

EURHOBOP Kick-off meeting
Barcelona, 28-29 September 2009

from

EUPHORIC

EU Public Health Outcome Research and Indicators Collection

to

EURHOBOP

**EUR HOspital Benchmarking by Outcomes in Acute Coronary
Syndrome Processes**

Marina Torre

Valerio Manno, Mascia Masciocchi

Istituto Superiore di Sanità – Rome - Italy



Summary

- **EUPHORIC objectives & Project organisation**
- **Aims, methods and results of CV pilot**
- **From EUPHORIC to EURHOBOP**



EUPHORIC: general objectives

- cooperate on benchmarking of the outcomes of selected health performances
- exchange information on quality standards, best practice and effectiveness in public health, by developing and maintaining EU networks
- verify the hypothesis that the possibility of developing common outcome indicators in Europe exists
- identify common EU elements suitable for a political EU platform oriented at best practice guarantees for the EU citizens

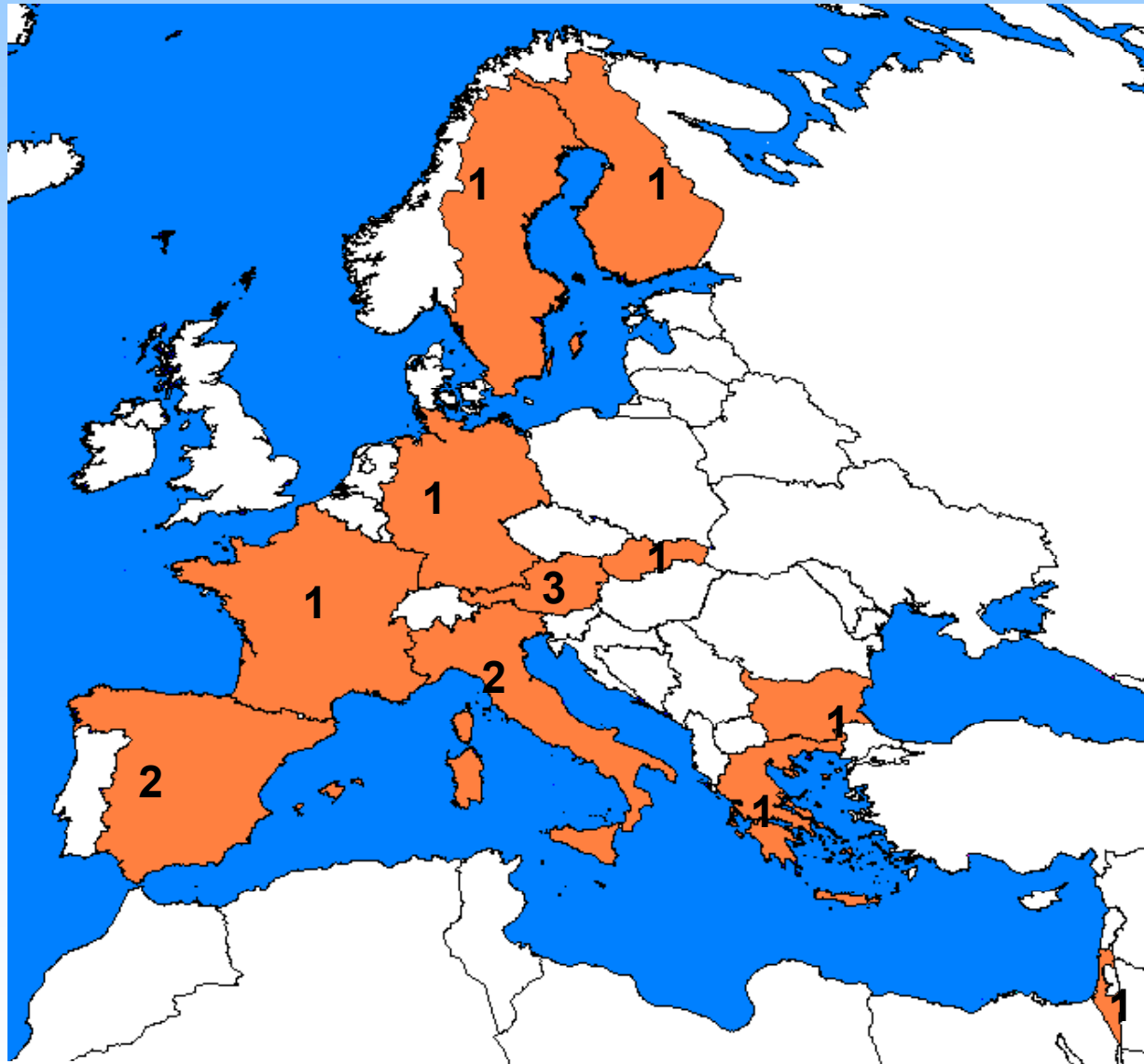


EUPHORIC: specific objectives

- setup of a high quality framework - consortium
- collect detailed information on health outcome indicators;
- develop a standardised methodology;
- assess quality of care of selected health procedures;
- provide objective, transparent, high quality and standardised information easy accessible to users (doctors, health staff, health administrative, decision makers, policy makers, EU people);
- provide assistance to EU countries for the development and implementation of a common monitoring system of standardised outcome indicators in the prospective of a common public health planning in Europe;
- investigate validity of routinely collected data



Participants countries and n. of institutions



EUPHORIC: partners



Coordinator

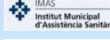
- Istituto Superiore di Sanità (ISS), Rome, Italy

Associated Beneficiaries

1. European Arthroplasty Register, Austria
2. National Research and Development Centre for Welfare and Health, Finland
3. National and Kapodistrian University of Athens, Greece
4. Local Health Authority RM/E, Italy
5. Institut Municipal d'Assistència Sanitària, Spain
6. Karolinska Institutet, Sweden

Collaborating partners

1. National Center of Public Health Protection, Bulgaria
2. Catalan Agency for Health Technology Assessment and Research, Spain
3. Slovak Arthroplasty Register, Slovak Republic
4. Arthroplasty Register Tyrol, Austria
5. Ludwig Boltzmann Institut for Health Technology Assessment, Austria
6. French Society of Orthopaedic and Trauma Surgery, France
7. BQS Bundesgeschäftsstelle Qualitätssicherung gGmbH, Germany
8. Israel Society for the Prevention of Heart Attacks at NCRI, Israel



EUPHORIC: organisation

Organised into six work packages:

- **WP 1 Management (ISS)**
- **WP 2 Dissemination (ISS)**
- **WP 3 Liasons with other projects (STAKES)**
- **WP 4 Indicators development (ISS)**
- **WP 5 Pilot (IMIM, EAR, DEASL)**
- **WP 6 Web-based DB (ISS)**

Performed in three phases:

- **SURVEY**
- **PILOT**
 - **CV, Orthopaedic, Risk adjustment and statistics**
- **RESULTS DISSEMINATION**



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Results of Survey: Indicators list

OUTCOME INDICATORS OF THE EUPHORIC PROJECT

The work carried out by all the partners of the EUPHORIC project led to the creation of a list of 54 outcome indicators, divided in 9 categories. The compiling of the list is based on evaluation criteria, such as data availability, clinical relevance of the indicator and its importance to the international scientific community. The indicators were identified on the basis of the data available in the first phase of the project, in particular covering 2004-2005

The 54 indicators of the EUPHORIC project

Category	N.	Indicator
Cardiovascular disease and surgery	A1	Emergency readmission to hospital following treatment for a stroke
	A2	Death within 30 days of admission to hospital with a stroke
	A3	In-hospital deaths following Coronary Artery Bypass Graft (CABG) operation
	A4	Death within 30 days of Coronary Artery Bypass Graft (CABG) operation
	A5	In-hospital deaths following Percutaneous Transluminal Coronary Angioplasty (PTCA) operation
	A6	Death within 30 days of Percutaneous Transluminal Coronary Angioplasty (PTCA) operation
	A7	Death within 6 months of Percutaneous Transluminal Coronary Angioplasty (PTCA) operation
	A8	Death within 12 months of Percutaneous Transluminal Coronary Angioplasty (PTCA) operation
	A9	In-hospital deaths following admission to hospital with Acute Myocardial Infarction (AMI)
	A10	Death within 30 days of admission to hospital with Acute Myocardial Infarction (AMI)
	A11	Death within 30 days of admission to hospital with Congestive Heart Failure (CHF)
	A12	Hospital admission for Congestive Heart Failure (CHF)
	A13	In-hospital deaths and neurological complications following carotid stenting procedures
	A14	Deaths and neurological complications within 30 days from carotid stenting procedures
Cancer	B1	Breast cancer relative survival
	B2	Lung cancer relative survival
	B3	Colon cancer relative survival
Infectious diseases	C1	Emergency admissions to hospital of children with lower respiratory infections
	C2	AIDS survival
	C3	Death within 30 days of admission to hospital with pneumonia
	C4	Hospital admissions for paediatric gastroenteritis
	C5	Hospital admissions for influenza
	C6	Hospital admissions for tuberculosis
Other chronic diseases	D1	Hospital admissions for uncontrolled diabetes
	D2	Hospital admissions for short term complications of diabetes
	D3	Hospital admissions for long term complications of diabetes

A starting point

Identifying outcome indicators, which can be applied in different health contexts, requires constant updating. Only in this way can it be guaranteed that the differences among countries are not underestimated but rather they are included and codified so as to improve the evaluation tools and compare the results. Neither can the most recent terminology be omitted as it is in continual evolution in relation to the new procedures and standards being introduced. Therefore, the list of indicators identified by the EUPHORIC project is not the definitive end point but the starting point of a path to constantly improve the quality of health assistance offered to European citizens.

Category	N.	Indicator
	D4	Hospital admissions for lower extremity amputations in patients with diabetes
	D5	Hospital admissions for adult asthma
	D6	Hospital admissions for paediatric asthma
	D7	Hospital admissions for senile asthma
Orthopaedics	E1	Emergency readmission to hospital following treatment for a fractured hip
	E2	Death within 30 days of admission to hospital with a fractured hip
	E3	In-hospital death following admission with a fractured hip
	E4	Returning home following hospital treatment for fractured hip
	E5	In-hospital waiting time for femur fracture surgery
	E6	Total hip replacement in-hospital mortality rate
	E7	Partial hip replacement in-hospital mortality rate
	E8	Revision rate
	E9	Revision burden rate
Transplantations	F1	Medulla osseum graft relative survival
	F2	Liver transplantation relative survival
	F3	Heart transplantation relative survival
	F4	Lung transplantation relative survival
	F5	Kidney transplantation relative survival
Emergency	G1	Emergency admissions to hospital
	G2	Emergency readmissions to hospital within 28 days
	G3	Emergency hospital admissions for alcohol related pathologies
Neonatal/ Maternal	H1	Maternal mortality rate
	H2	Neonatal / Infant mortality rate
	H3	Perinatal mortality rate
	H4	Perinatal intensive care mortality rate
	H5	Percentage of births carried out by caesarean section
Miscellanea	I1	Death within 30 days of surgery (selective and non-selective admissions)
	I2	Hospital admissions for alcohol related pathologies

Results of Survey: indicators sheets



EU Public Health Outcome Research and Indicators Collection
EUPHORIC Project
Grant Agreement n°2003134

*A project funded by the European Commission,
Health and Consumer Protection Directorate General*

Deliverable N. 6

Detailed sheets of the collected outcome indicators
(long list)

February 2008



A: CARDIOVASCULAR DISEASE AND SURGERY

A3: In-hospital deaths following Coronary Artery Bypass Graft (CABG) operation

Rate of deaths occurring in hospital after Coronary Artery Bypass Graft (CABG).

RATIONALE: It has been fully demonstrated that mortality rate after CABG represents a good indicator of performances in cardio-surgery departments as a whole.

It has been shown that some deaths are also related to shortcomings in health care.

This indicator could be useful in preventing such potentially avoidable deaths by comparing mortality rates of different hospitals/populations and identifying situations where the number of observed deaths results higher/lower than expected.

NUMERATOR: The number of ordinary admissions with CABG where the patient dies in hospital (before the discharge).

DENOMINATOR: The number of ordinary hospital admissions with CABG.

STATISTICAL METHODS: This indicator is presented at trust and population level.

In-hospital death rate following CABG procedure may vary between organizations because of many factors. Age, gender and type of procedure (isolated or associated to other procedures CABG) standardization or stratification is highly recommended to account for at least those aspects of case mix which can be certainly identified.

HOW TO USE THIS INDICATOR:

- for comparative evaluation of hospital performances;
- for comparative evaluation between groups of facilities with similar organizational and/or process characteristics (i.e. treatment volume, technological equipment);
- for comparative evaluation between populations resident in different areas or of different socio-economic status;
- for analysis of trend over time.

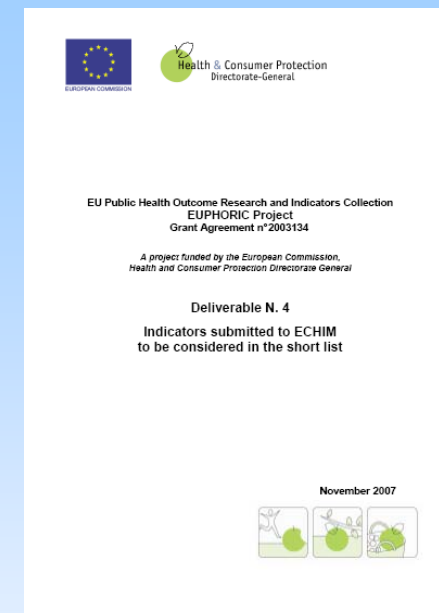
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- Iezzoni LI, Ash AS, Shwartz M, Daley J, Hughes JS, Macklerman YD. Judging hospitals by severity-adjusted mortality rates: the influence of the severity-adjustment method. *Am J Public Health* 1996; 86:1379-87.
- Nuhoff SAM, Roques F, Michel P, Granchou E, Lemeshow S, Salomon on the EuroSCORE study group. European system for cardiac operative risk evaluation (EuroSCORE). *Eur J Cardiothorac Surg* 1999;16:9-13.
- New York State Department of Health. *Adult Cardiac Surgery in New York State 2000-2002*. Albany, NY: New York State Department of Health; October 2004.



Indicators submitted to ECHIM

1. In hospital / 30 days mortality following admission to hospital with an AMI
2. In hospital / 30 days mortality following CABG



ADDITIONS TO THE ECHI SHORTLIST SUGGESTED BY THE PHP WORKING PARTIES, PROJECTS AND OTHERS; FINAL SELECTION LIST AFTER WORKING PARTY INDICATORS MEETING 10-11.12.2007 AND NCA MEETING 30-31.1.2008

AMI 30-day in-hospital case-fatality rate	Included by PK because in initial set of OECD health care quality indicators; also suggested by EUPHORIC project	Proportion of deaths in hospital within 30 days after admission with primary diagnosis ICD-10 I21-I22, among all such admissions; documented by OECD; EUPHORIC suggests to add two slightly different definitions, well-documented, to be outlined later.	Good indicator for adequacy of AMI treatment in the acute phase. Appropriate care is a large contributor for declining AMI mortality	well-documented by OECD/HCQI; also by EUPHORIC project	Data from 24 OECD countries in 'Health at a Glance' 2007. Bulgaria: not monitored	High rank from Health S
Stroke 30-day in-hospital	Included by PK because in	Proportion of deaths in hospital within	Good indicator for adequacy of	Well-documented by	Data from 23 OECD	High rank from Health S



Pilot

Focussing on 2 areas:

- **Cardiovascular** → Acute coronary syndrome
- **Orthopaedics** → Arthroplasty

Inclusion criteria:

- High political and clinical relevance
- Availability of data

Further inclusion of an additional pilot:

- **Risk adjustment and statistics**





EUPHORIC Project



The Cardiovascular Pilot

Jaume Marrugat & Roberto Elosua & Yolanda Ferrer
Institut Municipal d'Investigació Mèdica de Barcelona
Universitat Autònoma de Barcelona
Parc de Recerca Biomèdica de Barcelona
C/ Dr. Aiguader, 88
08003 Barcelona

933160710

jmarrugat@imim.es

www.imim.es

www.regicor.org

WWW.EUPHORIC-PROJECT.EU



Specific aims of the EUPHORIC CV pilot

1. To define a simple set of factors that determine **quality of health care outcome** (in-hospital case-fatality) in patients who received **thrombolysis, underwent coronary angiography, or percutaneous interventions** or were treated for **AMI or UA**. These indicators will be analyzed in the context of characteristics at **individual, hospital and country levels**.
2. To develop a **set of tools (mathematical functions) to benchmarking European hospitals by their observed indicators** (in-hospital case fatality) according to the expected adjusted risk of the outcome, that provides systematic information to end-users (doctors, health staff, health administration, decision makers, policy makers, EU population and public health stakeholders).
3. To test the functions that estimate the indicators to information obtained routinely for administrative purposes.
4. To develop and update a systematic review of the literature on the efficacy of GPIIb-IIIa inhibitors in the ACS.



Tasks of the EUPHORIC CV pilot

1. Choosing diseases
2. Selecting procedures to be assessed
3. Selecting suitable outcomes
4. Selecting potential predictors
 1. Individual level
 2. Hospital level
 3. Country Level
5. Population registry data gathering and analyses
6. Testing the functions with administrative



1. Choosing CVD

- **Acute Coronary Syndrome**
 - Non ST Elevation**
 - ST Elevation**
 - Undetermined**
- Heart Failure
- Stroke
- Valvular disease
- Peripheral artery disease

- **The easiest is ACS: admission required, many ongoing registers, in-hospital and 6-month procedures and outcomes relatively easy to monitor.**

2. Selecting procedures

The candidate procedures and conditions were:

- **GPIIb/IIIa blocker use (meta-analysis)**
- **Myocardial infarction & UA management**
- **Angiography**
- **Percutaneous Coronary Interventions**
- **Thrombolysis**
- **Coronary artery bypass grafting (CABG)**

CABG: was abandoned because there are no severity scores available, and the number of procedures is low in ACS acute phase

Meta-analysis of GPIIb/IIIa use in non-ST elevation ACS patients with PCI

The screenshot shows a Windows Internet Explorer browser window displaying the Cochrane Library website. The address bar shows the URL: <http://www.interscience.wiley.com/cochrane/clsystrev/articles/CD002130/frame.html>. The page title is "Platelet glycoprotein IIb/IIIa blockers for percutaneous coronary intervention and the initial treatment of non-ST segment elevation acute coronary syndromes (Review)". The authors listed are Bosch X, Loma-Osorio P, Marrugat J. The page includes a search bar, navigation links, and a table of contents on the left side. The main content area displays the abstract and background information for the review.

Platelet glycoprotein IIb/IIIa blockers for percutaneous coronary intervention and the initial treatment of non-ST segment elevation acute coronary syndromes (Review)

Bosch X, Loma-Osorio P, Marrugat J



SOURCES OF SUPPORT

External sources of support

- FIS PI050120, Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III SPAIN
- Red HEFACLES RD06/0003, Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III SPAIN
- EUPHORIC Project (Ref. 2003/134) EUROPEAN UNION

Internal sources of support

- University of Barcelona SPAIN
- Institut Municipal d'Investigació Mèdica, Barcelona SPAIN

.pdf downloadable from the EUPHORIC website

<http://www.euphoric-project.eu/files/GPIIbIIIa%20NSTEACS%20&%20PCI%20Systematic%20review%202008.pdf>

3. Selecting outcomes in ACS

- **In-hospital mortality**
- 30-day mortality
- 30-day mortality + angina or infarction extension.
- 6-month / one-year readmission for unstable angina, reinfarction, heart failure, severe arrhythmias, or cardiovascular death, other-cause death.

4.1 Potential predictors: individual level

- mean age
- proportion of patients of female gender
- “ “ “ with hypertension
- “ “ “ with diabetes
- “ “ “ with history of CVD

Consider multilevel logistic mixed regression analyses with random and fixed effects.

4.2 Potential predictors: hospital level

- **university hospital**
- **on-site catheterization laboratory**
- **on-site cardiac surgery**

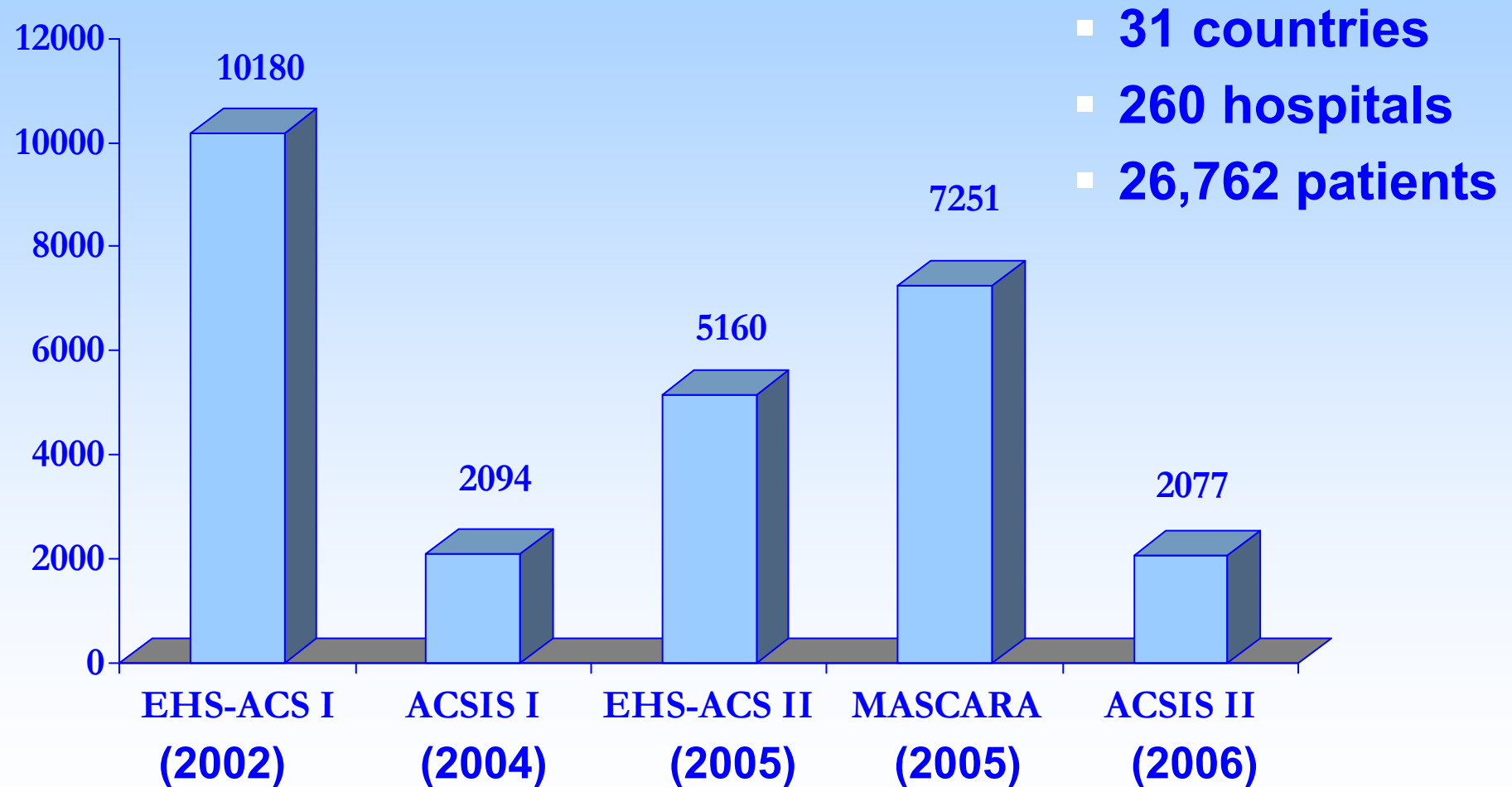
4.3 Potential predictors: country level

- Yearly gross national income per capita (x 1000\$)
- life expectancy at birth
- age-adjusted coronary heart disease mortality rates (x 100,000)

http://www.who.int/whosis/database/core/core_select.cfm



5. Sources of data

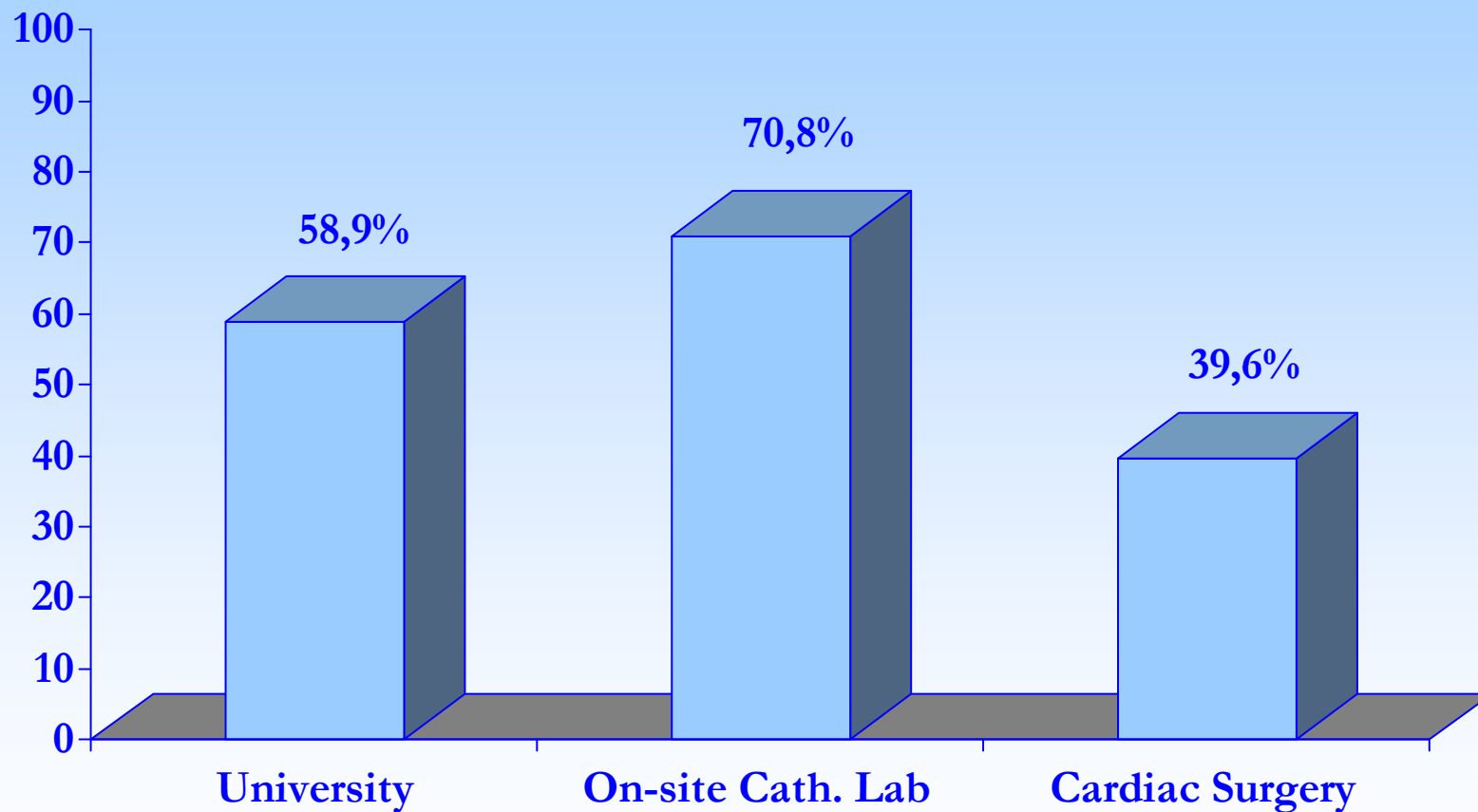


Total patients included 26.762

5. Countries per classes of n. patients

35-99	Estonia, Romania , Turkey, Ukraine
100-249	Belgium, Bulgaria, Croatia, Denmark, Ireland, Norway, Serbia&Montenegro, Switzerland
250-499	Austria, Finland, Georgia, Hungary, Lithuania, Slovenia
500-999	Czech Republic, France, Greece, Portugal, Russia, Sweden, UK
1000-1999	Germany, Italy, Netherlands, Poland
>4000	Israel, Spain

5. Hospitals per type of characteristic



5. The model

GOAL: predict in-hospital mortality rate for a given hospital.

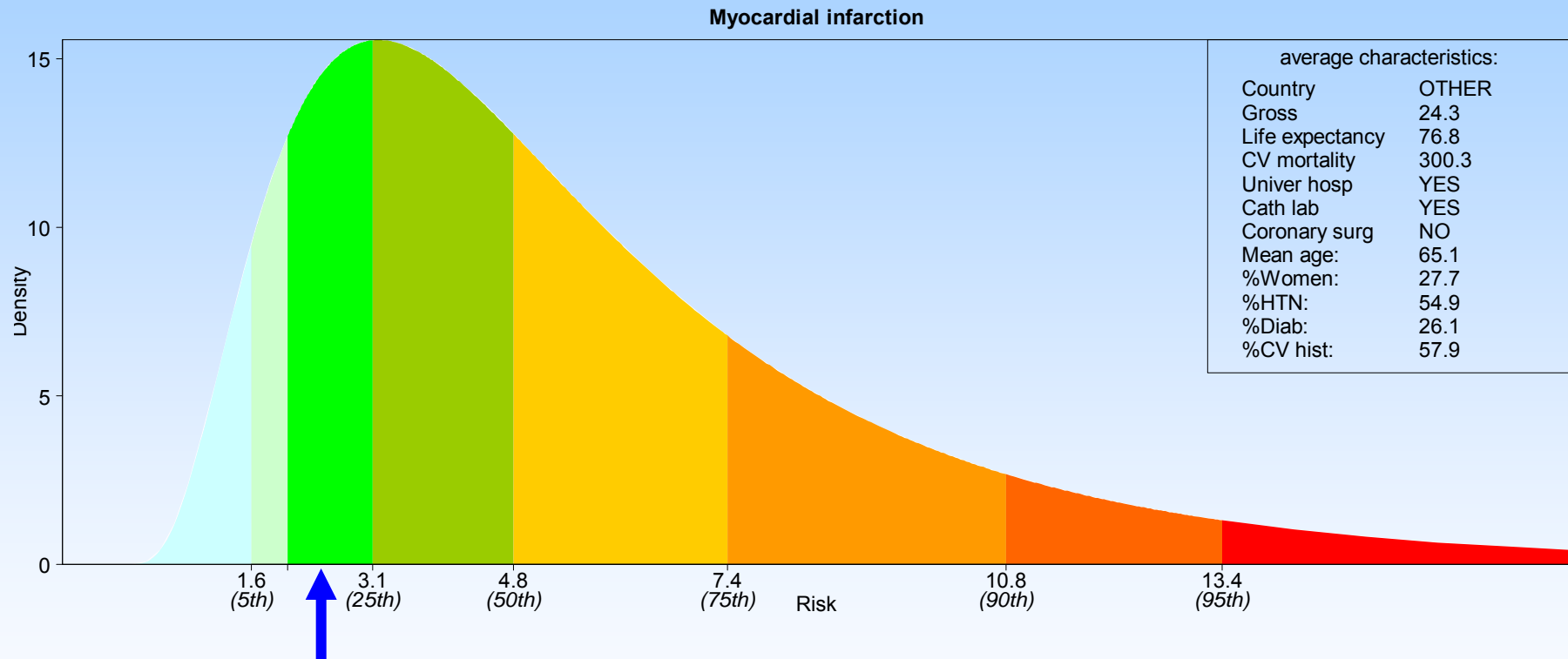
- After fitting the model to the sample data, estimations of parameters are obtained: $\hat{\mu}$, $\hat{\beta}$, $\hat{\sigma}_C$, $\hat{\sigma}_H$.

They are used to perform the predictions.

$$P_d = \frac{1}{1 + e^{-(\bar{X}^* \bar{\beta} + \mu + q)}}$$

- The given hospital will be always anonymous,
 - ➔ This introduce uncertainty in the prediction
 - ➔ **The prediction will not be a single number but a random variable with a range of probable numbers.**
- Remember: $\text{logit}(p) = \mu + \beta x + C + H$
If we don't know the hospital, the value of H is unknown.
But its distribution is assumed to be $N(0, \sigma_H)$.

5. Model output: the prediction



2.2% observed in-hospital mortality rate

According to the model and the data, this given hospital is in the best quartile of hospitals with the same characteristics (patients and hospital variables) and the same country.

5. Model output: prediction utility

The tool gives a reference of what is the expected range of mortality rates in a hospital with the proposed characteristics receiving patients with the described individual characteristics in the corresponding country



Philosophy of the benchmarking system

- **Confidentiality:**
 - the mortality rate of tested hospital is not required.
 - Hospital identity is not required
- **Self-test oriented**
- **When validated, or during the validation process, European hospital participation will be requested**



CV tool β version

- Available only in the restricted area
- Proper validation with real data from a number of hospitals in Europe
- Periodical update may be necessary (therapeutic, and country and hospital characteristics change rapidly), data refer to 2000
- Guarantee confidentiality, but may also be open to active participation in a continuous validation procedure with real individual data and case-fatality rates, that can be added-up to the existing registry data-bases



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From EUPHORIC to EURHOBOP

- The β function available in the restricted area of EUPHORIC will be included in a specific area of the EURHOBOP website
- Partners will be given a specific ID to test the function and transmit the collected data
- In close cooperation with HOPE EU hospitals will be informed about the objectives of EURHOBOP and their potential contribution (dissemination of the leaflet)
- Hospitals willing to test the function will be allowed with different level of access (anonymous benchmarker, registered benchmarker)



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Thank you!



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