Inaugural Lecture

UNIVERSITI MALAYA
KUALA LUMPUR

Health Promotion and Disease Prevention
Myths and Reality

Professor Nasruddin Jaafar

Faculty of Dentistry
University of Malaya
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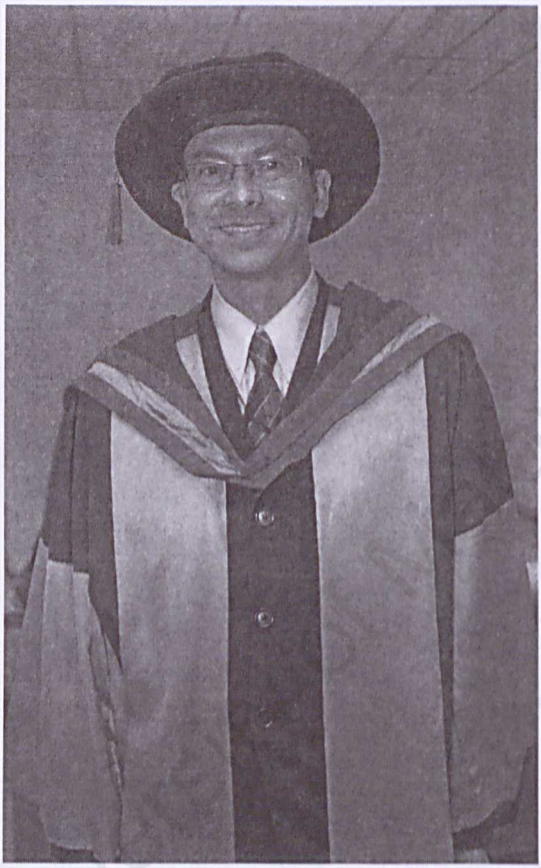

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Abstract:

Mankind has been trying to grapple with the problem of preventing disease and promoting health since the growth of large populations. Many strategies have been tried. In theory there should be a cure for every ill. Consequently, we delved deeper and deeper into smaller and smaller microscopic systems to understand a problem and produce a magic bullet. Multi-complex issues are broken into bit sized pieces and tested on a scientific pedestal. Unitary cures are then prescribed. Sometimes it worked, but most of the time the magic bullet is a myth. That misguided enterprise clouded the real issues affecting health (and oral health), leading to a confusion of priorities. Developing countries become the real losers when they try to solve critical health situations in their countries using the reductionist approach.

It is unfortunate that the more detailed we understand the submicroscopic processes, the less we understand and miss the big picture. Simple public health rules, strategies and policies become side issues not worthy of massive government resources and the scientific community's respect. Economic priorities often outweigh health considerations. Is it true that our population's future health depend solely on our understanding and ultimate destruction of those evil microbes and viruses? Can technology and more specialized doctors guarantee healthy populations in developing countries? Or are we condemned to destroy ourselves and our

civilizations by neglecting the obvious? Should we "Blame everything else except ourselves"?

Professor Nasruddin will discuss the evolution of preventive strategies, trace the several significant phases through history and illustrate how we seem to have come a full circle back to the basic holistic approach. Using the rise and fall of dental caries as a model, he will illustrate how non-traditional preventive strategies can be very effective and has been proven successful that it improved the caries status dramatically in the West within the last 20 years.

However, unbridled health promotion strategies too can create its share of problems and dilemmas. Are we prepared to pay the price? Is prevention cheaper than cure? So what can we in Malaysia learn from the West's painful mistakes? If we are ever to learn from history, then we shouldn't reinvent the square wheel.

Health Promotion And Disease Prevention: Myths And Reality

Aim: the aim of this presentation is to critically assess the evolution of prevention and health promotion over the last three centuries and to analyze the major landmarks related to dental practice and control of the major oral diseases.

Objectives:

1. Introduction: Population growth and the modes of disease control
2. What determines our health?
3. The case of dental caries: from disease treatment, to prevention, to health promotion.
4. Conclusion: current oral health status in Malaysia - what can we learn?

1.0 Introduction: Population growth and the modes of disease control

1.1 The Stone Age.

Mankind has been trying to grapple with the problem of preventing disease and promoting health since the growth of populations. It didn't matter much when small tribes live sparsely separated by large uninhabited areas. Personal dirty habits like poor personal hygiene, non existent public sanitation and absence of public health laws created ripe conditions for disease. Most of the diseases in this era were acute infections. In this scenario, disease outbreaks - whenever it occurred - was naturally controlled or contained. Curative intervention were at best based on observations and past experience of "medicine men". The worse case scenario was that all non-able bodied persons (the weak and the sick) will perish and by the theory of natural selection only the fittest will survive. Gradual genetic adaptations occur over a few

generations since the pace of human evolution is very slow. The upside is that the survivors propagate a new resistant gene pool which was better adapted to the changing environmental conditions to survive and procreate. This was the era of the nomads and cavemen.

1.2 The Renaissance and Impact of Industrialization.

As population growth centers develop, due to mechanization and the growth of factories, people started to live in larger numbers and living together in close proximity. This was the start of urbanization. Mini towns sprouted to become cities. Cities become mega cities. Industrialization and urbanization became synonymous. Then it was no longer possible to contain disease naturally whenever it occurred. Due to close living neighbors, what one neighbor did is bound to affect the other.

Suddenly there was a need to deal with tons of rubbish produced by thousands of inhabitants sharing a small geographic space. Human muck was polluting the population to death. Centralized water supply although a boon for urban living also meant that diseases could be easily distributed through the polluted water distribution network. Acute infectious disease occurrence on a large scale became a nightmare. The Black Death caused by bubonic plague in Europe (1347-1348 AD) killed hundreds of thousands of people. These outbreaks and smallpox in 18th century Europe - were all the results of poor personal hygiene, poor environmental hygiene due to non existent public sanitation and absence of organized community efforts and laws to regulate close quarter living.

The classic case of cholera control by simple epidemiological reasoning of Dr John Snow (1813-1858) in Soho London was a case in point. The cholera outbreak was controlled not by treatment of doctors, but by the simple act of removing the Broad Street water pump that prevented people from ac-

cess to the infected well water. Thus the importance of public health was clearly demonstrated.

1.3 The Modern Borderless World.

Fast forward to the present and future era. We now live comfortably with all the mod-cons. For many people, the most strenuous exercise was changing the channels of the remote control or walking to the fridge to get a snack. Highly nutritious foods coupled with extreme physical inactivity - resulted in mass obesity, rocketing diabetics, blocked coronaries, chronic hypertension, cardiac arrests and rampant caries. All of these are chronic diseases. They are not cured by drugs. They are the diseases of lifestyles and irresponsible behavior.

Acute disease outbreaks whenever it occurred can no longer be contained by national boundaries. AIDS, bird flu, SARS - can all be exported to any corner of the earth within a few hours of air travel. This has never occurred in the Stone Age nor the Renaissance, when air travel was non-existent. Welcome to the new public health era - when disease, illness and human suffering depend on how well we adapt to the modern situation through inter-country collaboration and learning from each others experience. There is yet no cure for AIDS, bird flu or SARS - despite that, based on history, this sort of disease can be contained by concerted public health measures.

We also must be aware of what factors led to the decline of death rates and debilitating acute infectious diseases in the West in the last three hundred years, so that we will not be misled into missing the forest for the trees. This will be the gist of my presentation today entitled: **Health Promotion And Disease Prevention: Myths And Reality.** It is about a journey of self-reflection, of self-discovery, and understanding the limitations of modern medicine and dentistry. To cure diseases, the treatment of the population is as important, if not more important, than the individual.

1.4 The Role of Medicine & Doctors.

In the last half of last century, doctors have been credited for the vast improvements in the population's health. This was fueled by medical marvels due to technological advances of modern medicine and surgery. Doctors can now cut people up, change their organs and repair damage as a matter of routine. In theory there should be a cure for every ill. This was the direct consequence of doctors, dentists and scientists who successfully delved deeper and deeper, into smaller and smaller microscopic systems in order to understand disease and produce THE magic bullet.

Complex disease, anatomical, physiological and pathological processes, are studied and broken down into bit sized pieces and tested on a scientific pedestal. Unitary cures are then prescribed to the individual, rarely to the population in which these individuals lived their lives. While there is no doubt that the cures were successful, it is almost always a short term palliative remedy. Without drastic changes in the environment and personal behavior, the disease tends to recur sooner rather than later.

Usually the motivation to find THE cure is always based on the healthcare industry's economic returns a.k.a profits. Massive capital is invested in research to find the cure. Sometimes it worked, but most of the time the magic bullet is a myth. The reality is that healthcare and the search for a cure has become a profitable industry. But, what is the evidence that medical intervention by doctors is responsible for the vast improvements in the health of populations?

1.5 Myth 1: Doctors are responsible for the decline of disease in the last 300 years.

"The physician must know what the physicians knew before him, lest he deceives himself and others" – Hippocrates.

We know beyond doubt that vast improvements in health indices have occurred in the Western populations within the last three centuries. However, Professor Thomas McKeown (1979) refutes that medical treatment and surgical advances are the major cause of these health improvements. By analyzing the sequence of disease events that has taken place over the last few centuries, he has demonstrated what made Western populations stay healthy and what made the disease prevalence became small and become residual problems. Doctors become effective only when the disease prevalence is small.

McKeown (1979) observed that diseases may be crudely divided into four categories. This was done so that we know in which category the doctor can make an impact, which disease can be prevented, which can be controlled by community prevention and health protection and in which category no one can do anything about and thus needs the doctor to be caring and sharing. To try and treat all diseases on an individual level is a myth because doctors, drugs and technology are always in short supply. Prevention must be made to work before the treatment strategy can make an impact. Tables 1 and 2 show that the majority of diseases are preventable.

Table 1: Categories of disease and the role of doctors (McKeown 1979).

Four Categories	Examples	Notes
1. Relatively intractable	a) Genetic disease b) Wear & tear "disease" c)Occasional specific prenatal environments	Very few < 0.5% live births. Eyesight, Hearing loss, Joints – Geriatrics Problems. Congenital, eg Downs sydrome, Anencephalus, Mental, Blood Dyscrasias
2. Preventable, Associated with poverty.	Poverty causes malnutrition, poor hygiene, poor living and working conditions. Eg. lung cancer, smoking, TB, Cholera, Typhoid, Measles, AIDS, Drug addiction	Eg. Life expectancy in Europe 71+yrs versus only 43+yrs in Africa in 1970's. Intracountry social class differences exist in all countries.
3. Preventable. Associated with affluence	Cardiovascular, hypertension, diabetes.	Overeating, Physical inactivity, Smoking, Alcohol,
4. Potentially preventable, but not known to be related to poverty or affluence.	Common cold, Viral Pneumonia, Viral GIT diseases, Neurotic, Psychotic, Psychosomatic illnesses, Multiple sclerosis, Rheumatoid arthritis, Renal disease, Some cancers. (Motor vehicle related accidents) *	

* Note: Authors addition

Table 2. Dental disease categories and the role of dentists?

Four Categories	Examples	Dental disease & conditions
1. Relatively intractable	a) Genetic disease b) Wear & tear "disease" c) Occasional specific prenatal environments	Cleft lip and palate Some oral pathology conditions.
2. Preventable, Associated with poverty.	Poverty causes malnutrition, poor hygiene, poor living and working conditions.	Periodontal disease Oral cancer Dental caries
3. Preventable. Associated with affluence	Affluence is an enabling factor for a luxurious and irresponsible lifestyle.	Dental caries Dental erosion
4. Potentially preventable, but not known to be related to poverty or affluence.	Motor vehicle related accidents	TMJ disorders Arthritis Maxillofacial fractures & injuries

For all these categories, the common factor one must ask is what is the prognosis for prevention? The treatment and rehabilitation option should always be a short-term option. It should be a top priority only if it there is *no known method of prevention.* It is obvious that more than three-quarters of oral disease conditions are preventable through simple means.

Prevention in a population basis should always be the top priority whenever these criteria are met (Sheiham & Watt, 2003):

1. When the prevalence of the condition is high (e.g. caries and periodontal disease). If it is rare, the condition should be serious (e.g. life threatening such as oral cancer).
2. The impact of the condition on the individual's quality of life is great (e.g. pain, discomfort, functional limitation, social isolation).
3. The impact on the wider society is great (e.g. Cost of treatment, time off work or school etc.)
4. The condition is (easily) preventable, and effective treatment is available.

In dentistry, the two most prevalent dental diseases ie. caries and periodontal disease, lies within Category 2 or 3 (Table 1). They are simply a disease of dirt (poor personal hygiene) and diet (sugar abuse) (Sheiham 2001). While both diseases have been successfully reduced to minimal residual levels in Western populations in the last 15 years, why are these diseases still not eliminated in many developing countries? Curative treatment seems to be the main strategy. However, due to chronic shortage of dental manpower, the treatment option is a myth in developing countries. Because of this, actually there is no choice but to make prevention work as it did in the Western populations in the last 20 years. To do this, we need to understand what led to the decline in disease as well as dental disease in the West. In other words, what are the real determinants of health?

2.0 What determines our health? (and oral health)

The answer may lie with McKeown's (1979) classic analysis of the decline in disease and mortality and the vast improvements in health in the West, over the past three centuries:

1. The most important influence was the improvement in nutrition that occurred around 1700 AD. Healthy well fed people are more resistant to disease through natural immunity. They don't contract disease easily, and they recover faster.
2. Between the mid-19th. century and today, hygiene measures were responsible for at least one-fifth of the reduction in death rates. This was attributed mainly to the control of water- and food-borne diseases. Clean people living in clean environments make poor conditions for bacteria to thrive until it no longer becomes a potential threat to health.
3. The changes in reproductive practices which led to the decline in birth rates was very significant, because it ensured that the improvements in health brought about by other means, was not reversed by overwhelming numbers. The attitude and behavior of healthy people, living in clean environments changed for the better because they know the chances of survival of their children are better. So there is no need to have large families as "insurance".
4. The impact of vaccination and antibiotics was only important in the mid-20th century (penicillin was only produced in 1941; sulphonamides in 1935) but that had very little effect on national mortality trends. The epidemiological evidence showed that the large decline in death rates has already occurred long before the curative technology were available.

Factors (1) and (2) are environmental measures, while (3) is behavioral. Together they account for the bulk of all health improvements in the 18th (environmental) and 19th century (behavioral), while therapeutic measures in the 20th century contributed only to a very small decline when the disease prevalence have become residual (very few). Their sequence in time reflects their effectiveness in maintaining healthy populations (McKeown, 1979). This is a very impor-

tant finding for the Third World to consider when dealing with overwhelming disease and calamity. The West did not conquer their disease problems through the treatment strategy!

What does this tell us about improving the health status of populations in developing countries? Should therapeutic measures be the main strategy to improve our health? Is this supported by historical evidence? What does that mean for the prevention strategies of preventable dental disease - dental caries and periodontal disease? It is obvious that it is the physical and social environment that influences the community and personal behavior, which in turn influences the micro-environment of the human body and microbial infestations. So the long term control of any disease cannot and must not start at the wrong end. Failure to do so will increase inequality in health because the causes of causes were never dealt with.

The question is, now that we understand the limitations of the role of therapeutic or curative technology in controlling diseases in populations, should we continue to ignore the obvious ie to improve the environment and therefore lay the foundations of behavior change by eradicating poverty and illiteracy. We cannot continue to treat disease indefinitely or wait for somebody to discover the magic bullet, drug or vaccine for caries, periodontal disease or oral cancer!

2.1 Myth 2: Germs and Viruses are the enemies of health.

Scientific research has proven that bacteria and viruses are the cause of disease. Thus most scientists and the public will declare war on our immortal enemy – germs (and viruses). They are blamed for almost every ill. It is thought that if we can eliminate all germs in the body then there will be no disease, no caries, no periodontal disease, no AIDS, no TB, no dengue and no suffering.

History has even blamed germs for laziness. In 1902, when hookworm was first discovered as the cause of anemia and lethargy among factory workers, the newspapers in New York headlined "germs of laziness found". It was not the long hours of work in poor factory and living conditions that caused people to become ill, it was germs. The social system responsible for the dirty living conditions was let off the hook. The victims are blamed for their own misfortune (Crawford 1977).

This belief originated from earlier scientific discoveries related to the invention of the microscope and the discovery of tiny organisms (Leeuwenhoek 1632-1723). The invention of super microscopes, the electron microscope in 1931 (Max Knott & Ernst Ruska) made it possible for human disease to be investigated up to the minutest levels – the micro, the nuclear and now at the DNA/genetic level. While there is nothing wrong with pushing the frontiers of knowledge and technology, the downside was that scientists and doctors became increasingly blind to the obvious – the actual determinants of health.

Germs are blamed for causing diseases among the refugees of Sudan, Ethiopia, Afghanistan, Iraq and Palestine. Thus they *"need"* antibiotics! The public lives in fear of touching toilet door handles and shaking hands lest the germs should spread to them. People are bombarded with messages to come to the doctor for screening and check-ups, take their daily dose of health enhancing drugs, swallow their vitamins and minerals and swish their mouth everyday with germ killing solutions. People are blamed if they get sick. The health food industries make a killing out of the people's insecurities. Healthcare becomes an industry and a commodity. The bottom-line of profits gets legitimized – courtesy of the germs.

However, Professor Rene Dubos (1959; 1973) pointed out that germs and viruses are all part of the natural ecology of the environment. They will only cause disease and death if they are allowed to flourish in certain environments. That environment is created by man and his irresponsible

behaviour. The fact is that germs and viruses live in ecosystems which have natural check and balances with one another. That the ecosystem tilted in the germs favour allowing them to flourish is almost always man-made.

For dentistry, caries is blamed on *Streptococcus Mutans*. Periodontal disease is blamed on a host of bacteria which are normally mouth commensals. Do we need vaccines for these? Every human carries these bacteria in different numbers. But only some will succumb. Who are they? The fact that why these bacteria flourish in these people is rarely asked. Blame their unhygienic behavior (never brushed?) or their abuse of sugar. But the never asked question is what chances have the refugees in Sudan, Afghanistan and other war zones to live in clean and healthy conditions? Do they have a choice? Alas sending doctors to treat disease is an easier option compared to changing their environment and behavior through political means and nation building. Not only is the latter difficult, above all it is not profitable to multinational drug companies.

2.2 Myth 3: Curative intervention will reduce the prevalence of disease eventually. Thus diseases can be treated away.

As I have pointed out above, this is wishful thinking. Never in history has any disease been conquered through the treatment strategy. Even the West never produced enough doctors to service their population's needs and had to resort to using doctors from Third World countries to man their hospitals (Doyal 1979). The situation exists till today. Fortunately for them most of the preventable diseases have been conquered through public health means. What remains now are support for the care services – geriatrics, mental and social services – for which there is no cure. There is thus justification for mobilizing more resources as this affects the quality of life. McKeown also points out areas in which medical intervention have been very successful among them anesthesia, surgery and he quotes "dentistry".

"Cure is rare but the need for care is widespread" – Cochrane (1982).

Another aspect of medical (and dental) treatment seldom mentioned is iatrogenesis. Iatrogenesis simply means inadvertent and preventable induction of disease or complications by the medical treatment or procedures of a physician (or dentist). In other words treatment also creates new disease as much as it treats. A medical critic, Professor Ivan Illich (1977) classified iatrogenesis into (i) clinical, (ii) social, and (iii) cultural iatrogenesis.

Doctors often know that the risk of "clinical iatrogenesis" associated with any treatment is inevitable. We hope the benefits outweigh the risks. But often in history it is discovered long after the event leading to untold miseries. For example, Thalidomide, an anti-emetic drug prescribed for pregnant women to prevent pregnancy related vomiting in the 1950's was found to be teratogenic in 1961 - too late for the countless babies born with deformed limbs (Wikipedia 2005). The social and cultural iatrogenesis are less clear to many dental practitioners. The following historical event will demonstrate these concepts.

3.0 The case of dental caries: from disease treatment, to prevention, to health promotion.

3.1 Clinical, Social And Cultural Iatrogenesis – Lessons From The 1st. International Collaborative Study Of Dentistry.

For dentistry, the International Collaborative Study deserves to be mentioned because looking back at the last fifty years, a few events stand out as being "defining moments" in dental history. Such events stand out because they shaped the dental treatment policy of conservation that we now practice.

The first was the discovery of fluorides following forty years of piecing together the puzzle of evidence linking fluorides and low dental caries (1901-1940). The discovery was well known and resulted in a global dental preventive policy

that contributed to the decline in dental caries in many industrialized countries through public water fluoridation and widespread use of cheap fluoridated toothpaste by the end of the 1990's. The second was the discovery of the adhesive resin by Bowen in the 1960's which revolutionized clinical practice with fissure sealants and tooth colored adhesive aesthetic restorations replacing the unsightly dental amalgams and revolutionizing the way conservative cavities are prepared. Small fillings are now possible.

However, the third event, The International Collaborative Study of Dental Manpower Systems or commonly referred to as the ICS (1973 – 1981) is relatively unknown even among the dental fraternity. The impacts of these three discoveries combined, resulted in dental caries being no longer THE massive public health problem it used to be in the West. Despite the fact that the ICS changed forever how dentistry was practiced and taught, many in the dental profession as well as the public have never heard of it.

> Dentists who see in their profession what other dentists can see, must eventually become its victim
> (Hayakawa, 1983)

The impact on dentistry directly or indirectly linked to the ICS 's dramatic findings include "Health promotion", adhesive dentistry, reevaluation of Blacks cavity design, fissure sealing, standard conservative operative procedure for early caries lesions and evidence-based-dentistry.

What are the findings of the ICS that shook the foundations of dentistry and policymakers world wide?

3.2 The International Collaborative Study (ICS 1973-1981): Purpose and hypothesis of study.

In 1973, a multinational study codenamed ICS, was initiated by the US Public Health Service (USPHS) and the WHO with the aims:

1. To assess the relative effectiveness of various national dental care delivery systems, and,
2. To identify those components associated with **favorable oral health outcomes**, for a given society, which might be applicable to other societies.

The operational hypotheses of the ICS are as follows:

Assumed Premise	Assumed benefit
1. **The greater the availability of manpower...** *Eg. Highest Dn:popn ratio 1:<1500 in urban Hannover, Lodz, Trondelag. The best operating dental nurse: schoolchildren ratio 1: 570 in urban & rural Canterbury, New Zealand.(The worst ratio 1:>4000 in rural Dublin, Leipzig, Sydney)*	**The greater the beneficial effect to the consumer.** *Ie. (It was expected more manpower will lead to better oral health status in the population).*
2. **The greater the availability of supporting personnel, in relation to operating manpower...** *(Eg. There were more technicians & chair side dental surgery assistants in Sydney, Leipzig & Hannover) (Very low in Yamanashi Japan)*	**The greater the beneficial effect to the consumer.** *Ie. (It was expected that more supporting dental staff eg. Operating dental nurses, technicians and dental surgery assistants will lead to better oral health status).*
3. **The greater the degree of central control,...** *Eg. The "best" central control in schoolchildren in Canterbury New Zealand & Trondelag Norway.(Very little central control in others).*	**The greater the beneficial effect to the consumer.** *Ie. (It was expected that centrally planned and controlled dental policies to the general population will lead to better oral health status in the population).*

4. The greater the physical ease of contact between consumer and provider,...	**The greater the beneficial effect to the consumer.** *Ie. (It was expected that if everyone can have easy access to dental services, it will lead to better oral health status in the population).*
5. The less direct payment for services,... *Dental service coverage for school children were free and automatic in New Zealand and Norway.*	**The greater the beneficial effect to the consumer.** *Ie. (it was expected that if people need not have to worry about personal financial costs, it will lead to better oral health status).*
6. The greater the degree of quality control,... *High quality meant the "quality of restorations" and early treatment of all disease (especially incipient white spot lesion)*	**The greater the beneficial effect to the consumer.** *Ie. (It was assumed that people given the highest quality dental care, will have better oral health status)*
7. The greater the consumption of fluoridated water,...	**The greater the beneficial effect to the consumer.** *Ie. (It was expected that people living in areas with fluoridated water, should have a better oral health status)*

Ten developed and affluent countries participated in this study which stretched from 1973–1981 namely **USA** (Baltimore), **Canada** (Ontario, Alberta, Quebec), **Australia** (Sydney), **New Zealand** (Canterbury), **FR Germany** (Hannover), **German DR** (Leipzig), **Poland** (Lodz), **Norway** (Trondelag), **Ireland** (Dublin) and **Japan** (Yamanashi).

The countries were selected on the basis that the dental service delivery system must be in operation for **more than 20 years** in addition to 4 major criteria: (i) Degree of Government and Private enterprise, (ii) Use / non-use of auxiliaries

(especially operating auxiliaries), (iii) Different systems of financing (government / private / insurance), and (iv) Defined target groups receiving services.

Common to the participating countries is that ALL had a **high annual per capita sugar** consumption of between 40-50 kg/person/year, **including** a very high intake in Canterbury, New Zealand and Sydney, Australia (more than 50kg per capita sugar intake). In contrast, only Yamanashi in Japan, had a very low per capita sugar consumption of 28.6 kg / person / year.

Statistically representative sample populations were drawn from each country, such that: (i) It is a good representation of the overall country's delivery system. (ii) It contains a representative metropolitan & a non-metropolitan area. (iii) The Dentists:Population ratio **must be lower than 1:3000**. and, (iv) The sample must represent the following age-groups (8-9yrs for schoolchildren; 13-14 for teenagers; 35-44yrs old representing middle aged adults).

The main findings of the ICS were:

(1) Regions with fluoridated public water supply (ie. *Dublin, Ontario, Baltimore, Albert)* showed the lowest caries experience, in both primary and permanent dentition, which was 4 - 5 times better than non-fluoridated areas.

(2) Systems with comprehensive school dental service which emphasized curative treatment (restorative policy) and rewards productivity in that aspect, without emphasis on prevention *(eg. In Trondelag, Norway and Canterbury, New Zealand* showed :

- the highest dmft / DMFT, for all age groups.
- A very high FILLED component that made up most of the DMFT but DECAYED teeth is very low, showing that almost all treatment needs have been met. Ironically the DMFT was much much higher than other countries which had no organized dental services, suggesting that treatment did not reduce disease but actually increased the index. In other words

the more treatment is given, the more long term maintenance needs is being created because of the limited lifespan of fillings. The implication is that more dentists need to be trained in future just to maintain the existing restorations which needed more complex replacements in future. Thus restorations did not stop the vicious cycle, so long as the sugar intake was high.

(3) The adults 35-44 year olds data is even more perplexing:

i) The number of **missing** teeth (MT) in dentate adults, was **very high** in all countries especially Canterbury NZ (16.2), except Leipzig Germany (4.5) and Yamanashi Japan (3.2).

ii) The percentage of **edentulous** adults was nothing short of scandalous. In Canterbury NZ , 35.7% of 35-44 year-olds had no teeth!! as compared to only 0.4% Leipzig and no edentulous persons in Yamanashi Japan.

The International Collaborative Study of dental manpower systems (1978) proved to be a turning point. Why is it that even in countries without dental services, they do not have such high edentulous rates in their middle aged populations? One–third of middle aged 35-44 year-old adults in New Zealand were found to be edentulous despite the presence of ideal dentist: population ratio and superb oral healthcare facilities. One third prevalence of edentulousness among middle aged 35-44 years old does not occur even in countries with very poor dentist: population ratio or non-existent dental health services. For example the natural history of caries or periodontal disease does not lead to edentulousness in this age range in an area in Sri Lanka where there were no dental services and no personal oral hygiene measures (Loe et al 1978). In other words the presence of dentists actually aided the premature loss of teeth.

Drastic action was taken by New Zealand after the ICS preliminary results. These include:

1. A nationwide survey (in 1976) which confirmed the ICS findings, ie: the high tooth loss and edentulousness among 35 - 44 yr-olds is typical of New Zealand as a whole.
2. A National Workshop (in 1978) recommended that simple preventive care at individual & community level could reduce oral disease in children and adults. Thus all first dental visits of schoolchildren must be preventive orientated counseling and oral health education before treatment is started.
3. Modification of emphasis of the targets of the school dental service:
   i) set a national target to reduce fillings by 10%
   ii) criteria for the diagnosis of caries reviewed (ban sharp probes for diagnosis).
   iii) actively discouraging early operative intervention of carious lesions. The maxim "if in doubt fill" is replaced by "if in doubt wait and monitor progress or seal".

As a result of the above modifications there was a dramatic improvement in child oral health in New Zealand as shown below:

The Canterbury NZ experience:

Age group	1973	1980
8 - 9 yr. olds (DMFT - substantial chg!)	3.3	1.3
8 - 9 yr. olds (% caries-free permanent dent.)	11%	34%
12 - 13 yr. olds (DMFT)	8.5	5.1

If we could learn one valuable lesson from the history of dentistry and not repeat its "mistakes", it is that aggressive treatment is counterproductive to dental health and as shown above constitute a clinical iatrogenesis. Why did the middle aged in New Zealand have to lose so many teeth? They were conditioned by societal norms to expect endless cycles of dental treatment, retreatment and ultimately failure of the restorations. Many New Zealanders opted to have all their teeth extracted and replaced by full dentures. The dentists' role was akin to "assisted euthanasia" - if we consider edentulous people as dentally dead! Edentulousness at 35 years of age cannot occur naturally as a result of natural progression of any known oral diseases.

Ironically, when measures of satisfaction were compared with other countries in the ICS, the New Zealand adults were most highly satisfied with their national dental services. But is the aim of having dental services to save teeth or to have highly satisfied but edentulous customers? Therefore prevention should not only include the prevention of clinical iatrogenesis, but also the prevention of "social and cultural iatrogenesis" created by the dependence of the population on doctors and dentists to produce health (Illich, 1977).

The traditional restorative approach per se has been shown to have many shortcomings and does not on its own ensure oral health. Caries is a disease of lifestyles and treatment do not change lifestyles! (Elderton, 1994)

3.3 Myth 4: More doctors and dentists will improve health and dental health?

Quality healthcare is often equated with the number of specialists a country has, the sophisticatedness of medical technology used and the sophistication of the hospital facilities. The seldom asked question was how many can benefit from this massive investment? How many lives lost did it prevent? Is the quality of life restored after treatment?

More doctors with more sophisticated and expensive technology is produced, hoping that it will lead to better "quality" healthcare and by extension "better health". If only as much investment is given on preventive infrastructure as curative, most of the preventable categories of disease would have been reduced to low residual cases, easily treatable with fewer doctors. Ironically, the more specialists the Third World countries train, the more outflow of human capital to Western countries occurs when these doctors migrate. It is a fact now that Third World countries are now producing doctors for the West instead of the opposite. Many doctors from developing countries opted to stay back in Western countries upon graduation there because of lucrative incomes.

For dentistry, how many dentists is enough dentists. How many do we need? Is there an ideal ratio? In Sweden, in 1979 an area where the dentist population ratio was 1:600 the authors claimed that it is still not enough to meet the needs (Hugosen & Koch 1979). If they can't handle it with that amount of resource what chances have we? Are we any closer to the ideal ratio in the near future?

It is noted that Malaysia has responded by opening more private and public dental schools to produce more dentists. The target is to reduce the dentists: population ratio from the current about 1:10,000 to 1:4000. The country has about 2500 dentists in 2005 to serve 25 million population. At the rate of growth of 3% per year the population will grow to about 40 million in about 20 years (2025). That means about 4000 dentists are needed just to maintain the current 1:10,000 ratio or 10,000 dentists to reach the ideally projected 1:4000 ratio.

The current annual production of dentists from local schools UM, UKM and USM is about 200. Assuming another 200 from overseas graduates and probably another 120 from the newly planned dental schools UIA, KUIM and AIMST, the total production might reach 500 beginning 2010. With this production rate by 2025, there will be only about 7500 dentists. Discounting the fact that there will be natural attrition, migration or refusal of overseas graduates to return to

serve, the numbers are likely to be less. Although these figures are at best guesstimates, the reality is that the dependence on the treatment strategy to treat oral health problems is a myth, which is unachievable without the success of population wide prevention.

We must remember that the ICS experience proved that even with 1:3000 dentist population ratios, there is no guarantee that the disease levels will decline if all they ever do is create more fillings. We need preventive orientated dentists who will make prevention work. Since we can never train enough dentists within 20 years, there is actually no choice for Malaysia except to make prevention work.

3.4 Myth 5: We all agree that quality clinical services will lead to quality oral health?

Defining quality is not an easy task. If we ask clinicians to define quality they tend to concentrate on technical and scientific elements reflecting their professional training and expertise. But "quality treatment" is not synonymous with "quality health". High quality dentures does not mean high quality oral health. Quality health is much more than perfect cavosurface angles of fillings, precision of marginal ridge of amalgams or fit of dentures.

Quality health should translate into how effective are we in preventing "pain" and "premature deaths" - in dental terms how many people did we prevent from being edentulous before the end of their natural life? God made the natural dentition to last a lifetime, but many people are becoming "dentally dead" before their biological death.

Even dental lecturers and experts in restorative dentistry do not agree on a common quality standard. In an experiment on 15 dentists' decision to restore teeth in 18 young adults, the variations in which surfaces to restore ranged from 20 to 153 surfaces. Only 40% of the decisions are agreed upon by one-half of the dentists (Elderton, 1983). The question is, are all these restorative treatments necessary? Is there over treat-

ment because of the uncertainty? It is clear that the dentist's philosophy of treatment is more important than other preventive measures taken to reduce the caries index. As a result, Elderton (1990) proposed the use of non-invasive management of caries, the minimally invasive ART technique for deciduous and inaccessible areas and preventive restorations with minimal tooth cutting. The only quality all could agree upon is the preservation of sound functioning natural teeth for the biological lifespan of most people.

The International Collaborative Study (Ingle & Blair 1978; Cohen 1978; Rodda 1978) showed that when quality is technically defined such as maximizing the capacity to provide fillings, the number of fillings shot up beyond what was expected if no dental services were available. Things that gets measured, gets done. So the importance of this findings is that preventive goals must be made clear to all providers, whether public or private dentists, as a matter of national policy.

It is evident that the failure to control tooth loss prior to 1978 was the lack of clearly stated national goals which emphasized prevention. In other words management by objective was not done prior to 1970's. Only the number of restorations done mattered. Dentist weren't very clear what they were supposed to help to achieve for the country, because productivity was measured by the number of fillings done.

Since then, the WHO responded by setting a global goal to reduce dental caries to 3 or less DMF teeth among 12 year-olds by the year 2000. As a result many developed countries now have as low as one or less DMFT at 12 years of age. Sixty percent caries-free 12 year-old school children is the norm in most developed countries now. It is amazing how this change in philosophy served as a powerful tool in promoting oral health and preventing disease worldwide, provided that all service providers understand the big picture and play by the rules.

But who is going to monitor what dentists are doing to individual patients especially those ignorant of the impor-

tance of conservation or those who have never heard of the ICS?? In Malaysia the national goals for oral health 2010 were spelt out in a public document (MOH, 2001) but how many dental practitioners are actually aware of it and how their actions will contribute to it?

4.0 Current oral health status in Malaysia - what can we learn?

Since changes in national policy towards prevention, minimal intervention, fissure sealants and fluoridation in Malaysia, there has been a shift in improvement of dental caries among school children. The DMFT in 12 year-olds in urban areas has now reached developed country status. However the variations in geographically disadvantaged areas remain bleak.

If the lessons from the rise and fall of diseases shown by McKeown and the ICS are anything to go by, then first, there must be a marked improvement in the environment, both physical as well as the social environment. The problem is that in Malaysia, the physical infrastructure advances faster than changes in social environment. First world infrastructure, third world mentality – laments our Prime Minister. With carefully planned health promotion, the population's attitude towards sugar abuse, smoking, personal hygiene, oral hygiene, seat belt use, helmet use and judicious use of health services – could be positively influenced starting with the young.

For adults, where the caries prevalence (DMFT) is almost 90% in Malaysia, they will continue to need maintenance of existing restorations for the next 30 to 40 years. After this cohort, the younger generation should have less restorative and maintenance needs but sustained preventive needs. There would be more opportunities for aesthetic and interceptive orthodontic opportunities. Dentistry would then be rightly associated with services that improves peoples quality of life rather than a pain-relieving profession. That is

our hope and the future expectation of dentistry in Malaysia.

The current elderly cohort over 60 years old are now more than two-thirds edentulous. Their current needs for dentures, full or partial, might last for another 10-15 years, before the new cohort with a higher complement of natural teeth fall into the elderly category. They will need maintenance of healthy teeth.

However all these predictions will come to naught if the increasing number of dentists being trained now and in the future does not adopt a preventive attitude. The lessons from the ICS would not have been learnt. Sending dental treatment mobile teams to disadvantaged rural communities, without efforts to change their environments into safer sanitary practices, potable water supply, decent housing, education and employment opportunities, meant that the lessons from McKeowns rise and fall of diseases in the West have not been learnt. We have finally come to a full circle from disease treatment, to prevention, to health promotion, social action and personal responsibility.

Since the 1970's many researchers have recommended the obvious. The seven key to good health lies in self-discipline and moderation. These are 1) don't smoke cigarettes, 2) sleep for seven hours, 3) eat breakfast, 4) keep weight down, 5) drink moderately (I recommend total abstinence), 6) exercise daily, and 7) don't eat between meals (Belloc & Beslow, 1972; 1973). Virtue will always be handsomely rewarded.

5.0 Conclusion.

1. **First**, We must learn from history.
   - In medicice, doctors and medical intervention have only a very limited impact on the population basis IF the environment and people's behaviour is not changed.
   - Similarly in dentistry, the impact of fillings and restorations are all relatively short-term cures

which will not last unless the total environment and personal behaviour is changed.

- This is the lesson we must learn. Developing countries should not copy wholesale the technological methods used in developed countries at high cost – because that is not how they achieved their healthy populations in the first place. Pay attention to creating healthy environments, then good behaviour will be easier to perform. The resultant low disease levels can then be treated by the few doctors that we have.

2. **Second**, We must also realize that over reliance on treatment and drugs to produce health have led to a lot of iatrogenesis (doctor caused disease).
   - These include not only clinical iatrogenesis, but also social and cultural iatrogenesis (when people become totally dependent on doctors to give them health).
   - So they don't even want to take responsibility for their own unhealthy behaviors or take steps to change their environments.

3. **Third**, We must return to personal responsibility as well as collective social action to modify our living environment. The key to good health lies in moderation in lifestyles.

4. **Finally**, dentists must adopt preventive practices and policies.
   - They have a moral responsibility to make prevention work by counseling all their patients with preventive advice. If not, they will cause more teeth to be lost prematurely. Organized dentistry will then repeat the same mistakes before the ICS (International Collaborative Study).
   - So my advise to all of us is – to choose your den-

tists wisely my friends.

- Visit only preventively orientated dentists who will give you good preventive advise together with quality treatment.
- If they just fill your cavity, take your money and say nothing – then perhaps its time to find a new dentist.

THANK-YOU Ladies and gentleman.

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REFERENCES:

1. Belloc NB & Breslow L (1972). Relationship of physical health status and health practices. Prev Med 1(3), 409-421.
2. Belloc NB (1973). Relationship of health practices and mortality. Prev Med 2(1); 67-81.
3. Cochrane AL (1982). Effectiveness and Efficiency- Random Reflections of the Health Services. London: Nuffield Prov Hosp Trust.
4. Cohen LK (1978). Implications of findings for dental care across cultures. Int Dent J 28; 383-8.
5. Crawford R (1977). You are dangerous to your health – the ideology and politics of victim blaming. Int J Health Services 7; 663-80.
6. Doyal L (1979). The political economy of health. London: Pluto Press.
7. Dubos R (1959). Mirage of health. London: Doubleday Anchor.
8. Dubos R (1973). Man adapting. Yale: Yale University Press.
9. Elderton RJ, Nutall NM. (1983). Variations among dentists in planning treatment. Br Dent J 154; 201-6.

10. Elderton RJ (1990). The dentition and dental care. In: Clinical Dentistry in health and disease Vol.3. London: Heinemann.
11. Elderton RJ (1994). Critical look at operative dentistry. Annals Dent Univ Malaya
12. Hayakawa SI. (1983). cited by Hoffman JH, in: Philosophy in dentistry. CAL Japan and Dentistry July 1983; 28-31.
13. Illich I (1977). Limits to medicine. Medical nemesis: the expropriation of health. Middlesex: Penguin.
14. Ingle JI & Blair P (1978). International dental care delivery systems. Cambridge: Ballinger.
15. Hugosen A, Koch G. (1979). Oral health in 1000 individuals aged 3 toyears in the community on Jonkoping Sweden. Swed Dent J 3; 69-87.
16. Loe H, Anerud A, Boysen H, Smith M. The natural history of periodontal disease in man. J Periodontal Res 13; 550-62.
17. MOH Oral Health Division (2002). National Oral Health Plan. August 2002.
18. McKeown T (1979). The role of medicine: dream, mirage or nemesis? Oxford: Blackwell.
19. Rodda JC. (1978). Restorative dentistry: a dental dilemma. New Zealand Dent J 74; 21-5.
20. Sheiham A (2001). Dietary effects on dental diseases. Public Health Nutrition. 4; 569-91.
21. Wikipedia (2005). http://en.wikipedia.org/wiki/Thalidomide