

REPORT OF AN EXPERT WORKING GROUP

DENTAL CARIES INDICATOR DEVELOPMENT

NSW HEALTH DEPARTMENT

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E xecutive summary

NSW Health has a commitment to developing an evidence-based approach to the delivery of services and for improved access to appropriate care that meets the lifestyle needs and working patterns of client groups. A 'health outcomes' approach has changed from a focus on service providers, processes and inputs, to a system also incorporating a focus on outcomes and the community. The underlying principle is that the effectiveness of interventions should be measurable in terms of improving health.

As an integral part of the development of Population Health Indicators, the Oral Health Branch has taken the initiative to review indicators for the most prevalent oral disease, dental caries. A discussion paper based on a wide literature search of available information was prepared within the Oral Health Branch in January 1999. This draft document was sent for peer review throughout Australia to 36 persons. From the comments received it was considered to be a background reference document on dental caries indicators that would be suitable for use by a working group.

An Expert Working Group of 15 persons, mainly from NSW but with some from interstate, was formed in April 1999. At a two-day residential workshop in May 1999 the participants met in plenary sessions and in three smaller working groups to discuss: effective interventions required [especially prevention]; groups at risk for dental caries; outcomes expected; valid indicators; and data collection. The Expert Working Group identified priority groups, interventions and out-comes, and gave priority to appropriate indicators for dental caries.

Interventions for dental caries noted and discussed by the group included: fluorides; diet; plaque control; education; partnership with other agencies; and dental treatment.

Priority groups at risk were classified by: age groups; compromised groups with special needs; demographic groups with limited access to oral health services; community groups with restricted access to dental services; the community as a whole; and institutions.

Out-comes expected were noted as: reduction in dental caries; reduction in treatment needs; and positive changes in behaviour and lifestyle.

Indicators were grouped as process or outcome, and were discussed under the headings of: clinical; demographic; patient history; behaviour; and lifestyle.

Minimal Clinical Indicators for dental caries were determined.

Indicators were noted for associated *demographic and patient information*.

Indicators were noted for associated *behavioural activities and lifestyle*.

The latter *Indicators* noted need further investigation before determining minimal sets.

This project has had input from an Expert Working Group to determine basic indicators for a key oral health disease, dental caries. The outcome will facilitate the use of evidence based indicators to improve the process and the outcome of care provided for patients in NSW.

The NSW initiative in determining suitable oral health indicators for dental caries will be of value when indicators are considered at a national level. The findings of the group should assist in promoting standardisation of indicators and analysis of data, setting of minimum service targets and monitoring national oral health goals through the maintenance of a national data collection and evaluation centre.

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Abbreviations

Abbreviations in relation to oral health	
Deciduous dentition	primary (baby) teeth (t)
Permanent dentition	adult teeth (T)
Exfoliate	to naturally lose a deciduous tooth
Dentate	having at least one natural tooth
Edentulous	having no teeth
d or dt	decayed teeth (deciduous teeth)
D or DT	decayed teeth (permanent teeth)
f/F or ft/FT	filled teeth (deciduous/permanent)
m/M or mt/MT	teeth missing due to caries (deciduous/permanent)
s/S or st/ST	sound teeth (deciduous/permanent)
i/I or it/IT	teeth indicated for extraction due to caries (deciduous/permanent)
dfs	decayed or filled surfaces (deciduous teeth)
DFS	decayed or filled surfaces (permanent teeth)
dmfs	decayed, missing or filled surfaces (deciduous teeth)
DMFS	decayed, missing or filled surfaces (permanent teeth)
dmf or dmft	decayed, missing, or filled deciduous teeth
DMF or DMFT	decayed, missing, or filled permanent teeth
dimf or dimft	decayed, indicated for extraction, missing, or filled deciduous teeth
DIMF or DIMFT	decayed, indicated for extraction, missing, or filled permanent teeth
Caries free	deciduous dentition – dmft score = 0
Caries free	permanent dentition – DMFT score = 0
ART	atraumatic restorative technique
GAs	general anaesthetics
POC	primary oral care

Abbreviations of departments, institutions and other related topics and systems	
ABS	Australian Bureau of Statistics
ADA	Australian Dental Association
AHMAC	Australian Health Ministers Advisory Council
AHS	Australian Health Surveys
AIHW	Australian Institute of Health and Welfare
CDHP	Commonwealth Dental Health Program
CDHS	Child Dental Health Survey [DSRU]
DMIS	Dental Management Information System [DSRU]
DSRU	Dental Statistics and Research Unit [AIHW located in Univ Adelaide]
HOIST	Health Outcomes Information Systems Toolkit [NSW]
NDTIS	National Dental Telephone Interview Survey [DSRU]
NESB	Non English Speaking Background
NHMRC	National Health and Medical Research Council [Australia]
NOHSA	National Oral Health Survey of Australia
OHE or DHE	Oral Health Education
SOKS	Save Our Kids Smiles [NSW]
SES	Socioeconomic status
WHO	World Health Organisation

Introduction

In New South Wales (NSW) interventions to prevent dental caries have included: the introduction of water fluoridation; fluoride exposure in the form of toothpaste and topical fluoride treatments; better diet; diet education; improved personal oral hygiene; increase in regular dental care; improved dental technology and treatment options such as sealants. The oral health status of the population has improved with a decline in dental caries in children and a decrease in the number of edentulous adults. Valid indicators are needed to measure the outcome benefits to the community of the different interventions.

In Australia the cost for dental services in 1993–94 was estimated to be \$1.8 billion, which accounted for almost 6% of the total health budget. Costs were about \$500 million in NSW. There are limitations in estimating costs for oral disease because community and public health programs are not yet included in the estimates of disease costs due to the difficulties in obtaining comprehensive data. The indirect costs of oral disease can include the economic value society places on people not in the labour force, pain and suffering. In the *1995 Australian National Health Survey*, oral disease was the sixth most reported recent illness with more than one million persons visiting a dentist in the two weeks prior to the survey.

NSW Health has a commitment to developing an evidence-based approach to the delivery of services, *Strategic Directions for Health, 1998–2003*, and for improved access to appropriate care that meets the lifestyle needs and working patterns of client groups. The underlying principle is that the effectiveness of interventions should be measurable in terms of improving health. A *health outcomes* approach has changed from a focus on service providers and inputs, to a system also incorporating a focus on outcomes and the community.

As an integral part of the development of *Population Health Indicators*, the Oral Health Branch has taken the initiative to review indicators for dental caries, which is the most prevalent oral disease. A discussion paper based on an extensive literature search and available information was completed within the Oral Health Branch in January 1999 and is a separate publication. Some definitions of indicator terms from that discussion paper are presented in Appendix 1.

The central purpose of the discussion paper was to outline a process for identifying a set of core oral health indicators for dental caries that will help oral health professionals promote and improve the oral health of people in NSW. The discussion paper was prepared as a background resource document for an expert working group that was formed to identify indicators for dental caries.

A number of factors have driven the development of these indicators. In NSW the provision of oral health services is being affected by:

- demographic changes
- resource allocations
- movement towards an evidence-based approach.

NSW Health has a commitment to addressing issues of *equity and access*, in particular:

- improving access to rural and remote locations
 - providing a health service that meets the lifestyle needs and working patterns of people in the community
 - increasing awareness of cultural and health needs of Aboriginal and Torres Strait Islander people and those of non-English speaking backgrounds.
- [LOTE]

As a result, the indicator development process has focussed on identifying determinants of risk to locate those amongst the population most at risk of developing dental caries from risk groups, risk behaviours and risk factors. This project will use a model developed by the Population Health Indicators Unit, which piloted melanoma as a disease model.

In 1996, The Australian Health Ministers' Advisory Council [AHMAC] endorsed the recommendations of the National Health Information Management Group [NHIMG] to focus on improving health outcomes within a defined framework. The Oral Health Branch initiative is consistent with these developments and with recommendations from the *1998 Senate Community Affairs Committee Report on Public Dental Services* which suggest the setting of minimum service targets and monitoring national oral health goals through the maintenance of a *national data collection and evaluation centre*.

This indicator development initiative seeks to *identify factors that contribute most to the burden of oral disease in the community*. Indicators and outcomes will be used to develop more effective policy and strategies. This, in turn, will assist Area Health Services to provide more effective outcome based clinical services. If, over time, the burden of disease requiring clinical services can be significantly reduced this would enable better use of resources. It will involve a collaborative process with experts in different aspects of oral health, and build on work already undertaken in oral health surveillance.

The expected outcomes are as follows:

- promotion of systematic identification of oral health indicators through the use of a health outcome framework (including information on the level of development of existing indicators, and issues where indicators are lacking and require research).
- facilitation of comparisons of indicator data by promoting standardisation of indicators and analysis.
- improved capacity of Area Health Services to monitor their health improvement activities in a standardised manner in the longer term.
- in the longer term, facilitate service specifications across Area Health Services, with a view to maintaining and improving performance.

Project objectives:

The population health indicator development project will:

- complete a discussion paper for peer review based on a wide literature critique of available information and from consultation with experts.
- define age and health continuum for relevant risk groups.
- identify source of data items required for each indicator.
- identify determinants of risk for risk groups, risk factors and risk behaviours.
- circulate the paper for reference to experts nominated as working group members.
- complete a report identifying relevant indicators to measure oral health outcomes.

2

Background discussion

The discussion paper is based on a wide literature search of available information and was completed within the Oral Health Branch by M Osborn in January 1999. The purpose of the discussion paper was to outline a process for identifying a set of core oral health indicators for dental caries that will help oral health professionals promote and improve the oral health of people in NSW. This document has been published as a separate document and gives a detailed review covering background; introduction; the indicator process; monitoring oral health in NSW; monitoring dental caries; determinants of risk for risk groups, risk behaviours and risk factors and has an extensive list of references.

Some text and tables from the document have been incorporated into the body of this report.

An extensive literature search was conducted and where possible relevant evidence was obtained for New South Wales. Where this was not available Australian or overseas data was used. A *determinants of risk framework* was suggested to locate those most at risk of developing dental caries from: risk groups; risk behaviours and risk factors. Perceived oral health status was also considered. It was found that many factors influence perceptions of risk and the value of risk reduction could be conveyed through an education program. Perceived, not objective, risk explains readiness to change oral health behaviours such as eating cariogenic snack foods, or using fluoride toothpaste.

The process of indicator development for oral health should focus on *identifying determinants of risk amongst the population*. Within particular age groups a set of measurable indicators will be identified to recognise inequities in oral disease and in quality of life. Indicator development will begin with the identification of process and outcome indicators, followed by an assessment of their validity and reliability and the feasibility of collecting data for each indicator across various oral clinical settings and population settings. Data available for each indicator is

placed in order with NSW first, Australia next and then internationally. It was anticipated that the discussion paper would be used as a resource document for an expert working group that would be formed to identify indicators for dental caries.

The document was first sent to 36 persons in Australia for *peer review*.

The terms of reference for review of draft background document were to:

- comment on the **process** proposed
- list major **deficiencies and inaccuracies** in the document
- comment on the **content and format**
- comment on **future directions**.

Comments received indicated general approval of the approach being taken by the Oral Health Branch and that the ‘excellent’ document was a *useful information and extensive reference source, which could be used as a background document for a Working Group*.

Some negative comments made on the document itself were: “need to be more focussed; needs editing; needs extra bibliography; should not be needed by ‘experts’; need to be briefer; need to tighten up; too repetitive; need to be more logical and organised; misses risk factors; should consider risk groups and risk factors together; too medline dependent; needs better referencing system; need conclusions; need document editing”.

Other comments included: “need more local manuals and input; need details of indices already used in Australia; concentrate on risk groups; need for positive outcome; need for positive action; need for simple and concise approach; need to proceed and implement.”

3

Working group – formation

The majority of the working group had been initially approached [4 March 1999] by the Oral Health Branch for comment on the background [discussion] document and for comment on the NSW Oral Health Branch initiative.

An invitation to join an Expert Working Group on Dental Caries Indicator Development was sent to a representative group from health departments, universities and other organisations on 31 March. The letter indicated: that they would be members of a small, but select, working group; that the project was an integral part of the development of population health indices in NSW and that the Working Group would consider and report on indicators for dental caries.

This small Expert Working Group of 15 persons was confirmed. A further letter was sent on 19 April requesting comment on the provisional agenda and materials that would be available to participants for the workshop. The workshop format was sent out to the Expert Working Group on 4 May.

Working group – agenda

The agenda proposed for the working group was to:

Review materials on:

- interventions
- risk groups
- indices – process, outcome
- data collection needs.

Identify effectiveness of:

- interventions
- best indices for interventions.

Set priorities for:

- interventions and risk groups
- most appropriate indices.

Determine a:

- minimal set of practical and cost effective indicators.

Workshop - format

Residential workshop

Period

- a two day workshop
- 20-21 May 1999

Venue

- out of Sydney to gain maximum participant input
- accessible to participants from NSW and interstate
- with good conference facilities, good environment
- the venue chosen was Novotel, North Beach, Wollongong

Structure

- discussion of background documents
- plenary sessions to assign topics
- small working groups on assigned topics – ensure a balance of persons in these working groups
- small working groups reporting to plenary sessions
- nominal group technique used for topic assignment and discussions
- plenary session discussion of reports – major headings and clarification
- plenary session assignment of priorities

Reporting

- decisions to be made on final report format
- decisions to be made on final report content
- draft report of the Working Group is to be prepared by PD Barnard
- the draft report[s] to be circulated to the Working Group for amendment
- there may be a need for some other follow-up with the group
- final report of the Working Group to be submitted in August/September 1999

Time schedule		Thursday 20 May 1999	
0900		Coffee and tea – Continuous refreshments and morning tea	
0930-1015		Opening Session <ul style="list-style-type: none"> • objectives for working group; need for data collection and indicators • reporting of outcome information • workshop objectives; participant expectations • background document; workshop groups 	
1015-1230		Working Groups 1 – Plenary 1 <ul style="list-style-type: none"> • effective interventions / expected outcomes • groups at risk 	
1230-1330		Lunch – Continuous refreshments and afternoon tea	
1330-1530		Working Groups 2 – Plenary 2 <ul style="list-style-type: none"> • valid indicators 	
1530-1800		Working Groups 3 – Plenary 3 <ul style="list-style-type: none"> • appropriate interventions for risk groups • indicators to measure expected outcomes of interventions 	
1900-1130		Pre-dinner drinks and dinner	
Time schedule		Friday 21 May 1999	
0700		Breakfast – Continuous refreshments and morning tea	
0800-0900		Plenary 3 [continued] <ul style="list-style-type: none"> • priority ranking of interventions and their indicators 	
0900-1100		Working Groups 4 – Plenary 4 <ul style="list-style-type: none"> • available data collection resources • data collection resources required • minimum set of indicators [Plenary 4] 	
1100-1200		Working Groups 5 <ul style="list-style-type: none"> • practicality, benefits and costs of minimum indicator set 	
1200-1300		Lunch - Continuous refreshments and afternoon tea	
1300-1400		Plenary 5 <ul style="list-style-type: none"> • practicality, benefits and costs of minimum set • confirm priorities of proposed indicators of oral health outcomes [Plenary 5] 	
1400-1445		Closing Session <ul style="list-style-type: none"> • future activities • structure of draft report • final report validation • evaluation of workshop 	

4

Opening session

Dr Alan Patterson, Chief Dental Officer, Oral Health Branch extended a welcome to the working group. He noted the contribution of M. Osborn in preparing the background discussion document and of PD. Barnard in acting as project director. He stressed the need for data collection and indicators, went through the objectives for the working group and discussed the relevance of the project to the Oral Health Branch.

Dr Patterson talked of the changing and exciting times for public health dentistry and set out a brief indication of *future directions for public health dentistry*. The present project is not only a NSW Health exercise, but seeks to promote a broader health issues focus. A joint approach is the way to move forward for public health dentistry as it has failed to align itself with mainstream thinking in public health, which has moved towards a focus on *health outcomes, based around indicator development*. There is a need for a more informed focus on research. The Centre for Research and Clinical Policy funding is a testament to NSW Health focus on streamlining health care. The business plan of the Oral Health Branch has incorporated this initial project concerning indicators for dental caries. This project should be followed up for periodontal disease and then move forward to other oral diseases and conditions.

Ms Helen Moore of the **Epidemiology and Surveillance Branch** within NSW Health was unable to attend this opening session of the workshop but her paper, on *'reporting of health status indicators and health outcome information'*, was presented by Dr Patterson. Notes of the presentation were given to participants along with the latest Report of the NSW Chief Health Officer. *Appropriate indicators record and present health outcomes clearly and promotion of health outcomes will be enhanced through indicators for dental caries.*

Standardised indicators using AHS specifications will also enhance performance indicators. *A NSW Health project on melanoma indicators was taken as a model for this workshop.* The methods employed in that study; issues set out; determinants; key factors; interventions that make a difference; measurement of interventions; what data is required; data sources; classification systems and the priority setting process were covered.

Associate Professor Peter Barnard determined that the working group did not see a need to vary the workshop objectives. He asked participants to introduce themselves and *give their personal expectations of the workshop* – these were mainly to contribute their experience and expertise, learn what others were doing and thinking in the areas of indicators, and to discuss wider issues with their colleagues. Professor Barnard then discussed *the review of the basic background document*. He introduced the group to the background literature; documents and reprints available for *reference at the workshop*; outlined the proposed *schedule for working and plenary sessions* and divided participants into diverse smaller working groups. The available information concentrates on intervention and oral health outcomes, and indicators for dental caries are only a way of measuring these outcomes. The workshop participants were expected to come up with *indicators that are validated, but simple and easy to use*. An informal environment and flexible schedule with good communication and expression of opinions was requested.

5

Interventions & outcomes

Methods used for identifying and evaluating evidence-based prevention and treatment for interventions for dental caries have been described in the discussion document. These methods look at the use of randomised controlled trials; controlled trials without randomisation; cohort studies and case-control studies and expert opinion. Levels of evidence were classified using the rating system adapted from the US Preventive Services Task Force (1989) which contains levels of evidence based on study type with a statement of study quality based on the terms ‘properly-designed’ or ‘well-designed’. The definitions of strength and of grading of recommendation originated from the US Agency for Health Care Policy and Research. (Appendix 2)

Effective interventions and expected outcomes as noted by the working group are summarised in Table 1 and Table 2.

Prevention levels

The Workshop subgroups chose to include *three levels of prevention* of dental caries:

1. **Primary** community based, public health, education, by dentist, by individual
2. **Secondary** through early intervention, risk assessment, diagnosis, prevention
3. **Tertiary** through restoration and rehabilitation [maintenance]

The workshop also felt there was a need to expand the concepts of primary, secondary, and tertiary prevention to include interventions that needed *partnerships with other organisations* eg. local government, Institute of Sport, schools, nutrition groups and the incorporation of dentistry into, or as an add on to, other health initiatives. The importance of AHMAC was stressed, as in the National Oral Health Priority Area the approach recommended to the Commonwealth may flow over into the States and Territories.

Intervention outcomes

The principal outcomes of interventions that were considered can be summarised as:

- prevention of dental caries initiation
- reversal / re-mineralisation or arrest of early initial dental caries
- prevention, arrest or restoration of clinical cavitation dental caries
- reduction in number of teeth and teeth surfaces affected by dental caries
- increase in number of sound teeth or teeth retained
- reduction in tooth extraction
- reduction in need for endodontic treatment
- reduction in number of edentulous persons;
- reduction in need for prosthetic appliances such as full dentures
- reduction in effects of dental caries on pulp/ pain / infection / cellulitis / osteomyelitis.

Also considered were outcomes, *which related to improvement* in:

- function [increase in functional dentitions]
- appearance
- social acceptability.

Many factors influence *perceptions of risk and value of risk reduction* as presented in oral health education programs. Perceived, rather than objective, risk explains readiness to change oral health behaviours of individuals and groups. It was accepted by participants that *education would be aimed at changing perceptions and changing behaviour* so that preventive actions would be taken by individuals or, for some measures, by the community or other organisations or institutions.

Fluorides	Diet
Water fluoridation Fluoride tooth paste <ul style="list-style-type: none"> • children's • regular • high fluoride content Fluoride topical applications	Infant feeding Ante-natal education Tuck shop reform Diet modification Sugar substitutes Food labelling
Plaque control	Education
Altered rinsing behaviour Flossing Interdental brushes /sticks Toothbrushing [smooth surface] Fluoride toothpaste Anti-microbials Immunisation	Oral health education <ul style="list-style-type: none"> • one-to-one, group Oral health promotion for <ul style="list-style-type: none"> • change in motivation / perception Education of carers
Need for partnerships	Dental treatment
Government, local government, other health bodies, community groups, consumer groups general practitioners, pharmacies nutritional guidelines, diabetics nursing mothers, breast feeding, parenting skills Heart Foundation, Australian Institute of Sport Australian Health Ministers Advisory Council [AHMAC], National Health Priorities	Restorative dentistry Early diagnosis Early intervention Minimal intervention Preventive Fluorides, sealants Oral stabilisation / rehabilitation Continuing education of dentists Improved access to dental services Incentives in insurance plans

Table 1. Interventions considered effective

Interventions	Outcomes
Initial caries	Prevention; re-mineralisation; arrest
Dental caries <ul style="list-style-type: none"> • clinical cavitation • recurrent 	Prevention; arrest; restoration; increase sound teeth; decrease extraction; decrease pulp therapy; decrease tooth replacement
Dental caries effects	Improve function; decrease edentulous; improve aesthetics; reduce pain; reduce infection

Table 2. Expected outcomes of interventions

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Groups at risk

Workshop participants considered and noted differences by age in the level of dental caries and the differences in preventive and treatment needs. They considered groups at higher risk of dental caries to be due to their physical, mental, medical, demographic or social status.

Risk assessment also involves individual factors that may affect the carious process and the discussion document identifies individuals and groups at highest risk for dental caries development and summarises available evidence for factors with a predictive value for dental caries. Some factors may be altered by *individual behaviour* or by *professional interventions* such as: oral health education; fluoride treatments; home-fluoride rinsing programs; and application of pit and fissure sealants.

Determinants of risk associated with oral health are interrelated to other diseases such as diabetes, heart disease, cancer and injury. Environmental and social factors, as well as individual perception and behaviour can influence factors determining a person's risk of oral disease. Socioeconomic status, occupation, and life style behaviours impact on a person's health and well being. Gender, geographic location, and cultural differences, as well as other factors, all contribute to population differences in patterns of oral disease and treatment. Risk groups identified by workshop participants are shown in Table 3.

Determinants of dental caries have utility in explaining the variation in the population, but have little predictive value in assessing dental caries risk in individuals.

Age groups – considered some factors are age specific	Compromised groups with special needs
0-4 years School aged – infant & primary 5-12 School aged – secondary 13-18 Adolescents / young adults Adults Older adults	People with disabilities Groups requiring GAs Drug users Medically compromised Children with special needs Home bound
Demographic groups – with limited access to dental services	Community groups – with restricted access to dental services
Geographic regions / isolated areas Aboriginal TSI Indigenous urban / indigenous rural Cultural / religious / ethnic NESB / LOTE Refugee	Low SES Low education Low income Unemployed Rural / remote
Communities with	Institutions
Low exposure to fluoridation / fluorides Lack of primary preventive measures for all groups Limited access for all groups	Special schools Psychiatric institutions Correction institutions Nursing homes

Table 3. Risk groups identified

7 Indicators

Outcome indicators [either health or other final outcomes], risk indicators [determinants of the outcome] or process indicators [measures of success in implementing an intervention] were considered by workshop participants.

The working groups used initial classifications of *clinical, behavioural, and demographic [later expanded]* to put forward indicators, which they had previously used or considered would be useful. It was noted that

not all of these *indicators identified* in Table 4 could be considered as valid according to the terms defined earlier. The workshop participants considered this listing and determined which valid indicators they would *consider essential or with high priority* for use. These are shown on Table 5 after the subgroups had indicated their rankings of 1,2,3 or nil for usefulness and had then agreed to the value of an absolute *minimal set of indicators* that are needed. This set has been summarised in Table 6.

Clinical – outcome	Demographic – risk
Edentulous % Caries free % <ul style="list-style-type: none"> • Permanent, deciduous, both dentitions Past caries experience <ul style="list-style-type: none"> • DMFT / DMFS – dmft / dfs DMFT components <ul style="list-style-type: none"> • DT, MT FT Teeth indicated for extraction <ul style="list-style-type: none"> • IT, it Conservative treatment need <ul style="list-style-type: none"> • DT, dt, DT/DMFT, dt/dmft or /dft Prosthetic treatment – status and needs <ul style="list-style-type: none"> • Partial denture • Full dentures – F/F OHIP Reduction in GAs	Gender Age Aboriginality Country of birth SES measures <ul style="list-style-type: none"> • Education • Income Household structure Family size and structure Local area characteristics <ul style="list-style-type: none"> • postcodes, education, income, rural, remote Home ownership / material ownership
Patient history – risk	Lifestyle – risk and/or outcome
Biological measures [bacterial based, saliva] Plaque accumulation Fluoride history Systemic / medical conditions Medications used Substance use / abuse [drugs, alcohol, tobacco]	Satisfaction survey <ul style="list-style-type: none"> • Quality of life issues • Patient expectations Satisfaction with clinical care Parental influence / primary carer Family / culture profile Level of knowledge Perceptions of dentists Perceptions of procedures
Behaviour – risk and/or outcome	Process
Frequency of attendance at dental clinics Type of treatment sought Frequency of tooth-paste application Patterns of food intake Compliance with instructions Process	% achievement of goals % satisfied with care

Table 4. Indicators identified

Ranking	Indicator	Agreement
1,1,1	Edentulous %	y-y-y
1,1,1	% caries free	y-y-y
1,1,1	Caries experience [range of DMF components]	y-y-y
1,1,1	DMFT / DMFS	y-y-y
- - -	Teeth health index	-
1,2,1	Oral Health Impact Profile	y-y-y
1,1,2	GA ¹ separations	y-y-y
- - -	Children with special needs	-
- - -	Systemic / medical	-
- - -	Erosion	-
2,2,-	Satisfaction surveys - quality of life issues; patient expectations	y-y-y
2,2,-	Satisfaction with clinical care	y-y-y
- 3 -	Biological measures (bacterial based, saliva)	n-n-n
3,3,-	Plaque accumulation	n-n-n
3, -, -	Parental influence / primary carer	y-n-n
2, 1,2	Regularity of care	y-y-y
- , 1,2	Frequency of tooth paste application	n-y-n
3,2,2	Patterns of food intake	n-n-n
- - -	Substance use / abuse	-
3, -, -	Compliance with oral health advice	n-n-n
1,1,1	Age	y-y-y
1,1,1	Sex	y-y-y
1,1,1	Aboriginality	y-y-y
1,1,1	Country of birth	y-y-y
1,1,1	SES - Concession card status (dependents)	y-y-y
1,1,2	SES - Education	y / n
1, -, 2	SES - Income	y-n-n
1,1,1	SES - Employment status	n-n-n
1,3,3	Household structure	?-n-n
1,1,1	Fluoride history	y-y-y
1, -, -	SES - Home ownership / material ownership	n-n-n
1,1,1	SES - Local area characteristics (post codes)	y-y-y
2,2,3	% sales oral hygiene products	n-n-n
1,1,1	Language spoken at home	y-y-y
1,1,1	Activity indicators – oral health behaviour, utilisation	y-y-y

Table 5. Ranking of some valid indicators

Clinical	% edentulous; caries free; with caries experience; DMFT; DMFS; components of DMFT and DMFS Oral Health Impact Profile [OHIP] GA separations [GAs]
Demographic	Age; sex; aboriginality; country of birth; concession card status; educational level; language at home; Post-code local area characteristics; Fluoride history
Behavioural	Regularity of oral health care; satisfaction with clinical care; Patient expectations; quality of life issues; activity

Table 6. Minimal indicators needed

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Interventions and indicators

At the third subgroup and plenary sessions, participants were asked to take:

- *appropriate interventions for risk groups*
- *indicators to measure expected outcomes of interventions*

and then:

- *determine priority ranking of interventions and their indicators*

The next summary table gives an indication of *risk groups [with their problem], intervention suggested, and indicator(s) which could be used to measure the process and / or outcome of the intervention.*

The participants considered that the information given on Table 7 should not be considered as a strategic business plan for oral health service activities but rather a listing of examples of interventions for various risk groups. The types of indicators that members of the working group would use to measure the success of interventions and/or expected oral health outcome(s) were determined at plenary session.

Workshop participants did not have the time, nor did they feel it was their major responsibility, to determine priority ranking for all of these interventions and risk groups. The opinion of the working group was that their major attention should be directed towards the indicators.

Target group	Problem/objective	Intervention	Indicators - process	Indicators - outcome
Community non-fluoride	No fluoridated water	Water authority F plants	Number of plants % persons covered	{ Decrease treatment need { Decrease dental caries
Age groups 0-4 years [0-5]	Early childhood caries	Education via pharmacies	% with pharmacy contact	{ Decrease treatment need
	Infant feeding knowledge	Ante-natal dental advice	% ante-natal with advice	{ Decrease dental caries
	Inappropriate feeding	Change infant feeding pattern	% with appropriate feeding	Decrease % GAs separations
	Early caries	Label dummies & bottles Examine at eruption times Product labelling	% pharmacy compliance % with dental visits % compliance	Increase in sales warnings
	Low parent education	Post-natal dental advice	% parents reached	Change in behaviour
	New parent education	Education of parents		Improved parent oral health
	Fluorosis	Use children's tooth paste Incentive from Health Dept	% using toothpaste	Decrease in fluorosis
5-12 years school aged [6-12]	Early caries	Alter tooth-paste use Rinsing after eating Tuck shop reform Fissure sealants [6s & 7s]	% reporting % reporting % schools compliance Increase in fissure sealants	{ Decrease treatment need { Decrease dental caries { Increase % caries free { Decrease in fillings [FT]
	Knowledge & behaviour [especially prevention]	Education through schools Parent education	Change in child & parent oral health/ behaviour	Decrease child need & caries
	Some limited access to care	Increase access to care	% at risk classification	Decrease Code 2 waiting list
	Lack of early intervention	Increase early intervention		Decrease child need & caries
	High previous caries	Cavity modification – ART		Increase % caries free
	Preventive care not targeted	Minimal intervention Education of dental staff CED		

Table 7. Interventions and indicators

Target group	Problem/objective	Intervention	Indicators - process	Indicators - outcome
13-18 years secondary school	Need for more self care behaviour	Education through physical education programs Media education [eg Colgate health promotion] Use of image to promote oral care	Increase in sales of products Increase niche products Increase in media education	
Adolescents	Lower access to dental care	Diversify access points for assessment, education, marketing image and oral care	Change image Sales of products	Maintain % caries free
	Fall off in attendance	Incentives for attendance Strategies / incentives for private/public care	No of assessment per year % attendance	Decrease treatment need Decrease episodic care
	Poor oral health habits Poor oral hygiene	Increase assessments Change flossing activity	% flossing % toothbrush sales	Decrease inter-proximal bleeding, caries
Post-secondary to early 20s [Teenage and young adults]	Poor oral health	Incentives for access to care		Decrease treatment need
	Low follow up of school treatment	Increase continuation of dental care	% attendance	
Young adults	Caries	Maintaining access to care – extension of recall programs	Change visiting behaviour Service mix	Oral quality of life Tooth Health Index Less DT, lower D/DMFT
At risk adults	Oral health promotion Xerostoma/caries	Targeting information to [and through] patient programs, medical practitioners, pharmacies, other institutions and groups	% institutions / chainstores / pharmacies which have stocks of information	Decrease treatment need
Partially edentulous	Inability to maintain oral health	To see oral assessment as an important part of ACAP	% of oral assessment as part of ACAP	Reduced need for restoration intervention Less pain Increase quality of life
Older adults	Lack of oral care Oral neglect	Access to oral health services Nursing home strategies	Increase in attendance Increase nursing home programs	Decrease in edentulous Decrease treatment need Improve resident oral health

Table 7. Interventions and indicators

Community	Problem/objective	Intervention	Indicators - process	Indicators - outcome
Unemployed	High need for acute care High episodic care	Improve access to dental services	Reduction in number accessing emergency care	Decrease treatment need Decrease episodic dental care Decrease dental caries
Low SES	Higher caries experience	Early identification through improved access to risk assessment programs	% increase seeking care	Decrease treatment need Decrease episodic dental care Decrease dental caries
Low SES households	Low use of fluoride tooth-paste	Mailbox drops in SES areas Information programs	Participation rate	% within the scheme after 12 months
Working poor	Poor access to dental services Lower oral health status	Improve access to scheme such as co-payments, insurance incentives Increase access	% increase in access	Improved oral health status Decrease treatment need Decrease episodic dental care Decrease dental caries
Demographic	Problem/objective	Intervention	Indicators - process	Indicators - outcome
Aboriginal / TSI	Failure to access care	Community consultation for culturally appropriate access	% increase in access	Decrease treatment need Decrease episodic dental care
	Lower fluoride use	Incentives for access Oral health information Distribute toothbrush / paste	Incentives offered % toothbrush % F tooth-paste	Decrease dental caries % D/DMFT
Specific cultural groups	High caries Failure to access care in time More episodic care	Staff awareness and training Oral health education for groups	% staff trained Increase access	Reduction in GAs Decrease treatment need Decrease episodic dental care
Some ethnic groups	Low access to services	Create partnerships with ethnic community	Improve attendance rate More regular attendance Change service mix	Decrease treatment need Decrease episodic dental care Decrease dental caries
NESB / LOTE Refugees	Oral neglect	Improving availability of oral care language messages	Improve attendance rate No. of stabilised cases	Decrease treatment need Decrease episodic dental care
Rural / remote adults	Poor life skills Poor oral health behaviour	Oral health instruction Home contact Stabilisation	Persons with >20 teeth Plaque scores	Completion of treatment Reduce plaque scores

Table 7. Interventions and indicators

Compromised	Problem/objective	Intervention	Indicators – process	Indicators – outcome
Children with medical needs [medically compromised]	Medications with high sugar & high pH	Reduction sugar based medicines Lobby drug manufacturers GP promotion	Change by manufacturers Change in prescribing pattern	Decrease treatment need Decrease dental caries
Adolescents with problems Homeless youth Drug abuse	Low access to dental care	Strategies / incentives for private/public care	% attendance Increase in programs	Decrease treatment need Decrease dental caries
Homeless youth /drug users	Oral health problems Lack of education Awareness of access to care	Dental education programs through mentor programs Specialist OHE to groups	Increase in programs Increase in accessing care	Decrease treatment need Decrease dental caries
Patient receiving radiotherapy treatment [head & neck]	Caries increase	Oral health aspects included in education Diagnosis to include dental	% of patient having oral care incorporated in care program	Decrease treatment need Decrease dental caries Increase quality of life
People with disabilities	High need for dental care (secondary)	Improve access	Decrease in episodic care Increase in dental care	Decrease treatment need Decrease dental caries
People with disabilities	Failure to access dental care	Cross program collaboration Cross program arrangements	Increased access Increased screening	Increased disabled separation both in house and GAs Increase FT/DMFT
Home-bound aged	Coronal / root caries	Early intervention and advice Use high fluoride toothpaste, Education community groups Education of carers	% frequency of application of F toothpaste % groups educated % staff trained	Decrease root caries
Institutions	Problem/objective	Intervention	Indicators – process	Indicators – outcome
People with mental/physical disabilities in community institutions / facilities/boarding	Lack of correct information to carers Lack of clinical access Poor oral health on entry	Teams of specialist educators to provide oral health education to carers Screen residents within 3 months	% clients on oral care programs % institutions [teams] with information in programs Improved diets Improved prevention	Decrease treatment Decrease dental caries Decrease episodic care Improve function
Special schools	Inappropriate diet High caries	Education of kitchen staff Education of carers	Improvement in diet Diet analysis	Decrease treatment need Decrease dental caries
Policy & planning	Problem/objective	Intervention	Indicators – process	Indicators – outcome
Health Ministers	Lack of National Policy	AHMA Council Lobbying by dental profession	Recognition of public dentistry in the system	Increase \$ to community for dental services Commonwealth DHP
Health planners	Oral health into strategic planning process Link oral health with systemic health Lack of oral health indicators	Lobbying Developing issues papers Use public health bulletins Define indicators	Inclusion of oral health in mainstream health policy Recognise links between oral and systemic health Availability of indicators	Improvement in oral health services Improve oral health reporting

Table 7. Interventions and indicators



Data collection

Workshop participants at the next two sessions considered the *available data collection resources*, and those *required to record indicators*. They then discussed a minimum set of indicators bearing in mind the resources that would be required to collect appropriate data.

The current data, and data sources, available in NSW and at a national level were noted in the background discussion document and are summarised and up-dated in this section. Copies of some data collection forms are included in Appendix 3.

NSW data

In NSW there are some data collection facilities for school children assessed and treated by government services. Any surveillance data for adults relates only to those who use the adult public oral health services (18%), compared with the majority (81%) who use private oral health services. However, on closer inspection it would appear that there are very limited aggregated NSW state data for adults for oral health status and treatment needs. There is adult data on service mix (treatment provided) at local level. For children there is data available on oral health assessment (SOKS) and treatment or service mix for those attending public clinics (DMIS – treatment provided). There has been some sampling of children records and aggregation of oral health status and treatment needs by the AIHW Child Dental Health Survey (more recent data is from SOKS not all complete clinical – some with categories of treatment need).

Dental Management Information System (DMIS)

DMIS was implemented in NSW government services in January 1991. This system was modelled on that of the South Australian Dental Service and used scanned data collection forms for children and adults.

- The system provided for data on (a) – mix of treatment services provided for children and adults and (b) – oral health status clinical examination for

a sample of children. This system was used for children for clinical examinations until 1 January 1996 when it was replaced by SOKS assessments

- *The School Dental Service Operator Daybook* was replaced by SOKS Clinical Services – Dental Therapists / Dentist records on 1 October 1997. DMIS for children was decommissioned in August 1999.
- The DMIS system as used for adults was replaced by MCLIN from 1995 to 1996. The MCLIN software system has been retained by most areas and clinics in NSW.

The DMIS had as its objectives:

- to measure equitable access to services
- to focus on oral health promotion activities
- to facilitate the introduction and implementation of quality assurance programs.

The data set provides information on the following:

- oral health status for children and adults
- identification of ‘high risk’ target groups
- performance indicators
- epidemiological surveys.

Micro Computer Clinical System (MCLIN)

MCLIN was set up in 1995 as a software program used by DSRU to collect data for the Commonwealth Dental Health Program (CDHP), which was withdrawn in 1997. Data is recorded on forms suitable for scanning onto a database.

An inhouse version of MCLIN for government services replaced DMIS in NSW during this period 1995-1997.

From 1997 MCLIN continued to be used to collect inhouse data from government clinics (not private practice) in most Area Health Services in NSW. (# other systems)

The data recorded is for treatment provided [service mix]. The data does not include oral health status and treatment need, but it can be used to collect data on *treatments provided* using ADA items of service classifications. *The system is used to:*

- validate patient applications for oral health services
- issue authorised oral health service orders
- record the confirmation of services provided.

The information collected is used to:

- generate claims for payment of service
- report dental health statistics.

Some data for NSW was reported for adults as part of CDHS evaluations by the DSRU.

A full statewide data extraction was performed in February 1999 and this is currently being assembled and analysed by the Oral Health Branch.

Other systems for adults that are in use in NSW

Not all NSW clinics use MCLIN.

- United Dental Hospital uses their own system called TRIM
- Westmead Hospital uses their own Information System for Oral Health – ISOH
- One clinic in the Greater Murray Area Health Service uses the system EXACT

Child Dental Health Survey (CDHS)

Data were obtained from school oral health clinics around NSW as part of the national *Child Dental Health Survey* carried out by DSRU for the period 1986 to 1995.

The CDHS collected demographic, oral health status, and dental service information from a random sub-sample [by birthday] of school children examined.

This data collection for NSW schoolchildren ceased in December 1995 due to the commencement of SOKS data collection for clinical risk assessments in January 1996.

The CDHS continues annually, but NSW data are now sampled from SOKS assessment [basically screening] data rather than the clinical records data used pre-1996.

Save Our Kids Smiles (SOKS)

SOKS is a risk assessment program for all children in the school grades of K, 2, 4, 6 and 8 in public, catholic and independent schools in NSW [all schools invited, most participate].

Data have been available since 1996 and the 1996–1997 figures reported 273,506 assessments [about 65% of those in eligible grades].

The parent or guardian response rate in 1997 was 73% for all schools involved in the assessments conducted by dental therapists. Assessments are coded on an odontogram in the clinics and electronically transmitted [or entered into] to the SOKS database at the Oral Health Branch.

SOKS Assessment in NSW

The assessed children are ranked into three codes:

Code 1:

Need of Immediate Care for pain and /or infection or pain that could occur within three months – includes oral infections and large lesions with pulpal involvement. The child is given a note to the effect that they must be seen in child oral health service in the next 24–48 hours. If the child opts for a private dentist, this is noted.

Code 2 to code 2.5:

Need for Routine Care includes **fit** but has been identified with either **current untreated oral disease**, or because their history of oral disease are considered at risk and therefore in **need of clinical preventive treatments** such as fissure sealants. Referral to a public child dental clinic and a letter is sent to their parents or guardian.

Code 3:

No Treatment Required as no oral health problems identified.

Follow-up is usually conducted for those who are classified code 1, but not for most with code 2, to ascertain whether they go to a child oral health service or to a private dentist.

NSW Health – Inpatient Statistics Collection (ISC)

The NSW Inpatient Statistics Collection is maintained by the NSW Health Department's Information and Data Services Branch.

- The survey has covered approximately 70 variables since 1993 and consists of demographic and clinical information collected for all inpatient separations (discharges, transfers and deaths) from all NSW public [including psychiatric], private and repatriation hospitals, private day procedures centres and public nursing homes in NSW. Hospital admissions are coded according to ICD-9 classifications [version 10-July 1998].
- The principal diagnosis is the first ICD-9 variable reported on the hospital separation form and refers to the principle reason for admission. Eleven diagnoses are recorded as well as E [Emergency] codes for admissions for injury and poisoning.
- The International Classification of Diseases to dentistry and stomatology (ICD-DA) are classifications concerned with all diseases and conditions that occur in, have manifestations in, or are associated with the oral cavity and adjacent structures.

There are possibilities for oral health data inclusion for: diagnosis; malignant separation* (140-149); diseases of oral cavity (520-525); disease of salivary glands; disease of teeth; diseases of oesophagus (530); cleft palate (749); procedures and hospital separations.

* The NSW Central Cancer Registry receives notifications from all pathology laboratories in NSW and oral carcinoma is defined using ICD-9 codes 140-149.

Health Outcomes Information Statistical Toolkit (HOIST)

The HOIST system was set up in 1988 by the Epidemiology Branch of NSW Health. It is a collection of much of the data used in population health surveillance and research and provides a common data analysis environment across the NSW public health network.

- All data has been converted to the one format using SAS datasets and time series and annual reporting can be provided.

- HOIST contains dental data from: ISC; 1998 NSW Health Survey; 1989 and 1995 ABS National Health Surveys.
- SOKS assessment data [1996-98] has also been included in HOIST since May 1999.

Data that are available at national level and from other states

Dental Statistics and Research Unit (DSRU)

This unit of the Australian Institute of Health and Welfare (AIHW) was established in 1988 at the University of Adelaide and has the main data sources for dentistry available at a national level. The DSRU compiles the oral health status of the population as a whole.

- A national dental telephone interview survey with 79 questions conducted in 1994.
- An oral health satisfaction questionnaire conducted with the adult population in 1994.
- A *Child Dental Health Survey* [CDHS] is conducted annually for Australia and states from clinical examination data obtained from school oral clinics [1989-1998].
- *Child Fluoride Study 1991-1998* collected additional data on residence and water history of the children participating.
- The last published CDHS NSW report from school clinics was in 1996. Data for 1994 and 1995 is held for NSW but not published.
- The DSRU analysed data and prepared a CDHS report on a NSW sample again in 1996 from data provided through SOKS assessments.
- South Australian Dental Longitudinal Study has been carried out 1991-1998.
- The DSRU collected and analysed data for persons seen in private practices and government services as evaluation of the Commonwealth Dental Health Program.

- The Prospective Adult Dental Programs Survey [1995–96] is a continuous monitoring survey for patients within public-funded programs. It collects oral health status, demographic and utilisation characteristics, and profiles services provided during courses of dental care. (See copy of data collection form in Appendix 3.)
- Adult Dental Programs Survey [1996] was cross sectional.

Commonwealth Dental Health Program (CDHP)

The Commonwealth Dental Health Program (CDHP) funded adult services in the states from January 1994 to December 1996.

- The Australian [and NSW] base line and evaluation data was collected by DSRU using the MCLIN software program in NSW and DECAID in other states. Collection included data from private dental practices.
- An in-house [government] software component of MCLIN was introduced during 1995–1997 for about 1.5 years for CDHP data collection.
- The MCLIN software is still in use in NSW clinics.

Australian Bureau of Statistics (ABS)

The ABS conducts National Health Interview Surveys [1979, 1983, 1989, 1995].

In 1995 a number of data items were included relating to dental consultations. The data items include oral health-related actions taken by respondents in the two weeks prior to the survey such as: oral health consultations; type of consultation and the treatment received; days off work and most recent illness [in the past two weeks].

Input towards questions requested to be included in these surveys has come from government departments, the Australian Dental Association and DSRU.

National Oral Health Survey Australia

In 1987–88 a national household survey was carried out with interview and clinical oral examination for N= 14,432 persons 5+ years. Comparative data is available for NSW. It is hoped funding will become available for a follow-up by DSRU of this survey.

States were requested to forward information on data collected for dental caries and responses were received from NSW, South Australia and Victoria.

Victoria Data Collection for dental health status in the School Dental Program is collected for a 1 in 8 sample with VISDED scan form and includes decayed, extracted, filled and sealed teeth. Additional data is to be sought for postcode, ethnicity [mothers country of birth] aboriginality, concession card, and risk status. There is no collection of data for adults [this ceased when CDHP ended]. The *Dental Care Profile* used provides number of services [for 10 ADA categories, 34 items] per 100 individuals treated.

SADS Data Collection as reported from South Australia relates to measuring outcomes of dental caries interventions from CDHS [DSRU], *Adult Dental Programs Survey* of previous CDHP [DSRU], and SADS internal service profile MIS collection. Also *Personalised Dental Care Program* in School Dental Service [1990–1998] assigns children to high, medium and low risk groups which determines recall times and targeting of preventive activities to those at high risk.

WHO Oral Health Data Bank

WHO collects comparative data on dental caries from many countries for dental caries. WHO publishes standardised guidelines for standardised collection of data on oral health status and treatment needs.

10

Indicator sets

Workshop participants were able to consider practicality, benefits and costs [resources required] of a minimal indicator set but did not formally set priorities of proposed indicators of oral health outcomes using the criteria relating to the intervention, the indicator, equity and quality of life. The group presented different baskets of indicators that they considered essential for different data collections. Indicators were grouped as process or outcome and divided into: clinical; demographic; patient history; behaviour and lifestyle [including cultural family profile].

Background demographic indicators

No matter what indicators are used to measure outcomes for dental caries as a result of intervention, it was considered essential [high priority] that *background demographic data* be collected as a routine for all persons seen by the government dental services and that this data be available on any data-base(s) used. This data is required for planning, evaluation and measurement of dental health out-comes in different community groups. Individual patient records are maintained in all NSW government dental clinics including the United Dental Hospital and Westmead Centre for Oral Health. Some information on patients seen and treatments provided is aggregated at local level but computer records for oral health status and treatment needs are not readily available or accessible. NSW adult data from other clinics is at present being aggregated from all MCLIN data bases collected up to February 1999. Data from United Dental Hospital and Westmead Centre for Oral Health will be appended to this data set.

Present collection of SOKS assessment data for **schoolchildren** is transferred to a NSW SOKS database. Analysis of data for number of children assessed, by SOKS priority assessment, referral information and follow-up attendance is possible. This data could be analysed by *different demographic* characteristics.

There does not appear to be any data collected and available for **adults** seen by government services in NSW for those eligible or emergency patients. Limited information for *adults* is collected, and available, in some clinics in some Area Health Services where the software program MCLIN is used to record data relating to patient demographics, waiting list management, and treatment provided.

Minimal data set – demographic

To obtain even this basic set of demographic indicators it will be necessary for NSW Health to develop and adopt a system which records information in a way which will allow that information to be accessible for analysis and evaluation. Such basic data should be standard between different areas of the state and enable necessary statistics to be aggregated for the State. This information can be obtained by questionnaire administered by direct interview, telephone, or self-administered questionnaire. This information can be obtained when any clinical oral examination or assessment is carried out.

Fluoride history is important, as it is a risk factor and important intervention variable. However it requires further definition for use as an indicator. Postcode of residence can indicate whether living in a fluoridated area, but not length of residence or use of the water. Use of fluoride toothpaste and topical fluoride treatments are also needed.

Minimal Data Set for Demographic should include:

- date of birth
- age
- sex
- aboriginality
- country of birth
- concession card status [health card]
- educational level
- language spoken at home

- post-code – gives local area characteristics and rural/remote information
- fluoride history [partly derived from postcode]
- socio-economic status [derived from postcode in NSW]
- employed
- annual household income
- ethnic group [includes country of birth of mother]

Background Personal History

The working group considered that basic information should be obtained when any clinical oral examination or assessment is carried out. The group did not define or give any priorities for the information required.

Information needed from patient [or previous records] should include:

- dental history
- medical history
- substance use / abuse [drugs, alcohol, tobacco]
- medication history
- past allergy history
- fluoride treatment history
- oral hygiene status with plaque accumulation [also part of clinical status]
- xerostoma status and salivary flow [also part of clinical status]

Behavioural and lifestyle indicators

Indicators of behaviour of individuals are necessary so any interventions in the dental caries process by individuals can be recorded. The working group also considered lifestyle and quality of life indicators along with the behavioural indicators. The essential basic data should be collected at the same time as basic demographic data is collected and should be maintained on the same database. This information can be obtained by telephone, interview, or questionnaire. This data should also be collected at the time of any oral clinical examination or assessment.

Minimal data set – behavioural

The minimal set of indicators for behaviour should follow already established indices used by the ABS, the DSRU and WHO.

These were not defined by the group but would include the following:

- regularity of oral health care
- satisfaction with clinical care
- patient expectations
- quality of life issues
- use of toothbrush
- use of toothpaste
- use of fluoride toothpaste

Patient expectations and quality of life indicators

These are not well established but there is some guidance from the WHO International Collaborative Study II. These indicators need to be further considered to agree on a minimal set acceptable around Australia. There is a need to establish priority indicators and those with a necessary but lower priority that should be used for sub-samples or special surveys. Lifestyle indicators tie in with behavioural indicators for both risk and/or outcome

Lifestyle indicators could include:

- satisfaction surveys
 - quality of life issues
 - patient expectations
- satisfaction with clinical care
- parental influence / primary carer
- level of knowledge
- perceptions of dentists
- perceptions of procedures
- perceptions of need for treatment

Behavioural indicators given lower priority by the working group included:

- type of treatment received at last visit
- where treatment received
- who provided treatment
- waiting time
- reason for attending for dental care
- reason for not attending for dental care

- perception of need for treatment by type of treatment
- satisfaction with treatment provided
- satisfaction with the dental service
- satisfaction with the provider
- type of service desired
 - regular or episodic
 - preventive
 - diagnostic
 - mix of services
 - emergency / restorative
- compliance with dentist advice / instructions
- adequate plaque control
- care for dentures
- satisfaction with aesthetics
- satisfaction with function
- ability to masticate
- level of knowledge
- compliance with oral health education
- food intake
- use of refined carbohydrates
- frequency of cariogenic snacks

Clinical indicators for dental caries

Clinical indicators are usually applied when a dentist or dental therapist carries out a clinical examination of an individual, either as a complete or partial examination or assessment.

It is noted that patient perception of status can be obtained for a few items [by interview or questionnaire] including edentulous state, ownership and wearing of dentures by type of denture, and whether they have had fillings. Patients can also give an indication of previous treatment and their perception of treatment that may be required.

Many examinations and assessments are being carried out in NSW but details are not being maintained on computer records and as a result they are not available to assist with measurement of the outcome of interventions being undertaken to prevent, limit, or

reduce the treatment needs for dental caries. Where an outcome is less treatment need then the number and type of services provided may give some indication of this.

Minimal data set – clinical / outcome

- edentulous
- caries free
- caries experience
- DMFT
- DMFS
- components of DMFT and DMFS
- Oral Health Impact Profile (OHIP)
However the 49 question composite index was considered too complex
- GA separations; [extraction/restoration under GA information from hospitals]

It is noted that patients can also provide:

- edentulous state [no natural teeth]
- perceived treatment need
- denture(s) wearing
- state of dentures

Clinical indicators with lower priority include:

- deciduous dentition – dmft dft, dmfs, dfs and components
- prosthetic treatment – status and needs
- partial dentures, full dentures, and full/full dentures
- plaque presence and extent
- salivary flow
- salivary buffer capacity
- salivary / plaque microflora



Closing session

The agenda for the closing session was:

- *future activities of Working Group*
- *structure of draft report*
- *mechanism for final report validation*
- *evaluation of workshop.*

Future activities

The group was in agreement that the working group would need to review the draft report in detail but they would not have to meet again as a group.

A tele-conference could be arranged if there were contentious points included in the draft report.

The draft of the report must be sent to members of the Expert Working Group, preferably by September 1999. Final report would require validation if there were major changes to the draft required. Final report should also be sent to the group members for approval.

Structure and content of draft report

- The report should be useful for the NSW Oral Health Branch and also for individual or community use and for use by other organisations and agencies.
- The report should be of political use and understanding to fit in with the needs of the Oral Health Branch and the NSW Department of Health.
- The report should be of use to other health departments and any meetings relating to national data collection and national standardisation of indicators.
- The report should be a basic document that would support any application to run a pilot program(s) where required, to test and validate some of the indicators put forward
- The report should be in acceptable format and content to give credibility and support for any future project to develop indicators for periodontal disease.
- The report should include some background information on problems of why, where and when – plus any other issues arising from the workshop.
- The report should include material to help policy development and support dentistry.
- The report should note that there have been recommendations to suggest the setting of minimum service targets and the monitoring of national oral health goals through the maintenance of a national data collection and evaluation centre.
- The report should note that the NSW initiative in determining oral health indicators for dental caries would be of value when indicators are considered at a national level.
- The report should include some indication of the process used to set priorities.
- Indicators should include a wider range and not be restricted to clinical indicators.
- Report should think laterally, and include different types of indicators outside of clinical – ie clinical, behavioural, systems, lifestyle and other.
- The recommendations for indicators should be considered in baskets – and get final approval of working group members for inclusion in the final.
- PD Barnard should complete the details for the basket for clinical indicators that are already widely used in Australia.
- The baskets could include questions already used by other data collection systems in Australia [and WHO/FDI] but these questions will need to be considered further.
- Data collection sources in Australia and in NSW must be referred to – and their practicality – and possible need for pilot testing of indicator(s) mentioned.
- Examples of indicator use must be included in the report, either in text or appendix.

- The background discussion document should also be included as an appendix. Reasons for this inclusion are: the report would be more complete; it has a good literature review and list of references; few references would be required within the body of the report. Inclusion would also allow publication and access to the background document, which was a draft document.
- Some of the text and tables from the document should also appear in the body of the report – mention should be made of this within the report.

Evaluation of workshop

The evaluation of the workshop by participants was only carried out in relation to their personal expectations of the workshop – these appeared to have been met in relation to their own need to contribute and communicate personal experiences with other experts in the field. Participants agreed that their time had been well spent [not wasted]; that the group had covered a lot of ground; that the group had thought laterally; that there was general agreement for a wider approach to the problem of indicators for dental caries [not just clinical] and that the venue and arrangements had been very satisfactory.

It was generally agreed that the input of the working group and the outcome of the workshop will facilitate the use of evidence based indicators to improve the process and the outcome of care provided for patients in NSW. The NSW initiative in determining suitable oral health indicators for dental caries will be of value when indicators are considered at a national level. The findings of the group should assist in promoting standardisation of indicators and analysis of data, setting of minimum service targets and monitoring national oral health goals through the maintenance of a national data collection and evaluation centre.

12

Minimal indicator set

Dental caries

Summary and requirements

The outcome will facilitate the use of evidence based indicators to improve the process and the outcome of care provided for patients in NSW. The NSW initiative in determining suitable oral health indicators for dental caries will be of value when indicators are considered at a national level. The findings of the group should assist in promoting standardisation of indicators and analysis of data, setting of minimum service targets and monitoring national oral health goals through the maintenance of a national data collection and evaluation centre.

A minimal clinical indicator set for dental caries has been determined and recommended by the Expert Working Group. They are:

- edentulous
- caries free
- caries experience
 - DMFT
 - DMFS
- components of DMFT and DMFS
- GA separations

There is a need to follow up, and clearly define, other indices that are not in the minimal set but would be of use in special surveys such as those relating to lifestyle, including satisfaction. A listing of indicators which should be followed up to gain consensus for NSW and Australia is presented on the next page.

When patients are seen on an emergency basis or for primary oral care there is often a reluctance for time and resources to be extended to: obtain and record a full patient history; record a complete background; update patient demographic details; or for administration of any questionnaire relating to behaviour.

Many of the items considered of lower priority by the working group would be included in surveys being carried out for special purposes to obtain information from samples of the population receiving clinical examination or assessments.

There is a need to gain consensus for a minimal set of questions for satisfaction with care and quality of life from among the questions used by:

- ABS National health surveys
- WHO ICS I and ICS II questions
- DSRU Telephone interview survey
- DSRU Patient satisfaction survey
- DSRU Child fluoride study
- OHIP Oral Health Impact Profile
- OHB NSW waiting list management,
Dental management information systems

There is a need to gain consensus for data set(s) required to record oral health behaviour from topics or questions such as those used by: ABS; NOHSA; and DSRU.

- Utilisation**
- time since last dental visit
 - place of last dental visit
 - dental visit within past year
 - number of dental visits within past year
 - usual frequency of visits
 - intention behind use of care (last visit)
 - usual reason for visiting
 - nature of care received
 - waiting time
 - reason for not visiting (past year)

- Behaviour**
- frequency of toothbrushing
[number of times brushed previous day]
 - usual frequency of toothbrushing
 - use of fluoride toothpaste
 - use of dental floss [frequency]
 - days off work

- Lifestyle**
- function
 - food avoidance
 - toothache
 - appearance
 - avoid going out
 - financial burden
 - affordability
 - hardship encountered

A ppendix I

Terms and definitions in relation to indicator development

Terms	Definition
Indicator (health outcome focused)	An indicator is a statistic or other unit of information, which reflects, directly or indirectly, some property of a phenomenon or process. The term indicator is used in many different ways. Two commonly used expressions are 'a health outcome indicator' and 'performance indicator'. It should be noted that an indicator reflects the phenomenon or process, and does not necessarily provide a comprehensive measurement of it.
Primary outcome indicator	Provides information on incidence, prevalence and sequelae, ranging from mortality to quality of life.
Risk indicator	Risk indicators are non-etiological factors, for example, that are not thought to cause dental caries. These may include socioeconomic factors such as income; psychosocial factors such as health attitudes; clinical variables such as number of teeth filled; and laboratory factors such as <i>Streptococcus mutans</i> levels.
Process and quality indicators	This refers to indicators, which indicate provision of appropriate, high quality interventions. These indicators refer to the performance of the intervention and not the effects on health or risk.
System indicators	This reflects the system wide action separate from the person or population focused action.
Generic indicator	A generic indicator provides information on health, perceived health or a specific dimension of health using measurement methods that can be applied to people in any health condition.
Socio-dental indicators	Socio-dental indicators are the dental equivalent of social indicators that use selected events to monitor broad trends in societal well being. Socio-dental indicators to date have not been widely used and currently are too narrow to capture the multidimensional nature of oral health and the many subtle social and psychological effects of oral disorders.
Condition specific indicator	A condition specific indicator provides information on specific clinical conditions or health problems, or aspects of physiological function pertaining to specific conditions or problems.
Intervention	Interventions are strategies carried out by individuals, organisations, the community and government to maintain or attain health.
Health outcome	A health outcome is a change in the health of an individual, or a group of people or a population, which is wholly or partially attributable to an intervention or a series of interventions.
Prevention	Prevention aims to reduce the occurrence of new cases, decrease risk and /or increase protective factors that can be documented, delay the onset of illness, reduce the length of time that early symptoms continue, and/ or halt a progression of severity. Primary prevention includes promoting health by personal & community wide efforts. Secondary prevention involves detecting and treating disease early. Tertiary prevention is the limiting of suffering and disability caused by disease and rehabilitation to prevent loss of function.

A ppendix 2

Levels of evidence for classifying the quality of studies assessing interventions

Level of evidence	Description of study types from which evidence is derived	Risk of bias
I	Systematic review of all relevant randomised controlled trials Large multi-centre randomised controlled trials	a Low No unexplained heterogeneity of effect between studies or centres
II	One or more randomised controlled trials and studies	a Low b moderate
III	Controlled trials without randomisation Cohorts Case-control analytic studies Multiple time series Before and after studies (Preferably from more than one centre or research group)	a Low b Moderate
IV	Other observational studies	
V	Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	

Grading of recommendations

Grade	Recommendation (based on AHCPR)
A (Evidence levels Ia, Ib)	Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation
B (Evidence levels IIa, IIb, III)	Requires availability of well-conducted clinical studies but no randomised clinical trials on the topic of recommendation
C (Evidence level IV)	Requires evidence from expert committee reports or opinions and /or clinical experience of respected authorities. Indicates absence of directly applicable studies of good quality

A ppendix 3

Data collection forms

- School Dental Service Operator Daybook
- School Dental Service Examination Record
– 1991 –1996
- Save Our Kids Smiles Program
– SOKS – Consent Form
- SOKS Clinical Services – Dentist
- SOKS Clinical Services Dental Therapist
- Exams and Emergency Daybook
- Radiology Daybook
- Periodontics Daybook
- Oral Surgery Daybook
- Endodontic Daybook
- Fixed Prosthodontics Daybook
- Removable Prosthodontics Daybook
- Orthodontic Daybook
- Adult Dental Programs Survey
– used by Dental Statistics and Research Unit
- Community Service Daybook
– used in NSW prior to Exams and Emergency
Daybook

A ppendix 4

Members of expert working group

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