Swiss Flat Rates and Monitoring of Coronary Hospital Performances on Behalf of Serial Sentinel, Census, and Appropriateness Measurements

Discussions and Recommendations of the ad hoc Taskforce “audits in medicine”

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Abstract

Background

The Swiss Medical Society wants to control eventual negative effects of hospital care quality before and after the introduction of flat rates in 2012.

Method

We describe a method based upon well known observation methods using sentinels, day census and the application of findings on an audit method that incorporates both objective appropriateness criteria and subjective judgements. This methodology is termed sentinel census and is applied to patients hospitalized for coronary interventions, namely coronary revascularizations using either catheter based techniques or surgery.

Results

We expect a 10% reduction of appropriate indications and a sound hypothesis generation process based upon mortality audits. Based upon on our sample size calculations, annual observations in 300 patients is necessary in order to catch significant differences in the level of appropriateness.

Conclusions

We propose a national monitoring effort, which is based upon a sentinel-census methodology. We believe that this kind of monitoring is rapidly implementable at a relatively low cost and with the possibility of generation of statistically in clinically meaningful results with a high probability of feasibility and ethical responsiveness.

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Introduction

In view of the introduction of flat rates (diagnosis related cost groups, DRG) in Switzerland, questions about fairness and equity of health care performance and inter-institutional outcome-rates are indeed needed. Swiss specific flat rates will be used to cover hospital expenditures. Some patients will however be more costly than expected, e.g. with outliers (defined as longer than expected hospital stay) and inliers (defined as short time hospital stay with extreme costs) [1]. Therefore, treating such patients creates a cost risk to health care providers that ultimately may lead to institutions bank rot. Clearly enough, avoidance of treating potentially high cost risk patients, e.g. the sicker ones, might become a question of survival for a hospital. Based upon preliminary analysis of SwissDRG, DRG's explain hospital expenditures up to 48% [1]. Therefore, 52% of costs, if no other measures are taken, will be left as a cost risk to the treating hospitals. As reports from press media say, about one third ore about 100 hospitals with acute beds have to be closed. Since Switzerland disposes of a rather low number of acute hospital beds when compared to OECD countries (for the year 2007, 3.4/1000 beds are listed [2]), tear down 100 hospitals will create a scarcity of acute beds. Patient security within this sphere is likely to be threatened, since effects causing "good patient selection" and "waiting times" are likely to add up in a way decreasing patient safety. Within this potentially harmful setting of financing patient care in hospitals, the question, how to measure negative effects with highest accuracy at a lowest cost is of central importance. Basically, there are two ways to detect harmful effects: a) comparison of rates of side effects based upon institutional morbidity and mortality, eventually adjusted for case mix, age and gender, and b) by chart reviews (audits, either subjective or structured, e.g. using international guidelines) that identify preventable side effects of medical interventions and reviews of indications for interventions.

The following work stems from the ad hoc Taskforce "audits in medicine" and delivers its work and conclusions to the Swiss Medical Association (FMH) as an additional discussion and issues preliminary recommendations to better control for undesired, or even harmful, effects of flat rates on patient care and safety. Further, we aim at expanding the discussion furnished by the FMH in September 2009, expressed in a comprehensive position paper [3].

Methods

The following methodology described is principally based upon chart reviews and questionnaires with local hospital staff. It describes a form of audit that aims at detecting a) reasons of a deadly course of a hospitalization and b) the eventual change of the level of indication for interventions. We propose to use this method first in coronary revascularization patients and to eventually later on to adopt it to other disciplines in medicine and surgery. Since it is not feasible to collect data of all patients undergoing coronary revascularization in Swiss hospitals, the sample size has to be reduced. Samples should be collected a) using a random process, b) should be large enough to give meaningful results, and c) should be collected retrospectively in order to avoid a audit bias. We term this method the “sentinel census method”.

The Sentinel Method

The principle of our sentinel surveillance characteristic is a continued monitoring at the institutional level (hospitals performing coronary revascularizations).

The sentinel method should be case sensitive, which can be expected in patients admitted for stable or unstable coronary syndromes (low classification bias). Numerator frequencies correlate with the incidence of variables, which is not a problem when analyzing reasons for mortality, which serve to generate hypothesis about the main cause of observed deadly courses (e.g. lack of adequate number of nurses or medical doctors); however, when looking at changes in the level of indications, sample size has to be calculated (see below). The sentinel method is especially helpful for a closer look at eventual performance changes, which cannot be adequately assessed in larger populations [3]. By adequate selection of sentinel hospitals, the selection bias can be reduced.

The Census Method

The census method essentially serves to reduce the sample size further, but maintains the criterion of random selection [4].

The advantages of the one-day census are [cited from 5]:

(a) It is quick to implement and carry out

(b) It produces information about current practices, a "snapshot" of a service

(c) It can answer very specific questions about use of resources and quality of service

(d) Repeated censuses can measure the impact of service developments.

The one day census has limitations:

(a) It is not standardised, data are collected by many different individuals

(b) The 24-hour period chosen may be atypical

(c) It is cross-sectional and does not assess quality of care provided to individuals over time

(d) The cross-sectional nature of a one-day census makes it difficult to draw conclusions about the total activity of a service or to what extent it meets the needs of its total client group. Patient types who frequently use out-patient and day-patient facilities or have short admissions would be over-represented. This bias could be corrected statistically by collecting information such as date of last contact for out-patients and day-patients and length of stay for in-patients. A census could not provide accurate information about a services response to infrequent events such as response to psychiatric emergencies.

The census method implies a detailed questionnaire, which define the coefficient of determination that influences variables under observation.

Appropriateness criteria for coronary revascularization

Coronary revascularization is well suited for observation, because the appropriateness criteria for an intervention have been defined by international consensus [6, appendix]. For each possible clinical situation, appropriateness score from 1-9 with 9 being highly appropriate have been developed. Because some clinical situations occur less frequently, for the purpose of easier implementation of scoring the appropriateness of interventions, predefined situations such as patients without prior CABG could be excluded. The advantage of the use of such a scoring system is the possibility to observe shifts in appropriateness at a national level; the disadvantage is the problem of small numbers at the institutional level.

Mortality audits

Coronary revascularization with a deadly course during the first 30 days after intervention should be identified by the census procedure and reviewed subjectively by a trained censor who eventually gathers also information not only from patient charts but also from caring physicians and nurses. Since daily mortality per institution is very low, all deaths during the last month should be reviewed.

Number estimates for Switzerland

During the year 2006, 36817 coronary angiographies and 17061 percutaneous coronary interventions were performed in 27 centres (5 university hospitals, 9 public, nonuniversity hospitals, and 13 private hospitals) by 193 operators [7]. Between 1987 and 2004 the in-hospital mortality rate remained always below 1% [8], which would yield about 15 deaths per month. In 1991, 4100 CABG procedures were performed [9]. CABG procedures are likely to have stayed constant over time or declined by small numbers.

Statistical aspects and needed sample size

We assume that annual revascularizations (either PTCA or CABG) are performed around 20’000 times in Switzerland.

Table 1: sample size calculations

Sample Size Calculation http://www.surveysystem.com/sscalc.htm

Sample Size	300
Total Population	20000
CI level(%)	95
CI percentage	50
CI	5.62
Sample Size Needed	300

We expect that the appropriateness level in 20 institutions monitored 4 times yearly will give 296 cases, of which in the year 2011 237 (80%) are appropriate, whilst in the year 2012 207 will be appropriate (70%).

Table 2: Pearsons Chi2 Calculations

Sample Size Year 2011	296
Sample Size Year 2012	296
Appropriate N 2011	237
Appropriate N 2012	207
Pearsons X2 statistics	8.11
p=	0.0044

Expected results

Based upon our expected sample calculations, flat rates will decrease the percentage of appropriate coronary interventions by 10%. If this were true, this difference would be statistically highly significant. Mortality audits will generate clinically meaningful hypothesis on reasons for avoidable in-hospital death.

Discussion

Monitoring potentially hazardous effects of flat rates in medical care is a difficult task. The risk of a medical intervention decreases if performed in a healthier subject. The gain in risk reduction and income of institutions is directly related to an increase of performing inappropriate interventions. This is termed the “economization effect” on health care resources and is likely to increase costs despite flat rates.

In order to monitor shifts of appropriateness we need clear definitions: a) disease, e.g. coronary artery disease; b) interventions, e.g. PTCA or CABG; c) clearly defined appropriateness criteria, derived from a large group of experts accepted by national societies; d) sufficient large number of interventions.

Based upon our projections, the outlined sentinel-census for the years 2011 and 2012 encompassing at least 20 of 27 Swiss institutions performing coronary revascularizations, will allow to exactly monitoring, if a shift in appropriateness occurs after the introduction in the year 2012. Certainly, this monitoring should go on in the future years. Other specialist groups should equally check, if they can provide similar models, e.g. in general surgery.

It may appear difficult to judge the appropriateness of about 300 coronary interventions; however, for an expert, this is readily done and results could receive even higher robustness if 3 experts would try to reach a consensus (the importance of differences would then be calculated using weighted kappa statistics). In case of doubt about the categorization of a case, experts should adhere to the scoring system outlined in reference 6.

Because mortality from coronary interventions is low (in hospital mortality <1%), it appears difficult to perform statistics on such small numbers. Therefore, we chose to propose an alternative way: experts perform detailed mortality audits during a postspecified period – which – if numbers remain too small – can be extended further. The rationale and potential of mortality audits has been described in detail [10]. This process allows for hypothesis

generation: the audit person has to define the reason for a preventable death. Reasons can manifold, e.g. lack of adequate numbers of staff, to high workload with fatigue symptoms ecc. Results from mortality audits serve to allocate resources better and to determine, if flat rate effects due to cut downs of expenditures in health care performing wards of institutions may be a reason.

We further propose to create a national taskforce on behalf of the Swiss Medical Association, that is responsible to organize and perform the monitoring by 2011. Legal aspects have also to be discussed and it has to be clear, that results are not reported on the institutional but on the national level.

Ultimately, this kind of monitoring will show, if the introduction of flat rates is a principle key variable in appropriateness shifts and increase in avoidable deaths. A further advantage of this approach lies in the fact, that monitoring could be performed retrospectively for the last few years, therefore increasing the confidentiality of the results.

Limitations

There may be an avoidance of performing inappropriate interventions, if the census day is known ahead. Therefore, we propose to perform the 4 census days retrospectively.

Conclusion

We propose a national monitoring effort, which is based upon a sentinel-census methodology. We believe that this kind of monitoring is rapidly implementable at a relatively low cost and with the possibility of generation of statistically in clinically meaningful results with a high probability of feasibility and ethical responsiveness.

Our proposition is open to discussion and can be extended according to upcoming demands. It is of major importance that no only coronary interventions enter into the focus of such a monitoring, but that a broader range of disease therapy and medical interventions at the institutional level becomes available.

Our proposition is readily implementable, is likely to have a high institutional acceptance (because of guaranteed anonymity) and is straight foreward. We welcome any discussant in our workgroup who is willing to bring this work to reality.

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Appendix: Example of appropriateness criteria

Coronary Revascularization Appropriateness Criteria (By Indication)

Table 1. Patients With Acute Coronary Syndromes

Indication		Appropriateness Score (1–9)
1.	• STEMI • ≤12 hours from onset of symptoms • Revascularization of the culprit artery	A (9)*
2.	• STEMI • Onset of symptoms within the prior 12 to 24 hours • Severe HF, persistent ischemic symptoms, or hemodynamic or electrical instability present	A (9)
3.	• STEMI • >12 hours from symptom onset • Asymptomatic; no hemodynamic instability and no electrical instability	I (3)
4.	• STEMI with presumed successful treatment with fibrinolysis • Evidence of HF, recurrent ischemia, or unstable ventricular arrhythmias present • 1-vessel CAD, presumed to be the culprit artery	A (9)
5.	• STEMI with presumed successful treatment with fibrinolysis • Asymptomatic; no HF or no recurrent ischemic symptoms, or no unstable ventricular arrhythmias • Normal LVEF • 1-vessel CAD presumed to be the culprit artery	U (5)
6.	• STEMI with presumed successful treatment with fibrinolysis • Asymptomatic; no HF, no recurrent ischemic symptoms, or no unstable ventricular arrhythmias at time of presentation • Depressed LVEF • 3-vessel CAD • Elective/semi-elective revascularization	A (8)

(*Continued*)