the Use Ultrasound at Hospital-Level (France only)

	Quartile			
	1	2	3	4
Hospital proportion of patients who received ultrasound, median of % [IQR, 25 <sup>th</sup> – 75 <sup>th</sup> ]	0 [0 – 0]	1.43 [1.95 – 2.02]	5.35 [3.85 – 7.41]	46.25 [18.18 – 85.55]
Hospital proportion of patients with VTE, % (95% CI)	0.88 (0.76 – 1.00)	0.68 (0.58 – 0.77)	0.94 (0.84 – 1.04)	2.55 (2.31 – 2.79)
Hospital volume of hip arthroplasty, median [IQR, 25 <sup>th</sup> – 75 <sup>th</sup> ]	82 [40 – 140]	155 [97 – 228]	137 [74 – 228]	140 [72 – 238]
Type of hospital				
Public Hospital, n (%)	503 (42.70)	269 (22.84)	277 (23.51)	129 (10.95)
Private For Profit Hospital, n (%)	354 (24.65)	181 (12.60)	377 (26.25)	524 (36.49)
Hospital average LOS, median [IQR, 25 <sup>th</sup> – 75 <sup>th</sup> ]	13.18 [10.97 – 15.75]	12.31 [10.34 – 14.36]	12.02 [10.97 – 15.75]	11.73 [10.97 – 15.75]
Hospital average nb. of SDX, median [IQR, 25 <sup>th</sup> – 75 <sup>th</sup> ]	2.41 [2.31 – 2.51]	2.35 [2.23 – 2.47]	2.31 [2.21 – 2.40]	2.56 [2.45 – 2.67]





# Types of VTE by Quartiles Stratification on the Use Ultrasound at Hospital-Level (France only)



# Key Points Discussion

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- **Potential confounding factors = differences in practices across countries**
  - Hospitalization Length of Stay (LOS)
    - Normative LOS
    - Increase LOS as a consequence for VTE (*e.g.*, California)
  - Quality for coding diagnoses (# of SDx)
  - Methods used to assess or to detect VTE (Ultrasound, Clinical score [e.g., Wells score, Geneva score])
  
- **Two levels for taking into account these factors**
  - For within country PSI modeling (to be control)
  - For between countries comparisons (Not to be control, but to be use for results interpretation and discussion)

# »» Perspectives of R&D in the OECD context

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- ❑ **To focus on LOS and SDx**
  - To explore **Endogenous / Exogenous** factors
  - Using more appropriate models (Fractional polynomials, structural equations...)
- ❑ **To assess Process – Outcome relation in a structure context taking into account**
  - Differences in practices for prophylaxis
  - Differences in practices to assess VTE diagnostic (*e.g.*, ultrasound, clinical scores)
- ❑ **To explore potentially more relevant outcomes**
  - Up to 30 days post-surgery VTE rate, up to 30 days readmission rate, VTE cumulated incidence up to 3 months
  - VTE as an intermediate output (associated to mortality)

# Extending Measurement after Discharge

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- ❑ **But... metrological issues remain...**
  - Which data are available for after hospital discharge follow-up?
  - Which quality of such data? (difference between before vs. after discharge, factors associated to patients behavior...)
  - Issues to link databases
  - Differences in time to VTE occur between surgical procedures (*e.g.*, 7 days for hip vs. 18 days for knee)<sup>1</sup>

# »» Conclusions

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- ❑ **International comparisons allow to identify important findings that could be used at the national-level for PSI interpretation, and quality and safety improvement**
- ❑ **Heterogeneous practices between countries should be accurately appreciated to allow robust conclusions and for national implementation**
- ❑ **Valid benchmark candidates to be investigated in regard of the main goal: Patient-centered outcomes**

# »» Thanks to:

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C. Colin (*France*)

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P. Hider (*New-Zealand*)

R. White, B. Danielsen, P.S. Romano (*US, California*)

And the International Methodology Consortium for Coded Health Information (IMECCHI)

Original article on these international comparisons is under process...

# Thank you !

Jean-Marie.Januel@chuv.ch