Toward Clinical Excellence

An Introduction
to **Clinical Audit,**
Peer Review
and Other
Clinical Practice
Improvement
Activities

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Foreword

Toward Clinical Excellence is a series of publications developed to assist practitioners and managers as they work to improve clinical quality in the New Zealand public health system. This publication, the third in this series, provides a handbook for practitioners developing expertise in peer review and clinical audit as part of their service quality plan.

The systematic critical review of the quality of clinical practice by a multidisciplinary team is the key to improving outcomes for service users. Clinical audit, peer review and evidence based practice methodologies provide practitioners with knowledge to better understand the nature of their clinical practice.

At a policy level there is strong support for this development from the Minister of Health. The New Zealand Health Strategy (King 2000), along with the recently introduced Health and Disability Sector (Safety) Act 2001 and health professionals competency assurance legislation, provides clear direction toward quality improvement in health care. In addition, the new Clinical Services Directorate in the Ministry of Health has assembled key staff to provide more effective support and co-ordination for national quality improvement projects.

The most important factors driving the success of the move towards improved clinical quality, however, reside within District Health Boards themselves. Key success factors within their organisational culture include a focus on improving outcomes for service users, a commitment to learning organisation principles and a system of identifying and rewarding clinical quality improvement 'champions' to provide clinical leadership at both organisational and service levels.

The task of implementing activities for clinical quality improvement provides a number of challenges for health professionals, not least of which is prioritising the competing demands on available time and resources. Achieving a clinical environment in which all health professionals understand the concepts and tools required to be effective in their clinical audit activities, however, is well worth this investment. As a result, we can look forward to improved outcomes and satisfaction for service users and the maintenance of professional integrity at both practitioner and service levels.

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Using This Handbook

Toward Clinical Excellence: An introduction to clinical audit, peer review and other clinical practice improvement activities is the work of a group of health professionals listed in Appendix A. Although other quality tools and processes are introduced, its purpose is to provide a simple explanation of clinical audit and peer review to encourage health professionals to develop these skills to achieve ongoing improvement of clinical care. It is a handbook, not a textbook. That is, it offers a practical, 'how to' guide for those with little experience of peer review or clinical audit, and identifies resources that offer more in-depth information.

The focus of this publication is on practitioners in a multidisciplinary team. Hence the generic terms *practitioner* and *health professional* are used. Similarly *health service* is used to denote a health and disability support service delivery entity, department or practice. In general, *service user* or *consumer* are used to describe the people for whom health services are provided; in some instances *patient* is used.

We expect that, over time, publications such as this will change in content and detail as we become more accustomed to evidence based practice. The Ministry of Health is developing a website that will serve as an adjunct to this document, supplying updated information on clinical practice improvement. In the meantime, we would appreciate your feedback on the usefulness of this handbook.

Comments and suggestions should be addressed to:

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Glossary of Key Terms

Some key terms related to clinical practice improvement activities have a number of meanings. In this handbook, they are used based on the following definitions.

Clinical audit The systematic peer evaluation of an aspect of patient care. The process, which may be multidisciplinary, involves a cycle of continuous improvement of care based on explicit and measurable indicators of quality. These indicators include a service user perspective.

Clinical indicator An evaluative criterion providing an objective measure of either process or outcome in qualitative terms that is comparable across similar services. Indicators are generally reported in percentages or ratios. Although primarily for clinical use, indicators are intended to provide useful information to other people in addition to clinicians. For example, they can enable consumers to make informed choices about treatment options, tell providers how they are functioning in comparison with others and enable funders to make appropriate policy and funding decisions.

Clinical pathway A 'road map' outlining a course of care provided to a patient. It is a combination of clinical practices that result in the most effective, resource-efficient, appropriate treatment for a specific condition, procedure or symptom. Clinical pathways are a 'point of service' tool used to disseminate and implement clinical guidelines.

Clinical practice improvement (CPI)	The evidence based process of improving clinical practice, using tools such as clinical pathways, outcome and performance indicators, clinical measurement and review in a continuous quality improvement cycle supported by appropriate information systems.
Criteria	The measurable key components of a standard. Criteria specify what is to be measured in a clinical audit, such as the appropriateness of specific health care decisions, the effectiveness of specific processes of care, or the acceptability of specific outcomes (National Centre for Clinical Audit 1997b).
Evidence based practice (EBP)	An approach that incorporates best available evidence, based on scientific research, into the clinical decision-making process using tools such as clinical practice guidelines, peer reviewed clinical research and direct clinical measurement (adapted from Royal Australasian College of Physicians website www.racp.edu.au).
Guideline	Has a very specific meaning in modern medical language. A clinical guideline provides an evidence based summary of the benefits, risks and contraindications for investigation, treatment and ongoing management of a particular condition or disease. At a service delivery level a guideline is used as a tool to close the gap between how we currently practise (and the outcomes associated with current practice) and other alternative practices (and the outcomes associated with those practices). It informs decisions for individual patients and for organisations by making clear the benefits, harm and costs of different treatment options.

Morbidity and mortality review	A form of peer review that involves the multidisciplinary team and focuses on processes or systems of care within a service that led to less than ideal patient outcomes.
Peer review	An evaluation of the performance of individuals or groups of practitioners by members of the same profession whose status is similar to the status of those delivering the care. It may be formal or informal and can include any occasion in which practitioners are in learning situations with other colleagues. Peer review should also be used in the context of multidisciplinary teams to incorporate feedback from 'peers' of other health professions who are members of the team.
Standard	A measurable statement about performance describing the quality of care to be achieved based on the best available evidence. It may describe (a) minimum performance or results (b) excellent performance or results or (c) a range of acceptable performances or results (Grimshaw and Russell 1993).

Section One: Introduction

The central concern for health professionals and provider organisations is to ensure that clinical care is safe, effective and efficient, as well as appropriate to the needs of a particular service user. The challenge for health professionals is not just to identify inadequate care, but to make changes that improve clinical practice and health care service delivery. Meeting this challenge is primarily a health service responsibility involving a range of health professionals represented in the team who contribute to patient outcomes. There is also an individual professional responsibility to ensure ongoing competence within an identified scope of practice.

Concern with improving clinical care is not new. Codes of practice in medicine date back thousands of years – perhaps the best known being the Hippocratic Oath. As a nurse in the Crimea, Florence Nightingale used clinical audit in the mid 19th century. Similarly, Abraham Flexner's documentation of the quality of surgery in the United States in the early 20th century led to major reforms and contributed to the development of the American College of Surgeons accrediting process in 1913 (Lembeke 1967).

In essence, health care providers today need to answer three questions:

1 What are we trying to accomplish?

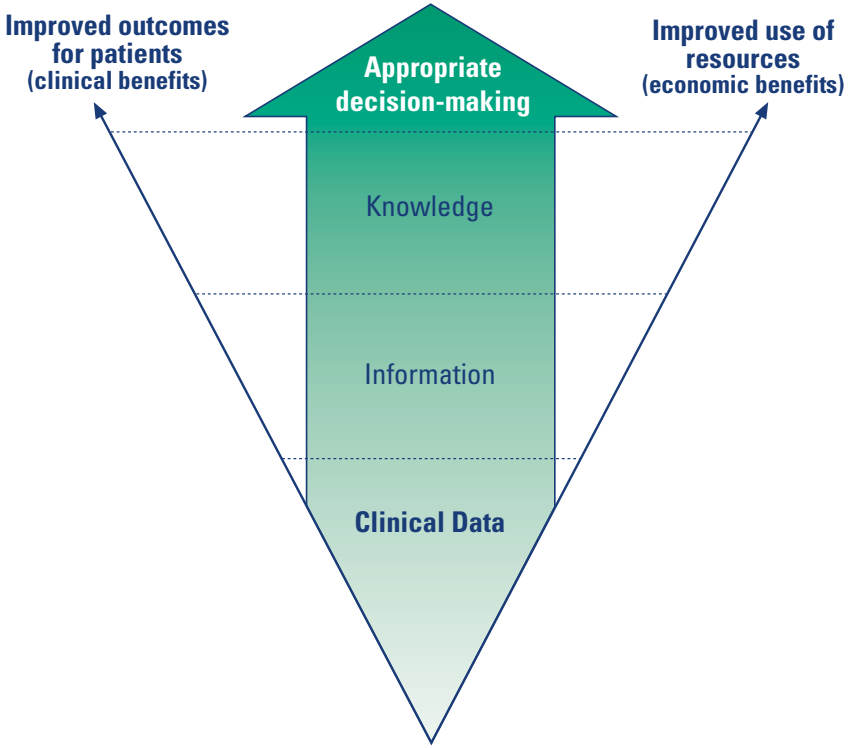
2 What changes can we make that will result in an improvement?

3 How will we know a change is an improvement?

(Institute for Health Care Improvement, www.ihi.com).

To answer these questions we need clinical data that are both valid and reliable, enabling appropriate decision-making with both clinical and economic benefits. This process of improvement based on sound data is demonstrated in Figure 1.

Figure 1: Clinical data as the basis for appropriate health service decision-making

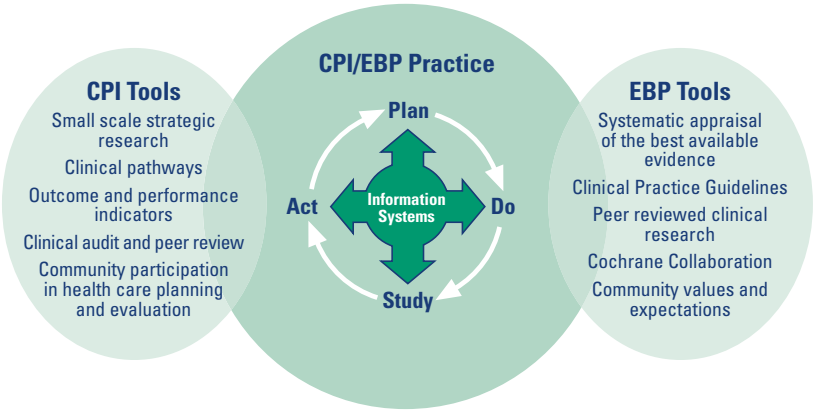


Using a systems approach to clinical practice improvement

The key to improving clinical care is to take a systematic approach. Each service should have a quality plan that sets out the activities to be undertaken, documents the processes to be used and identifies individual accountabilities. In developing your service quality plan, use the skills of those people in your organisation responsible for quality improvement systems so that you can be sure it is consistent with the organisational plan. Start simple – complexity is not necessarily better. The first step is to systematise the quality activities the service does now and identify areas for development.

Figure 2 demonstrates how some of the pieces of the 'jigsaw' for clinical quality improvement – combining tools of clinical practice improvement (CPI) with those of evidence based practice (EBP) – might fit together in a health service.

Figure 2: Relationship between clinical practice improvement and evidence based practice



Source: Adapted from Berwick 1994

The clinical quality improvement 'team'

The focus of this document is on the practitioner and the multidisciplinary team engaged in clinical practice improvement activities. There are other important parties in these activities whose roles need to be clarified at the outset. These include service users, management and professional bodies.

Role of service users

One of the seven principles of the New Zealand Health Strategy is to have *'active involvement by consumers and communities at all levels'* (King 2000). The role of the service user therefore needs to be explicit. Clinical quality improvement activities are enhanced by input from service users. This input may be broad, such as the perspective of an independent consumer or an 'expert' service user in service planning and evaluation, or more specific, providing information about an individual's experience of a particular episode of care.

Role of management

The role of management in clinical quality improvement is critical. A quality improvement focus and the involvement of consumers in service evaluation are strategies that need to be supported and suitably resourced by the Board and management team.
This requires an organisational climate in which improving outcomes for the patient is the central purpose, practitioners are valued as partners, and resources appropriately prioritised.

Role of professional organisations, colleges and specialist societies

Practitioners in a range of disciplines in health are increasingly being required by their professional bodies to engage in continuing education and activities to maintain professional standards as a requirement for ongoing registration. These activities include clinical audit and peer review. In an environment of increasingly complex health care and associated technology and the subsequent development of sub specialisation and advanced practice, it makes good sense to develop a closer relationship between the practitioner, the organisation and professional bodies.
This relationship has the potential to focus on key clinical quality improvement issues, reduce ambiguity for the practitioner and enable consumers to contribute at both a professional and organisational level.

Overview of this handbook

The next section constitutes the bulk of this publication, providing a step by step approach to clinical audit. Sections Three to Seven look at the tools and processes that are used in clinical audit, peer review and other clinical practice improvement activities.
For a guide to the terms used throughout this document, see the Glossary of Key Terms.

A considerable amount of material is contained in the appendices. In addition, the Ministry of Health is developing a webpage (www.moh.govt.nz/quality) that will serve as an adjunct to this document, supplying updated information on clinical practice improvement.

Section Two: Clinical Audit

Introduction

The principle of all clinical audit activity is that it leads to improvements in clinical practice, resulting in improved outcomes for patients. It allows for the systematic, critical review of the quality of clinical practice by a multidisciplinary team. It includes the procedures used for diagnosis, treatment and care of patients, the associated use of resources and the effect of care on the outcome and quality of life for the patient.

Audit compares actual practice to a standard of practice. As a result of this comparison, any deficiencies in actual practice may be identified and rectified.

Similarities and differences between audit and research

Clinical audit is sometimes confused with research because the two activities have many similarities, but they also differ in some significant ways. Audit has been described as determining whether current knowledge, skills and resources are being properly used (www.ubht.org.uk). In contrast, research is concerned with generating new knowledge that will have general application, for example determining whether a new treatment is superior to an existing one. Put another way, *'research discovers the right thing to do; audit ensures it is done right'*.

For further discussion about the similarities and differences between audit and research, see Appendix B.

Development of clinical audit

The last 20 years have seen considerable development and increasing use of clinical audit. This development has been significantly influenced by the requirement that health professionals participate in audit by their colleges and professional bodies, their employing organisations, and purchasers and funders of health care.

Clinical audit can make a powerful contribution to clinical quality improvement. From a professional development perspective, audit may expose health professionals to new information and knowledge, while service based audit involving the multidisciplinary team assists in 'breaking down barriers' among professional groups. The practice of health care often lags behind the science. Audit activities initiated, developed and conducted by individual practitioners or clinical teams can therefore be instrumental in changing practice, adjusting resource allocation and improving standards of patient care.

Organisational requirements for effective clinical audit

The following are examples of criteria that will determine to a large extent the ability of health professionals within a service to develop effective clinical audit processes:

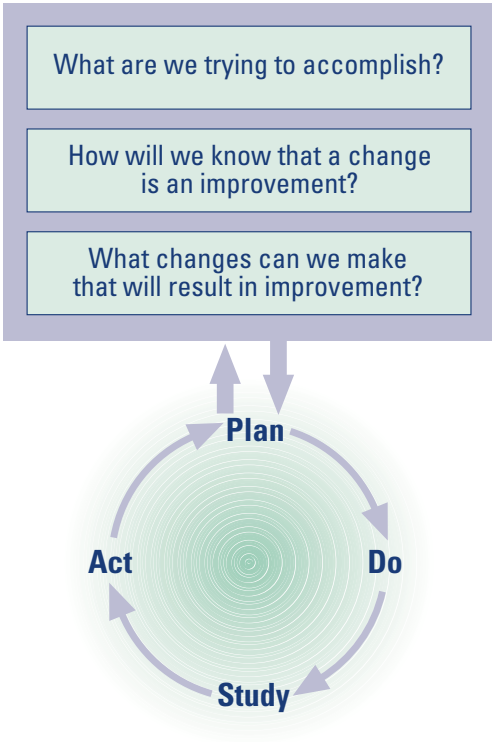
- board and management 'champions' for ongoing clinical quality improvement
- a professional 'champion' for clinical audit activities
- knowledge of and commitment to clinical practice improvement among clinicians
- appropriately resourced service quality plans that are developed from DHB annual plans
- dedicated personnel – health professionals whose primary role is to facilitate audit activities
- appropriate support such as availability of meeting rooms and secretarial support, information systems and technical support.

The audit cycle

The essential features of audit are embodied in the audit cycle. The classical model of quality improvement illustrated in Figure 3 has two parts:

- three key questions, which can be addressed in any order
- the Plan-Do-Study-Act (PDSA) Cycle to test and implement changes in real work settings.

Figure 3: Classical model for quality improvement



Source: Adapted from IHI Quality Improvement Resources

As well as dealing with the key questions in this model, more detailed questions such as the following will need to be answered in planning an audit project.

- What is the clinical outcome that you are aiming to improve?
- How can you review this outcome in a systematic way?
- How is confidentiality to be maintained for the patients whose provision of care is being reviewed and for the clinicians delivering the care?
- Are all of the professionals whose care is being audited members of the planning team?
- How will the information be collected?
- What standards are available, or need to be developed, against which to audit?
- At what stage will implementation be possible?
- How should changes be introduced so that implementation is effective?
- When will you review the implemented changes to determine whether the outcome has improved?

A practical guide for clinical audit

Clinical audit is a process rather than a static event. This process involves a cycle of continuous improvement of care against evidence based standards. A number of different versions of this 'audit cycle' have been suggested; the information in this handbook is based on a nine-step cycle:

1 Select an audit topic.

2 Plan the audit.

3 Test the audit methodology and tool.

4 Conduct the audit.

5 Analyse the data.

6 Review the results and rank problems that are identified.

7 Develop solutions.

8 Implement solutions.

9 Re-audit.

To demonstrate certain aspects of the audit cycle, examples are given from medical, physiotherapy and nursing perspectives. Although each example may have a particular professional focus, there are common elements that could form the foundation of a multidisciplinary team audit.

Throughout this section resources are referred to which provide further detail on a range of aspects of clinical audit; additional resources are contained in Appendix C. In addition, Appendix D details services provided by the New Zealand Health Information Service (NZHIS), a group within the Ministry of Health responsible for the collection and dissemination of health-related information. Audit data collected at local department, ward or service level, particularly if they relate to an identifiable cohort of patients, can be compared with data from other sources that have been collected, validated and collated by the NZHIS.

Step 1: Select an audit topic

- Who should be involved?
- What should be audited?
- Prioritise audit topics.
- Make a final decision about your audit topic.

Who should be involved?

Clinical care is multidisciplinary. When an activity is undertaken to improve care, the process should involve all members of the clinical team. This is not to suggest that individual professional audit is not a key part of a departmental or practice audit programme. Focusing all members of the team on key areas in a co-ordinated way, however, will generally lead to greater improvements. Team ownership of the audit process makes improvements easier to identify and implement in all aspects of care.

What should be audited?

Because health resources are limited, it is important to determine the priority topics for an audit in a particular service area.
The following questions may be useful in identifying audit topics.

- What things are done frequently?
- Are there areas where problems have been identified?
- What do we do that involves significant risk (to patients, staff or the organisation)?
- What do consumers think we should audit?
- Is there a particular area of practice where complaints have been received?
- Where is there clear potential for improving the service delivery?
- Where do national standards or guidelines exist?
- Is there evidence about clinical effectiveness?
- What do we do that is particularly costly?
- What are the personal interests of the health team members?

Prioritise audit topics

Answering the questions above will identify a number of potential audit topics that may need to be prioritised. One or more of the following criteria may help to rank the topics in order of priority:

- clinical concern
- concern of service users
- high risk
- high volume
- clinician interest
- complex or difficult management
- high cost
- availability of national or professional standards.

One way of prioritising topics is to score each topic based on frequency, risk and level of concern to practitioners. Topics that score highly on all of these criteria are high priority for audit. Alternatively, scoring each topic using different criteria such as availability of evidence, patient concern and cost may produce a different priority. It is important that the team agree on the method used for prioritising the topics because the criteria chosen will influence the result, as shown in the examples below.

Audit prioritisation examples

Example 1 identifies asthma management as the highest priority for audit by scoring each potential audit topic out of 10 and then comparing totals for the three criteria the team chooses.

Example 1

Topic	Frequency	Risk	Practitioner concern	Total
Asthma management	7/10	6/10	8/10	21/30
Chest pain management	6/10	8/10	5/10	19/30
Heart failure management	5/10	6/10	4/10	15/30

Using the scoring system in Example 2, chest pain management is the area that scores highest and is the priority for audit.

Example 2

Topic	Evidence	Patient concern	Cost	Total
Asthma management	7/10	4/10	5/10	16/30
Chest pain management	9/10	7/10	8/10	24/30
Heart failure management	6/10	3/10	7/10	16/30

Levels of evidence

An important part of selecting an audit topic is agreement by the team as to the level of evidence that will be required to justify any proposed clinical practice improvement as a result of the study. Three accepted ways to determine levels of evidence are Sackett's five-level approach, the more recent revised SIGN grading system, and the Joanna Briggs Quality of Evidence ratings. All these approaches are outlined in Appendix E.

Make a final decision about your audit topic

Prior to finalising your audit topic it is a good idea to review the process to date and ask the following questions.

- Is the topic important?
- Is it 'do-able'?
- Are all the important stakeholders involved?
- Is there a 'champion' in the department for the audit and improvements?
- Has the issue of confidentiality been addressed?
- Will ethical approval be required?

Step 2: Plan the audit

- Set aims and objectives.
- Develop best practice standards.
- Select cases for audit.
- Develop the audit tool and method of data collection.

Set aims and objectives for the audit

After choosing an audit topic it is important for the practitioner or team to agree on exactly what the project is trying to achieve or establish. This will ensure that the audit stays focused, making the most efficient use of time and resources. The audit should concentrate on collecting specific data, using the simplest method in the shortest possible time. This approach makes audit easy and effective.

The aim and objectives of the audit should follow on from the question you are trying to answer (see example below).

The aim is a broad statement of intent. Always try to express the aim using positive language.

Objectives break the audit aim into components that are measurable and time limited.

Examples of the question that the audit is to answer

Question	Audit aim
Example 1 Are we managing patients with asthma in the emergency department based on best practice standards?	Improve the management of patients with asthma in the emergency department
Example 2 Are we managing elderly people who fall based on best practice standards?	Improve the management of elderly patients who fall
Example 3 Are we using best practice standards to assess patients with leg ulcers?	Improve the assessment of ambulatory patients with leg ulcers

Develop best practice standards

Once the aims of the audit have been established, the team develops standards that are measurable statements of best practice for these goals, derived from guidelines. The guidelines and standards you use for the audit should represent, where possible, evidence based best practice. The guidelines will have evidence of specific interventions that are proven to be effective and should be used to develop standards for the audit. (References on guideline development including information from the New Zealand Guidelines Group and the United Bristol Healthcare National Health Service Trust are listed in Appendix C.)

Examples of standards and guidelines

Audit aim	Guidelines	Standard
Example 1 To improve the management of patients with asthma in the emergency department	'Patients should be given a written action plan based on signs and symptoms and/or PEF (Peak Expiratory Flow); this is especially important for patients with moderate-to-severe persistent asthma or a history of severe exacerbation.' *US National Guidelines Clearing House*	All patients discharged from the emergency department with asthma receive and have explained to them a written action plan.

Audit aim	Guidelines	Standard
Example 2 To improve the management of elderly patients who fall	'Elderly patients who have fallen and are admitted to hospital should have the safety of their home environment assessed prior to discharge.' (Mawson and McCreadie 1998)	All elderly persons who have fallen and are admitted to hospital have documented evidence that the safety of their home environment has been assessed prior to discharge.
Example 3 To improve the management of ambulatory patients with leg ulcers	'Assessment and clinical investigation should be undertaken by a health care professional trained in leg ulcer management.' RCN Institute (1998)	All ambulatory patients with a leg ulcer of six weeks' duration are assessed by a trained nurse practitioner.

From the range of guidelines available, it is important to find one that is suited to your environment and adequately evidence based. Three different ways of assessing the evidence associated with the guideline's standards are detailed in Appendix E.

A useful acronym in developing new standards or using existing standards is S.M.A.R.T. It is a reminder that evidence based guidelines and standards should be:

- **S**pecific – use precise language.
- **M**easurable – identify a target standard to measure practice against.
- **A**chievable – use performance levels that can actually be used in practice.
- **R**elated – to the aims and objectives of your project.
- **T**heoretically sound (based on best practice) and Time-bound.

Select cases for audit

In selecting an audit sample the team must first identify the target population whose care is being reviewed. The population needs to be defined as exactly as possible, since the results will be applicable only to the population you choose.

Examples of selected study population

Audit aim	Study population
Example 1 To improve the management of asthma in the emergency department	Patients with asthma presenting to the emergency department, who have not been referred by the general practitioner, are 16 years or over and were discharged home from the emergency department.
Example 2 To improve the management of elderly patients who fall	People of 65 years or over who have fallen and subsequently received physiotherapy and/or occupational therapy while they were inpatients and for whom the fall was the key reason for therapy intervention.
Example 3 To improve the management of ambulatory patients with leg ulcers	Patients receiving ambulatory care whose leg ulcer shows no improvement for a period of six weeks or more.

These above examples illustrate how specifically the target population is defined.

- The patients with asthma in the first audit used the emergency department for primary care and were discharged; therefore they should have pre-discharge education and a written action plan. This audit does not review the department's management of patients with acute severe asthma admitted to hospital in the same period.

- The second audit identifies elderly people who receive physiotherapy or occupational therapy after a fall. Elderly patients not reviewed or referred to physiotherapy or occupational therapy after a fall, or for whom a fall was not the primary reason for the referral, are excluded.
- In the third example, patients receiving ambulatory care for a lower leg ulcer of more than six weeks' duration, which is healing, are not included in this study.

Sampling

In deciding if it is necessary to review every patient who meets the criteria in the audit, consider the following points.

- It is not practical to review every patient record in a large population.
- A timeframe that is too short or a sample that is too small will introduce bias.
- Where conditions are seasonal, estimates of frequency will vary widely depending on the time of year that the sample is taken.

For a population of 100 patients you can sample 80 and be 95 percent confident that your sample reflects the population. That is, there is a one in 20 chance that the your results will not be representative. Using a sample is acceptable as long as everyone is aware of the greater chance that the sample may not be representative and agrees that improvements can be made to local management based on the results.

You may choose one of the following methods of sampling.

Systematic sampling uses every nth case, eg, every 10th case. Choose the starting point at random, eg, based on a random number between 1 and 10 (use a calculator or computer). Then review only the cases identified in the sampling.

Simple random sampling gives each person in the population an equal chance of being drawn. A random number generator (on a scientific calculator or in a statistical tables book) can be used to choose a population sample. A number of readily available texts explain this process (see Beaglehole et al 1993).

In *stratified random sampling*, you may specify certain conditions for the sample before taking the sample. For example, if your population is 80 percent European and 20 percent Māori and you wish to ensure these populations are appropriately represented, you can separate the two groups and sample of each group at random.

Develop the audit tool and method of data collection

Once the topic, aims, standards and population have been defined, you can design a tool to collect the appropriate data. Ask the following questions about data collection.

1 What data do you need to collect?

Data collection should include relevant information about the sample of consumers audited, which may include:

- basic demographic data – eg, patient age, sex, ethnicity
- clinical data – eg, peak flow readings and medication.

The specific information you collect will depend on what data analysis you will be conducting to determine whether you are meeting your audit goals.

2 When will data be collected?

Depending on the availability of data, your audit may be:

- *retrospective*, if data has already been collected. It is important to check if the data have been collected accurately and completely before commencing a full audit. As treatments and recommendations change over time, and a retrospective audit over many years may not represent current practice;

- *prospective or concurrent audit*, if no data or insufficient data have been collected or if practice has changed
- *concurrent*, if data is collected as care is provided.

The advantages and disadvantages of these three types of audit are outlined in Appendix F.

3 Who will collect the data?

To determine who would be the most appropriate and reliable person to collect the data, consider the relative importance of the following:

- understanding the audit goals
- being familiar with the condition
- being familiar with the case notes structure
- being someone who may need to change practice as a result of the audit.

A multidisciplinary audit might require more than one person to complete parts of the data collection form. In this case it is important to define the responsibilities for each person involved.

Finally, ensure the person or people collecting the data are allocated sufficient time and training for this task. Sufficient time is especially important where data collection may compete with a clinical caseload.

4 Will data collection be manual or electronic?

Choice of manual or electronic format will depend on a number of factors, such as the availability of appropriate information technology systems and support. Among the advantages of electronic data collection are that it:

- is efficient – data are collected and entered in one step
- is accessible – an electronic collection form on a network can be accessed from any terminal
- allows immediate manipulation of large amounts of data
- avoids loss of data collection forms
- reduces transcribing error.

Both manual and electronic data collection raise privacy issues. Ensure data are anonymised and used only for the purpose for which they were collected. Further, although the potential for remote access through electronic collection can be advantageous, it is important to address associated privacy concerns.

5 What is an appropriate design for the data collection form?

To ensure consistent collection of data, the data collection form should be simple and unambiguous. For each of the standards defined for the audit, there should be at least one question with clear options for the answer. Ensure you can identify which goal each question addresses.

In designing a manual form consider the following points.

- Keep the questions short and simple.
- Where possible use forced choice options such as tick boxes to simplify data recording and analysis.
- If brief guidance notes are required put them after the question.
- Ideally the form will be no longer than one A4 sheet.

Example of a manual form for asthma

Identification code				
Question	**Yes**	**No**	**Comment**	**Name of Practitioner**
1 Peak flow Documented on arrival in ED (within 10 minutes)				
2 Best peak flow Documented (or no previous peak flow) Predicted peak flow documented				
3 Action plan Documented as given and explained				

An electronic data collection form is an alternative to a paper data collection form. Consider the following points in its design.

- Use only one screen on which the respondent reads and answers the questions.
- Ask short, unambiguous questions.
- Have explanations of individual questions available.
- Numbers, options or tick boxes are the best structures for responses (not free text).

Example of an electronic form for asthma

Patient 1	***Asthma Electronic Audit***		
Observations	**Yes**	**No**	**Comment**
Peak flow (< 10 minutes of arrival)		¤	
Best peak flow (or 'no previous peak flow') predicted documented	¤		
Respiration rate		¤	
Waiting Dr < 10 minutes	¤		*Patient triage code 3*
Documented action plan		¤	

Where electronic data already exist, a form is not needed. Instead, simply sort the data appropriately and check for validity.

6 How will completed data collection forms be stored?

In prospective and concurrent manual audits particularly, everyone must be aware of where the forms are kept. Ideally the storage place will be near where the forms are going to be used. Everyone must also be aware of where to send the forms after completing them. A reminder on the form is a good idea.

Step 3: Test the audit methodology and tool

- Seek comment from colleagues.
- Pilot the audit methodology and tool.
- Undertake final modifications.

Seek comment from colleagues

As a first task in pretesting the tool, ask for feedback from colleagues who have not been involved in the process of development. Check that they interpret the wording in the way that is intended. They can also give feedback on the validity of the tool by questioning the rationale for including or excluding certain questions.

Another advantage of seeking feedback is that it publicises the project to other members of staff. Such awareness may be useful later when making recommendations for change and subsequently implementing them.

Pilot the audit methodology and tool

After seeking comment from colleagues, pilot the tool on a few cases that will not be included in the sample (around 10 percent of the sample size). The results of the pilot should indicate that the data you are about to collect will enable you to meet the audit goals. The people who are going to perform the audit should check the results for any misinterpretations and determine if any modifications are required before commencing the audit proper. If the audit is concurrent or prospective, have a team member available to answer any questions and consider whether either the methodology or the tool require modification.

Undertake final modifications – tool, staff training and timeframe

Piloting the tool and subsequent feedback may highlight:

- where further training of those performing the audit is required
- a need to define more clearly some of the questions or terms in the audit tool
- time constraints to be allowed for, and which the data collection schedule must accommodate.

Step 4: Conduct the audit

- Audit co-ordination.
- Avoid errors that lead to poor data collection and collation.
- Collect the data.

Audit co-ordination

Step 4 involves the collection of the audit data and then collation of the audit forms. Issues may arise that need clarifying so it is useful to have a member of the team available to answer questions from those collecting the data and to follow up incomplete data.

Identifying and resourcing an audit co-ordinator is a key consideration. Data collection is one of the most labour-intensive steps of the audit process. In addition, the accuracy and timeliness of data collection are critical – they influence analysis and interpretation of data and thereby the outcome of the audit.

Avoid errors that lead to poor data collection and collation

It is the role of the audit co-ordinator to minimise human error in collecting and collating data, particularly where data are being collected manually. Measures to limit human error include:

- appropriate staff training, including an understanding of the purpose of the audit
- a set process for answering queries related to data collection (for a concurrent or prospective audit)
- an unambiguous process for collecting and collating data
- strategies to ensure inter-rater reliability
- strategies to reduce transcribing errors
- a set process for dealing with missing data (retrospective study).

Collect the data

After all preliminary steps have been taken and appropriate procedures are in place, you are ready to collect the data.

Step 5: Analyse the data

- Collate the results.
- Identify gaps between standards and performance.
- Use graphical displays of data.

Collate the results

Use the standards that you identified prior to the audit in analysing the data. Where possible, use simple statistical methods to analyse the results against the agreed standards to highlight the areas requiring improvement. If more sophisticated methods are required, it may be necessary to seek external statistical or analytical expertise. It is important, however, that it is the team who interprets the results.

Identify gaps between standards and performance

Where benchmarks are established for monitoring points, it is important to identify variance or gaps between the expected standards and actual delivery of care.

Use graphical displays of data

Using graphs is an effective way of presenting the results. The examples below demonstrate how histograms may be used. Run-charts that show variation across time can be used to illustrate changes since the previous audit.

Examples of histograms

Figure 4: Percentage of patients receiving an asthma action plan by shift

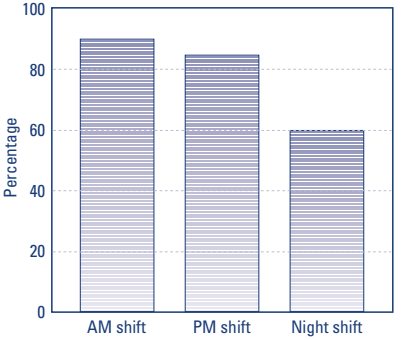
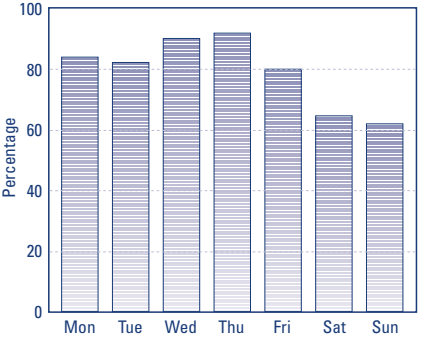


Figure 5: Percentage of patients receiving an asthma action plan by day of the week



Note: Both figures illustrate how data compare with the audit standard of achieving 100% compliance in patients receiving an asthma education plan. Figure 4 analyses the results by shift, Figure 5 by day of the week.

Step 6: Review

- Interpret the results.
- Recognise bias and variance.
- Rank problems according to priority for resolution.

Interpret the results

Those providing clinical care should interpret and validate the results. They have the greatest understanding of the process and will be able to identify the most appropriate corrective actions. Interpreting results requires individual reflection and discussion with colleagues. This task may be time consuming, but it is important not to jump to conclusions.

Recognise bias and variance

Despite careful planning, problems that arise during data collection can introduce bias that must be acknowledged. Bias may arise from errors in sampling, in data collection and collation or in the design of the tool itself.

Variation is present in all aspects of life. Walter Shewhart's concept of variation (Langley et al 1966) suggests that it should be viewed in one of two ways:

1 as variation that indicates something has changed or is not right

2 as random variation, which is similar to variation that has occurred in the past and does not indicate change.

Decisions therefore should be based on the nature of the variation. Individual instances of variation may not be relevant whereas a pattern of variation will warrant further attention.

Audit results are reviewed against the aims and objectives set in Step 2. Your review may include the following questions:

- How do the standards that you set at the start of the audit compare to the results?
- How has the performance of other departments or hospitals compared to the standards?
- Are there established benchmarks being met elsewhere?
- How do the results compare to other published studies?

Rank problems according to priority for resolution

Again, those members of the team providing clinical care must have input in ranking the problems identified in the review of results. During this process you will need to refer back to the key questions identified in relation to the audit aim (Step 2).

Step 7: Develop solutions

- Form an action plan to select the appropriate solution.
- Document required changes and remedial action.

Form an action plan to select the appropriate solution

Once the areas requiring improvement have been identified, the first task is to form an action plan. As mentioned in the introduction, the challenge is not just to identify inadequate care, but to change clinical practice to improve patient care. To this end, an action plan will:

- list all identifiable causes for variance
- prioritise these causes
- define actions to address these causes
- where there is more than one possible solution, first trial the solution that seems the most appropriate. If no improvement is evident by the time of re-audit, you will need to try other possible solutions, so do not discard this information.

Document required changes and remedial action

When an audit is completed it is important to present the results to all those participating in the care process and to document them for wider circulation. The recommended actions and required changes to policy or procedure should be documented.
The person responsible for the audit and for ensuring these changes occur should present and interpret the data for other groups involved including management. Reminders are also useful to reinforce the findings and recommendations of the audit.

Step 8: Implement solutions

- Undertake diagnostic analysis.
- Develop a dissemination and implementation strategy.
- Plan to monitor and evaluate.

Changing clinical practice requires a systematic approach and strategic planning. This requires diagnostic analysis, development of a dissemination and implementation strategy and a plan to monitor and evaluate the impact of any changes made.

Undertake diagnostic analysis

In your analysis of the available information, identify:

1 all groups affected by or influencing the proposed change

2 potential internal and external barriers to change, including whether practitioners are willing to change

3 enabling factors for change such as resources and skills.

Develop a dissemination and implementation strategy

Raising awareness about the reasons for change, while important, is unlikely to be sufficient to change behaviour. Below is a brief review of the evidence concerning benefits and pitfalls of implementation strategies to improve clinical practice.

The following features contribute to an effective implementation strategy.

- Timing is important when introducing change.
- Health professionals need to receive information that is easy to understand. It should also give them confidence that the proposed changes are based on valid and reliable information and will have a beneficial impact on patient outcomes.
- A personal approach works best – take time to talk with individual practitioners and teams.
- Successful solutions will take account of particular service or service team needs.

Audit and feedback are effective mechanisms of change, but not on their own. Strategies that enhance their effectiveness include:

- using opinion leaders to generate enthusiasm
- providing reminders and information on progress
- using peer comparisons within the service
- linking changes in practice with patient outcomes
- targeting trainees
- benchmarking with other organisations.

Ineffective strategies include:

- distribution of printed material as a strategy on its own
- didactic education.

For more information on evidence based implementation strategies refer to:

www.york.ac.uk/inst/crd/ehc51.pdf or
NHS Centre for Review and Dissemination (1999).

Plan to monitor and evaluate

Your planning for monitoring and evaluation culminates in the final step of the audit cycle – re-audit. Re-audit evaluates the effectiveness of the change, the degree of compliance and develops strategies to maintain and reinforce change.

Step 9: Re-audit

• Has improvement been achieved?

Has improvement been achieved?

The final step is to re-audit. This important step shows whether the changes implemented have improved care or whether further changes are required. Re-audit is usually limited to those areas highlighted as requiring improvement.

If you find no, or only limited improvement, you may need to:

- review some of the other solutions that were not used after the initial audit
- find completely new solutions
- undo some of the changes if they are not successful – but you needed to try them to gain evidence of their effect.

CONGRATULATIONS! This audit cycle is now complete.

Audit follow-up

Take some time to reflect on:

- what you learned from this audit
- what you could have done better
- how to put this learning into practice with your next project.

Section Three: Peer Review

Introduction

The peer review process is designed to foster individual accountability for professional development and practice, as well as group accountability for the overall quality of professional practice in a particular service. Peer review is considered to be a hallmark of professional practice. It is a professional tool with multiple uses. It contributes to clinical audit and other activities such as professional development, information for credentialling and service planning and evaluation.

The overall purpose of peer review is to inform others about one's own practice in relation to that of the peer group. Its more specific purposes and benefits are summarised in Table 1.

Table 1: Purposes and benefits of peer review

Purpose	Benefits
Self-regulation within the profession	• Acknowledges professional expertise • Allows feedback on individual performance • Provides a 'safe' environment to admit mistakes
Ongoing education	• Helps individuals to identify their strengths and areas needing improvement
Awareness of standards and quality of performance	• Encourages information sharing • Promotes a professional approach to problems that is centred on the service user • Helps to organise information
Individual and team accountability for professional development and practice	• Provides reassurance of personal and/or team competence • Gives support during periods of risk taking, conflict and role transition
Improvement of teamwork	• Recognises group members as resources, providing different perspectives • Creates a feeling of equality • Takes pressure off individuals

Types of peer review

Peer review may be regular and structured or occur informally. Informal peer review happens on a daily basis often without being recognised as such; for example, 'handover' between shifts and discussion with colleagues about investigations or drug therapy. 'Grand rounds' are an example of a more formal approach.

Structured assessments such as questionnaires also provide useful feedback for practitioners about their performance.
Such assessments may be completed by professional peers or by a range of respondents. For example, the Physician Achievement Review (PAR) developed in Alberta, Canada requires practitioners to have their performance assessed by a range of stakeholders every five years. Questionnaires are completed by 25 patients, eight medical peers and eight practitioners from other health professions. These respondents comment on five categories of performance (clinical knowledge and skills, communication skills, psychosocial management, administrative skills and collegiality) (www.par-program.org/PAR-History2.htm).

A formal peer review process increases objectivity and provides a structured opportunity to give significant feedback. Effective peer review demands commitment and consultative skills. It also requires an understanding of small group processes, good listening skills, skills in facilitation and problem solving, and an understanding of the principles of effective feedback.

How to introduce peer review

Peer review is a skill in which many health professionals have had no formal training. Some professional groups have developed resources that are readily available, such as the Physician Assessment Review developed by the Royal Australasian College of Physicians.

Before introducing a formal process of peer review, it may be useful to have a workshop to discuss the purpose and process. The following points should be included:

- Comments should be precise, objective and factual, using non-judgemental language.
- Give your opinion only; do not discuss the review with others.
- Excellence in one area does not mean the person is excellent in all areas. Comment both on areas of excellence and areas needing improvement.
- Comments at either end of the scale must be supported by specific examples.
- Consider the person's performance over the whole time under review. It is important to avoid being swayed by one incident.
- Accurate reporting is a professional responsibility. Modifying feedback to avoid damaging or enhancing egos places consumer safety and professional credibility at risk.

Peer review meetings

The process, content and documentation of formal peer review meetings should be agreed in writing. Among the matters that need to be specified are:

- the frequency of meetings, numbers for a quorum, election of a chair
- the method of reporting key findings, which will be influenced by whether this is a protected activity under the Medical Practitioners Act 1995, Part VI. However, any method should include the essential components of peer review:
  - discussion of adverse events
  - quantitative indices of the clinical performance of the service
  - identification of systemic deficiencies
  - follow-up of previously identified matters

- the reporting route and responsibilities of the person receiving the report to deal with issues identified
- how to manage the situations where serious concern about an individual's performance has been identified. This would include establishing a process for reporting to the credentialling committee in the event of a clinical competence issue.

Self-evaluation

Like peer feedback, self-evaluation is both a skill and a professional responsibility. It is another valuable element of the peer review process that encourages a critical look at one's own performance and clinical practice. It is aimed at providing insight, promoting expertise, and evaluating competency.

New Zealand peer review documentation

Appendix H provides a directory of health professional organisations and associated groups in New Zealand, to assist in locating examples specific to a given health profession.

In addition, a Ministry of Health webpage (www.moh.govt.nz/quality) is to be developed and will provide examples of current practice in this area.

Section Four: Morbidity and Mortality Review

Introduction

Morbidity and mortality review meetings are a core component of any service quality plan. They focus on systems and processes used in the service, but may generate information on the performance of individual practitioners.

Review meetings should be held on a regular basis; the specific frequency will depend on the service, but there should be at least one review a month. Frequent meetings are important so that the cases reviewed are fresh in the memory of those involved.

Objectives

The objectives of morbidity and mortality meetings are to:

1 involve the multidisciplinary team in a critical analysis of the systems and processes leading to an outcome of care. In addition to examining deaths and adverse events within the service setting, a morbidity and mortality review may cover subsequent death outside the service setting where appropriate and may regularly review clinical indicators relevant to the service

2 recommend improvements to processes and systems

3 action these recommendations and monitor the results.

Key points

Morbidity and mortality meetings are more effective where:

- written Terms of Reference make explicit that the focus of discussion is on process and system change, with the aim of developing recommendations to prevent a similar adverse outcome in the future
- the meeting is aimed at team learning and quality improvement. It should therefore include staff at all levels of seniority
- this is not a forum to discuss individual competence. Where competence issues are apparent, the chair (or professional leader or service manager) should consider referring the matter to the appropriate credentials committee
- everyone involved in the case under review should be given the opportunity to report to the meeting
- a brief written report should be compiled for each meeting. Action points should be noted for the next agenda and feedback must always be given to ensure that recommended changes are implemented and evaluated.

Section Five: Clinical Practice Guidelines

Introduction

Perhaps the greatest benefit that clinical practice guidelines offer to the health system is improved outcomes for service users through consistent and effective treatment. By promoting interventions with proven benefit they can reduce morbidity and mortality and improve quality of life for some conditions, thereby increasing the cost-effectiveness of care provided.

Guideline use is not universally popular with some health practitioners for whom the 'art' rather than the 'science' of healing is the driving force in their practice philosophy. Yet guideline use does not eliminate the art required in practice, as it allows for adaptation to individual cases and circumstances. What use of guidelines does achieve is to reinforce the importance of critical appraisal of practice, which in turn highlights ineffective and dangerous practices as well as practices that are not cost-effective.

Should new or existing guidelines be used?

Organisations may choose to evaluate and adopt existing 'seed' guidelines, thus taking advantage of the work of other groups rather than developing their own guidelines. The choice of approach will depend on the resources available for clinical quality improvement and the specific needs of the service concerned. Generally the evaluation and adaptation of existing guidelines, where these exist, is the more cost-effective option for most organisations.

Table 2 compares features of both options to be considered when deciding whether to evaluate and adapt existing guidelines or develop new ones.

Table 2: A comparison between developing new guidelines and using existing guidelines

	Developing new guidelines	Evaluating and adapting existing guidelines
Resources	• Resource intensive	• Smaller investment required
Skills required	• Literature search and evaluation • Guideline development • Leadership of a small group • Information management	• Guideline evaluation • Leadership of a small group • Information management
Advantages	• Facilitates implementation • Builds an evidence based culture in the service • Encourages practitioner participation and 'buy in' • May facilitate mandatory updating of guidelines	• Is less resource intensive than developing new guidelines • Develops relationships with other organisations through accessing and regular updating of their guidelines

Finding 'seed' guidelines

Finding guidelines on a particular topic is not hard to do. Finding rigorously developed guidelines that can be used to 'seed' local adaptation, however, is much more difficult. As part of the selection process, an interested clinician or specialist professional group often presents guidelines for consideration.

The New Zealand Guidelines Group recommends using the AGREE guidelines appraisal instrument (www.agreecollaboration.org) to determine the quality of potential seed guidelines. It will save time and effort if you limit your searching to evidence based guidelines. Library staff can help

search electronic databases for guidelines. Another strategy that can save time is to go to sources with mature and rigorous guideline programmes.

Appendix I lists a number of sources of 'seed' guidelines and international best practice.

Developing effective guidelines

To be effective, guidelines need to be:

- **valid** – their use leads to health gain
- **reliable** – given the same evidence and method another guideline group should produce essentially the same recommendations
- **representative** – all key groups are involved in their development, including consumers
- **flexible** – exceptions to recommendations should be identified including how to take account of consumer preferences
- **research based**.

Guideline implementation

Implementing a new guideline in a service needs planning. It is not sufficient to issue the guideline to all potential users; it needs to be 'marketed' in order to gain acceptance. The following strategies may assist in this process.

- Ensure that guidelines take into account local circumstances.
- Provide an appropriate education programme.
- Enlist senior practitioners in the team to 'champion' guideline introduction.
- Develop practical steps to ensure the guideline is used, such as patient specific reminders.
- Identify and resolve any barriers to implementation.
- Build checks and fail-safes into the system.
- Consider the cost implications of implementation and ensure adequate resources are available.

Measurable health outcomes from guideline implementation include:

- clinical outcomes
- improvement in the quality of care
- improvement in patient satisfaction
- user satisfaction with the guideline
- cost-effectiveness.

Ongoing guideline evaluation

Guidelines have a limited 'shelf life'. Regular evaluation and review of guidelines are essential and ongoing.

Section Six: Clinical Pathways

Introduction

Clinical pathways are evidence based, multidisciplinary plans of care. They may be for patients who have been diagnosed with a specific condition (diagnosis based), who are having a particular procedure (procedure based), or who are presenting with a particular symptom (symptom based).

These time- and stage-oriented tools are used to synchronise the activities of every member of the health care team to achieve predetermined patient outcomes and provide a continuum of care for those patients whose outcomes are predictable 60 to 75 percent of the time. The aim of using a clinical pathway is to increase the probability that the required care will achieve predetermined clinical outcomes and will be provided in a timely way, minimising delays, omissions, cancellations and unnecessary costs.

Clinical pathways are best developed by the multidisciplinary team members who are directly or indirectly involved in the care of the patient. It is essential that sufficient flexibility be built into the pathway format so that it can be tailored to individual patient needs. Two common designs for a clinical pathway are illustrated on the following page to demonstrate the format options. Currently algorithms are less frequently used than the text format in New Zealand.

Guideline

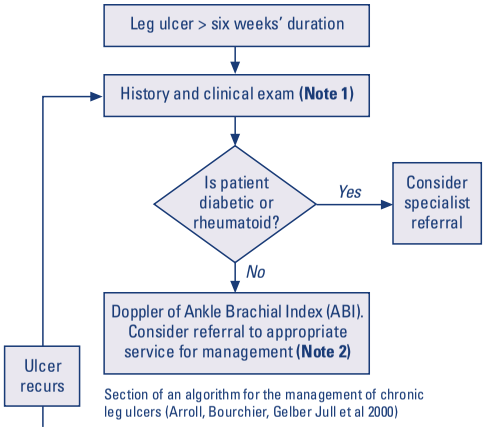
Assessment of leg ulcers:

Assessment and clinical investigations should be undertaken by a health care professional trained in ulcer management (Strength of Evidence III).

A full clinical history and physical exam should be conducted for a patient presenting with either their first or recurrent leg ulcer and should be ongoing thereafter (Strength of Evidence III).

Excerpt from Royal College of Nursing (1998).

Algorithm format



Section of an algorithm for the management of chronic leg ulcers (Arroll, Bourchier, Gelber Jull et al 2000)

Text format

	Assessment	Treatment	Activity	Education
Week 1	History and clinical examination including: • Pain • Wound • Doppler ultrasound			
Week 2	• Pain • Wound • Activities of daily living			

Benefits of clinical pathway use

Use of clinical pathways offers benefits for both health professional and service user (see local examples below). For staff, the pathway gives a plan of care for that patient on any given day, reducing documentation time. Needs are anticipated, allowing for better organisation and sequencing of interventions. It is an ideal orientation tool for new, less experienced or relieving staff and is a self-assessment guide for the team to evaluate and monitor care provided. The valuable contribution that each health care professional provides is also acknowledged.

The pathway is a printed document. An edited, 'patient friendly' version should be available to patients so that they can participate in and have more control over their care. Written information for patients should cover:

- the disease or procedure
- the health professionals involved in their care
- the care they should expect and when to expect it
- expected length of stay
- discharge planning.

Local examples of how a clinical pathway can benefit patient care

The following two local examples have been reported recently:

- An Ashburton Hospital audit found that only 50 percent of patients presenting with myocardial infarction received Aspirin pre-hospitalisation or in the emergency department. After introduction of a Myocardial Infarction Pathway, a Coronary Care Department audit showed 100 percent compliance.
- Hutt Valley DHB's Chronic Obstructive Pulmonary Disease pathway reduced the 30-day readmission rate by 15 percent and the 90-day rate by 27 percent. The average length of stay was reduced by 0.8 days.

Quality improvement and risk management potential

Although legal advantages have not been formally tested, it has been suggested that properly utilised pathways provide a wealth of information and assist in risk management in the case of an adverse event. The information is documented concisely, logically and independent of literary ability or memory. Less time is required for recording, resulting in better compliance. In addition, omissions are less likely and repetition and transcribing errors are avoided. Problems with legibility, grammar, spelling and inappropriate abbreviations are also minimised.

Variance

Variance is any deviation from the predicted 'path'. It can be positive or negative: a positive variance occurs when a patient progresses faster than expected; a negative variance when progress is slower than expected. A negative variance will also occur if activities prescribed in the pathway are not completed.

Either way, variance is an important component in analysing and improving care. By identifying variances, team members are alerted to areas of care they can learn from. The key point about variance analysis is that the information obtained should be used to improve the pathway where appropriate.

Evaluation criteria

Evaluation criteria represent what the team hopes to achieve through implementation of a clinical pathway. They are identified at the outset and used as a basis for post-implementation evaluation and review. Outcomes that the team expects the patient to achieve are articulated and are specific to each pathway. Examples are outcomes related to mobility, physiological parameters such as absence of pain or fever or demonstrated ability to carry out particular self-care activities safely.

Section Seven: Clinical Indicators

Introduction

To improve quality in health care we need to be able to reliably measure and report aspects of clinical practice that will help us determine current performance and identify quality improvement. As well as providing information for health professionals, clinical indicators can enable consumers to make informed choices about treatment options, tell providers how they are functioning in comparison with others and enable funders to make appropriate policy and funding decisions. For example, District Health Boards use clinical indicators, such as bloodstream infection rates, in Balanced Scorecard reporting to the DHB Funding and Performance Monitoring Directorate. (For further information about the Balanced Scorecard approach to performance measurement see Appendix G.)

The following principles of measurement underpin a clinical practice reporting framework and apply to the use of clinical indicators:

- All measures should be transparent.
- Information should be made freely available.
- Measurements should be meaningful to health professionals to ensure accurate collection and subsequent use for quality improvement.
- The process of measurement should require minimal additional effort for practitioners.
- Practitioners should be involved throughout the process to ensure accuracy and to minimise misinterpretation.
- Measurements used should be regularly reviewed.

Indicators of performance are pivotal tools for quality management. A clinical indicator is an objective measure of the clinical management and outcome of patient care at a point on the process–outcome continuum. Although outcomes measurement has been emphasised, process measures can be sensitive indicators of the quality of care (Crombie and Davies 1998). The advantages of process measures over outcome measures is that they:

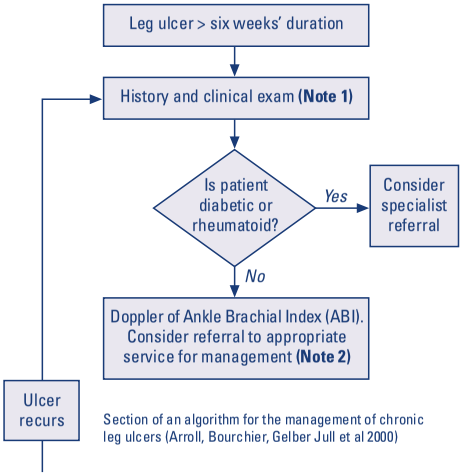
- are readily measured and easily interpreted
- indicate deficiencies of care that need to be remedied
- do not depend on comparisons, in contrast to outcomes monitoring.

It is important that **evidence** links the processes of care with desirable outcomes. Clinical indicators are not exact standards. They are designed to alert health professionals to possible problems as well as opportunities for improvement in patient care. Because clinical indicators are objective they may also identify areas for further quality activities, generate ideas for new studies, or assist in assessing whether a standard in patient care is being met. They allow for comparison of performance against national aggregate data, by providing agreed definitions – for example, the numerator and denominator for rate based indicators.

Ideally, a good quality indicator should:

- identify cases concurrently (to provide immediate patient-specific information) and retrospectively
- use data that are easily collected
- identify cases with a high likelihood of having sub-standard care
- identify common problems caused by factors that are predictable, manageable and preventable.

(Hofer et al 1997)

Guideline	Clinical pathway	Clinical indicator
Assessment of leg ulcers: Assessment and clinical investigations should be undertaken by a health care professional trained in ulcer management (Strength of Evidence III). A full clinical history and physical exam should be conducted for a patient presenting with either their first or recurrent leg ulcer and should be ongoing thereafter (Strength of Evidence III). Excerpt from Royal College of Nursing (1998).	 Section of an algorithm for the management of chronic leg ulcers (Arroll, Bourchier, Gelber Jull et al 2000)	Example of clinical indicators for the assessment of chronic leg ulcers: • All patients with a chronic leg ulcer of more than six weeks' duration are assessed by a nurse trained in chronic leg ulcer management within 14 days of referral. • All patients not referred to a specialist have a doppler of Ankle Brachial Index at their initial examination.

Four features of indicators

There are four aspects of clinical and performance indicators: normative, technical, strategic and operational. These aspects are critical to the effectiveness of any indicator set.

Society as a whole wants to know many different things about the health system. Different stakeholders bring different values, priorities and norms to the process of constructing indicator sets and including particular indicators. As we move toward the adoption of indicators that will be used by multiple stakeholders, some important questions are raised in regard to their **normative** aspects. For example, whose values will be addressed, whose values will predominate and how will conflicting values be reconciled?

Technical aspects should also be considered if indicators are to be useful. Such aspects include the ability to provide meaningful comparisons across entities, validity and reliability, the ability to distinguish between high and low performers and the capacity to be appropriately risk adjusted.

To be **operational** – that is, to be useable and thus meaningful, indicators must provide reliable and comparative data. Accompanying them must be standard protocols to collect and provide data, along with methods of packaging and disseminating data that are comprehensible, credible and accessible to the end-users.

Finally, if the **strategic** performance of a system is being assessed, the indicators must tap into the functioning of different elements of the system and identify how they interact.

Uses of clinical indicators

The two main categories of clinical indicators are:

- **rate based indicators** for which a certain number of cases are usually unfavourable. Thresholds or acceptable rates in such cases are established from preliminary audits, or from comparisons with the international literature

- **alert indicators**, which signal to managers and staff that a specific event has happened or is likely to happen. These indicators monitor 'vital signs' within programmes and organisations and prompt predetermined responses when they identify that the risk of disaster or dysfunction is high.

Method for selecting effective indicators

For an indicator to be valid strong evidence must support the relationship between the process and outcome of care. If this relationship is weak the indicator is measuring a process that has minimal impact on the outcome, or it is measuring an outcome that is not associated with the process of care. In either case, the indicator is ineffective. To ensure indicators are effective, it is important to validate them during the selection process. The following method offers an example.

- Select potential indicators based on a literature review and clinical expertise.
- Assess the strength of evidence supporting the use of each indicator (process – outcome relationship).
- Identify rates of cases provided by each indicator.
- Identify and classify preventable problems in the process of care.
- Have an expert panel review each potential indicator.
- Test each indicator for any quality problems using a chart review of cases and controls.
- Simulate each indicator in its proposed setting and evaluate its performance. (For example, ask: what sample size is needed?)

For further resources to develop clinical indicators see Appendices C, D and E.

Appendix A: Members of the Working Group

Gillian Bohm *(Project Sponsor)*	Principal Advisor, Quality Improvement and Audit, Ministry of Health
Patsi Davies	Consumer perspective
Dr Stephen Dee *(Project Co-ordinator to October 2001)*	Registrar Clinical Audit, Hutt Valley District Health Board
Mr Phillip Godfrey	General Surgeon & Medical Director, Ashburton Hospital
Dr Ian Goodwin	Liaison Psychiatrist, Auckland District Health Board
Assoc Prof Peter Gow *(Working Group Chair)*	Chairman, Clinical Board, Counties Manukau District Health Board
Gillian Hall	Senior Teaching Fellow, School of Physiotherapy, University of Otago
Dr Lynne Lane	Public Health Physician, Acting GM Funding, Auckland District Health Board
Dr Peter Leslie	Chair, New Zealand Council of Medical Colleges
Phillipa Molloy	Nurse Advisor, Nelson Marlborough District Health Board
Amanda Newton	Account Manager, New Zealand Health Information Service

Appendix B: Similarities and Differences between Audit and Research

Both audit and research have similarities that relate to process and rigour. For example, both activities:

- answer a specific question relating to quality of care
- may be prospective, retrospective or concurrent in nature
- involve sampling, questionnaire design and analysis
- require professional leadership.

Table B1 outlines some of the differences between audit and research. Even with this information it is sometimes still difficult to decide whether a proposal is audit or research. If so, it may be necessary to discuss the project with your Medical Advisor or Director of Nursing, clinical board, local ethics committee and regional ethics committee.

Table B1: Differences between research and audit

Research	Clinical audit
Creates new knowledge about what works and what doesn't	Answers 'Are we following best practice?'
Is based on a hypothesis	Measures against standards
Is usually carried out on a large scale over a prolonged period	Is usually carried out on a relatively small population over a short time
May involve patients receiving a completely new treatment	**Never** involves a completely new treatment
May involve experiments on patients	**Never** involves anything being done to (or withheld from) patients beyond their normal clinical management
May involve patients being allocated to different treatment groups	**Never** involves allocation of patients to different treatment groups
Is based on a scientifically valid sample size (although not necessarily with a pilot study)	Depending on circumstances, may be based on a sample size acceptable to clinicians
Extensive statistical analysis of data is routine	Some statistical analysis may be useful (simple statistics often applied)
Results are generalisable and hence publishable	Results are only relevant within local setting (though the audit process may be useful to others)
Responsibility to act on findings is unclear	Responsibility to act on findings rests with the organisation – Clinical Director/Clinical Head of Department and Management
Findings influence the activities of clinical practice as a whole	Findings influence activities of local clinicians and teams
Always requires ethical approval	May require ethical approval
Always requires patient consent	May require patient consent

Appendix C: Online Resources for Clinical Audit

Table C1 lists New Zealand sites that have general advice on quality activities or are repositories of standards, examples of audits or audit tools for use in secondary care. Overseas sites are listed in Table C2.

Table C1: New Zealand audit resources on the Internet

Organisation	Internet address	Description
New Zealand Guidelines Group	www.nzgg.org.nz	Evidence based guidelines that can be used as standards for audit Section on introducing guidelines
New Zealand Centre Evidence Based Nursing	www.joannabriggs.edu.au/team/nz.html	Guidelines and latest evidence for in Nursing practice
New Zealand Health Information Service	www.nzhis.govt.nz	Data standards and publications
Clinical Leaders Association of New Zealand	www.clanz.org.nz	Role of leadership in quality improvement
Health Research Council	www.hrc.govt.nz/publicns	Guidelines for health research and how to put research into practice
Mental Health Commission	www.mhc.govt.nz	Publications and progress reports in implementation of Blueprint for Mental Health Services in New Zealand
New Zealand Health Technology Assessment Clearing House	nzhta.chmeds.ac.nz/	Clearing house of evidence based health policy and outcomes assessment
National Health Committee	www.nhc.govt.nz	Online publications on quality and important areas in health requiring focus
Health and Disability Commissioner	www.hdc.org.nz	Code of patient rights, reports and outcomes of cases
Enigma Publishing Group	www.enigma.co.nz/hcro_articles/0006/vol4no6_002 www.healthsite.co.nz/practice_support/specialist_care/index.htm	Articles on accreditation and health care quality Access to journals and resources online by speciality
National Library of New Zealand Health Resources Online	tepuna.natlib.govt.nz/web_directory/NZ/health.html	National Library collection of online health resources
Ministry of Health	www.moh.govt.nz	Ministry publications and quality initiatives

Table C2: Overseas audit resources on the Internet

Resources	Internet address	Description
IHI quality improvement resources	www.ihi.org/resources/qi/index.asp	A model of quality improvement; contains a lot of useful quality knowledge and tips
Audit flags (clinical indicators)	www.jr2.ox.ac.uk/bandolier/band7/b7-6.html	Nine generic quality flags/indicators from Bandolier
Example of quality improvement tools and techniques used in the emergency medical service, US	www.nhtsa.dot.gov/people/injury/ems/leaderguide/#qitat	Guidance in using run charts, histograms, cause and effect diagrams, flow charts and pareto diagrams for service quality improvement
Pain management in day case surgery: a quality improvement project	www.jr2.ox.ac.uk/bandolier/ImpAct/imp08/i8-4.html	Project to improve post-operative analgesia and a web-based clinical guideline and flowchart
Quality flags in fractured neck of femur management	www.jr2.ox.ac.uk/bandolier/band25/b25-3.html	Some flags from the UK on care processes for neck of femur management
Example of how to apply continuous quality improvement to a clinical problem	www.jr2.ox.ac.uk/bandolier/band83/b83-3.html	Summary of a continuous quality improvement project focused on the rate of planned induction of labour from Canada (Summary Bandolier)
Scottish report on outcome indicators	www.show.scot.nhs.uk/indicators/Publications/OutcomesReport2000.pdf	Outcome indicators in maternal health, child health, dental health, colorectal cancer and emergency admissions
National Institute of Clinical Excellence	www.nice.org.uk/catlist.asp?c=160	Guidelines
Primary care audit tools, UK (University of Leicester)	www.le.ac.uk/cgrdu/protocol.html	Specific audit tools for angina, asthma, heart failure, hypertension and benzodiazepine prescribing in primary care
The clinical audit assessment framework: improving the effectiveness of audit (UK)	www.hsmc3.bhlam.ac.uk/hsmc/publicns/caaf	In-depth frameworks for assessing audit projects and programmes

Appendix D: National Health Information Datasets held by the New Zealand Health Information Service

The New Zealand Health Information Service (NZHIS) is a group within the Ministry of Health responsible for the collection and dissemination of health-related information. Its data cover all publicly funded inpatient and day patient events obtained from hospitals. This is a good source of information to use as part of an audit.

The NZHIS data can be used to analyse efficiency, effectiveness, severity and complexity, quality, coding practice and survival. This analysis can be performed at a specific level, grouped by diagnosis/procedures, admission types and discharge types. An analysis is also possible at aggregated levels by facility, District Health Board, rural area, secondary and tertiary care, or nationally.

NZHIS can conduct such analysis and then feed the results back to the local area. The local service verifies and interprets these results so that it can incorporate the information into clinical and managerial decision-making and quality improvement.

Before analysis NZHIS 'cleans up' the data by removing events with duplicates or overlapping events, coding errors, unacceptable or non-specific principal diagnoses, inappropriate diagnoses for the person (eg, age- or gender-specific diagnoses), unsuitable cause of death, or diagnoses that are unusual in New Zealand.

NZHIS can also use Victorian trim points to identify events outside expected levels and to trim outliers so that they do not skew statistics.

An example of a recent in-depth analysis by NZHIS is its examination of the quality of fracture of neck of femur procedures across all hospitals. This analysis was drawn from data collected in

the National Minimum Dataset (NMDS) for the 1999/2000 year and is being reviewed by the New Zealand Orthopaedic Association. The indicators reviewed were quality, readmission, complications/misadventures, mortality rates, access to hospital, access to surgery, and the impact of delay in time to surgery. For mortality, two patient treatments were compared – conservative versus surgical. Clinical practice was also considered – reduction and fixation, hemiarthroplasty or total hip replacement. Clinicians have been consulted throughout the analysis to ensure accurate interpretation of the data – a very important element of the analysis.

On completion of the analysis a report will be written, endorsed by the New Zealand Orthopaedic Association, which will then be distributed to all DHBs. Rather than giving detailed conclusions, the report will raise questions. Only the organisations and clinicians concerned can draw the appropriate conclusions.

National data from the NMDS have also been used to develop a standard set of indicators of secondary care to provide DHBs with benchmarking information at the level of Diagnosis Related Group (see Table D1). This set can be viewed at various levels of detail across different groupings. NZHIS has developed a tool that takes 12 months of NMDS data and produces indicators at a relevant level for benchmarking across hospitals. It is intended to encourage the analysis of the quality of hospital services. This first dataset has been cut to CD and distributed to all DHBs. Further datasets will be distributed in the future. It is emphasised that the indicators only give a high-level picture of each service; a full evaluation of quality of care requires an in-depth analysis.

The national collections that NZHIS maintains and manages are a vast source of data that can be used for analysis and audit. They are:

- National Health Index (NHI) – a mechanism for identifying every health care user by assigning them a unique identifying number. As a registration system, the NHI includes only the information needed to identify health care users, such as name, address, date of birth, ethnicity and gender.

- National Minimum Dataset – a single integrated collection of secondary and tertiary health data for New Zealand. It collects information about all inpatients and day patients to both public and private hospitals. The data cover diagnoses, and diagnostic and therapeutic procedures as well as some demographic information about the health care user.
- National Cancer Registry – a population based tumour register of all primary malignant diseases, except basal-cell and other 'simple' skin cancers. It has operated since 1948. Data cover the site, stage, and pathology of the cancer as well as demographic information.
- National Mortality Registry – a register of all cause of death data based on the legal death certificate or coroner's report, together with autopsy reports. The data cover the underlying cause of death, and demographic information about the deceased.
- Mental Health Information National Collection (MHINC) – a database containing information on secondary mental health and alcohol and drug services. This database is not fully populated yet so it is not used for quality analysis.
- National Reporting Booking System (NBRS) – a database on all health events where a patient has received an assessment of priority for a medical or surgical service and is accepted for publicly funded treatment. Booking information can be linked to the actual procedure when it is undertaken as each hospital attaches its patient management system unique event identifier when submitting the data to NZHIS. This database is also not fully populated at this stage.

At present for analytical purposes it is possible to draw on only the NHI, NMDS, Cancer Registry and Mortality Registry collections. The records in each collection can be linked to each other using the NHI number, so a person can be tracked through the cancer registry, secondary care treatment and even death.

NZHIS also maintains the following primary care warehouses:

- Pharmhouse – pharmacy claim data.
- Labs – laboratory claim data.
- Immunisation – immunisation claim data.
- Maternity and Newborn Information System (MNIS) – integrated data related to pregnancies from March 1998.
- Hepatitis B Screening Programme (Hep B) – primary care and secondary care information for the Hepatitis B Screening Programme pilot, which is being run for a three-year period.

Table D1: Standard set of indicators

Heading	Description
DRG	Diagnosis Related Group
DESCR	DRG description (*=NSW tertiary DRG annotation; +=NZ tertiary DRG annotation)
NO	Number of events
NOA	Actual number of patients with the same NHI
NOR	Number of events per number of patients
AGE	Average age
SEXM	Sex – males
SEXF	Sex – females
ETHNM	Ethnicity – Maori (21)
ETHNPI	Ethnicity – Pacific Island (30–37)
ETHNO	Ethnicity – other (10–12 and 40–54)
ETHNNS	Ethnicity – not stated (99)
ADMR	Admission source – routine rate
ADMT	Admission source – transfer from another hospital facility rate
ADMWN	Admission type – waiting list (WN) + arranged (AA) rate
ADMZ	Admission type – ACC covered (ZW, ZA, ZC, ZP) rate
ADMAC	Admission type – acute (AC) rate

Heading	Description
DISDD	Discharge type – died (DD) rate
DISDS	Discharge type – self discharged (DI, DS) rate
DISDT	Discharge type – transferred to another facility (DT, DP), acute specialist facility (DA) or other department within same facility (DW) rate
DISDC	Discharge type – day cases (DR, DC, DL, DN and LOS=0) rate
DISDR	Discharge type – ended routinely (DR, DC, DL, DN and LOS>0) rate
ANZDEP	NZDep96 index of deprivation (interval variable mapped against domicile code)
HOLOS	Special circumstances (V60 code) rate
DXREC	Average number of codes per record
MDC	Average number of disease categories per record (ICD-9, total of 17)
CC	Average number of complications/co-morbidities per record (as defined by the ICD-9-CM classification system)
OUTL	Low outliers rate (below the Victorian low trim point)
OUTH	High outliers rate (over the Victorian high trim point)
LELOS	Patients with leave days rate
DAYC	Day cases rate
LOSD	Average length of stay – overall including day cases
TLOSD	Truncated average length of stay – overall including day cases (Victorian trim points)
ACCL	Average CCL (complication/co-morbidity level). Complication/co-morbidity class level (CCL) is a field calculated and output by the grouper as a result of an evaluation of all coded secondary diagnoses against the complication/co-morbidity class (CC) list, the CC exclusion list and the appropriate CC tables. A list of highly correlated codes is used to exclude certain codes from CC status, hence a secondary diagnosis code that occurs on the CC list can be demoted to non-CC status if the secondary diagnosis is too closely aligned with the principal diagnosis. There are three levels for the patient's clinical severity in each medical DRG and four levels in each surgical DRG:

Heading	Description
	• Level 0 = no secondary diagnosis that is CC • Level 1 = at least one secondary diagnosis that is a minor CC (but none is more than minor) • Level 2 = at least one secondary diagnosis that is a moderate CC (but none is more than moderate) • Level 3 = at least one secondary diagnosis that is a major CC (but none is more than major) • Level 4 = at least one secondary diagnosis that is a catastrophic CC (surgical partition only).
ACOMBW	Average combined weights. This measure is determined for recognising the patient's increased severity and case complexity by an adjustment methodology on the basis of CCLs, length of stay, and the patient's cost data. It provides the assessment of inter-DRG variations, ie as higher ACOMBW, higher case complexity.
ACOSTW	Average Victorian cost weight
SULOS	Procedures not carried out rate (V64)
RAMDC	MDC related same hospital readmission rate. An admission is classified as a readmission if the patient returned to the same hospital within 30 days of the original discharge. The exception to this definition include: • discharges with an event end type of DD (discharged dead) or DI/DS (self discharge) or DT/DP/DA/DW (transfers) followed by another admission within 24 hours • admissions with an admission type of WN/ZW (waiting list) or AA/ZA (arranged) or AP/ZP (private). For those events classified as readmissions, an attempt was made to distinguish between 'related' (at MDC and DRG levels) and unrelated readmissions. The total MDC readmission rate includes both MDC and DRG related readmissions.
TCOMPL	Total complication rate (996–999 range)
TMISAD	Total misadventure rate (E870–876 range)
TDEATH	Total death rate

Appendix E: Determining Levels of Evidence

The following three methods are generally accepted approaches to determining the strength of a given body of evidence.

Sackett's criteria for the grading of evidence (Sackett 1989)

A study's evidence may be ranked at one of five levels.

Level I study: Large randomised trials, statistically significant, clear-cut results (low risk of error).

Level II study: Small randomised trials with uncertain results: can identify trends but not significance (moderate to high risk of error).

Level III study: Non-randomised, concurrent cohort comparisons of contemporaneous patients (bias toward compliance theory – patients who are compliant with treatment influence clinicians' perceptions about clinical efficacy).

Level IV study: Non-randomised historical cohort comparisons between current patients who did receive therapy and former patients who did not (from same institution or from the literature).

Level V study: Case series without controls – description of a group of patients.

Revised SIGN grading system (2000)

Levels of evidence

1++ High quality meta analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

1+ Well conducted meta analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1 – Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++ High quality systematic reviews of case-control or cohort or studies. High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal

2+ Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal

2 – Case control or cohort studies with a high risk of confounding bias, or chance and a significant risk that the relationship is not causal

3 Non-analytic studies, eg, case reports, case series

4 Expert opinion

Grades of recommendation

A At least one meta analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or

A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

B A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

C A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 2++

D Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

Joanna Briggs quality of evidence ratings

These ratings have been adapted from the National Health and Medical Research Council guidelines for the development and implementation of clinical practice guidelines (1995).

Level I Evidence obtained from a systemic review of all relevant randomised, controlled trials

Level II Evidence obtained from at least one properly randomised, controlled trial

Level III Evidence obtained from well designed, controlled trials without randomisation, or evidence obtained from well designed cohort or case control analytic studies, preferably from more than one centre or research group, or evidence obtained multiple time series, with or without the intervention. Dramatic results in uncontrolled experiments, such as the results of the introduction of penicillin treatment in the 1940s, could be regarded as Level III evidence

Level IV Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Appendix F: Uses of Retrospective, Prospective and Concurrent Audit

If the data are already collected a retrospective audit might be appropriate. It is important to check that the data have been collected accurately and completely before commencing the full audit. If no data or insufficient data are available or practice has changed, you may wish to start a prospective audit or concurrent audit. Table F1 outlines the advantages and disadvantages of each of these approaches.

Table F1: A comparison of retrospective, prospective and concurrent audits

Timing of audit	Advantages	Disadvantages	Application
Retrospective	• Ability to review many records of patients and/or documents • Cost-effective option	• Data may be incomplete or inaccurate • May not be suitable for rapidly changing treatment/ technologies	• Large sample • Good data available
Prospective	• Can determine data to be collected, and quality of collection • Quick and accurate identification of cases to study. Prevents lengthy tracking after discharge	• Potentially more expensive than retrospective audit for similar-sized sample • Data collectors may need more training	• Useful for evaluating audit topics where data are not retrievable by diagnostic coding methods and in high cost/high risk situations
Concurrent (open audit)	• May be more accurate because data are collected as audited care is provided • Opportunity to intervene to make clinical care improvements as these are discovered	• Potentially more expensive than retrospective audit for similar-sized sample • Data collectors may need more training	• Used where data are not normally collected and for which no system exists

Appendix G: Balanced Scorecard Approach to Performance Management

Robert Kaplan and David Norton developed the Balanced Scorecard concept in 1992. It translates an organisation's mission and strategy into a comprehensive set of performance measures, and links improved quality with increased financial performance. The traditional key performance dimensions include finance, process and efficiency, patient and quality, and organisational health. The relevance of the Balanced Scorecard to clinical audit is that standards in audit can include a variety of process and outcome measures, including patient perceptions of care, quality measures such as clinical appropriateness and access, and financial parameters.

The rationale for this approach to performance measurement in the health sector is described in detail in the Balanced Scorecard Performance Indicators for New Zealand Public Hospital and Health Indicators: Hospitals Monitoring Directorate (October 2000, www.moh.govt.nz).

The Balanced Scorecard approach reflects the four quadrants of operational effectiveness:

1 **finance**

2 **productivity**, which incorporates efficiency ie effectiveness without waste

3 **clinical quality**, which covers functional dimensions of quality, such as safety, appropriateness, consumer participation and access

4 **delivery quality**, which incorporates customer satisfaction (internal and external, including general practitioners), patient satisfaction (more accurately patient perceptions of care), and the organisational health factors, including staff satisfaction and turnover.

The patient and quality dimensions in the Balanced Scorecard include overall patient satisfaction with the hospital, as measured in the quarterly patient satisfaction survey of the DHB Funding and Performance Monitoring Directorate. There are two clinical indicators (emergency department triage times, and hospital-acquired blood stream infections) in the patient and quality quadrant of the Ministry of Health Balanced Scorecard, which is a set of measures collected quarterly by the Ministry of Health.

Appendix H: Directory of New Zealand Health Professional Groups

The National Library of New Zealand (tepuna.natlib.govt.nz/web_directory/NZ/healthproforgan.htm) links to most health professional organisations in New Zealand, eg, colleges, societies (see list below).

Organisation	Web address
Association of Salaried Medical Specialists (ASMS)	www.asms.org.nz/
Australasian Faculty of Occupational Medicine	www.racp.edu.au/afom/index.htm
Australasian Faculty of Public Health Medicine	www.afphm.org.nz/
Australasian Society for Infectious Diseases (ASID)	www.racp.edu.au/open/asid1.htm
Australasian Society of Blood Transfusion (ASBT)	www.asbt.org.au/
Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT)	www.racp.edu.au/open/ascept.htm
Australasian Society of Clinical Immunology and Allergy (ASCIA)	www.medeserv.com.au/ascia/
Australia and New Zealand Dialysis and Transplant Registry (ANZDATA)	www.anzdata.org.au/ANZDATA/anzdatawelcome.htm
Australian and New Zealand College of Anaesthetists (ANZCA)	www.medeserv.com.au/anzca/
Australian and New Zealand College of Mental Health Nurses (ANZCMHN)	www.voyager.co.nz/~anzcmhn/
Australian and New Zealand Intensive Care Society (ANZICS)	anzics.herston.uq.edu.au/
Australian and New Zealand Society of Occupational Medicine Inc	www.anzsom.org.au/
Australian and New Zealand Society of Nephrology (ANZSN)	www.nephrology.edu.au/

Organisation	Web address
Australian and New Zealand Society of Occupational Medicine (ANZSOM)	www.anzsom.org.nz/
Australian and New Zealand Society of Respiratory Science Inc. (ANZSRS)	www.csu.edu.au/special/anzsrs/ANZSRS.html
Aviation Medical Society of Australia and New Zealand (AMSANZ)	www.avmed.org.nz/
Cardiac Society of Australia and New Zealand	www.csanz.edu.au/
Clinical Leaders' Association of New Zealand (CLANZ)	www.clanz.org.nz/
College of Nurses Aotearoa (NZ)	www.nurse.org.nz/
Hauora Mäori	www.healthsite.co.nz/hauora_Maori/
Health Information Association of New Zealand	www.northland.ac.nz/HIANZ/index.html
Health Promotion Forum of New Zealand	www.hpforum.org.nz/
HEMNZ : Health Emergency Management New Zealand	www.hemnz.org.nz/index.html
Human Genetics Society of Australasia	www.hgsa.com.au/
Internal Medicine Society of Australia and New Zealand (IMSANZ)	www.racp.edu.au/imsanz/
Marce Society Australasian Branch	www.wairua.co.nz/marce/
Maternity Services Consumer Council	www.maternity.org.nz/
Medical Council of New Zealand	www.mcnz.org.nz/
Mutagenesis and Experimental Pathology Society of Australasia (MEPSA)	www.mepsa.org/
National Society on Alcoholism and Drug Dependence New Zealand	www.nsad.org.nz/
New Zealand Association of Natural Family Planning	www.natfamplan.co.nz/
New Zealand Association of Neonatal Nurses (NZANN)	www.nzann.org.nz/
New Zealand Association of Optometrists (NZAO)	www.nzao.co.nz/
The New Zealand Branch of the Australian and New Zealand College of Mental Health Nurses	www.voyager.co.nz/~anzcmhn/index.html
New Zealand College of Midwives	www.midwives.org.nz/

Organisation	Web address
New Zealand Drug Foundation	www.nzdf.org.nz/
New Zealand Foundation for Cosmetic Plastic Surgery	www.nzcosmeticsurgery.org.nz/
New Zealand Guidelines Group	www.nzgg.org.nz/
New Zealand Medical Association (NZMA)	www.nzma.org.nz/
New Zealand Microbiological Society	www.nzms.org.nz/
New Zealand Nurses Organisation (NZNO)	www.nzno.org.nz/index.html
New Zealand Private Hospitals Association	www.nzpha.org.nz/
New Zealand Rheumatology Association	www.rheumatology.org.nz/
New Zealand Society of Naturopaths Inc.	www.naturopath.org.nz/
New Zealand Society of Otolaryngology – Head and Neck Surgery	www.orl.org.nz/
New Zealand Society of Podiatrists Inc.	www.podiatry.org.nz/
New Zealand Society of Physiotherapists	www.physiotherapy.org.nz/
Nursing Council of New Zealand	www.nursingcouncil.org.nz/
Nursing Informatics New Zealand Inc (NINZ)	www.ninz.org.nz/
Nursing Research Section of the New Zealand Nurses Organisation	www.nursingresearch.co.nz/
Nutrition Society of New Zealand	www.nutritionsociety.ac.nz/
The Paediatric Society of New Zealand	www.paediatrics.org.nz/
Pasifika Medical Association (NZ) Inc	www.pacifichealth.org.nz/
Perinatal Society of Australia and New Zealand	www.128.250.239.13/psanz/
Pharmaceutical Society of New Zealand	www.psnz.org.nz/
Pharmacy Guild of New Zealand Inc.	www.pgnz.org.nz/
Physiological Society of New Zealand	www.otago.ac.nz/PSNZ
Researched Medicines Industry Association of New Zealand Inc. (RMI)	www.nzhealth.co.nz/rmi/
Royal Australasian College of Physicians (RACP)	www.racp.edu.au/

Organisation	Web address
Royal Australasian College of Surgeons (RACS)	www.racs.edu.au/
Royal College of Pathologists of Australasia	www.rcpa.edu.au/
Royal New Zealand College of General Practitioners	www.rnzcgp.org.nz/
Thoracic Society of Australia and New Zealand (TSANZ)	www.thoracic.org.au/
Transplantation Society of Australia and New Zealand Inc. (TSANZ)	www.racp.edu.au/tsanz/index.htm

Source: National Library of New Zealand

Appendix E Sources of Seed Guidelines and International Best Practice Websites

Sources of Seed Guidelines

Appraisal Instrument for Clinical Guidelines

NZGG – New Zealand Guidelines Group

US Agency for Healthcare Policy and Research (AHCPR)

US Preventive Services Task Force

SIGN – Scottish Intercollegiate Guidelines Network

Canadian Task Force on the Periodic Health Exam

American College of Physicians

Managed Care Organisations with Mature Guideline Programmes
- Group Health Cooperative of Puget Sound
- Kaiser Permanente

Evidence based practice websites:

Name	Internet address	Description
Bandolier	www.jr2.ox.ac.uk/bandolier	Oxford Evidence Based Medicine site
Cochrane reviews	www.cochrane.org	Cochrane database of evidence based reviews
Netting the evidence	www.med.unr.edu/medlib/netting.html	Finding evidence based links
The Trip Database	www.tripdatabase.com	Evidence based reviews and research
US National Guidelines Clearing House	www.guideline.gov/index.asp	Guidelines that have been logged from around the world, predominantly from the US
Scottish Intercollegiate online Guidelines Network (SIGN)	www.sign.ac.uk/	Scottish guidelines
UK Guidelines database and audit projects (CLIP database)	www.eguidelines.co.uk/eguidelinesmain/index.htm	Database of UK guidelines and CLIP database of clinical audits completed (giving title and contact person only) Registration free
Institute of Health Care improvement	www.ihi.org/	

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Notes

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