

## Indicators list

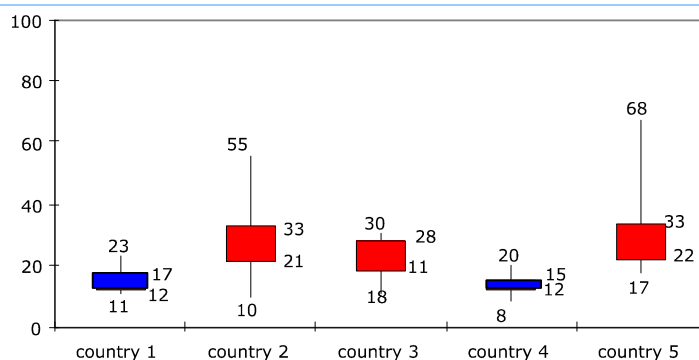
|  |
|--|
| C-section rate                               |
| Patient based stroke 30 day in-hospital      |
| Patient based AMI 30 day in-hospital         |
| Post-operative thromboembolism               |
| Use of blood components                      |
| Day surgery rate                             |
| Smoke free hospital audit                    |
| AMI patients prescribed aspirin at discharge |
| Prophylactic antibiotic use                  |
| Length of stay                               |
| Operating theatre performance                |
| Needle-stick injuries                        |
| Exclusive breastfeeding                      |

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| Short name       | C-section rate  |   |
|------------------|---|---|
| Detailed name    | Detailed name   | Rate of c-section after exclusion of deliveries with high risk of c-section.  |
| Short definition | Short definition  | Number of c-section over the total number of live births, expressed as a percentage. Categories of deliveries with a high risk of c-section are excluded (pre-term, foetal death, multiple, breech, abnormal presentation).   |
| Rationale        | Rationale (including justification, strengths and limits) | <p>Rationale:</p> <ol style="list-style-type: none"> <li>1) C-section is the most common operative procedure in many industrialized countries. In 2002, in Europe, c-section rate ranged from 6.2 to 36% with an average of 19% (1) and those rates are steadily rising in most countries in the European Region. Those figures are well above the WHO recommendations to maintain rates no higher than 10-15% (2). Though the optimal rate of c-section remains controversial, in developed countries with a rate substantially higher to 15%, the attention has focused on strategies to reduce use due to the concern that higher c-section rates do not bring additional health gain but may increase maternal risks, have implications for future pregnancies and have resources implications for health services (1). This indicator may address large potential for quality improvement in a number of settings.</li> <li>2) The burden of data collection is low. This indicator is built on data readily available in administrative database (discharge abstract) in most countries and is already regularly being monitored. There is a high consensus on use.</li> <li>3) Data-driven quality improvement initiatives have supported decrease in the rate of c-section (3, 4).</li> </ol> |

|                          |   |
|--------------------------|---|
| Operational definition   | <p><b>Numerator</b></p> <p>Total number of deliveries at the denominator with c-section as procedure code (Appendix A)</p> <p><b>Denominator</b></p> <p>Total number of deliveries</p> <p><b>Exclusion</b></p> <p>Delivery before the 37<sup>th</sup> week of gestation, foetal death, multiple gestation, breech procedure, abnormal presentation (Appendix B)</p>   |
| Previous PATH experience | <p>International results and discussion on this indicator can be found in the PATH Newsletter 4.</p> <p>The definition of the c-section indicator is identical for PATH-pilot, PATH-II and PATH'09. However, in PATH-II, the codes for inclusion and exclusion criteria were not specified. In PATH-II, it was suggested to complement the c-section indicator with measures of repeat c-section (number of vaginal deliveries over number of deliveries with previous c-section) and primary c-section (number of c-section over number of primary deliveries). Those two tailored indicators were measured by only few hospitals, on an ad-hoc data collection for a limited time period (and hence limited number of cases that make) and reliability of data was low because of poor understanding of the definition. Hence, it was decided not to include those two tailored indicator in PATH'09.</p> <p>In PATH-II, extremely seldom did hospitals present c-section rates below 10%. Countries 2, 3, and 5 (figure 1, red) tended to have a higher rate (median and mean) as well as a wider dispersion (inter-quartile and standard deviation) compared to countries 1 and 4 (figure 1, blue). This might signal generally better practices in countries 1 and 4 with more homogeneity in the process around a more accepted median or mean rate. If socio-cultural factors (mother-induced c-section for non clinical reasons) can contribute to higher rates in some countries, it does not explain wider variations in those same countries. However, the seemingly better results in countries 1 and 4 might also be explained by homogeneous patient populations in both countries and question the reliability of exclusion criteria identified from administrative database and coding practices in countries 2, 3, and 5. In PATH-II, some hospitals indicated that they were not able to identify the exclusion criteria and some relied on other sources (ward medical document).</p> <p>In PATH-II, mother-induced demand (caesarean delivery on mother request – a request at term in the absence of medical or obstetrical indications) was repeatedly cited in several countries as the main driver for high c-section rates, especially in primary deliveries. This observation confirms numerous commentaries in the medical literature suggesting that consumer demand contributes significantly to continued rise of births by caesarean section internationally (5). However, a review of the literature (2000-2005), highlights that only a small number of women request a c-section. Women's preferences for c-section varied between 0.3 and 14% with only 3 studies looking directly into these preferences without clinical indication (5).</p> |



**Figure 1:** International comparison on average C-section rate within country (min, quartile 1, quartile 3, max, in %)

#### Data source

Retrospective data collection on administrative database (discharge abstracts).

This indicator is computed for the last 3 years available (2006, 2007, 2008) or the three last available years. If the data is retrieved manually from paper database, the indicator can be computed based on a sample (all deliveries meeting the inclusion and exclusion criteria for the months of e.g. October and February 2006, 2007 and 2008). The PATH Coordinator in the Country should be informed of the sampling procedure.

**Patient-level data** (one record for each patient) is to be sent to the PATH Coordinator in the Country (PCC). For each patient, it includes relevant data for the calculation of the numerator and denominator (specification of inclusion/exclusion criteria) and may also include fields on age of the mother, day/time of delivery, obstetrician, assurance status, etc. Those additional fields are to be discussed at the national level depending on availability of the data (ease to retrieve) and relevance in the context of the country.

The coding practices should be discussed among participating hospitals to assess how much the exclusion criteria are specified in the discharge abstracts or if alternative sources of information need to be retrieved on an ad-hoc basis.

#### Domain

This indicator is multidimensional as it addresses:

- Clinical effectiveness: appropriateness of medical care.
- Patient safety: maternal and infant risks related to inappropriate (over and under) use of c-section, physician defensive practice.
- Efficiency: higher utilization of resources for C-section than vaginal deliveries.
- Responsive governance: access, availability.
- Patient centeredness: patient informed choice, physician responsibility in providing balanced information and honouring patient choice for elective c-section.

#### Type of indicator

Process measure

|                               |  |
|-------------------------------|--|
| Adjustment/<br>stratification | <p>No risk-adjustment. Risk-adjustment of caesarean birth rate is hampered by inadequacies in the existing secondary data sources or by the need for extensive chart reviews. Hence, it is not proposed for this purpose. Great caution should be used when interpreting the results as it has been demonstrated that risk-adjustment might have a substantial impact on “ranking” hospitals (6, 7). By excluding some deliveries with high risk of c-section, the indicator though is somewhat reducing the variability in patient characteristics.</p> <p>It is suggested to compare the per cent of deliveries excluded at the denominator out of the total number of deliveries. This measure might reflect differences in case-mix or differences in how exclusion criteria are identified and coded in the discharge abstracts or from alternative sources. Hence, it is advisable to compare this measure for different levels of care (e.g. university hospital with neonatal intensive care vs. community hospital). It should then be discussed among the group of participating hospitals if the differences do indeed represent differences of case-mix (complex deliveries oriented to higher level of care).</p> <p><i>Stratification in subgroups is suggested for benchmarking of c-section rates between units and for auditing results of total c-section rate (Robson Classification) (8, 9).</i></p> |
| Sub-indicators                | <ul style="list-style-type: none"> <li>- By age categories of the mother (less 20, 20-35, more 35).</li> <li>- By assurance status of the mother (if relevant to the country).</li> <li>- By elective vs. emergency or proxy: day of the week, time of the day.</li> <li>- By categories for BMI of the mother.</li> <li>- By categories for weight of the newborn.</li> <li>- By parity (primary/not).</li> </ul>   |
| Related indicators            | <ul style="list-style-type: none"> <li>- Length of stay for patient (mother) at numerator, for patient (mother) at denominator with vaginal delivery, and for all patient (mother) at denominator</li> <li>- Deep vein thrombosis</li> </ul> <p>The following indicators are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to the rate of c-section:</p> <ul style="list-style-type: none"> <li>- APGAR score at birth</li> <li>- Antibio prophylaxis before elective c-section</li> </ul>   |

## Interpretation

Limit: Because of the numerous factors that affect the rate of c-section and because there is no "gold standard" on optimal c-section rate, this indicator is difficult to interpret. Both very low rates and very high rates should be scrutinized to understand the reasons for variations.

The indicator is difficult to interpret because of the numerous drivers for c-section (clinical factors but also cultural and socio-economic factors) and because there is little consensus on optimal c-section rate. This indicator is bi-directional. It means that both high and low rate should be scrutinized. Selection bias is expected (high risk pregnancies concentrated in some facilities, mother choosing their physician to fit their preference in terms of c-section or vaginal delivery).

Hence, the best reference point is oneself:

***It is crucial to look at the evolution over time and understand what factors might affect the trends.***

Comparison between hospitals within a same country might be relevant to identify some best practices; understand why c-section rate is stable in some hospital while the general trend is a (sharp) increase in c-section. International comparisons are of less value because of the numerous external factors (cultural, socio-economic) that might affect the outcome and which contributions are very difficult to isolate or make explicit.

A number of organizational factors such as the type of on-call, the level of paediatric services and the architecture of maternities exert a strong impact and a significant effect on the rate of c-section (10).

A number of strategies have a demonstrated impact on reduction of c-section rates such as audit and feedback, quality improvement, and multi-faceted strategies, while quality improvement based on active management of labour showed mixed effect, in a meta-analysis (11). It was also demonstrated that prospective identification of efficient strategies and barriers to changes is necessary to achieve a better adaptation of intervention and to improve clinical practice guidelines implementation (12).

With a patient orientation perspective, when comparing c-section, it is suggested to also comparing the procedure to obtain and content and quality of information provided to pregnant mothers on the risks and benefits of c-section. A comparison of the content of the informed consent form is relevant (see for instance, UK Royal College of Obstetricians and Gynaecologists, draft informed consent for c-section – 13). Fear for the mother or for the baby appear to be major factors' behind a mother's request for caesarean section, coupled with the belief that caesarean section was safest for the baby (12). Hence, mother counselling is a key in acknowledging women's preferences while providing most adequate care.

Complementary measures for further scrutiny – to investigate outliers:

Key specific measures/data to investigate the cause of outliers:

|            |  |
|------------|--|
|            | <ul style="list-style-type: none"> <li>- Subgroup (Robson) analysis</li> <li>- Proportion by category of urgency (immediate threat to the life of the mother or foetus)</li> <li>- maternal or foetal compromise that is not immediately life threatening,</li> <li>- mother need early delivery but no maternal or foetal compromise, Delivery timed to suit the mother and the staff) (classification according to the National Confidential Enquiry into Perioperative Deaths NCEPOD)</li> <li>- Time distribution of c-section (e.g. weekday/weekend)</li> <li>- Surgeon/Obstetrician specific rates</li> <li>- Rate of epidural use</li> <li>- Proportion of failed vaginal delivery after c-section</li> <li>- Labour induction</li> <li>- Presence of unit guidelines for indication of c-section</li> <li>- Presence of material supporting women in informed choice</li> </ul>  |
| Guidelines | NICE guideline: <a href="http://www.nice.org.uk/nicemedia/pdf/CG013fullguideline.pdf">http://www.nice.org.uk/nicemedia/pdf/CG013fullguideline.pdf</a>  |
| References | <p>(1) Betrán AP, Meriáldi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, Wagner M. Rates of caesarean section: analysis of global, regional and national estimates. Paediatric and Perinatal Epidemiology, 2007;21: 98-113.</p> <p>(2) World Health Organization. Appropriate technology for birth. Lancet 1985; 2:436-437. AHRQ Quality/Patient safety indicators <a href="http://www.qualityindicators.ahrq.gov">.http://www.qualityindicators.ahrq.gov</a></p> <p>(3) Kazandjian VA, Lied TR. Cesarean section rates: effects of participation in a performance measurement project. Joint commission Journal on Quality Improvement 1998;24(4):187-196.</p> <p>(4) Main EK. Reducing cesarean birth rates with data driven quality improvement activities. Pediatrics 1999; 103 (1supp.E):374-383.</p> <p>(5) McCourt C, Weaver J, Statham H, Beake S, Gamble J, Creedy DK. Elective cesarean section and decision-making: a critical review of the literature. Birth 2007;34 (3):273-274.</p> |

(6) Aaron DC, Harper DL, Shepardson LB, Rosenthal GE. Impact of risk-adjusting cesarean delivery rates when reporting hospital performance. *Journal of the American Medical Association* 1998;279:1968-1972.

(7) Pasternak DP, Pine M, Nolan K, French R. Risk-adjusted measurement of primary cesarean sections: reliable assessment of the quality of obstetrical services. *Quality Management in Health Care* 1999;8(1):47-54. 1999

(8) Robson MS. Classification of caesarean sections. *Fetal and Maternal Medicine Review* 2001; 12(1) 23-39)

(9) McCarthy FP, Rigg L, Cady L, Cullinane F. A new way of looking at caesarean section births. *Australian and New Zealand Journal of Obstetrics and Gynaecology* 2007;47:316-320.

(10) Naiditch M, Levy G, Chale JJ, Cohen H, Colladon B, Maria B, Nisand I, Papiernik E, Souteyrand P. Cesarean sections in France: impact of organizational factors on different utilization rates (French). *Journal de Gynécologie, Obstétrique et Biologie de la Reproduction* 1997;26(5):484-495.

(11) Chaillet N, Dumont A. Evidence-based strategies for reducing caesarean section rates: a meta-analysis. *Birth* 2007;34(1):53-64.

(12) Chaillet N, Dubé E, Dugas M, Audibert F, Tourigny C, Fraser WD, Dumont A. Evidence-based strategies for implementing guidelines in obstetrics: a systematic review. *Birth* 2007;34(1):65-79.

(13) <http://www.rcog.org.uk/womens-health/consultation-documents>

**Appendix A: Numerator - Inclusions****Name**

INCLUDE - ICD-9-CM Cesarean delivery procedure codes:

|                        |       |
|------------------------|-------|
| CLASSICAL C-SECTION    | 74.0  |
| LOW CERVICAL C-SECTION | 74.1  |
| EXTRAPERITONEAL C-SECT | 74.2  |
| CESAREAN SECTION NEC   | 74.4  |
| CESAREAN SECTION NOS   | 74.99 |

**Appendix A: Numerator - inclusions****Name**

INCLUDE - ICD-10 codes:

|           |     |
|-----------|-----|
| C-SECTION | O82 |
|-----------|-----|

**Appendix B:****Denominator - Exclusions****ICD-10 Code****Name**

|  |  |
|--|--|
| <b>O30 (O30.0, O30.1, O30.2, O30.8, O30.9)</b> | Multiple gestation   |
| <b>O31.1</b>                                   | Complications specific to multiple gestation                           |
| <b>O32.1</b>                                   | Maternal care for known or suspected malpresentation of fetus          |
| <b>O32.2</b>                                   | -  |
| <b>O32.3</b>                                   | -  |
| <b>O32.5</b>                                   | -  |
| <b>O36.4</b>                                   | Maternal care for intrauterine death                                   |
| <b>O60</b>                                     | Preterm labour   |
| <b>O63.2</b>                                   | Delayed delivery of second twin, triplet, etc.                         |
| <b>O64.5</b>                                   | Obstructed labour due to compound presentation                         |
| <b>O66.1</b>                                   | Obstructed labour due to locked twins                                  |
| <b>O75.6</b>                                   | Delayed delivery after spontaneous or unspecified rupture of membranes |
| <b>O81</b>                                     | Single delivery by forceps and vacuum extractor                        |
| <b>P01.5</b>                                   | Fetus and newborn affected by multiple pregnancy                       |
| <b>Z37.1</b>                                   | Single stillbirth  |
| <b>Z37.2</b>                                   | Twins, both liveborn   |
| <b>Z37.3</b>                                   | Twins, one liveborn and one stillborn                                  |
| <b>Z37.4</b>                                   | Twins, both stillborn  |
| <b>Z37.5</b>                                   | Other multiple births, all liveborn                                    |
| <b>Z37.6</b>                                   | Other multiple births, some liveborn                                   |
| <b>Z37.7</b>                                   | Other multiple births, all stillborn                                   |

## Appendix B: Denominator - Exclusion

| Name                      | WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-9) | Name   | WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-9) |
|---------------------------|---|--|---|
| EARLY ONSET DELIV-UNSPEC  | 64420   | TRANSV/OBLIQ LIE-UNSPEC                                      | 65230   |
| EARLY ONSET DELIVERY-DEL  | 64421   | TRANSVER/OBLIQ LIE-DELIV                                     | 65231   |
| TWIN PREGNANCY-UNSPEC     | 65100   | TRANSV/OBLIQ LIE-ANTEPAR                                     | 65233   |
| TWIN PREGNANCY-DELIVERED  | 65101   | FACE/BROW PRESENT-UNSPEC                                     | 65240   |
| TWIN PREGNANCY-ANTEPART   | 65103   | FACE/BROW PRESENT-DELIV                                      | 65241   |
| TRIPLET PREGNANCY-UNSPEC  | 65110   | FACE/BROW PRES-ANTEPART                                      | 65243   |
| TRIPLET PREGNANCY-DELIV   | 65111   | MULT GEST MALPRESEN-UNSP                                     | 65260   |
| TRIPLET PREG-ANTEPARTUM   | 65113   | MULT GEST MALPRES-DELIV                                      | 65261   |
| QUADRUPLLET PREG-UNSPEC   | 65120   | MULT GES MALPRES-ANTEPAR                                     | 65263   |
| QUADRUPLLET PREG-DELIVER  | 65121   | INTRAUTERINE DEATH-UNSP                                      | 65640   |
| QUADRUPLLET PREG-ANTEPART | 65123   | INTRAUTER DEATH-DELIVER                                      | 65641   |
| TWINS W FETAL LOSS-UNSP   | 65130   | INTRAUTER DEATH-ANTEPART                                     | 65643   |
| TWINS W FETAL LOSS-DEL    | 65131   | LOCKED TWINS-UNSPECIFIED                                     | 66050   |
| TWINS W FETAL LOSS-ANTE   | 65133   | LOCKED TWINS-DELIVERED                                       | 66051   |
| TRIPLETS W FET LOSS-UNSP  | 65140   | LOCKED TWINS-ANTEPARTUM                                      | 66053   |
| TRIPLETS W FET LOSS-DEL   | 65141   | DELAY DEL 2ND TWIN-UNSP                                      | 66230   |
| TRIPLETS W FET LOSS-ANTE  | 65143   | DELAY DEL 2ND TWIN-DELIV                                     | 66231   |
| QUADS W FETAL LOSS-UNSP   | 65150   | DELAY DEL 2 TWIN-ANTEPAR                                     | 66233   |
| QUADS W FETAL LOSS-DEL    | 65151   | BREECH EXTR NOS-UNSPEC                                       | 66960   |
| QUADS W FETAL LOSS-ANTE   | 65153   | BREECH EXTR NOS-DELIVER                                      | 66961   |
| MULT GES W FET LOSS-UNSP  | 65160   | MULT PREGNANCY AFF NB  | 7615  |
| MULT GES W FET LOSS-DEL   | 65161   | DELIVER-SINGLE STILLBORN                                     | V271  |
| MULT GES W FET LOSS-ANTE  | 65163   | DELIVER-TWINS, BOTH LIVE                                     | V272  |
| MULTI GESTAT NEC-UNSPEC   | 65180   | DEL-TWINS, 1 NB, 1 SB  | V273  |
| MULTI GESTAT NEC-DELIVER  | 65181   | DELIVER-TWINS, BOTH SB                                       | V274  |
| MULTI GEST NEC-ANTEPART   | 65183   | DEL-MULT BIRTH, ALL LIVE                                     | V275  |
| MULTI GESTAT NOS-UNSPEC   | 65190   | DEL-MULT BRTH, SOME LIVE                                     | V276  |
| MULT GESTATION NOS-DELIV  | 65191   | DEL-MULT BIRTH, ALL SB                                       | V277  |
| MULTI GEST NOS-ANTEPART   | 65193   | <b>ICD-9-CM breech procedure codes</b>                       |   |
| BREECH PRESENTAT-UNSPEC   | 65220   | PART BRCH EXTRAC W FORCP<br>7253 TOT BRCH EXTRAC W<br>FORCEP | 72.51   |
| BREECH PRESENTAT-DELIVER  | 65221   | PART BREECH EXTRACT NEC<br>7254 TOT BREECH EXTRAC<br>NEC     | 72.52   |
| BREECH PRESENT-ANTEPART   | 65223   |  |   |



# Patient based stroke 30 day in-hospital (same hospital) mortality rate

December 2009

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| <b>Short name</b>   | Patient based stroke 30 day in-hospital (same hospital) mortality rate<br><br><i>(Alternative: Admission based stroke 30 day in-hospital (same hospital) mortality rate)</i>  |
| Detailed name   | In-hospital (same hospital) mortality rate within 30 days of hospital admission for stroke (hemorrhagic or ischemic).   |
| Short definition  | Percent of patients admitted ( <i>alternative: percent of admission</i> ) for hemorrhagic or ischemic stroke who died in the hospital within 30 days of admission.  |
| Rationale (including justification, strengths and limits) | <p>Stroke is the third most common cause of death and disability in the industrialized countries. Mortality of patients with stroke represents a significant outcome potentially related to quality of care. This rate-based indicator identifies an undesirable outcome of care. High rates over time warrant investigation into the quality of care provided.</p> <p>Strong rationale, death is an outcome that needs to be avoided</p> <p><i>Strengths:</i> Literature demonstrates clear relationships between clinical processes and procedures and mortality, i.e. mortality is a proxy for good clinical practice. This indicator can to some extent be used to monitor the effect of quality improvement actions.</p> <p><i>Limitations:</i> Rating is strongly affected by risk adjustment procedure, time frame and whether or not deaths after discharge are included. Overall the reliability is dependent on the magnitude of the patient population (unit level) and the quality of coding in administrative databases.</p> |
| Operational definition                                    | <p>Used by OECD Health Care Quality Indicators project.</p> <p><b>Numerator</b></p> <p>Number of deaths <b>in the hospital</b> that occurred within 30 days of initial acute hospital admission among cases at the denominator</p>  |

**Denominator**

All patients admitted (*alternative: all admissions*), age 15 years and older, with the principal/primary diagnoses of stroke (includes ischemic and hemorrhagic stroke):

ICD-9: 430, 431, 432, 433, 434, and 436

ICD-10: I61, I62, I63, and I64

All patients are included, whether transferred or not. In addition, three indicators are computed and reported simultaneously on sub-samples:

- patients not transferred to/from other hospital,
- patients transferred to other hospital,
- patients coming from other hospital.

Such sub-indicators (mortality rate for patient not transferred, for patients transferred from/to another hospital,) might provide additional insights and be included in the reports. It would be also very useful information how many percent of patients belong to these sub-samples. It might be also analysed if transfers were from or to: home / nursing home / rehabilitation hospital / acute care hospital / other.

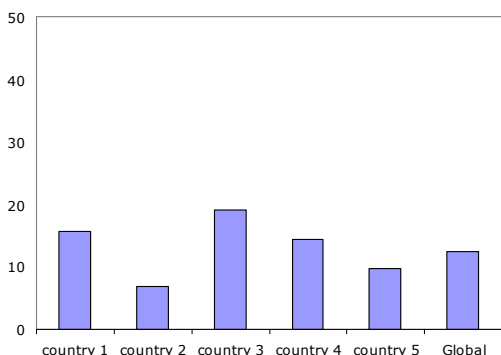
For analysis of indicators and better understanding variations, it is suggested to measure also mortality rate within 24h or 48h and length of stay in hospital (for the initial stay, if readmitted).

Previous PATH experience

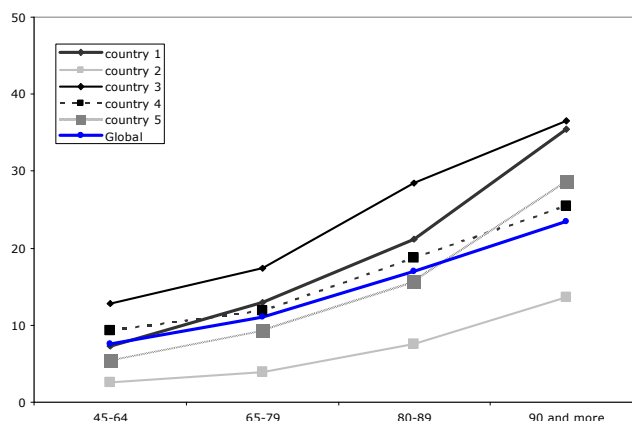
In PATH-Pilot and PATH-II, patients both transferred from another hospital or to another hospital were excluded from both the numerator and denominator. This exclusion criterion has significantly been discussed while looking at the result as part of the proper treatment for QAMI might include temporary transfer to another facility for appropriate invasive examination/treatment if the technology is not available in the hospital where the patient was initially admitted.

In PATH-II, it was initially proposed to adjust for both age and sex. However, sex did not come out as a significant variable to predict mortality. And the predictive value of the logarithmic model solely based on age was extremely low. Hence, based on PATH-II experience, it was agreed that risk-adjustment with such limited information on risk factors does not have much sense and that it is preferable to present results stratified by age and sex categories.

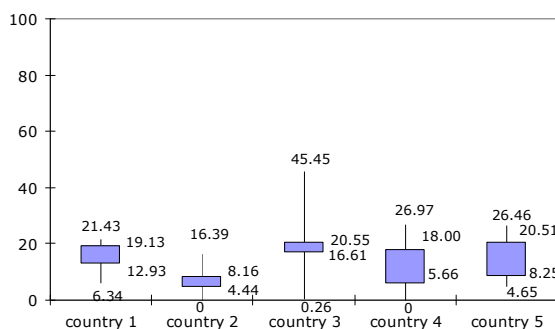
**International comparison on 30-days mortality rate after admission for stroke (rate calculated at the country level)**



**International comparison on 30-days mortality rate after admission for stroke (rate calculated at the hospital level) (boxplot: min, 1<sup>st</sup> quartile, 3<sup>rd</sup> quartile, max)**



**International comparison on 30-days mortality rate after admission for stroke per age category (rate calculated at the country level)**



Data source

Retrospective data collection. Administrative databases (eg. discharge abstracts).

Compute the indicator on three full years to identify potential trends (2006, 2007, 2008) or the three last available years.

It is necessary to have a unique patient identifier in order to be able to trace case fatalities after the patient has been discharged and readmitted to the same hospital. This should be discussed among PATH participating hospitals in the country before implementation of the indicator. Any local adaptation of the definition should be made very explicit and agreed among all hospitals. The PATH Coordinator in the Country should inform the International Secretariat.

→ Alternative definition (if no unique patient identifier): Admission based indicator (see definition above in *italic and underlined*): *in-hospital mortality during initial episode of care*

→ Complementary optional indicator (if hospital database is linked with death registry): 30-days mortality (within hospital or in any other care setting or at home).

Patient level data that should be sent to the PATH Coordinator in the Country are described at appendix 1.

Domain

Clinical effectiveness  
Safety

|                               |  |
|-------------------------------|--|
| Type of indicator             | Outcome measure  |
| Adjustment/<br>stratification | <p>Option 1: stratification</p> <ul style="list-style-type: none"> <li>– reported separately for ischemic/hemorrhagic stroke</li> <li>– stratified by age and sex</li> <li>– stratified by the severity of stroke</li> </ul> <p>Option 2: risk adjustment (degree of complexity of risk adjustment to be decided locally based on available data and sample size)</p> <ul style="list-style-type: none"> <li>– age and sex</li> <li>– co morbidities: diabetes, hypertension, ischemic heart disease, heart failure, pneumonia, urinary catheter related infections, decubitus ulcer or others present at admission</li> <li>– degree of severity of stroke</li> </ul>   |
| Sub-indicators                | By transfer patterns (see operational definition)  |
| Related indicators            | <p>Length of stay</p> <p>The following indicator are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to the case fatality for stroke:</p> <p>Readmission rate</p> <p>Process measures (compliance with guidelines on medical treatment of stroke)</p>  |
| Interpretation                | <p>Improvement is noted as a decrease in the rate.</p> <p>Very low rates may indicate early discharges or transfers, lack of registration of deaths in emergency room settings (and no readmission to the hospital) rather than high quality of care.</p> <p>International studies report wide variations in the in-hospital stroke mortality between and within countries. Data from the Polish Stroke Registry reports variations in in-hospital mortality from 8-36% (1), a European study group found variations in three-month mortality between countries of 17-56% (2) and data from the International Stroke Trial suggest variations in six-month mortality of 18-28% (3). Reasons for variations in in-hospital mortality are related to differences in case-ascertainment and case-mix, but to a large extent may reflect local practices: Hospitals may attract different types of patients or differ in procedures for the admission and discharge of patients.</p> |

|                   |  |
|-------------------|--|
|                   | <p>The definition of this indicator is mapped on OECD health care quality indicators. Hence, the same measure at the national level is available as a reference point in some countries.</p> <p>Literature demonstrates clear relationships between clinical processes and mortality (4-5).</p> <p>Peer groups: Before implementation of the indicator, the participating hospitals in the country could agree on some specific criteria for comparing results based on available technology in the hospital (e.g. stroke unit) or other structural factors.</p> <p>Key specific quality issues which should be addressed (e.g. by medical record review) in units with high (absolute total values above 15%, above 2 standard deviations of the peer group average) mortality:</p> <ul style="list-style-type: none"> <li>- early CT scan to establish the diagnosis and classification of stroke,</li> <li>- multidisciplinary team approach in specialized care units (stroke centre),</li> <li>- monitoring and appropriate treatment of atrial fibrillation including anticoagulation,</li> <li>- timely – within 24h after admission - and appropriate administration of oral antiplatelet agent,</li> <li>- early – within 2 days - initiation of rehabilitation,</li> <li>- frequency of complications reflecting the quality of nursing and rehabilitation: Pneumonia, urinary catheter related infections, decubitus ulcer,</li> <li>- nurse and therapist staffing.</li> </ul> |
| <p>Guidelines</p> | <p>Further information on stroke management and quality improvement:<br/> <a href="http://www.strokecenter.org/prof/guidelines.htm">http://www.strokecenter.org/prof/guidelines.htm</a></p>  |
| <p>References</p> | <p>(1) Ryglewicz, D., Milewska, D., Lechowicz, W et al. Factors predicting early stroke fatality in Poland. Neurological Sciences 24: 301-304, 2003.</p> <p>(2) Wolfe CDA, Tilling, K, Beech R et al. &amp; European Study of Stroke Care Group. Variations in case fatality and dependency from stroke in Western and Central Europe. Stroke 30: 350-356, 1999.</p> <p>(3) Weir NU, Sandercock PAG, Lewis SC, Signorini DF, Warlow CP. Variations between countries in outcome after stroke in the International Stroke Trial (IST). Stroke 32: 1370-1377, 2001.</p> <p>(4) Ingeman A, Pedersen I., Hundborg, H. H. , Petersen, P., Zielke,P., Mainz,J., Bartels,P. and Johnsen S.P. Quality of Care and Mortality among Patients with Stroke: A Nationwide Follow-up Study. Medical Care 2008;46: 63-69.</p> <p>(5) Saposnik G et al. Variables associated with 7-day, 30-day and 1-year mortality of stroke.<br/> <a href="http://OECD.org">http://OECD.org</a> (Health at a glance, technical manuals).</p>  |

## Data to be reported to the coordinator for calculation of the core and complementary indicators

This form is to be used as a stepping stone to define national reporting forms for hospitals that can then be created e.g. into xls sheet or database tool.

### At the patient level (one record per patient)

#### Data from the hospital central database or national database

*Italics underlined for the minimum data for core indicator*

\* for risk-adjustment or for sub-indicators

\*\*to compare process of care and initiate discussion on differences of practice

#### Patient information

1. Patient ID:
2. ICD code principal diagnosis :
3. ICD codes secondary diagnosis (at admission/during stay/)\*: (---/----/----/----/---/---)
4. Age or date of birth:
5. Sex:

#### Admission

6. Date of admission:
7. Admission from (origin of patient)\*:
  - home / hospital or
  - home (home / nursing home) vs hospital (rehabilitation hospital, acute care hospital, other)

#### Patient stay

8. Date of admission or transfer to stroke unit in the hospital (if relevant)\*\*:
9. Date of admission or transfer to rehabilitation department within the hospital (if relevant)\*\*:
10. Procedure codes and date procedures in hospital\*\* (--/---/--/---/--/---)

#### Discharge

11. Death in hospital: yes/no
  12. If yes, date of death:
13. Discharge to (destination of patient)\*:
  - home / hospital or
  - home (home / nursing home) vs hospital (rehabilitation hospital, acute care hospital, other)
14. Date of discharge\*\*

**Additional data if extracted directly from the patient record (on a sample of patients during a short observation period) – optional**

15. Severity of stroke\*

16. Temporary transferred for procedure to other hospital\*\* (yes/no)

17. if yes, date of transfer out

18. if yes, main procedure codes: (---/---/---/---/--/---)

19. if yes, date of return:

**Comorbidities and complications**

20. diabetes\* (yes/no)

21. hypertension\* (yes/no)

22. ischemic heart disease\* (yes/no)

23. heart failure\* (yes/no)

24. pneumonia (yes, present at admission\*, yes, not present at admission\*\*, no)

25. urinary catheter related infections (yes, present at admission\*, yes, not present at admission\*\*, no)

26. decubitus ulcer (yes, present at admission\*, yes, not present at admission\*\*, no)

27. others (to be defined a priori based on risk factors)

**Patient treatment:**

28. CT scan performed\*\*

29. Date CT scan\*\*

30. Administration oral antiplatelet with 24 hours after admission \*\* (yes/no)

31. Rehabilitation\*\* (yes/no)

32. Date of start of rehabilitation\*\*:



# Patient based AMI 30 day in-hospital (same hospital) mortality rate

December 2009

## Contents:

Short name

Detailed name

Short definition

Rationale

Operational definition

Previous PATH experience

Data source

Domain

Type of indicator

Adjustment/ stratification

Sub-indicators

Related indicators

Interpretation

Guidelines

References

|                            |   |
|----------------------------|---|
| <b>Short name</b>          | Patient based AMI 30 day in-hospital (same hospital) mortality rate.  |
| Detailed name              | In-hospital (same hospital) mortality rate within 30 days of hospital admission for acute myocardial infarction (AMI).  |
| Short definition           | Percent of patients admitted (alternative: percent of admission) for AMI who died in the hospital within 30 days of admission.  |
| Rationale                  | Mortality of patients with AMI represents a significant outcome potentially related to quality of care. This rate-based indicator identifies an undesirable outcome of care. High rates over time warrant investigation into the quality of care provided.  |
| Operational definition     | Strong rationale, death is an outcome that needs to be avoided.   |
| Previous PATH experience   | <i>Strengths</i><br>Literature demonstrates clear relationships between clinical processes and procedures and mortality, i.e. mortality is a proxy for good clinical practice. This indicator can to some extent be used to monitor the effect of quality improvement actions.                          |
| Data source                | <i>Limitations</i><br>Rating is strongly affected by risk adjustment procedure, time frame and whether or not deaths after discharge are included. Overall the reliability is dependent on the magnitude of the patient population (unit level) and the quality of coding in administrative databases). |
| Domain                     | Used by OECD Health Care Quality Indicators project.  |
| Type of indicator          | <b>Numerator</b><br>Number of deaths <b><u>in the same hospital</u></b> that occurred within 30 days of hospital admission among cases at the denominator.  |
| Adjustment/ stratification |   |
| Sub-indicators             |   |
| Related indicators         |   |
| Interpretation             |   |
| Guidelines                 |   |
| References                 |   |

**Denominator**

Number patients admitted to hospital (*alternative: number of admissions to hospital*), age 15 years and older, with the principal/primary diagnoses of acute myocardial infarction (AMI):

ICD-9: 410

ICD-10: I21, I22

All patients are included, whether transferred or not. In addition, three indicators are computed and reported simultaneously on sub-samples:

- patients not transferred to/from other hospital,
- patients transferred to other hospital,
- patients coming from other hospital.

Such sub-indicators (mortality rate for patient not transferred, for patients transferred from/to another hospital) might provide additional insights and be included in the reports. It would be also very useful information how many percent of patients belong to these sub-samples. It might be also analysed if transfers were from or to: home / nursing home / rehabilitation hospital / acute care hospital / other.

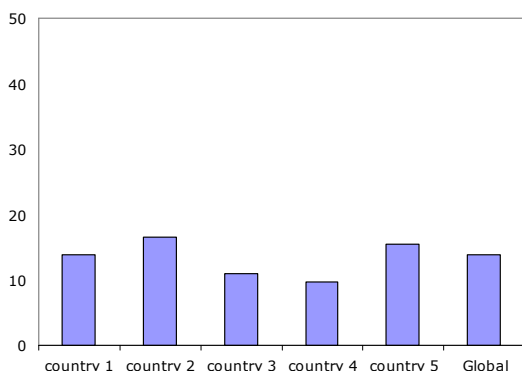
For analysis of indicators and better understanding variations, it is suggested to measure also mortality rate within 24h or 48h and length of stay in hospital (for the initial stay, if readmitted).

Previous PATH experience

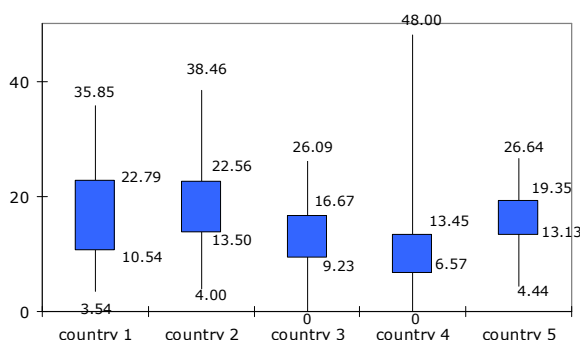
In PATH-pilot and PATH-II, patients both transferred from another hospital or to another hospital were excluded from both the numerator and denominator. This exclusion criterion has significantly been discussed while looking at the result as part of the proper treatment for AMI might include temporary transfer to another facility for appropriate invasive examination/treatment if the technology is not available in the hospital where the patient was initially admitted.

In PATH-II, it was initially proposed to adjust for both age and sex. However, sex did not come out as a significant variable to predict mortality. And the predictive value of the logarithmic model solely based on age was extremely low. Hence, based on PATH-II experience, it was agreed that risk-adjustment with such limited information on risk factors does not have much sense and that it is preferable to present results stratified by age and sex categories.

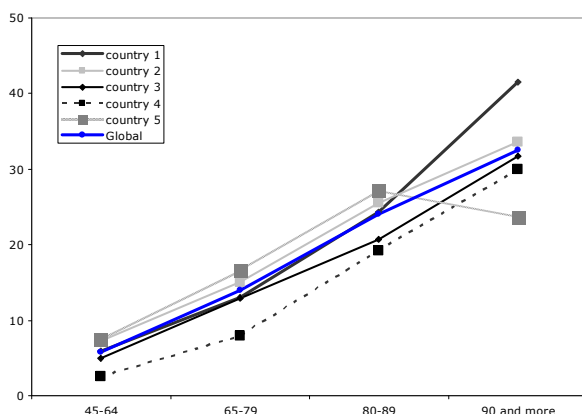
**International comparison on 30-days mortality rate after admission for AMI (rate calculated at the country level)**



**International comparison on 30-days mortality rate after admission for AMI (rate calculated at the hospital level) (boxplot: min, 1<sup>st</sup> quartile, 3<sup>rd</sup> quartile, max)**



**International comparison on 30-days mortality rate after admission for AMI per age category (rate calculated at the country level)**



Data source

Retrospective data collection. Administrative databases (e.g. discharge abstracts).

Compute the indicator on three full years to identify potential trends (2006, 2007, 2008) or the three last available years.

It is necessary to have a unique patient identifier in order to be able to trace case fatalities after the patient has been discharged and readmitted to the same hospital. This should be discussed among PATH participating hospitals in the country before implementation of the indicator. Any local adaptation of the definition should be made very explicit and agreed among all hospitals. The PATH Coordinator in the Country should inform the International Secretariat.

→ Alternative definition (if no unique patient identifier): Admission based indicator (see definition above in *italic and underlined*): in-hospital mortality during initial episode of care.

→ Complementary optional indicator (if hospital database is linked with death registry): 30-days mortality (within hospital or in any other care setting or at home).

Patient level data that should be sent to the PATH Coordinator in the Country are described at appendix 1.

Domain

Clinical effectiveness  
Safety

|                               |   |
|-------------------------------|---|
| Type of indicator             | Outcome measure   |
| Adjustment/<br>stratification | <p>Option 1: stratification</p> <ul style="list-style-type: none"> <li>– stratified by age and sex</li> <li>– stratified by the severity of AMI</li> </ul> <p>Option 2: risk adjustment (degree of complexity of risk adjustment to be decided locally based on available data and sample size)</p> <ul style="list-style-type: none"> <li>– age and sex</li> <li>– co morbidities: diabetes, hypertension, ischemic heart disease, heart failure, pneumonia, urinary catheter related infections, decubitus ulcer or others present at admission</li> <li>– degree of severity of AMI</li> </ul>   |
| Sub-indicators                | By transfer patterns (see operational definition)   |
| Related indicators            | <p>Length of stay</p> <p>The following indicator are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to the case fatality for AMI:</p> <p>Readmission rate</p> <p>Process measures (compliance with guidelines on medical treatment of AMI)</p>   |
| Interpretation                | <p>Improvement is noted as a decrease in the rate.</p> <p>Very low rates may indicate early discharges or transfers rather than high quality of care and lack of registration of deaths in emergency room settings.</p> <p>International studies report a general decreasing trend in mortality due to coronary heart diseases. Data from different sources report variations in in-hospital mortality from 4-7% (1-3). In-hospital mortality rates are usually higher in patients without documented ischemic symptoms at admission (4).</p> <p>The presence of extra cardiac vascular disease and overweight/obese are risk factors for poor outcome in patients with an acute myocardial infarction (5). This also applies to diabetes which increases in-hospital mortality significantly when patients with no diabetes are compared with diabetics, respectively diabetics with end-organ damage (5.7%, 7.8%, 13.5% mortality) (3).</p> |

|                   |   |
|-------------------|---|
|                   | <p>There are different risk-scores and models available to predict mortality and guide the clinical decision-making process when the patient is admitted to the hospital after acute myocardial infarction (6-8). One-year mortality observed by different sources often exceeds 10% (5, 9).</p> <p>Reasons for variations in in-hospital mortality are related to differences in case-ascertainment and case-mix, but to a large extent may reflect local practices: hospitals may attract different types of patients or differ in procedures for the admission and discharge of patients.</p> <p>For analysis of indicators and better understanding variations, it is suggested to define, for each patient, whether he/she was transferred from another hospital, to another hospital, to another care setting (rehabilitation or nursing home) and length of stay in hospital (for the initial stay, if readmitted). Such sub-indicators (mortality rate for patient not transferred, for patients transferred from another acute care hospital, transferred to another hospital, transferred to a rehabilitation or mortality rate within 24h or 48 h) might provide additional insights and be included in the reports.</p> <p>The definition of this indicator is mapped on OECD health care quality indicators. Hence, the same measure at the national level is available as a reference point for some countries.</p> <p>Peer groups: Before implementation of the indicator, the participating hospitals in the country could agree on some specific criteria for comparing results based on available technology in the hospital or other structural factors.</p> <p>Key specific quality issues which should be addressed e.g. by medical record reviews in units with high mortality rates (e.g. 2 standard deviations above peer group average) (10):</p> <ul style="list-style-type: none"> <li>• case volume of unit,</li> <li>• door to thrombolysis time,</li> <li>• administration of betablockers at admission,</li> <li>• administration of low dose aspirin at admission.</li> </ul> |
| <p>Guidelines</p> | <p>Further information on the management and guidelines of acute myocardial events: <a href="http://www.americanheart.org">http://www.americanheart.org</a></p>   |
| <p>References</p> | <ol style="list-style-type: none"> <li>1. McNamara RL, Wang Y, Herrin J, Curtis JP, Bradley EH, Magid DJ, et al. Effect of Door-to-Balloon Time on Mortality in Patients With ST-Segment Elevation Myocardial Infarction. <i>Journal of the American College of Cardiology</i>. 2006;47(11):2180-6.</li> <li>2. Chew DP, Amerena J, Coverdale S, Rankin J, Astley C, Brieger D. Current management of acute coronary syndromes in Australia: observations from the acute coronary syndromes prospective audit. <i>Internal Medicine Journal</i>. 2007:(OnlineEarly Articles).</li> <li>3. Verein Outcome. Results of outcome measurements in hospitals in Switzerland. Unpublished data. <a href="http://www.vereinoutcome.ch">www.vereinoutcome.ch</a></li> <li>4. Schelbert EB, Rumsfeld JS, Krumholz HM, Canto JG, Magid DJ, Masoudi FA, et al. Ischaemic Symptoms, Quality of Care, and Mortality during Myocardial Infarction. <i>Heart</i>. 2007 July 16, 2007:hrt.2006.111674.</li> </ol>  |

5. Anderson JL, Adams CD, Antman EM, Bridges CR, Califf RM, Casey DE, Jr., et al. ACC/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non ST-Elevation Myocardial Infarction) Developed in Collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine. *J Am Coll Cardiol*. 2007 August 14, 2007;50(7):e1-157.
6. Antman EM, Cohen M, Bernink PJ, McCabe CH, Horacek T, Papuchis G, et al. The TIMI risk score for unstable angina/non-ST elevation MI: A method for prognostication and therapeutic decision making. *Jama*. 2000 Aug 16;284(7):835-42.
7. Boersma E, Pieper KS, Steyerberg EW, Wilcox RG, Chang WC, Lee KL, et al. Predictors of outcome in patients with acute coronary syndromes without persistent ST-segment elevation. Results from an international trial of 9461 patients. The PURSUIT Investigators. *Circulation*. 2000 Jun 6;101(22):2557-67.
8. Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, et al. Predictors of hospital mortality in the global registry of acute coronary events. *Arch Intern Med*. 2003 Oct 27;163(19):2345-53.
9. Schiele F, Meneveau N, Seronde MF, Caulfield F, Fouche R, Lassabe G, et al. Compliance with guidelines and 1-year mortality in patients with acute myocardial infarction: a prospective study. *Eur Heart J*. 2005 May 1, 2005;26(9):873-80.
10. Peterson ED, Shah BR et al. Trends in the quality of care for patients with acute myocardial infarction in the national registry of myocardial infarction from 1990 to 2006 . *Amer Heart J*. 2008; 156(6): 1045-55.
11. Lewis WR, Peterson ED et al. An organized approach to improvement in guideline adherence for acute myocardial infarction. *Arch Int Med* 2008; 168(16): 1813-19.

<http://www.OECD.org> (Health at a glance, technical manuals).

**Data to be reported to the coordinator for calculation of the core and complementary indicators**

This form is to be used as a stepping stone to define national reporting forms for hospitals that can then be created e.g. into xls sheet or database tool.

**At the patient level (one record per patient)****Data from the hospital central database or national database**

*Italics underlined for the minimum data for core indicator*

\* for risk-adjustment or for sub-indicators

\*\*to compare process of care and initiate discussion on differences of practice

**Patient information**

1. Patient ID:
2. ICD code principal diagnosis :
3. ICD codes secondary diagnosis (at admission/during stay/)\*: (---/---/---/---/---/---)
4. Age or date of birth:
5. Sex:

**Admission**

6. Date of admission:
7. Admission from (origin of patient)\*:
  - home / hospital or
  - home (home / nursing home) vs hospital (rehabilitation hospital, acute care hospital, other)

**Patient stay**

8. Date of admission or transfer to AMI unit in the hospital (if relevant)\*\*:
9. Date of admission or transfer to rehabilitation department within the hospital (if relevant)\*\*:
10. Procedure codes and date procedures in hospital\*\* (--/---/--/---/--/---)

**Discharge**

11. Death in hospital: yes/no
  12. If yes, date of death:
13. Discharge to (destination of patient)\*:
  - home / hospital or
  - home (home / nursing home) vs hospital (rehabilitation hospital, acute care hospital, other)
14. Date of discharge\*\*

**Additional data if extracted directly from the patient record (on a sample of patients during a short observation period) – optional**

15. Severity of AMI\*
16. Temporary transferred for procedure to other hospital\*\* (yes/no)
17. if yes, date of transfer out
18. if yes, main procedure codes: (---/---/---/---/---/---)
19. if yes, date of return:

**Comorbidities and complications**

20. diabetes\* (yes/no)
21. hypertension\* (yes/no)
22. ischemic heart disease\* (yes/no)
23. heart failure\* (yes/no)
24. pneumonia (yes, present at admission\*, yes, not present at admission\*\*, no)
25. urinary catheter related infections (yes, present at admission\*, yes, not present at admission\*\*, no)
26. decubitus ulcer (yes, present at admission\*, yes, not present at admission\*\*, no)
27. others (to be defined a priori based on risk factors)

**Patient treatment:**

28. case volume of unit\*\*
29. door to thrombolysis time\*\*
30. Administration of betablockers at admission \*\* (yes/no)
31. Administration of low dose aspirin at admission \*\* (yes/no)

# Post-operative thromboembolism

December 2009

## Contents:

- Short name
- Detailed name
- Short definition
- Rationale
- Operational definition
- Previous PATH experience
- Data source
- Domain
- Type of indicator
- Adjustment/ stratification
- Sub-indicators
- Related indicators
- Interpretation
- Guidelines
- References

|   |   |
|---|---|
| <b>Short name</b>   | Post-operative thromboembolism  |
| Detailed name   | Rate of postoperative pulmonary embolism or deep vein thrombosis.   |
| Short definition  | Percent of patients after surgical procedures with pulmonary embolism or deep vein thrombosis.  |
| Rationale (including justification, strengths and limits) | <p>Deep venous thrombosis (DVT) and pulmonary embolism (PE) are considered to be among the most common life-threatening complications to surgery.</p> <p>The risk of DVT/PE is dependent on patient factors, type of surgical intervention and underlying disease but can be substantially reduced by a number of prophylactic interventions – both pharmacologic and nonpharmacologic (early mobilisation, etc.).</p> <p>The rate of postoperative thromboembolism therefore represents an important outcome of patient safety interventions in surgery.</p> <p><i>Strengths:</i> Literature demonstrates strong relationships between clinical processes (anticoagulants, early mobilisation and other preventive measures) and PE/DVT. This indicator can be used to monitor the effect of quality improvement actions within hospitals and in healthcare systems.</p> <p><i>Limitations:</i> Because of the variation in prevalence of risk factor, benchmarking at hospital level requires stratification or establishing peer groups of hospitals with approximately same surgical case-mix profile.</p> <p>PE/DVT is known to be frequently undiagnosed. Thus, health facilities with better monitoring practices may be mislabelled as having unusually high event rates.</p> |

|                           |  |
|---------------------------|--|
| Operational definition    | <p>Used by OECD Health Care Quality Indicators project.</p> <p><b>Numerator</b></p> <p>Discharges among cases meeting the inclusion and exclusion rules for the denominator with ICD codes for deep vein thrombosis or pulmonary embolism in any secondary diagnosis field (Appendix).</p> <p><b>Denominator</b></p> <p>All surgical discharges age 18 and older with a code for an operating room procedure.</p> <p><b>Exclusion</b> criteria (Appendix).</p> <ul style="list-style-type: none"> <li>- With pre-existing (principal diagnosis or secondary diagnosis present on admission, if known) deep vein thrombosis or pulmonary embolism.</li> <li>- Where a procedure for interruption of vena cava is the only operating room procedure.</li> <li>- Where a procedure for interruption of vena cava occurs before or on the same day as the first operating room procedure. Note: If day of procedure is not available in the input data file, the rate may be slightly lower than if the information was available.</li> <li>- MDC 14 (pregnancy, childbirth, and puerperium) or principal diagnosis: A34, F53, O00-O99, Z32-Z37, Z39, Z64.0.</li> <li>- With length of stay less than two days.</li> </ul> |
| Previous PATH experience  | Not applicable   |
| Data source               | Retrospective data collection for 2006, 2007, and 2008 or the three last available years. Administrative databases (discharge abstracts).  |
| Domain                    | <p>Clinical effectiveness</p> <p>Safety</p>  |
| Type of indicator         | Outcome measure  |
| Adjustment/stratification | <p>Stratification can be done at country or hospital level to explain local variation over time or differences between hospitals. Suggested risk factors for stratification are as follows:</p> <ul style="list-style-type: none"> <li>- surgical procedure,</li> <li>- age, sex,</li> <li>- co-morbidity (diabetes, hyper-tension, ischemic heart disease, heart failure)</li> <li>- life-style factors (BMI, smoking, alcohol consumption) (3).</li> </ul>   |
| Sub-indicators            |  |

|                    |  |
|--------------------|--|
| Related indicators | <p>Length of stay</p> <p>Use of blood components</p>   |
| Interpretation     | <p>Improvement is noted as a decrease in the rate.</p> <p>Caution is needed in using this indicator for comparison between units because of variations in monitoring and coding those adverse events. Hence, an evaluation of own coding practices and documentation is necessary to support interpretation of this indicator and while comparing between hospitals or units.</p> <p>Key specific quality actions which could be implemented in units or hospitals with increasing rates of DVT/PE or high rates compared to selected peer-group of units or hospitals include:</p> <ul style="list-style-type: none"> <li>- review of medical records to assess the completeness of interventions (procedures) for prevention of DVT/PE – consider both pharmacological and other evidence based interventions,</li> <li>- review the staff knowledge of guidelines,</li> <li>- treat all cases of postoperative pulmonary embolism as a potential sentinel event.</li> </ul>   |
| Guidelines         | <p>Both NICE and SIGN guidelines for prevention of venous thromboembolism after surgery expect revised versions in 2009 (3).</p>   |
| References         | <p>(1) Roderick P, Ferris G et al, Towards evidence-based guidelines for the prevention of venous thromboembolism: systematic reviews of mechanical methods, oral anticoagulation, dextran and regional anaesthesia as thromboprophylaxis, <i>Health Technol Assess</i> 2005; 9(49): 1-78.<br/> <a href="http://www.hta.ac.uk/fullmono/mon949.pdf">http://www.hta.ac.uk/fullmono/mon949.pdf</a></p> <p>(2) Kakkos SK et al, Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism in high-risk patients, <i>Cochrane database of systematic reviews</i> 2008: issue 4 Art No CD005258.</p> <p>(3) Hunt BJ, The prevention of hospital-acquired venous thromboembolism in the United Kingdom, <i>Brit J Haematol</i> 2008; 144. 642-52.</p> <p><u>Details about ICD coding and technical definitions in:</u></p> <p>OECD Health Technical papers no 19: Facilitating cross national comparisons of indicators for patient safety at the health system level in the OECD countries. 2008 and OECD Technical manual for patient safety indicators 2009.</p> <p>Algorithm for Postoperative Pulmonary Embolism (PE) or Deep Vein Thrombosis (DVT) on page 19.</p> |

## Appendix

**Postoperative Pulmonary Embolism (PE) or Deep Vein Thrombosis (DVT)****ICD-9-CM Pulmonary Embolism diagnosis codes**

41511 Iatrogenic pulmonary embolism and infarction

41519 Pulmonary embolism and infarction, other

**ICD-9-CM Deep Vein Thrombosis diagnosis codes**

45111 Phlebitis and thrombosis of femoral vein (deep) (superficial)

45119 Phlebitis and thrombophlebitis of deep vessel of lower extremities . other

4512 Phlebitis and thrombophlebitis of lower extremities

45181 Phlebitis and thrombophlebitis of iliac vein

4519 Phlebitis and thrombophlebitis of other sites of unspecified site

45340 DVT-embolism lower ext nos (Oct 04)

45341 DVT-emb prox lower ext

45342 DVT-emb distal lower ext

4538 Other venous embolism and thrombosis of other specified veins

4539 Other venous embolism and thrombosis of unspecified site

**ICD-10-WHO Pulmonary Embolism and Deep Vein Thrombosis diagnosis codes**

I26.0 Pulmonary embolism with mention of acute cor pulmonale

I26.9 Pulmonary embolism without mention of acute cor pulmonale

I80.1 Phlebitis and thrombophlebitis of femoral vein

I80.2 Phlebitis and thrombophlebitis of other deep vessels of lower extremities

I80.3 Phlebitis and thrombophlebitis of lower extremities, unspecified

I80.8 Phlebitis and thrombophlebitis of other sites

I80.9 Phlebitis and thrombophlebitis of unspecified site

I82.8 Embolism and thrombosis of other specified veins

I82.9 Embolism and thrombosis of unspecified vein

**Exclusion:****ICD-9-CM Interruption of Vena Cava procedure code:**

387 Interruption of vena cava

**ICD-10 Interruption of Vena Cava procedure code:**

KPHB30 Interruption of vena cava

**ICD-10 Pregnancy, childbirth, and puerperium or principal diagnosis code:**

A34, F53, O00-O99, Z32-Z37, Z39, Z64.0

# Use of blood components

December 2009

## Contents:

- Short name
- Detailed name
- Short definition
- Rationale
- Operational definition
- Previous PATH experience
- Data source
- Domain
- Type of indicator
- Adjustment/ stratification
- Sub-indicators
- Related indicators
- Interpretation
- Guidelines
- References

|  |  |
|--|--|
| <b>Short name</b>  | Use of blood components  |
| Detailed name  | Blood components transfused per patient.   |
| Short definition   | Number of blood components transfused per patient during selected tracer procedures in the hospital.   |
| Rationale<br>(including justification, strengths and limits) | <p><i>Rationale:</i></p> <ul style="list-style-type: none"> <li>- Blood transfusions are common in surgical patients (1). However, attitudes toward blood transfusion have changed in the last decade. Although transfusion can be lifesaving, recent evidence suggests that their use is associated with increased morbidity and mortality and therefore, current transfusion practices may require re-evaluation (2,3).</li> <li>- Despite evidence supporting more restrictive use of blood, the use of transfusions among surgical patients has increased during the last decade (4).</li> <li>- Patients are concerned about the safety of blood transfusion and payers about the costs of blood transfusion. There is still insufficient information on the clinical use of blood in elective surgery and there are large recorded variations in transfusion practices. Studies have demonstrated high variability in red blood cell (RBC) transfusions and blood loss in standard surgical procedures (5-7).</li> <li>- Demand for blood products is growing and it often exceeds the resources of the local blood bank, thereby disrupting both the planning and the nature of surgical protocols. Therefore, it is necessary to streamline blood ordering and transfusion practice.</li> <li>- A number of studies showed over-ordering of blood components by surgeons or by anesthesiologists.</li> </ul> |

- Over-ordering of blood has to be minimised: Demanding large quantities of blood each day, of which little is ultimately used commits valuable supplies and resources both in technician time and reagents.
- The ready availability of blood components often results in liberal use of blood. In adults, blood loss of up to 20% (about one liter for an average person with 70 kg of body weight) is well tolerated in the majority of patients, provided that the circulatory volume is compensated with colloids or crystalloids). Transfusion of red cell concentrates is recommended only if there is >30% blood loss (8, 9).
- Blood transfusion carries a number of well-recognized risks and complications and blood products have become more expensive because of their specific preparation procedures. Surgical technique, awareness of the problem and restriction of transfusion trigger have become an important factor affecting the transfusion therapy and blood loss management.
- The transfusion trigger has shifted from the optimal Hb level of 10 g/dl, which has been considered as a gold standard for a long time. Current evidence indicates that for most patients more restrictive transfusion is more effective (10).
- An expert consensus conference convened by United States Food and Drug Administration concluded that transfusion was likely to be necessary when the Hb value dropped below 7 g/dl and unlikely to be necessary when it was greater than 10 g/dl (11).

*Strengths*

There is a strong association of RBC transfusion with mortality and postoperative morbidity. RBC transfusion increases risk for mortality and several morbidities in surgical patients (3,12,13). Benchmarking transfusion activity may help to decrease the inappropriate use of blood products, reduce the cost of care and optimize the use of voluntary donor's gift.

*Limitations*

There might be substantial differences in the blood components practices across hospitals and across countries, which may reduce the comparability of the results. Furthermore, blood transfusion may be affected by the local supply of blood products, in a way that a serious shortage may cause under-representation of the blood components use, especially in countries that are often facing blood donor shortage periods.

Operational definition

**Numerator**

The amount of intra- and postoperative blood components transfused for patients involved in denominator.

Definition of component for transfusion: A component for transfusion is prepared either from whole blood donation (450+/- 10%) mL or collected by aphaeresis. One unit means component derived from whole blood donation (450+/- 10%) mL. For platelet aphaeresis, the number of units collected from the donor in one session should be shown on the label or contained in the product information leaflet (Guide to the preparation, use and quality assurance of blood components, Recommendation No. R (95) 15, Council of Europe, 2008).

|                          |   |
|--------------------------|---|
|                          | <p><b>Denominator</b></p> <p>All patients who underwent selected elective surgical procedures in a given time period (based on the DRG code, see below) for which intra-operative and/or postoperative transfusion was requested.</p> <p><b>Exclusion</b></p> <p>(1) Patients known to have pre-existing abnormalities of the coagulation system (documented by history of bleeding and/or preoperative international normalised ratio &gt;1.5 or prothrombin time (PT) &lt;=0.35; thrombocyte count &lt;50 000/<math>\mu</math>l).</p> <p>(2) Patients submitted to more than one type of surgical procedure during the same hospital episode.</p> <p>(3) Re-operated patients for the same type of procedure.</p> <p><i>Tracer procedures</i> (Australian DRG codes): Elective surgical procedures selected because they are frequently performed and often involve or might involve blood transfusion:</p> <p><b>Aortofemoral bypass</b> – unilateral (AF) DRG 32708-00</p> <p><b>Primary unilateral total knee replacement</b> (TKR) DRG 49518</p> <p><b>Primary unilateral total hip replacement, cemented or non-cemented</b> (THR) DRG 49318-00</p> <p><b>Transurethral prostatectomy</b> (TURP) for <b>prostate adenoma</b> DRG 37209-00</p> <p><b>Coronary artery bypass graft</b> (CABG) <b>surgery</b> DRG 38497; 38500; 38503</p> |
| Previous PATH experience | Not applicable  |
| Data source              | <p>Prospective data collection during two months or at least consecutive 30 cases (April-May 2010), based on the patient's clinical file and administrative discharge information. The files of the hospital transfusion service might be useful to compare the record of requests and transfusion complications for each patient.</p> <p>If possible retrospective data collection during the entire year period, covering possible seasonal changes in the blood components use.</p> <p>Data on individual level: protocols of surgery and anaesthesiology. This is based on the requirement that every blood component must be well recorded, either subject to various laws or other regulations that control the collection, preparation and the use of blood components.</p> <p><u>Data collection tool</u></p> <p>A layout of a data collection Excel sheet is proposed.</p>   |
| Domain                   | <p>Clinical effectiveness</p> <p>Safety</p> <p>Responsive governance</p>  |
| Type of indicator        | Outcome measure   |

|                               |  |
|-------------------------------|--|
| Adjustment/<br>stratification | <p>Stratification can be done at country or hospital level to explain local variation over time or differences between hospitals. Data for adjustment/stratification is presented at the data collection forms shown as follows:</p> <ul style="list-style-type: none"> <li>- age,</li> <li>- sex,</li> <li>- preoperative Hb <math>\leq 90</math> g/L or <math>&gt;90</math> g/L,</li> <li>- preoperative data, intra-operative data, early post-operative (within 24 hours) and post-operative (after 24 hours, within hospitalization) data. (Appendix A)</li> </ul> <p>If only 30 cases are observed, stratification is problematic.</p> <p>It is recommended to obtain the clinician's agreement to participate in providing data (this is due to the multiple treatment approaches, including anaesthesiology, surgery, clinical transfusion service and possibly other departments).</p>  |
| Sub-indicators                | <p>For the analysis and better understanding of variations in transfusion practice it is suggested to define, for each patient underwent the procedure if the blood components including red blood cells, plasma, platelets have been transfused previous to the operation, during the operation, within post-operative period within 24 hours after surgery to the patient discharge.</p> <p>Also, to develop better understanding on the reasons for variations in transfusion practice and design appropriate recommendation for improving, it is suggested to define if patient received autologous blood transfusion.</p> <p>The number of patients underwent the procedure without blood transfusion of any blood components should also be computed )</p> <p>At the level of each procedure which means at the level of patient record the number of red cell units cross-matched and the number of units transfused. Based on these data the following 3 indices could be calculated:</p> <p>Calculation for each procedure including the following:</p> <p><b>C/T ratio:</b> Cross-match (C) to Transfusion ratio = No. of red cell <u>units</u> cross-matched / No. of <u>units</u> transfused. A C/T ratio of <math>\leq 2.5</math> is indicative of significant blood usage. A C/T ratio of <math>&gt;2.5</math> means that less than 40% of cross-matches are transfused) (18).</p> <p><b>Transfusion Probability (%T):</b> No. of <u>patients</u> transfused x 100 / No. of <u>patients</u> cross-matched. (A value of 30 is indicative of significant blood usage) (19).</p> <p><b>Transfusion Index (Ti):</b> No. of <u>units</u> transfused / No. of <u>patients</u> cross-matched. (A value of 0.5 is indicative of significant blood utilization). The average number of units used per patient cross-matched by <math>T_i</math> signifies the appropriateness of number of units ordered. It is suggested that a procedure that uses <math>&lt;0.5</math> units of blood per procedure does not require a preoperative cross-match.</p> |
| Related indicators            | <ul style="list-style-type: none"> <li>- Length of hospital stay,</li> </ul> <p>The following indicator are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to:</p> <ul style="list-style-type: none"> <li>- Patient expectations</li> <li>- Training expenditure</li> </ul>   |

|                |  |
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| Interpretation | <p>Improvement involves better coordination of care (surgery, blood bank or hospital transfusion service, anaesthesiology and nursing) and more appropriate use of blood.</p> <p>Studies report wide variations in blood utilization between and within countries, even within the same hospital. Variations mainly reflect local practices despite the number of published guidelines concerning the optimal use of blood and blood components in different clinical settings. In turn, this means that the interpretation must be performed cautiously, taking into account all possible modifying effects.</p> <p>Other factors to take into account are: The use of technologies to decrease perioperative allogenic blood transfusion, including pharmaceutical drugs such as aprotinin, desmopresin, tranexamic acid, erythropoietin and autologous transfusion techniques such as ANH (autologous normovolemic haemodilution), ICS (Intraoperative Cell Saver), PAD (Preoperative autologous donation) and POS (Postoperative salvage) (14,15). The administration of antifibrinolytic (tranexamic acid) in total hip replacement is effective in reducing the blood loss and transfusion requirements, especially in women and also effective in total knee replacement surgery (16,17).</p> |
| Guidelines     | <p>Guidelines on the Management of Massive Blood Loss. <i>British Journal of Haematology</i> 2006; 135(5): 634-41.</p> <p>Guidelines for the use of fresh-frozen plasma, cryoprecipitate and cryosupernatant. <i>Brit J Haematol</i> 2004,126,11-28.</p> <p>Guidelines for policies on Alternatives to Allogeneic Blood Transfusion. <i>Transfusion Medicine</i> 2007; 17(5): 354-65.</p> <p>Guidelines For The Use Of Platelet Transfusions. <i>British Journal of Haematology</i> 2003; 122(1): 10-23.</p> <p>The clinical use of red cell transfusion. <i>British Journal of Haematology</i> 2001; 113(1): 24-31.</p> <p>Guidelines for autologous transfusion. II. Peri-operative haemodilution and cell salvage. <i>British Journal of Anaesthesia</i> 1997; 78: 768-71.</p> <p>Guidelines for implementation of a maximum surgical blood order schedule. <i>Clinical and Laboratory Haematology</i> 1990; 12: 321-27.</p> <p>Practice Guidelines for Blood Transfusion: A Compilation from Recent Peer-Reviewed Literature. American red Cross, April, 2007.</p>   |

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Appendix A

Print screen of Excel table for data to be reported

Dimension: **Safety, Clinical effectiveness, Responsive Governance**  
 CORE Indicator: **Use of blood components**

Tracer: \_\_\_\_\_ DRG code: \_\_\_\_\_

**Inclusion:** Patients with the type of selected elective surgical procedure for which blood transfusion of any blood components was requested

**Exclusion:** Patients with known abnormalities of the coagulation system documented by history of bleeding

**Exclusion:** Preoperative international normalised ratio >1.5 or prothrombin time <=0.35

**Exclusion:** Preoperative platelet count <50 000/µl

**Exclusion:** Patients submitted to more than one type of surgical procedure during the same hospital episode

**Exclusion:** Re-operations for the same initial surgery

**Data source:** Prospective or retrospective data collection

Time period: if prospective two months (April and May in 2010 or at least consecutive 30 cases); if retrospective the entire year

Number of patients who underwent surgery for these tracer, but did not receive blood transfusion

| Case number | ID Case | Age at time of procedure | Sex<br>(M = 1 ; F = 2) | Preoperative    |   |   |                        |                                     |   |   |  |
|-------------|---------|--------------------------|------------------------|-----------------|---|---|------------------------|-------------------------------------|---|---|--|
|             |         |                          |                        | Preoperative Hb | Number of allogeneic Red Blood Cells unit ordered (cross-match requested) for surgery | Number of allogeneic Red Blood Cells transfused | Plasma transfused (mL) | Number of platelet units transfused | Patient administered anti-platelet therapy during the last pre-operative week | Autologous blood procured / number of units predeposited<br>0 if none |  |
| 1           |         |                          |                        |                 |   |   |                        |                                     |   |   |  |
| 2           |         |                          |                        |                 |   |   |                        |                                     |   |   |  |
| 3           |         |                          |                        |                 |   |   |                        |                                     |   |   |  |



# Day surgery rate

December 2009

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Data source

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|                            |  |
|----------------------------|--|
| <b>Short name</b>          | Day surgery rate   |
| Detailed name              | Percent of procedures performed in the hospital on a day surgery.  |
| Short definition           | Number of procedure performed with the intent of day-surgery (no overnight stay) over the total procedures performed in the hospital, for selected tracer procedures; expressed as a percentage. |
| Rationale                  |  |
| Operational definition     |  |
| Previous PATH experience   |  |
| Data source                |  |
| Domain                     |  |
| Type of indicator          |  |
| Adjustment/ stratification |  |
| Sub-indicators             |  |
| Related indicators         |  |
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**Short name**

Day surgery rate

Detailed name

Percent of procedures performed in the hospital on a day surgery.

Short definition

Number of procedure performed with the intent of day-surgery (no overnight stay) over the total procedures performed in the hospital, for selected tracer procedures; expressed as a percentage.

Rationale  
(including justification, strengths and limits)

*Rationale*

1. International comparisons (especially Europe compared to North America) suggest large potential for further substitution to day surgery. Day surgery helps deviate resource to less care intensive settings and free hospital inpatient beds. From the patient's point of view, day surgery was demonstrated to translate into faster recovery and return to work and lower prevalence of nosocomial infections.
2. The burden of data collection is low. This indicator is built on data readily available in administrative database (discharge abstract).

*Strengths*

This indicator is multidimensional as it addresses:

**Efficiency – Cost-efficiency and optimal use of capacity.** In a context of limited bed availability, increased one-day surgery will release inpatient beds for major cases and hence improve access and reduce waiting times. Inpatient days are highly resource intensive. Cost-effectiveness of one-day surgery was demonstrated for a number of surgical procedures and different context.

Clinical effectiveness – Innovativeness and diffusion of technologies: Improvements in anaesthetic drugs and procedures and in surgical techniques allowed more operations to be completed as day surgery cases. A prerequisite for increased use of day surgery is the development of less invasive surgery, such as laparoscopy and endoscopy. Pain management and anaesthesia techniques are pivotal to successful day surgery. The degree to which this indicator reflects innovativeness depends on choice of tracer procedure.

Patient centeredness perspective on clinical effectiveness – Outcomes and patient satisfaction (faster recovery, focus on pain management): Risk of hospital acquired infection is reduced. Patient surveys indicate that the great majority of patients prefer to recover home rather than staying overnight in hospital. In particular, day surgery is indicated for children as overnight admission is often the most distressful part of visiting hospital for them.

Patient centeredness – Organization of care: The necessity to adapt and to transform the traditional hospital is a major challenge for the development of day surgery. In day surgery, the organizational priorities are reversed and the patient is truly the focus of the organization. Cancellation of surgery due to emergency pressures in a dedicated day surgery unit is unlikely.

*Limits*

There might be a selection bias if day surgeries are performed on an ambulatory care setting (e.g. outpatient clinic) rather than in-hospital. International comparisons are difficult to interpret because of various coding schemes for procedures, definitions and also because the financial incentives for day surgery and the surgeries performed on an ambulatory (outpatient) setting can vary widely. Also, the reliability of coding of the “day surgery intent” might be low.

Operational definition

**Numerator**

Total number of procedures included at the denominator which are performed with the intent of day-surgery.

The determination of “day surgery patient” is left to local determination. In some countries, day-surgery patients are attributed a specific code on admission and hence can easily be identified from database. In some other countries, day surgery patients will be identified as the patients with no overnight stay. In such case, patients with intent of day surgery who were then admitted after the procedure for clinical or organizational reasons and stayed overnight will inadequately be excluded from the numerator. This potential bias should be made explicit when reporting on the indicator and should be discussed with all PATH participating hospitals in each country to agree on a common country level definition of “day surgery patient” and hence limit such bias.

**Denominator**

Total number of patients undergoing the tracer procedure

Tracer procedures (ICD9-CM)<sup>1</sup>:

- Knee arthroscopy: 80.26
- Inguinal hernia: 53.0, 53.1, 53.21
- Tonsillectomy and/or adenoidectomy: 28.2 and 28.3
- Cholecystectomy: 51.22 and 51.23
- Varicose veins – stripping and ligation: 38.59

Tracer procedures (NOMESCO codes)

- Knee arthroscopy: NGA01A, NGA21A, NGA21C, NGA31A
- Inguinal hernia: JAB
- Tonsillectomy and/or adenoidectomy: EMB
- Cholecystectomy: JKA20, JKA21
- Varicose veins – stripping and ligation: PHD, PHB 10,11,12,13,14

Previous PATH experience

This indicator was measured in both PATH-pilot and PATH-II. The previous experience indicated substantial variations not only between countries (figure 2) for a same procedure but also within country (figure 1). This finding highlights that the external legal and financial incentives to perform day surgery are only one element to explain the rate of day surgery to which hospital react differently.

Figure 1: Percent of day surgery for selected tracer procedure WITHIN one anonymous country (minimum, quartile 1, quartile 3, maximum)

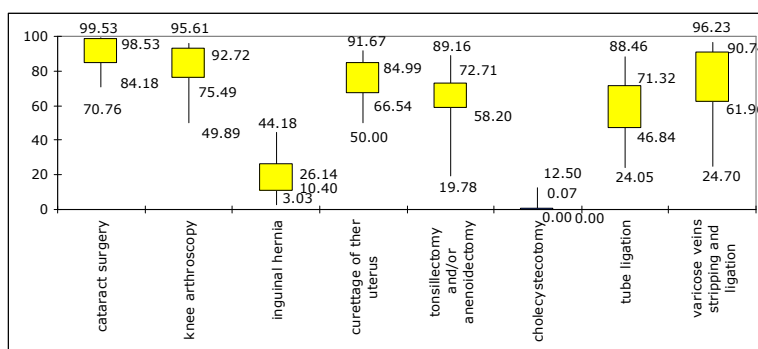
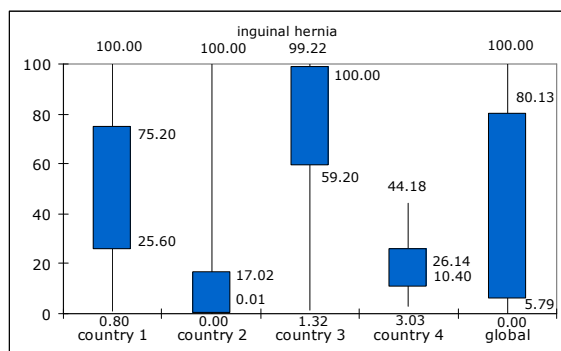


Figure 2: International comparison of the percent inguinal hernia repair performed on a day surgery (anonymous countries) (minimum, quartile 1, quartile 3, maximum)

<sup>1</sup> If another coding system for procedure is used in the country, please agree on common codes in your country and forward this information to the PATH international secretariat. This information will be consolidated and forwarded to all PATH coordinators if international comparisons are expected.



The number of tracer procedures was slightly reduced compared to PATH-pilot and PATH-II to lower the burden of data collection and to ease interpretation (more focus).

In previous waves of data collection and analysis, the rate of day surgery was assessed simultaneously with the rate of admission after day surgery. However, this complementary indicator was dropped for two reasons. First, in most PATH countries, it proved extremely difficult to trace patients as having initial intention of one-day surgery that are admitted because when those patients change status to "inpatient", the initial intention of day-surgery is "lost" in the information system.

Administrative database do not support such monitoring with great ease and ad-hoc data collection at the dedicated one-day surgery unit (if any) might be necessary. It is probably for this reason that the observed rates of admission (typically between 0.1% and 2.5%) were much lower than reported in the literature (around 10%). Because the number of admission is so low, comparisons of rates are not statistically significant.

One should look at each specific case and understand the reason for admission. Though this indicator is not included in the set of PATH'09 indicator. It is strongly advised to monitor admissions after day surgery and analyse them as improvement actions are implemented to increase the proportion of surgeries on a day basis.

Indeed, admission after day surgery is distressing for the patient. It often reflects either a minor/major complication during surgery (postoperative pain, delayed recovery, bleeding), or a poor patient selection for day surgery or organizational issue (e.g. delay in time surgery is started). Studies indicate that around 75% of admission are justified by postoperative pain nausea or social problem (e.g. no care taker after surgery) and thought to be preventable.

Data source

Retrospective data collection on administrative database (discharge abstracts).

This indicator is computed for the last three years available (2006, 2007, and 2008 or the three last available years). If the data is retrieved manually from paper database, the indicator can be computed based on a sample (all procedures for the months of e.g. October and February 2006, 2007, and 2008). The PATH Coordinator in the Country should be informed of the sampling procedure.

|                           |   |
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|                           | <p><b>Patient-level data</b> (one record for each patient) is to be sent to the PATH Coordinator in the Country (PCC). For each patient, it includes relevant data for the calculation of the numerator and denominator.</p> <p>The coding practices should be discussed among participating hospitals to assess how tracer procedures are specified in the discharge abstracts or if alternative sources of information need to be retrieved on an ad-hoc basis.</p>   |
| Domain                    | <p>Efficiency</p> <p>Clinical effectiveness</p> <p>Patient orientation</p>  |
| Type of indicator         | Process measure   |
| Adjustment/stratification | No  |
| Sub-indicators            | PATH hospitals are invited to tailor the list of tracer procedures to include one additional procedure that is commonly performed on a day surgery and one additional procedure that is still under-developed for day surgery in the country. The objective is to focus on tracer procedures where there might be more potential for improvement in the short-term, either for some selected hospitals "laggards" in terms of adoption of day surgery, either for most hospitals.   |
| Related indicators        | Admissions after day surgery (see above "Previous PATH experience")   |
| Interpretation            | <p>Improvement is noted as an increase in the rate.</p> <p>A world wide survey on ambulatory surgery done by the International Association for Ambulatory Surgery shows that the lowest rate of knee arthroscopy performed as day surgery is found in Portugal (1.9 %) and the highest rate is found in the U.S. (93.9%). In Belgium 69 % of the knee arthroscopies are performed on an out-patient basis while the Netherlands perform 93% of their knee arthroscopies as day surgeries (1). A higher day surgery rate is preferred, as long as safety is not compromised. Reasons for variation in day surgery rates may be regulatory (national regulations and guidelines), economic (differences in economic incentives for the use of day surgeries), educational (the lack of knowledge about benefits), lack of support (local, home and community) and organizational (lack of facilities and staff equipped for the task). Furthermore inconsistent coding and differences in case-mix may contribute to variations (1-3).</p> <p>Key success factors to achieve higher day surgery rates (3):</p> <ul style="list-style-type: none"> <li>• consider day surgery the norm for all elective knee arthroscopic surgeries,</li> <li>• separate flows of day-surgery patients from in-patients,</li> <li>• design day-surgery facilities,</li> <li>• remove regulatory and economic barriers,</li> <li>• align incentives,</li> <li>• monitor and provide feedback on results.</li> </ul> |

|            |   |
|------------|---|
| Guidelines | NHS Department of Health. Day surgery: Operational guide. 2002 available at <a href="http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4005487">http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4005487</a>   |
| References | <p>The Association of Anaesthesiologists of Great Britain and Ireland. Day Surgery. 2005 (to be revised in 2010).<br/><a href="http://www.aagbi.org/publications/guidelines/docs/daysurgery05.pdf">http://www.aagbi.org/publications/guidelines/docs/daysurgery05.pdf</a></p> <p>(1) Toftgaard C. World Wide Day Surgery Activity 2003. The IAAS Survey on Ambulatory Surgery. 2003.</p> <p>(2) Aylin P, Williams S, Jarman B, Bottle A. Trends in day surgery rates. BMJ 2005; 331(7520):803.</p> <p>(3) Castoro C, Bertinato L, Baccaglini U, Drace C, McKee M. Policy Brief Day Surgery: Making it Happen. 2007. World Health Organization 2007, on behalf of the European Observatory on Health Systems and Policies.</p> |

# Smoke free hospital audit

December 2009

## Contents:

Short name

Detailed name

Short definition

Rationale

Operational definition

Previous PATH experience

Data source

Domain

Type of indicator

Adjustment/ stratification

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|   |  |
|---|--|
| <b>Short name</b>   | Smoke free hospital audit  |
| Detailed name   | Score on the self-audit questionnaire of European Network for Smoke-free Hospitals.  |
| Short definition  | A score between 1 and 168 is computed based on the answers to 42 items covering 10 standards for smoke free hospitals. For each item, the hospitals self-assess the degree of implementation on a scale from 1 to 4.   |
| Rationale (including justification, strengths and limits) | <p>The European Network for Smoke-free Hospitals (ENSH) highlights 7 reasons why tobacco control should be a priority for hospitals:</p> <ol style="list-style-type: none"> <li>1. The fight against tobacco is a national priority in most EU countries and the rules that forbids the use of tobacco in health premises has been reinforced.</li> <li>2. Appropriate legal rules on non-smoking areas within the health facilities are still insufficiently applied.</li> <li>3. Example and attitude of health professionals is crucial for the credibility of their message towards patients to quit smoking.</li> <li>4. Hospitals are a place where tobacco related illnesses are treated and tobacco cessation conditions the short and long-term prognosis of those illnesses; tobacco cessation consultations constitute necessary complements to the treatment.</li> <li>5. It is the duty of hospitals to provide a clean environment, specifically regarding air quality.</li> <li>6. Smoking in the hospital can bring a major safety risk regarding fire prevention and safety. Fire outbreaks within hospitals have been related to the careless use of a cigarette.</li> </ol> |

|                          |   |
|--------------------------|---|
|                          | <p>7. Tobacco control within the hospital is receiving increased attention as an excellent indicator of the quality of care. For instance, some smoking criteria have been included in the French accreditation guide under the chapter "taking care of the patient".</p>   |
| Operational definition   | <p>The self-audit questionnaire is available for download in a number of languages from the following webpage:<br/> <a href="http://www.ensh.eu/ensh/racine/default.asp?id=954">http://www.ensh.eu/ensh/racine/default.asp?id=954</a></p> <p><b>Description of the tool from the ENSH webpage</b></p> <p><i>The tool is a 42 items self-administered audit tool structured into 10 sections. These sections represent the basic standards which summarise our policy. For more information, you can click in each of the following sections:</i></p> <ul style="list-style-type: none"> <li>(1) <u>commitment</u></li> <li>(2) <u>communication</u></li> <li>(3) <u>education</u></li> <li>(4) <u>identification and cessation support</u></li> <li>(5) <u>tobacco control</u></li> <li>(6) <u>environment</u></li> <li>(7) <u>healthy workplace</u></li> <li>(8) <u>health promotion</u></li> <li>(9) <u>monitering</u></li> <li>(10) <u>policy implementation</u></li> </ul>  |
| Previous PATH experience | <p>PATH-II indicator assessed the prevalence of staff on payroll smoking, using the first question on the survey developed by the European Network of Smoke-free Hospitals for point prevalence study. If the information on staff smoking prevalence was already available from other sources (such as periodic staff health survey or occupational medicine records), then these were used. Data was stratified by age categories, sex and occupational group.</p> <p>While PATH-II focused on outcomes (% staff smoking), PATH'09 focuses on structures and process. This shift of focus indicates how little impact hospitals assume that they actually have on the smoking prevalence and the high burden of data collection. International comparisons were considered of extremely little value. It was agreed during the Ljubljana consensus workshop to prefer at this stage the self-audit. Also, the self-audit survey does not limit itself to staff but also includes the patient and visitors' perspective.</p> <p>The prevalence rate between participating hospital staff and the general population was compared. In most European countries the smoking rate among hospital workers is over 25%, which is only just a little below the rate for the general population.</p> |

|                   |  |
|-------------------|--|
| Data source       | <p><b>Instructions on use of the questionnaire from the ENSH webpage</b> (<i>italic font</i>) and adapted to the PATH network (normal font).</p> <p>It is suggested that the PATH Coordinator in the Country contacts the local Smoke Free hospital Network (established in Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Poland, Portugal, Slovakia, Slovenia, Spain) to discuss potential to share resources for analysis of the questionnaire and sharing best practices and identifying potential for quality improvement. Emphasis is on supporting continuous improvement (incremental progress, networking and shared experiences) consequently smaller samples at regular intervals is preferable.</p> <p><i>“Prior to completing the self audit Questionnaire, organizations should complete a review of current practices with regard to the following aspects :</i></p> <ol style="list-style-type: none"> <li><i>a. commitment and communication,</i></li> <li><i>b. training and smoking cessation support services,</i></li> <li><i>c. general tobacco control and environment.</i></li> </ol> <p>The Questionnaire is completed locally at each hospital. The format to return it to the PATH Coordinator in the Country (electronic or paper) is to be defined locally.</p> <p><i>Each participating hospital rates itself on each item by selecting one of the following five options :</i></p> <ol style="list-style-type: none"> <li><i>1 = No / Not implemented</i></li> <li><i>2 = Less than half implemented</i></li> <li><i>3 = More than half implemented</i></li> <li><i>4 = Yes / fully implemented</i></li> </ol> <p><i>A total score is calculated ranging from 1 to a maximum of 168. (...) Emphasis is on supporting continuous improvement (incremental progress, networking and shared experiences) rather than competition between participating hospitals and participating countries.</i></p> <p><i>It is important to provide regular feedback to staff and users on the progress and/or difficulties encountered in implementing all standards.</i></p> <p><i>Organizations are strongly advised to undertake this review before completing the questionnaire, as an accurate assessment will aid the development of realistic action plans, the exchange of information and the provision of appropriate support and assistance”.</i></p> |
| Domain            | Responsive governance as well as patient centeredness and staff orientation.   |
| Type of indicator | Process measure  |

|                               |   |
|-------------------------------|---|
| Adjustment/<br>stratification | Not relevant  |
| Sub-indicators                | To develop a better understanding and identify priority areas for improvement, the scores might be decomposed on each sub-dimension (see definition above).   |
| Related indicators            | It is relevant to assess this indicator together with a measure of the prevalence of staff smoking, if monitored locally (and reference points for the hospital in the past or for national reference points are available) and though not included in the PATH'09 indicator set. The potential to cross-cut both indicators should be discussed within the PATH participating hospitals group in each country before implementation of the self-audit on structures and process. |
| Interpretation                | Reasons for unsatisfactory scores (reflecting standards not met) are evident as ENSH for each of the above mentioned sections of the questionnaire provides standards for best practice.  |
| Guidelines                    | <a href="http://strategyguides.globalink.org/pdfs/Enforcement_Strategies.pdf">http://strategyguides.globalink.org/pdfs/Enforcement_Strategies.pdf</a>   |
| References                    | The self-audit tool as well as supporting material for this descriptive sheet is to be found at the ENSH home page. <a href="http://www.ensh.eu">http://www.ensh.eu</a> . Links to national networks and relevant national material are provided.<br><a href="http://www.ensh.eu/ensh/racine/default.asp?id=872">http://www.ensh.eu/ensh/racine/default.asp?id=872</a>  |

# Exclusive breastfeeding

December 2009

## Contents:

Short name

**Short name**

Exclusive breastfeeding

Detailed name

Detailed name

Percentage of healthy infants exclusively breastfed at discharge.

Short definition

Short definition

Percentage of infants being exclusively nurtured with breast milk (including expressed milk) from birth to discharge.

Rationale

Rationale (including justification, strengths and limits)

### *Positive impact*

Exclusive breastfeeding (EBF) is internationally recognized as the best nurture for infants during the first six months of life according to the WHO and EU recommendations (1,2). The benefits of breastfeeding are multiple:

Breastfeeding eases digestions and provides all the nutrients, micronutrients, water, antibodies, hormones and antioxidants needed by babies. It also protects babies from diarrhea and acute respiratory infections, stimulates their immune systems and response to vaccination. Finally, according to some studies it confers cognitive benefits as well (1, 2, 3).

Breastfeeding has also benefits for mothers since it protects against breast cancer (4), decreases the risks of hip fractures and contributes to the increase of birth spacing (5).

### *Hospital influence and quality*

Exclusive breastfeeding from birth is possible except for a few medical conditions. The post-partum is a critical period in which mothers need support and respect. Interfering breastfeeding with additional feeding sources and nutrients or by restricting the child-mother contact may result in negative influences for milk production.

Operational definition

Previous PATH experience

Data source

Domain

Type of indicator

Adjustment/ stratification

Sub-indicators

Related indicators

Interpretation

Guidelines

References

|                        |   |
|------------------------|---|
|                        | <p>Therefore, in order for breastfeeding to act as a good quality indicator we should only use "exclusive" breastfeeding as inclusion criteria. Based on scientific evidence the Baby-Friendly Hospital Initiative (BFHI), promoted by WHO and UNICEF (6), recommends exclusive breastfeeding and defines the cases for which such recommendation applies (see operational definition in this descriptive sheet). In this respect, the hospital staff and organization have a key role, as admitted by BFHI.</p> <p>Although BFHI recommends the use of the indicator over the total number of delivered babies in the hospital, PATH proposes a more restrictive indicator that allows controlling for hospital complexity variability. The reason is to avoid focusing the discussion on differences in hospital complexity among PATH members rather than the core point of the indicator, that is the use of exclusive breastfeeding in, say, "normal" conditions.</p> <p><i>Strengths</i><br/>Very strong rationale on benefits for all children and mothers; major public health impact. Whole population based. Low burden of collection.</p> <p><i>Limits</i><br/>Covers partially the area of health promotion in the hospital.<br/>Most countries and regions collect data for a centralized registry. Usually this data is gathered at the moment of the baby blood sample collection –usually right after birth. Some hospital staff may feel that filling the data for the PATH initiative is a duplication of efforts</p>   |
| Operational definition | <p><b>Numerator</b></p> <p>Number of babies exclusively breastfed (EBF<sup>a</sup>) from birth to discharge. To receive drops or syrups with vitamins, minerals, and medicines is allowed.</p> <p><b>Denominator</b></p> <p>Total number of singleton newborns with birth weight greater than or equal to 2,000 grams at birth, gestational age greater than or equal to 37 weeks, 5-minute Apgar score greater than or equal to 5, neither mother nor infant has a medical condition for which breastfeeding is contra-indicated<sup>b</sup>.</p> <p>(<sup>a</sup>) EBF requires that the infant receive breast milk (including expressed breast milk from the mother, a wet nurse or a breast milk bank).</p> <p>(<sup>b</sup>) Medical conditions for which breastfeeding is contraindicated by the WHO/UNICEF or those in which the addition of other foods for a limited period, or the temporary avoidance of breastfeeding is justified (7):</p> <ul style="list-style-type: none"> <li>- Infant conditions: galactosemia, maple syrup urine disease, phenylketonuria. Other conditions in which the addition of other foods for a limited period, or the temporary avoidance of breastfeeding may be justified: newborn infants at risk of hypoglycaemia by virtue of impaired metabolic adaptation or increased glucose demand.</li> <li>- Maternal conditions: HIV infection (condition valid only for European Region countries), addiction to drugs and chemotherapy. Other conditions in which the addition of other foods for a limited period, or the temporary avoidance of breastfeeding may be justified: severe illness as sepsis, herpes simplex virus type 1 on the mother's breast, and some maternal medication).</li> </ul> |

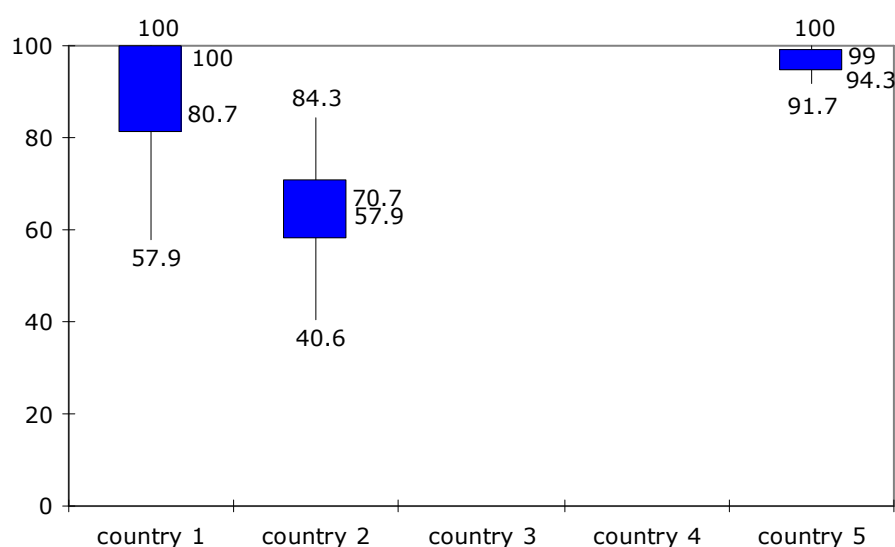
Previous PATH experience

In PATH-II and PATH-pilot, exclusive breastfeeding rate at discharge was already monitored. Though, no data collection grid was provided to the hospitals. We might assume differences in how supplements are recorded in patient record and low reliability in the definition of “exclusive” breastfeeding.

In one country, this indicator prompted the creation of a breastfeeding working group within PATH which discussed the challenges and opportunities to increase breastfeeding and for more baby-friendly hospitals. The group collaborated on the achievement of the 10 steps for baby-friendly hospitals.

PATH-II highlighted great differences across countries but also within countries. Breastfeeding is very culturally grounded and hospitals have only a relative contribution to support breastfeeding. Though, comparisons of practice internationally and understanding how hospitals achieve better results in some countries than in others might prove useful for the countries with lower rates.

**Inter- and within-country distribution of core indicator (Box plot: min, 1<sup>st</sup> quartile, 3<sup>rd</sup> quartile, maximum)**



Data source

**Population:** Data should be collected from the whole population of newborn babies in hospitals. In this way indicators and sub-indicators can also be calculated.

**Sample:** The sample must be representative of the target population. Using simple Statistics, a minimum sample of 865 mother-infant pairs is found to be sufficient to estimate a 10% of no-EBF, which provides a margin of error close to  $\pm 2\%$ , with a confidence level of 95%. The time necessary to achieve the sample size must be estimated as a function of the annual number of deliveries.

**Data collection:** The following are crucial aspects of data collection:

- i) include into the denominator all newborns meeting conditions of denominator,
- ii) the accuracy and precision in registering categories of feeding,
- iii) information on reasons for using supplements or replacement foods should be collected aside and be used for improving the interpretation.

Source: Data is collected through the compliance of a data-collection sheet where the "data collector" registers the information obtained by asking directly to the mother within the reference period. Therefore, the source of information is the mother.

Person that collects the data: The person collecting the data should not be directly related with the child-mother care (i.e. one from the administrative or kitchen's staff) in order to avoid information biases. Although some WHO documents recommend data to be collected from the kitchen information system when women receive different diets because of breastfeeding.

Note: Maternal recall is a standard method with adequate validity and reliability to collect data for estimating breastfeeding initiation (8). The 24 hours recall is the recommended method in epidemiological studies on infant populations with a wide range of age (9). Mothers' calling is more reliable if the period from birth to the interview remains within the normal duration (discharge at 48 – 76 hours). Therefore, mothers are to be interrogated from birth until the moment of the interview (see below).

Recording time: The information being asked to the mothers is always retrospective. Three moments are required for registering the information needed for the indicator and the related sub-indicators:

- Between 24 and 48 hours after birth. Note: in some countries the discharge occurs 48 hours after birth; in those cases there is a need to discuss cross country comparisons issues. Collecting data during the first 24 hours is unadvisable because it is not a valid measure of the hospital intervention. The reason why first data should not be collected before the first 24 hours of life is because sometimes newborns sleep long hours due to exhaustion.
- At discharge. Note: Apart from being the standard recording time, it might also be convenient for hospital staff since several data are usually collected at discharge anyway.
- At the follow-up telephone calls after discharge. Some hospitals carry out telephone follow-ups or post-partum visits a few days after discharge either to monitor and assist the mothers or to survey and evaluate the impact of their efforts to promote EBF. The data collection sheet does not include a section to be applied at this moment. Although the PATH data collection sheet does not include this moment, hospitals that carry out monitoring and follow-ups after discharge are encouraged to collect data on EBF in this part of the process.

Data collection tool. (Appendix: Data Collection Tool 1/2 and 2/2)

A layout of a data collection sheet is proposed with two sections, one to be filled between 24 to 48 hours, and the other at discharge. These are to be validated by countries and cross-cultural equivalences should be tested

|                               |   |
|-------------------------------|---|
| Domain                        | Responsive governance<br>Patient centeredness   |
| Type of indicator             | Outcome measure   |
| Adjustment/<br>stratification | Mother and infants' health conditions, and hospital characteristics (level of complexity) can be considered.  |
| Sub-indicators                | <p><b>Exclusive breastfeeding (EBF) from birth to a moment between 24 to 48 hours after birth</b><br/> <i>Numerator:</i> Number of babies EBF from birth to a moment between 24-48 h.<br/> <i>Denominator:</i> Same denominator as in operational definition (see above).</p> <p><b>Exclusive breastfeeding at discharge on the whole population</b><br/> <i>Numerator:</i> Number of babies EBF from birth to discharge.<br/> <i>Denominator:</i> All newborn infants.</p> <p><b>Exclusive breastfeeding after discharge</b><br/> Some hospitals carry on a post-discharge follow-up by telephone.<br/> <i>Numerator:</i> Number of babies EBF from birth to XXX days after discharge.<br/> <i>Denominator:</i> Same denominator as in operational definition (see above).</p>   |
| Related indicators            | C-section rate  |
| Interpretation                | <p>Higher rate implies better assistance and more patient-centeredness. Given that the PATH breastfeeding indicator excludes "complex" cases, interpreting a good practice implies reaching at least 90 percent of the cases.</p> <p>Although both WHO and EU use indicators that include all babies (1), this has the inconvenience that a great part of variability might be induced by differences in hospital complexity. The PATH indicator is therefore more convenient for discussion and easier to interpret since it rules out "complex" cases.</p> <p>Nonetheless, since the data collection sheet includes all cases, the analyst always has the option to calculate the indicators according to the international guidelines, including the whole population newborn infants. In the latter case, the WHO/UNICEF BFHI certification requires reaching at least a 75% exclusive breastfeeding.</p> <p>The sub-indicator of EBF 48 hours after birth might be used in the case that length of hospital stay varies significantly across PATH hospitals. The advantage of this indicator is that the reference period has less variability.</p> <p>Finally, an indicator with a longer reference period is proposed for the hospitals that carry on a follow-up on mothers and babies after discharge through telephone calls. Again, this will only be useful for comparative purposes if the timing of the call is similar across hospitals.</p> |

|            |   |
|------------|---|
|            | <p>It should be noted that this indicator is proposed as one for capturing hospital patient-centeredness focus. Other relevant indicators that could give similar glances are c-section, skin-to skin contact after birth, rooming-in, etc.</p> <p><b>Additional uses:</b> <i>the PATH indicator can be incorporated into existing regional maternal and child health monitoring registries.</i></p>  |
| Guidelines | See references  |
| References | <p>(1) Fifty-fourth World Health Assembly. Infant and young child nutrition. World Health Assembly 54.2, Agenda item 13.1, 18 May 2001.</p> <p>(2) EU Project on Promotion of Breastfeeding in Europe. Protection, promotion and support of breastfeeding in Europe: a blueprint for action. European Commission, Directorate Public Health and Risk Assessment, Luxembourg, 2004. It can be downloaded from:<br/> <a href="http://europa.eu.int/comm/health/ph_projects/2002/promotion/promotion_2002_18_en.htm">http://europa.eu.int/comm/health/ph_projects/2002/promotion/promotion_2002_18_en.htm</a></p> <p>(3) Fleisher Michaelson, K., Weaver, L. &amp; Branca, F. Feeding and Nutrition of Infants and Young Children. Copenhagen: WHO Regional Publications, European series; No. 87, 2000.</p> <p>(4) Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease. Lancet. 2002;360(9328):187-95.</p> <p>(5) Rea MF. [Benefits of breastfeeding and women's health] J Pediatr (Rio J). 2004;80(5 Suppl):S142-6.</p> <p>(6) WHO, UNICEF and Wellstart International. Baby-friendly hospital initiative: revised, updated and expanded for integrated care. Section 1; Background and implementation.</p> <p>(7) WHO, UNICEF and Wellstart International. Baby-friendly hospital initiative: revised, updated and expanded for integrated care. Section 4, Hospital self-appraisal and monitoring.</p> <p>(8) Riordan JM, Koehn M. Reliability and validity testing of three breastfeeding assessment tools. J Obstet Gynecol Neonatal Nurs. 1997 Mar-Apr;26(2):181-7.</p> <p>(9) WHO. Indicators for assessing breast-feeding practices (WHO/CDD/SER/91.14) Geneva, Switzerland: World Health Organization 1991.</p> |

Data collection tool 1/2

1. Infant ID:   
 2. Family ID:

## Newborn feeding until 2nd day

Interview between 24 - 48 hours after birth

3. Date of delivery:  4. Date of completion:   
 5. Gestational age:  6. Birth weight:  7. Sex:   
 8. 5-m Appgar:

### Delivery and early post-partum

9. Type of delivery:

- 1  vaginal
- 2  c-section with general anesthesia
- 3  c-section with local anesthesia
- 4  other (describe): \_\_\_\_\_

10. Risk conditions for the delivery

- 1  None
- 2  Yes. Which ones?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_

11. Skin-to-skin contact immediately after birth:

- 1  yes →
- 2  no →
- 3  do not know →

12. If yes:

- 1  for less than 1 hour
- 2  for 1 hour or more
- 3  do not know

13. If no, why?

- 1  Child reanimation difficulties
- 2  Mother's complications
- 3  other. Explain: \_\_\_\_\_

### Baby's location from birth to 48 h

14.

- 1  same room as mother all the time
- 2  nursery / observation room all the time
- 3  same room & nursery/observation room (1 & 2)
- 4  special care unit
- 5  other: \_\_\_\_\_

### Feeding from birth to 48 h

15. Breast-milk:

- 1  yes →
- 2  no →

16. How baby breastfed

- 1  direct contact with mother
- 2  bottle
- 3  cup or other (describe) \_\_\_\_\_

17. Supplement feeds and other:

- 1  none
- 2  water
- 3  drops or syrups with vitamins, minerals and medicines
- 4  formula
- 5  home preparation or other (describe): \_\_\_\_\_

18. How were the supplement (or replacement) feeds administered?

- 1  bottle
- 2  syringe
- 3  other

19. How many times were they administrated?

1  \_\_\_\_\_

19. Reasons for supplements or replacement feeds

1  galactosemia

2  maple syrup urine disease

3  phenylketonuria

4  mother HIV infection

5  mother addiction to drugs (describe):

6  other (describe):  
\_\_\_\_\_

20. Any problem related to positioning or attachment for infant feeding

21. Actions taken

**Baby's location from birth to 48 h**

22. Hospital name: \_\_\_\_\_

Data collection tool 2/2

1. Infant ID:   
 2. Family ID:

## Newborn feeding until discharge

### Interview at discharge

3. Date of delivery:   
 4. Date of discharge:   
 5. Gestational age:   
 6. Birth weight:   
 7. Sex:   
 8. 5-m Apgar:

### Feeding from birth to discharge

9. Have you breast-feed your baby during the last 24h?

- 1  yes  
 2  no

10. Did your baby received breastmilk directly from the breast, with bottle or other way?

- 1  direct contact with mother  
 2  bottle  
 3  cup or other (describe)  
 \_\_\_\_\_

11. Has your baby been given anything other than breast milk during the last 24h? What?

- 1  no, he/she was not given supplements  
 2  water  
 3  drops or syrups with vitamins, minerals and medicines  
 4  formula  
 5  home preparation or other (describe):  
 6  do not know  
 \_\_\_\_\_

12. How were the supplement (or replacement) feeds administrated?

- 1  bottle  
 2  syringe  
 3  other

13. Why was your baby given supplements?

- 1  I requested it  
 2  Staff recommended the supplements but I do not know why  
 3  Staff recommended the supplements because (describe):  
 \_\_\_\_\_

4  Other (please, tell us why):  
 \_\_\_\_\_

### Delivery and early post-partum

14. What type of delivery did you have?

- 1  vaginal  
 2  c-secion with general anesthesia  
 3  c-secion with local anesthesia  
 4  other (describe): \_\_\_\_\_

15. How long after birth did you first hold your baby?

- 0  I did not (go to 17)  
 1  inmediately after birth  
 2  \_\_\_\_\_ minutes after birth  
 3  do not know

16 How did you hold your baby this first time?

- 1  skin-to-skin contact  
 2  wrapped without much skin-to-skin  
 3  no contact

18. Why?  
 \_\_\_\_\_

17. For about how long did you hold your baby this first time?

- 1  \_\_\_\_\_ minutes  
2  don't know

**Baby's location from birth to 48 h**

19. Where was your baby when you were in the hospital after giving birth?

- 1  My baby was always with me both day and night  
2  There were times my baby was not with me (he/she was in nursery/observation room)  
3  My baby was all the time in the nursery/observation room  
4  My baby was all the time at a special care unit  
5  other: \_\_\_\_\_

20. Any problem related to positioning or attachment for infant feeding

21. Actions taken

**Baby's location from birth to 48 h**

22. Hospital name: \_\_\_\_\_



# AMI patients prescribed aspirin at discharge

December 2009

## Contents:

- Short name
- Detailed name
- Short definition
- Rationale
- Operational definition
- Previous PATH experience
- Data source
- Domain
- Type of indicator
- Adjustment/ stratification
- Sub-indicators
- Related indicators
- Interpretation
- Guidelines
- References

|   |  |
|---|--|
| <b>Short name</b>   | AMI patients prescribed aspirin at discharge   |
| Detailed name   | Compliance with guidelines for continued aspirin treatment of patient with AMI.  |
| Short definition  | Percentage of AMI patients who have been prescribed aspirin at discharge in compliance with guidelines.  |
| Rationale (including justification, strengths and limits) | <p>A meta analysis of randomised control trials of long term antiplatelet therapy in 20,006 high risk patients (1) showed that treatment resulted in significantly fewer serious vascular events and vascular death.</p> <p>Underuse of aspirin as a prophylactic drug in another medical disease (stroke patients (2)) occurs in up to 50 percent of patients and the underuse shows wide variations between hospitals compliance with guidelines. These finding suggests that there is room for improvement also for AMI patients.</p> <p>Though the burden of data collection (prospective) of setting up an ad-hoc data collection is high, it has a great potential to raise awareness on the issue and drive quality improvement. In analogy to PATH II experience with use of indicator on prophylactic use of antibiotics in compliance with guidelines, this type of indicator calls for greater attention to compliance with guidelines. It supposes that previous to data collection, the guidelines are widely disseminated and explained in the hospital.</p> |

|                          |   |
|--------------------------|---|
| Operational definition   | <p><b>Numerator</b></p> <p>Number of patients at the denominator (meeting the inclusion and exclusion criteria) - in <u>compliance</u> with guidelines on long term prophylactic use of aspirin in AMI patients. At discharge patients are provided with a prescription on aspirin in accordance with guideline.</p> <p>A national guidelines are to be defined in details within the PATH national group of participating hospitals based on international guidelines tailored to local working procedures.</p> <p><b>Denominator</b></p> <p>Number patients admitted to hospital, age 15 years and older, with the principal/primary diagnoses of acute myocardial infarction (AMI):</p> <p>ICD-9: 410</p> <p>ICD-10: I21, I22</p> <p><b>Exclusion</b></p> <ul style="list-style-type: none"> <li>- Transferred to another in-patient hospital</li> <li>- Allergy to aspirin</li> <li>- Patient not given informed consent to aspirin treatment</li> <li>- Patient left hospital against medical advice</li> <li>- In hospital death</li> </ul> <p>A Prospective Data Collection Form (Appendix A) and an Indicator Computation Algorithm (Appendix B) are provided with this indicator descriptive sheet to support uniform data collection and calculations in accordance with the operational definitions.</p> |
| Previous PATH experience | Not applicable  |
| Data source              | <p>Prospective data collection continuously for at least two periods a year (e.g. starting February and October, minimum number of cases 30 per period). It should be repeated at least every 6 months to sustain awareness to continuous improvement in compliance with guidelines.</p> <p>The prospective data collection form is to be enclosed in the patient records for all eligible patients with the below listed procedure and diagnostic codes.</p> <p>It should be discussed and agreed within the PATH national group on a common procedure to make sure that all relevant patients get the Prospective Data Collection Form into their record, that it is filled in (by whom, and when) and that the forms, when filled in, are collected centrally in the hospital for the necessary calculations and reporting to be established. All the fields in the prospective data collection form are to be electronically encoded by the hospitals on a common structure (file) to be provided by the PATH coordinator in the country (e.g. Excel sheet or EPI Info). The database is then sent to the PATH coordinator in the country to validate the classification in "buckets" and compute indicators.</p>   |

|                               |   |
|-------------------------------|---|
| Domain                        | Clinical Effectiveness<br>Safety  |
| Type of indicator             | Process measure   |
| Adjustment/<br>stratification | Not relevant  |
| Sub-indicators                | The percent of patients with missing/ incomplete data should also be computed to monitor and assess the data quality (Appendix A).  |
| Related indicators            | <p>The following indicators are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to rate of AMI patients prescribed aspirin at discharge:</p> <p>Measurement of compliance with other Grade A evidence treatments for AMI, e.g.:</p> <ul style="list-style-type: none"> <li>- Early aspirin treatment</li> <li>- Early ACE (angiotensin-converting enzymes) inhibitor</li> <li>- Re-admittance rates</li> </ul>  |
| Interpretation                | <p>Improvement is noted as an increase in the rate of compliance. A near 100% compliance rate should be sought.</p> <p>Variations between different hospitals can be caused by different financial incentives for the use of aspirin, differences in the hospitals autonomy to order drugs and differences in the effectiveness of dissemination of the clinical guidelines (3).</p> <p>The process-owners for prescribing of aspirin at discharge may include doctors, nurses, pharmacists and support staff on the nursing unit. Opportunities may exist in any of these arenas which, when addressed jointly, can generate true process improvement.</p>   |
| Guidelines                    | <a href="http://www.nice.org.uk/nicemedia/pdf/CG48FullGuideline.pdf">http://www.nice.org.uk/nicemedia/pdf/CG48FullGuideline.pdf</a>   |
| References                    | <p>(1) Baigent C, Sudlow C, Collins R, Peto R. Collaborative meta-analysis of randomised trials of antiplatelet therapy for prevention of death, myocardial infarction, and stroke in high risk patients. <i>Br Med J</i> 2002; 324(7329):71-86.</p> <p>(2) Ingeman A, Pedersen I., Hundborg, H. H. , Petersen, P., Zielke,P., Mainz,J., Bartels,P. and Johnsen S.P. Quality of Care and Mortality among Patients with Stroke: A Nationwide Follow-up Study. <i>Medical Care</i> 2008;46: 63-69.</p> <p>(3) Grimshaw JM , Thomas RE, MacLennan G, Fraser C, Ramsay C, Vale L et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. <i>Health Technology Assessment</i>. 2004; 8(6).</p> |

# Prophylactic antibiotic use

December 2009

## Contents:

Short name

Detailed name

Short definition

Rationale

Operational definition

Previous PATH experience

Data source

Domain

Type of indicator

Adjustment/ stratification

Sub-indicators

Related indicators

Interpretation

Guidelines

References

|                            |   |  |
|----------------------------|---|--|
| <b>Short name</b>          | Prophylactic antibiotic use                               |  |
| Detailed name              | Detailed name   | Compliance with prophylactic antibiotic guidelines for selected tracer procedures.   |
| Short definition           | Short definition  | Per cent patients who have received prophylactic antibiotic in full compliance with the guidelines; elective surgery for selected tracer procedures.   |
| Rationale                  | Rationale (including justification, strengths and limits) | <p>According to the Institute for Health Care Improvement, an estimated 40 to 60 percent of Surgical Site Infections are preventable with appropriate use of prophylactic antibiotics. Prophylaxis reduces major morbidity, reduces hospital costs and is likely to decrease the overall consumption of antibiotics. It reduces short-term morbidity but there is no Randomised Clinical Trials that proves that prophylaxis reduces the risk of mortality or long-term morbidity.</p> <p>It is estimated that overuse, under use, improper timing, and misuse of antibiotics occurs in 25- 50 percent of operations. PATH-II indicator provided similar results (20-40% depending on procedure). PATH-II also highlighted wide variations between hospitals. This finding suggests that very substantial improvements could be achieved in a number of hospitals.</p> <p>Though the burden of data collection (prospective) of setting up an ad-hoc data collection is high, it has a great potential to raise awareness on the issue and drive quality improvement, as was demonstrated in PATH-II. It calls for greater attention to all five criteria for compliance with guidelines (see below: Operational definitions). It supposes that previous to data collection, the guidelines are widely disseminated and explained in the hospital.</p> |
| Operational definition     |   |  |
| Previous PATH experience   |   |  |
| Data source                |   |  |
| Domain                     |   |  |
| Type of indicator          |   |  |
| Adjustment/ stratification |   |  |
| Sub-indicators             |   |  |
| Related indicators         |   |  |
| Interpretation             |   |  |
| Guidelines                 |   |  |
| References                 |   |  |

Operational definition

### Numerator

Number of patients at the denominator (meeting the inclusion and exclusion criteria) - in full compliance with guidelines on prophylactic antibiotic use for the specific surgical procedure on five criteria. All five criteria below have to be met simultaneously for all patients to have received prophylactic antibiotic compliant with guidelines. Criteria 1 and 2 are to be defined within the PATH national group of participating hospitals (based on national and/or international guidelines); criteria 3 to 5 are built on international consensus and common to all participating hospitals in PATH.

- 1) Appropriate antibiotic drug (to be defined nationally)
- 2) Appropriate dose (to be defined nationally)
- 3) Appropriate route of administration: intravenous administration (international consensus)
- 4) Appropriate timing, within one hour of surgical wound incision (international consensus)
- 5) Appropriate timing: discontinued within 24 hours after surgical wound closure (international consensus) – or documentation of appropriate clinical indication for continuation of treatment beyond 24 hours

### Denominator

Inclusion: Planned surgery for tracer diagnostic/procedure, patients aged 18 years and older with principal procedure codes listed in Appendix A1, B1, and C1 AND principal diagnostic codes listed in corresponding Appendix A2, B2, and C2. The procedure codes might need to be adapted nationally to reflect the classification methodology used in the country.

### Exclusion

- Evidence of pre-operative infection
- Allergy to the antibiotic drug
- Unplanned (emergency) operation

*Tracer procedures:* A specific indicator is computed for each of the following tracer procedure:

| <i>Tracer condition</i>   | <i>Procedure code<br/>Appendix</i> | <i>Diagnostic code<br/>Appendix</i> |
|---------------------------|------------------------------------|-------------------------------------|
| Colorectal cancer surgery | A1                                 | A2                                  |
| Hip replacement           | B1                                 | B2                                  |
| Hysterectomy              | C1                                 | C2                                  |

|                          |   |
|--------------------------|---|
|                          | <p>Procedure and diagnostic codes are provided at appendix A, B, and C. At the national or local level, additional tracer procedures might be included. To include the above mentioned criteria 1 and 2 the appropriate antibiotic drug and dose has to be defined nationally (Appendix D).</p> <p>A Prospective Data Collection Form (Appendix E) and an Indicator Computation Algorithm (Appendix F) are provided with this indicator descriptive sheet to support uniform data collection and calculations in accordance with the operational definitions. The prospective data collection form and the indicator computation algorithm have to be adapted at national level to include the above mentioned criteria 1 and 2 (Appendix D).</p>   |
| Previous PATH experience | <p>International results and discussion on this indicator can be found in the PATH Newsletter 4. In PATH-II, hospitals were to assess compliance in accordance to guidelines defined locally (by the hospital) or nationally. The timing of the first and last dose of antibiotics was a tailored indicator. The core indicator did not include monitoring of those components if they were not specified in the local guidelines.</p> <p>Experience in PATH-II highlighted the lack of local or national guidelines or that the guidelines did not cover some internationally agreed components such as the timing of the prophylaxis to be initiated within one hour of incision and stopped within 24 hours of incision. The wide diversity in the degree of stringency of the guidelines made any comparison very difficult.</p> <p>Also, some countries/hospitals used this experience to review their guidelines and align them with the international consensus. Hence, PATH'09 goes a step further as in PATH'09 the indicator definition is already aligned to the international guidelines (except for antibiotic molecule and dosage which can be adapted to local conditions). Also, the definition and procedure for data collection in PATH'09 is detailed with the specification of an algorithm for calculation of the indicator and with a data collection form. Finally, for PATH'09, a prospective data collection is suggested.</p> |
| Data source              | <p>Prospective data collection continuously for at least two periods a year (e.g. starting February and October, minimum number of cases 30 consecutive patients per period). It should be repeated at least every 6 months to sustain awareness to continuous improvement in compliance with guidelines. In 2010, this data will be collected during February/March and September/October.</p> <p>The prospective data collection form is to be enclosed in the patient records for all eligible patients with the below listed procedure and diagnostic codes.</p> <p>It is strongly recommended to collect the data prospectively as it has a greater potential for making a positive impact on quality and because the burden of data collection is lowered and number of incomplete records is limited. However, if it is not possible, than retrospective data collection is acceptable but a similar approach is to be adapted by all the hospitals within a country. In addition, countries might decide that they compare prospective results with retrospective results.</p>  |

|                           |  |
|---------------------------|--|
|                           | <p>It should be discussed and agreed within the PATH national group on a common procedure to make sure that all relevant patients get the prospective data collection form into their record, that it is filled in (by whom, and when) and that those prospective data collection forms, when filled in, are collected centrally in the hospital for the necessary calculations and reporting to be established.</p> <p>All the fields in the Prospective Data Collection Form are to be electronically encoded by the hospitals on a common structure (file) to be provided by the PATH coordinator in the country (e.g. Excel sheet or EPI Info). The database is then sent to the PATH coordinator in the country to validate the classification in “buckets” and compute indicators.</p>   |
| Domain                    | <p>Clinical Effectiveness</p> <p>Safety</p>  |
| Type of indicator         | Process measure  |
| Adjustment/stratification | Not relevant   |
| Sub-indicators            | <p>To develop a better understanding on the reasons for non compliance and design appropriate actions for improving compliance, the global rate of compliance can be decomposed to reflect what criteria (1 to 5, see above: Operational definitions) were not met and thereby if overuse, under use or misuse of antibiotic drugs is observed. A suggested lay-out for a table to keep record of the appropriate use is depicted in Appendix G.</p> <p>The percent of patients with missing/ incomplete data should also be computed to monitor and assess the data quality (Appendix G).</p>   |
| Related indicators        | <p>This indicator might be related to hospitals’ monitoring of wound infections. PATH’09 does not include a specific indicator on wound infection rate but if this is currently monitored in the hospitals, bringing those two indicators (process and outcome) together would increase impact.</p>  |
| Interpretation            | <p>Improvement is noted as an increase in the rate of full compliance. A near 100% compliance rate should be sought.</p> <p>Variations between different hospitals can be caused by different financial incentives for the use of antibiotics, differences in the hospitals autonomy to order drugs and differences in the effectiveness of dissemination of the clinical guidelines (1). Key quality improvement issues identified by van Kasteren et al. (1) and the Scottish Intercollegiate Guidelines Network include:</p> <ul style="list-style-type: none"> <li>• each department should have an locally agreed guideline which is feasible and in agreement with local conditions as well as current scientific evidence,</li> <li>• use a practical safe guideline to assure proper timing (anaesthesiologist administer and surgeon confirm before incision),</li> </ul> |

|            |   |
|------------|---|
|            | <ul style="list-style-type: none"> <li>• ensure that all staff is knowledgeable about the clinical guideline in use,</li> <li>• identify logistical barriers preventing adherence to guidelines.</li> </ul> <p>The process-owners for timing of administration of antibiotics may include clinicians and support staff on the nursing unit as well as in the presurgical holding area, as well as in the operating room itself. Opportunities may exist in any of these arenas which, when addressed jointly, can generate true process improvement.</p> <p>As a prerequisite to interpreting the PATH'09 indicator, the hospital should compare its locally or nationally designed guidelines with criteria 1 to 5. If the local contradict the national/international consensus, a low degree of compliance will be expected. In such case, the reasons for divergence between local / national / international guidelines should be understood.</p>  |
| Guidelines | <p>Institute for Health Care Improvement:<br/> <a href="http://www.ihc.org/IHI/Topics/PatientSafety/SurgicalSiteInfections/">http://www.ihc.org/IHI/Topics/PatientSafety/SurgicalSiteInfections/</a> and their guideline on preventing Surgical Site Infections: <a href="http://www.ihc.org/NR/rdonlyres/C54B5133-F4BB-4360-A3E4-2952C08C9B59/0/SSIHowtoGuide.doc">http://www.ihc.org/NR/rdonlyres/C54B5133-F4BB-4360-A3E4-2952C08C9B59/0/SSIHowtoGuide.doc</a></p> <p>Scottish Intercollegiate Guideline Networks guideline on Antibiotic Prophylaxis in Surgery: <a href="http://www.sign.ac.uk/pdf/sign104.pdf">http://www.sign.ac.uk/pdf/sign104.pdf</a> (published in 2008) or their guideline on Management of Colorectal Cancer <a href="http://www.sign.ac.uk/pdf/sign67.pdf">http://www.sign.ac.uk/pdf/sign67.pdf</a> (published in 2003)</p> <p>The guideline from the Society of Obstetricians and Gynaecologists of Canada on Hysterectomy: <a href="http://www.sogc.org/guidelines/public/109E-CPG-January2002.pdf">http://www.sogc.org/guidelines/public/109E-CPG-January2002.pdf</a></p> <p><i>Primary total hip replacement: a guide to good practice</i> issued by the British Orthopaedic association:<br/> <a href="http://www.library.nhs.uk/guidelinesfinder/ViewResource.aspx?resID=113711&amp;tabID=288">http://www.library.nhs.uk/guidelinesfinder/ViewResource.aspx?resID=113711&amp;tabID=288</a><br/> (Published in 1999 and revised in 2006)</p> |
| References | <p>(1) van Kasteren ME, Kullberg BJ, de Boer AS, Mintjes-de GJ, Gyssens IC. Adherence to local hospital guidelines for surgical antimicrobial prophylaxis: a multi-centre audit in Dutch hospitals. <i>J Antimicrob Chemother</i> 2003; 51(6):1389-1396.</p>  |

**Appendix****A1. Colorectal cancer surgery :Principal procedure codes**

(to be adjusted to national guidelines recommendations)

*NOMESCO Classification of Surgical Procedures (NCSP), version 1.12*

|          |                                       |
|----------|---------------------------------------|
| JFB20-63 | Partial excision of intestine (colon) |
| JGB      | Excision of rectum                    |

**Appendix A2:****Colorectal cancer surgery: Diagnostic codes**

(to be adjusted to national guidelines recommendations)

*WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-10)*

|       |   |
|-------|---|
| C18   | Malignant neoplasm of colon   |
| C18.1 | Appendix  |
| C18.2 | Ascending colon   |
| C18.3 | Hepatic flexure   |
| C18.4 | Transverse colon  |
| C18.5 | Splenic flexure   |
| C18.6 | Descending colon  |
| C18.7 | Sigmoid colon   |
| C18.8 | Overlapping lesion of colon   |
| C18.9 | Colon, unspecified  |
| C19   | Malignant neoplasm of rectosigmoid junction                           |
| C20   | Malignant neoplasm of rectum  |
| C21.0 | Malignant neoplasm: Anus, unspecified                                 |
| C21.1 | Malignant neoplasm: Anal canal  |
| C21.2 | Malignant neoplasm: Cloacogenic zone                                  |
| C21.8 | Malignant neoplasm: Overlapping lesion of rectum, anus and anal canal |

**Appendix B1:****Hip replacement: Principal procedure codes**

(to be adjusted to national guidelines recommendations)

*NOMESCO Classification of Surgical Procedures (NCSP), version 1.12*

|     |   |
|-----|---|
| NFB | Primary prosthetic replacement of hip joint |
|-----|---|

**Appendix B2:****Hip replacement: Diagnostic codes**

(to be adjusted to national guidelines recommendations)

*WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-10)*

|     |                                 |
|-----|---------------------------------|
| M16 | Coxarthrosis (arthrosis of hip) |
|-----|---------------------------------|

**Appendix C1:****Hysterectomy: Principal procedure codes**

(to be adjusted to national guidelines recommendations)

*NOMESCO Classification of Surgical Procedures (NCSP), version 1.12*

|     |                            |
|-----|----------------------------|
| LCC | Partial excision of uterus |
|-----|----------------------------|

|     |                          |
|-----|--------------------------|
| LCD | Total excision of uterus |
|-----|--------------------------|

**Appendix C2:****Hysterectomy: Diagnostic codes**

(to be adjusted to national guidelines recommendations)

*WHO's "International Statistical Classification of Diseases and Related Health Problems (ICD-10)*

|       |                                   |
|-------|-----------------------------------|
| N80   | Endometriosis                     |
| N71   | Inflammatory diseases of uterus   |
| N84.0 | Polyp of corpus uteri             |
| N81   | Uterine prolapse                  |
| N85.0 | Endometrial glandular hyperplasia |
| N85.1 | Endometrial adenomatous           |
| N85.2 | Hypertrophy of uterus             |

**Appendix D****Prophylactic antibiotic according to national guidelines**

|                  |              |
|------------------|--------------|
| Recommended drug | Generic name |
|------------------|--------------|

|                          |           |
|--------------------------|-----------|
| Recommended initial dose | Milligram |
|--------------------------|-----------|

Appendix E

Prophylactic antibiotic use – Planned surgery for \*given tracer condition\*

**Prospective Data Collection Form**

Place this paper data collection form in the patient record of all patients undergoing planned surgery for \*tracer condition\*.

Fill in the form prospectively as the relevant data is available, i. e. register data on the form as close in time as possible to the clinical situation which generate the data.

The data herein is the minimum data set to unambiguously put the patient in one of the three categories (M, N, or D) according to the sorting in the Indicator Computing Algorithm: M = missing/invalid data case, N = numerator case, D = denominator case

|   |   |
|---|---|
| Patient name: Given names   | Patient ID: Number                        |
|   |   |
| Patient name: Family name   |   |
|   |   |
| Patients birthday   |   |
| Day   | Month                                     |
| Year  |   |
| <input type="text"/> <input type="text"/>   | <input type="text"/> <input type="text"/> |
| <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> |   |

|   |   |
|---|---|
| Principal procedure code  | Is the surgical procedure planned   |
| <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>                             | Yes      No<br><input type="checkbox"/> <input type="checkbox"/>  |
| Is patient allergic to antibiotic   | If Yes: Generic name of antibiotic drug   |
| Yes      No<br><input type="checkbox"/> <input type="checkbox"/>  |   |
| Has patient pre-operative infection   | If Yes: Type of infection   |
| Yes      No<br><input type="checkbox"/> <input type="checkbox"/>  |   |
| Date* of surgical incision  | Time of surgical incision   |
| Day      Month      Year<br><input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | 24 hour: minutes<br><input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> |

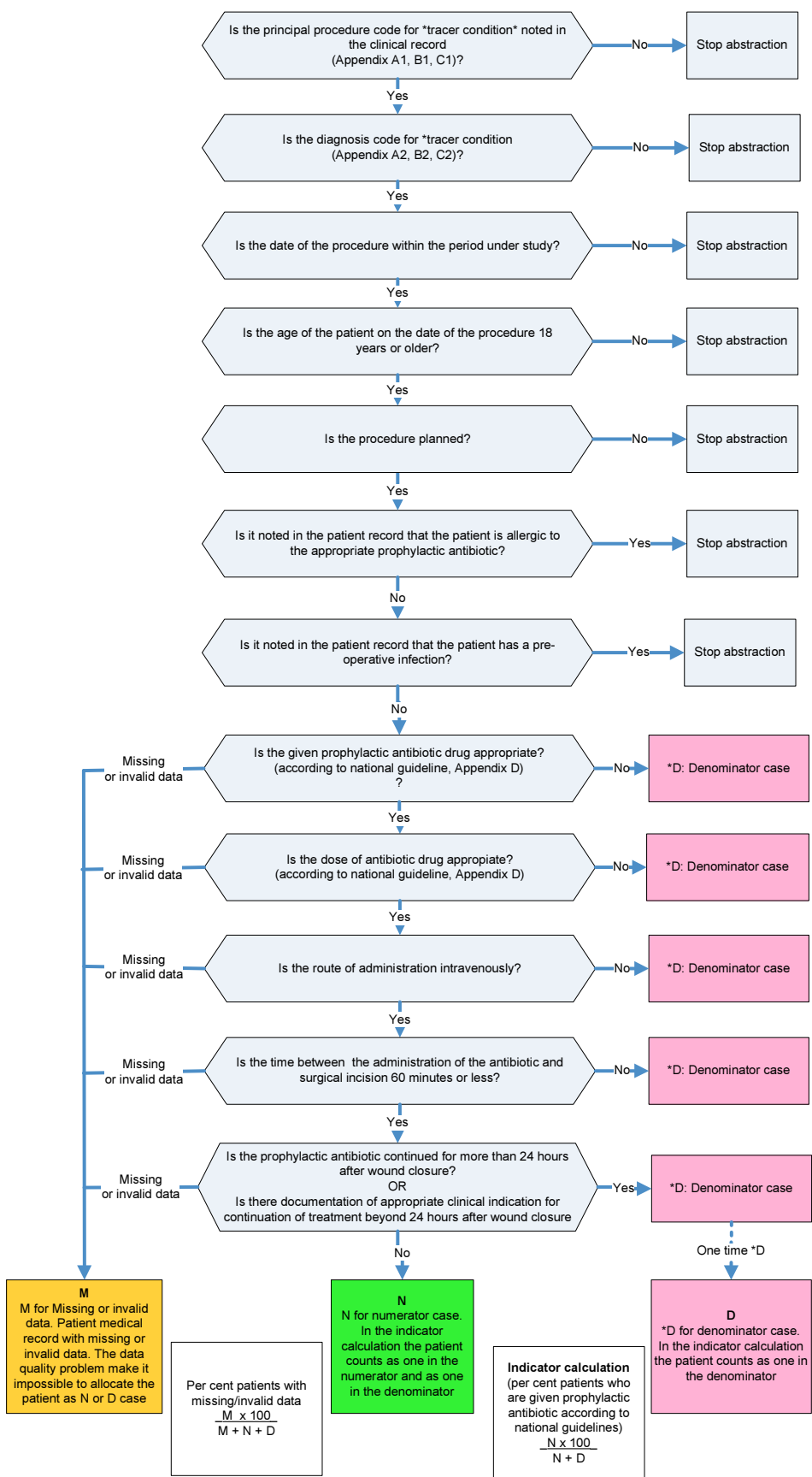
|   |  |
|---|--|
| Prophylactic antibiotic given   | If Yes:  |
| Yes      No<br><input type="checkbox"/> <input type="checkbox"/>  | Generic name of antibiotic drug  |
|   |  |
| First dose  | First dose - Route of administration   |
| Milligram<br><input type="text"/> <input type="text"/> <input type="text"/>                                     | IV      IM      SC      Other<br><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|   | IV = Intravenous<br>IM = Intramuscular<br>SC = Subcutaneous<br>Other = Other routes of administration                                |
| First dose - Date of administration   | First dose - Time of administration  |
| Day      Month      Year<br><input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | 24 hour: minutes<br><input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/>                            |
| Last dose - Date of administration  | Last dose - Time of administration   |
| Day      Month      Year<br><input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | 24 hour: minutes<br><input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/>                            |

|   |   |   |
|---|---|---|
| Date of surgical wound closure  | Time of surgical wound closure  | Category to which the patient belongs<br>according to the Indicator Computation Algorithm<br>N=numerator case      D=denominator case      M= missing/invalid data case<br><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| Day      Month      Year<br><input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | 24 hour: minutes<br><input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> |   |
| Principal diagnosis code  |   |   |
| <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>                             |   |   |

\*Date of surgical incision is used to calculate the age of the patient and decide in which indicator periode the patient belongs

Appendix F

**Indicator Computation Algorithm**



**Appendix G:****A suggested lay-out for a table to keep record of the appropriate use of prophylactic antibiotic**

|                               |                                       | Period A |     | Period B |     | Period X |     |
|-------------------------------|---------------------------------------|----------|-----|----------|-----|----------|-----|
|                               |                                       | No       | %   | No       | %   | No       | %   |
| <b><i>Appropriate use</i></b> | In full compliance                    |          |     |          |     |          |     |
| <b><i>Misuse</i></b>          | Appropriate antibiotic drug not given |          |     |          |     |          |     |
|                               | Dose not correct                      |          |     |          |     |          |     |
|                               | Route not correct                     |          |     |          |     |          |     |
|                               | Timing first dose > 60 minutes        |          |     |          |     |          |     |
| <b><i>Overuse</i></b>         | Timing last dose > 24 hours           |          |     |          |     |          |     |
| <b><i>Total</i></b>           |                                       |          | 100 |          | 100 |          | 100 |

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| Short name  | Length of stay  |  |
|---|---|--|
| Detailed name   | Detailed name   | Length of stay (LOS) in hospital for selected tracer conditions and procedures.  |
| Short definition  | Short definition  | Number of days of hospitalization (admission and discharge date count for one day) for selected tracer conditions and procedures (average and median).   |
| Rationale<br>Operational definition<br>Previous PATH experience<br>Data source<br>Domain<br>Type of indicator<br>Adjustment/ stratification<br>Sub-indicators<br>Related indicators<br>Interpretation<br>Guidelines<br>References | Rationale (including justification, strengths and limits) | <p>In many countries, policy makers are debating surrounding the over- or under-bedding. In EU countries, a trend towards shorter stays can be observed; however, without reaching US levels. Routine data showed that there are variations in length of stay between countries, regions and hospitals. The trends in length of stay showed a decrease over time in all regions.</p> <p>Research fails to show an adverse effect on health outcomes of reducing length of stay, but there may nevertheless be an ethical or moral minimum length of stay. However, numerous studies on appropriateness of hospital days indicate a great frequency of inappropriate days (see here-under).</p> <p>Length of stay is a direct measure of efficiency and reflects appropriateness.</p> <p><i>Strengths:</i> Low burden of data collection and very strong rationale, such as improving efficiency (maximizing the use of limited resources), improving integration and coordination of care (patients requiring alternative services should receive at the most appropriate place, e.g. nursing home, home care), improving internal processes and improving clinical effectiveness (reducing patients' exposure to hospital hazards).</p> <p><i>Limits:</i> Difficult to interpret because it may reflect and impact on many different sub-dimensions of performance. Furthermore difficulties to adjust for different in case-mix.</p> |

|                          |   |
|--------------------------|---|
| Operational definition   | <p><i>Tracer conditions and procedures</i><sup>1</sup></p> <p><b>Stroke:</b> ICD-9: 431, 433, 434, 436. ICD-10: I61, I62, I63, and I64</p> <p><b>Acute Myocardial Infarction (AMI):</b> ICD-9: 410 and ICD-10: I21, I22</p> <p><b>Community acquired pneumonia:</b> ICD-9: 485, 486 and ICD-10: J13, J14, J15, J18, A48.1</p> <p><b>Hip fracture:</b> ICD-9: 820. ICD-10: S72.0, S72.1, S72.2</p> <p><b>Coronary Artery Bypass Graft:</b> ICD-9-CM 36.10 through 36.19. NOMESCO: FNA through FNE</p> <p><b>Knee arthroscopy:</b> ICD9-CM: 81.26. NOMESCO: NGA01A, NGA21A, NGA21C, NGA31A</p> <p><b>Inguinal hernia:</b> ICD9-CM: 53.0, 53.1, 53.21. NOMESCO: JAB</p> <p><b>Tonsillectomy and/or adenoidectomy:</b> ICD9-CM: 28.2 and 28.3. NOMESCO: EMB</p> <p><b>Cholecystectomy:</b> ICD9-CM: 51.22 and 51.23. NOMESCO: JKA20, JKA21</p> <p><b>Varicose veins – stripping and ligation:</b> ICD9-CM: 38.59. NOMESCO: PHD, PHB 10,11,12,13,14</p> <p><b>Inclusion</b></p> <p>All bed days in hospital for selected tracer conditions and procedures: day care, bed units, intensive care units, rehabilitations units.</p> <p><b>Exclusion</b></p> <ul style="list-style-type: none"> <li>- Patient transferred to/from other hospitals</li> <li>- Acute surgical cases</li> <li>- Patients under 15 years of age</li> </ul> <p><i>Computation</i></p> <p>For each eligible patient, subtract hospital discharge date from hospital admission date. If subtraction gives value 0 (zero), count 1. Calculate average and median as measures of central tendency; standard deviation, 1<sup>st</sup> and 3<sup>rd</sup> quartiles as measures of dispersion ; report also minimum and maximum values for the period under consideration.</p> |
| Previous PATH experience | <p>There is a though rationale for exclusion of transferred patients (in and out); it create bias when part of the process to limit LOS is to have transfers.</p> <p>Focus should be on comparison of hospital over time: combine indicator of “absolute” LOS with indicator of trends in LOS.</p>  |

<sup>1</sup> If another coding system for procedure is used in the country, please agree on common codes in your country and forward this information to the PATH International Secretariat. This information will be consolidated and forwarded to all PATH coordinators if international comparisons are expected.

|                           |  |
|---------------------------|--|
| Data source               | <p>Retrospective data collection. Administrative databases (e.g. discharge abstracts): principal diagnosis and procedure codes, age at admission, admission date, discharge date; for sub-indicators also: elective surgery date.</p> <p>Compute the indicator on three full years to identify potential trends (2006, 2007, 2008) or the three last available years.</p>  |
| Domain                    | Efficiency   |
| Type of indicator         | Outcome measure  |
| Adjustment/stratification | <p>Age</p> <p>Sex</p> <p>Co-morbidities</p>  |
| Sub-indicators            | <p>For surgical procedures:</p> <p>Number of days from admission to elective surgery</p> <p>Number of days between elective surgery and discharge</p>  |
| Related indicators        | <p>Day surgery rate</p> <p>The following indicators are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to length of stay:</p> <p>Bed occupancy rate</p> <p>Readmission rates for selected conditions and procedures</p>   |
| Interpretation            | <p>From the point of view of indicator of efficiency, shorter is better, but very low median days may pose patients at risk.</p> <p>Length of stay has become an important measurement used to control costs, is commonly used as an indication of the quality of care rendered, and is a common outcome variable used to compare the performance between hospitals. Prolonged length of stay may be an indication of patient complications.</p> <p>Patients may experience extensions in hospitalizations due to delays in decision-making by providers while they wait for results, schedule diagnostic tests, conduct discharge planning, or wait for consultation because of inadequate access to consultants and specialists.</p> |
| Guidelines                | See references   |

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# Operating theatre performance

December 2009

## Contents:

- Short name
- Detailed name
- Short definition
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|   |   |
|---|---|
| <b>Short name</b>   | Operating theatre performance   |
| Detailed name   | Efficiency of use of the operating theatre for elective and emergency surgery (inpatient and outpatient).   |
| Short definition  | Percent of usefully spend time (directly with patient) in operating theatre.  |
| Rationale (including justification, strengths and limits) | <p><i>Justification</i></p> <p>The operating theatre (OPT) or operating room is a high cost department within hospitals. Considerable resources are wasted if operating room is not used effectively. Effective management of operating room is paramount when operating room is a "bottleneck". By increasing use of operating room, patient flow improves and waiting list can be reduced.</p> <p>Direct measure of optimal use of the capacity. Increasing surgical theatre use maybe achieved by better work organization, such as better preparation by the team of anaesthetic, theatre and surgical staff, however, may also require higher staffing levels. Improving the performance of operating theatres is key to achieving shorter waiting times for treatment, implementing booking of elective operations and reducing cancelled operations. Indicator is very sensitive to planning (scheduling and forecasting) and coordination of care (preoperative preparation).</p> <p><i>Strengths</i></p> <p>Very strong rationale for use: Analyzing the operating room utilisation trends allows rescheduling of elective operating sessions so that all units achieve optimal utilization. This is only possible if the data is closely monitored and if reasons for low utilisation rates and/or high rate of unused sessions are investigated. Potential relationship with other indicators of performance to increase content validity of the set as a whole, forces hospitals to monitor operating room utilization.</p> |

|                        |   |
|------------------------|---|
|                        | <p><i>Limits</i></p> <p>Concerns regarding reliability across countries and burden of data collection.</p>  |
| Operational definition | <p>It is very important how hospitals define operating theatre at national and international levels. <b>Operating Theatre</b> is the room where surgical procedures are performed under anaesthesia* (surgical procedure codes provided by NOMESCO) <a href="http://www.nordclass.uu.se/verksam/NCSP1_12.pdf">http://www.nordclass.uu.se/verksam/NCSP1_12.pdf</a></p> <p>First an occupancy rate is calculated for each operating room. Then the average is calculated separately for:</p> <ul style="list-style-type: none"> <li>- elective only rooms,</li> <li>- emergency only rooms,</li> <li>- mixed rooms (with both elective and emergency room),</li> <li>- day surgery rooms.</li> </ul> <p><u>For each room:</u></p> <p><b>Numerator</b><br/>Sum of patient time in the operating room during normal staffed hours*</p> <p><i>*If patient <u>exits before the normal closing time</u>:</i><br/>Patient exits time minus patient entrance time (in minutes)<br/>(e.g. patient exits 3.30 pm, patient enters 1.30 pm = 120 minutes).</p> <p><i>*If the patient <u>exit after the normal closing time</u>:</i><br/>Normal closing time minus patient entrance time (in minutes)<br/>(e.g. patient exits 4.30 pm , normal closing time 4pm, patient enters 1.30 p = 150 minutes).</p> <p><i>This distinction is for elective only rooms as emergency rooms are usually open 24 hours</i></p> <p><i>If entry time is before normal opening time, then actual entry time is used as a reference. It reflects a planned early opening or promptly ready room and hence contributes to higher productivity.</i></p> <p><b>Denominator</b><br/>Total number of hours staffed per local norms. This value is normative. It corresponds to the "normal" working hours in the operating theatre (e.g. from 8 am to 4 pm = 480 minutes for elective only room but 24 hours for emergency room) multiplied by number of working days during the observation period (e.g. 20 days for elective only or 30 days for emergency room).</p> |

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\* Adapted from the Estonian definition

|                          |   |
|--------------------------|---|
|                          | <p><b>Inclusion</b></p> <p>This indicator is only computed for <b>centrally managed rooms</b>. This criteria is justified for practical reason (data collection feasible and more reliable) to have more homogeneity in management practices.</p> <p><b>Exclusion</b></p> <ul style="list-style-type: none"> <li>- closed facilities (e.g. because of lack of staff) - as the number of regular staffed hours is null,</li> <li>- induction and recovery rooms.</li> </ul> <p>When reporting the data, the hospital should also report for each room:</p> <ul style="list-style-type: none"> <li>- number of patients (volume),</li> <li>- normative opening and closing hours (staffed),</li> <li>- number of days staffed.</li> </ul> <p>For peer grouping and benchmarking purpose (identifying whom to learn from), we also advise to report the following additional information for each room:</p> <ul style="list-style-type: none"> <li>- associated induction room (yes/no),</li> <li>- associated recovery room (yes/no),</li> <li>- specialty.</li> </ul>  |
| Previous PATH experience | <p>In PATH-II this indicator was only measured by asking the hospitals:</p> <p>Do you monitor your operation theatre capacity use? [yes, no]</p> <p>How do you measure? [Free text]</p> <p>Please provide value? [value for own performance report]</p>   |
| Data source              | <p>Data collected prospectively for one month, repeated every 3 or 6 months. The suggested collection period for 2010 are March and October. Holidays period should be avoided.</p> <p><i>Data source:</i> To be organised nationally or locally depending on the feasibility. The methodology for data collection should be explained shortly when reporting the data to the coordinator in the country.</p> <p>The required information is not available from national databases. Data is to be extracted at the hospital level. Potential sources are:</p> <ul style="list-style-type: none"> <li>- operation protocol or patient record,</li> <li>- ad hoc data collection tool in the OR.</li> </ul> <p>It is crucial that clear responsibility for collecting this data is identified and that the reliability is estimated if several persons are to fill in ad-hoc sheet in the operating theatre.</p> <p>If ad-hoc data collection is performed directly at the operating theatre (e.g. PATH form at the entrance of the operating rooms), the completeness of recording should be evaluated. It is critical to assure that all patients with surgery in the hospital in the included operating rooms are indeed reported with an entry and exit time. It might be necessary to cross check two databases. For instance, identify all patients from the surgical theatre database and for those with no data in the ad-hoc reporting form then return to the patient records for more detailed information on times of procedure.</p> <p>Fields to be extracted and reported for calculation of the indicator are presented at appendix A and B.</p> |

|                           |  |
|---------------------------|--|
| Domain                    | Efficiency<br>Patient centeredness   |
| Type of indicator         | Process measure (utilization indicator)  |
| Adjustment/stratification | A separate indicator is computed for <ul style="list-style-type: none"> <li>- elective only rooms (excluding day surgery only rooms),</li> <li>- elective day surgery only rooms (if centrally managed),</li> <li>- emergency only rooms,</li> <li>- mixed elective/emergency rooms.</li> </ul>  |
| Complementary indicators  | <p>The occupancy rate is calculated based on the normal staffed hours. Patient exit time after the normal hours might be the result of a high occupancy or of a delay during the day for some logistic reasons (e.g. patient not arrived, equipment not arrived, room not cleaned, anaesthesiologist not available) or for some medical reasons (e.g. complication during surgery). For management, it is very valuable to compare the occupancy rate during the normal staffed hours and the additional hours. Hence, it is suggested to compute for each elective operating room the following indicator:</p> <p><u>For each room, each day</u>, compute:<br/>exit time of the last patient – normal closing time (=A)</p> <p><u>For each room, for the whole observation period</u>, compute:<br/>A for day1 + A for day2 + A for day3 +...A for day31 (only for days when exit after normal closing) / total number of staffed days during the observation period</p> <p>For instance, for room 1, we would have an occupancy rate of 60% but an average 60 minutes overtime per day (this would trigger in in-depth analysis to understand the causes for the delays). For another room, the occupancy rate is the same but no additional overtime. We could also have rooms with very high occupancy rates and very high overtime (this would trigger the need to stay open for more hours or for an additional room).</p> <p>To understand the reasons of variations and to identify the main sources of inefficiency, it can be relevant to measure the following additional times and to decompose the total occupancy rate based on these different times:</p> <ul style="list-style-type: none"> <li>- time from patient arrival to beginning of anaesthesia,</li> <li>- time from the beginning of anaesthesia to start of surgery,</li> <li>- time from start of surgery to finish of surgery,</li> <li>- time from finish of surgery to patient leave of the OPT.</li> </ul> <p><i>Complementary indicators:</i></p> <ul style="list-style-type: none"> <li>- Occupancy rate: anaesthesia start to time left operating room / operating session time allocated.</li> <li>- Surgical utilization rate: surgery start to surgery finish / operating session time allocated.</li> </ul> <p>Data extraction and indicator computation tool is presented at appendix B.</p> |

|                           |   |
|---------------------------|---|
|                           | <p>Definitions:</p> <ul style="list-style-type: none"> <li>- <i>Anaesthesia start</i>: is measured from when the anaesthetists actually commences doing something relevant to the case, e.g. drawing up of drugs, checking machine, ect.</li> <li>- <i>Surgery start</i>: is measured from when skin preparation begins or when specialised positioning of the patient begins, whichever occurs first.</li> <li>- <i>Surgery finish</i>: surgery is considered ended when the dressings are applied.</li> </ul>   |
| <p>Related indicators</p> | <p>Day surgery rate</p> <p>Prophylactic antibiotic use</p>  |
| <p>Interpretation</p>     | <p>Direction and targets:</p> <p>Higher utilization rate is better. Though, an extremely high rate may trigger concerns regarding access for emergency patients. The Australian National Demonstration Program targeted an operating room utilization rate of 80-85% and exceeded this target.</p> <p>Very good indicator for quality improvement over time in hospitals.</p> <p>For international comparison it is necessary to agree on one definition for operational theatre.</p>   |
| <p>Guidelines</p>         | <p>See references</p>   |
| <p>References</p>         | <p>Commonwealth Department of Health and Family Services. Towards Best Practice in Elective Surgery: A Guide. The National Demonstration Hospitals Program. September 1997. Canberra, Australia.<br/> <a href="http://www.archi.net.au/document/index.phtml/id/517/topic_id/207">http://www.archi.net.au/document/index.phtml/id/517/topic_id/207</a></p> <p>Step Guide to Improving Operating Theatre Performance. NHS Modernisation Agency. Theatre Programme. June 2002.</p> <p>Caleb D Mpyet. An Audit of the Use of Ophthalmic Theatre Time. Community Eye Health. 2002; 15(44): 62–63.<br/> <a href="http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1705872&amp;blobtype=pdf">http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1705872&amp;blobtype=pdf</a></p> <p>D. Ricketts, J. Hartley, M. Patterson, W. Harries, and D. Hitchin. An orthopaedic theatre timings survey. Ann R Coll Surg Engl. 1994 May; 76(3): 200–204.<br/> <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2502313/pdf/annrcse01589-0064.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2502313/pdf/annrcse01589-0064.pdf</a></p> <p>J. M. Leedal and A. F. Smith. Methodological approaches to anaesthetists' workload in the operating theatre. British Journal of Anaesthesia 94 (6): 702–9 (2005).<br/> <a href="http://bj.oxfordjournals.org/cgi/reprint/94/6/702.pdf">http://bj.oxfordjournals.org/cgi/reprint/94/6/702.pdf</a></p> |

**Appendix A: Fields to be extracted and reported for calculation of the indicator****Section 1: patient level data, one record per patient, verify the completeness (all patients included) – to calculate numerator**

Operating room ID: -----

Patient ID: -----

Patient time in: HH.MM

Patient time out: HH.MM

Date of operation: DD/MM/YY

These data are implemented in table at appendix B.

**Section 2: room level data, one record per room – to calculate denominator**

Operating room ID: -----

Operating room type:

- elective only rooms (excluding day only surgery rooms)
- elective day surgery only rooms (if centrally managed)
- emergency only rooms
- mixed elective/emergency rooms

Normal opening hour on weekdays<sup>†</sup>: HH/MM

Normal closing hour on weekdays: HH/MM

Normal opening hour on Saturdays: HH/MM

Normal closing hour on Saturdays: HH/MM

Normal opening hour on Sundays and holidays: HH/MM

Normal closing hour on Sundays and holidays: HH/MM

Number of working days in the observation period: --

Associated induction room (yes/no)

Associated recovery room (yes/no)

Specialty:

General surgery

Orthopedic

....

<sup>†</sup> if required locally, further details might be collected to indicate if the working hours are different between the workdays (e.g. shorter on Fridays). It is however important to provide the regular or common working hours rather than the working hours on a daily basis depending on the surgical plan for the next day.

**Appendix B: data requirements and examples of times computations for operating theatre performance indicator and complementary indicators**

For each operating room separate data collection table with operating room ID, which will be useful when creating a common data base for all operating rooms before analysis. It is required to fill in the table with surgical patient data in chronological order of surgeries performed.

| Measures |                   |   |            |                |                   |                      |                    |                |                  |                      |                             |
|----------|-------------------|---|------------|----------------|-------------------|----------------------|--------------------|----------------|------------------|----------------------|-----------------------------|
| Case No. | Operating room ID | Operating room type:  | Patient ID | Procedure code | Date of operation | Time patient arrives | Anaesthesia starts | Surgery starts | Surgery finishes | Anaesthesia finishes | Time patient leaves (exits) |
|          |                   | 1.elective only (excluding day only surgery rooms)<br>2.elective day surgery only<br>3.emergency only<br>4.mixed elective/emergency |            |                | DD/MM/YY          | HH.MM (1)            | HH.MM (2)          | HH.MM (3)      | HH.MM (4)        | HH.MM (5)            | HH.MM (6)                   |
| 1        |                   |   |            |                |                   |                      |                    |                |                  |                      |                             |
| 2        |                   |   |            |                |                   |                      |                    |                |                  |                      |                             |
| 3        |                   |   |            |                |                   |                      |                    |                |                  |                      |                             |
| n        |                   |   |            |                |                   |                      |                    |                |                  |                      |                             |

| Computations (examples) |   |   |  |   |  |  |  |  |  |  |
|-------------------------|---|---|--|---|--|--|--|--|--|--|
| Case No.                | Time patient arrives fill time patient leaves operating theatre | Time from patient arrives fill operating room normal closing time | Operating room normal closing time fill time patient leaves operating room | Time patient arrives fill time anaesthesia starts | Time surgery starts fill time surgery finishes (duration of operation) | Time surgery finishes fill time anaesthesia finishes | Time surgery finishes fill time patient leaves (exits) | Time anaesthesia starts fill time anaesthesia finishes (duration of anaesthesia) | Time from the end of anaesthesia fill time of beginning the next anaesthesia |  |
|                         | (6)-(1)   | (6)-operating room normal closing time                            | operating room normal closing time-(1)                                     | (2)-(1)   | (4)-(3)  | (5)-(4)  | (6)-(4)  | (5)-(2)  | (2) for case n+1 - (5) for case n  |  |
| 1                       |   |   |  |   |  |  |  |  |  |  |
| 2                       |   |   |  |   |  |  |  |  |  |  |
| 3                       |   |   |  |   |  |  |  |  |  |  |
| n                       |   |   |  |   |  |  |  |  |  |  |

# Needle-stick injuries

December 2009

## Contents:

- Short name
- Detailed name
- Short definition
- Rationale
- Operational definition
- Previous PATH experience
- Data source
- Domain
- Type of indicator
- Adjustment/ stratification
- Sub-indicators
- Related indicators
- Interpretation
- Guidelines
- References

|                               |   |
|-------------------------------|---|
| <b>Short name</b>             | Needle-stick injuries   |
| Detailed name                 | Needle-stick injuries per healthcare worker per year.   |
| Short definition              | Number of reported needle-stick injuries per health-care worker (full time equivalent) per calendar year.   |
| Rationale                     | <p>Needle-stick injuries are wounds caused by needles or other sharp objects that accidentally punctures the skin and may result in exposure to blood or other body fluids. Needle-stick injuries are a hazard for people who work with hypodermic syringes and other needle equipment.</p> <p>These injuries can occur at any time when people use, disassemble, or dispose of needles. When not disposed of properly, needles can become concealed in linen or garbage and injure other workers who encounter them unexpectedly. Needle-stick injuries transmit infectious diseases, especially blood-borne viruses.</p> <p>Some hospitals report one third of nursing and laboratory staff suffer such injuries each year.</p> <p>This indicator reflects safe working conditions. It should be taken into consideration that there is a possibility of bias, because of an under estimation the injuries or lack of reporting.</p> <p><i>Strengths:</i> High burden, strong hospital impact, sends a crucial message to monitor the issue.</p> <p><i>Limits:</i> Low incidence, very low reliability.</p> |
| Operational definition        |   |
| Previous PATH experience      |   |
| Data source                   |   |
| Domain                        |   |
| Type of indicator             |   |
| Adjustment/ stratification    |   |
| Sub-indicators                |   |
| Related indicators            |   |
| Interpretation                |   |
| Guidelines                    |   |
| References                    |   |
| <b>Operational definition</b> | <p>Reported needle-stick injuries per calendar year:</p> <p><b>Numerator:</b> Number of needle stick injuries reported.</p> <p><b>Denominator:</b> Number of full time equivalent staff of healthcare workers</p>   |

## Previous PATH experience

The definition of this indicator is identical for PATH-pilot, PATH-II and PATH'09. The previous experience highlight issues with reporting needle injuries: a large proportion of participation hospitals have not been able to report data on all staff categories (or even some of categories) and the relatively low reported rates in PATH compared to the international literature suggest under-reporting.

In PATH-II, less than half of the participating hospitals have reported on the number of needle injuries for all staff. This low participation rate is troubling as the definition is generic to accommodate any source of data locally available and hence the burden of data collection was supposed to be very low. This finding might mean that a large number of hospitals have no central monitoring system in place to report needle injuries for all staff categories and hence lack opportunities to learn from those adverse events and to decrease their occurrence.

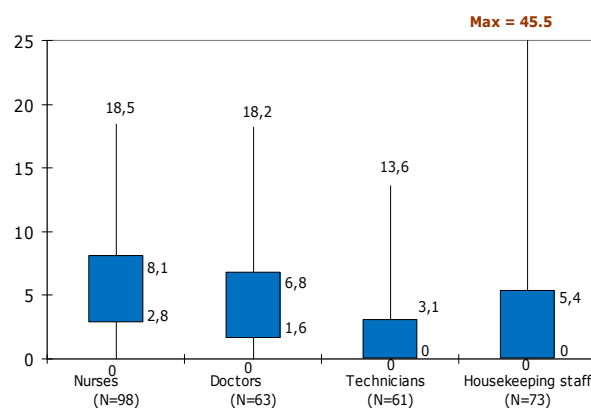
In general, the rates documented in ad-hoc studies were much higher than the rates we got with PATH from spontaneous reporting (source: occupational medicine database). In the literature, rates vary widely, for instance:

- 10.4 and 5.0 sharp injuries per respectively 100 FTE medical or nursing staff in Australia teaching hospital (1)
- 55.1% and 22.0% needle injuries experienced by respectively for medical and nursing staff in a German university hospital (2)
- 33.2 and 18.0 % incidence rate for all staff in 9 teaching and 32 non teaching US hospitals (3)

### PATH-II results (2008):

#### Distribution of incidence rate in % by professional categories (Box plot: min, 1<sup>st</sup> quartile, 3<sup>rd</sup> quartile, maximum)

N= number of hospitals reporting data for this staff category



(1) Bi P, Tully PJ, Pearce S, Hiller JE. Occupational blood and body fluid exposure in an Australian teaching hospital. *Epidemiol Infect* 2006; 134(3):465-71.

(2) Wicker S, Jung J, Allwinn R, Gottschalk R, Rabenau HF. Prevalence and prevention of needlestick injuries among health care workers in a German university hospital. *Int Arch Occup Environ Health* 2007.

(3) Perry J, Parker G, Jagger J. EPINet report: 2004 percutaneous injury rates. *Intern Healthcare Safety Centre* 2007 (August):1-4.

|                           |  |
|---------------------------|--|
| Data source               | <p>Database with reported cases of need-stick injuries.</p> <p>If a reporting system is not implemented an alternative data source is:<br/>Point prevalence survey among hospital staff.</p>   |
| Domain                    | Safety (staff orientation)   |
| Type of indicator         | Outcome (staff oriented)   |
| Adjustment/stratification | Stratified by type of personnel:<br>nurses, physician, technicians, students and housekeeping.   |
| Sub-indicators            | In depth analysis of factors that cause needle-injuries.   |
| Related indicators        | <p>The following indicators are not computed in the frame of PATH'09 but if monitored in the hospital, it might be relevant to relate to needle injuries:</p> <ul style="list-style-type: none"> <li>- Training expenditure</li> <li>- Excessive working hours</li> </ul>  |
| Interpretation            | <p>Many types of needles and other sharp devices are used in health care. However, only a few needles and other sharp devices are associated with the majority of injuries. Of nearly 5,000 percutaneous injuries reported by hospitals in the US (between June 1995 and July 1999), 62% were associated with hollow-bore needles, primarily hypodermic needles attached to disposable syringes (29%) and winged-steel (butterfly-type) needles (13%).</p> <p>A comprehensive needle-stick injury prevention program would include:</p> <ul style="list-style-type: none"> <li>- employee training,</li> <li>- local guidelines,</li> <li>- safe recapping procedures,</li> <li>- effective disposal systems,</li> <li>- surveillance programs,</li> <li>- improved equipment design.</li> </ul> |
| Guidelines                | See references   |

## References

US National Institute for Occupational Safety and Health: Preventing Needlestick injuries in health care settings. <http://www.cdc.gov/niosh/2000-108.html>

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Porta C, Handelman E, McGovern P [1999]. Needlestick injuries among health care workers: a literature review. *Am Assoc Occup Health Nur J* 47(6):237—244.

Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses. *Infect Control Hosp Epidemiol.* 2007 Feb;28(2):156-64.

Canadian Centre for Occupational Health & Safety:  
[http://www.ccohs.ca/oshanswers/diseases/needlestick\\_injuries.html](http://www.ccohs.ca/oshanswers/diseases/needlestick_injuries.html)