

#82:

THE TEACHING OF CARIES PREVENTION IN U.S. AND CANADIAN DENTAL SCHOOLS: A NEW INITIATIVE

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caries prevention was sent to all invitees. Faculty responsible for teaching caries prevention were invited from 66 dental schools in the U.S. and Canada to attend the Leadership Conference. Proceedings included reviews on health policy, etiology, diagnosis, science of cariology (including risk assessment), diet and health behavior. A planning model (Senge) was employed to review organizational barriers to change in clinical teaching programs. Program changes made in 4 selected dental schools were presented as examples. Results: Faculty from 64 of the 66 dental schools attended. 85% were responsible for teaching clinical prevention and represented a cross-section of disciplines. 68% of the Schools have written competencies in Preventive Dentistry. One short-term outcome is that about 1/3 of all Schools have developed or are developing plans for improving caries prevention education. Conclusions: Planning that takes account of organizational barriers to change can lead to improvement in teaching dental caries prevention and management. Students who graduate with enhanced skills in caries diagnosis and management, and delivering dental services efficiently will ultimately change dental practice in the U.S. and Canada. (Supported by Procter & Gamble Oral Care)

Objective: To describe the process, strategy and short-term outcomes of the Clinical Preventive Dentistry Leadership Conference (Dec., 2002, Cincinnati, OH). Program Design: A pre-conference survey of current teaching and clinical practices in

To describe the process, strategy and short-term outcomes of the Clinical Preventive Dentistry Leadership Conference (CPDLC) held in Cincinnati, Ohio in December 2002.

DESIGN

Pre-conference Survey. A baseline survey of current teaching and clinical practices in caries prevention and remineralization was sent to all Conference invitees. The conference invitees were primarily faculty who had the responsibility for teaching preventive dentistry.

Conference Proceedings. The Conference started with scientific reviews on health policy, epidemiology, etiology, diagnosis, science of cariology (including the concept of risk assessment), diet and health behavior of dental caries.

A strategy for addressing change in teaching programs within organizations and dealing with other barriers was systematically approached using the Senge planning model.

Examples of Preventive Programs in four different dental schools were presented to stimulate ideas about improving and developing preventive programs in the institutions represented by the attendees.

After the presentations small working groups of attendees and one of the program presenters meet to articulate short-term and long-term changes that might be possible to implement in each of the attendees respective institutions. The Senge planning model was utilized as a format for this exercise.

Impetus for this Initiative. The current science of cariology, including the concepts of remineralization, has not in general translated into changing the teaching and clinical practice of restorative dentistry in the United States and Canada. In addition, this initiative is predicated on both the science of cariology and the social science of organizational change within dental schools. If the clinical teaching of caries prevention, and ultimately dental practice, can change in the U. S. and Canada, clinical practice may be more evidence based which may better justify improving access to care, economically and ethically.

"Systems Thinking" Worksheet — P.M. Senge
ISSUE: Making caries prevention an integral part of the students' clinical experience

A. Problem/Issue Identification

1. Problem/Motivation/Catalyst
 - What are the key motivators for initiating/modifying a caries prevention program at your school?
2. Short-Term/Long-Term Goals
 - What do you hope to achieve?
 - Short-term: < 2 years
 - Long-term: > 2 years

B. Solution

Program Description

- What do you plan to do?

ORGANIZATION

1. When will the program occur in the curriculum?
2. What department will be responsible for the organization and teaching of the program?
3. Where will the program occur?
 - Physical site:
 - On-campus
 - Off-campus

TEACHING

1. How will the teaching experience be organized?
2. What will occur in the clinical teaching?
 - a. Activities
 - b. Procedures
 - c. Requirements

ASSESSMENT

1. How will students be assessed?

EVALUATION

1. How will you know you have achieved your goal?

C. Management Considerations

1. Administrative/Political Issues

- What accreditation, curriculum, interdepartmental issues need to be considered to implement/modify the program?
- Who needs to be involved?
- What is the best way to communicate?

2. Stakeholders

- Who will be affected by your plan? (List at least three key stakeholders.)
 - Stakeholder 1:
 - List this stake holder's "needs" or "concerns."
 - List some means of motivating this stakeholder to "buy in" to the plan.
 - List some ideas on how best to communicate with this stakeholder throughout the process of developing and implementing the plan.
 - Stakeholder 2:
 - Same as above
 - Stakeholder 3:
 - Same as above

3. Resources

- What resources (people, space, equipment, new funding, reallocation of funds, etc.) to implement the program?
- Needs Ideas on how to secure resources needed

D. Development Process

1. Action Plan

- List key actions and steps for each action that needs to be accomplished to implement the program:

Action & Steps	Person(s) Responsible	Timeline		Status
		Begin Date	End Date	

RESULTS

Pre-conference Survey RESULTS.

PROFILE OF ATTENDEES INVITED TO THE CPDLC

- 68 attendees were invited: 66/68 from United States and Canadian Dental Schools attended.
- Respondents were targeted because they were the faculty responsible for teaching clinical preventive dentistry (85%).
- 74% (48) Dental Schools were in State Universities and 26% (17) Private Institutions.
- 14% (9) were Canadian Dental Schools.
- 45% (29) had yearly class sizes of 30 to 74 students.
- 52% (34) had yearly class sizes of 75+ students.

ATTENDEES HAD THE TEACHING RESPONSIBILITY FOR:

- Biology of Dental Caries.
- Diet and Dental Caries.
- Individual Patient Oral Health Education Theory and Methods.
- Preventive Agent formulation, actions, safety, efficacy and use.

FORMAT for PRESENTING PREVENTIVE DENTISTRY was SPREAD ACROSS BASIC SCIENCE and CLINICAL DISCIPLINES

- Lectures 100% (65)
- Formal Problem Based Learning 26% (17)
- Seminars 34% (22)
- Other methods 26% (17)

ONE or MORE WRITTEN COMPETENCIES in PREVENTIVE DENTISTRY EXISTED in

- 70% (30) of the U.S. Schools
- 66% (6) of Canadian Schools

CLINICAL TEACHING ARRANGEMENTS AMONG THE VARIOUS DENTAL SCHOOLS

- Schools with Formal Course Number for Clinical Preventive 40% (26)
- Most schools integrated clinical prevention with other disciplines 86% (55)
- Only a few schools had numerical requirements for clinical caries prevention 22% (14)

HOW STUDENT PERFORMANCE IN CLINICAL PREVENTIVE DENTISTRY WAS EVALUATED

- NOT Graded 25% (16)
- Separate Grade given 15% (10)
- Separated Grade factored into a Comprehensive Grade 11% (7)
- Assess as part of a more comprehensive grade 37% (24)
- Other 12% (8)

NO DEPARTMENT/DIVISION HAD RESPONSIBILITY FOR:

- Organizing caries prevention in the dental clinics 31% (20)
- Actual instruction of students in caries prevention 23% (15)

Table 1. Activities Included in Clinical Prevention

	%	N
Caries specific history taken	80	52
Caries detection, interpreting, recording	97	63
Bacterial testing	31	20
Salivary testing	37	24
Dietary testing	85	55
Caries risk analysis	69	45
Preventive planning	83	54
Re-evaluation of preventive outcomes	68	44
Re-evaluation of re-mineralization, specifically	38	25

Table 2. Key Persons Deciding how Clinical Caries Prevention was to be Taught (more than one may apply)

	N	%
A small group of faculty	65	42
Department/Division Chairperson	54	35
Curriculum Committee	46	30
Clinic Director	18	12
Dean(s)	15	10
Faculty collectively	9	6
One key faculty member	3	2
Other	8	5

Table 3. Advantages Faculty Perceived in Preventive Dentistry having a Clinical Presence

Science

- Contemporary biological and behavioral science can be clinically applied.
- Health-behavior-change methods can be applied.
- Links oral health to general health.
- Risk based standards of care can be developed and applied.

Dental Care System

- Following a medical rather than a surgical (restorative) model.
- Reduced costs for dental care, improving access to care and workforce deployment.
- Preferred ethical position (primum non nocere)
- Fewer restorative treatment failures.
- Allows more time for high risk patients.
- Elevates prevention to level of other disciplines.

Students

- Improved student understanding of disease etiology.
- Improved multidisciplinary clinical teaching.
- Eliminates the sharp divide between didactic and clinical instruction.

- Preventive dentistry cannot be learned in the classroom alone.

Patients

- More positive patient experience especially for children and the aged.
- Better patient knowledge and improved preventive behaviors.

Table 4: Problems and Attitudes Encountered by Faculty in Integrating Caries Prevention in Clinical Teaching

Science

- Many faculty and students are not based in evidence and the evidence is incomplete.
- Many faculty do not observe existing clinical preventive guidelines.
- Studies of risk assessment, testing and efficacy of prevention need strengthening through research.
- The behavioral science and skills for oral-health-behavior change not well understood or taught.
- Poor understanding of evidence-base for preventive outcomes is associated with over-optimistic prognosis for technical treatment.

Dental Care System

- "Not the best use of clinical time" by faculty and students.
- Perceived lack of financial and student progress incentives.
- Licensure examinations under-emphasize prevention.
- "Comprehensive care" clinics often have little preventive emphasis.
- Complementary teaching in applied community preventive programs is lacking.
- Time and cost resources are needed to implement prevention.
- Reevaluation systems for high risk person are difficult to implement and operate in a dental school.
- The value of prevention (absence of disease) is an abstract concept, not well appreciated by some faculty, students or patients.
- Lack of insurance reimbursement for some preventive procedures, e.g., dietary assessment/instruction – "we do not practice what is not compensated."
- Too many forms and procedures are involved in teaching prevention.
- Outcome assessment and quality assurance need to be improved.
- Lack of digital clinical recording and tracking system.
- Dental school clinics are restoratively powered and driven.

Faculty

- Perceived to be a preclinical or public health topic, not clinical.
- Lack of support and reinforcement by some faculty and administrators.
- Faculty too focused in their own segregated disciplines.
- Ownership of prevention fractionated among departments and difficult to coordinate.
- Lack of a dedicated faculty preventive "coordinator."

- Uncoordinated, inconsistent, fragmented teaching.
- Technically simple prevention requires development of higher order integrative skills.
- Technically competent faculty are often not biologically, socially or behaviorally competent.
- Emphasis and content expertise not consistent among faculty.

Table 5. Procedures Included in Implementation of Clinical Caries Prevention, as appropriate

	%	N
Patient instruction:		
- use of preventive products	98	64
- dietary change	97	63
- use of antibacterials	74	48
- salivary stimulation	51	33
Professionally applied topical fluorides	100	65
Sealant placement	100	65
Re-mineralization	66	43

Methodology and risk based intensity of these activities are not known.

SHORT TERM RESULTS

Responses to Followup Questions to the Attendees of the CPDLC

- At least one-third of all U. S. and Canadian Dental Schools have developed or are developing plans for the improved teaching of caries prevention as the result of the Clinical Preventive Dentistry Leadership Conference.
- There is optimism among the attendees that by fusing the sciences of cariology and health behavior change and the social science of organizational change in dental schools, it is hoped ultimately to change dental practice and better justify it scientifically, economically and ethically.
- Attendees were encouraged to hold meetings with stakeholders at each of their respective dental schools with the intent of continuing the planning process.

CARIES MANAGEMENT BY RISK ASSESSEMENT (CAMBRA)

As a result of the CPDLC, attendees from the five California Schools and the Dental Schools in Washington and Oregon have agreed to meet at least several times per year with the goal of agreeing to use a common Caries Risk Assessment Form for adults (appeared in the California Dental Association Journal).

Two of the five Schools in California have already adopted the use of the form and the others are working

towards approaching 100% acceptance on their own individual time frames. For example, UCLA is in the process of going to an electronic data record. During this transition period, the risk assessment form is still on paper, but the treatment recommendations are all in the electronic data record. It is anticipated that the risk assessment form will be on the electronic record by this Summer. There is no doubt that the electronic data record will make the process of developing a Preventive Treatment Plan for each patient less time consuming, less of a burden on the student dentist and increase the efficiency needed to make prevention more cost-effective.

DISCUSSION

Benn (JADA, 2002) has proposed some ideas concerning how to improve the efficiency of the Preventive Assessment and Treatment Process. He believes that automating the (1) recording the patient history, (2) longitudinal charting with enhanced details, (3) risk factor identification, (4) risk estimation, (5) prevention and treatment planning, (6) setting the re-evaluation interval, (7) re-evaluating the disease outcomes, will all contribute to making this complex process more acceptable.

Using decision systems and advanced clinical data software, Benn modeled possible financial and organizational results using the Evidential and Risk Based approach. The results of his modeling appear in the following table.

Caries Risk Level	Financial & Organizational Results
LOW Risk Patients	will require 25% DDS/DMD time, plus 100% (Caries & Perio) time of 2 RDHs
	annual visits and decisions support systems offer strong potential for reduced costs of care, and increase of patients served
	yet gross income equivalent to that of a conventional DDS/DMD is projected
MEDIUM & HIGH Risk Patients	will require 75% DDS/DMD time, plus 100% time of a 3rd RDH
	gross income projected to double

Even under the most favorable conditions the complexity of caries risk assessment and treatment have inherent issues that need to be resolved in the future. The most apparent ones are:

- (1) The sensitivity and specificity of caries risk testing is less than ideal.
- (2) It is very difficult to subject oral health risk assessment and dental preventive behaviors/procedures to controlled clinical trials.

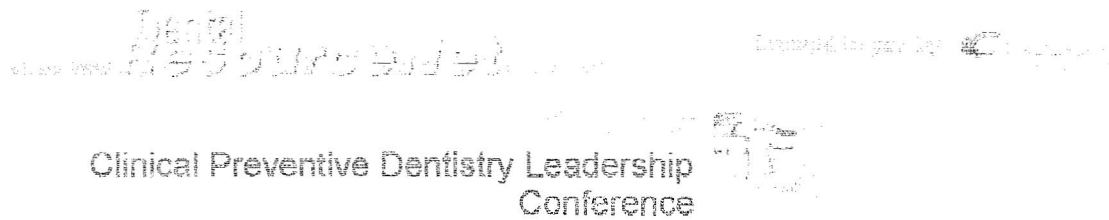
- a. Observational Studies on dental patients, and the use of "smart systems" may be the way forward. By bootstrapping, the systems of risk assessment and of prevention can create self-improving systems.
- b. The greatest barrier seems to be organizational change by dental schools, dental practices, and dental clinicians.

CONCLUSIONS

- (1) Teaching the management of dental caries by risk assessment is complex.
- (2) Clinical faculty need to better understand the evidence and guidelines for caries management.
- (3) Implementation of a protocol for caries management can succeed only when the clinical faculty value and believe in prevention.
- (4) Changing dental practice in the United States and Canada can only occur when:
 - a. there are improvements in diagnosis (bacterial, salivary and detection of early lesions);
 - b. the efficiency of documenting caries risk and the prescribed treatment (via an electronic record) is increased;
 - c. the efficiency of delivering dental services is increased;
 - d. the social science of organizational change within dental schools is understood.

REFERENCES

- Benn DK. Applying evidence-based dentistry to caries management in dental practice: a computerized approach. *Journal of the Dental American Association* 2002; 133(11): 1543-48.
- Oral Health in America. Report of the Surgeon General. USDHHS 2003, pp 61-66.
- Featherstone JDB, Roth JR. Caries: Moving from restoration toward prevention Part 1. *Journal California Dental Association* Vol 31. No. 2, 2003. Available at: "<http://www.cdafoundation.org/journal/jour0203/intro.htm>" Accessed April 26, 2004.
- Featherstone JDB, Roth JR. Caries: Moving from restoration toward prevention Part 2. *Journal California Dental Association* Vol 31. No. 3, 2003. Available at: "<http://www.cdafoundation.org/journal/jour0303/intro.htm>" Accessed April 26, 2004.
- Senge PM. *The Fifth Discipline. The Art & Practice of the Learning Organization*. Doubleday/Currency: New York, 1990.
- Clinical Preventive Dentistry Leadership Conference (CPDLC). "<http://www.dentalcare.com/drn.htm>" Do a "quick search" for CPDLC.



ADVANCING TRULY PREVENTIVE DENTISTRY

Dental caries is now well understood to be a truly preventable disease. Early carious enamel lesions are not only preventable but also reversible via remineralization. Just as prevention of primary caries has been widely adopted clinically, so should remineralization of early carious lesions.

From December 11-13, 2002 Procter & Gamble hosted the Clinical Preventive Dentistry Leadership Conference at its' Health Care Research Center outside of Cincinnati, OH. The conference aimed to incorporate the remineralization and evaluation over time of early carious lesions into the clinical management process. Conference attendees included faculty from every dental school in the U.S. and Canada. The conference offered these educators the opportunity to interact with their peers to discuss the barriers to change in teaching clinical preventive dentistry and to identify possible solutions.

Goals and objectives of the conference included the following:

- L To concisely summarize the current scientific knowledge of the biology, mineralogy, and health behaviors of dental caries.
- L To develop awareness of the importance of relating caries etiology to successful prevention and remineralization approaches in specific individual cases.
- L To determine how prevention and remineralization of caries can efficiently and effectively be implemented in clinical teaching and to facilitate longitudinal observation and outcomes assessment.
- L identify the barriers systematically and plan to implement scientifically justified changes in clinical teaching and ultimately the practice of preventive dentistry.

Listed below are the featured scientific speakers who presented at the conference:

- L Dushanka V. Kleinman, DDS, MScD, Assistant Surgeon General and Chief Dental Officer, USPHS; Deputy Director, NIDCR
- L George K. Stookey, MSD, PhD, Associate Director, Exploratory Research, Oral Health Research Institute; Distinguished Professor of Preventive and Community Dentistry, Indiana University School of Dentistry
- L John D.B. Featherstone, MSc, PhD, Chair, Department of Preventive & Restorative Dental Sciences, University of California, San Francisco
- L Carole A. Palmer, EdD, RD, Professor and Head of the Division of Nutrition and Oral Health Promotion, Tufts University School of Dental Medicine

Following the scientific sessions, clinical preventive dentistry models were presented by the following individuals:

- L Vladimir Spolsky, DMD, MPH, Associate Professor Division of Public Health and Community Dentistry, UCLA School of Dentistry (External Clinical Teaching Model)
- L Michele Henshaw, DDS, MPH, Assistant Professor and Director of Community Health Programs, Boston University School of Dental Medicine (General Practice Model)
- L Chris Clark, DDS, MPH, Professor and Chair of Community and Preventive Dentistry, University of British Columbia, Faculty of Dentistry (Problem Based Teaching and Learning Model)
- L Nancy Hudepohl, PhD, Educational Development Specialist, Division of Educational Research & Development, University of Texas Health Science Center San Antonio (Internal Oral Health Assessment and Caries Risk Model)

Attendees then participated in the following workshops:

- Pre-Conference Survey Results (~~Click here to view slides~~), (Special thank you to Cynthia Olney, PhD, Academic Information Services, UTHSCSA School of Dentistry, for developing the pre-conference survey.
- Clinical Preventive Dentistry Models: Participants shared information on how clinical preventive dentistry is currently taught and implemented at their corresponding schools.
- Planning a Clinical Preventive Dentistry Teaching Program: The goal of this workshop was to create or modify an individual plan to improve upon the current teaching of clinical caries prevention at their school. Individual plans were systematically developed using the The Fifth Discipline, The Art & Practice of the Learning Organization by P.M. Senge. (~~Click here to view Senge's "Systems Thinking" Worksheet~~)

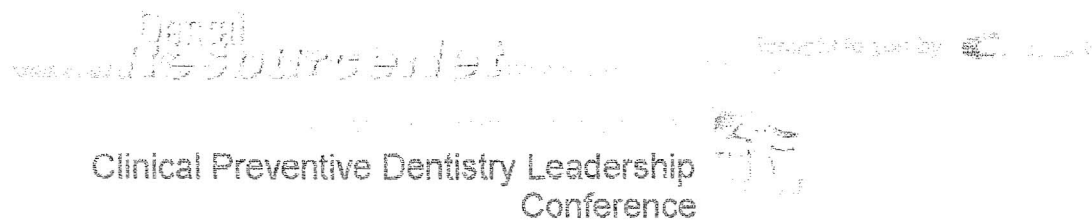
Procter & Gamble would like to acknowledge and thank the following individuals for organizing and developing the conference.

- John Brown, BDS, PhD, Professor and Chairman, Department of Community Dentistry, UTHSC School of Dentistry at San Antonio
- Nancy C. Hudepohl, PhD, Educational Specialist, Academic Informatics Services UTHSC San Antonio
- Vladimir Spol'sky, DMD, MPH, Associate Professor Division of Public Health and Community Dentistry, UCLA School of Dentistry
- Raul I. Garcia, DMD, M Med Sc., Professor and Chairman, Department of Health Policy & Health Services Research, Boston University Goldman School of Dental Medicine

Without their dedication and passionate interest in clinical prevention this conference would not have been possible.



Previous



Speaker's Slide Presentations

- Caries Prevention: Transitioning from Classroom to Clinical Practice**
Dushanka V. Kleinman, DDS, MScD
Assistant Surgeon General and Chief Dental Officer, USPHS, Deputy Director,
NIDCR
- Caries Etiology, Diagnosis and Prevention**
George K. Stookey, MSD, PhD
Associate Director, Exploratory Research, Oral Health Research Institute
Distinguished Professor of Preventive and Community Dentistry, Indiana University
School of Dentistry
- The Caries Balance: The Basis of Caries Management by Risk Assessment**
John D.B. Featherstone, MSc, PhD
Chair, Department of Preventive & Restorative Dental Sciences, University of
California, San Francisco
- The Diet and Behavior Dilemma**
Carole A. Palmer, EdD, RD
Professor and Head of the Division of Nutrition and Oral Health Promotion, Tufts
University School of Dental Medicine

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