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Attributes of the complete dental record: a Delphi approach to standards

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ABSTRACT

Background: Adherence to the Dental Board of Australia Guidelines on dental records is not universal and remediation of deficient practise requires clarity in the practical application of standards. The aim of this research is to clarify practical requirements of dental record keeping in New South Wales.
Methods: Seventeen experts were invited to participate in an electronically administered series of Delphi questionnaires. Concepts were refined until consensus was reached.
Results: Two rounds were required to achieve a satisfactory level of consensus (>80%). A high level of consensus was obtained across the two rounds, with 72% and 86% agreement on propositions in the first and second rounds, respectively. Consensus criteria were established in 14 domains to establish attributes of the complete dental record (ACDR).
Conclusions: The ACDR may supplement existing national guidelines and are likely to be useful in a remediation context in which clear, unambiguous expectations for conduct are paramount.

Keywords: Compliance, dental, documentation, record keeping, records.

Abbreviations and acronyms: ADA = Australian Dental Association; AHPRA = Australian Health Practitioner Regulation Agency; APMO = average percentage of majority opinions; DBA = Dental Board of Australia; DCNSW = Dental Council of New South Wales; NSW = New South Wales.

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INTRODUCTION

Dental practitioners in Australia are bound by their professional registration requirements to keep a record of each patient encounter. Dental records have important implications for continuity of care, patient safety and commercial considerations such as insurance or government remuneration for services.[1] The dental record also plays an important role in adverse circumstances such as consideration of complaints against dentists, compliance auditing and forensic applications.[2] Consequently, poor dental records expose the patient and clinician to a myriad of risks, including inappropriate, inefficient or illegal practises.[3,4] Accordingly, dental professionals require sound record-keeping skills as a graduate attribute and ongoing competency. Despite this requirement, record-keeping practises are frequently found to be suboptimal among dental practitioners.[5,6] Aberrant dental records are a frequent finding in complaints (notifications) made to health regulators in Australia.[7]

The Dental Board of Australia (DBA) Guidelines on Dental Records set out the minimum standards for dental record keeping in Australia. Some elements of these guidelines may be perceived as ambiguous or subject to interpretation.[8,9] In addition, when looking to remediate, standards alone may not be sufficient. Specific knowledge of deficiencies and measurable outcomes of improvement are required.[10] Clear criteria for competency are also necessary in order to establish the efficacy of education approaches aimed at improving record-keeping.

The primary objective of this research was to clarify the specific attributes of competent dental record-keeping in New South Wales (NSW) to complement the DBA Guidelines, with the intention to use this as the basis of an education and evaluation resource to address deficient practises.

Methods

A Delphi consensus development approach was used to identify the attributes of a complete dental record

from the perspectives of key stakeholders. Stakeholders were identified according to the categories proposed by Schiller *et al.*:[11] policy makers and governments; research community; practitioners and professionals; civil society organizations; public; health and social service providers; and private business. Each stakeholder identified within these categories was invited to nominate dental record experts for participation in a series of Delphi questionnaire rounds (Table 1). This research received approval from and was conducted in accordance with the standards set by the Monash University Human Research Ethics Council (project no. CF14/3932-2014002044). This research was conducted at HealthPEER (Health Professions Education and Educational Research Unit, Monash University Building, Clayton, Victoria, Australia).

Stakeholders nominated 17 experts (as defined by experience in teaching, evaluating or remediating record-keeping) who were invited to participate. The first Delphi questionnaire round consisted of a series of questions to clarify elements of the DBA Guidelines on Dental Records. Each element of the DBA Guidelines on Dental Records was analysed individually and possible interpretations were identified. These interpretations were developed into propositions that formed the basis of the questionnaire. Two members of the research team (MB and CP) and an independent statistical consultant from Monash University reviewed the draft questionnaire. The questionnaire was piloted with another member of the research team (DC). No questions were eliminated or added as a result of this pilot phase; however, feedback was used to change the phrasing and order of questions for improved clarity. Participants were asked to provide a response to propositions on a Likert scale of five options: (i) strongly disagree; (ii) disagree; (iii) neither agree nor disagree; (iv) agree; or (v) strongly agree. The opportunity for free-text comments was also provided to allow participants to explain their position or concerns with the propositions.

A range of possible consensus cut-off rates have been identified in the literature.[12] It was decided that the technique for attributing a reasonable consensus rate defined by Kapoor[13] was appropriate. This strategy multiplies the number of majority agreements with the number of majority disagreements, then divides this by the total opinions expressed to arrive at an 'average percentage of majority agreements'.

The range of responses were summarized and synthesized. A 5-point Likert scale was used to yield three categories of responses: (i) disagree/strongly disagree; (ii) neutral/neither agree nor disagree; and (iii) agree/strongly agree. Qualitative analysis of free-text fields was used to supplement the process of quantitative data analysis. Open text was coded, then codes were grouped into common themes. Where a theme was replicated by at least two experts, the response was considered to provide a recurring theme.

Table 1. Stakeholders identified in dental records remediation New South Wales

Category	Organizations/individuals	Justification
Policymakers and governments	Dental Council of NSW	Dental Council of NSW is the organization responsible for considering record-keeping compliance when complaints are considered
	Dental Board of Australia	Dental Board of Australia is the organization responsible for registration of dentists under AHPRA and produces the Guideline for Dental Records
	Ministry of Health	State representative for health services
	NSW State Oral Health Executive	The relevant committee within the NSW Centre for Oral Health Strategy
	The Australian Council on Healthcare Standards	Australia's leading health care assessment and accreditation provider. Mission is to improve the quality and safety of health care
Research community	Records Continuum Research Group (Monash University)	This group is concerned with the creation storage and analysis of data in records and archival systems
Practitioners and professionals	ADA Peer Advisors	ADA Peer Advisors assist dentists with concerns relating to dental practise including accompanying clinicians to hearings of DCNSW in many instances
	Charles Sturt University	One of two universities training dental students in NSW
	University of Sydney	One of two universities training dental students in NSW
Civil society organizations	Community orientated non-governmental organizations	ADA NSW is the peak organisation representing dentists and oral health advancement in this State
Public	Community members	Community representatives on the Dental Council are selected as they are pre-vetted and knowledgeable in this area
Health and social service providers	Health Education and Training Institute	Supports NSW health system in its education and training requirements
	Medicare	Delivery of health-related payments and services
Private business	Indemnity insurance provider	Guild Insurance is the majority representative of NSW dentists who take out mandatory public liability (indemnity) insurance

ADA = Australian Dental Association; AHPRA = Australian Health Practitioner Regulation Agency; DCNSW = Dental Council of New South Wales; NSW = New South Wales.

Items that achieved consensus in round one were not included in the second questionnaire. Propositions that were met with majority disagreement or polarized participants as defined by divergent comments with no common theme were eliminated. Propositions approaching consensus or requiring further clarification as indicated by qualitative comment themes were integrated into a second questionnaire. The results from the second questionnaire were synthesized and compared with round one. Items that achieved consensus were then summarized into a list of attributes of the complete dental record (ACDR).

RESULTS

The response rate was 76% ($n = 13$) for the first round Delphi questionnaire in which 17 experts were invited to participate. There was no response from two invited experts. Two further experts declared a conflict with their other academic roles and did not participate in either round of the questionnaire. Twelve of the 15 experts invited to the second round questionnaire participated, representing an 80% response rate in this round (Table 2).

Table 2. Response rates and prior experiences with dental record-keeping

	Round one (N)	Round two (N)
Experts invited	17	15
Conflict with other academic work	2	0
Participants	13	12
Clinical experience (dental practitioner responsible for records)	8	7
Teaching dental record-keeping	7	6
Assessing dental record-keeping in consideration of complaints	10	9
Auditing dental records	8	4
Use of dental records for legal purposes	6	7
Use of dental records for forensic purposes	4	3
Remediation of dental record skills when found to be deficient	6	5
Other (legal practitioner advising on record-keeping)	1	1

The experience of the participating experts in both rounds was distributed across a broad range of contexts including clinical experience (dental practitioner responsible for keeping records), teaching dental record-keeping, assessing dental record-keeping in consideration of complaints, auditing dental records, use of dental records for legal purposes, use of dental records for forensic purposes and remediation of dental record-keeping skills when found to be deficient (Table 2).

The average percentage of majority opinions (consensus threshold) based on the questionnaire results (APMO) was calculated as 80% (rounded to the nearest decile):

$$\text{APMO} = \frac{\text{majority agreements}(721) + \text{majority disagreements}(71)}{\text{Total opinions expressed}(978)} \times 100\% = 81.29\%$$

Overall, there was a high level of consensus on the propositions. In round one, 72% ($n = 62$) of the items gained consensus. In round two, 85% ($n = 17$) of items gained consensus agreement as defined by an 80% agreement threshold (Table 3). Items achieving consensus were synthesized to provide the ACDR (Table 4).

Several items did not gain consensus after two rounds of questionnaires. The experts did not believe that the practitioner should record whether 'the problems the

Table 3. Summary of item consensus outcomes

Consensus round one	Consensus round two	No consensus
Accuracy	Legibility	Elements of relevant history
Contributors to dental record	Logical content	Rationale of limited exam
Name, date of birth, address	Other contact details	When to exclude exam findings
Comprehensive exam	Phone number	Instructions to contact
Consent	Medical history	Medical history frequency
Correspondence	Reason for attendance	Presenting complaint for each appointment
Name, quantity and dose of medication	Relevant history	Diagnosis at each appointment
Duration of use, instructions and warnings for medication	Region of limited exam	
Offer to refer	Diagnosis	
Estimates	Clinical treatment details	
All communication	Infection control (batch control identification)	
Computer-aided design and manufacturing and digital files	Form of medication	
Declined treatment	Mode of administration	
Procedures conducted	Copy of prescriptions	
Batch control identification	Off-label prescriptions	
Laboratory communications		
Advice and unusual sequelae		
Inclusions for record keeping resource		
Teaching method for record-keeping resource (e-Learning)		

Table 4. Attributes of the complete dental record

Domains and criteria
General principles
The dental record was made at the time of appointment or as soon thereafter as practical
Entries have been made in chronological order
The date of each appointment and record entry is clearly noted
Entries are accurate (authentic, unaltered description of what occurred)
Dental records are understandable readily by third parties (particularly another dental practitioner)
All comments within the dental record are couched in objective, unemotional language
Any corrections to the dental record have not removed the original information
The treating dental practitioner has not delegated responsibility for the accuracy of medical and dental information
Identification
The records include identifying details of the patient including the full name, date of birth, address and means by which the patient can be contacted
The contact information of the parent or guardian is recorded when needed
The identity of the practitioner providing treatment is clearly documented
The identity of anyone contributing to the dental record is clear
History
A complete and current medical history including any adverse drug reactions is present
There is evidence that the practitioner has prompted the patient to disclose relevant medical information and new findings (including whether there are no changes) have been recorded
The presenting complaint or reason for attendance has been recorded
A relevant history (usually relating to the presenting complaint and/or reason for attendance) is recorded. This should include: • When the patient first became aware of or suspected the condition and any events that corresponded with it starting • What the patient has been experiencing as a result of the condition • If the patient has experienced the condition before and the outcome of prior experiences • The outcomes of any prior diagnostic/management attempts • Any aspects of the medical, dental or social history that could be important in the presentation or management of the condition
Examination
The type of examination performed is clearly documented
If a limited examination was performed, the region to which the examination focused is recorded
Where a limited examination has been conducted, any recommendation for a future comprehensive examination has been noted
Where a comprehensive exam has taken place, the following findings for a comprehensive exam have been recorded: • Extraoral findings (e.g. temporomandibular joint function, opening) • Soft tissue findings (for example, changes to the colour or contour of the oral mucosa) • Dental findings (for example, occlusal relationships, erosion, abrasion, attrition, caries) • Periodontal findings (for example, periodontal screening, probing results, recession, bleeding) • Special tests, photographs or radiographs used during the examination and the results of these (e.g. saliva testing, caries risk assessment and radiographs including recording that findings were normal when this is the case
Diagnosis
A diagnosis is clearly recorded when the patient presents with a specific concern, any condition is observed that varies from normal or any treatment is proposed
If it has not been possible to provide a definitive diagnosis, a differential or provisional diagnosis has been recorded prior to any treatment being provided
Treatment plan
The treatment plans and alternatives considered are clearly documented
If the dental practitioner has offered to refer the patient for treatment, this has been documented
Consent
The following aspects of consent are recorded: • If consent was gained or not • The means by which consent was gained (e.g. verbal, written) • Who provided consent (patient, parent, guardian) • That the oral condition to be addressed has been discussed with the patient (diagnosis) • Proposed treatment and expected benefits • The anticipated fees (if any) discussed • Risks of proposed treatment discussed • Alternative treatment options discussed • Likely outcomes discussed if no treatment is provided
Procedures conducted
The procedures conducted have been recorded: • Topics and warnings discussed prior to treatment • Anaesthetic used (type, volume, route of administration and any patient reactions) • Tooth/teeth treated • Surfaces treated • Materials used (including shades for tooth-coloured restoratives, sizes used for items such as stainless steel crowns)

(continued)

Table 4 continued

Domains and criteria
• Any adverse/unexpected events, how the patient was notified of this and how the issue is to be managed • Medicaments applied or dispensed and any instructions for their use • Post-procedural instructions given • Diagnostic tools to support treatment (e.g. radiographs, caries detection) • Tests for efficacy and results of these (e.g. occlusal tests, radiographs, patient approval of comfort and appearance)
Instrument batch tracking Batch control identification is recorded for all instruments used for high-risk procedures as defined by penetration into sterile tissue, cavity or bloodstream Examples of instruments that typically require batch control include dental forceps, elevators, flap retractors and surgical burs, instruments used in the placement of implants, implantable items including mini-implants, surgical dental handpieces
Medicines/drugs prescribed, administrated or supplied Name of product or medication (preferably generic or approved name) • Quantity • Dose • Medication form (for example, tablet, paste) • Mode of administration (for example, oral, topical) • Duration of use • Instructions provided to the patient or pharmacist • Warnings given to the patient about use of the medication If medication is prescribed or administrated for an 'off-label' use, records should contain additional information to indicate that the patient has been advised that the drug is being used for an indication that is not approved by the Therapeutic Goods Administration ('off-label' use of medication), and has consented to its use (according the outline of recorded consent above)
Advice provided Relevant advice provided to the patient is recorded All instances of communication with the patient should be recorded such as follow up phone calls, patient complaints or reminder letters
Unusual sequelae of treatment If any unusual sequelae of treatment have been noted, this is clearly documented including what information regarding these sequelae was provided to the patient
X rays and other diagnostic data X rays and other diagnostic data such as models have been identified appropriately and maintained as part of the dental record
Other digital information Computer-aided design and manufacturing, and other digital files such as photographs have been identified and stored appropriately as part of the dental record
Communication/correspondence When communicating with colleagues about patient treatment, the following has been recorded: • The patient has consented to communication about their treatment with other health professionals or specific individuals • The date of communication • The mode of communication (e.g. letter, email, phone call) • Copies of all documents exchanged • A summary of all correspondence with or about the patient

patient is experiencing are consistent in nature, fluctuating, increasing or decreasing'. Comments associated with this item clarified that the respondents felt this item was too detailed and was already covered by the consensus to record 'what the patient has been experiencing as a result of the condition'.

Experts agreed that the region to which an examination was limited should be noted, but did not agree that it was necessary to record the rationale for performing a limited examination. Despite strong consensus (N = 12, 92%) that an offer to refer a patient for treatment should be recorded, experts did not agree that instructions given to the patient on how to contact the recommended health professional needs to be recorded. Experts were also asked whether they agreed that some items could be omitted from the dental record if the patient was returning for a course of care such as denture fabrication or root canal treatment. Experts did not reach consensus on whether medical history updates, presenting concerns, diagnosis and examination findings should be recorded when patients return for the next stage of treatment in such circumstances.

DISCUSSION

The aim of this study was to clarify the expected standards for record-keeping in NSW. This research has resulted in a list of 14 domains and associated descriptors, which form the ACDR. Each included item achieved consensus agreement among the experts consulted through the Delphi process.

Although a high level of consensus was expected, there were some interesting controversial elements of

the research when considering the professional expectations of conduct. For instance, there was marked divergence in round one, when different options were proposed regarding the frequency with which a medical history should be updated. The DBA Guidelines[14] state that a completed and current medical history including any adverse drug reactions needs to be recorded and maintained, 'where relevant'. The observation that experts did not initially agree on the terms that define 'where relevant' highlights the challenging nature of using such terms as part of guidelines without further qualification to define these terms or provide examples. This finding reflects broader inconsistency in the recording of medical histories by Australian dentists.[8] Other allied professions such as optometry have detailed clinical guidelines for record keeping that are published by their peak professional association, with adherence regulated by national board policy. Such an approach may be informative for the dental profession.

When an education intervention yields potential consequences for professional registration and therefore public safety, it would seem reasonable that a consolidated expectation for performance is adopted. A possible criticism of the Delphi technique is that by using expert opinions to shape the outcomes, a 'gold standard' may be established rather than a basic threshold. However, by using the existing Guidelines as the foundations of this study, it is assumed that the results are grounded in current general expectations for competent practise. This same grounding makes these results likely to be translatable across different Australian states and territories.

The ability of the Delphi tool to achieve consensus in two rounds across geographically dispersed stakeholder and expert groups supports existing evidence of the efficiency of this approach.[15,16] Furthermore, in the context of self-regulation, a privilege that many of the health professions enjoy, the Delphi process has demonstrated a means by which peer-reviewed standards for remediation can be derived.

Remediation cannot occur without a sound understanding of the desired conduct.[10] The disparities between expert opinions regarding elements of the Guidelines would seem to highlight a need to reconsider the language used in subsequent revisions of the Guidelines to improve clarity for users, or to supplement the DBA Guidelines with additional references. Future guidance to clinicians from the DBA should be informed by the insights of this standard. To date, literature surrounding the teaching of record-keeping practises has been elusive with respect to the criteria used to define sound practise, and how the expected standards have been developed.[17] Such ambiguity raises challenges for training assessors and achieving objectivity in remediation processes.

Unambiguous standards are also required to assess that a practitioner is competent. Frameworks that are open to divergent interpretations place the assessor and assessed in equally vulnerable positions.[18] In its current form, the ACDR provides a reference that can be used to guide record-keeping behaviours to supplement existing Guidelines and clarify the parameters of competence. At present, the ACDR may augment the DBA guidelines, however the DBA Guidelines remain supreme in a regulatory context under the Health Practitioner National Law. This does not prohibit the use of the ACDR to inform the feedback or remediation activities that participants undertake, since enhanced ability for self-assessment may be afforded by clearer expectations. Future work will focus upon the validity of using the ACDR as an assessment tool.

CONCLUSIONS

Expert consensus through use of a Delphi process has provided a consolidated description of expectations for dental record keeping in NSW: the ACDR. Reference to this list will provide dental practitioners with an adjunct resource to supplement the DBA Guidelines on dental records when looking towards practical applications and pragmatic expectations for professional practise. The tool may be applied in a remediation context and will form the foundation of further resources for this purpose.

REFERENCES

1. Holmboe ES. Practice Audit, Medical Record Review, and Chart-Stimulated Recall. In: Holmboe ES, Hawkins RE, eds. Practical Guide to the Evaluation of Clinical Competence, 1st edn. Philadelphia: Mosby Elsevier, 2008:60–62.
2. McAndrew R, Ban J, Playle R. A comparison of computer- and hand-generated clinical dental notes with statutory regulations in record keeping. Eur J Dent Educ 2012;16:e117–e121.
3. Hand JS, Reynolds WE. Dental record documentation in selected ambulatory care facilities. Public Health Rep 1984; 99:583–590.
4. Rios Santos JV, Martin Garcia P, Segura Egea JJ, Fernandez-Palacin A, Bullon Fernandez P. Audit of dental reports (II): first Phase-II study in a Spanish Faculty of Dentistry. Med Oral Patol Oral Cir Bucal 2008;13:E529–E535.
5. Charangowda BK. Dental records: an overview. J Forensic Dent Sci 2010;2:5–10.
6. Holmboe E. Practice Audit, Medical Record Review, and Chart-Stimulated Recall. In: Holmboe E, Hawkins R, eds. Practical Guide to the Evaluation of Clinical Competence. Philadelphia: Mosby Elsevier, 2008:60–74.
7. DCNSW. Annual Report 2013: Dental Council of New South Wales 2013. Available at: http://www.hpca.nsw.gov.au/Dental-Council/Publications/Recent-Publications/default.aspx. Accessed 20 October 2014.
8. Stow L, James H, Richards L. Australian oral health case notes: assessment of forensic relevance and adherence to recording guidelines. Aust Dent J 2016;61:236–243.
9. Brown LF. Inadequate record keeping by dental practitioners. Aust Dent J 2015;60:497–502.

10. Cohen D, Rhydderch M, Cooper I. Managing Remediation. Understanding Medical Education. Chichester, West Sussex: John Wiley & Sons, Ltd, 2013:433–444.
11. Schiller C, Winters M, Hanson H, Ashe M. A framework for stakeholder identification in concept mapping and health research: a novel process and its application to older adult mobility and the built environment. BMC Public Health 2013;13:1–9.
12. Heiko A. Consensus measurement in Delphi studies: review and implications for future quality assurance. Technol Forecast Soc Chang 2012;79:1525–1536.
13. Kapoor P. A Systems Approach to Documentary Maritime Fraud (Dissertation). Plymouth, UK: Plymouth Polytechnic, 1987.
14. DBA. Guidelines on dental records: Dental Board of Australia, 2010. Available at: http://www.dentalboard.gov.au/Codes-Guidelines/Policies-Codes-Guidelines.aspx. Accessed 12 November 2015.
15. de Villiers MR, de Villiers PJ, Kent AP. The Delphi technique in health sciences education research. Med Teach 2005;27:639–643.
16. Palermo C, Conway J, Beck EJ, Dart J, Capra S, Ash S. Methodology for developing competency standards for dietitians in Australia. Nurs Health Sci 2016;18:130–137.
17. Amos KJ, Bearman M, Palermo C. Evidence regarding teaching and assessment of record-keeping skills in training of dental students. J Dent Educ 2015;79:1222–1229.
18. Hauer KE, Ciccone A, Henzel TR, *et al.* Remediation of the deficiencies of physicians across the continuum from medical school to practice: a thematic review of the literature. Acad Med 2009;84:1822–1832.

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