EUropean Public Health Outcome Research
and Indicators Collection
(G.A. 2003134)

ATTACHMENT 4

**DELIVERABLE N. 4
Indicators submitted to ECHIM
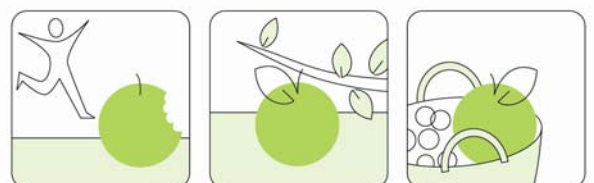To be considered in the short list**

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

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Health and Consumer Protection Directorate General

Deliverable N. 4

Indicators submitted to ECHIM
to be considered in the short list

November 2007

Online information about the European Union in 23 languages is available at: http://europa.eu

Further information on the Health and Consumer Protection Directorate-General is available at: http://ec.europa.eu/dgs/health_consumer/index_en.htm

The EU Public Health Portal : http://health.europa.eu

Main beneficiary

Istituto Superiore di Sanità, Italy

Associated beneficiaries

EFORT/EAR Verein zur Unterstützung der Tätigkeit von nationalen Endoprothesenregistern, Austria

Sosiaali-ja terveysalan tutkimus-ja kehittämiskeskus, Finland

National and Kapodistrian University of Athens, Greece

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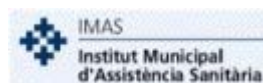
Institut Municipal d'Assistencia Sanitaria, Spain

Karolinska Institutet, Sweden

Collaborating partners

National Center of Public Health Protection, Bulgaria

Catalan Agency for Health Technology Assessment and Research, Spain

Slovak Arthroplasty Register, Slovak Republic

Arthroplasty Register Tyrol, Austria

Ludwig Boltzmann Institut for Health Technology Assessment, Austria

French Society of Orthopaedic and Trauma Surgery, France

BQS Bundesgeschäftsstelle Qualitätssicherung gGmbH, Germany

Israel Society for the Prevention of Heart Attacks at NRCI, Israel

ECHIM *Indicator name*	**B) Health status** AMI
Definition for indicator	1) In Hospital Deaths Following Admission To Hospital With An Acute Myocardial Infarction 2) Death Within 30 Days Of Admission To Hospital With An Acute Myocardial Infarction
Calculation of the indicator (numerator, denominator)	1) NUMERATOR: The number of emergency admissions for patients, aged over 18, with a primary diagnosis of AMI on admission, where the patient dies in hospital (before the discharge). DENOMINATOR: The number of emergency admissions for patients, aged over 18, with a primary diagnosis of AMI. 2) NUMERATOR: The number of emergency admissions for patients, aged over 18, with a primary diagnosis of AMI on admission, where the patient dies in hospital and after discharge between 0-29 days (inclusive) of admission. DENOMINATOR: The number of emergency admissions for patients, aged over 18, with a primary diagnosis of AMI.
Additional underlying concepts	30-day mortality may be substituted by in-hospital mortality given the fact that typically, patients are followed up to the discharge time and not 30 days which is a convenience for prospective research 1) In hospital mortality rates may vary among different organizations because of different discharge policies: lower rates could be observed for hospitals where discharges occur earlier. 2) 30-day mortality rate is a more accurate indicator than in-hospital mortality rate because it is less susceptible to different discharge policies (lower rates could be observed for hospitals where discharges occur earlier).
Relevant dimensions (subgroups)	Women are known to have worse outcomes than men after myocardial infarction. Proper adjustment for severity and comorbidity may be required. Country (region), age, sex, trust
(preferred) data source(s)	Discharge records & hospital registries when existing to update the reference for benchmarking 1) Discharge records 2) Discharge records, Clinical studies, Register At present, information about this issue is available on the EUPHORIC database only for Spain, Greece, Finland, Sweden, Italy
Rationale	It has been demonstrated that appropriate treatment of acute myocardial infarction can substantially reduce mortality.
Data availability, quality, periodicity	Usually recorded in administrative/systematic hospital discharge data bases as a diagnosis. Assessment every 5 years recommended. Comorbidity adjustment factors may be missing in administrative data. At present, information about this issue is available on the EUPHORIC database only for Spain, Greece, Finland, Sweden, Italy
References	Tu JV, et al. Development and validation of the Ontario acute myocardial infarction mortality prediction rules. J Am Coll Cardiol 2001;37:992-7. Bundorf MK, et al. Impact of managed care on the treatment, costs and outcomes of fee-for-service Medicare patients with acute myocardial infarction. Health Serv Res 2004;39:131-52. Núñez JE, et al. [Valor pronóstico del índice de comorbilidad de Charlson a los treinta días y a un año después del infarto agudo de miocardio]. Rev Esp Cardiol 2004;57:842-9. Krumholz HM,et al. An administrative claims model suitable for profiling hospital performance based on 30-day mortality rates among patients with an acute myocardial infarction. Circulation 2006;113:1683-92. Sendra Gutiérrez JM, et al. Desarrollo de un modelo de ajuste por el riesgo para el infarto agudo de miocardio en España: comparación con el modelo de Charlson y el modelo ICES. Aplicaciones para medir resultados asistenciales. Rev Esp Salud Pública 2006;80:665-677. Marrugat J, Sanz G, Masià R, Valle V, Molina L, Cardona M, Sala J, Serés L, Szescielinski L, Albert X, Lupón J, Alonso J, for the RESCATE Investigators. Six-month outcome in patients with myocardial infarction initially admitted to tertiary and nontertiary hospitals. J Am Coll Cardiol. 1997; 30: 1187-1192.
Work to do	Implementation in EUPHORIC CV pilot due by end 2008

ECHIM Indicator name	**B) Health status** CABG
Definition for indicator	1) Rate of deaths occurring in hospital after Coronary Artery Bypass Graft (CABG) 2) Rate of deaths occurring (both in hospital and following discharge) within 30 days of a Coronary Artery Bypass Graft (CABG)
Calculation of the indicator (numerator, denominator)	1) NUMERATOR: The number of ordinary admissions with CABG where the patient dies in hospital (before the discharge). DENOMINATOR: The number of ordinary hospital admissions where CABG was performed. 2) NUMERATOR: The number of ordinary admissions with CABG where the patient dies in hospital (before the discharge). DENOMINATOR: The number of ordinary hospital admissions where CABG was performed.
Additional underlying concepts	1) In hospital mortality rates may vary among different organizations because of different discharge policies: lower rates could be observed for hospitals where discharges occur earlier. 2) Mortality rates may vary from different organizations because different discharge politic; hospitals/populations where discharges occur earlier could present lower rates but this could not means better performances. For these reasons is more appropriate to consider 30 days mortality rates rather then in hospital rates when comparing hospitals and/or organizations.
Relevant dimensions (subgroups)	Women are known to have worse outcomes than men after myocardial infarction. Proper adjustment for severity and comorbidity may be required. Country (region), age, sex, trust
(preferred) data source(s)	Discharge records & hospital registries when existing to update the reference for benchmarking 1) Discharge records 2) Discharge records, Clinical studies, Register At present, information about this issue is available on the EUPHORIC database only for Spain, Greece, Finland, Sweden, Italy
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 related with shortcomings in health care as well. This indicator could be useful to prevent such potentially avoidable deaths comparing mortality rates of different hospitals/populations and identifying situations where the number of observed deaths results higher/lower than expected.
Data availability, quality, periodicity	Usually recorded in administrative/systematic hospital discharge data bases as a diagnosis. Assessment every 5 years recommended. Comorbidity adjustment factors may be missing in administrative data. At present, information about this issue is available on the EUPHORIC database only for Spain, Greece, Finland, Sweden, Italy

ECHIM *Indicator name*	**B) Health status** CABG *continued*
References	Hannan EL, et al. Coronary artery bypass surgery: the relationship between inhospital mortality rate and surgical volume after controlling for clinical risk factors. Med Care 1991;29:1094-107. Higgins TL, et al. Stratification of morbidity and mortality outcome by preoperative risk factors in coronary artery bypass patients. A clinical severity score. JAMA 1992;267:2344-2348. O'Connor GT, et al. Multivariate prediction of in-hospital mortality associated with coronary artery bypass grafo surgery. Circulation. 1992;85:2110-8. Hannan EL, et al. Improving the outcomes of coronary artery bypass surgery in New York State. JAMA. 1994;271:761-766. Ghali WA, et al. Searching for an improved clinical comorbidity index for use with ICD-9-CM administrative data. J Clin Epidemiol 1996;49:273-8. Plogman PL, et al. Anthem Blue Cross and Blue Shield's coronary services network: a managed care organization's approach to improving the quality of cardiac care for its members. Am J Manag Care 1998;4:1679-86. Ivanov J, et al. Ready-made, recalibrated, or Remodeled? Issues in the use of risk indexes for assessing mortality after coronary artery bypass graft surgery. Circulation 1999;99:2098-104. Shroyer AL, et al. The 1996 coronary artery bypass risk model: the Society of Thoracic Surgeons Adult Cardiac National Database. Ann Thorac Surg 1999;67:1205-8. Charlesworth DC, et al. for The Northern New England Cardiovascular Disease Study Group. Development and validation of a prediction model for strokes after coronary artery bypass grafting. Ann Thorac Surg 2003;76:436-43. Hannan EL, et al. Do hospital and surgeons with higher coronary artery bypass graft surgery volumes still have lower risk-adjusted mortality rates? Circulation. 2003;108:795-801. Likosky DS, et al; Northern New England Cardiovascular Disease Study Group. Intra- and postoperative predictors of stroke alter coronary artery bypass grafting. Ann Thorac Surg 2003;76:428-34. Peterson ED, et al. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291:195-201. Ugolini C, Nobilio L. Risk adjustment for coronary artery bypass grafo surgery: an administrative approach versus EuroSCORE. Int J Qual Health Care 2004;16:157-64. Cram P,et al. Cardiac revascularization in specialty and general hospitals. N Engl J Med 2005;352:1454-62 Ferreira-Gonzalez IJ, et al; ARCA study group. Outcomes in off-pump vs. on-pump coronary artery bypass grafting stratified by pre-operative risk profile: an assessment using propensity score. Eur Heart J 2006;27:2473-80. Novick RJ, et al. Direct comparison of risk-adjusted and non-risk-adjusted CUSUM analyses of coronary artery bypass surgery outcomes. J Thorac Cardiovasc Surg 2006;132:386-391. Selim AJ, et al. Use of risk-adjusted change in health status to assess the performance of integrated service networks in the Veterans Health Administration. Int J Qual Health Care 2006; 18:43-50.
Work to do	Implementation in EUPHORIC CV pilot considering only the patients with diagnosis of infarction, due by end 2008

ECHIM Indicator name	**B) Health status** Revision Rate
Definition for indicator	Rate of Revision surgery (ICD9-CM: 81.53) at a defined follow up period.
Calculation of the indicator (numerator, denominator)	NUMERATOR: Number of Revisions (= Exchange or removal of at least a part of the implant) at Follow up period X DENOMINATOR: Total Number of primary implantations included in the evaluation sample
Additional underlying concepts	Definition of a revision is when at least a part of the implant has to be removed. Thesaurus: Survival rate (=1 - Revision rate) is often used as a synonym This indicator is presented at Kaplan-Meier Survival curves with the follow up period at the x-axis and an implant of surgical procedure at the y-axis. For adjustment in general Cox-regression analyses are used, but these procedures are not standardised by now in detail in the different national and regional European projects.
Relevant dimensions (subgroups)	In general the charts are adjusted to influence factors like gender, age or geographical regions.
(preferred) data source(s)	Arthroplasty Registers
Rationale	The goal of lifelong proper function is of highest importance for the exception by the patient, but also by surgeon and public health institutions. Even most of the patients are able to meet these exceptions the number of failures should be decreased to a minimum. The differences in revision rates between implants, medical procedures and health systems are high and have multifactor reasons. In general the time period between primary surgery and revision surgery has a high variety and a long term perspective. Revision surgery is a relatively rare procedure, but related with high impact on the quality of life of the patient and high costs for the public health budgets. According to an agreement among orthopaedic societies an up to date implant is required to have at least 95% survival rate after 10 years of follow up (= max. 5% revision rate). Additionally to the crude revision rate it is important to get access to information about the reasons for failure for analyses and quality control issues.
Data availability, quality, periodicity	By the present date data at national level are available in countries running a national arthroplasty register. A summary of information is available online at the EFORT-portal (http://www.efort.org/E/05/01-50.asp). The evaluation methods are similar, but not completely standardised.
References	Consensual agreement at the Scientific Board, European Arthroplasty Register (EAR www.efort.ear.org)
Work to do	The EUPHORIC-project final report will include a summary of the evaluation methods and a proposal for a future standard. The National Arthroplasty Registers in Europe are already included in a cooperation network, the European Arthroplasty Register (EAR). Common standards can be introduced by this way. A European structure for hosting the data, evaluations and reporting should be developed. EAR already started to establish procedures, achieve the agreement of the national partners and to sign contracts to realise the legal base for the transfer of data, data security and data handling. This activities should be synchronised with EU-requirements and activities.

ECHIM *Indicator name*	**B) Health status** Revision Burden Rate
Definition for indicator	Ratio between revision surgery and all the interventions in a defined geographical area
Calculation of the indicator (numerator, denominator)	NUMERATOR: Number of Revisions (= Exchange or removal of at least a part of the implant) in a period DENOMINATOR: Number of primary and revision operations in the same period
Additional underlying concepts	Definition of a revision is when at least a part of the implant has to be removed.
Relevant dimensions (subgroups)	This indicator is presented as a ratio referring to periods and geographical regions in general. This indicator could be used for defined cohorts of institutions too, but a proper adjustment to the background referred is recommended
(preferred) data source(s)	Arthroplasty Registers, Discharge Records, if comprehensive Register datasets are not available.
Rationale	The goal of patients, physicians and health institutions when implanting a medical device is in high amount to remain in the human body the entire life time. Based on this precondition every revision surgery related to the medical device has to be stated as a failure. The ratio between revisions and all the interventions is a valid general indicator concerning the quality of the medical service. Some limitations should be taken into consideration, first the fact that for most of the medical devices the period between primary intervention and revision surgery is long. Changes in the numbers of primary operations have an impact on the revision burden figures. Increasing numbers of primary implantations are decreasing the revision burden figures since the number of revision is based on a minor cohort from the past. For interpretation of revision burden figures it is recommended to take the development of primary interventions into account.
Data availability, quality, periodicity	Currently this indicator can be calculated from the information included in the annual report of National Arthroplasty Registers for the countries running specific projects. A summary of websites is available online at the EFORT-portal (http://www.efort.org/E/05/01-50.asp). Since not all the National Arthroplasty Registers have already published Reports, additional information has to be requested by direct contact. The European Athroplasty Register network is routinely in contact with all the national projects and confirms its cooperation on these activities. Discharge records are an other possible data source, but with inferior quality due to a less accurate definition of the intervention mainly in revision surgery. The main advantage in using this dataset is the interoperability since in this way it should be possible to collect standardised information in all countries due to the standardisation and common use of ICD-codes.
References	Consensual agreement at the Scientific Board, European Arthroplasty Register (EAR www.efort.ear.org)
Work to do	Description of a data collection and evaluation procedure and available data sources. Development of Arthroplasty Registers in all EU member states.