

# Dental audit (I): Exact criteria of dental records; Results of a Phase-III study

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## Abstract

**Objective:** Evaluating the quality of dental records in the Faculty of Dentistry of the University of Seville (Spain). We attempted to collect and/or develop identifiable elements of dental care used to evaluate its appropriateness, as well as to measure its level of filling-in between 1999 and 2004 (Phase III of the record audit).

**Method:** The 46 criteria used to evaluate dental care are shown, measuring—in 50 dental records randomly chosen within a 5-year-time period—their level of filling-in (Phase III of a health audit).

**Results:** A low level of filling-in was observed in all quality criteria defined. No record was found to be free from errors. A maximum of 36 criteria out of 46 was fulfilled (mean of 20.8).

**Conclusions:** The standard of appropriate filling-in was only met in 12 criteria (75 %), the results being poor, due to the importance which clearly deficient aspects related to diagnosis and treatment plan have in the process of patient care. For such reason, we suggest a remedial action (Phase IV) developing a new model of dental record and its subsequent re-evaluation (Phase V), which will be subject to analysis in the second part of this paper.

**Key words:** Dental audit, dental records, record criteria, quality control.

## Introduction

### 1. Concept of Quality. Quality Control

Quality control is a practice developed within industry which emerged when manufacturing processes became more complex and it became necessary to verify that final products fitted into the desired pattern. It was subsequently applied to oral health. Quality control refers to the assessment or measurement of evaluations of the service quality and the creation of the necessary changes to keep or improve the quality of the provided care (1).

Perhaps one of the most valuable contributions has been that of A. Donabedian, who established in 1996 the classification of methods for quality evaluation in structure,

process and results, as well as numerous approaches both at theoretical and practical levels, which have gained extreme importance in the field of quality (2).

### 2. Methods for Care-Quality Control

From its origins, several variants for quality control have been described, being that of Donabedian in 1996 (2) the most accepted one. It classifies quality-control methods into indirect (which analyse structure and care process) and direct ones (which attempt to evaluate their results). Currently, they are rather considered as the successive phases of a system: the audit method was described in the 1950s (3) and consists of five stages, all of them equally important.

- Phase I. Definition of objectives, criteria and standards: The first step is choosing an area identified as deficient (in terms of quality). It is preferable that objectives are chosen internally by the group of professionals which are involved in the problem. This stage is crucial: if professionals involved in care do not feel implicated, they can reject the conclusions of the audit.

One of the definitions of criterion is the following: "Identifiable elements of medical care which can be measured to evaluate its appropriateness" (4). They are guidelines which state what dentists should or should not do.

The best thing we can do in the building of the criteria is to use bibliography to define which care elements can become true quality measures, according to those criteria by Lembcke (5) (Table 1). In order not to complicate evaluation, it is preferable to choose few criteria which are supposed to be of extreme importance, rather than attempt to analyse and measure the results of a high number of criteria of unequal importance. Once they have been defined and consensus has been reached upon them, it is time to determine the standards.

**Table 1.** Attributes which Lembcke demands from criteria (5).

1. Objectivity: they should be immune to interpretation variations
2. Verifiability: it should be possible to check them through the existing documentation
3. Uniformity: they should be independent from the sample, socio-economic level of the patient, etc.
4. Specificity: for each researched aspect and for no other one
5. Pertinence: adequacy to the aspect of the care we want to evaluate
6. Acceptability: according to the existing studies on effectiveness

We define standard as the degree of application of a norm or criteria which we consider as acceptable within a particular circumstance. Bailit defines it as the percentage of times which a particular criterion must be fulfilled in order to consider the provided service or treatment as appropriate or acceptable (6).

- Phase II. Design of the study; data collection and index obtaining: Design should take into account: target population, sample, unit of care analysis, data sources, professionals who carry out data collection and its time duration. Once data-collection process is finished, we can obtain the indexes (degree of application of the criteria).

- Phase III. Finding analysis and deficiency detection: The comparison between the standards fixed in the first phase and the indexes found in the second allows us to state their discrepancies. It is a delicate phase, since we have to analyse the grounds of such discrepancies in order to correct them and thus improve care. If we do not achieve the full-circle of the audit, its evaluation would be devoid of any content.

We should firstly question its design itself and the carrying-out of the evaluation. We have to consider if any error might have been made during the data collection phase, or the data source was incomplete. Subsequently, we should revise the criteria: were they the appropriate ones? In this sense we have to point out that the group should not reduce its requirements, although the indexes are found quite below the standards, if they are convinced that the chosen criteria are the appropriate ones.

- Phase IV. Advices on correction and their application: Knowledge or technical-skill deficits should be resolved through education activities. The carrying-out of evaluation studies itself is a good educational instrument in order to improve quality.

The second great block of quality problems are those dealing with organization: deficits in structure, material, staff, register systems, etc. These problems are those which are more frequently detected in all evaluation studies, and demand huge investments of resources to be solved, but in the long run its solution will be that which will provide the highest performance-level in the improvement of care quality.

Problems regarding attitude are those which are more difficult to solve. The most important thing which the group carrying out the audit should value is if practice carried out by the professionals who do not adjust their work to those criteria considered as correct by the rest of the centre, damage the centre's care quality. If such quality is not affected, we recommend just attempting to convince them from incorporating into the way of working of the team. We will only take actions aimed at modifying their practice if the care quality which their patients are receiving is considered as deficient.

- Phase V. Re-evaluation: Re-evaluation should be carried out following exactly the same methodology used in the first evaluation. If it shows results below the marked standards, we should give precedence to re-formulating the audit from its initial phases.

This phase, which achieves the full-circle of the medical audit, is crucial, since it will state if we have achieved the main objective of care-quality control, if those changes recommended have been carried out, if such changes have produced any improvement of the pursued quality improvement, and if such improvement is kept subsequently.

### 3. Clinic Record and Quality Control

The functions carried out by clinic records (7) are: care, teaching, research, health and epidemiological, managerial, administrative, legal, not forgetting quality-control. There is a statement which is frequently quoted — "Dentists and patients forget, but good records remember" (8).

Health industry has accepted record audit. In Dentistry they are very useful since most oral diseases are chronic and demonstrable. Besides, it is possible to keep an eye on the advance of the disease and the treatment's effectiveness when these data are correctly noted down in records.

Many valuation and assurance systems have already used dental records as a data source (9, 10). Systems of quality assurance—which clearly trusted patients' dental records to evaluate care quality—were developed (11).

However, it has also been admitted that the production of correct records/files is a prerequisite to evaluate care quality. Although good records do not ensure the quality of a particular treatment, they do provide the opportunity of evaluating it. The present work on quality evaluation (12, 13) does not attempt to carry out an approved intervention of the kind ISO 9001-9004, including evaluation of suppliers, services, custom satisfaction, etc., but it is rather centred in this line only in the clinic record as a variable to control within the process of production of a dentist.

#### 4. Problem Approach

The Faculty of Dentistry of the University of Seville, as an education centre which provides oral-care service, is concerned with both education and health-care quality. The subject Comprehensive Dentistry—given within the 5th year of the degree on Dentistry—is aimed at facing students with patients. Experience as supervisor teachers has proved the existence of a high number of problems in the handling of clinic records (14): absence of uniformity, record losses, duplicity, incomplete records, lost or in-bad-condition X-rays, non-updated medical records, illegible notes, absence of a written treatment-plan, absence of patient's signatures, etc. All this affects the duration of the provided treatment, as well as its convenience.

The maintenance of correct and complete dental records is a key element for care, since it provides permanent documentation of the treatment and constitutes the grounds for diagnosis and treatment plan. Besides, when several attendants provide care, care continuity depends on the communication between suppliers provided by records. Such files mean a basis for the evaluation of the results of the treatment: it is impossible to evaluate the quality without having appropriate records at our disposal. Another factor which turns out to be really important is the responsibility which we bear as educators in the development of the students' ability to carry out good records (15): many times the students adopt the kind of register used during the degree almost automatically and take it as the model to be used afterwards during their professional life.

Therefore, we worry about the quality of the dental records we handle and, therefore, we propose the following as fundamental objectives:

1st. Collect and/or develop correct criteria (“identifiable elements of dental care used to evaluate its appropriateness”) (16), and

2nd. Measure the level of filling-in of such criteria in the clinic records of Comprehensive Dentistry used between 1999 and 2004 in the Faculty of Dentistry of Seville (Spain). (Phase III of the record audit.)

## Material and Methods

Research has been carried out in the Dental School of the University of Seville on patients who receive oral care in the subject Comprehensive Dentistry (CD), which is given within the 5th year of the degree on Dentistry.

The whole care process is reported in dental records, which have been the data source used in this work. The criteria assumed as quality indicators were elaborated using scientific bibliography and reaching consensus among the professionals implied in the study of quality assurance. A total number of 46 criteria were described; these are:

### 1. Positive criteria in demographical data:

A1– There is enough data to identify the individual clearly

A2– There is data of the spouse or person to be contacted in case of emergency

### 2. Positive criteria in medical record:

B1– There is enough information about the health condition of the patient

B2– The patient's full name and signature are included within the data of his/her health

B3– There is proof of the day in which the medical record was made (date)

B4– It reports data referring to allergy, coagulation alterations, etc.

B5– There is explanation notes or the dentist's signature is included

B6– There is proof of updating every academic year

### 3. Positive criteria in Stomatology records:

C1– The main reason for consultation is reported

C2– There is a summary of previous oral treatments

C3– The patient's habits of oral hygiene are reported

C4– There is proof of the symptoms referred by the patient

C5– The patient's opinion on the appearance of his/her mouth is reported

### 4. Positive criteria in examination:

D1– There is a graph (absent teeth, cavities, restorations, etc.)

D2– The hygiene index of O'Leary or any other indicator is reported

D3– It includes the CPITN; if it is  $\geq 3$  in any sextant, there should be a tooth diagram

D4– There are written notes referred to previous endodontia

D5– There is extra-oral data (inspections, head or neck touching, etc.)

D6– There is information referring to the examination of oral mucous

D7– There information referring to the occlusal state

D8– There is data referring to the evaluation of the TMJ

D9– There is proof of the investigation of harmful habits

D10– There is information about edentulous areas and existing prosthesis

5. *Positive criteria in diagnosis:*

- E1- Relevant diagnoses are registered
- E2- There is information about the diagnosis helps which have been used
- E3- The content of the X-ray examination is appropriate
- E4- The diagnosis quality of the X-rays is acceptable
- E5- X-Rays include date
- E6- X-Rays are appropriately documented (informed)

6. *Positive criteria on treatment plan:*

- F1- There is a clearly defined treatment-plan
- F2- Other alternative treatment-plans were also taken into account
- F3- The inherent risks of the treatment were stated
- F4- The patient has been informed and agrees (signed)
- F5- An appropriate planning for the treatment has been carried out
- F6- The patient is informed of the consequences of a reversal of the treatment

7. *Positive criteria on evolution notes:*

- G1- Notes referring to therapeutic measures are legible
- G2- Notes are also dated and signed
- G3- The treatment provided is clearly detailed
- G4- When drugs have been prescribed, they are detailed enough
- G5- Documented inter-consultations (reason and destination are reported)
- G6- There is information about the circumstances which altered the treatment plan
- G7- Notes are made with indelible ink, without deletions
- G8- There is information about the prognosis once the treatment is finished
- G9- Instructions about house-care are reported
- G10- There is information about the check-up protocol
- G11- Significant comments made by the patient are reported

SAMPLE: 50 clinic records —randomly obtained among all the patients who had received oral care in CD between the academic years of 1999 and 2004— were revised; work forms were chosen by drawing; one patient per each teaching month.

INTRUMENT: The instrument for revision was designed to evaluate the presence and sufficiency of 46 criteria of the dental record. The existence of each criterion in the

record is registered as ‘present’ (+) (accepting a standard of 75 % of filling-in as adequate for each criterion).

The professional who carries out records’ data collection is an associate teacher of the subject CD, trained during two days in the use of the revision instrument. Calibration sessions were aimed at clarifying the criteria and the protocol to carry out revisions. Reliability of the examiner was measured at the end of the training program and the halfway point of the revision process. In both moments homogeneity in the evaluation of criteria was higher than 90 %, taking duplicated samples from 10 records with a time-gap between them of two days.

STATISTICAL METHOD: The data matrix was stored in MS Access 2000 software according to the form of the revision instrument. Statistical analysis was carried out with SPSS software for MS Windows 13.0.1 (SPSS Inc., Chicago, USA). We established a data depuration and created variables including different sub-variables: A (A1, A2), B (B1 to B6), C (C1 to C5), D (D1 to D10), E (E1 to E6) and G (G1 to G11), which were correlated with the equally-named criteria.

We obtained the indexes (degree of application of the criteria in our unit of care analysis). Subsequently, we carried out a simple descriptive with frequency tables and percentages. We calculated the arithmetic mean ( $\pm$  standard deviation) or the median ( $\pm$  interquartile range), depending on data’s symmetry or asymmetry. We carried out a descriptive study of the number of positive criteria in each record.

**Results**

No record was free of errors and a maximum of 36 criteria of the total number were fulfilled, establishing an average of 20.08, with a typical deviation of 5.63. The lowest number of positive criteria found in a record was 4. There is a low level of fulfilment of the defined quality criteria. The standard of adequate fulfilment is only met in twelve criteria out of the forty-six defined criteria.

Categorization in deciles (Table 2) also demonstrates the fulfilment of quality criteria in the Phase III of the audit (finding analysis and deficiency detection). The number of positive criteria is shown in Table 3. Its detailed analysis will be carried out in the second part of this study, comparing them with the results of the Phase V of the audit (re-evaluation).

**Table 2.** Categorization in deciles of the number of positive criteria.

	1	2	3	4	5	6	7	8	9	10
<b>Evaluation (+) Count % GROUP</b>	13 26,0%	11 22,0%	9 18,0%	8 16,0%	4 8,0%	3 6,0%	1 2,0%	0 0,0%	1 2,0%	0 0,0%

**Table 3.** Number of positive criteria.

Criteria	Beginning		Monitoring		Comparison Value of <i>p</i>
	Frequency	%	Frequency	%	
<b>DEMOGRAPHICAL DATA (A)</b>					
0	10	20	7	10	P < 0.0005
1	38	76	10	14.3	
2	2	4	53	75.7	
<b>MEDICAL RECORD (B)</b>					
0	3	6	0	0	P < 0.0005
1	0	0	0	0	
2	0	0	0	0	
3	1	2	0	0	
4	2	4	2	2.9	
5	26	52	1	1.4	
6	18	36	67	95.7	
<b>STOMATOLOGY RECORD (C)</b>					
0	19	38	2	2.9	P < 0.0005
1	18	36	2	2.9	
2	6	12	1	1.4	
3	5	10	10	14.3	
4	2	4	54	77.1	
5	0	0	1	1.4	
<b>EXAMINATION (D)</b>					
0	0	0	0	0	P < 0.0005
1	1	2	0	0	
2	4	8	0	0	
3	5	10	1	1.4	
4	7	14	0	0	
5	6	12	0	0	
6	4	8	7	10	
7	8	16	13	18.6	
8	10	20	23	32.9	
9	4	8	26	37.1	
10	1	2	0	0	
<b>DIAGNOSIS (E)</b>					
0	8	16	0	0	P < 0.0005
1	8	16	4	6.9	
2	13	26	5	8.6	
3	10	20	12	20.7	
4	4	8	10	17.2	
5	4	8	14	24.1	
6	3	6	13	22.4	
<b>TREATMENT PLAN (F)</b>					
0	25	50	0	0	P < 0.0005
1	13	26	4	6.9	
2	9	18	12	20.7	
3	3	6	12	20.7	
4	0	0	14	24.1	
5	0	0	7	12.1	
6	0	0	9	15.5	
<b>EVOLUTION (G)</b>					
0	0	0	0	0	P < 0.0005
1	1	2	0	0	
2	3	6	0	0	
3	10	20	6	10.3	
4	15	30	10	17.2	
5	13	26	17	29.3	
6	5	10	13	22.4	
7	2	4	6	10.3	
8	1	2	1	1.7	
9	0	0	2	3.4	
10	0	0	2	3.4	
11	0	0	1	1.7	

## Discussion

Regarding the size of the sample, Gill (17) discusses about the number of records which should be revised. He points out that the Joint Commission on Accreditation of Hospitals (JCAH), randomly audits approximately 0.1 % of all hospital admissions in a year, as a part of the accreditation process. The survival of an institution may depend on an extremely small sample and, however, JCAH considers that such sampling reflects the quality of a centre. Gill accepts this figure and revises 1 % of the records of patients from the previous year; at the end, he concludes that his purpose is not a scientific study but the detection of practices of a lower quality than that desired.

Hand (18) carries out a retrospective audit of 316 clinic records to evaluate the level of documentation in 13 dental clinics taking part in the program Medicaid. The number of files requested to each installation kept proportion with its total volume, with a minimum of 10 records per centre.

We define 46 criteria using the bibliography and through consensus between the two teachers in charge of the study. The task was not easy, since in Dentistry those criteria which define work's technical-quality constitute the most developed area in quality assurance, being process criteria those developed least (15).

Leake (19) deals with the main role which dental educators play in the process of establishing guidelines or standards for practice. As well as their research experience and their ability to publish, they would be very useful as transmitters of the enthusiasm for improvement to the students. Palmer (20) suggests a series of practical norms for their building:

- Building simple criteria
- Limiting the number of criteria
- Including only the essential elements
- Using aspects of demonstrated care effectiveness
- Rejecting dangerous or ineffective elements
- Rejecting superfluous or unnecessary elements
- Attempting to get the best possible adaptation to resources
- Ensuring that their content is updated

Gill (17) shows an audit in which he examines five different areas of the record. We gather the 46 quality criteria into seven separate areas in the dental record, being guided by the basic components which a dental record should have according to Oberbreckling (8), although we prefer to join the last two sections of such author into an only epigraph called "evolution notes" in order to simplify the exposition of the results.

Among the American dental insurance companies which are concerned in quality assurance, there is a tendency to score several elements of the structure and process, in order to get a total mark of the clinic which is being evaluated.

Friedman (21) used a scale of 3 points in which 2 equalled 'good' and 0 equalled 'unacceptable'. The final mark was

the sum of each element, but the sections which determined the level of care acceptability were arbitrary. Morris (22, 23) also uses marks to value the structure, process and results.

However, in our work we do not use a mark gradation to value the fulfilment of the criteria, but we prefer to use a dichotomic scale which clearly discriminates if it is adequate and does not depend on a posterior valuation of the sections.

In our audit we consider the constancy in the patient's record of each of the 46 criteria which compose the revision instrument like 'present' (+), and like 'absent' (-) when they are not correctly reported.

Some other authors agree in using a dichotomic scale: Hand describes 13 criteria for the evaluation of dental registers and evaluates them as 'adequate' or 'deficient'; Gill defines 24 criteria gathered into five areas and evaluates them with 'yes' or 'not'; Schoen also recommends a dual scale, since he thinks that different quality levels can be distinguished.

Regarding the number of criteria used in our revision, it can be adduced that they are too many and/or of unequal importance. We decided to include them in our Table of Criteria to analyse all the basic components which a dental record should include.

We honestly believe that we are still in our first steps in quality control and that the progresses in this field are carried out through slow changes. Besides, optimum quality is an abstract term which is almost impossible to measure. Therefore, great part of the quality-revision systems only attempt to establish a difference between adequate and inadequate care. All experts know that without patience and sensitivity it is impossible to achieve improvements both in individual and collective work.

The indexes of our study point out that the standard of adequate fulfilment is only achieved in 12 criteria (75 %), being the results in some of these criteria somewhat discouraging due to the importance which clearly deficient aspects — regarding diagnosis, treatment plan and evolution notes — have in the patient-care process. Thus, we considered a remedial action (audit's Phase IV) developing a new model of dental record together with its subsequent re-evaluation (Phase V) which will be shown in the second part of this paper.

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