



UNIVERSITY OF NAIROBI

# Inaugural Lecture

**Achieving Oral Health for all in Kenya:  
A Reality or a Myth?**

by

**Jacob Thuranira Kaimenyi**

BDS (Nairobi), MDS (Mangalore), PhD (Nairobi)

**Deputy Vice-Chancellor (Academic Affairs)**

**And**

**Professor of Periodontology**

**Venue: Multipurpose Hall, 8-4-4 Building,  
University of Nairobi (Main Campus)**

**Thursday, 18th May, 2006**

Med  
Afr  
RK  
341  
K35  
C.5

# **ACHIEVING ORAL HEALTH FOR ALL IN KENYA: A REALITY OR A MYTH?**

**USE IN THE LIBRARY ONLY**

## **Inaugural Lecture**

By

**Jacob Thuranira Kaimenyi**

BDS (Nairobi), MDS (Mangalore), PhD (Nairobi)

Deputy Vice-Chancellor (Academic Affairs)  
and

Professor of Periodontology  
Department of Periodontology, Community and  
Preventive Dentistry

*E-mail:* [jkaimenyi@uonbi.ac.ke](mailto:jkaimenyi@uonbi.ac.ke)

*Website:* [www.uonbi.ac.ke](http://www.uonbi.ac.ke)

University of NAIROBI Library



0514620 4

*Typesetting and Printing:*

School of Journalism  
University of Nairobi  
P.O. Box 30197- 00100  
Nairobi, Kenya

**MEDICAL LIBRARY  
UNIVERSITY OF NAIROBI**







6d 298352  
**PROF. JACOB THURANIA KAIMENYI**

BDS (Nairobi), MDS (Mangalore), PhD (Nairobi)

Deputy Vice-Chancellor (Academic Affairs)  
and  
Professor of Periodontology

## Table of Contents

Contents	Page
Inaugural lecture title and contact details .....	i
Dedication .....	iv
Biography .....	v
Abbreviations .....	xii
Introduction .....	1
General information on Kenya .....	2
Organization of health services in Kenya .....	4
General health policy .....	4
Sources of finances for health in Kenya .....	8
Oral health services infrastructure .....	10
Consequences of the current health care system in Kenya ....	10
Funding options and constraints in oral health financing ....	11
Specific problems that hamper oral health financing .....	11
A summary of the oral health status of the Kenyan people based on some of the studies carried out to-date .....	12
National Oral Health Policy and critical review of efforts made towards its implementation .....	23
Conclusion .....	43
Acknowledgement .....	44
References .....	45
Appendices .....	50



.....

## Dedication

This Inaugural Lecture is dedicated to my wife,  
Stella Gatirithu and my children; Susan, Eva,  
David, Timothy and Anne.

Without their support and understanding,  
I wouldn't have achieved whatever I have done  
to-date, especially in the world of academia.

.....

# BIOGRAPHY

## Birth and Family Background

**JACOB THURANIRA KAIMENYI** was born in Mulathankari location, Meru Central District, on the 10<sup>th</sup> of July, 1952. Early in life, his parents instilled in him a strong sense of responsibility, hard work, discipline and love for God. J.T. as he is popularly known, was fond of his father, a businessman who was an inspiration to the community. His mother, a devout catholic planted and contributed to the growth of the Catholic church in the location. J.T. is married to Stella Gatirithu Kaimenyi and they have raised their five children following the same principles of hard work and determination to excel and serve the society. J.T. has thus been a "first" in several activities at academic, research and community service fronts.

## Education and Distinguished Administrative Experience

Between 1961 and 1967, J.T attended Mulanthankari Primary school, where he sat for the Certificate of Primary Education (CPE). He was admitted to the prestigious Meru School for his O level education, between 1968 and 1971. In 1972, J.T. was admitted to Kenyatta College, Higher Secondary School Division where he sat his A- levels in 1973.

J.T. was one of the pioneer class of the newly introduced Bachelor of Dental Surgery Degree (BDS) Programme in 1974 at the University of Nairobi. Between September 1978 and September

of 1979, J.T. served as a Dental Intern at the Kenyatta National Hospital in Nairobi. After he obtained his registration, J.T. was able to work on rotation in all the departments of dentistry at the hospital. In 1980, J.T was admitted to the college of Dental Surgery in the University of Mangalore, India where he obtained his Master of Dental Surgery (MDS) in 1982. Upon his return to Kenya, J.T. served a three year stint as a consultant periodontologist and Head of the Department of Periodontology and Periodontics at the National Dental Unit, fondly called "Kabete ya Meno". At the Kenyatta National Hospital, J.T. maintained his links with his Alma Mater. He was an honorary lecturer in periodontology and carried out lectures and clinical teaching of the third and fourth year BDS students.

On 15<sup>th</sup> March 1985, J.T. was appointed a lecturer of Periodontology and Periodontics at the Dental School, University of Nairobi. Later in the year, he left Kenya for a nine-month research fellowship at Guy's Hospital of the University of London. He used the time away to treat periodontal disease cases referred from other departments and by private dental practitioners. He pursued research on bone loss in chronic periodontitis from panoramic radiographs. Barely three months after his return from UK, he was promoted to a Senior Lecturer on 1<sup>st</sup> January, 1987. Four years later, the University of Nairobi promoted J. T. to be the first Associate Professor in the Division of Periodontology and Periodontics at the then Department of Dental Surgery, on 3<sup>rd</sup> May, 1991. Between 15<sup>th</sup> October 1989 and 11<sup>th</sup> December 1992, he was the chairman of the Dental School. His responsibility was to oversee and coordinate the day to day running of the school. In 1995, with the inception of the Faculty of Dental Sciences, J.T was appointed chairman of the Department of Periodontology, Community and Preventive



Dentistry. This was yet a busy period for him, but also a most prolific time, for it is in this period that he successfully registered for his doctoral studies at the Faculty of Dental Sciences, University of Nairobi and successfully defended it within a period of four years. His thesis, "Epidemiological and clinical studies of acute necrotizing gingivitis in Nairobi," is widely quoted for its contribution to literature.

It was also in this same period of development that J.T. served as chairman of the University Show Committee. Under his tutelage, the show became an important event for the University to showcase its research, products development and consultancy services.

On 22<sup>nd</sup> February 2000, J.T. became the first elected Dean of the Faculty of Dental Sciences. He was re-elected in 2002 for a second term.

On 11<sup>th</sup> June, 2004, J.T. was appointed Deputy Vice-Chancellor, Academic Affairs. His main responsibilities have been the management of syllabuses and regulations, examinations, postgraduate affairs, research, students' welfare service and academic training.

### **Exemplary National and International Contributions**

J.T.'s academic life has been one with an international flavor. He has represented Kenya in the Association of Professional Societies of East Africa, has served as the president of the East and Southern Africa Section of the International Association for Dental Research and is the current President Elect of the Commonwealth Dental Association. He will be installed its President in December 2006.

Locally, J.T has served as Chairman of the Kenya Dental Association and in a variety of Boards of Schools, church groups, councils and trusts. Currently he is the Vice-Chairman of the Water Services Trust Fund and a member of the Board of Management of Kenya Medical Research Institute. He is also the Chairman of the Board of Governors of Meru School. On 31/1/2006, he was appointed a member of the taskforce for the review and harmonization of education, training and legal framework. J. T's skills as a leader started quite early in all the schools he attended by being appointed a school prefect. This was to be capped later with his appointment as the class representative for his pioneer BDS class for three (3) consecutive years. At the University, he served as a member of the Executive Committee of the Meru University Students Association.

Some of the exemplary National service that J.T has been involved in include: organization of national dental health action months (between 1989 and 2000) and presentation of oral health view points on local radio and television. As a practising Catholic, J.T has been involved in various activities of the Church including fundraising for buildings and schools. Indeed he is currently the Chairman of the Board of Management of Thomas Burke Primary School which was built by the Blessed Sacrament Church, Buru Buru, where he served as the Vice-Chairman of Parish Pastoral Council and Chairman of St. Charles Lwanga Small Christian Community for several years.

### **In the World of Academia**

J.T has a prolific research, scholarship and teaching background. He has served as an external examiner in Kenya, Botswana, Uganda and Tanzania for diploma, undergraduate and post

graduate students. J.T has also been a member of panels to assess foreign trained dentists for pre-registration, pre-internship and remedial courses. *"I believe in maintaining high standards in the dental profession"* he says.

His contribution to academic excellence is encapsulated in the many research papers and publications that he has authored and presented. These contributions on oral health approaches and trends with respect to HIV/AIDs, gum diseases and other oral health related diseases/disorders of Kenyan people have been published in peer reviewed journals such as: East African Medical Journal, Indian Journal of Dental Research, Journal of Periodontology, Journal of Clinical Periodontology, Tropical Dental Journal, International Dental Journal and the African Journal of Health Sciences. J. T. is also credited for being a contributor to chapters in two textbooks of Periodontology and Periodontics.

Since his appointment as Professor, J.T has shown special interest in the oral hygiene practices and approaches for dentists and their families. There is a concern that the physician is not able to heal himself or herself, a paradox from the bible. *"Unmasking that smile"* is a response to the number of people suffering from oral diseases complications. J.T. wants to show that the gums are an important component of the teeth and they must be preserved.

### **One of the Key Pillars for Novel Initiatives Towards a World Class University**

J.T has served the University of Nairobi in several capacities with distinction. The Senate, Council and UNES have benefited from



his vast and solid experience. Some of his achievements include: As Dean of the Faculty of Dental Sciences, he started the Master of Dental Surgery Degree in Oral and Maxillofacial Surgery and he instituted a review of the BDS curricula. In the process, two masters degree programmes are in the pipeline. As a fund and friends raiser, he was able to access funds to start the theatre at the Dental School. This theatre is the centre of oral surgery in East and Central Africa. He renovated the Dental School and in his tenure, there was promotion of a number of dons to professorial appointments. As the Deputy Vice-Chancellor (Academic Affairs), he has been working with a like minded team that is tightening the supervision of postgraduates to ensure that students benefit and graduate on time. At the same time, he is reigning down on cheating in examinations with the insistence of invigilation following the 1:50 students rule. J.T has overseen the reduction of those consultancies which are carried out at the expense of teaching students. He is proud of being part of the team that initiated the process that mainstreamed HIV/AIDS into the curricular and that culminated in the launch and acceptance of the AIDS/HIV policy instrument for the University of Nairobi.

### **Philosophy in Life**

The guiding philosophy in J.T.'s life is "Nothing but the best". He lists Professors David Ndeti, and Cyril Enwonwu of the University of Maryland in USA, as his mentors. These two gentlemen not only supervised his doctoral studies, but they also served as a revelation to him of the power of dedication and perfection in academia. The other guiding principal in the life of J.T is that, **"Whatever you do, you must do it for the glory of God"**.



## **The Inaugural Lecture**

Professor Kaimenyi's inaugural lecture is on a topic which we hope will hold a smile for all of us, a topic that will be memorable and serve to remind us that teeth are our best friend. "TABASAMU MILELE", as they will tell you at Colgate Palmolive East Africa Limited.

# ABBREVIATIONS

AIDS	Acquired Immuno-deficiency Syndrome
ANUG	Acute Necrotizing Ulcerative Gingivitis
ANC	Ante Natal Clinic
COHOS	Community Oral Health Officers
CDE	Continuing Dental Education
CME	Continuing Medical Education
CPD	Continuing Professional Development
CMC	Cytomegalovirus
DMFT	Decayed, Missing, Filled Teeth
FDI	Federation Dentists Internationale
GOK	Government of Kenya
GDP	Gross Domestic Product
ICT	Information, Communication, Technology
IEC	Information, Education, Communication
KEMRI	Kenya Medical Research Institute
KNH	Kenyatta National Hospital
KSH	Kenya Shilling
KMTC	Kenya Medical Training College
MCH	Maternal and Child Health
MOH	Ministry of Health
MOES & T	Ministry of Education, Science and Technology
NHIF	National Health Insurance Fund
NHSSP	National Health Sector Strategic Plan
NGO	Non-Governmental Organization
PhD	Doctor of Philosophy
PPM	Parts Per Million
PHC	Primary Health Care
SNH	System of National Accounts
TF	Thystrup and Fejerskov
UN	United Nations
UNES	University of Nairobi Enterprises and Services
US	United States
WHO	World Health Organization



## INTRODUCTION

As you have been told, my Inaugural Lecture this afternoon is titled, **“Achieving Oral Health For All In Kenya: A Reality or a Myth?”**.

Before presenting my lecture, it is important that we all understand the meaning of “ORAL HEALTH”. Oral Health is defined as, **“The absence of disease and the optimal functioning of the mouth and its tissues, in a manner that preserves the highest level of self esteem”** (WHO, AFR/RC48/9). Oral health describes a standard of oral and related tissues, which enables an individual to eat, speak and socialize without disease, discomfort or embarrassment and which contributes to the general well-being (Department of Health, England – MOH, 2002).

At this juncture, I believe some of you must be asking themselves a very important question, namely, *“what are these oral diseases that are likely to make it difficult for anyone to eat, speak and socialize?”* Ladies and gentlemen, they are a “legion”. For want of time, allow me to show you some of them. In so doing, it will make you appreciate the diversity of oral diseases that exist and are unknown to many of us seated in this audience.

During my presentation, I shall talk about the following:-

- (a) Demography of Kenya.
- (b) Kenyan economy.
- (c) Organization of health services in Kenya.
- (d) General Health Policy.

- (e) Oral health (public/private sectors) personnel in Kenya.
- (f) Breakdown of the number of specialists in various oral health disciplines.
- (g) Sources of finances for health in Kenya.
- (h) Oral health services infrastructure.
- (i) Consequences of the current health care system in Kenya.
- (j) Funding options and constraints in oral health financing.
- (k) Specific problems that hamper oral health financing.
- (l) Oral health status of the Kenyan people based on studies conducted to-date. Where possible, I will indicate the trends of some of the diseases or abnormalities.
- (m) National Oral Health Policy and Strategic Plan for 2002 to 2012 and critical review of efforts made towards its implementation.
- (n) Conclusion.

Over the years, I have carried out research in different areas of PERIODONTOLOGY and PERIODONTICS, which is my specialty. As I present to you the oral health status of the Kenyan people based on studies conducted to-date, this will become very apparent. Efforts will be made to highlight some key findings which have contributed significantly to better understanding of the causes and prevention of periodontal disease. Ladies and gentlemen, over the last 28 years, I have been actively involved in spearheading the promotion of improvement of the oral health care of our people. This too will become quite apparent during my presentation.

**GENERAL INFORMATION ON KENYA** – One that is likely to impact negatively or positively on oral health.

## DEMOGRAPHY

The population currently stands at 33.6 million. 5% of the population is under one year. 20% of the population is under five years. 50% of the population is under 15 years. As at independence in 1963, the population growth rate was 3%. This rose to 4% in 1979 and declined in mid 1995 to 2.9%. The current population growth rate is 2.5%. Life expectancy stands at 54 years because of AIDS pandemic. In the absence of AIDS pandemic, it should be 60 years. The crude birth rate is estimated at 37/1000. On the other hand, crude death rate is estimated at 12/1000.

## ECONOMY

Predominantly agricultural. GDP per capita is about US\$230. The poverty level stands at 50%. The poor are defined as those who cannot meet food or non-food requirements. 30% of the rural population suffer from absolute poverty. On the other hand, absolute poverty in the urban areas stands at 10%. Absolute poor are those who cannot meet the minimum recommended calorific requirement and basic non-food needs. In 1997, absolute poverty levels were estimated at Ksh.1,239 per person per month in rural areas and Ksh.2,648 per person per month in urban areas.

The economy has been on a recovery path since 2002. Real Gross Domestic Product (GDP) computed on the basis of the new System of National Accounts (1993, SNA) expanded by 4.3% in 2004 compared to 2.8% in 2003. Growths were more pronounced in manufacturing (4.1%), construction (3.5%), trade (9.5%), tourism and hotels (15.1%), transport and communications (9.7%). Better performance of the economy was constrained by



poor state of infrastructure, decline in net foreign direct investment, high cost of production, low domestic demand and high oil prices (Economic Survey, 2005).

## **ORGANIZATION OF HEALTH SERVICES IN KENYA (A BRIEF)**

The Ministry of Health (MOH) is structured into three departments: curative and rehabilitative; promotive and preventive; standards and regulatory services. The Division of Oral Health Services falls under the curative and rehabilitative department. Oral Health Division Comprises of Promotive and Preventive Section; Curative and Rehabilitative Sections. The Chief Dental Officer heads the Oral Health Division. He is assisted by the following oral health personnel:- a public health officer, a community oral health officer and a chief dental technologist. Oral health services are offered in public and private sectors which comprise of the following:- hospitals, health centres, dispensaries, nursing and maternity homes, and health clinics. There are two national referral hospitals; Kenyatta National Hospital and Moi Teaching Hospital. Oral health personnel are trained by the government in tertiary and middle level colleges. Oral health personnel also provide services in research institutions and the military hospitals.

## **GENERAL HEALTH POLICY**

This is well detailed in the Second National Health Sector Strategic Plan of 2005 to 2010. According to the said plan, the Ministry of Health intends to reverse the decline in the health status of Kenyans. The **vision** of the sector, "Is efficient, high

quality health care system that is accessible, equitable and affordable for every Kenyan household". The **mission** is, "To promote and participate in the provision of integrated and high quality curative, preventive, promotive and rehabilitative health care services for **all Kenyans**". The plan is further designed to contribute to the accomplishment of Kenya's economic recovery strategy and the achievement of the millennium development goals.

Besides a whole new approach to service delivery, NHSSP II lays out a series of supporting measures ranging from community involvement, human resources and financial management, to monitoring and evaluation, infrastructure and institutional reforms. The indicators, targets and outputs of NHSSP II will be used as the basis for the development of annual operational plans and internal and external annual performance reviews.

Reducing inequalities in health care and reversing the downward trend in health related impact and outcome indicators, are the twin goals of NHSSP II. Six separate but interlinked policy objectives aim towards the realization of this goal:

- Increase equitable access to health services.
- Improve the quality and responsiveness of services in the sector.
- Improve the efficiency and effectiveness of service delivery.
- Enhance the regulatory capacity of the Ministry of Health.
- Foster partnerships in improving health and delivering of services.
- Improve the financing of the health sector.

A thorough review of the experiences with Kenya's Health Policy Framework, 1994-2010 and the efforts to implement NHSSP I (the first National Health Sector Strategic Plan) yielded the basic design principles that guided the development of the second strategic plan. First, service delivery will place human approach squarely at the core of its interventions. Moreover, NHSSP II shifts the emphasis from the burden of disease to the promotion of individual and community health. It does this by introducing the **Kenya Essential Package for Health**, which focuses on the health needs of individuals through the six stages of the human life cycle.

The six distinct life cycle stages include:-

- Pregnancy, delivery and the newborn child (up to 2 weeks of age)
- Early childhood (3 weeks to 5 years)
- Late childhood (6 to 12 years)
- Adolescence (13 to 24 years)
- Adulthood (25 to 59 years)
- Elderly (60 years and over)

These phases represent various age groups or cohorts, each of which has special needs. The Kenya Essential Package Health approach also defines six service delivery levels:-

- Level 1, the community level, is the foundation of the service delivery priorities, because it allows the community to define its own priorities so as to develop ownership and commitment to health services. Communities will be empowered with information and skills. Only in this way can real change towards health life styles be achieved.

- Levels 2 and 3 are, respectively, the dispensaries and the health centres and maternity/nursing homes, which will primarily handle promotive and preventive care, but also some curative services.
- Levels 4-6 are the primary, secondary and tertiary hospitals, which will focus mainly on the curative and rehabilitative aspects of the service delivery package.

## ORAL HEALTH PERSONNEL

As shown on Table 1, the majority of the oral health personnel are dentists. The reason behind having very few trained auxiliary personnel can be traced to lack of a National Oral Health Policy for the country before June 2002. Dentistry being a four handed profession, training of auxiliary oral health personnel is a must. Way back in 1994, we carried out a study to determine the nature of utilization of dental auxiliaries in Kenya (**Kaimenyi et al, 1994**). 81.6% of the respondents used dental auxiliaries and the main reason was to improve efficiency in managing patients. 93.5% of the auxiliaries were on job trained secondary school graduates. 26.3% of the respondents didn't delegate any duties to the dental auxiliaries. In a descending order, the main reasons for non-delegation were: it would be risky to patients, not allowed by law, they didn't find it necessary and that auxiliaries were not held responsible if something went wrong. From this, it is quite obvious that there is need to train dental auxiliaries such as dental hygienists and chairside assistants. Further, they must be allowed by law to carry out certain dental procedures.

Table 2 shows a breakdown of the number of dental specialists in various oral health disciplines. As is quite apparent, the majority are oral and maxillofacial surgeons. The other cadres



are too few to be true. It is therefore not surprising that starting postgraduate degree programmes in all or most dental disciplines is a herculean task if not impossible.

The number of registered dentists in Kenya is about 656. Therefore, the dentist/population ratio is 1:378,000 in the public sector. When all the sectors are combined, the dentist/population ratio improves and becomes 1:60,000. Of the 656 dentists in Kenya, 20% are in the rural areas and 80% are in the urban areas. For people to want to work in the rural areas, the environment must be conducive. At the moment communication; availability of electricity, dental materials, instruments and equipment; as well as the relevant support staff are a major problem.

## **SOURCES OF FINANCES FOR HEALTH IN KENYA**

Table 3 shows the sources of finances for health in Kenya. The two main sources of health care funding are the government and by individual households.

### **GOVERNMENT OF KENYA FINANCING**

Over the past decade, real financial allocations to the public sector have declined or remained constant. Reviews of public expenditures and budgets in Kenya show that total health spending constitutes 8.6% of total government expenditure and that recurrent expenditures have been consistently higher than development expenditures, both in absolute terms and as a percentage of the GDP. The per capita total health spending stands at about Ksh500, showing that health spending remains far below the WHO recommended level of US\$34 per capita. It

also falls short of the GOK commitment to spend 15% of the total budget on health, as agreed in the Abuja Declaration. The under-financing of the health sector has thus reduced the sector's ability to ensure an adequate level of service provision to the population.

GOK funds the health sector through budgetary allocations to MOH and related government departments. Tax revenues as sources of health finance are unreliable, however, because macroeconomic conditions such as poor growth, national debt and inflation often affect allocations to health. Manifestations of the health budget shortfalls are the widespread lack of adequate drugs and pharmaceuticals, staff shortages, and poor maintenance of equipment, transport and facilities.

Over the past two decades, GOK has pursued a policy of cost-sharing to bridge the gap between actual budgets and the level of resources needed to fund public health sector activities. The revenue from the cost-sharing programme has continued to grow in absolute terms and as a percentage of the recurrent government budget. In 2003/04, cost sharing contributed over 8% of the recurrent expenditure and about 21% of the non-wage recurrent budget of the MOH. Because of the worsening poverty situation in the country, however, MOH has changed its cost-sharing policy and replaced it with the "10/20 policy", thus reducing this source of income.

The budgetary allocation for oral health is 0.0016 of the total health budget. In view of this, improvement of oral health care delivery has been an uphill task.

## **INDIVIDUAL HOUSEHOLD FINANCING**

This is mainly from out of pocket user fees, cost sharing and over the counter payment for medications. Given that the majority of Kenyans and indeed the entire sub-Saharan Africa survive on less than a dollar per day, we can all appreciate the lack of effectiveness and the attendant unpopularity of this source of funding.

## **DONOR FUNDING**

Provided by several donor agencies for project and non-project funding. Currently, it constitutes 16% of the health development budget. In some past years, donor contributions were over 90%. Other sources include employers, community based insurance schemes and co-operatives.

## **ORAL HEALTH SERVICES INFRASTRUCTURE**

Most health facilities don't have space for the provision of oral health services. They were put up without taking into account that oral health is a key component of general health. Approximately 75% of dental equipment do not function adequately. The majority of dental laboratories are poorly equipped. Most facilities lack sufficient supplies.

## **CONSEQUENCIES OF THE CURRENT HEALTH CARE SYSTEM IN KENYA**

- (a) Inadequate or poor oral health care services in public institutions.
- (b) Cost escalation in the private sector.

- (c) Lack of access to health services for an increasing section of the population.
- (d) Demoralized oral health care providers.
- (e) Underutilization of the health care providers.

**Has the Government thought about this and put a framework to address these consequences? YES.**

### **FUNDING OPTIONS AND CONSTRAINTS IN ORAL HEALTH FINANCING**

- (a) Raise the level of health budget allocation to MOH. This is likely to lead to rise in taxation.
- (b) Increase cost sharing in public health facilities. If done, it will also lead to further increase in the cost of health care to individuals.
- (c) Establish health insurance schemes. This scenario would in turn increase the risks associated with health insurance. This is something we have lobbied for since I became a dentist in 1978 and no company is willing to go the full length on this matter. It has been a history of unfulfilled promises.

### **SPECIFIC PROBLEMS THAT HAMPER ORAL HEALTH FINANCING**

- (a) Oral health has traditionally been segregated from the general health.
- (b) Lack of appreciation of the importance of oral health to the general health and welfare.
- (c) Oral health doesn't receive priority treatment in health financing programs.



- (d) Negativity towards development of health financing programs.
- (e) Association of oral health services with high cost.
- (f) Incoherent approach in the management of oral diseases.

**Is there a road map to solve these myriad of problems by the Government or any suggestions from stakeholders? The answer is "YES", and I will discuss this in detail towards the end of this Inaugural Lecture.**

### **A SUMMARY OF THE ORAL HEALTH STATUS OF THE KENYAN PEOPLE BASED ON SOME OF THE STUDIES CARRIED OUT TO-DATE**

Attempting to present findings of all studies done on diverse oral diseases and conditions in Kenya to-date is extremely difficult because of the short time allotted to this inaugural lecture. Consequently, I will present findings of some oral diseases that have been identified by WHO as key for every country worldwide (FDI, 2004)

Before going into examining the results of the studies on oral diseases and disorders that have been carried out in Kenya to-date, it is important for one to remind oneself of what "ORAL HEALTH" is. It is, "The absence of disease and the optimal functioning of the mouth and its tissues, in a manner that preserves the highest level of self esteem". As pointed out earlier, oral health describes a standard of oral and related tissues, which enables an individual to eat, speak and socialize without disease, discomfort or embarrassment and which contributes to the general well-being. It is with this meaning in mind, that this lecture shall not only report on oral diseases but also on oral

disorders as well. No National Oral Health Survey has been carried out in Kenya. Therefore, the results of the studies that shall be presented in this lecture are not truly representative of the entire Kenyan population. However, they are very important in that they provide one with a general understanding and appreciation of the oral health status of the Kenyan people. (Kaimenyi, 2004)

## DENTAL CARIES

MEDICAL LIBRARY  
UNIVERSITY OF NAIROBI

### (a) Urban populations

Under 18 year olds have a mean DMFT of 0.2 to 1.8 (Ng'ang'a, 2002). 12-15 year olds have a mean DMFT of 1.2 to 1.9. Handicapped children aged between 5 to 15 years, have a mean DMFT of 0.8. (Ohito, Opinya and Wang'ombe, 1993). Most of these studies have been conducted in the capital city, Nairobi (Ng'ang'a, 2002). For unknown reasons, dental caries status on adults has received very little attention. This is despite the fact that it is the main cause of teeth loss in our National Dental Unit at Kenyatta National Hospital (Kaimenyi, 1988). In one study, 26-59 year olds in a rural population were found to have a mean DMFT of 5.8 (Manji, Bachum and Fejerskov, 1989).

### (b) Rural Populations

Information that has been collected is scanty (Ng'ang'a, 2002). Mean DMFT recorded to-date is below 2 (Ng'ang'a et al, 1993). Molars are the most affected. Lesions are mainly occlusal and involve dentine. Relatively few people have fillings. The prevalence of dental caries is highest amongst the middle socioeconomic groups. Females have a higher prevalence than

males (Ng'ang'a, 2002). **TRENDS IN DENTAL CARIES.** There are no follow up reports of these studies. Consequently, one cannot say with certainty whether dental caries in Kenya is on the increase or not (Manji, 1986).

## **PERIODONTAL DISEASE**

### **Gingivitis**

Prevalence varies between 0.2 to 90% (Kaimenyi, 1993). The severest form of this disease is acute necrotizing ulcerative gingivitis (ANUG). The incidence varies between 0.19 percent and 27 percent in hospitalized cases of protein energy malnutrition (Kaimenyi, 1999). In my study, it was found out that out of the 53,572 patients who were treated at KNH between January 1992 and December 1993, 82 patients (0.15 percent) had ANUG. Their age range was 1.5 to 46, with a mean of 14.5 years. The most affected ethnic groups were Kikuyus and Luos. 72 percent of the patients were seen in March and April and between September and December. It was concluded that the frequency of ANUG was low, ANUG affected children and adults and that ANUG varied seasonally. The common clinical features of this disease (Kaimenyi, 1999), include gingival ulceration (61.9%), poor oral hygiene (47.6%), inter-dental craters (39.7%) and submandibular lymphadenitis (34.9%). In a related study, I examined 1,802 children from Nairobi primary schools and found only one (1) case of ANUG. This means that the prevalence of ANUG amongst these children was 0.06%. I inevitably concluded that the prevalence of this disease in Kenya is very low (Kaimenyi, 1997).



## Chronic Periodontitis

Prevalence varies between 1 to 85%. The number of patients with chronic periodontitis increases with age (Kaimenyi, 1991). In one study in Kenya (Kaimenyi, 1993), 75-85% of the 65 year olds were reported to have periodontal pockets in Machakos District. In my 1992 study when I analyzed the oral hygiene status of the participants as per their socio-economic status, I found out very unusual results. Their plaque index increased with increase in income. This result was contrary to other studies. It was difficult to explain this. Probably the higher income group in the study comprised of people who were not keen on brushing their teeth. Periodontal disease is so common to the extent that the majority of those seated here this afternoon are likely to be suffering from it or will suffer from it at some point in their lives. The following are the signs and symptoms of periodontal disease:- bleeding from the gums upon brushing or the slightest touch, change in colour of the gums so that they look bluish, reddish or magenta, swelling of the gums, shift in the margins of the gums towards the bottom of the teeth, weak gums in that the gums can be easily detached from the tooth surface, weak teeth in that one feels pain or uncomfortable upon chewing, loose teeth, elongation of teeth, shifting of the positions of the teeth, flaring of teeth, development of spaces between the teeth which were not there, oozing of pus upon digital pressure on the gums, hypersensitive teeth to cold, hot foodstuffs or touch by a metallic instrument, dull toothache upon taking something cold or hot, forceful wedging or lodgement of food between the teeth upon chewing, relief of pain or discomfort between the teeth upon using a tooth pick, ulceration of the gums and foul smell from the mouth (Kaimenyi, 1984). Any of these signs and symptoms may occur singularly or severally. In Kenya and East Africa in



general, many patients have heavy plaque and calculus deposits but minimal or no destruction of the periodontium.

### **Juvenile Periodontitis**

Prevalence amongst young adults aged 18 to 26 years was 0.28% (Wagaiyu, E. and Wagaiyu, C. 1992). They examined 350 National Youth Service trainees out of a total population of 1000, and found only one (1) case of Juvenile Periodontitis. This percentage falls within the range of published prevalence of 0.1% to 3.4% among young adults globally (Kaimenyi, 2004).

## **OTHER ULCERATIVE ORAL LESIONS**

In general, other ulcerative lesions amongst patients seeking dental treatment are rare (0.12%) (Kaimenyi and Guthua, 1994). Of these, 5% are NOMA, 25% are aphthous ulcers, 5% are atypical ulcerations, 10% are angular cheilitis, 5% are oral candidiasis (dorsum of tongue), 10% are aspirin burns and 5% are radiotherapy induced. Of these ulcerative lesions, NOMA needs more attention. The term NOMA or CANCRUM ORIS as it is commonly called, is used to designate "a spontaneous process of gangrenous necrosis which starts on the oral mucous membrane of the oral cavity and may spread rapidly to the neighbouring structures". Occasionally, this spread may be fatal (Kaimenyi and Guthua, 1994). The fatality rate has been reported to be between 53.3% and 77.7%. The highest fatality is usually among children under two years old. The earliest features of cancrum oris include: excessive salivation, marked fetor oris, facial oedema and grayish black discolouration in the affected area (Kaimenyi and Guthua, 1994).

NOMA often times occurs as a complication of Acute Necrotizing Ulcerative Gingivitis. The cause(s) of both diseases, continues to be a subject of much debate. Since Plaut and Vincent came to recognize the fusiform bacilli and spirochete nature of ANUG for the first time, several medical and dental scientists have continued to implicate micro-organisms in the aetiology of ANUG. The fact that symptoms of ANUG abate remarkably following antibiotic therapy tends to support the infection theory. However, it is difficult to sustain the theory of a specific infection by Vincent's organisms, when it is considered that these micro-organisms are also present in simple gingivitis and that all attempts to produce ANUG lesions in the human by transfer of fusospirochetal organisms have failed (Kaimenyi, 2001).

The following predisposing factors have been identified:-

- (a) Sepsis, stress and smoking. The three form a *triad* of inter-related predisposing factors.
- (b) Cytomegalovirus (CMV) i.e. Viral aetiology.
- (c) Poor oral hygiene.
- (d) Systemic diseases. These include: acute monocytic leukaemia, common cold, measles, small pox, malaria, herpetic infections, kalaazar, metallic intoxication and influenza.
- (e) Malnutrition. Some people have reported that these diseases occur only in children from low socio-economic groups (Jimenez and Baer, 1975). Because of this, ANUG has been described as, "A SOCIO-ECONOMIC LESION," and sometimes, "A POOR MAN'S DISEASE." (Enwonwu, 1972).

The exact role of malnutrition in the causation of ANUG

continues to be rather speculative. There are those who argue that it causes release of cortisol which in turn lowers one's immunity making one susceptible to ANUG (Cohen-Cole et al, 1983). It would appear that there is a threshold level of lowered immunity at which some of the micro-organisms associated with ANUG become pathogenic. This might indeed explain the peculiarities of ANUG worldwide:-

- (a) That it doesn't affect all patients with compromised immune status such as HIV/AIDS and those suffering from other systemic diseases.
- (b) That it doesn't affect all patients with psychiatric problems.
- (c) And that it doesn't affect all the patients with very poor oral hygiene. In the circumstances, I have proposed a theory for the genesis of ANUG which is summarized on **diagram I** (Kaimenyi, 1997).

## **TRENDS IN PERIODONTAL DISEASE**

Based on the review of studies carried to-date, one can comfortably, state that there is no unequivocal evidence that periodontal disease is on the increase in Kenya (Kaimenyi, 1993).

## **DENTAL FLUOROSIS**

Data has been collected using either Dean's or Thystrup and Fejerskov (TF) indices (Ng'ang'a, 2002). The prevalence ranges between 44% (using Dean's index) to 72% using TF index. It also varies from place to place (Gitonga, Nair and Manji, 1984; Manji and Kapila, 1984) and the severity increases with rising concentrations of fluoride in water (Opinya et al, 1991). In some places, dental fluorosis is found to be substantially higher than would be expected from the levels of fluoride in drinking water.

A number of hypotheses among them altitude and fluoride ingestion from other sources, have been suggested. Between 60.4% and 84.3% of Kenyans view dental fluorosis as an important problem because of its unfavourable effects (**Mwaniki, Courtney and Gaylor, 1994**). While 60% of respondents in some studies have attributed the problem to water, knowledge on perceived methods of prevention of dental fluorosis is significantly low. Fluoride in some of the Kenya lakes such as Lake Nakuru is as high as 2,400ppm. Skeletal fluorosis has been reported amongst patients drinking borehole water with fluoride levels of 18.29ppm (**MOH, 2002**).

### **MALOCCLUSION**

Reported prevalence rates are as follows:- 39% amongst 3-15 year olds (**Ng'ang'a, 1991**), 47% amongst 13-15 year olds (**Ng'ang'a, 1991**) and 58% amongst 12-18 year olds (**Ng'ang'a et al, 1993**). Of these, 84% have neutral occlusion, 11.5% distal occlusion, and 5% mesial occlusion (**Ng'ang'a, 1991**). As is quite apparent, the data vary from one study to another. These variations are probably due to the wide differences of some of the study populations cited and the subjectivity of the criteria applied in diagnosing occlusal anomalies.

### **OCCURRENCE OF IMPACTED TEETH**

Has only been investigated on third molars amongst radiographs (**Guthua and Mwaniki, 1992**). Most of the impactions are mandibular and occur bilaterally. Unfortunately, no follow up studies related to other impacted teeth are available. Permanent canines for example are seen to be frequently impacted in clinical situations, yet this has not been documented (**Ng'ang'a, 2002**).



## **OTHER OCCLUSION RELATED PROBLEMS**

### **Artificial Sucking Habits**

The prevalence is low (Ngatia et al, 2001). As expected, a significant correlation was reported between anterior open bite and digital sucking, but the need for orthodontic treatment due to thumb sucking was considered too low.

### **Supernumerary Teeth Amongst Children**

The reported prevalence is 3.7% (Ng'ang'a, 2002). Male/female ratio is 1:1. Supernumerary teeth occur more frequently in the mandibular premolar areas followed by the maxillary incisor areas.

## **HYPODONTIA**

The prevalence amongst children studied has been reported as 6.3% (Ng'ang'a, 2002). Of these, 80% lack one or two teeth and 8% have two or more teeth missing in the same quadrant. Most frequently missing teeth are mandibular second premolars. Since this was a selected sample, it cannot be taken to be representative of the general population.

## **CRANIOFACIAL BIRTH DEFECTS**

The most common birth defects are cleft lip and palate (MOH, 2002). It is estimated to affect 1 out of 1000 live births. There are about 30,000 untreated cases in Kenya.

## EDENTULISM

No prevalence studies have been conducted to-date. However, it is important to note that the main cause of tooth loss in Kenya is dental caries (**Kaimenyi, 1988**). In a study that we carried out retrospectively on 2,965 patients who had undergone extractions for various reasons, we found out that the commonest causes of teeth mortality at the Kenyatta National Hospital in a descending order were: Dental caries (80.88%), Periodontal disease (12.78%), Orthodontic considerations (6.51%), Supernumerary teeth (0.3%), over-eruption (0.03%) and Trauma (0.03%).

## ORO-FACIAL PAIN

Although patients with disabling diseases such as temporomandibular disorders, Sjogren's syndrome, trigeminal neuralgia and postherpetic neuralgia, fibromyalgia and Bell's palsy present with some pain, no studies on these diseases have been carried out in Kenya. However, clinical experience shows that pain is a common symptom of craniofacial disorders and almost 80% of adults report some form of oro-facial pain in their lifetime (**MOH, 2002**).

## MAXILLOFACIAL TRAUMA

This is a common occurrence in the urban society where interpersonal violence is the main cause (**Mwaniki and Guthua, 1990**). Unintentional injuries many of which include head, mouth and neck injuries are common (**Ohito, Opinya and Wang'ombe, 1992; Ng'ang'a and Valderhaug, 1988**). Amongst 13 to 15 years olds in Nairobi, the reported prevalence of fractured anterior teeth is 16.8% (**Ng'ang'a and Valderhaug,**

1988). Boys have a higher prevalence than girls. Causes of traumatized anterior teeth include fall, assault, stationary objects, opening bottle tops and road traffic accidents. Falls alone account for 77% of all injuries (Ng'ang'a and Valderhaug, 1988). Falls as the main cause of dental injuries (73.5%) was confirmed by a recent study by doctors Muriithi, Masiga and Chindia amongst 0-15 year olds (Muriithi, Masiga and Chindia, 2005). The other rare causes included donkey kick (0.2%) and dog bite (0.2%). Trauma to anterior teeth is known to be related to the severity of overjet in some communities but no studies have been carried out to-date (Ng'ang'a, 2002).

## ORAL CANCER

A retrospective study covering a 9 year period from 1968 to 1976, revealed that the frequency of oral cancer in Kenya is very low (Onyango and Prabu, 1980). Oral cancer accounted for 2% of all malignancies. Amongst Africans, Kenyans of Somali origin and Kikuyus showed the highest rates of occurrence. On the other hand, amongst non-Africans, Kenyans of Asian origin showed the highest rate of occurrence. Cancer of the tongue and the palate were common compared with other intra-oral sites. Another recent study (Onyango et al, 2003) was done to determine changes in the pattern of oral cancer for the past 20 years (1978 to 1997). Of the 22,788 malignancies that were diagnosed during this period at the National Referral Hospital, 3.6% were oral cancer. The most preferred site for oral cancer was the tongue. Comparison with the previous study did not demonstrate a dramatic change in the frequency or pattern of oral cancer in Kenya, despite changes in lifestyle and emergence of AIDS in the country.

## HIV/AIDS

In a cohort of women at high risk of AIDS, oral candidiasis was found to be the most common oral lesion (Wanzala et al, 1989). Clinical symptoms of viral infections, such as herpes labialis and oral ulcers are common in adulthood, affecting about 20% of adults between 25 to 44 years of age.

Ladies and gentlemen, I trust that I have managed to give you a bird's eye view of oral health in Kenya.

## NATIONAL ORAL HEALTH POLICY AND CRITICAL REVIEW OF EFFORTS MADE TOWARDS ITS IMPLEMENTATION

Kenya has recently (MOH, 2002) formulated an Oral Health Policy that addresses or gives direction on improving the oral health of her citizenry. The policy is referred to as, "**NATIONAL ORAL HEALTH POLICY AND STRATEGIC PLAN: 2002 TO 2012**" (MOH, 2002).

I happen to be very privileged to have been the chairman of the taskforce that drafted the said policy and strategic plan. Other members of the committee included:-

1. Dr. Meshack Onguti - Chief Dental Specialist.
2. Dr. Bernard Mua - A representative of the Ministry of Health.
3. Dr. Peter Wanzala - A representative of KEMRI.
4. Mrs. Anastasiah Kimeu - A representative of KMTTC (Secretary to the Task Force).
5. Dr. Loice Gathece - A representative of the University of Nairobi, Faculty of Dental Sciences.



We also had Dr. Sam Thorpe from WHO as a Technical Advisor. The exercise was sponsored by MOH, WHO and Colgate Palmolive East Africa Limited.

The mission statement of the said policy reads, "The National Oral Health Policy shall, within the next 10 years, lead to the establishment of a comprehensive oral health care system fully integrated in the general health, and based on primary health care, with emphasis on promotion of oral health and prevention of oral diseases".

The system will ensure continued facilities for curative and rehabilitative care, within the available resources, **so that all individuals and communities are assured of improved levels of oral health and function.**

The **General objective** of the policy is, "To ensure that Kenyans enjoy improved levels of oral health and function by significant lowering of oral diseases burden, equitable cost-effective quality oral health care and adoption of healthy lifestyles through promotion of public, private and community partnerships" (MOH, 2002).

### **Specific Objectives**

The policy has specific objectives geared towards addressing the following oral health delivery related issues:- integration, coverage, scope of care, quality assurance, vulnerable groups, technology, human resource, community involvement, partnership, information and research.

#### **1. Integration**

- To integrate oral health programmes into PHC activities.

## **2. Coverage**

- To ensure equitable access to oral health care.
- To ensure advocacy for oral health care is conducted among all stakeholders.

## **3. Scope of care**

- To ensure mechanisms for the provision of emergency oral health care, e.g. relief of pain.
- To ensure NHIF and other health insurance schemes cover oral health diseases and disorders.

## **4. Quality assurance**

- To ensure high level of professionalism and ethics in delivery of oral health care to the public.
- To put in place cross-infection control measures at all levels of the oral health care service.
- To establish appropriate means of dental waste disposal in dental clinics e.g. mercury, needles and extracted teeth.

## **5. Vulnerable groups**

- To ensure that appropriate measures are in place to take care of the oral health needs of vulnerable groups such as: refugees, children, pregnant women, the elderly, the disabled and prisoners.

## **6. Technology**

- To ensure that district oral health services focus on community oral health needs and utilize available and appropriate forms of technology.
- To ensure proper and sustainable maintenance of oral health equipment.

## **7. Human resource**

- To ensure availability of adequately and appropriately trained oral health personnel.
- To ensure there is regular monitoring and evaluation of oral health training programmes.
- To equitably distribute oral health personnel at all levels of the oral health services.

## **8. Community involvement**

- To facilitate community participation in the planning, implementation and evaluation of relevant oral health programmes.

## **9. Partnership**

- To promote and encourage effective partnerships with NGOs, Commerce and Industry, Aid Agencies, WHO and other UN Agencies.

## **10. Information**

- To develop an effective oral health management information system.

## **11. Kenya oral health services**

- To increase annual oral health budgetary allocation.
- To put in place mechanisms for monitoring and evaluation of the National Oral Health Policy.

## **12. Research**

- To identify areas where there is lack of essential data and where existing data need to be strengthened.

The effective implementation of the National Oral Health Policy and its sustainability will be guided by the following principles:-

*(a) Preventive And Promotive Oral Health Care*

Essentially aimed at creating oral health awareness through targeted information, education and communication (IEC) to all i.e. policy makers, the public and professionals, in order to advocate for the need to have oral health as an acceptable component of general health.

*(b) Curative And Rehabilitative Care*

The focus here will be to reduce barriers between people and oral health care services such as costs, culture, access and ensuring promotion of public, private and community partnerships to deliver and improve oral health care.

*(c) Strengthening And Promotion Of Research*

This will be achieved through identifying research priority areas in oral health, in order to accelerate the building of science and evidence based care to guide planning, implementation and evaluation of oral health services. This principle is good if only we take it seriously as a nation. Every ministry is meant to have a research unit or a component of research in one of the Departments/Divisions. The unfortunate state of affairs is that most ministries have no active research and development sections. MOH is no exception. To compound an already existing gloomy scenario, very little money if any, is set aside for research. As a country, we need to be bold and wise enough to precisely set aside sufficient funds for the relevant research in each ministry. At the moment, the government has set aside 0.6% of GDP for research, although what is disbursed is much less! Research as you know is the engine and catalyst for any



meaningful development. We know this obvious fact but we have continued paying lipservice to it for unknown reasons. Research in this country faces many other challenges which include:-

1. Lack of harmonization of research policies.
2. Research is delinked from development.
3. Limited research and especially applied research. Oral health research is no exception in this regard.
4. Limited mechanisms and arrangements for the dissemination and utilization of research findings.
5. Absence of up-to-date research bank of inventories and directories of what has been done or is being done.
6. Limited demand driven and collaborative research between universities/research institutions and private sector/industries.
7. Weak institutional capacity in terms of human resources and equipment.
8. And inadequate prioritization of research vis-à-vis goals, aspirations and commitments (MOES & T, 2005).

Research helps us to make evidence based recommendations. For example, many of us used to recommend that people should be discouraged from chewing khat (miraa) because it causes decay and might be associated with poor oral hygiene. In 1991, we carried out a study to find the effects of chewing khat on teeth of 231 khat chewers in Meru. We compared the health of their teeth with that of 199 non-khat chewers. We found out that the mean surfaces of the teeth without dental caries among khat chewers were more than those of non-khat chewers. This was particularly true of the mesial surfaces of the teeth. It was

concluded that there was no evidence to show that chewing khat was detrimental to the health of the teeth (Jorgensen and Kaimenyi, 1991).

#### *(d) Oral Health Services Development*

Efforts will be made to strengthen the national oral health structures, processes and outcomes in order to be more responsive to oral health needs and priorities of Kenyans.

To be able to achieve the aforementioned twenty (20) specific objectives, the policy has stated very clearly the strategies which have been identified for the implementation of each one of them. Since these strategies are many (62), and for want of time, allow me to discuss some of the strategies identified for implementing the following key specific objectives;

1. To integrate oral health programmes into PHC activities.
2. To ensure equitable access to oral health care.
3. To ensure advocacy for oral health care is conducted among all stakeholders.
4. To ensure that district oral health services focus on community oral health needs and utilize available and appropriate forms of technology.
5. To ensure mechanisms for the provision of emergency oral health care, e.g. relief of pain.
6. To ensure high level of professionalism and ethics in the delivery of oral health care to the public.
7. To put in place cross-infection control measures at all levels of the oral health care service.
8. To ensure that appropriate measures are in place to take

care of the oral health needs for the vulnerable groups, e.g. children, refugees and prisoners.

9. To regularize proper and sustainable repairs and maintenance of oral health equipment.
10. To ensure availability of adequately and appropriately trained oral health personnel.
11. To equitably distribute oral health personnel at all levels of the oral health service.
12. To increase the annual oral health budgetary allocation.
13. To identify areas where there is lack of essential data and where existing data need to be strengthened.

The strategies which I am about to present are what I consider as recommendations or the road map for spurring the improvement of oral health in Kenya as the Government tries very hard to achieve the following global oral health goals as recommended by WHO and FDI World Dental Federation way back in 1981 (FDI, 2004):-

1. 50% of 5-6 year olds to be free of dental caries.
2. The global average to be no more than 3 DMFT at 12 years of age.
3. 85% of the population should have all their teeth at the age of 18 years.
4. A 50% reduction in edentulousness among 35-44 year olds, compared with the 1982 level.
5. A 25% reduction in edentulousness at age 65 years and over, compared with the 1982 level.
6. A database system for monitoring changes in oral health to be achieved.

These goals were to be achieved by the year 2000. Taking into account what I presented to you earlier, do you think by the end of 2000, Kenya had achieved these goals? I leave that for you to ponder.

Ladies and gentlemen, you are all aware that one can have a great strategic plan and yet achieve very little of what is stated in the mission. Why? Because of a multiplicity of factors such as:-

- (a) Inadequate finances.
- (b) Lack of goodwill from stakeholders.
- (c) Inadequate resources especially the requisite human resource.
- (d) Unrealistic or over-ambitious arrangements/plans.
- (e) Lack of commitment and passion for change by the key implementation personnel within a given government department.

Kenya like any other country, is likely to be a victim of all these scenarios. In the circumstances, I will comment on what has been achieved to-date, four years down the line since that wonderful document was crafted. Equally important and where possible, I shall endeavour to explain why we have failed to meet some of the main objectives.

## **1. To integrate oral health programmes into PHC activities**

### *Strategies*

- (a) Advocate for inclusion of oral health component at all PHC programmes.



- (b) Develop appropriate IEC materials.
- (c) Increase availability of mobile dental clinics. As we talk now, there are only three mobile dental clinics in the government hospitals/clinics. It is only recently that the Kenya Dental Association set wheels in motion to acquire one. I do hope that once they acquire it, they must put in place arrangements for regular repairs and maintenance. The idea of mobile dental clinics is to take basic dental care to the places where people live and work. For some, they are too poor to afford transport to the nearest fully equipped dental facility. Faced with a choice between "expensive" dental treatment and "sukuma wiki", the poorest of our society are likely to go for the "sukuma wiki" than dental treatment for obvious reasons.
- (d) Raise awareness that oral health arises from the same conditions as general health.
- (e) Train community health workers in oral health care.
- (f) Ensure participation of oral health personnel in the national campaigns and programmes on HIV/AIDS.
- (g) Integrate oral health messages into other existing programmes such as: nutrition and campaigns against tobacco use, alcohol consumption and violence.

To the best of my knowledge most of these strategies have as yet to be actualized. Participation of oral health personnel in national campaigns and programmes on HIV/AIDS has improved but there are so many instances where general health personnel don't remember to involve oral health personnel in our relentless fight against this pandemic or monster. This is despite our spirited-effort and recommendation to have oral health integrated into primary health care way back in 1984

(Kaimenyi, 1984). Ladies and gentlemen, if oral health messages are integrated into other existing programmes such as nutrition, campaigns against tobacco, alcohol consumption and violence, we shall utilize our health personnel better especially the oral health personnel. This practice will definitely cut down on the cost of promoting such messages and also reduce boredom and the occasional hopelessness amongst our oral health care personnel, which is related to lack of dental materials and instruments.

**2. To ensure equitable access to oral health care.**

*Strategies*

- (a) Provide adequate supplies of drugs, dental equipment and materials to all health facilities.
- (b) Deploy adequate number of oral health personnel to all relevant areas.

These are all very good strategies. To operationalize them, I want to believe that the Division of Oral Health at the Ministry of Health has done "needs assessment" for the entire country with regard to drugs, materials, instruments and equipment at all levels of our health facilities.

**3. To ensure that advocacy for oral health care is conducted among all stakeholders.**

*Strategies*

- (a) Mobilize the private sector, local authorities, public sector and NGOs to promote oral health.

- (b) Advocate for multidisciplinary and multisectoral approach to oral health care.

None of these strategies have been implemented, yet, they are a very practical way of multiplying the number of stakeholders involved in the promotion of good oral health of the Kenyan people. In my view, to meet this objective, very little funding is required. Therefore, the sooner we get on with it the better. To mobilize other people and to be a good advocate for a worthy course requires one to have certain skills. Do dentists have such skills? I am not sure the majority have them. Why? Most dental syllabi don't cover these skills. It is presumed that one will acquire them naturally. In my view, our dental students or any Kenyan university student should be taught in a holistic manner. They should be trained on how to negotiate, lobby, fundraise, start and run a business, communicate better or how to sharpen their leadership skills. They should have basic ICT skills too. The days of a "robotic student" are gone. We don't want students who if you tell to manufacture or produce a gadget to kill others, go ahead to do it without thinking of the consequences on the environment or humankind in general. This happened in Germany during the Second World War. If our students learn history, cultures of other people and are good at more than one international language, they will become better businessmen and women. In summary, we need a student with good skills for self-determination and survival in this complex global market. If our oral health care personnel such as the dentists are equipped with skills that I have alluded to, they would be better placed to lobby for several things.

For example, they can lobby for reviewing the Medical Practitioners and Dentists Board Act so that they are better represented in the Board instead of having only two elected

members. None is appointed like the medics by the Minister for Health. Further, there is dire need for lobbying for the review of the relevant acts so that a dental officer can be appointed a Director of Medical Services or the Chairman of the Medical Practitioners and Dentists Board.

As it is now, dentists are seen as junior partners in matters of health care delivery, which is unhealthy and in my opinion unjustifiable. There are other interests which oral health personnel need all the requisite armamentarium to lobby for, so as to be satisfied with their jobs and professions (Kaimenyi, 1986).

4. **To ensure that district oral health services focus on community oral health needs and utilize available and appropriate forms of technology.**

### *Strategies*

- (a) Carry out needs assessment. To the best of my knowledge, this hasn't been done and yet it is simple and cheap just like the earlier objective.
- (b) Identify and use available, acceptable and appropriate technologies. For example, use of a chewing stick (mswaki) should be promoted because it has been demonstrated unequivocally that in instances where there are moderate plaque deposits on the teeth, it is as efficacious as the conventional toothbrush in plaque control (Ndung'u and Kaimenyi, 1990). It is a truism that chewing sticks are used by many of our children in the rural areas with much success in maintaining an oral hygiene that prevents periodontal disease (Kaimenyi and Ndung'u, 1993).



5. **To ensure mechanisms for the provision of emergency oral health care, e.g. relief of pain**

*Strategies*

- (a) Train oral health personnel in emergency care techniques. In my strong considered opinion, our oral health personnel particularly the oral surgeons, must be given continuing professional courses on emergency oral health care techniques and other related medical emergencies. This is particularly critical if our government wishes to use oral health personnel in the management of national disasters such as bomb blasts or air disasters (Odhiambo et al, 2002).
- (b) Provide and sustain the supply of emergency drugs and equipment to all oral health care facilities.

6. **To ensure high level of professionalism and ethics in the delivery of oral health care to the public.**

*Strategies*

- (a) Carry out vetting of oral health personnel.
- (b) Carry out inspection of all facilities providing oral health care.
- (c) Ensure mandatory CME, CPD and CDE.

A lot has been done to meet this objective.

Quackism continues to be a major problem and is traceable to two main reasons:-

- (i) Large numbers of unemployed middle cadre of oral health personnel such as dental technologists and community oral health officers.

- (ii) Inadequate and uneven distribution of the existing oral health personnel at all levels of our health care system. The recent introduction of compulsory CME/CDE and CPD, is most welcome. At last there is light at the end of the tunnel. Health professionals must constantly update their skills so as to improve the quality of the health care that we provide to our citizenry. We are dealing with very informed clientele, quite a good number of whom can easily access the internet and know whether we are current in our clinical practices or not. Few of the oral health personnel attend continuing education meetings. This is unlike in some countries in Europe and Asia where thousands flock to such meetings. In the said countries, professionals are prepared to spend their own money to attend meetings or learn something new. Why we are lethargic in doing the same in Kenya remains an enigma. Is it because we don't value such meetings? Are we too busy to attend? Do we fear to spend our hard earned cash? I leave it to you to answer these questions. SLEEP ON THEM AS THEY SAY. If we are to survive in this changing world, we must be in tandem with the rest of the world on matters of best practices in serving our patients and other Kenyans in general. That can only happen if we are prepared to sacrifice our energy, time, money and our comfort zones. We must also be prepared to accept our own limitations and endeavour to overcome them through continuing professional development (Kaimenyi, 1992).

7. To put in place cross-infection control measures at all levels of the oral health care services.

### *Strategies*

- (a) Provide autoclaves to all dental clinics.
- (b) Provide protective gear to all oral health personnel.
- (c) Provide incinerators for all oral health facilities. Little has been achieved here. There are quite a good number of our institutions without functional and modern incinerators.
- (d) Prepare manuals for patients and community health care workers on self-care and prevention.
- (e) Provide post exposure prophylaxis to oral health personnel and patients. Substantial efforts have been made to do this but the high cost for this important strategy continues to make it difficult to sustain its implementation continuously.

Prevention of cross-infection in dental surgeries in Kenya and East Africa in general, has been done very poorly. Several oral health care providers continue not to apply the recommended preventive and control measures especially during invasive dental procedures. For example, in two separate studies amongst dental auxiliaries and dentists in 1994 (**Kaimenyi and Ndung'u, 1994**) we found out that:

- (i) 87.7% of the 71 dental auxiliaries who participated, felt that dentistry as practiced in Kenya then, carried a high risk of transmission of HIV because of improper sterilization procedures.
- (ii) 33% of the dental auxiliaries didn't use protective eye wear and protective gloves on operatories routinely, because they were not provided for by the employer. Amongst the dentists, 8.5% of the 112 who participated in the other study

didn't find use of protective eye wear absolutely necessary. Of course they were right but one hopes that they had in mind non-use of protective eye wear in instances where spatter of oral fluids was unlikely.

- 8. To ensure that appropriate measures are in place to take care of the oral health needs for the vulnerable groups, e.g. children, refugees and prisoners.**

### *Strategies*

- (a) Develop special curricula for vulnerable groups in existing training programmes.
- (b) Establish oral health outreach programmes for vulnerable groups, e.g. children, refugees and prisoners.
- (c) Integrate oral health care services into existing MCH and ANC. Train oral health personnel in specialized care of vulnerable and underserved groups.

Hardly any efforts have been made towards meeting the oral health care needs of vulnerable groups in Kenya. Establishing outreach programmes for refugees and prisoners is not too expensive. It is achievable. Many a time sponsors will be willing to fund it as long as we show concrete and achievable plans in black and white.

- 9. To regularize proper and sustainable repairs and maintenance of oral health equipment.**

### *Strategies*

- (a) Train special cadres for dental equipment maintenance. This used to be done as a policy by the Ministry of Health



some years ago. To the best of my knowledge this wonderful initiative has become a cropper for want of funds. My opinion is that we should re-start it and train maintenance technicians who are multi-skilled in that they can repair and maintain all health related equipment. That is why we proposed this strategy as we shall see later.

- (b) Sub-contract for dental equipment repair and maintenance.
- (c) Integrate basic maintenance and repair skills into oral health personnel curricula. Although this was a brilliant idea, we didn't implement it during our recent review of the Faculty of Dental Sciences Curricular. Why? I guess because of an oversight.
- (d) Train medical engineers in the maintenance and repair of dental equipment.

**10. To ensure availability of adequately and appropriately trained oral health personnel.**

*Strategies*

- (a) Develop appropriate curricula and review them periodically.
- (b) Train adequate oral health personnel e.g. dentists and COHOs. Before 1980, there were many scholarships for training in foreign countries. This is no longer the case because our partners are also finding it increasingly difficult to support us. Even in countries such as Germany where university education has been free, they have started charging. The most plausible panacea for the situation that we find ourselves in is to start postgraduate studies in various dental disciplines at the School of Dental Sciences and in other dental schools in East, Central and Southern

Africa Regions. It will be cheaper and our people will be trained in familiar environments. This proposal might appear easily acceptable but wait a minute. It is likely to meet resistance from some unexpected quarters, namely, the dentists themselves. When I was the Dean of the School of Dental Sciences and I proposed that we start a second masters Degree in Oral and Maxillofacial Surgery, my colleagues were not happy about it. They wanted it delayed for sometime but my insistence yielded success. The rest is history. I don't know up to this moment the reasons underlying the aforementioned resistance. I think the reasons were mainly twofold:-

- (i) Probable increased workload on the part of oral and maxillofacial surgeons.
- (ii) Diminution of the time available to sneak out and do private practice. If you don't believe this suggestion, sample the following scenario. When I was a member of the Medical Practitioners and Dentists Board and we went to inspect some of our popular city hospitals' capability to mount internship training, we were shocked to learn that most of their permanent and pensionable staff were members of staff of the University of Nairobi. I don't mind sharing our expertise with others but surely, we must give to Caesar all that belongs to him or alternatively a big chunk of it.
- (c) Strengthen the capacity of the training institutions. This is one area that a lot of effort must be put. Some institutions have very old equipment which is obsolete and unserviceable. It's no wonder that one such institution was described as, "a mortuary of equipment".
- (d) Solicit for training funds both internally and externally.

**11. To equitably distribute oral health personnel at all levels of the oral health services.**

*Strategies*

- (a) Review staff establishment and distribute them appropriately. This can only be meaningful if we do know from the ministries of Health and National Planning and Development, the number of oral health personnel that we need in a given period. As it is, there is a tendency to train personnel of different types in Kenya in an ad hoc manner. The implications of this state of affairs I believe are manifold and known to us all and yet, we have continued to do nothing about it!
- (b) Strengthen institutional capacity for training categories of oral health personnel.
- (c) Develop appropriate curricula and review regularly.

**12. To increase the annual oral health budgetary allocation.**

*Strategies*

- (a) Advocate for increase in the annual oral health budgetary allocation from the current 0.0016% to 5% of the general health budget.
- (b) Advocate for allocation of funds for oral health care in the WHO country budget.

Our efforts to have the oral health budget increased have never been born any fruits. I understand when we have done well, we only manage to increase it to near 1% of the general health budget. Are we the only ones? No. Indeed, it is a global problem and can be explained by the problems which hamper oral health financing as spelt out earlier in my presentation.

13. To identify areas where there is lack of essential data and where existing data need to be strengthened.

### *Strategies*

- (a) Carry out National Oral Health Survey.
- (b) Strengthen oral health personnel capacity to carry out operational research.
- (c) Carry out basic and applied research in oral health.

A national Oral Health Survey has not been carried out as I indicated earlier. A reliable source of information indicates that WHO is in the process of sponsoring this long awaited and overdue survey. Without a National Oral Health Survey, all our oral health strategies are unlikely to succeed appreciably because they are not informed on the burden of oral diseases in the country. The sooner this is done, the better. The amount of money required might appear colossal, but it is nothing compared with amounts that have lined the pockets of some of our brothers and sisters during the Golden Berg Saga. That is why recovery of that money should be done “yesterday”, so as to direct it to different facets of our economy where it is needed most.

## **CONCLUSION**

Ladies and gentlemen, Kenyans’ dream of achieving oral health for all is unlikely to be realized because we have not made serious inroads into implementing our National Oral Health Policy. Until this is done, my dream and those of many stakeholders in this country will be a mere mirage.

For me to have arrived in my current station in academia has



been a journey characterized by all manner of twists and turns. I can say with absolute certainty that there have been thrills and pitfalls on the way. Behind my academic achievement, are men whom I consider to be my role models. Talk of pursuit for academic excellence and you will find that these gentlemen have two key characteristics in common, namely; **A PASSION FOR SUCCESS** and **AN EYE FOR DETAIL**. These men are none other than Professors DAVID NDETEI of the University of Nairobi and CYRIL ENWONWU of the University of Maryland in America. Both supervised me for my PhD. My other great role models have been my late parents; Mzee MOSES M'THURANIRA KITHUMBI and REBECCA TIRINDI. Both were paragons of hardwork and sensitivity to detail in all that they set out to do.

### **My Parting Short?**

Kenya is a country of men and women with enormous potential be it in oral health or any other specialty. Together, let's utilize this potential to take Kenya to the league of developed countries because that is where it belongs. As we do this, let us be confident enough to develop solutions to our own problems instead of seeking external support often.

## **ACKNOWLEDGEMENT**

My special thanks go to Ms. Joyce N. Daniel for typing this inaugural lecture; Dr. J. F. Onyango of the School of Dental Sciences, University of Nairobi, for providing part of the general information on Kenya; Mr. Webuye, HOD for his invaluable advice on arrangements for the lecture; and the University of

Nairobi, for providing me with a conducive environment to prepare and present this milestone lecture in my academic career. Last but not least, my wife Stella and children; Susan, Eva, David, Timothy and Anne, for their excellent and unwavering moral support.

## REFERENCES

1. World Health Organization (WHO) AFR/RC48/9. *Oral health in the African region: A regional strategy*, 1999-2008.
2. Ministry of Health (MOH). *Kenya National Oral Health Policy and Strategic Plan: 2002-2012*. June 2002.
3. *Economic Survey, 2005*. Prepared by Central Bureau of Statistics, Ministry of Planning and National Development, Republic of Kenya.
4. Ministry of Health (MOH). *The Second National Health Sector Strategic Plan: 2005-2010*. September 2005.
5. Kaimenyi JT; Guthua SW; Wakiaga J; Kisumbi, B *Utilization of dental auxiliaries in private dental surgeries in Kenya*. *E Afr Med J* 1994 71:811-815.
6. FDI World Dental Federation. *Planning conference for oral health in the African region – conference report*. 14<sup>th</sup>-16<sup>th</sup> April, 2004 Nairobi, Kenya.
7. Kaimenyi JT *Oral health in Kenya*. *Int Dent J* 2004 54: 378-382.
8. Ng'ang'a PM. *An overview of epidemiologic and related studies undertaken on common dental diseases and conditions in Kenya between 1980-2000*. *Afri J Oral Hlth Sci* 2002 3:103-110
9. Ohito F; Opinya, G N.; Wang'ombe J *Dental caries and dental plaque in handicapped children in Nairobi, Kenya*. *E Afr Med J*. 1993 70: 71-77.

10. Kaimenyi JT; Sachdeva P; Patel S *Causes of tooth mortality at the dental unit of Kenyatta National Hospital. Trop Dent J* 1988 XI:17-20.
11. Manji F; Bachum V; Fejerskov O. *The pattern of dental caries in adult rural population. Caries Res* 1989 23:55-62.
12. Ng'ang'a PM. *et al. Dental caries, malocclusion and fractured incisors in children from a pastoral community in Kenya. E Afr Med J* 1993 70:175-178.
13. Manji F. *Is dental caries on the increase in Kenya? E Afr Med J* 1986 63:13.
14. Kaimenyi JT. *Is periodontal disease on the increase in Kenya? A review. E Afr Med J* 1993 70: 519-522.
15. Kaimenyi JT. *Prevalence and clinical features of acute necrotizing gingivitis in Nairobi, Kenya. Afr J Oral Health Sci* 2000 1:19-23.
16. Kaimenyi JT. *Demography and seasonal variation of acute necrotizing gingivitis in Nairobi, Kenya. Int Dent J* 1999 49:347-351.
17. Kaimenyi JT. *Epidemiological and clinical studies of acute necrotizing gingivitis in Kenya. A thesis submitted in fulfillment for the Degree of Doctor of Philosophy in the University of Nairobi, 1997.*
18. Kaimenyi JT; Gururaja Rao TR. *A comparative study on the periodontal health status of adult populations of Kenya and India. Ind J Dent Res* 1991 2:29-34.
19. Kaimenyi JT. *Find out if you are a victim of chronic periodontitis. Medicus* 1984 10:14 and 28.
20. Wagaiyu EG.; Wagaiyu CK. *Prevalence of juvenile periodontitis in National Youth Service Trainees. E Afr Med J* 1992 69: 31-32.

21. Kaimenyi JT; Guthua SW. *Occurrence of ulcerative oral lesions at Kenyatta National Hospital Nairobi, Kenya.* **Afr J Or Hlth Sci** 1994 1:179-181.
22. Kaimenyi JT; Guthua SW. *Residual facial deformity resulting from cancrum oris – a case report.* **E Afr Med J** 1994 71:476-478.
23. Kaimenyi JT. *Acute gingival lesions; Acute necrotizing ulcerative gingivitis, in the Textbook of periodontology.* Pg 94-101, TR Gururaja Rao, editor. 2<sup>nd</sup> ed. 2001. All India Publishers and Distributors, Chennai (Madras).
24. Jimenez M; Baer PN. *Necrotizing ulcerative gingivitis in children. A 9 year clinical study.* **J Periodontol** 1975 46:715-719.
25. Enwonwu CO. *Epidemiological and biochemical studies of necrotizing ulcerative gingivitis and Noma (cancrum oris) in Nigerian children.* **Arch Oral Biol** 1972 17:1357-1371.
26. Cohen et al. *Psychiatric, psychosocial and endocrine correlates of acute necrotizing ulcerative gingivitis (Trench mouth): A preliminary report.* **Psy Med** 1983 1:215-225.
27. Gitonga JN.; Nair KR; Manji F. *The occurrence and distribution of fluorides in water in Kenya.* In Likimani S ed. *Fluorosis research strategies.* Nairobi. **Afr Med J Res Found** 1984 25-31.
28. Manji F; Kapila S. *Fluorides and fluorosis in Kenya – an overview.* In: Likimani S, ed. *Fluorosis research strategies.* Nairobi. **Afr Med J Res Found** 1984 11-21.
29. Opinya GN et al. *Intake of fluoride through food and beverage by children in a high fluoride area (9ppm) in Kenya.* **Disc Inn** 1991 3: 71-75.
30. Opinya GN. et al. *Intake of fluoride and extraction in mother's milk in a high fluoride area (9ppm) in Kenya.* **J. Chin Nutr** 1991 45: 37-41.



31. Mwaniki DL; Courtney JM; Gaylor J.D. *Endemic fluorosis: an analysis of needs and possibilities based on case studies in Kenya.* **Soc Sci Med** 1994 39: 807-813.
32. Ng'ang'a PM. *A study of occlusal anomalies and tooth loss in children aged 13-15 years, in Nairobi.* **E Afr Med J** 1991 68: 980-988.
33. Guthua SW; Mwaniki DL. *A retrospective study of characteristics of impacted mandibular wisdom teeth in 110 patients treated in Nairobi, Kenya.* **Afr Dent J** 1992 6:30-38.
34. Ngatia EM et al. *Artificial sucking habits and malocclusion in 3-5 year old in Nairobi.* **Afr J Oral Hlth** 2001 2:27-29.
35. Mwaniki D; Guthua SW. *Occurrence and characteristics of mandibular fractures in Nairobi, Kenya.* **Brit J Oral and Max Surg** 1990 28:200-202.
36. Ohito FA.; Opinya GN.; Wangombe J. *Traumatic dental injuries in normal and handicapped children in Nairobi, Kenya.* **E Afr Med J** 1992 69: 680-682.
37. Ng'ang'a PM.; Valderhaug J. *The prevalence of fractured permanent incisors in 13 to 15 year old school children in Nairobi.* **Afr Dent J** 1988 2: 76-79.
38. Muriithi HM; Masiga MA; Chindia ML. *Dental injuries in 0-15 year olds at Kenyatta National Hospital, Nairobi.* **E Afr Med J** 2005 82:592-597.
39. Onyango JF; Prabu SR. *Oral Cancer in Kenya.* **Medicom** 1980 2:87-90.
40. Onyango JF et al. *Pattern of Oral Cancer in a Kenyan Population.* In Press. **E Afr Med J** 2003.
41. Wanzala P et al. *Oral mucosal lesions in HIV seropositive African Women.* **J Or Path Oral Med** 1989 18: 416-418.

42. Jorgensen E; Kaimenyi JT. *The effects of chewing miraa (Catha Edulis) on teeth.* **Pharm J Kenya** 1991 3:115-117.
43. Ministry of Education, Science and Technology. **Sessional Paper No. 1 of 2005** on a policy framework for education, training and research.
44. Kaimenyi JT. *Integrating oral health into primary health care in Kenya.* **Afr Hlth** 1984 6:57-58.
45. Kaimenyi JT. *Job satisfaction among dentists in the public and private sectors in Kenya.* **Medicus** 1986 5:4-5.
46. Ndung'u FL; Kaimenyi JT. *A comparative study of the efficacy of plaque control by a chewing stick and a tooth brush.* **E Afr Med J** 1990 67:907-911.
47. Kaimenyi JT; Ndung'u FL. *Oral hygiene habits and dental health awareness of Kenyan children aged 9-15 years, in a peri-urban and urban school.* **E Afr Med J** 1993 70:67-70.
48. Odhiambo WA et al. *Maxillofacial injuries caused by terrorist bomb attack in Nairobi.* **Int J Oral Maxillofac surg** 2002 31: 174-177.
49. Kaimenyi JT. *Accepting our own limitations.* **Afr Hlth** 1992 14:47.
50. Kaimenyi JT; Ndung'u FL. *Knowledge, practices and attitudes towards HIV positive and AIDS patients among dental auxiliaries.* **E Afr Med J** 1994 71: 304-310.
51. Kaimenyi JT; Ndung'u FL. *Knowledge, attitudes and practices towards HIV positive and AIDS patients among public service dentists in Nairobi.* **Afr J Hlth Sc** 1994 1:116-121.

## APPENDICES

**TABLE 1** *Oral Health Public Sector Personnel in Kenya*

Category of Personnel	Number
Dental Specialists	69
General Dentists	183
Dental Technologists	126
Community Oral Health Officers	130
Dental Hygienists	1

**TABLE 2** *Breakdown of the Number of Dental Specialists in Various Oral Health Disciplines.*

Speciality	Number of Oral Health Specialists	
	June 2002	May 2006
Oral & Maxillofacial Surgery	15	19
Oral Medicine and Oral Pathology	4	5
Oral Biology	1	0
Restorative Dentistry	6	8
Prosthetic Dentistry	4	4
Orthodontics	3	5
Paediatric Dentistry	6	10
Periodontology and Periodontics	4	5
Biomaterials	2	2
Community and Preventive Dentistry	2	2
Public Health	10	18
Dental Radiology	1	1

**TABLE 3** *Sources of Finances for Health in Kenya*

Source	KSh (Billions)	Share (%)
Out of pocket spending (cost sharing)	37.3	53
Government (from tax revenues)	14.9	21
Employer paid medical services	11.5	16
NHIF	2.8	4
Private pre-paid health plans	2.5	4
Non-profit institutions	1.1	2
TOTAL HEALTH EXPENDITURE	70.1	100



**DIAGRAM 1** *Kaimenyi's Theory of the Genesis of Acute Necrotizing Gingivitis*

