HANDOUT #1: CASE STUDY Children’s Hospital Emergency Department Case

**Chief Complaint:** Swelling of face and mouth (upper left) and pain

**History of present illness:**
A 4 year old girl is brought to the Emergency Room by her mom. Mom states her daughter is complaining of pain in a tooth on the left side of her mouth and now has pain and swelling in her face. Mom reports daughter first complained of pain a week ago and it is now significantly worse. Mom initially took her to her regular dental care provider at the Community Health Center. X-rays were attempted but were not successful because the girl was not cooperative. No treatment started at that time.

This morning the child woke up with some pain, discomfort, and swelling. Mom also reports that child was eating well but had an episode of vomiting today. When mom noticed the facial swelling, she brought patient to the pediatric hospital emergency room.

**Past medical history:** Unremarkable. Term pregnancy, uncomplicated birth, routine immunizations up to date

**Past Dental History:** Patient was seen by Community Health Center 6 months prior for comprehensive dental care under general anesthesia. Mom reports daily brushing both by child and parent.

**Social history:** Lives with mom, rural area 45 minutes by car from children’s hospital, dad not involved

**Meds:** No daily meds. Dose of Motrin at 3AM.

**Allergies:** None known

**Pain score:** Moderate

**Examination findings:**
Temp: 99.9  HR 100
Uncomfortable appearing girl; quiet, occasionally crying and insists on sitting on mother’s lap. When asked questions, unwilling to engage. Buries face in mother’s body and whimpers. Child and parent appear tired.

Left facial region with noticeable swelling and erythema of the cheek, and infraorbital area, tender to palpation
Temporomandibular joint (TMJ) examination was normal. No limitation of opening or deviations.
Dental provider on-call to ER asked to evaluate:
Intraoral: Left maxillary vestibular swelling and mild swelling of the gingiva. No parulis or gingival drainage. Tooth #I and tooth #J have an existing stainless steel crown. No mobility noted on the teeth. Neither of the teeth is tender to percussion. The soft tissues are tender to palpation.

Radiographic examination: A total of 3 intraoral periapical radiographs were attempted. Patient had difficulty cooperating with examination and none of the images obtained provided adequate visualization of the affected area
Diagnosis:
1) Facial cellulitis
2) Probable caries/abscess tooth #H, # I, #J

Initial Treatment Plan:
- Admission medical service for IV antibiotics
- Initiation of clindamycin and ibuprofen for pain management
- Attending dentist consulted – recommended repeat exam in a.m. and consider general anesthesia for imaging if necessary at that time

Outcome:
Patient was treated at the Dental Surgery Center under general anesthesia. Simple extractions were completed on #H and #I with no complications.

Questions for Discussion – first answer these questions individually, then discuss with your small groups:

At Admission:
- What role does YOUR profession have in this patient’s care?

Costs and Upstream Investments:

Health system perspective
- Considering this case, what do you think the costs are (e.g, ER visits)?
- Which parts of the health system do we need to engage to address this health problem beyond one patient at a time?
- What is the obligation of a health system organization to positively affect the health of the population it serves?

Public health perspective
- Consider economic and other societal costs (e.g., lost work days) to the family, the facility, and the general community. What upstream investments could be made to impact these downstream costs?

General
- What is your profession's role in preventing similar cases in the future?
HANDOUT #2: Identify the causes of pediatric dental caries at each level of the socio-ecologic model
The Common Risk Factor Approach: a rational basis for promoting oral health


Abstract – Conventional oral health education is not effective nor efficient. Many oral health programmes are developed and implemented in isolation from other health programmes. This often leads, at best to a duplication of effort, or worse, conflicting messages being delivered to the public. In addition, oral health programmes tend to concentrate on individual behaviour change and largely ignore the influence of socio-political factors as the key determinants of health. Based upon the general principles of health promotion this paper presents a rationale for an alternative approach for oral health policy. The common risk factor approach addresses risk factors common to many chronic conditions within the context of the wider socio-environmental milieu. Oral health is determined by diet, hygiene, smoking, alcohol use, stress and trauma. As these causes are common to a number of other chronic diseases, adopting a collaborative approach is more rational than one that is disease specific. The common risk factor approach can be implemented in a variety of ways. Food policy development and the Health Promoting Schools initiative are used as examples of effective ways of promoting oral health.

This paper addresses the pressing question of which oral health promotion and preventive approaches dental workers should adopt. The question is particularly important for a number of reasons. In an era of evidence-based health care, there are valid reasons for questioning the effectiveness of current health education methods (1,2) and where it has been effective oral health education can increase oral health inequalities (3). Another reason for reassessing which approaches to use is that resources for oral health promotion are scarce in industrialised and underdeveloped countries. The methods which are being used are not only relatively ineffective, but expensive in terms of money and human resources. In addition, oral health interventions frequently duplicate, conflict with and are inconsistent with existing general preventive programmes implemented by other health professionals (4). The public is therefore increasingly becoming sceptical and weary of health messages (5). The most important reason for questioning what is currently being done is that many oral health strategies are theoretically flawed (6). The strategies are based upon questionable concepts of what causes change in oral health related behaviours.

In contrast to the approaches used in oral health, the dominant theory about health and disease, is that health is mainly determined by socio-political factors (7–10). Avoiding the need for developing effective social policies for health in favour of a concentration on problems of individual health related behaviour is not only an oversimplification, but an evasion of responsibility. Concentration on lifestyle often obscures broader determinants of health. This criticism of the emphasis on individual lifestyle as a cause and solution of health problems is particularly relevant to dentistry (11). The main focus of
most oral health policy is on individual behaviour change. Such an approach diverts attention away from the underlying determinants of oral diseases.

Limitations of the lifestyle approach

Lifestyle is frequently considered a consciously chosen personal behaviour. Others interpret lifestyle as an expression of the social and cultural circumstances that condition and constrain behaviour, in addition to the personal decisions the individual may make (12). But apparently simple acts are enmeshed in more complex lifetime habits and social circumstances associated with lifestyle (13). Living conditions affect how lifestyles are sustained (14,15). Indeed Blane (1985) argues convincingly that the causative role of individual behaviours have been exaggerated. They should be seen “... as indicators of other factors which are more straightforwardly related to the social structure, and which are the true aetiological agents” (14). The importance of social structure is evidenced by the universal finding, in all societies, that mortality and morbidity follow a gradient. Health inequalities are not found only between the rich and poor, or between ‘the deprived’ and everyone else (16). Those in the higher ranks are healthier than those below them. The gradient has been stable over time despite changes in average income levels and life expectancy. More importantly, the gradient is continuous and does not have a threshold. It stretches up the social scale (17). People in the top stratum are healthier than those just below them, even though the latter are often of the same social class and have similar levels of education and income as the top group. Those in the second rung are in turn healthier than those just below them and so on, all the way down the employment hierarchy. What is more the gradient exists for most kinds of ill health and causes of death (18).

The universality of a social gradient in health and health behaviours suggests that health related behaviours are not a simple matter of free choice but significantly determined by the social environment in which people live and work. Those who study the details of lifestyle call for individuals to assume greater responsibility for their oral health. There are serious problems in modifying some behaviours to effect changes in lifestyles without tackling the larger and more pervasive socio-economic changes that are the preconditions for change. The Multiple Risk Factor Intervention Trial (MRFIT) showed that lifestyle behaviours were problems related to the social and cultural milieu rather than problems of the individual (19,20). In MRFIT, optimal conditions existed for lifestyle change. Yet most of the highly selected subjects specifically chosen for their motivation were able to make only minimal changes in their eating and smoking behaviours over a six-year period. The methods used in the MRFIT were based upon the best current research on behaviour change. However failure to markedly change important health related behaviours by these conventional methods should be a warning bell to dental health educators.

Funding agencies are unlikely to support approaches to change aspects of behaviours specifically related to oral health. The agencies are more concerned with broad health promotion strategies focusing on reducing heart disease, hypertension, cancer, obesity, injuries and suicide. As will be demonstrated later in this paper, oral health problems have risk factors in common with a number of important chronic diseases and conditions such as cardiovascular disease, cancers and injuries. It is wasteful to target each disease separately when they have similar origins. Therefore a strong reason for alliances with other sectors involved in health promotion is to avoid duplication, increase effectiveness and efficiency and reduce isolation. Another reason is that the populations with the greatest burdens of all diseases are the deprived and socially excluded.

The solutions to the chronic disease problems are shared solutions. The strategies to mitigate the above mentioned problems are incorporated in the Ottawa Charter for Health Promotion (21). Community action and support, environmental change, legislation, improving personal skills, and empowering people to become stakeholders in society and collectively challenge the structures which determine their health. Significant control of dental diseases can mainly be achieved in terms of social policy. The task of oral health workers is to convince policy makers and society to undertake the specific social measures which are required to solve general and oral health problems, and to participate in the implementation of these policies.

The determinants of chronic diseases

Health promotion is directed at the underlying determinants, as well as the immediate causes of ill health (21). The immediate causes of the major dental diseases, caries and periodontal disease are diet,
plaque and smoking. Oral mucosal lesions, oral cancer, temporomandibular joint dysfunction and pain are related to tobacco, alcohol and stress and trauma to teeth and injuries (Fig. 1). As these causes are common to a number of other chronic diseases such as heart disease, cancer, and strokes, it is rational to use a common risk factor approach (22).

A common risk factor approach – an integrated approach

The key concept underlying the integrated common risk approach is that promoting general health by controlling a small number of risk factors may have a major impact on a large number of diseases at a lower cost, greater efficiency and effectiveness than disease specific approaches (23). Savings may be made by coordinating the work done by various specialist groups and organizations. Decision-makers and individuals will be more readily influenced by measures directed at preventing heart diseases, obesity, stroke, cancers, diabetes, as well as dental caries than if disease-specific recommendations are made alone.

One of the principles of health promotion is to focus on the whole population rather than on disease-specific at-risk groups (24). The new public health is no longer oriented to single diseases. Many community programmes have shifted from vertical programmes towards a more horizontal approach, thus enlarging their scope to cover other non-communicable disease. There are basically two approaches for an equity oriented health policy. Focussing on actions to reduce specific diseases or on specific risk factors and public policies aimed at improving health conditions in general and among those at particular risk. The Common Risk/Health Factor Approach (CRHFA) distinguishes between actions aimed at reducing “risk factors” and actions promoting “health factors”. The strategy includes efforts to improve health by reducing risks, promoting health and strengthening possibilities to cope with given’ risk factors – creating supportive environments, reducing the negative effects of certain risk factors and facilitating behaviour changes. A major benefit of the CRHFA is the focus on improving health conditions in general for the whole population and for groups at high risk. It thereby reduces social inequities.

Concepts of common risk factors must inform public health work and education. A number of chronic diseases such as heart disease, cancer, strokes, injuries and oral diseases have risk factors in common and many risk factors are relevant to more than one chronic disease. Such risk factor oriented strategies are more rational than those directed at specific diseases. Cardiovascular risk factors affect a number of diseases indicating that they have a much broader impact on health. Preventive strategies based upon CRFA will exert a favourable effect, not only on a single disease but simultaneously on several conditions (23).

Three approaches may be used based upon the epidemiology of common chronic diseases. Most chronic diseases have a multifactorial causation. Integrated action may be taken against a number of risk factors related to one or more diseases (23). Second, if one risk factor affects several diseases, the attack may be integrated across disease boundaries. The third approach overlaps with the first. Here some of the risk factors cluster in groups of people. Changing one of the factors may influence the others. For example, smoking, heavy drinking and poor diet tend to cluster in the same people. Changing their smoking behaviour may affect other behaviours.

The epidemiological basis for CRFA

The major risk factors for chronic diseases are smoking, diets high in saturated fats and sugars and low in fibre, fruit and vegetables, stress and
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low control, alcohol, environmental hygiene, injuries and a sedentary lifestyle (25).

Diet
Many of the diseases which are increasing in industrialised and developing societies and are the main cause of premature morbidity and mortality are attributed at least in part to diet (26). Numerous expert committees have concluded that particular diets, namely those high in saturated fatty acids, non milk extrinsic sugars (NMES) and low in polysaturates, fibre and vitamins A, C and E are associated with conditions such as coronary heart disease, stroke, diabetes, cancers, obesity and dental caries (27–29).

Increasing scientific evidence from epidemiological, clinical and other relevant research has been accumulated to show that NMES are a causative factor in a range of diseases, especially dental caries. A considerable body of evidence has highlighted the key role of excessive NMES consumption on caries development (26, 27, 28, 30). A reduction in NMES intake is considered desirable in view of their cariogenicity, as well as other harmful effects on general health. Adverse health effects of excessive consumption of NMES are obesity, dental caries and diabetes. In an analysis of 115 expert committee reports which had formulated guidelines on diet and health from countries around the world, 97 recommended reductions in NMES to a maximum of 10% of energy intake (31), a target proposed by the World Health Organization (26).

Smoking
Smoking has been implicated in a large number of diseases. Smokers develop more cancers of the lung, mouth, throat, pancreas, kidney and urinary tract, coronary heart disease and stroke, respiratory diseases, diabetes and ulcers than do non-smokers. (32, 33). It is estimated that smoking causes about 30% of all cancer diseases and deaths and 90% of all lung cancers (33–35). Smokers also have more periodontal disease and other diseases of the oral mucosa (36–38).

Stress and control
It is well established that cardiovascular disease, diabetes mellitus and numerous other chronic diseases are related to sociopsychological factors (39–41). There is evidence linking stress to periodontal diseases and temporomandibular joint dysfunction (42,43). Life events are associated with periodontal disease by affecting physiological processes and risk behaviours such as smoking and oral hygiene which increase susceptibility to periodontal diseases (44). Not only do some systemic diseases affect periodontal disease, but periodontal diseases may increase the risk of cardiovascular disease (45).

Alcohol
High alcohol consumption increases the risk of a wide variety of conditions such as raised blood pressure, liver cirrhosis, cardiovascular disease and cancers of the mouth, pharynx and oesophagus. Heavy long term use is also associated with mental illness, neurological disease and liver cancer. In addition, many social problems such as family violence, crime and injuries are linked with heavy alcohol use (46–48). Trauma to the head often includes fractures of the jaws and teeth.

Hygiene
Dirt causes inflammation of the skin and mucosa. Dental plaque is the main cause of gingival inflammation and periodontitis (49–51). The dental plaque bacteria and bacterial products in oral biofilms interact with the host, and lead to inflammation and tissue destruction. If left unchecked, the established gingival inflammation may, in some people, lead to periodontitis with loss of tooth support (51). Similarly, biofilms of bacteria on the skin, if not washed away, leads to pimples and more serious skin conditions.

Injuries
Injuries are responsible for many deaths in both developing and developed countries. Accidental injury is the most important cause of death among children and young people in the UK, Europe and USA (52). Injuries are also responsible for a large number of hospital admissions especially amongst the young and old. The prevalence of dental trauma amongst children and young people is significant and is largely related to injuries at home or school (53–55).

Exercise
Lack of physical exercise is a risk factor for a number of chronic diseases including coronary heart disease and obesity (56). In particular, exercise is related to overweight, which in turn affects insulin resistance, glucose tolerance and blood pressure. The syndrome is commonly referred to as the multiple metabolic syndrome (57).
**Clustering of risk factors**

Clustering is the co-occurrence of a number of characteristics in one individual. Overall risk factor patterns in populations include behavioural and demographic characteristics. The main risk factors for the major chronic diseases frequently cluster in the same individuals. Drinking and smoking commonly go together. People who smoke are more likely to eat a diet high in fats and sugars and low in fibre, polyunsaturated fatty acids, fruit and nutrient rich foods containing Vit A, C and E, take less exercise and drink more alcohol than non-smokers (58–60). Indeed the higher rate of cancer in smokers may be affected by their lower intake of nutrients with antioxidant properties (61) and their higher heart disease rates to lower intakes of polyunsaturated fatty acids (60). There was a positive relationship between smoking and sucrose (58, 62, 63). Non-smokers were more likely than smokers to take part in aerobics, jogging and swimming (64, 65).

The clustering of risk factors in individuals and groups, particularly those at the lower levels of the social gradient suggests that preventive approaches should be directed at clusters of risk factors common to a number of diseases and the social structures which influence individuals’ health risks (66).

**Policy Implications**

A radical shift in the preventive approach to promote oral health is urgently needed. The isolated, compartmentalised and individualistically focused approach will never effectively promote oral health in all sections of the community. The common risk factor approach implemented through a comprehensive health promotion strategy based upon the principles of the Ottawa Charter is more likely to be effective than the present theoretically flawed methods (21,67). Table 1 outlines the key components of a health promotion strategic framework. By focusing action on the common underlying determinants of health, in partnership with a range of other agencies and the communities themselves, sustainable change will be achieved. Such an approach is dependent upon delivering a complementary range of strategies including health education, policy development, community action and legislation.

**Examples of the CRFA in practice**

*Food policy*

Caries levels amongst preschool children remain a public health problem in many parts of the world (68). Treatment services and conventional preven-
Table 3. Prevention of injuries through Health Promoting Schools

1. Personal and social education aimed at developing life skills – focus upon conflict resolution, dealing with relationship problems and health skills in relation to the misuse of alcohol and drugs.
2. School policy on bullying and violence between students to create a supportive social environment within school.
3. Physical environment – play areas, sports fields all monitored for safety and security.
4. School health policy – play areas, sports fields all monitored for safety and security.
5. School health policy – resources and training for staff in first aide procedures.
6. Alcohol policy – restriction on alcohol consumption within school premises.
8. Links with health services – procedures for emergency treatment established, screening programmes staff training and support in health issues.

Dental nutrition programmes have had only a limited success in addressing this problem (69). Rather than focusing only upon caries prevention, an alternative approach is the development of a holistic nutrition programme which aims to improve the overall nutritional status of preschool children (70,71). Such an approach, if successful, will not only reduce NMES consumption and hence improve oral health but will also improve the overall quality of preschool children’s diet and thereby promote their growth and future development.

The range of potential partners involved in a preschool health promotion nutrition programme is outlined in Table 2, together with the various actions that may be adopted. A wide range of sectors are involved in the food chain all of whom have a potential role. Rather than only focus attention on the consumers of food, this approach recognises the importance of influencing key groups from food producers, to manufacturers to government departments (72). Health education forms only one component part of the overall programme and can be targeted at a range of influential partners and professionals, not only the public. Other complementary actions can address cost and access issues in relation to food.

In Brazil food policies in state nurseries in a very deprived region have not only substantially reduced sugars consumption and improved the nutritional quality of the diet but have also successfully reduced caries increments over a one year period (73). Similar food policy guidelines have been introduced for residential homes for older people (74).

Health promoting schools
An emerging dental public health problem in many countries is trauma to teeth and jaws which is both expensive to treat and has a considerable impact on individuals quality of life (75). The causes of dentally related trauma in children is injuries at school in relation to fighting, bullying and sports. The individualised approach to prevention of trauma to front teeth is to treat children with protruding teeth by orthodontics or encourage the use of gum guards. This approach has had a minor effect on preventing trauma.

The WHO Health Promoting Schools programme offers an alternative approach to tackling the problem of dental trauma amongst adolescents (76). Such an approach focuses upon the influence of the social and physical environment on health. The concept of the Health Promoting School places emphasis upon developing a range of complementary policies and actions to promote the health and well being of students, staff and the wider community involved in the school. A Health Promoting School can be characterised as a school constantly strengthening its capacity as a healthy setting for living, learning and working (76). In relation to injuries and the prevention of dental trauma a wide range of actions and policies are possible (Table 3). All these depend upon collaborative working between staff, students, parents, education authorities, local government and health professionals.

Conclusion
Further improvements in oral health and a reduction in oral health inequalities will only be secured through the adoption of oral health promotion policies based upon the common risk factor approach. Isolated individually focused oral health education interventions are ineffective, wasteful of limited resources and may increase inequalities. The CRFA addresses risk factors common to many chronic conditions within the context of the wider socio-environmental milieu. The potential benefits of such an approach are far greater than isolated interventions. Future research needs to evaluate the long term effects of this approach on oral health. To be effective in this style of working oral
health professionals need to develop a range of networking and communication skills to enable them to work collaboratively with other agencies and professionals.

References

Stages of Caries (Tooth Decay) in Children

- Healthy Teeth
- White Spot Lesion Stage
- Mild Tooth Decay
- Moderate Tooth Decay
- Severe Tooth Decay

Tooth decay can be prevented and treated with fluoride and good oral hygiene and dietary practices.

Teeth with mild to moderate decay need to be repaired with crowns and fillings.

Tooth extractions, antibiotics and hospital admission may be required to treat severe decay.
Primary teeth generally begin to erupt at about 6 months of age. Typically the first teeth to emerge are the two bottom front teeth (called the mandibular central incisors), followed by the two top front teeth (the maxillary central incisors).

Tooth eruption typically proceeds from front to back. Most children have a full complement of 20 primary teeth by 31 months of age.

Spacing between primary teeth is both normal and desirable, as this allows room for the larger permanent teeth to erupt without causing crowding.

Important to note is that the timing and pattern of tooth eruption may vary. However, if teeth have not erupted by 12 months of age the child should see a dentist for evaluation.
Permanent teeth begin to emerge around 5-6 years of age for most children. The bottom front teeth (called the mandibular central incisors) are usually first to appear. Around this same time, the first permanent molars, called the ‘six-year-molars’, will also begin to erupt. During this phase of development children have a mix of primary and permanent teeth, known as a mixed dentition.

Dental development remains relatively stable during the early mixed-dentition phase. The child will not begin losing teeth again until the late mixed dentition phase, which occurs around age 10. The second permanent molars, known as the ‘12-year-molars’, begin to erupt at this time. By the early teen years most children have a full complement of permanent teeth.

Primary teeth are usually shed naturally. However, in some cases the roots of the primary teeth do not dissolve so they fail to loosen. In such situations, the child should see a dentist for possible extraction.
Step-by-Step Guide to Fluoride Varnish Application

Equipment & Supplies

Basic tools are needed to apply fluoride varnish and perform an oral exam in a medical setting.

The procedure requires: a good light source (such as a pen light or headlamp), disposable gloves, a bib or paper towel, 2” x 2” gauze squares and the fluoride varnish. A disposable mirror and tongue depressor are optional.

Fluoride varnish is typically sold in unit-dose containers, packaged with individual disposable brush applicators.

Varnish Application

When implemented by healthcare providers, fluoride varnish has been shown to decrease the incidence of tooth decay by 33%.

Applying fluoride varnish is a simple procedure that can be safely performed on infants, children, and adolescents.

**STEP 1.** Dry the teeth using either gauze or other cotton products.

**STEP 2.** Using the disposable, manufacturer-supplied brush, apply the varnish to coat all surfaces of all anterior teeth.

**STEP 3.** Apply the varnish to coat all surfaces of all posterior teeth.

Fluoride varnish is quite sticky. Although children may eat and drink immediately following the application, parents and caregivers should be advised to avoid brushing children’s teeth for the remainder of the day. This helps to maximize the time the varnish is in contact with the teeth.

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Smart Snacking Chart

Healthy Zone

Healthy Snacks
- Water
- Fresh fruits
- Nuts
- String cheese
- Fresh vegetables
- Regular milk
- Plain popcorn
- Cold cut meats
- Cottage cheese

Cavity Causing Snacks
- Juice
- Soda
- Candies
- Cookies
- Fruit snacks
- Sports drinks
- Crackers
- Dried fruit snacks

Cavity Zone

Breakfast

Snack

Lunch

Snack

Dinner

Snack