Feature

Understanding clinical information in terms of quality of improvement

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Introduction

Health data come from a variety of sources: administrative records, research studies, data synthesized into systematic reviews, clinical guidelines, quality improvement activities, observations on patients, data extracted from clinical records, etc. This paper discusses data in terms of what to collect and how to use them to improve patient care, optimize health outcomes and, contain costs.

A quality framework

Donabedian proposed a quality framework in 1980[1] in which a health service could be considered in terms of structure (how the service is organized), process (what and how health care was delivered) and outcome (whether good health outcomes result, at a reasonable is). Donabedian's philosophy, and the inter-relationship between structure, process and outcomes are still being debated, and discussions on quality practice continue to be challenging.

Health clinics can have great structures (fashionable furniture, staff carrying important – sounding titles or wearing attractive uniforms, etc.) but their practices may be poor (patients given poor assessments, out-of-date, unsafe or ineffective treatments, or given too much, or not enough treatment). Variable health outcomes can result, in having no predictable health gain or service cost. Conversely, clinics may have ordinary structures, but deliver great care, achieving better outcomes for reasonable cost. The current theory in quality improvement proposes that good structures do not automatically equate to good processes or outcomes, as these are very different matters, and require different investments in time and resources in achieving them. Conversely, good outcomes do not necessarily indicate consistently good structures or processes, as they can occur by chance. The most important element for therapists to consider is the delivery of consistently good processes underpinned by appropriate and supportive structures. There is a higher possibility that the outcomes from care which combines good structures and processes are consistently better than those from good structures, or good processes, existing separately.

How to measure outcomes, what outcome measures mean to different people, and how outcomes equate to quality care continue to challenge both clinicians and researchers.

Measurements taken in clinical practice

Health practitioners usually measure a lot of things, most of which reflect administrative requirements, and some which measure costs and patient outcomes. Irrespective of the type of data collected, these measures can only be trusted if they are measured consistently in a standard manner and a clear purpose. For instance, health outcomes can only be properly evaluated if they are measured using standard and valid instruments, and reviewed regularly, identifying poor practices. Health outcomes are not believable if they come from testimonials, or from occasionally surveyed patients reporting '*that they feel better'*. This always raises the question of '*whose opinion has been left out?*' Health outcomes are systematically and regularly measured attributes of health that mean something to patients, their families, clinicians and funding bodies.

There has been a body of work conducted in Australia over the last 20 years by allied health professionals trying to come to terms with what constitutes a minimum set of data which reflect allied health activity. There is no resolution on minimum data sets because there is no consensus on the purpose of data collection, and what 'data' actually means[2]. The lack of consensus reflects unresolved issues of differences between allied health disciplines' training and focus, their service delivery patterns, and the different allied health disciplines' way of

managing their patients, as well as differences between the public and private sectors.

Administrative data

Allied health clinical practice data in is most often collected on patient-throughput or clinical activity. In the quality improvement sense, this provides very little information on quality structures, processes or outcomes. This data simply reports on the number of patients seen in a week, the hours of available therapist time per week, number of patients on waiting lists, or therapist to patient ratios. In quality improvement terms, such data provides very little information, as it raises more questions than it answers – what type of patients are seen, how many times does each patient attend, what conditions do new patients have, why do some therapists treat more patients than others, do patients have to wait long for treatment, why are some patients seen quickly and others not, which patients are discharged from treatment, and why?

Clinicians, particularly those in private practice, most often record per-patient information relevant to billing or administrative purposes. They often use practice-specific database software which records details such as patient identifiers (name, date of birth), insurance status, consumed visits, dates of visits, etc. They may also record the length of the visit (if there are different costs for different service types) and whether consumables are provided (tape, splints, books etc). They may note which therapist consulted the patient, in instances where there were differential costs for therapists (specialist therapists versus new graduates etc) What these data do is provide a cost-centred view of service provided to one patient, from which an account can be generated. This information provides little evidence of health outcomes or value for money.

Diagnosis and health outcome data

Administrative data collection means that the most important data for health outcome assessment are generally missing from therapists' datasets, such as why did patients attend this clinic, what risk factors did they have for poor outcome, what treatment was provided to them, did they improve, did they suffer reoccurrences, or why did some patients improve and others not? Rarely in clinical settings is useful information on diagnosis or patient-outcome measures collected. Data on diagnosis and outcome provide essential clinical information on outcome of care for specific groups of patients, and adds vital reference to the quality improvement puzzle.

Diagnosis coding has been used for a long time in hospitals as an essential mechanism for determining hospital funding. As they have grown in sophistication, these codes now reflect many allied health conditions. However, they are rarely used directly by allied health clinicians for their own quality improvement purposes. Attempts have been made to develop codes for specific allied health diagnosis, but their success has been tempered by pragmatics, practicality and application. There are persuasive clinical arguments not to use diagnostic codes, as they are perceived to be insensitive to specific diagnostic/ clinical reasoning markers that identify a specific patient's problems, or describe a homogenous group of patients for quality improvement purposes. The compelling reason for recording any standard diagnosis code is to be able to retrieve information for individuals, or for a group of patients, and to consider the quality of care relative to costs. Diagnosis codes can be recorded electronically along with other information on patients, or kept on a simple written register linked to patient identifiers, so that patients' records can be retrieved for quality improvement purposes.

Thus, a useful diagnosis code needs to be a standard set of numbers or letters that is understood by everyone using it. We recall an evaluation that we undertook some years ago of an electronic patient record system at a local hospital which included a diagnosis field[4]. We were understandably excited by this because it was in the middle of the period of debate on usefulness of diagnosis coding in Australia. How disappointed we were to find the diagnosis code field mostly blank, or with one code in it (9999 meaning diagnosis not specified). Discussions with clinicians at this hospital identified that they felt that diagnosis was too difficult to assign. Reasons given were that the list with which they had been provided was very basic, that the diagnosis list of codes was not handy to their workstation, and that they would not want to be legally responsible to the patient if information was wrong. Thus by default they had done nothing!

Many diagnostic coding systems incorporate information that is not a descriptor of diagnosis *per se*, but reflect useful adjunct descriptive information of events that may impact on outcome of care (for instance patient age, chronicity of condition, severity of condition, nature of injury/ trauma). Diagnoses are

integrally related to clinical reasoning and problem solving, and because this is becoming a therapy art-form, it may well indicate the agreed diagnostic codes are a long way off.

Disentangling diagnostic information

Let's consider a common diagnostic term, **low back pain**. To start with, is this a diagnosis, or simply a descriptor of a pain location? This 'diagnosis' is common across clinical and research projects. What is 'low back pain'?

'Low back pain' comprises two descriptive elements. There is value in describing **body part or location**, as this is common with many other medical diagnostic descriptors. The other element of this descriptor is '**pain**' – that is, the presenting problem. Pain is a complex phenomenon related to irritation of body structures sufficient to trigger pain signals. Thus it is pain reflecting an adverse event occurring in, or related to, the structures in the low back. The next logical question is its **chronicity** - the length of time low back pain has been a problem – is it a recent event or is it a long term problem? If it is a long term problem, how often has it been a problem? Remember too, that there are different definitions of chronicity in the literature! Over the period of time in which the patient has suffered the condition, has it occurred daily, monthly, infrequently, or always in association with a specific event?

Now let's focus on this current presentation – what is the **pattern** of the pain? Pain can be intermittent, related only to doing a specific activity. Or it can be consistent, being present throughout the day and night and related to no specific activity. Its **severity** may be the next logical question – how bad is it? Is it that bad all the time, or are there degrees of 'badness'? Linked to pattern and severity are often issues of **restriction of usual activity**, which describe the impact of the pain in the low back on lifestyle. Then there are the **clinical diagnoses** issues – using the specific tests, can the presenting pain be isolated to an anatomical structure, which can give the diagnosis more biomechanical meaning? Is the pain related to poor performance of a disc? A facet joint? A muscle tear? A ligament sprain? Is the pain not related to anything in the low back, is it more a behavioural presentation incorporating psychosocial factors that need to be treated? Being cynical, we could ask how important is it that a particular body structure is isolated as a cause – how valid and reliable are any of our clinical tests? How useful is medical imaging in determining affected body structures? Does information about an injured structure truly direct the clinical management?

Risk factors

There is also important clinical information on the patient which could assist in identifying potential risk factors for the onset of a medical problem and/ or the likelihood that the problem will not resolve quickly. Risk factors are related to patients' personal, social, emotional and/ or demographic factors, which potentially impact on the patient's response to treatment. Risk factors are usually identified from epidemiological studies which assess the strength of cause and effect models. Is the presence of a risk factor part of a 'diagnosis'?

Low Back Pain Case Scenario

Consider a typical case scenario of a patient with low back pain, and the wealth of information that we could potentially record for diagnostic purposes.

Presenting patient = Male, 54 years, high BMI, unfit, truck driver, works six days per week 18 hours per day, heavy smoker, dissatisfied with job, suspects problems at home but never there long enough to bond with family, gets little exercise, eats poorly when driving truck.

Location of problem = Low back

History of problem = pain in the low back which has occurred regularly over at least 10 years, related to sitting for long periods, each pain episode lasting for longer, can be minimized with tablets and alcohol and rest

This presentation = three days of niggling pain all the time, severe pain on lumbar extension, interferes with sleep, postural deformity in sitting and standing, can't drive truck as he can't get out of bed without pain, wife not happy with him being at home, no money coming in because he has used up all his sick leave and is waiting for insurance claim to come through. On examination he is acutely tender over the paraspinal muscles, anxious about his pain, and angry with his circumstances.

How can you use this information to make a diagnosis? What diagnosis would you record?

From our case scenario, the established risk factors for either onset of back pain, or its continuation, would be gender (male), age (54 years), BMI (high), fitness levels (unfit), smoking (heavy), sedentary high stress occupation (truck driver, works 6 days per week 18 hours per day), job attitude (dissatisfied with job), home life (poor), emotional factors (present in terms of anger and anxiety), daily physical activity (poor

as he has little opportunity for regular exercise), and nutrition (poor)[3]. In some instances, formal screening assessments can be made of patients presenting with specific conditions, in order to identify early in the treatment plan whether risk factors could be present, and if they are, focused management strategies can be employed to minimize the effects of risk factors on health outcomes.

There is additional information gathered from the physical examination of the patient which also contributes to our understanding of the 'diagnosis'. This exemplar patient presents with a regular and chronic pain history, related biomechanically to sitting for long periods, each pain episode lasting for longer. There is also information on patient self-management (pain which can be minimized with tablets and alcohol and rest). This information not only assists in describing the patient but in determining treatment plans, and measuring the success of these plans.

Outcome measures

Considering patient-specific data which could be used to assess treatment effectiveness, we could use any number of the presenting symptoms as outcome measures. This patient presents with a choice of measures with which we could demonstrate change in response to treatment. For instance we could measure pain, extension range of movement, tenderness over paraspinal muscles, interference with sleep, postural deformity in sitting and standing, capacity to undertake usual occupational tasks, severity, home situation, anxiety or anger. We could also use reduction in some of the risk factors to demonstrate the effectiveness of a self-management approach, or risk-reduction strategies. While we cannot realistically do much to change gender or age, we could educate our patient to reduce his weight, change his exercise and diet behaviours, to give up smoking, and to improve his relationship with his wife, in order to reduce the incidence of future low back pain events.

To demonstrate change in any of the health outcome or risk factors, they need to be measured at least twice – once on the first contact (treatment) with the patient (establishing a baseline) and at least once more throughout the treatment episode for comparison against the baseline. Only by having two or more sets of the same measures and calculating the difference (change) from baseline, can we demonstrate change that may be attributable to treatment.

Most importantly from the perspective of data handling is how all this 'diagnostic' information would be carried out. Given the opportunity and incentive, we would probably record the minimum amount of diagnostic information in order to retrieve records for this patient and any others like him (making a group of patients for investigation). Therefore, we would probably record that this patient presented with **chronic low back pain**. On his records you would then expect to find all of the important other factors that could be used for risk identification, or for calculation of the outcome of care. The issue of data recording and retrieval comes down to how much you need/ want to know, and what data you will use for quality improvement purposes.

Outcome measures

Outcome measures can be usefully classified into the World Health Organisation[4] framework of impairment (assessment of restrictions in movement, swelling, pain etc), assessment function capacity (estimated capacity to operate at usual (expected) functional levels) and participation (assistance required for the patient to operate to capacity). There is a plethora of published outcome measures, containing variable psychometric properties. These properties are established during the development of the instrument, and they relate to validity (face, content, construct), sensitivity to change, and reliability of administration. It is important to remember that an outcome measure used in one context may not be appropriate in another. Thus, choice of outcome measures requires knowledge of what constructs are measured and relevant. Most outcome instruments produce a score (presented as a number), which is a proxy for the extent of patients' problems.

There are two other issues to consider when using health outcomes– whose outcome is being measured, and what is the clinical utility of the outcome measure?

The question of <u>whose outcome</u> requires an understanding of perspective and ownership. Whilst impairment and participation can be measured by a therapist of a patient, pain and functional capacity can be only measured by the patients themselves. Therapists can use goniometers, tapemeasures or stopwatches to estimate the extent of impairment. They can also measure the use of a splint, medication, or restricted duties as measures of participation. However functional capacity needs to be measured in terms of how patients' problems influence their lives. Thus questions relating to function should address the context of questions

relevant to patients' daily activities. If the questions are designed by clinicians to find out what they think are important, without asking patients whether the questions are relevant to them, then functional measure could be invalid. For instance, a functional assessment instrument that requests information on 'return-to-work' may not be relevant to a retired person, to a disabled person unable to work, or to a volunteer, or a mother at home who does not work for wages. Questions about 'household' or 'garden duties' are only relevant to people who do them.

Clinical utility addresses issues such as who administers the outcome measure, how appropriate is it for a specific patient group, how are data recorded, how many questions are asked, how the scores are calculated, and how the data are analysed. Many clinicians are confused by outcome measures (particularly which ones to choose), and there are few guides that provide appropriate information on outcome measure availability, choice or use.

Why do you collect data?
Many clinicians collect as much data as possible, hoping that some of them will improve the quality of their care. The take-home message of this paper is to have a purpose for every piece of data you collect - why are you collecting data, how are you collecting them, how accurate are they, and how are you using them? Collecting and analyzing data take time, effort and resources, and only undertaken when there is a purpose and a plan.

If you collect administration or cost-related data, recognize that at best they will tell you how much money you have made, from how many patients, with your current staffing complement. They don't tell you why patients consulted you, whether they were returning for treatment (and whether this is for the same condition, or another one), whether the patients were treated appropriately, whether treatment produced a good outcome, and whether the outcome was valuable in terms of cost effectiveness and patient satisfaction. If you collect data electronically, can you retrieve and report on your data efficiently and appropriately? How readily can you manipulate the data to answer quality assurance questions? Whose responsibility is it to input the data, and who retrieves them for reporting purposes? Does anyone care? Are poor findings acted upon?

There has been Australian legislation in place since the 1990's regarding Reasonably Necessary Treatment for compensable injuries (injuries for whose treatment an insurer is responsible). The requirements of the legislation is that clinicians should justify their treatment choices based on the following concepts:

- Is treatment appropriate for the condition, the patient, the likely extent of improvement?
- Does treatment consider the known degree of effectiveness (actual or potential) and the potential cost?
- Is the treatment choice the best of all alternative treatment options?
- Has treatment been used previously in similar cases?
- Is it acceptable to peers?

To respond to a query about Reasonably Necessary Treatment, clinicians need to have access not only to their own treatment data, but also to data produced by others for comparison (research data, benchmarking data or other clinical data). Clinicians cannot operate in isolation or put their heads in the sand about the quality or accountability of their patient care. Information on patient throughput, or patient costs to the system provide none of the answers to questions on reasonably necessary treatment.

Centre for Allied Health Evidence (CAHE) Musculoskeletal Outcomes Calculator (www.unisa.edu.au/cahe)
This software provides a way in which clinicians can readily collect data on individual patients, per diagnosis, to demonstrate change in chosen outcome measures over time. The CAHE calculator is free to download from our website and it offers a patient-by-patient opportunity to collect relevant outcome information. It is supported by documentation that guides choice of outcome measures, based on evidence of psychometric properties and clinical utility. Clinicians are not restricted to using one outcome measure for one patient, as the current version of the calculator for musculoskeletal conditions contains 20 measures of outcome that have strong psychometric properties, and are linked to body parts. The selected outcome measures range across pain, function and satisfaction. A graph can be printed at the end of the episode of care to demonstrate change in the outcome measure over time, and to support quality improvement activities. The CAHE Calculator also provides clinicians with the opportunity to decide on expected improvement in outcome over an episode of care, and to consider whether the risk factors with which the patient presents, are impacting on the expected outcome. This requires the application of research knowledge to

clinical practice, and we see the Outcomes Calculator as a bridge between the two.

Clinical practice and research findings

The National Health and Medical Research Council (NH&MRC) in Australia recently endorsed Evidence-Based Management of Acute Musculoskeletal Pain guidelines[4] to assist clinicians to choose the most effective treatments for patients with low back pain. These guidelines provide an expected time frame of recovery for patients with different risk factors. Treatment effectiveness information was synthesised from the findings of randomized controlled trials, other experimental studies, and systematic reviews. The research evidence findings were scored in terms of consistency, volume, clinical impact, applicability and generalisability, and are outlined in the guidelines in terms of what treatment choices are based on strong evidence of effectiveness, what treatment choices may or may not be applied because of equivocal evidence of effectiveness, and what treatment choices should not be applied because of evidence of harm. The literature also provides strong evidence of risk factors for poor prognosis gleaned from epidemiological research – in the instance of low back pain, risks of poor outcome include psychosocial factors, poor physical fitness, high BMI, middle age, gender=male and sedentary occupations. Time frames for recovery have less robust evidence underpinning them and are often based on consensus opinion rather than good research evidence. The time frames suggested in the guidelines are that patient should obtain significant improvement within the first 2-3 physiotherapy treatments (1-2 weeks after onset of pain) and should be considering discharge from care by about treatment 6-7 (3-4 weeks after onset of pain). The question remains as to what is 'significant improvement' – is this statistically significant improvement which few clinicians would be in the position to calculate, or is it clinically significant for the patient? It also begs the question of the choice of outcome measure, as some outcomes may show different rates of change to others across the episode of care.

However, despite these concerns, using the CAHE Outcomes Calculator (or similar software) clinicians can chart the treatment-by-treatment progress of their patient, using a standard chosen measure of outcome. If the patient fails to achieve expected outcome change over specific time frames, therapists can ask informed questions. Does this patient have risk factors for a poor outcome, and if so, perhaps treatment should be oriented to dealing with these? Has ineffective treatment been provided (as indicated in the guidelines) and perhaps treatment choices could be adjusted? Perhaps after one-two treatments with no discernable change in outcome, patients could be directed to other types of care, rather than continue to consume ineffective care.

Summary

Clinicians are taught to collect data every time they consult a patient. What data are collected and why, are the key points when discussing quality improvement exercises. It is important in any clinical setting to take time to establish which data elements are currently collected routinely (either on electronic databases or on patient records). What is the purpose of each piece of data? What do they actually measure, do they allow you to reflect on the quality of your care? Are the data measured properly (is there the possibility of error?), how are the data used for reporting purposes, and are they acted upon? If you didn't collect these data, would there be a problem from anyone's perspective? What are the current gaps in data collection, identified by asking the question 'what more do you want to know about what you do, and what it achieves?' If new data items are suggested, think again about their purpose. How will the data be used to inform quality improvement processes? If the data allow you to reflect during, and after treating a patient, about whether he/she received the best care for the presenting problem, whether the outcome reflected the care, and whether the patient's needs were reflected in the outcome measure, then you are on the right track!

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