Editorial

Breaking the first law of informatics: the Quality and Outcomes Framework (QOF) in the dock

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Introduction

van der Lei stated ‘the first law of informatics’:

Data shall be used only for the purpose for which they were collected.

And the collateral:

If no purpose was defined prior to the collection of data, then the data should not be used.

Information technology makes aggregation of data a relatively easy task on a regional or national basis. One good example of this is the data used to evaluate performance on the Quality and Outcomes Framework (QOF). These are data taken from nearly every general practice in the UK to measure achievement of quality targets in chronic disease management. Evidence-based quality targets have been set for the management of chronic disease and quality points are awarded for achievement of these targets. Results for every practice and their individual quality scores, are publicly available from The Information Centre. Simply having these data so readily available makes it tempting to draw conclusions from them in breach of the first law of informatics. This editorial explores the pros and cons of using data recorded for one purpose but subsequently analysed to support objectives not stated at the time of collection.

We first examine the charge that QOF data, collected for managerial purposes, are now being used to draw conclusions about the quality of care and the defence of this approach.

The case for the prosecution: QOF breaks the first law of informatics

The Quality Prevalence and Indicator Database (QPID) has scant regard for the first law of informatics. It states:

It [QPID] meets the need for additional information requirements arising from the introduction of the Quality and Outcomes Framework in general practice ...

And makes the assumption:

... a set of QPID tables, providing summaries of 2004/05 QOF information that should meet most users’ requirements.

The assumption is that reuse of clinical data recorded on a general practice electronic patient record can readily be used for other purposes. Previously primary care clinicians, working in the context of the ten-minute consultation, rarely recorded the complete dataset as part of clinical care. The existence of financially rewarded quality points has now subtly changed the purpose of data recording. Data recorded for a financial purpose is now considered usable for other purposes. Researchers are starting to comment on associations between QOF data and factors such as deprivation. They make the assumption that acknowledgement of these data’s potential shortcomings make this breach of the first law acceptable.

Although the first law of informatics is 15 years old, it is widely supported in the informatics literature. The idea that data for health service management could be
derived from routinely recorded clinical data was an
idea promoted in the 1998 NHS Information Strategy
Information for Health. Some disrespectfully suggested
that the idea that management data can be generated
as a by-product of clinical care was ‘Burns’ folly’. Informaticians highlighted the problems of the
multiple reuse of information collected from routine
patient care and noted that the strategy had under-
estimated the magnitude of change required. There
is a need to move from different patterns of data
recording in primary and secondary care, between
clinical and non-clinical staff, and create a systemic
approach to recording data.

The arguments about taking limited data and
drawing conclusions about the quality of care by using
apparent measures of outcome are well-rehearsed within
the hospital setting, where the use of star ratings has
been roundly criticised. A wider range of factors con-
tribute directly towards quality. The quality of the
building and team (structures), organisational pro-
cesses to ensure quality (such as training, appraisal,
clinical audit), as well as other outcomes which should
include patient satisfaction and quality of life, may be
as important as easy-to-measure data. Case mix will
also make a significant contribution to outcome.

Although the authors presented the case for a move
from measuring outcomes to monitoring process, we
see the fundamental flaw in the hospital star rating
system as breaking the first law of informatics.

There are many good reasons why QOF data are
not readily usable for other purposes. These have been
summarised by Bingham. For example:

- QOF data cannot identify the age–sex distribution
  of the practice list and therefore standardise preva-
  lence rates
- QOF data do not identify the number of patients
  suffering from comorbidity of chronic diseases; you
cannot correlate the presence of one risk factor or
disease with another except within the same target
population
- QOF data do not show the level of exception coding
  for all indicators nor the precise exception codes
  used
- the denominator (population size) and numerator
  for diseases (national prevalence day) are assessed
  on different days
- not all practices participated in the QOF and some
practices that opted out of the standard General
Medical Services contract – choosing a Personal
Medical Services (PMS) contract instead – may have
negotiated different local contracts.

These shortcomings greatly weaken the ability of QOF
data to be used in the ways that are proposed.

The case for the defence: we all use routinely collected data

The case for the defence is that this is a bad and
outmoded law, honoured in the breach and to be
disregarded.

Routinely collected data are being used more and
more for quality improvement, health service plan-
ning and research and this is an international
phenomenon. The use of routinely collected data is
growing and health informaticians cannot sit, like
Canute, saying that this particular tide should not
come in.

We must learn how to overcome any limitations of
these data. Primary care informatics has been
characterised as:

The scientific study of data, information and knowledge
and how to use them to improve health and primary
medical care ...

Primary care informaticians should be developing
techniques for overcoming these problems. This can
only be achieved through informaticians encour-
gaging multidisciplinary teamwork involving clinicians,
managers and technologists.

We should be able to measure and adjust for any
perverse incentives associated with data recording.
For example, if an elderly man got chest pain walking
up a steep hill that went when he rested, historically, in
the pre-QOF world of general practice, the authors
would have labelled him as having ‘Angina’. Since
QOF, this person would be labelled ‘Chest pain’ until
all the investigations had been done and the diagnosis
confirmed by a cardiologist.

There are already benefits from using data for other
purposes. Services such as ‘Dr Foster’ are making
routinely collected data more available and by
identifying ‘frequent fliers’ (high users of NHS ser-
vice) are using routinely collected data to influence
decisions about the nature of healthcare provision.

The verdict

The case is finely balanced. Those who flout the first
law have such faith in QOF data that they over-claim
what these data infer, but fail to take account of the
complexity of primary care, incentives related to its
recording and the incompleteness of these data. Is it
possible that its ready availability and novelty is
seducing researchers and editors alike?

However, even if there are insufficient ‘health warn-
ings’ about these data’s weaknesses, is this a reason
not to use them? The challenge for the informatics
community is to dissect the detail of each indicator and to identify where it is reliable and where there are limitations.

Information technology allows high entropy of data; larger and larger volumes of data are becoming more widely available, yet its presentation may be chaotic, making its value limited or uncertain. QOF data about every practice can be readily downloaded from the internet. We need to learn the lessons of how to draw appropriate conclusions from these data before unbridled access to routine data occurs via the new Secondary Uses Service,16 which aims to ‘provide timely, pseudonymised patient-based data and information for purposes other than direct clinical care ’.

Our judgement is that only analyses that take into account all the socio-technical issues, the complexity and contextual issues associated with a set of data can ever overcome the first law of informatics. Informaticians should be describing the detail of the strengths and weaknesses of the current technical specifications in the pages of this journal.

A second law of informatics?

There may be a second law of informatics:

Information technology allows the entropy of clinical data, but caution is required when proceeding, having intentionally disregarded the initial premise for the data recording. The first law of informatics can be broken given a sufficiently limited dataset for which all a priori variables are known.

Only specific targeted reuse of data will prove possible. The a priori variables required to correctly interpret data include an understanding of the socio-technical context and the complexity of the clinical care environment in which the data were recorded and the input of a front-line professional who understands what the data meant at the time of recording. Other than when all the factors related to a small dataset are identified, the first law of informatics will continue to apply. Reprocessing of entire clinical datasets and expecting to infer meaning from them will remain illusory.

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