Our work on Inpatient Quality Indicators

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Aim

Improvement needs measurement first. Outcome which cannot be measured cannot be improved. Our work on the German Inpatient Quality Indicators (G-IQI) is dedicated to facilitating the measurement of medical outcome for inpatient treatment using available data, thus avoiding additional workload for physicians and/or other members of medical staff. The use of available data is possible as the introduction of DRG based payment systems has created a wealth of medical data in the administrative computer systems (so called ‘administrative data’ or sometimes ‘routine data’), which may not only be used for payment but also for other purposes. Our publications (see topic “Publikationen” on this site) contain many references to the scientific literature in this field.

The development of reliable measurement methods is also a prerequisite for the further development of payment methods in medicine. If we do not only want to pay for output (as with DRGs for example), but also for outcome or value, we need the corresponding indicators to measure outcome. Such indicators must be reliable, medically meaningful, suitable for automated algorithmic measurement and resistant against manipulation as far as possible.

History

Our work on indicators dates back to the year 2000 when the first Annual Medical Report for 1999 was published by the HELIOS Kliniken Group. It contained in-hospital mortality rates for many diagnoses and procedures, which was a novelty at that time in the German hospital market. From these beginnings the version 1.x of our indicator system developed, which can be seen in the subsequent reports of that hospital group (see for example the HELIOS Annual Medical Report 2001). The indicators were independently developed. However they show some similarities to many of the AHRQ Inpatient Quality Indicators and to some of the AHRQ Patient Safety Indicators. This is a result of common medical understanding. Asking physicians for quality measures anywhere in the developed countries will sooner or later lead to numbers as for example acute myocardial infarction (AMI) mortality rates. Stroke, pneumonia, colorectal resections, aortic procedures, nephrectomy, joint replacement and other important diagnoses and procedures will easily be part of such activities in any country. These indicators could also be applied to the so called emerging market economies as such diseases and/or procedures are common there too. However their relative share with respect to all inpatient treatments is lower due to a much younger population which leads to shifts in the distribution of inpatient cases and their relative importance. Currently in those countries obstetrics or trauma care will be of relatively higher and for example stroke vice versa of lower importance.
than in most developed nations. However due to aging of the societies and the high prevalence of diabetes in some of those countries the focus will soon shift.

In 2005 we undertook a major revision of our indicator system which led to version 2. It was first published in 2006 in the HELIOS Annual Medical Report for 2005. A full definition manual for G-IQI version 2.5 was published in 2009. This version covered more diseases and procedures and further detailed the indicator system. In March 2011 we published the new version 3.1 of the German Inpatient Quality Indicators. This largely revised version covered new areas like heart surgery, thoracic surgery, procedures on the peripheral arteries and others. Existing indicators had also been revised and supplemented by more details and differentiation. It also incorporated a lot of Swiss and Austrian proposals for the improvement of the indicator system. In 2012 we applied our indicators to the official German inpatient database and determined federal reference values for all indicators based on the over 17 million German inpatient cases (for data year 2010). The results were published in Deutsche Medizinische Wochenschrift. The combination of the indicator definitions of G-IQI Version 3.1 with German reference values 2010 was referred to as Version 3.2.

Latest version

In 2013 G-IQI was again overhauled. A new version 4.0 has been published with currently two variants:

- a definition manual for G-IQI 4.0 for the German coding systems of data year 2012 (in Volume 1 of the indicator manuals)
- a definition manual for G-IQI 4.0 for the German coding systems of data year 2013 (in Volume 3, 2nd edition of the indicator manuals)

Version 4.0 comprises many changes in the details of indicator definitions as compared to version 3.1. Many of these changes refer to improvements proposed by the clinical users of the system. Furthermore a lot of new disease groups have been included like for example gastrointestinal ulcers, treatments of ulcerative colitis and Crohn’s disease, and especially volume indicators for organ transplantations. A tabular overview of the changes is given in ‘Anhang 3’ of the manuals cited above.

The German reference values have also been recalculated based on the latest available German data year 2011. These reference values are published in ‘Anhang 1’ of the manuals. It should be mentioned that these reference values refer to all German inpatient cases (almost 18 million cases; unlike in the USA, Germany does not only provide a sample of it’s inpatient cases but a practically complete database). Besides providing references for G-IQI these numbers also contain a lot of information about the current state of well defined German inpatient disease and procedure groups.

Coverage

The scope or coverage of quality indicators cannot be judged by the number of indicators because this would not tell much about the cases covered. Therefore we determine the number of cases which are included in the indicators measured. As some patients with multiple treatments may show up in different indicators (for example myocardial infarction may not only be represented in the AMI indicators but also in the mechanical ventilation indicators) such counts must be corrected for double-counting.
After exclusion of multiple countings G-IQI 4.0 covers 41.9% of all 17.7 inpatient cases 2011. 51.4% of all inpatient deaths are contained in the mortality indicators of G-IQI 4.0. The fact that the share of deaths is higher than the share in case numbers shows that G-IQI has a focus on more complex cases although many low risk procedures are also included. This bias towards more complex medicine is intended as we expect a higher potential for improvement in this area.

G-IQI does not show mortality rates for endstage or palliative care patients as we do not consider mortality as a quality indicator for such disease stages. Indeed the 41.9% of all cases, which are covered by all G-IQI volume indicators, would contain 66.5% of all inpatient deaths. However, as mortality indicators are not given for all covered diseases, only 51.4% of the inpatient deaths are effectively contained in the explicitly defined mortality indicators.

With respect to disease and procedure specific indicator systems we suppose that G-IQI currently provides the most extensive approach for a disease/procedure oriented quality measurement.

International use

Our G-IQI indicators gained interest in other countries. In 2008 the Swiss Ministry of Health (Bundesamt für Gesundheit – BAG) published a report for some of the Swiss hospitals using an adopted version based on G-IQI V 2.x. In 2009 a second report based on the data of 2007 followed. It contained the results of almost half of the Swiss hospitals, which voluntarily participated. In 2011 we adopted the new version G-IQI 3.1 to the Swiss coding system incorporating many proposals made by Swiss experts. This led to the Swiss version CH-IQI 3.1. Based on this system Switzerland introduced an obligatory public reporting of the CH-IQI 3.1 indicators for all Swiss hospitals. Results and further information can be found on the website of the BAG.

In 2009 our indicator system was also adopted to the Austrian coding system. In 2010 this led to version 1.0 of the Austrian Inpatient Quality Indicators (A-IIQI). In April 2011 the Austrian Ministry of Health decided to use this system as a future basis for measuring inpatient quality on a national level. The Niederösterreiche Landeskliniken Holding is already using the system for it’s internal management. A new Austrian version based on G-IQI 3.1 is in preparation.

In November 2013 the Austrian Ministry of Health published the first national quality report based on A-IIQI. Details can be found here.

The G-IQI indicators are used by a large group of German hospitals, which publish their results based on this system. It is the Initiative Qualitätsmedizin (IQM). They use the same definitions as G-IQI, but in some cases with modified goals. Many other German hospitals use software, which can calculate G-IQI from administrative data. It is estimated, that more than 600 (out of about 2000) German acute care hospitals use G-IQI.

A reference table (PDF, 73.0 KB) gives an overview of the published and used versions of the indicators. It has to be mentioned that the involved authors tried to keep the German, Swiss and Austrian version as comparable as possible. However due to the different coding systems used in the different countries not all indicators can be fully comparable. Furthermore the indicator sets contain some national modifications. A cross-national comparison of the results therefore requires adequate precautions in the interpretation and knowledge of the corresponding definitions.
Use and application of G-IQI

Besides for public reporting G-IQI is used for improving outcome within a hospital’s quality management. G-IQI indicators are especially suited for monitoring the overall process performance for a disease or procedure. An increased myocardial infarction mortality in one hospital may indicate problems in one or more of the underlying treatment processes. In order to find out, if and which problems there might be, G-IQI is usually combined with peer review procedures based on patient records. The whole approach has been described in many of our publications as well as in publications of the various user groups (see our publication list and for example publications of Initiative Qualitätsmedizin and others).

See for example:

- Scriba, PC, Nimptsch, U, Mansky, T (2013) The German Experience with Indicator-Based Quality Improvement. download PDF (use password 312022 for access)

We have been able to show, that such an approach can help hospitals which were performing subpar in the beginning to improve their outcome considerably (see Nimptsch and Mansky, Health Affairs 2013).

We also use the diseases and/or procedures defined in G-IQI for the analysis of health services in Germany on a national level with respect to the development of volumes, treatment methods and outcome. For this purpose we use the national data base of DRG inpatient cases. Germany has implemented a complete all patient / all payer DRG-system (with the exception of psychiatry) in 2003/2004. Hospitals have to deliver all DRG data to the Federal Office of Statistics. Thus beginning from 2005 a complete database of inpatient cases is available for scientific analysis. We used these data to analyze the development of stroke care and stroke units in Germany (see: Nimptsch and Mansky 2012 and Nimptsch and Mansky 2013). Investigations for other diseases are in progress.

Reliable quality indicators also are a prerequisite for future inclusions of outcome aspects in medical payment systems as for example described by Michael Porter and many others. In our group we are investigating the criteria which have to be fulfilled in order to establish such systems. A catalogue of criteria with respect to medical as well as economic requirements has been published by Doerte Seeger.
Conclusion

G-IQI 4.0 currently is one of the most advanced quality indicator systems, which can rapidly be applied to administrative data. In Germany the indicators cover more than 42% of all 17.8 million inpatient cases. With respect to the in-hospital mortality the system covers 51% of all inpatient deaths.

These numbers indicate, that the indicators predominantly address severe diseases and/or procedures, where quality improvements can have considerable influence on mortality and thereby outcome. Intentionally known end-stage diseases are not part of the indicators. Our goal is to address potentially avoidable fatalities by identifying weaknesses in the treatment processes for subsequent improvement. It is not intended to interfere with end stage care.

G-IQI is successfully used as a system to identify weaknesses in the inpatient treatment processes and correspondingly target improvement activities. This usually also includes public reporting of the indicators at the hospital level. Furthermore we use G-IQI definitions on the national level for studying various aspects of certain diseases and/or procedures in health systems research.