

Audit in Practice: A Clinician's Guide to Setting up Audit

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Audit is the process used by health professionals to assess, evaluate and improve the care of patients in a systematic way in order to enhance their health and quality of life. There are many different ways of conducting medical audit and it carries a great benefit to practice such as improving efficiency and clinical error, demonstrating a good care, stimulating education and promoting higher standards of hospital and community care for patients.

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Background and basic principles

Audit is defined as the process used by health professionals to assess, evaluate and improve the care of their patients. It is the systematic critical analysis of the quality of medical care, including the procedures used for diagnosis and the treatment, the use of resources and the resulting outcome to improve the quality of life for the patients¹. Unlike research data, audit data are not intended to prove a hypothesis. It is not a project in the sense that it has no end; the same audit may be repeated to check that the improvement is maintained. Audit is essentially looking backwards and as none of the past can be diagnosed, audits should be small with only as many case studies as are required to produce valid findings².

Audit in medical practice has many areas of implementation; a test result lost, a specialist who can't be reached, a missing requisition, a long wait for barium meals. These are all too familiar examples of waste and rework, completing an error in the doctor's daily life. Audit is a mean to discover error in order to improve it. The goal must be educational and practical, it must be linked to improvement of all doctors and not to punish those who error. Audit may be simply defined as looking at what we are doing with the aim of making improvements in patients' care and use of resources³.

Types of audit

In general terms there are two types of audit. The first is a quantitative one. It depends upon the collection and analysis of data, about a large number of patients or events, and

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evaluates specific performance ie. how many family physicians request HbA1c for their diabetic patients or measuring the frequency of follow up of asthmatic patients.

The second type of audit is qualitative. This type of audit is based on review of the time leading up to a significant or critical event. A patient collapsed while waiting to be seen, in this case all members of the team are involved; clerks, nurses and doctors. Reasons for such event to occur are investigated and measures preventing it are suggested. This type of audit analyses the sequence of events, people involved and other related factors, rather than collecting a large number of data as in quantitative audits^{3,4}

What is measured in audit?

There are three main constituents of care that can be measured by audit, they are frequently referred to as: Structure, process and outcome.

Structure: Represents the resources, such as the practice equipment, the number and kind of people in the practice team and patients' records. Structure does not describe the performance of health professionals giving care; it can increase the chance of good quality care, but does not assume it. Examples of areas in structure that can be audited; the availability of peak flow meters in the consultation room of all primary care physicians, the presence of the basic data sheet in patients' medical records, availability of beds, etc⁴.

Process: Describes the care given by a doctor i.e. what doctors do for their patients. It reflects their attitudes, knowledge and skills. Unlike structure, the process of care usually relates directly to the benefits patients get, as the results of care³. Audits of process can investigate many aspects of care such as prescribing habits, hospital referrals, laboratory and x-ray use and patterns of clinical decision-making⁴.

Outcome: Defines the changes in a patient's current and future health status. Outcomes are the definitive indicators of health; they describe the effectiveness of care. Diabetic patients under control, patients' satisfaction with care provided, school absence in children with asthma, how many patients had returned to work three months after a myocardial infarction. In selecting outcome measures, the natural history of the disease has to be taken into account. For example the care given to a patient with minor virus infection would not be worth assessing because the condition is self limiting. Further more, the outcome of chronic disease may not be apparent for many years, in which case it may be difficult to determine the contribution that care has made to outcome when compared with many other factors that could have had an effect⁴.

These three types are frequently all part of the same pattern of care. The type of audit used will depend on the aim of your audit and what you are trying to measure. Table 1 shows examples of the three areas in audit.

Table 1. Examples of areas measured by audit

The resources And personnel available	The number of staff The use of specialized Equipment The availability of beds	Structure
What happens in the Practice/hospital unit	Referrals to hospital Clinical investigations The quality of clinical Notes	Process
The results of care	How many patients Returned to work three Months after myocardial Infarction?	Outcome

The audit cycle

Any audit consists of four basic steps, which can be summarized in Figure 1.

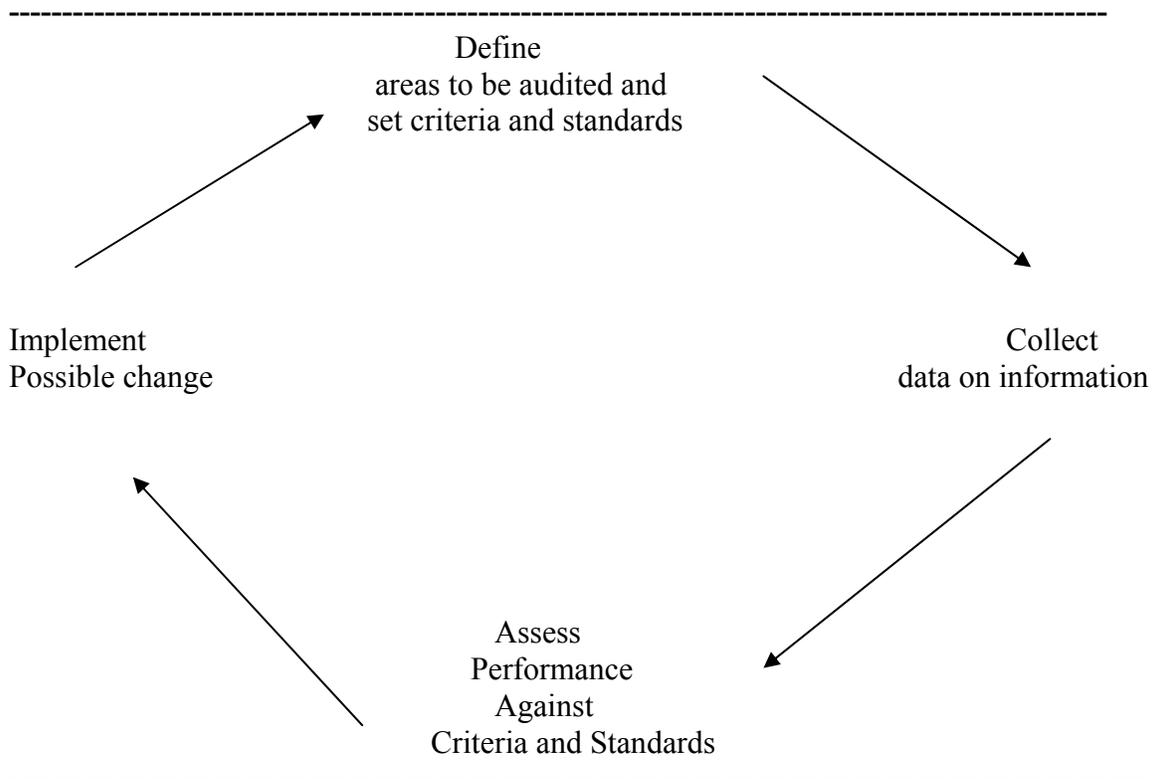


Figure 1. The audit cycle

Step 1: Identify what areas you intend to audit ie. structure, process or outcome and set criteria and standards.

Step 2: Collect data on current performance i.e. the care given and it's effect on patients.

Step 3: Assess performance against criteria and standards to determine the extent to which criteria and standards have been met.

Step 4: Identify the need for change, either to the way care is provided or to the criteria and standards and start implementing the change. Then, re-audit the performance against setting higher standards⁵.

Planning an audit:

When setting out along with the audit route it is often unclear what the process will be, or what methods are to be used and what resources are required, unless considerable thoughts are given to these issues, it is quite possible to discover too late that the data being collected in a practice will not provide an answer to the question being asked. Therefore, for an audit to succeed it should clearly identify where it wants to go and how to get there. The following guidelines will help you to plan your audit^{5,6}.

1. Choose the topic

The selection of a topic for audit is likely to be made by the partners or the practice team, it is important that the team agree on the choice. Any subject chosen for audit should be seen by the practice team as:

- Likely to benefit patients
- Likely to benefit the practice
- Significant or serious in terms of process and outcome of patient care
- Having potential for improvement

When choosing the priorities ask yourself the following questions:

- Is the problem common?
- Does it affect patient care?
- Does it have serious consequences in terms of morbidity or mortality?
- Would correcting the problem save more money?
- Does the team feel motivated to take the problem?

Now that you have decided on the area for the audit, the next step is to consider what kind of audit you are going to use, structure, process or outcome you don't have to confine your audit to only one type⁶.

2. Produce and clear written statement of aims

It is worth spending time achieving agreement in the practice on written aims that are ambiguous and capable of being tested, and clearly define what the audit is about and

what it should accomplish to assess measles immunization of children at fifteen months of age⁶.

3. Set Criteria and standards

The term criterion is used to describe definable and measurable items in health care, which describes quality. Criteria are usually written in the form of statements that describe what should happen, while standards describe the level of care to be achieved for any particular criterion. Table 2 illustrates examples of criteria and standards.

Table 2. Examples of criteria and standards

Criteria	Standards
Children under two years old should be immunized against tetanus and polio	90% of the registered two years old immunized against tetanus and polio
The notes of those patients sensitive to penicillin should be clearly marked	The notes of all (100%) patients sensitive to penicillin clearly marked
The reduction of severe wound infection in post-operative surgical patients	Severe wound infection reduced to less than 5% in post operative surgical patients

The criteria and standards can be derived from either the most recent medical literature or the best experience of clinical practice, or the practitioners whose care is subsequently assessed by audit can generate it internally. A practice team should construct and use internal working clinical standards for every day practice wherever possible, so that its members can see what they are trying to do and what they actually achieve^{4,5,6}. There are several points that should be born in mind when constructing criteria and standards, it is necessary to:

- Refer to the literature indicating current practice.
- Choose criteria and standards in line with current practice.
- Ensure that criteria and standards are based on facts.

Level of standards

There are three options for setting the level of standards.

- A minimum standard describes the lowest acceptable standard of performance ie. The minimum standard of children immunized for measles are 70%, below this level is considered as failure.

- An ideal standard describes the care that is possible to give under ideal conditions, the ideal standards requires that all (100%) of the children born in the catchment area of a health center are vaccinated for measles.
- An optimum standard lies between the minimum and ideal. Optimum standards represents the standard of care most likely to be achieved under normal conditions of practice e.g. putting in consideration that the catchment area of that health center is 20% non Bahrainis and, therefore, might leave the country at some time, so the expected optimum standards of measles vaccination could be set at 80%.

Grol R, Morkkik H, stated that setting standards locally could play an important part in the success of audit⁴.

4. Select the most appropriate method

Data collection

The nature of data for audit varies from objective numbers to subjective judgments depending on the topic examined. We may look at the basic structure of provision of care, at the clinical processes and at various outcomes for patients. Table 3 show topics for audit and type of data required⁷.

Table 3. Topics in practice and source of data

Examples	Source of data
Availability of appointments	Records of appointments available per week, Per day or just before surgery
Diabetic patients under control	Data from pharmacy drug list or diabetic clinic
Referral to hospital	Referral letters
Patient satisfaction	Interview or questionnaires

Data for audit may be a complete descriptive analysis or based on random sampling, such as an audit that describes all aspect of care given to all diabetic patients in a diabetic clinic or a sample of diabetic patients are assessed for control of diabetes. There are no hard and fast rules about sample size. The size needed is related to how accurately it is necessary to produce a valid result⁸. When comparing practice performance with a specific standard, one may enumerate all relevant patients with the practice or sample only some of the relevant patients and information: audit all children at age of fifteen months to assess measles vaccination, or taking a random sample of diabetic patients to

assess, whether diabetic sheets are used for monitoring or not. The detailed analysis could be done retrospectively by examining existing records or prospectively by using an external sheet to record the items to provide details⁹. Pilot studies are normally essential before setting out your audit. Go through the procedure with a small number of patients as if it were a full-scale audit, this will help you to check the feasibility of such an exercise and potential problem areas can be identified with the standards set at the beginning of audit.

The analysis of data

Complex statistical analysis is unnecessary for the majority of single practice audits. The first step in any analysis is to examine the frequency of occurrence of each item or event: the number of children who had been vaccinated in relation to the total number of children born in the catchment areas. Each of these numbers should be expressed as a percentage. Remember to calculate your dominator, that is the population specific to the audit, their sex, age, number etc. The next step is to construct a table that shows the range of each item of data collected. The last step is to compare the results generated^{10,11}. Table 4 demonstrates examples of data analysis.

Table 4. **Data analyses of pattern of HbA1c request at Nail Health Center (Audit example 2)**

Patients	<u>HbA1c done in the past 6 months</u>		
	Once	More than once	Not done
37	12	2	23
	32.5%	5.5%	62.0%

Presentation of data

The analysis of data produces results that need to be converted into information that the practice team can understand, and to which they can relate. Those results can be presented graphically by the use of pie chart or bar chart.

5. Make the change

Many audits stops after presenting the results, and perhaps after identifying the need for change. Too often a practice leaves the audit at that end, feeling that it was an interesting exercise with a good intention to make some changes in some unspecified way at some unspecified time in the future. But the aim of an audit goes far more than knowledge and good intentions. After audit results, the practicing team should start developing a plan on how to improve performance and when to re-audit again¹¹. For example, the team may suggest that they need a specific protocol for referring or prescribing or they might suggest a specific change in resources such as requesting peak flow meters for all consultation rooms or issuing a clear protocol for following fifteen months old children to

reduce the number of defaulters. Then the team should agree on a time limit to implement the change and when to re-audit. Without future planning for improvement and re-auditing, the audit loses its value and aim. Figure 2 demonstrates the change cycle.

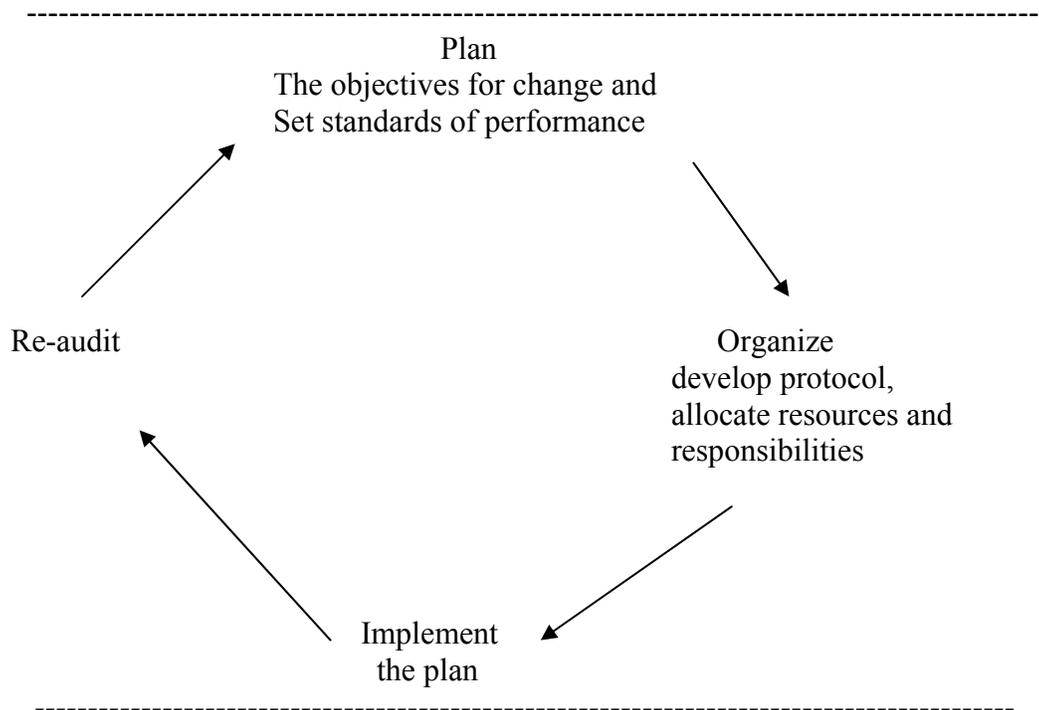


Figure 2. The change cycle

Examples of Audit

Example 1

Pattern of lipoprotein request at Naim Health center.

Background: The laboratory section - at Naim health center- raised a complaint that doctors are requesting lipoprotein analysis unnecessarily for the patients, and that they are not following the hypercholestremia investigation guidelines accurately. The guidelines indicated that only patients with blood cholesterol level more than 6.2 mg/dL or between 5.2 to 6.2 mmol/l with risk factors should have lipoprotein analysis done. The health center team, decided to carry out an audit to investigate the complaint.

Aim of audit: To review the existing pattern of lipoprotein request by doctors at the health center.

Criteria: Only patients with blood cholesterol level more than 6.2 mg/dL or between 5.2 to 6.2 mmol/l with risk factors, should have lipoprotein analysis done.

Standards: 80 % of lipoprotein analysis requested by physicians should be indicated according to the above criteria.

Method: All lipoprotein analyses done during January 1999 were collected from the laboratory records. A total of 33 requests were allocated and reviewed in relation to cholesterol level and the presence of risk factors, from patients' medical records.

Results: Of the 33 requests for lipoprotein analysis, only 14 (42.2 %) were indicated. And 19 (57.6 %) were not indicated. Accordingly the results show that the doctor's performance in following the investigation guidelines were far below the expected standards.

Action plan: The health center team planned the following:

- All physicians reviewed the hypercholesteremia investigation guidelines, and accordingly a clear investigation plan was agreed upon.
- A re-audit will be carried out after six months with expectation of 80 % standards.

Example 2

The pattern of HbA1c request for diabetic patients at Naim health center.

Background: HbA1c (Glycosylated hemoglobin) level corresponds closely with the person's average glucose levels for the previous four to eight weeks. Measuring these levels provides a long range prospective on how well glucose levels are being controlled. The team at the health center wanted to ensure a proper follow up of diabetic patients attending the health center through requesting HbA1c.

Aim of audit: To determine the pattern of HbA1c request for the follow up of diabetic patients at Naim health center.

Criteria: Patients with diabetes mellitus should have had their HbA1c checked at least twice for the last six months from the last visit.

Standards: 80 % of diabetic patients should have had their HbA1c checked at least twice for the last six months from the last visit.

Method: The sample was selected from the pharmacy records. A total of 693 diabetic patients were registered. Systemic sampling was used and a total of 37 patients were chosen as the sample for the audit. Diabetics on diet control were not included. Patients' medical records were reviewed for HbA1c request in the last six months from the last visit. The results were compared to standards.

Results: Samples of 37 diabetic patients were chosen. 13.5 % were type 1, and 86.5 were of type 2. Only 5.5% of the patients had their HbA1c requested more than once during the last six months, while 32.5% once during the past six months. The audit results, concluded that only 38% of diabetic patients had an HbA1c, while 62% of the patients did not have their HbA1c checked during the last six months from the last visit.

This percentage was far below the expected 80% standard. Table 4, demonstrates data analyses and results.

Action plan: The team discussed the importance of using HbA1c as an indicator of diabetes control. Guidelines were issued indicating that all diabetic should have their HbA1c checked three times per year. The team agreed to re-audit eight months from this audit aiming for 80 % standards.

CONCLUSION

Medical audit is a tool for improving medical care. Once the basic technique for conducting the audit has been learned and practiced, health professionals will find it stimulating and rewarding. Many practice teams see audit as a burden that they can do without, they fear that audit will be a mean of identifying mistakes and shortcomings and that it will lead to unpleasant relationships and criticism by colleagues or managers¹².

The immediate and most obvious benefits of audit are to alleviate or remove those areas of every day practice that causes frustrations. Every practice has problems that everyone complains about, but no one can solve. By defining, quantifying and analyzing a problem during audit, solutions may emerge which can be assessed for the effectiveness, through a second audit setting higher standards of performance. Audit leads to better quality of care, it encourages thoughtful planning which leads to valid information collection, and subsequently to informed decision making.

REFERENCES

1. Irvine D, Irvine S. Making sense of audit. Oxford: Radcliffe medical press, UK, 1991:16-65.
2. Warlow C, Al Shahi R. Differentiating between audit and research. BMJ 2000;320:713.
3. Arnold C, Bain J, Brown R, et al. What every doctor needs to know about medical audit. 1st edn. UK:Center for medical education, 1992:1-47.
4. Ellis B, Sensky T. A clinician's guide to setting up audit. BMJ 1991;302:704-07.
5. Sheldon M. Medical audit in general practice. Royal College of General Practitioners 1982;20:1-19.
6. Sharv CD, Costain DW. Guidelines for medical audit. BMJ 1989;229:498-99.
7. Baker R, Robertson N. Audit in general practice: factors influencing participation. BMJ 1995;311:31-34.
8. Charlton I, Charlton G. Audit of the effect of a nurse run clinic on workload and patient morbidity in general practice. Br J General practice 1991;4:227-31.
9. Smith T. Medical Audit: closing the feedback loop is vital. BMJ 1990;300:65.
10. Lyons C, Gumport R. Medical audit data counting is not enough. BMJ 1990;300:1563-6.
11. Spiegel N, Murphy E, Kinmouth L, et al. Managing change in general practice a step by step guide. BMJ 1992;304:231-4.

12. Baker R, Robertson W. Audit in general practice: factors influencing participation. *BMJ* 1995;311:31-4.