Republic of Mauritius

NATIONAL ACTION PLAN

FOR

ORAL HEALTH







2022-2027

MINISTRY OF HEALTH AND WELLNESS

MAY 2022

Prime Minister
Republic of Mauritius

FOREWORD

It is my pleasure to present this five-year National Action Plan for Oral Health which sets the compass for every action we take from now on to reduce the incidence and prevalence of oral diseases.

The Action Plan has been developed to provide a roadmap towards achieving universal access to quality Oral Health services, in line with the Health Sector Strategic Plan 2020-2024. The plan integrates the Sustainable Development Goal on health, and aims to ensure health and well-being for all, at every stage of life.

Oral Health education and promotion is an important area that has been prioritised in this plan. It also outlines steps that need to be considered when taking into account patients affected by non-communicable diseases such as diabetes and cardiovascular diseases.

This initiative follows the landmark resolution approved on 27 May 2021 by the World Health Organisation, paving the way for better oral health care.

The adoption of an Action Plan at the national level shows our commitment to achieve the stated outcomes of the resolution. Member States are urged to address key risk factors of oral diseases shared with other non-communicable diseases such as high intake of sugars, tobacco use, and harmful use of alcohol.

Oral diseases, while largely preventable, pose a major health burden and affect people throughout their lifetime, causing pain, discomfort, and disfigurement.

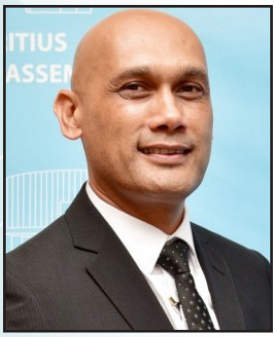
I am confident, however, that with the foundations being put in place, we will realise our vision and goal to advance the overall oral health of our citizens and enhance our quality of life.

24 May 2022

Pravind Kumar Jugnauth
Prime Minister

Republic of Mauritius

MESSAGE



The Ministry of Health and Wellness is pleased to present the first "National Action Plan for Oral Health (2022-2027)". This Action Plan delivers a multi-directional approach to improving the Oral Health status of our population. The repercussion of oral disease is not limited to the individual but also on the community in general through the cost allocation of the health system.

Oral Health is an essential and integral aspect to general health and well-being at every stage of life. A healthy mouth enables not only proper nutrition but also enhances social interaction and promotes self-esteem. Dental caries, however, continues to be the most common chronic infectious disease and places a substantial burden on the population. The good news is that oral disease is largely a preventable condition through a good oral hygiene.

This Action Plan is guided by the recommendations set forward by the World Health Organisation (WHO). As a result, we are targeting preventive interventions that will forestall oral diseases in children, medically compromised patients and the population in general. This will strengthen healthy oral practices at the family level, ensuring that the youngest ones get the best opportunity for a lifetime of sound Oral Health.

The highlights of the Action Plan include emphasising Oral Health Promotion by school Oral Health Programmes along with strengthening the role of primary health care in Oral Health Services, increasing the Oral Health professional workforce along with more dental clinics and thus improving the dental services.

We look forward to fulfilling the objectives of the National Oral Health Action Plan over the next five years, as we move towards meeting our vision: **"Experiencing a state of optimum Oral Health for all."**

Dr. the Hon. Kailesh Kumar Singh JAGUTPAL
Minister of Health and Wellness

Table of Contents

TABLE OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS/ACRONYMNS

ADA	**American Dental Association**
AHC	**Area Health Centre**
BMP	**Best Management Practice**
BRP	**Basic Retirement Pension**
CHC	**Community Health Centre**
CHRO	**Chief Health Records Officer**
CIC	**Consultant In Charge**
CISD	**Central Information Systems Division**
CPD	**Continuing Professional Development**
DA	**Dental Assistant**
DDS	**Director Dental Services**
DGHS	**Director General Health Services**
DPS	**Deputy Permanent Secretary**
DRE	**Dental Registration Examination**
DS	**Dental Surgeon**
EEC	**Early Childhood Caries**
ECCEA	**Early Childhood Care and Education Authority**
GBD	**Global Burden of Disease**
GDP	**Gross Domestic Product**
GMDOA	**Government Medical and Dental Officers Association**
GMIS	**Government Medical Insurance Scheme**
HCA	**Health Care Assistant**
HEO	**Higher Executive Officer**
HIV	**Human Immunodeficiency Virus**
HSSP	**Health Sector Strategic Plan**
ICT	**Information and Communication Technology**
METS	**Metabolic Syndrome**
MHR	**Manager Human Resources**
MIH	**Mauritius Institute of Health**
MNI	**Ministry of National Infrastructure and Community Development**

MOE	**Ministry of Education, Tertiary Education, Science and Technology**
MOHW	**Ministry of Health & Wellness**
NCC	**National Cooperative College**
NCD	**Non-Communicable Diseases**
NGO	**Non-Governmental Organisation**
NHA	**National Health Accounts**
OHE	**Oral Health Education**
OHP	**Oral Health Promotion**
OSS	**Operations Support Services**
PCR	**Polymerase Chain Reaction**
PPE	**Personal Protective Equipment**
PPM	**Parts Per Million**
PRB	**Pay Research Bureau**
PSC	**Public Service Commission**
RDS	**Regional Dental Superintendent**
RHD	**Regional Health Director**
RNA	**Regional Nursing Administrator**
SDA	**Senior Dental Assistant**
SDH	**Social Determinants of Health**
SDG	**Sustainable Development Goals**
SWC	**Social Welfare Centre**
UHC	**Universal Health Coverage**
WHO	**World Health Organisation**

ACKNOWLEDGEMENTS

The National Action Plan for Oral Health (2022-2027) has been accomplished through the concerted efforts of various stakeholders and experts, who contributed to a variety of ways towards its preparation, editing and publication.

At the very outset, we would wish to express our sincere thanks to Dr. the Hon. Kailesh Kumar Singh Jagutpal, Minister of Health and Wellness, Mrs. Devi Chand Anandi Rye Seewooruthun, Senior Chief Executive and Mrs. Zaheda Begum Lallmahomed, Permanent Secretary, for having given us the opportunity to formulate the first National Action Plan for Oral Health (2022-2027).

We also wish to acknowledge our indebtedness and deep sense of gratitude to Dr. Bhooshun Ori, Director General Health Services whose valuable guidance, throughout the writing and editing process, has eventually led to its completion.

A special thanks to all the Regional Dental Superintendents, for the recommendations through several consultative meetings, namely Dr. Sanjna Devi Seetha, Dr. Roodradutt Namah, Dr. Ajay Kumar Jahajeeah, Dr. Kantilall Bhowon, Dr. Chow Yan Chan Seem and Dr. Dawood Elyhee along with Dr. Ashroy Jhugroo, Consultant-in-Charge (Endodontics) and Dr. Vikash Dajee, Senior Dental Surgeon. We would like to value the dynamic contribution of:

Mrs. Renuka Devi Bissessur, Deputy Permanent Secretary;

Mr. Horatio Caine, Assistant Permanent Secretary;

Miss. Toolsi Loderchand, Office Management Assistant;

Mr. Nasser Jeeanody, Chief Health Statistician;

Mr. Sooneeraz Monohur, Chief Health Records Officer; and

Mrs. Hema Bhunjun-Kassee, Lead Health Analyst and her team.

Additionally, we would like to extend our sincere thanks to Dr. Yuka Makino, Technical Officer Oral Health, WHO Regional Office for Africa for her commendable insights.

Last, but not the least, our heartfelt thanks go to Mrs. Amina Khodabacchas, Mrs. Bibi Shenaz Buctawar and Mrs. Maneesha Aubroo-Bhoyroo (supporting staff), for their continuous technical support in the editing of the National Action Plan for Oral Health (2022-2027).

Dr. Ian RAMDIN
Director Dental Services

Dr. (Mrs.) Romila GOBIN-BEHAREE (BDS, MSc, MD)
Senior Dental Surgeon

EXECUTIVE SUMMARY

The National Action Plan for Oral Health (2022-2027) aims to prevent oral diseases and reduce the proportion of children and adults with untreated oral diseases and to help the population attain an optimum Oral Health. Oral diseases are a major global public health problem across all countries and populations. In Mauritius, the existing policy in Oral Health Care is to improve access, quality and delivery of Dental Services emphasising on customer care.

The current focus of prevention is primarily on screening of individuals who attend dental clinics and educational measures in schools. A systemic approach to population-wide Oral Health promotion based on education and sensitisation that addresses the underlying causes and risks of oral diseases would be far more reliable and cost-effective. In addition, leverage for other chronic diseases caused by the same risk factors can be coordinated within the primary health care system.

Transformation of the Oral Health system away from a disease-based curative model towards oral disease prevention will be a major goal of this National Action Plan. It will focus on the following key areas:

(i) Oral Health Promotion to improve Oral Health literacy;

(ii) Integration of Oral Health into the National Health Policy;

(iii) Oral Health Prevention strategies;

(iv) Consideration of workforce models that maximise efficiency;

(v) Infrastructural Development and facilities;

(vi) Development of surveillance systems;

(vii) The need to evaluate and monitor the concentration of fluoride for caries control;

(viii) Phasing down the use of mercury in dental amalgam;

(ix) Oral Health Rehabilitation strategies; and

(x) Oral Health Research approaches.

The ultimate goal is to see that there is an improvement in the Oral Health status of the population by reducing the incidence, prevalence and effects of oral diseases.

1.0 INTRODUCTION

Oral health is an undervalued parameter of global health. The Global Burden of Disease Study 2017 estimated that oral diseases affect 3.5 billion people worldwide. The most prevalent oral diseases include dental caries (tooth decay), periodontal (gum) disease, tooth loss and affect all population indiscriminately. Worldwide, 60-90% of children and nearly 100% of adults have dental caries (Jin 2016). Oral diseases restrict activities in school, at work and at home, causing millions of school and work hours to be lost each year the world over. Moreover, the psychosocial impact of these diseases often significantly diminishes quality of life.

As per the last National Oral Health survey, conducted in 2001 by the Ministry of Health and Wellness in collaboration with WHO in Mauritius, it is estimated that two thirds of children are affected by dental caries. Among the adults, the rate of caries and gum diseases is as high as 95%. According to the article published in 2019, "Trends in cancer incidence in the Republic of Mauritius, 1991-2015", prevalence of oral and pharynx cancer is 7.6% in males and 2.3% in females (Koon 2019).

In the Sub-Saharan African Region, Mauritius is one of few countries that has a strong health system that is moving towards Universal Health Coverage. The WHO defines Universal Health Coverage (UHC) as access to health promotion, prevention, curative and rehabilitative health interventions with the main objective to achieving equity in access to care and services, while also ensuring that people do not suffer financial hardship when paying for these services (Verrecchia 2019).

The UHC Service Coverage Index is comprised of sixteen tracer indicators, which track coverage with essential health services. All tracer indicators are direct measures of service coverage on a 0 to 100% scale. The UHC Service Coverage Index for Mauritius was 65% in 2017. The best performance recorded for this index was ≥ 80 (Global Monitoring Report 2021). Mauritius is ranked third in the region and is significantly advanced compared with the average in the region which is 42 %.

The Sustainable Development Goals (SDGs) set out a holistic agenda to guide global development until 2030, with Goal 3 focusing on good health and well-being. The SDG agenda which includes social determinants, NCDs and universal health coverage, is providing an anchor and entry point for better prioritization of Oral Health in the Region (Regional Office for Africa 2016).

The Ministry of Health and Wellness acknowledges that good health of every Mauritian is vital to his/her unalienable rights of life and the enhancement of the quality of life. The Government guarantees equitable access to free health care services to the population, regardless of their income, gender, race and religion.

The Government is also sustaining the provision of free health services in the public sector, further strengthening and enhancing the quality of care, with an emphasis on patient-centred services. The Ministry of Health and Wellness offers a comprehensive Oral Health package which includes Oral Health promotion, general Oral Health Services (diagnosis, extraction, temporary and permanent fillings, scaling, application of pit and fissure sealant) and specialised dental services (Oral Surgery, Orthodontics and Endodontics) free of user costs.

However, the limited availability of public funds and escalating costs of treatment present a challenge to the sustainability and improvement of the free and high-quality Oral Health Services in the public sector. The formulation and implementation of a National Action Plan for Oral Health 2022-2027 and a robust surveillance system for oral diseases will assist towards achieving a Universal Oral Health Coverage.

2.0 EXTRACT OF 'THE 2021 WHO RESOLUTION ON ORAL HEALTH'

On May 27, 2021, the 74th World Health Assembly of the World Health Organisation (WHO) approved a resolution on Oral Health. This resolution placed Oral Health on the global health agenda and comes 14 years after Oral Health was last addressed in a resolution by the WHO. This resolution reviews the high prevalence of the most common oral diseases (caries, periodontal disease, with resulting tooth loss and oral cancer), their impact across the life course, the preventable nature of the major oral diseases, and the enormous cost of treating existing disease. The statement also notes that the most common oral diseases have identified risk factors, which are lifestyle choices that are common to other non-communicable diseases. An emphasis is placed on good Oral Health being commensurate with good general health and better quality of life.

The WHO Resolution also notes the many challenges to meeting the Oral Health care needs in diverse populations across the globe. Contributing factors include a lack of resources, lack of political willingness to prioritise Oral Health, lack of infrastructure in resource-poor countries, an absence of a coherent preventive strategy utilising inexpensive approaches (i.e., school-based oral hygiene programmes), limited public awareness, as well as the ancillary but important issues of environmental impact (i.e. mercury hygiene).

The disproportionate impact of the COVID-19 pandemic on the provision of routine dental services is another example of the challenges to provision of routine care. The resolution urges countries to consider a variety of actions, with implementation dependent on each country's particular set of circumstances.

Key points include the following:

(i) Integration of Oral Health into National Health Policy.
(ii) A focus on preventive strategies as opposed to approaches that emphasise treatment of existing disease.
(iii) Consideration of workforce models that maximise efficiency.
(iv) Development of accurate surveillance systems to define the oral disease burden.
(v) The need to evaluate and monitor the concentration of fluoride for caries control.

Member countries are urged to consider Oral Health as a part of general health and look for collaborations to enhance the Oral Health messaging as part of a healthy lifestyle. Here, as mentioned, school settings should be engaged. Further, Oral Health providers should be able to identify cases of abuse and neglect which often manifest as injuries to the face and mouth.

Last, the Director-General of the WHO was tasked with developing a global strategy to improve Oral Health by 2022 and present an Action Plan by 2023. Conservative approaches, and concern for environmental safety, are to be emphasised (Lamster 2021).

3.0 AIM AND OBJECTIVES OF THE NATIONAL ACTION PLAN FOR ORAL HEALTH 2022-2027

The aim of this Action Plan is to improve the overall Oral Health status of the population by reducing the incidence and prevalence of oral diseases, thereby, helping all citizens of the Republic of Mauritius to attain a state of optimum Oral Health and well-being.

The main objectives are:

(i) Oral Health Promotion mainly to improve Oral Health literacy;

(ii) Integration of Oral Health into National Health Policy;

(iii) Oral Health preventive strategies as opposed to approaches that emphasise treatment of existing disease with a view to strengthening prevention and early intervention programmes;

(iv) Consideration of workforce models that maximise efficiency;

(v) Infrastructural development and facilities;

(vi) Development of accurate surveillance systems to define the oral disease burden which will improve population data on Oral Health status and enhance Oral Health promotion research;

(vii) Evaluating and monitoring the concentration of fluoride for caries control;

(viii) Phasing down the use of mercury in dental amalgam;

(ix) Oral Health rehabilitation strategies; and

(x) Oral Health research approaches.

4.0 JUSTIFICATION OF NATIONAL ACTION PLAN FOR ORAL HEALTH 2022-2027

The World Health Organisation (WHO) has adopted a resolution that elevates Oral Health to a global health priority and calls for member states to integrate Oral Health within national policies, hence the need for an Action Plan. According to the new resolution, WHO recommends that Member States address key risk factors shared between oral conditions and other non-communicable diseases, expand the capabilities of Oral Health professionals, and strengthen cross-sectoral collaboration.

So far, Mauritius has not yet developed an Action Plan regarding Oral Health and thus has not been fully addressing the burden of oral disease. The needs of an Action Plan are necessary to advocate and develop Oral Health policies and integrate it in the broader systems of social, economic and environmental determinants of health. Therefore, an Action Plan will provide a direction for a comprehensive oral care and treatment for improving Oral Health status for Mauritius.

This Action Plan will be able to use the solid NCD policy foundations and build on the evidence for reciprocal links between NCDs and oral diseases as well as provide a consensus on priority actions based on effective population-wide prevention interventions and comprehensive patient-centred strategies as per WHO's Strategic Orientation for the African Region (Varenne 2015).

Mauritius lacks baseline data to know the exact prevalence of oral diseases, low level of awareness, strained infrastructure, lack of research and Oral Health policies are some major factors that need to be tackled. Despite the already established dental services available, there are nevertheless a considerable number of gaps to fill in the dental public health services including research, programme planning/implementation and evaluation. The decades-long separate consideration of Oral Health and general health on a scientific, clinical and political level has led to a decoupling of the international health and health policy discourse in many areas.

Therefore, a fundamentally different approach is now needed; rather than being isolated and separated from the mainstream health-care system, dentistry needs to be more integrated into the primary care services. The causes of the dental health crisis are varied and complex and the aim of the Action Plan for Oral Health is to prevent oral diseases before it starts and reduce the proportion of adults and children with untreated oral diseases. The goal is to help all Mauritians attain their best Oral Health.

5.0 RESEARCH METHODOLOGY

This National Action Plan for Oral Health has been conceived by using mainly qualitative research techniques. A systematic review of multiple articles related to Oral Health and scientific search for pertinent information on Oral Health that is specific procedures or techniques used to identify, select, gather, process and analyse information on Oral Health was made. Other Action Plans in Oral Health of other countries were closely examined in a methodical order and taking into consideration the National Oral Health survey 2001 done in Mauritius in collaboration with WHO. Other quantitative data like studies/fact files, performance indicators, published recommendations and statistics for Mauritius and Rodrigues were also considered.

6.0 BACKGROUND

6.1 Definition of Oral Health

Oral Health is multifarious and includes the ability to speak, smile, smell, taste, touch, chew, swallow and express a range of emotions through facial expressions with confidence, without pain and disease of the craniofacial complex (Machiulskiene 2020).

Further characteristics of Oral Health:

- It is a key component of physical, mental health and well-being. It is present along a wide range of values and attitudes of people and communities.
- It implies that the physiological, social and psychological aspects are essential to the quality of life.
- It is influenced by the person's changing experiences, perceptions, expectations and ability to adapt to circumstances (Umberson 2010).

6.2 Oral Hygiene

Personal oral hygiene is the maintenance of oral cleanliness for the preservation of oral health. It prevents microbial plaque from accumulating on teeth and gingiva. Plaque is the primary etiological factor in gingivitis and periodontal diseases, which are largely preventable by plaque control. Although plaque removal contributes to the prevention of dental caries, fluoride delivered by fluoride toothpaste provides the major cariostatic effect. Current oral hygiene measures include mechanical aids (toothbrushes, floss, inter-dental cleansers, and chewing gums) and chemotherapeutic agents (mouth rinses, dentifrices and chewing gums).

The benefit derived from oral hygiene depends upon the manual dexterity, lifestyle, motivation and oral condition of the individual. Current mechanical and chemotherapeutic approaches to oral hygiene aim to modify the oral micro flora to promote healthy periodontal and dental tissues. Also, oral hygiene measures, when appropriately used and in conjunction with regular professional care, are capable of virtually preventing caries and most periodontal disease thus maintaining good oral health.

It is important that oral hygiene be carried out on a regular basis to enable prevention of dental disease and bad breath. Chemotherapeutic supplementation of mechanical measures using dentifrices, mouth rinses, gels and chewing gums as delivery vehicles can improve oral hygiene (James 2017). The list includes anti-calculus, antibacterial and cariostatic agents. For the population at large to make effective use of these oral hygiene measures, oral hygiene education and promotion needs to be firmly instilled.

6.3 Fluoride for caries control

Fluorides are regarded as effective element in the control of dental caries, which can both benefit the prevention and treatment. The most efficient way to prevent caries is by using fluoridated dental products. Fluoride can both reduce enamel demineralisation and promote enamel remineralisation. In terms of prevention, the topical application of fluoride is accessible, which includes fluoride toothpaste, fluoride varnish, fluoride gel, and mouth rinse.

In some countries, fluoride is added into water, salt, or milk. Fluoride is also used for the medical treatment of early dental caries. However, fluoride is a double-edged sword. Excessive fluoride intake will cause toxic reactions and dental fluorosis is caused by a high intake of fluorides during tooth development. A fluoride content of 0.7 ppm is now considered best for Oral Health. A concentration that is above 4.0 ppm could be hazardous (Public Health Reports 2015). The following table is a recommendation from The WHO Model List of Essential Medicines updated and published every two years; intended as a guide for countries or regional authorities to adopt or adapt in accordance with local priorities and treatment guidelines for the development and updating of national essential medicines lists.

Table 1: Dental preparations for use of fluoride as preventive measure for caries control

Dental preparations for use of fluoride as preventive measure for caries control	
Fluoride	**Paste, cream or gel**: containing between 1000 and 1500 ppm fluoride (any type). **In other appropriate topical formulations.**
Glass ionomer cement	**Single-use capsules:** 0.4 g powder + 0.09 mL liquid. Multi-use bottle: powder + liquid. Powder (fluoro-alumino-silicate glass) contains: 25-50% silicate, 20-40% aluminium oxide, 1-20% fluoride, 15-40% metal oxide, 0-15% phosphate, remainder are polyacrylic acid powder and metals in minimal quantities. Liquid (aqueous) contains: 7-25% polybasic carboxylic acid, 45-60% polyacrylic acid.
Silver diamine fluoride	**Solution**: 38%

Adapted from (WHO 2021)

Exposure to high concentrations of fluoride during childhood, when teeth are developing, can result in mild dental fluorosis. There will be tiny white streaks or specks in the enamel of the tooth. Major concerns about excessive fluoride intake and related toxicity were raised worldwide, leading several countries to ban fluoridation (Aoun 2018). Therefore, it is important that there is the establishment of a multidisciplinary national along with WHO's expert panel for a survey and thus providing technical advice and support to authorities which will aid the implementation and maintenance of water fluoridation.

6.4 Oral Health – An Essential Component of Overall Health

WHO has broadened the definition of Health by the inclusion of the concept of social well-being, thus extending the constituents of Oral Health. The latter, therefore, contributes to general well-being and not mere absence of disease; daily actions like eating, talking, smiling and creative contributions to society are determinants of an individual's well-being (Baiju 2017). Experiencing good Oral Health is not only intended at healthy teeth but it is a deep-seated initiative for the overall health. A good Oral Health reflects an aesthetic and purposeful dentition which allows individuals to maintain their preferred social and functional role. The interactions between oral and systemic health are bi-directional and complex, relating many pathways. These interactions strongly influence the progress of many diseases and the quality of life and economic performance of the general population (Johnson 2006).

6.5 What are the determinants of Oral Health?

General Health, including Oral Health, is determined by an intricate interface of various health determinants such as social, behavioural, biological, economic, environmental and cultural factors (Patrick 2006). Impacts of social determinants of health (SDH) can be accumulated during a lifetime, alter health trajectories across the life course and are transferred across generations. The term "social determinants" is relevant to communicable and non-communicable diseases (NCDs) alike. Oral diseases share the same determinants and risk factors as the main NCDs comprising cardiovascular diseases, cancer, chronic obstructive pulmonary disease, diabetes and mental health issues. It is known that many oral diseases are associated with socioeconomic status, which links to family income, educational attainment, employment status, housing, physical health and mental health.

Current understanding of these associations has prompted the development of a new approach for Oral Health promotion, which recognises that the behaviours accounting for the most important NCDs contribute to oral diseases as well. The common risk factor approach is directed to reducing risk factors common to several NCDs and addresses the SDH from an integrated and comprehensive health care approach (Tellez 2014).

Moreover, the quality of an individual's Oral Health is also influenced by:

- Access to health care systems and services
- Level of utilisation of dental services
- Levels of Oral Health literacy
- Awareness and attitudes towards health and disease.

Socio-economic factors have an insightful control on Oral Health with research showing a strong association involving income and the risk of poor Oral Health. Socio-economic status affects a person's capability to access dental services and preventive measures (Park 2016). Socio-economic status is also synchronous with high levels of sugar, tobacco and alcohol consumption which subsequently influences Oral Health such as:

- Consumption of high levels of sugar increases the risk of tooth decay.

Free sugars are the crucial dietary factor in the development and progress of dental caries. Dental caries develops when bacteria in the mouth metabolise sugars to produce acid that demineralises the hard tissues of the teeth (enamel and dentine). Limiting free sugars consumption to less than 10% of total energy intake and ideally even further, to less than 5%

minimises the risk of dental caries throughout the life course (Moynihan 2016). These WHO recommendations are intended for use by policy makers as a benchmark when assessing intake of sugars by populations and as a driving force for policy change.

- Consumption of tobacco increases the risk of gum disease and oral cancer.

Tobacco not merely holds an addictive effect, but it exacerbates periodontal disease by promoting the intrusion of pathogenic bacteria, hindering autoimmune defence, exacerbating the inflammatory reaction, and aggravating the loss of alveolar bone. According to current evidence, tobacco significantly aggravates the development and progression of periodontal disease as well as oral cancer and periodontal disease may be related to the prevalence of oral cancer (Zhang 2019).

- High levels of alcohol consumption increase the risk of oral cancer.

The increased risk of oral cancer associated with alcohol consumption is substantial. The association has been observed across different geographic regions and populations, which further supports the role of alcohol drinking in oral carcinogenesis. Moreover, a joint exposure of alcohol and tobacco validate a synergistic effect (Goldstein 2010).

6.6 Common Risk Factors between systemic diseases and oral diseases

All the risk factors associated with poor Oral Health are also related to numerous other chronic non communicable diseases such as diabetes, hypertension, cardiovascular diseases and cancer, among many others.

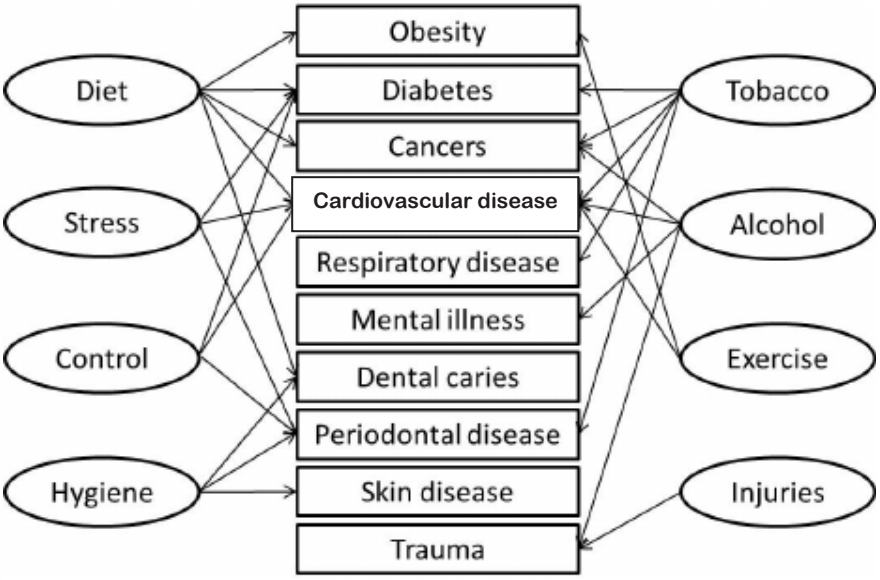


Figure 1: Systemic Factors with Risk Factors
Modified from **(Oswal 2010)**

Oral Health has been revealed to have multi-organ systemic effect which ranges from insulin resistance, due to periodontal diseases, up to far more complex multi-organ systemic complications relating to the cardiovascular system or even neurodegenerative pathology (Fiorillo 2019).

Oral Health has an insightful effect on systemic health. Poor Oral Health has an increased risk of infective endocarditis, cardiovascular disease, bacterial pneumonia, preterm delivery (Lockhart 2009). The probable mechanisms by which oral infections might contribute to cardiovascular diseases include a direct effect of micro-organisms in atheroma formation in the endothelium, indirect host-mediated responses, or a genetic predisposition for the pathogenesis (Meurman 2004).

It is implicit that mouth is the window to general heath and many diseases like osteoporosis, diabetes, HIV and some endocrine problems which can be diagnosed by some oral signs and symptoms.

It has also been observed that changes in the oral cavity, such as periodontitis and other manifestations of poor Oral Health are common in patients with chronic kidney disease and may contribute to increased morbidity and mortality because of systemic consequences such as inflammation, infections, protein-energy wasting, and atherosclerotic complications (Akar 2011).

MetS is another prevalent and multifactorial disorder that consists of a cluster of several clinical physical conditions and biological abnormalities that increase the risk of mortality; MetS is affected by insulin resistance and increases the risk of cardiovascular diseases. These conditions/diseases include glucose intolerance/insulin resistance/hyperglycemia, hypertension, visceral obesity, and dyslipidaemia (Gobin 2020). The correlation between periodontitis and MetS has been of much interest among researchers. It is of much concern in the context of Mauritius as most of the patients undergoing NCD treatment have the combination of the above-mentioned diseases. If diagnosed at the initial stage, periodontitis can be managed successfully without causing much morbidity.

Association between oral diseases and systemic diseases

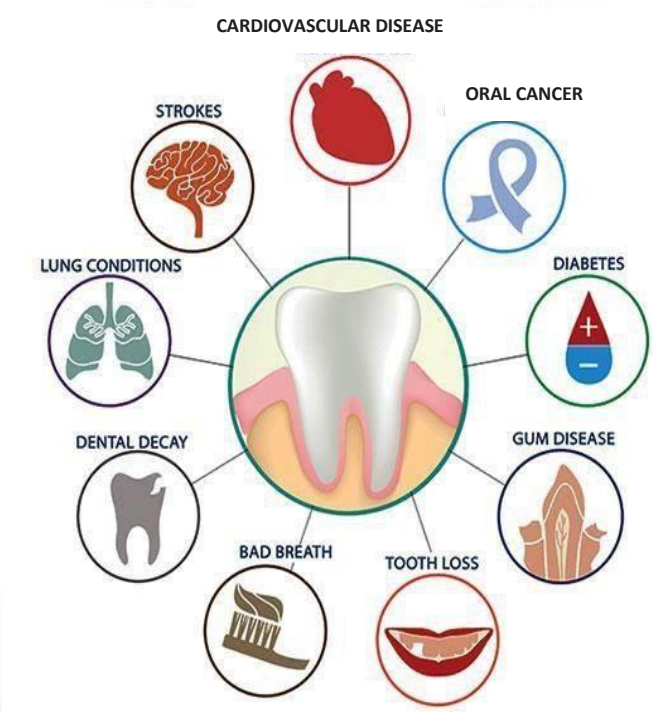


Figure 2: Association between oral diseases and systemic diseases
Modified from (Oral Health Foundation 2021)

6.7 Pregnancy and Oral Health

Maternal Oral Health has considerable implications for birth outcomes and for the infant. Nearly 60 to 75% of pregnant women have gingivitis, an early stage of periodontal disease that occurs when the gums become red and swollen from inflammation that may be aggravated by changing hormones during pregnancy. Because of normal physiologic changes, pregnancy is a time of particular vulnerability in terms of good Oral Health. Periodontal disease during pregnancy has been associated with pre-term birth, development of preeclampsia and delivery of low-birth-weight babies (Tettamanti 2017). It has also been found that maternal oral flora is transmitted to the new-born infant and increased cariogenic flora in the mother predisposes the infant to the development of caries (Boggess 2006). Maintaining Oral Health and improving Oral Health care knowledge during pregnancy is critical and promising step towards early childhood caries prevention. Although largely preventable, early childhood caries remains the most common chronic childhood disease, with nearly 1.8 billion new cases per year globally (GBD 2017). Pregnancy is an ideal period to promote ECC prevention given the profound influence of maternal Oral Health and behaviours on children's Oral Health. (Xiao 2019). Dental caries is also associated with adverse growth patterns.

6.8 Impact of poor Oral Health

It affects the functional, psychological and social dimensions of a person's well-being. Oral pain has destructive effects on individuals like sleep loss, poor growth, behavioural problems and poor learning, especially among children. Crucial processes of development in communication, socialisation and self-esteem are also hampered (Ogundele 2018). Poor Oral Health leads to distorted oro-facial appearance, which somewhat affects the beauty of an individual and interfere with verbal communication and mastication. Consequently, the social wellbeing of an individual or the quality of life is held back either directly or indirectly (Batra 2020).

Other conditions such as oral clefts, missing teeth, severe malocclusion, or severe dental caries are related with feelings of embarrassment, withdrawal and is of concern. Oral and facial pain from dentures, temporo-mandibular joint disorders, and oral infections affect social interaction and daily behaviours (Aljohani 2021).

In economic terms, oral diseases account for much absenteeism from work and school, resulting in loss of productivity and hampers the economic yield of the nation.

6.9 Oral Health and Ageing

Population ageing is defined as the rise in the median age of the population (defined as the age which divides the population into two equal size groups, one of which is younger and the other older than the median) as a result of the shifting of the age structure of the population towards the upper end of the age distribution. In Mauritius, the population aged 60 years and above represented 5.9% in 1972 compared to 17.4% in 2019.

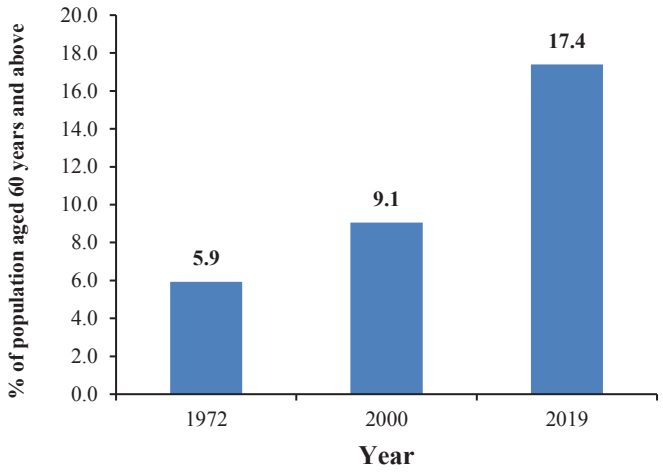


Figure 3: Percentage of the population aged 60 years and above, Mauritius, 1972 – 2019
Adapted from (Statistics Mauritius 2019)

The population of older adults is growing and is increasingly diverse. In the elderly residents, there is an amplified prevalence of caries, periodontal disease and tooth loss which leads to oral pain and is a problematic issue. Being edentulous, having xerostomia or soft tissue lesions and poorly fitting dentures affect eating and food choices which are of foremost concerns hence impairing the overall health and quality of life of many individual and mostly the senior citizens (Gil-Montoya 2015).

According to 2011–2012 data reported by the National Centre for Health Statistics, in America adults aged 75 years and older (26%) were twice as likely to be edentulous as those aged 65 to 74 years (13%) (Raphael 2017). In 2015, the WHO published the World Report on Ageing and Health, which outlines a framework for action to foster healthy ageing. The policies are extremely pertinent to the enhancement of Oral Health (P. J. Petersen 2020). Dental practice and dental systems can and should be transformed to ensure the Oral Health of all seniors.

6.10 Oral Cancer

Oral cancer includes cancers of the mouth and the back of the throat. Oral cancers develop on the tongue, the tissue lining the mouth and gums, under the tongue, at the base of the tongue, and the area of the throat at the back of the mouth.

Oral cancer most often occurs in people over the age of 40 and affects more than twice as many men as women. Most oral cancers are related to tobacco use, alcohol use (or both), and infection by the human papilloma virus (HPV). Oral cancer can spread quickly; early detection is important (Yete 2018).

According to the latest WHO data, Oral Cancer Deaths in Mauritius reached 52 or 0.57% of total deaths. The age adjusted Death Rate is 3.26 per 100,000 of population ranks Mauritius #87 in the world (World Life Expectancy 2020).

A dental surgeon can perform an oral examination and detect early signs of oral cancer. Oral cancer is often preceded by a clinical premalignant phase accessible to visual inspection and thus there are opportunities for earlier detection and to reduce morbidity and mortality.

7.0 SITUATION ANALYSIS

7.1 Global burden of Oral Health

Oral diseases are considered an important public health problem not only because of their high prevalence but also because they negatively affect the quality of life of individuals and have high costs for their treatment (Gauba 2016). The Global Burden of Disease study (GBD) in 2017 has demonstrated consistently that Oral Health represents a major neglected global population health challenge. Data from the global study revealed that there were 3.5 billion cases (95% uncertainty interval [95% UI], 3.2 to 3.7 billion) of oral conditions, of which 2.3 billion (95% UI, 2.1 to 2.5 billion) had untreated caries in permanent teeth, 796 million (95% UI, 671 to 930 million) had severe periodontitis, 532 million (95% UI, 443 to 622 million) had untreated caries in deciduous teeth, 267 million (95% UI, 235 to 300 million) had total tooth loss, and 139 million (95% UI, 133 to 146 million) had other oral conditions in 2017 (Bernabe 2020).

Data from the GBD study also offer the opportunity to identify countries achieving major success towards Oral Health goals, thereby helping to identify successful Oral Health strategies to reduce the burden of oral conditions (Kassebaum 2017).

Government and non-Governmental organisations need national and global estimates on the descriptive epidemiology of common oral conditions for policy planning and evaluation. The aim of this component of the Global Burden of Disease study was to produce estimates on prevalence, incidence, and years lived with disability for oral conditions by sex, age, and countries.

In general, more economically developed countries have the lowest burden of untreated dental caries and severe periodontitis and the utmost burden of total tooth loss (Linard 2012). The findings offer an opportunity for policy makers to recognise successful Oral Health strategies and strengthen them; initiate and monitor diverse approaches where oral diseases are increasing; plan integration of Oral Health in the agenda for prevention of non-communicable diseases; and estimate the cost of providing universal coverage for dental care (Benzian 2021).

7.2 Oral Health Services in Mauritius

According to the Health Sector Strategic Plan 2020-2024 (HSSP), Mauritius has a strong, resilient and equitable health system which is founded on the WHO Health System Framework. A dual-tiered system of healthcare services, comprising a government-led and funded public sector, and a thriving private sector, steers the country towards achieving its vision to "ensure healthy lives and promote well-being for all at all ages" by 2030. The public sector caters, free of any user cost, to the bulk of the healthcare needs of the population (73%) (HSSP 2020).

In the Island of Mauritius, as at the end of 2020, there were five regional hospitals namely Dr A. G Jeetoo Hospital, Sir S. Ramgoolam Hospital, Dr B. Cheong Hospital, J. Nehru Hospital and Victoria Hospital; two district hospitals namely Souillac Hospital and Mahebourg Hospital; and one Community Hospital namely Dr. Yves Cantin. There were also 6 Mediclinics, 19 Area Health Centres and 114 Community Health Centres along with 7 Specialised Hospitals, namely, one Psychiatric Hospital, one for chest diseases, one for eye diseases, one for ear, nose and throat (E.N.T.) diseases, 2 Cardiac Centres and a new Cancer Hospital which became operational in October 2020. The total number of beds in government health institutions was 3,738 as at the end of 2020. Public Health Care is delivered through a pyramidal system, in order of hierarchy in terms of level of care provided.

Mauritius has two types of dental care delivery, one through the public services and the other through the private services. There is a total of 428, including dental surgeons and dental specialist, registered with the Dental Council of Mauritius (Health Statistics Unit 2020). The Dental Council monitors, *inter alia,* the registration and is responsible for the regulation of the dental profession in order to promote high standards of dental practices, thus safeguarding the public, foster ethical conduct and upkeep the ethical standards of the profession.

Among those registered with the Dental Council, 59 dental surgeons and 11 specialists are employed by the Ministry of Health and Wellness. The population ratio to the number of dentists is 1: 2,957 in the country (Health Statistics Unit 2020).

The Public Dental Health Services in Mauritius is managed under the Ministry of Health and Wellness. These Dental Services have existed for more than 5 decades. Initially the Dental Services used to cover only extraction. With time, the Dental Services have started to provide Oral Prophylaxis and fillings. In the early 80s, the introduction of Specialised Services was established which comprises Oral Surgery, and thereafter Orthodontics and Endodontics services were also introduced.

Oral Health Service is no doubt an important part of health care but it is an expensive facility for most consumers around the world as it is mostly offered through paid services. Mauritius is among the few countries in the world where this facility is offered free of charge to the population in general.

In line with the rapid economic development and expansion of medical facilities in recent years, the health organisations, along with the customers of Oral Health the services are no longer merely focusing on effective dental treatment but also on the prevention of oral diseases.

Services offered at the public dental clinics include provision of emergency treatment, aiming at relief of oral pain, minor oral surgery including tooth extraction, tooth restoration and scaling. Preventive dental procedures consist of application of pits and fissure sealants.

The assessment, diagnosis and treatment procedures in the Public Dental Services in Mauritius are as follows:

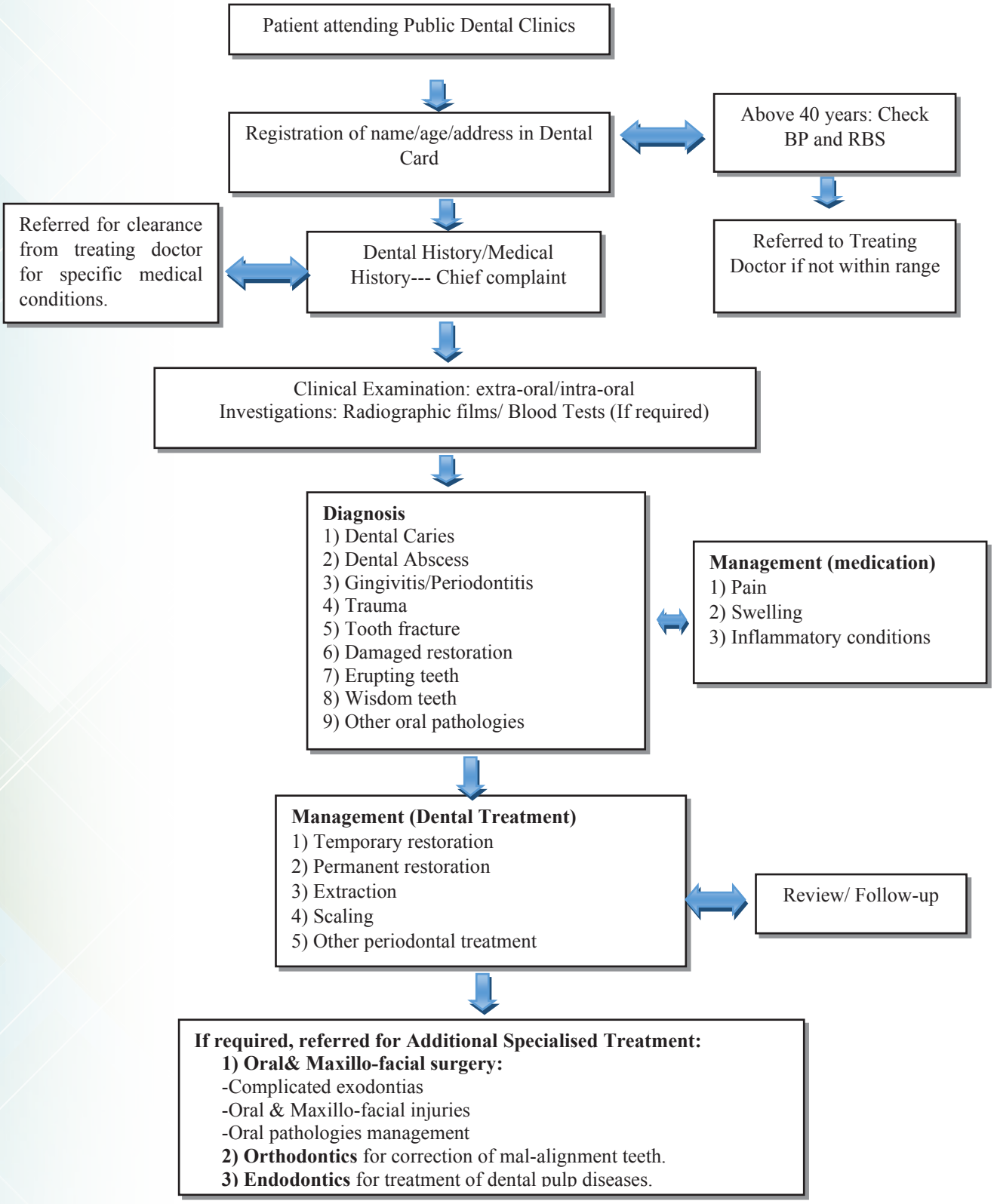


Figure 4: Assessment, diagnosis and treatment in the Public Dental Services

7.3 Public Dental Clinics in Mauritius, Rodrigues and Agalega

The total number of Dental Clinics presently stands at 54 (including 3 mobile dental clinics) at Hospital and Primary Health care level, providing routine dental care and 13 Specialised Dental Clinics (Oral Surgery, Orthodontics and Endodontics).

The 3 mobile dental clinics target mainly the school population and the services are also provided in remote areas where there is limited accessibility to dental services. Also, there are 3 dental clinics in the prisons.

In Rodrigues, there are three dental clinics, namely at Queen Elizabeth Hospital, Mont Lubin Health Centre, and La Ferme Health Centre. (Mont Lubin Health Centre has been converted into Covid-19 Centre recently). Basic dental services comprising care and treatment, dental extractions, fillings, scaling and endodontics treatment are provided by 2 dental surgeons in post in the Island. Resident dental surgeons provide Endodontics service while visiting surgeons carry out Orthodontics and Oral Surgery treatment at regular intervals.

Besides, a dental surgeon visits Agalega, whenever there is a request from the Outer Islands Development Corporation by the "Mauritius Trochetia" which sails to Agalega, to provide dental care to local inhabitants which is roughly thrice a year. A total number of 225 patients were examined and treated for the year 2020.

7.4 Dental Specialised Services

Patients requiring Dental Specialised care are first seen by the Dental Surgeons and then referred to the Dental Specialists. Dental Specialised care is available in the fields of:

(i) Oral and maxillofacial surgery

It is a surgical specialty focusing on reconstructive surgery of the face, facial trauma surgery, the oral cavity, head and neck, mouth and jaws, as well as facial cosmetic surgery. It was introduced in the public services in the early 1980's.

Number of Oral Maxillofacial Surgeons: 4 (Including 1 CIC)

Attendance/Treatment done in 2020: 7862

There is also an on-call service for the Oral surgery unit in the 4 Regional Hospitals after normal working hours. (Those from Dr. Bruno Cheong Hospital are being seen at Sir Seewoosagur Ramgoolam National Hospital)

(ii) Orthodontics

It is a dental specialty that addresses the diagnosis, prevention and correction of mal-positioned teeth and jaws and misaligned bite patterns. It may also address the modification of facial growth, known as dento-facial orthopaedics which was introduced in the public services in 1993.

Number of Orthodontists: 4 (Including 1 CIC)

Attendance/Treatment done in 2020: 5445

(iii) Endodontics

It is a dental specialty that deals with the study, diagnosis, and treatment of the dental pulp and the tissues surrounding the root of the tooth. This service is being offered since 2004.

Number of Endodontists: 4 (Including 1 CIC)

Attendance/Treatment done in 2020: 4078

7.5 Organigram of the Public Dental Services

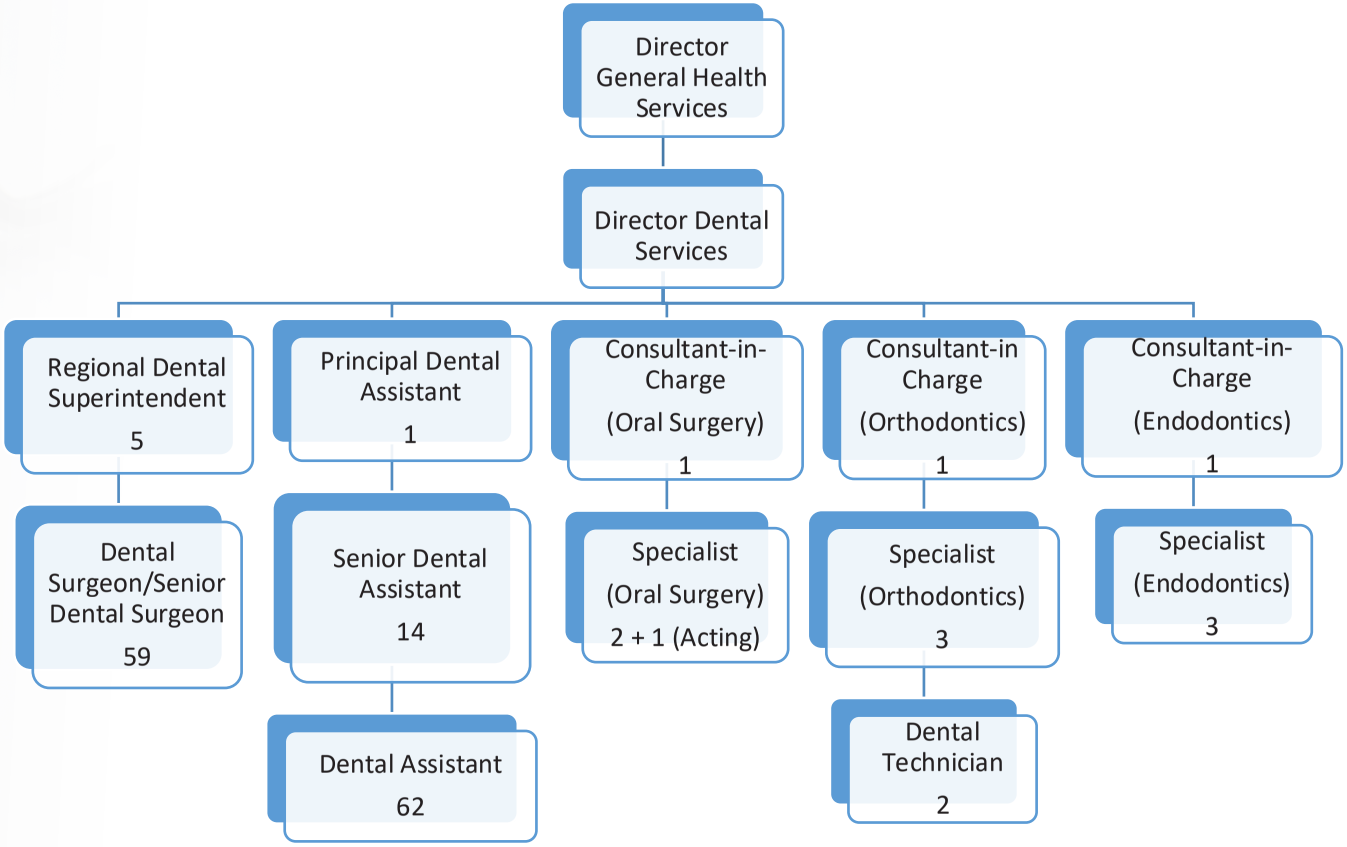


Figure 5: Organigram of the Public Dental Services

Figure 6: Public Dental Clinics in Mauritius

7.6 Oral Health Statistics Report for Mauritius

As per the Annual Health Statistics Report (2020), the estimated resident population as of 31 December 2020 was 1,221,759 compared to 1,221,663 as of 31 December 2019, indicating a growth rate of 0.01%.

The total number of attendances at Government Dental Clinics (static and mobile) in 2020 was 245,069, out of which 31,272, that is 12.8%, were among children aged less than 12 years. 17,385 (7.1%) were cases seen by dental specialists.

The number of cases treated for paradontal diseases was 25,525 and the number of surgical operations on jaws, including surgical extraction of roots and impacted teeth, was 5,039. As a matter of fact, a decreasing trend in attendance has been noted with previous figures of 308,673 in 2016; 303,068 in 2017; 275,303 in 2018; 265,051 in 2019 (Health Statistics Unit 2020).

Table 2: Dental Curative Services for Mauritius

DENTAL CURATIVE SERVICES

TABLE A: ATTENDANCES AT DENTAL CLINICS 2016-2020

ATTENDANCES	Number				
	2016	2017	2018	2019	2020
Cases seen by dentists:					
Children < 5 years	5,210	5,034	4,447	3,590	3,347
Children aged 5-11 years	48,592	45,822	39,944	35,047	27,925
Persons aged 12 years & above	231,529	230,332	210,834	205,053	196,412
SUBTOTAL	**285,331**	**281,188**	**255,225**	**243,690**	**227,684**
Cases seen by specialist:					
oral surgeons	11,563	11,007	10,213	10,941	7,862
orthodontists	7,470	6,375	5,774	5,983	5,445
endodontists	4,309	4,498	4,091	4,437	4,078
TOTAL ATTENDANCES	**308,673**	**303,068**	**275,303**	**265,051**	**245,069**

# of which 165,486 seen at Primary Health Care Centres (2020)

TABLE B: DISTRIBUTION OF CASES SEEN BY TYPE OF DENTAL CARE

Dental care		Number				
		2016	2017	2018	2019	2020
EXTRACTION AND TOOTH RESTORATION						
Deciduous teeth extracted		22,537	21,014	18,372	16,477	14,504
School children						
Temporary fillings inserted in :	deciduous teeth	6,968	6,617	5,740	4,737	3,191
	permanent teeth	3,392	2,193	1,753	1,617	1,071
Permanent fillings inserted :	amalgam	3,948	4,225	3,045	2,372	1,182
	composite	1,398	934	775	789	567
Permanent teeth extracted		653	886	545	522	774
Adults						
Temporary fillings inserted		61,456	58,076	49,698	48,244	41,745
Permanent fillings inserted :	amalgam	31,273	33,232	30,933	31,258	25,577
	composite	19,392	19,765	20,389	21,535	17,988
Teeth extracted		50,971	52,405	49,118	47,617	45,437
OTHER DENTAL CARE						
Treatment of paradontal disease		37,912	34,300	29,141	28,965	25,525
Surgical operations on jaws, etc.		4,924	5,418	5,080	5,256	5,039
Treatment of fracture of jaws		318	335	285	367	274
Endodontic treatment		4,309	4,330	4,074	4,295	4,070
Treatment of dental cysts		172	214	282	355	456
Treatment of temporo-mandibular joint		805	707	464	535	317
Application of pit and fissure sealants		2,617	4,158	2,866	1,491	401

TABLE C: ORTHODONTIC ACTIVITY

Activity	Number				
	2016	2017	2018	2019	2020
No. of appliances delivered	923	802	691	769	756
No. of patients with cleft palate	85	103	132	107	97
No. of appliances activated	4,726	3,956	3,519	3,847	3,748
No. of appliances repaired	0	5	12	22	21

Source: Health Statistics Report 2020

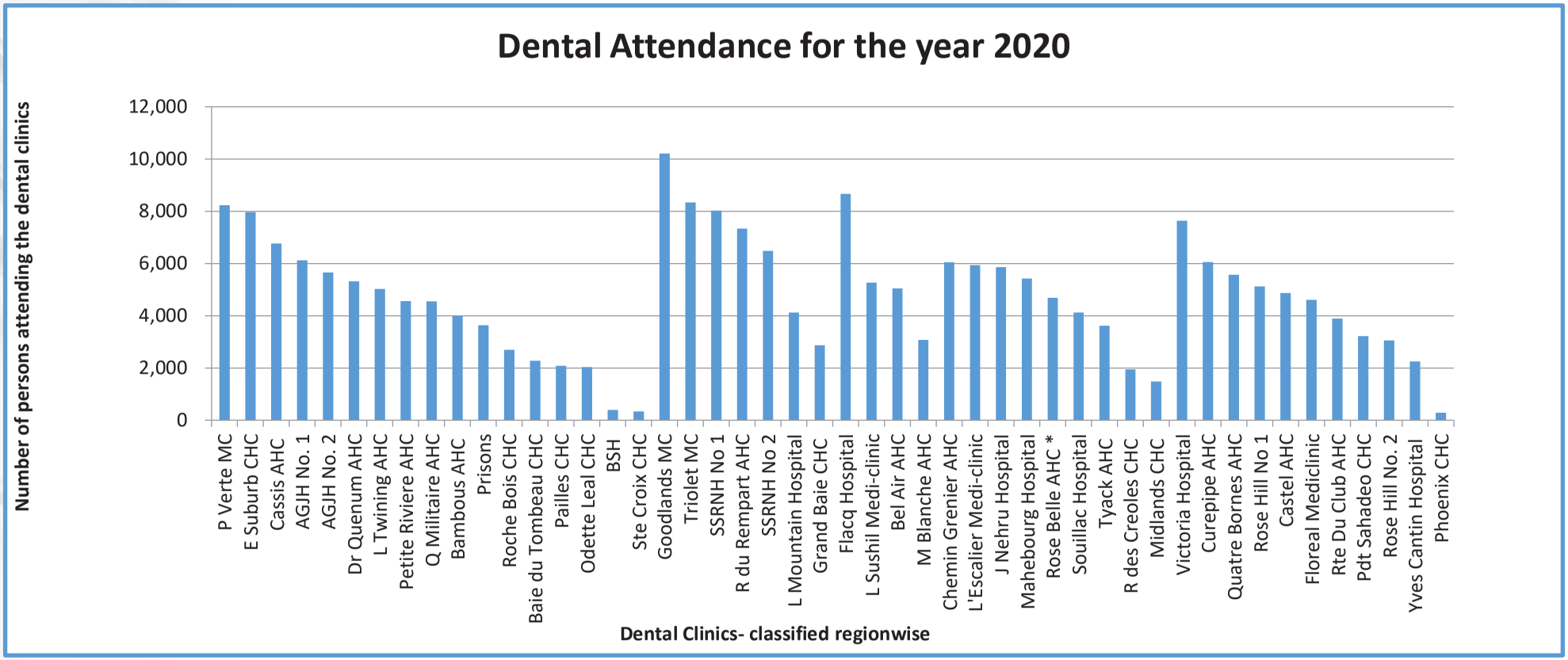
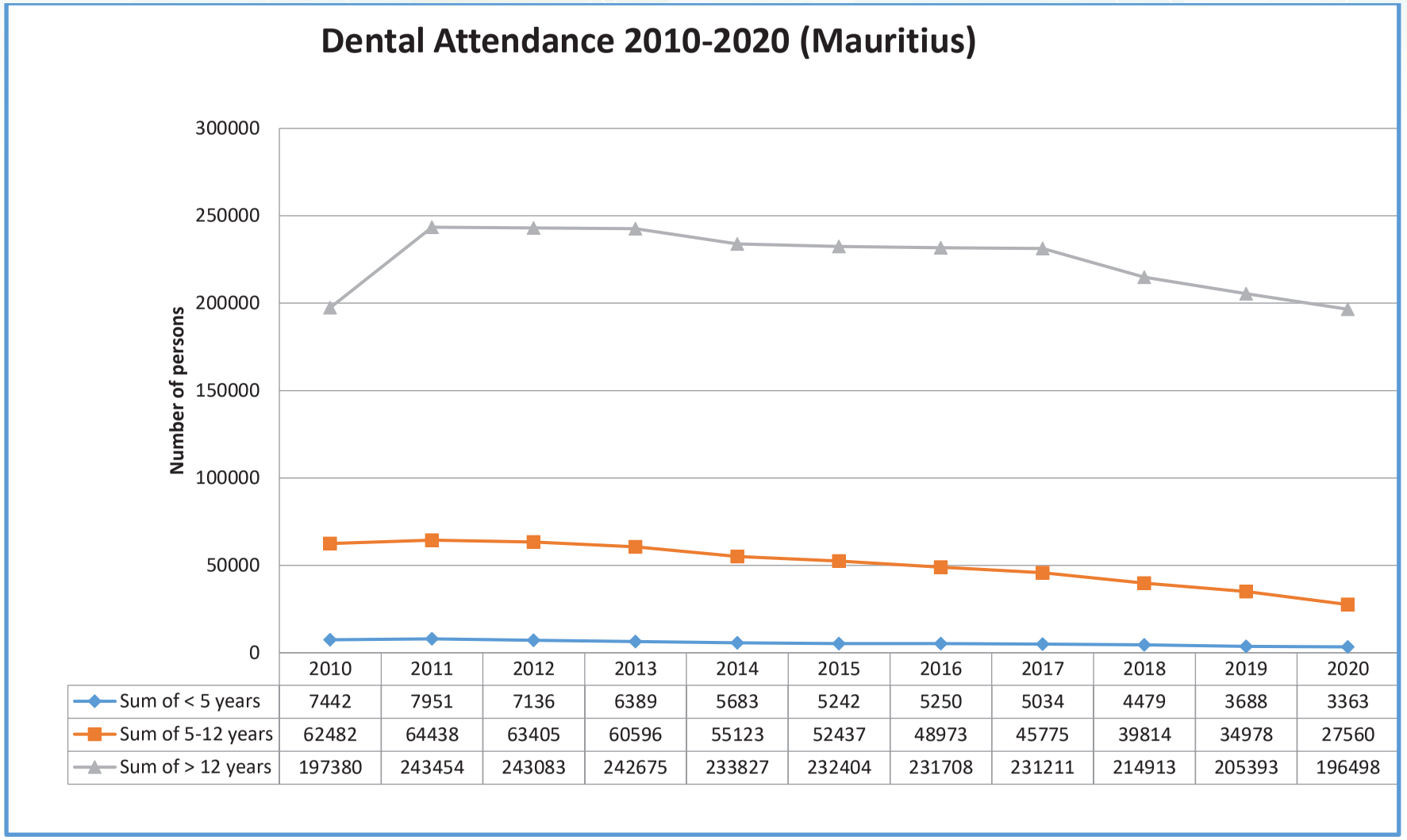


Figure 7: Number of Persons attending Public Dental Clinics



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sum of < 5 years	7442	7951	7136	6389	5683	5242	5250	5034	4479	3688	3363
Sum of 5-12 years	62482	64438	63405	60596	55123	52437	48973	45775	39814	34978	27560
Sum of > 12 years	197380	243454	243083	242675	233827	232404	231708	231211	214913	205393	196498

Figure 8: Dental Attendance 2010-2020

7.7 Activities of the Dental Services- Preventive Services

The Oral Health Promotion programme targets all sections of the population from pregnant women, school children, elderly and the disabled.

Oral Health Promotion is carried out through education, distribution of pamphlets and posters, demonstration of tooth brushing in schools, community centres and workplaces, as well as screening for oral diseases. There is also the mobile dental caravan which is used for giving dental treatment at schools. This service has been disrupted with the pandemic Covid-19 and intended to resume with the launching of Oral Health Month in June 2022.

Prevention of tooth decay in children is reinforced using pit and fissure sealants for erupting molars and continuous monitoring through regular dental check-ups.

Table 3: Activities of the Dental Health Service 2017-2020 Preventive Service

ACTIVITY	PLACE	POPULATION COVERED	2017	2018	2019	2020
ORAL HEALTH PROMOTION	Pre-Primary, Primary, & Secondary Schools	No. of pre-primary schools visited	137	109	91	31
		No. of pre-primary school children reached	6,598	3,204	2,774	786
		No. of primary schools visited	95	99	97	35
		No. of primary school children reached	24,762	27,143	22,773	8,557
		No. of secondary schools visited	1	-	-	-
		No. of secondary school children reached	292	-	-	-
	Other places (community)	No. of nursing mothers reached in well-baby clinics	-	-	-	-
		No. of persons reached in SWC/COM/other centres	538	-	-	-
		No of persons screened in mobile dental clinics				
	TOTAL		32,190	30,347	25,547	9,343

Source: Health Statistics Report 2020

7.8 Oral Health Statistics Report for Rodrigues

The estimated end-of-year resident population of the Island of Rodrigues increased from 43,538 in 2019 to 43,997 in 2020; the growth rate was 1.1%. The population density at the end of 2020 was 400 inhabitants per square kilometre. The proportion of population aged under 15 years decreased from 29.2 % in 2011 to 25.6 % in 2020, while in the same period, the proportion of elderly population (aged 65 years and above) increased from 7.5 % to 8.8%.

There were 2 dentists that is one for 21,999 inhabitants at the end of 2020 while in 2011 the ratio was one for 19,023 inhabitants. There are 4 Dental Assistants supporting the work of the dentists.

In 2020, the total number of attendances at the three dental clinics was 14,885 as compared to 15,620 in 2019, representing a decrease of 4.7%. Dental Clinics attended to 14,558 cases indicating 4.6% drop compared to 2019. 14,558 cases were treated by the Dental Services in 989 sessions in 2020 comprising 7,572 cases (52.0%) seen in 532 sessions at Queen Elizabeth Hospital, followed by 4,473 cases (30.7%) seen in 322 sessions at Mont Lubin AHC and 2,513 cases (17.3%) seen in 135 sessions at La Ferme AHC.

Also, 189 cases were registered for endodontics treatment in 2020 indicating an increasing trend of 7.2% annually in the last five years. There were 6,004 tooth extractions carried out in 2020 comprising 4,061 extractions of permanent teeth and 1,943 cases of deciduous teeth. Extractions have increased by 3.1%, with extraction of permanent teeth reckoning 0.3% increase and deciduous going down by 0.3% in 2020.

Also, 1,601 dental fillings were carried out at Queen Elizabeth Hospital, 1,426 at Mont Lubin AHC and 356 at La Ferme AHC. Fillings have been carried out on 13.4% of children and 86.6% of adults with a 5.5% decrease in 2020 (Statistics Mauritius 2019).

Table 4: Dental Curative Services for Rodrigues

TABLE A: ATTENDANCES AT DENTAL CLINICS 2016 – 2020

Attendances	2016	2017	2018	2019	2020
Cases seen by dentists:					
Children < 5 years	657	668	700	549	615
Children aged 5-11 years	3,490	3,620	3,638	2,827	2,345
Persons aged 12 years & above	12,724	13,675	13,454	11,714	11,584
SUBTOTAL	**16,871**	**17,963**	**17,792**	**15,090**	**14,544**
Cases seen by specialists:					
Orthodontists	372	316	314	358	234
Oral Surgeons	113	135	181	172	107
TOTAL ATTENDANCES	**17,356**	**18,414**	**18,287**	**15,620**	**14,885**

TABLE B: CASES SEEN BY TYPE OF DENTAL CARE

Dental care	2016	2017	2018	2019	2020
EXTRACTION AND TOOTH RESTORATION					
Deciduous teeth extracted	2,440	2,155	2,364	1,904	1,945
Schoolchildren					
Temporary fillings inserted in : deciduous teeth	94	331	77	43	52
permanent teeth	88	43	55	60	71
Permanent fillings inserted : Amalgam	582	187	286	121	36
Composite	15	7	6	9	8
Permanent teeth extracted	93	90	99	103	89
Adults					
Temporary fillings inserted	1,663	1,511	1,453	1,556	1,670
Permanent fillings inserted : Amalgam	1,312	1,390	1,221	1,178	1,019
Composite	591	556	408	443	391
Teeth extracted	4,230	4,260	4,492	3,815	3,980
OTHER DENTAL CARE					
Treatment of paradontal disease (scaling)	446	530	472	464	381
Treatment of dental abscess	1,055	1,405	1,465	1,070	1,039
Application of pit and fissure sealants	-	231	326	199	1
Endodontic treatment	156	156	204	167	195

NB: Drastic changes in certain yearly figures are mainly due to administrative reasons

TABLE C: ORTHODONTIC ACTIVITY

ACTIVITY	2016	2017	2018	2019	2020
No of impressions taken	46	50	36	41	39
No of appliances delivered	46	43	35	41	38
No of appliances repaired	-	1	-	-	-

Source: Health Statistics Report 2020

7.9 Performance Indicators

The following performance indicators, will provide ongoing monitoring of status and progress to achieving the overall National Goals:

- Dental Caries which is a disease of microbial origin in which the dietary carbohydrates are fermented by the bacteria forming an acid. This causes the demineralisation of the inorganic part and the disintegration of the organic part of the tooth, which often leads to cavitation (Pitts 2017). The number of fillings being done in the public sector is shown in the graph below (Figure 9).

Data Estimates from Global Oral Health Report 2020 for Mauritius stipulates the prevalence of caries in deciduous teeth in children 1-9 years old in 2019 was 43.4% whereas caries in permanent teeth in people 5 years and above was 26.8%.

- Periodontitis is one of the most common chronic oral diseases and is characterised by the pathological loss of the periodontal ligament and adjacent supporting alveolar bone. It can also be described as a bacteria-induced complex chronic inflammatory disease (Slots 2017) Periodontal diseases can account for most of the mobility in teeth therefore necessitating extraction as treatment. In Mauritius, the prevalence of severe periodontal disease in people 15 years and above in 2019 was 11.4% (GBD Collaborative Network 2020).

- Tooth loss is a complex outcome that reflects an individual's history of dental disease and its treatment by dental services over the life course. Tooth loss reflects not only dental disease but also patients' and dentists' attitudes, the dentist-patient relationship, the availability and accessibility of dental services and the prevailing philosophies of dental care. Tooth loss is considered an effective marker of population Oral Health and is therefore monitored in many countries, which is illustrated in Figure 10 for Mauritius and the prevalence of edentulism in people 20 years and above in 2019 was 10.1% (GBD Collaborative Network 2020).

These data are just estimates from GBD Report Quarter 3/ Quarter 4 2020. However, there is still the need for a National Oral Health survey to improve the estimation.

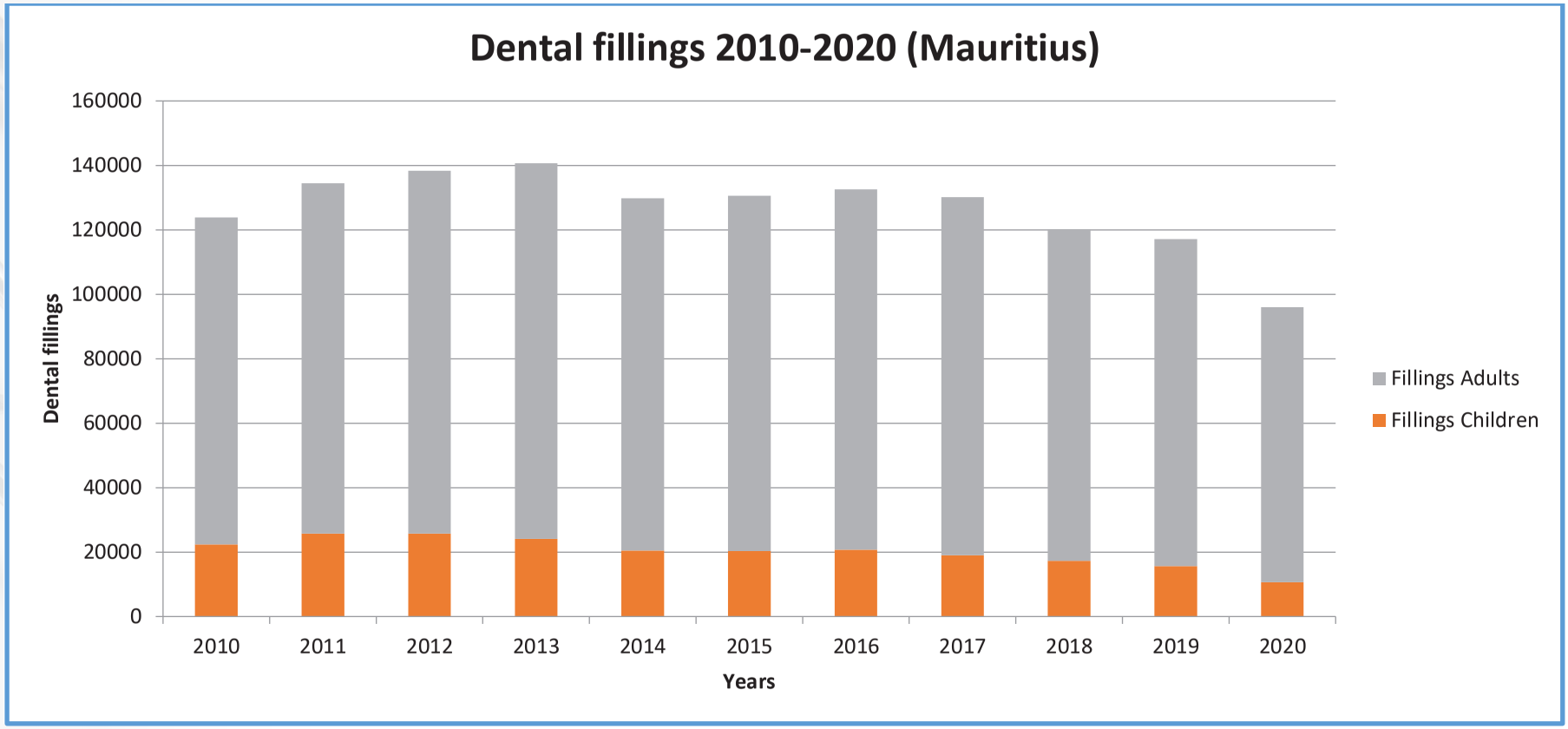
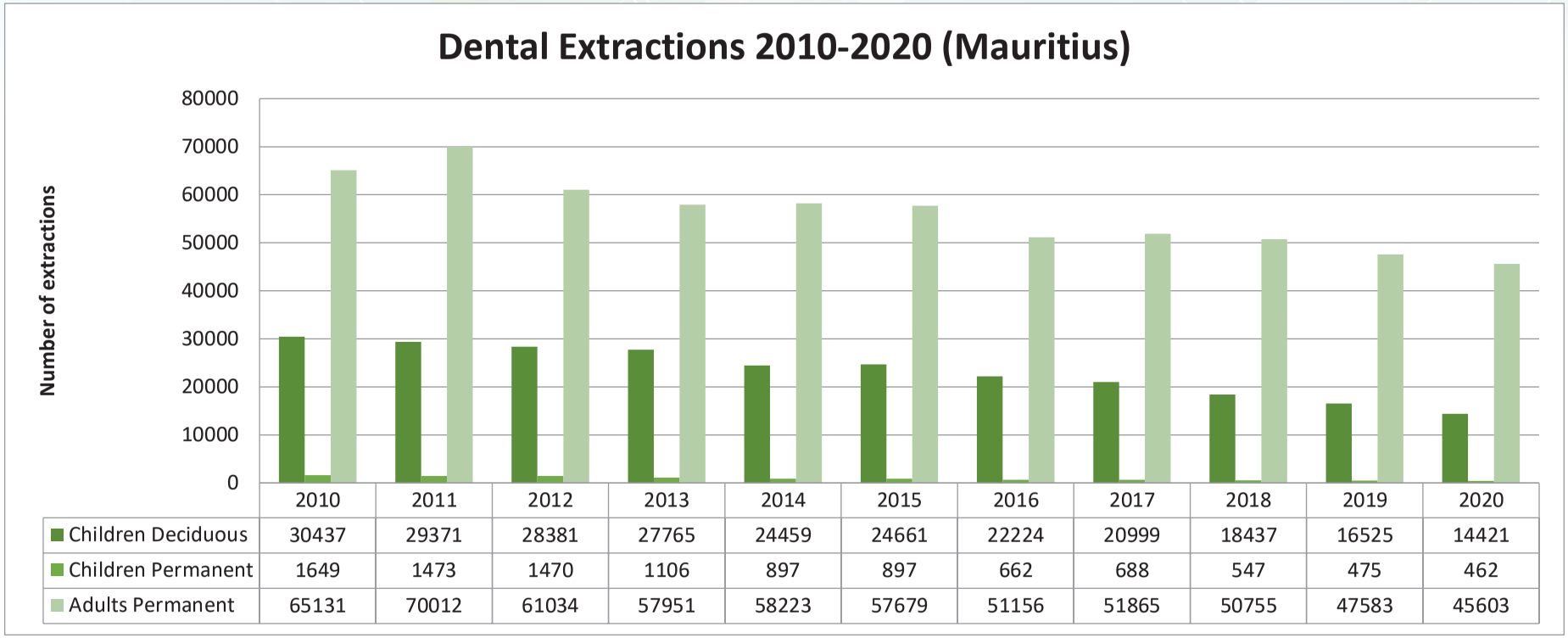


Figure 9: Number of adults/children who have had dental fillings in 2010-2020



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Children Deciduous	30437	29371	28381	27765	24459	24661	22224	20999	18437	16525	14421
Children Permanent	1649	1473	1470	1106	897	897	662	688	547	475	462
Adults Permanent	65131	70012	61034	57951	58223	57679	51156	51865	50755	47583	45603

Figure 10: Number of Dental Extractions done in 2010-2020

7.10 Annual performance report (01 July 2020 to 30 June 2021)-Dental Services

The policy of the Ministry of Health and Wellness is to improve access, quality and delivery of Dental Services by, *inter alia*, reducing waiting time for treatment and laying emphasis on customer care.

(i) Number of patients attending dental clinics

The attendance in Mauritius, Rodrigues and Agalega was 241,808; 15,625 and 276 respectively.
Specialised Dental Services- 17,918
Oral Health Promotion programme- 276,733

(ii) Waiting time

Routine dental treatment- 4 weeks
Specialised Dental treatment- 6 weeks

(iii) Procurement of Dental Consumables and Dental Equipment:

Dental Consumables amounting to Rs 13,297,098
Dental Equipment (Aerosol Suction Apparatus) amounting to Rs 1,520,000 have been awarded during the period 01.07.2020 to 30.06.2021.

(iv) Dental Clinics

a) Several Dental Clinics are being upgraded and new Mediclinics are being built.

b) A child-friendly set up has been adopted on a pilot basis in the Dental Clinic at Odette Leal CHC to make it less stressful for children.

c) The dental clinic at Rose Belle AHC has also been earmarked to incorporate the child-friendly set up.

d) New Dental Clinics have been opened at Goodlands Mediclinic (Second Dental Clinic) to accommodate the high number of patients and at Sainte Croix CHC to improve accessibility for the people in the region.

(v) Challenges/Way Forward

a) New Dental cards have been introduced and are being implemented since 27 January 2021.

b) To further improve accessibility to Oral Health Care to the population, new Dental Clinics will be set up in Mediclinics at Stanley, Bel Air and Quartier Militaire soon.

c) Decentralisation of Specialised Dental Services.

d) A fully functional Endodontics clinic has been set up in Phoenix CHC.

e) Specialised Dental Services (Endodontics) are currently being shifted from New Souillac Hospital to Tyack AHC to make such services more accessible to the people.

f) Further, it is proposed to set up Endodontics Services at Goodlands Mediclinic, Baie du Tombeau CHC, and in Black River Region.

(vi) Major Challenges for COVID-19 management

a) Specialised Dental Services were shifted from New E.N.T Hospital to new infrastructure at Victoria Hospital.

b) Procurement and installation of extra-oral aerosol suction apparatus in nearly all dental clinics.

c) Implementation of COVID-19 safety precautions for staff and patients (PPE, social distancing, temperature screening, use of sanitisers, aeration, regular disinfection of dental clinics as well as regular PCR tests for dental staff).

7.11 Covid-19 and Dental Services in Mauritius

The current pandemic has brought ethical issues in dental health care with discussions on triage policies, among many others thereby impacting Oral Health during the pandemic. Staffing issues, personal and community health risks and exacerbation of health disparities are just a few of the issues that have been highlighted during the current pandemic. During the lock down (2020), the 5 main Regional Hospitals and 6 Mediclinics were operational and giving emergency treatment. The dental services also had implemented international protocols regarding treatment to be given. The importance of Oral Health to overall health and the dental profession's ethical responsibilities to serve the patient and the public at large highlight the necessity for including dentistry in any planning exercise for responding to and mitigating the effects of any public health emergency.

7.12 Clinical Guidelines/Protocols for Dental Services

In the year 2020, for the first time, under the guidance of the Director Dental Services, Clinical Guidelines as protocols to be followed for General Dentistry were conceived by the 5 Regional Dental Superintendents. Furthermore, the Consultants in charge for each specialised unit namely Endodontics, Orthodontics and Oral Surgery conceptualised their respective sets of Protocols and all have been published on the Virtual Health Library Mauritius on the MIH website.

7.13 SWOT Analysis of the Public Dental Services

An overview of the strengths, weaknesses, opportunities and threats of the Dental Services and as depicted in Table 4.

Table 5: SWOT Analysis

Strengths:	**Weaknesses:**
• Dental surgeons stay up to date with current best practices through compulsory CPD. • Strong clinical appraisal by Supervising Officer. • Clinics have satisfactory attendance. • First-come first-serve: no staggered hour appointment. • Records through collection of data in clinics and submission to Ministry which is published annually in Health Statistics Report. • Mandatory registration of patients. • Regular change in posting for dental personnel. • Customer service improvement- Decrease in complaints. • On-going improvement of infrastructure. • New clinical guidelines for managing patients. • Weekly meetings with the DDS and RDS.	• Inappropriate infrastructure and facilities to meet modern standards. • No clinical quality standards to compare against. • No continued training for dental assistants. • Issues are often cursory and often do not result in timely remediation at hospital level. • Oral Health programme being limited to display of posters, distribution of brochures and Oral Health talks. • No national and local surveys carried out.
Opportunities:	**Threats:**
• Mass media sensitisation. • Increase community exposure to OHP. • E-Health. • Upgrade infrastructure with the help of the OSS. • Regular training. • Introduction of more dental specialities. • Increase the number of dental staffs. • Meeting rising public expectations. • Enhance prevention of oral diseases and their risk factors. • Strengthen monitoring and evaluation frameworks. • Introduce indemnity insurance to cover dental practitioners. • Conduct regular national and local surveys. • Technical and financial support from WHO.	• Ageing population: will need change in the approach to dental treatment. • Long-term fiscal sustainability: growing health costs of ageing population present serious challenges to the sustainability of health delivery.

8.0 CHALLENGES IN THE POLICY AREAS

The policy areas and challenges for the implementation of a multi-sectoral National Action Plan for Oral Health, addressing the country's specific issues are depicted below:

Table 6: Priority Actions

Policy Areas	Challenges
Health workforce	• Insufficient dental personnel (auxiliaries) • Long Recruitment procedures • Improve human resources efficiency and performance in the overall Oral Health delivery system
Health Infrastructure – including ICT	• ICT and E-Health to be implemented
Operational	• No dedicated budget for Oral Health programmes • Increase demand by community for quality dental services
Organisation & management of service delivery	• Standardisation of dental clinics concerning infrastructure • Wastages should be monitored • Training in management for supervisors • Dedicated funds for Oral Health Promotion programmes.
Health data, information and knowledge	• Proper Monitoring and Evaluation system for data submitted. • Develop a robust Oral disease Surveillance System
Financial risk protection	• Escalating costs of treatment • Challenge to sustain and improve free quality Oral Health Services in the Public Sector
User satisfaction with services	• Setting up a system to get feedback from health consumers, e.g., suggestion box
Innovation	• Keeping up with new Medical/Dental technologies
Demographics	• Targeting the ageing population, 14% of the population aged 60 years and over. • It is projected that this proportion will increase to 34.3% in 2053.

9.0 GUIDING PRINCIPLES

The following six principles taken from the Report of the Secretariat of the Regional Committee for Africa, Regional Oral Health Strategy 2016-2025 (Regional Office for Africa 2016) Addressing Oral Diseases as part of non-communicable diseases will guide the implementation of the Oral Health Action Plan:

(a) **Public health and community-based approach**: cost-effective interventions that combine population-wide prevention interventions as well as patient-centred care strategies with a focus on primary health care, school health and empowerment for effective self-care, ensuring optimal community involvement.

(b) **Country ownership and leadership**: The Ministry of Health leads initiatives for sustained advocacy on Oral Health as part of the NCD prevention and control programme.

(c) **Multi-sectoral collaboration:** effective oral diseases prevention and control require action beyond the health sector involving a range of stakeholders from, for instance, agriculture, communication, education, finance, sports, trade and industry.

(d) **Universal Health Coverage**: provide equitable Oral Health-care services that are appropriate, accessible and affordable for all people.

(e) **Life-course approach**: Tailor-made Oral Health interventions to respond to all stages through the course of life, including the changing needs of different age groups, while maintaining a clear focus on prevention of diseases in the early stages of life.

(f) **Evidence-based approaches and cost-effective interventions:** make evidence, including best practices, the basis for policy development and decision-making, in order to maximise the quality and impact of interventions.

10.0 STRATEGIC DIRECTION OF THE NATIONAL ACTION PLAN

The guiding principles act as foundation stones providing the basis for the achievement of the National Goals for Oral Health. Each goal has a defined objective supported by a series of strategies and activities as outlined below:

- **Goal 1 - Oral Health Promotion mainly to improve Oral Health literacy**

Oral Health Promotion mainly helps to improve Oral Health literacy which is a cost-effective strategy to reduce the burden of oral disease and maintain Oral Health and quality of life. It is also an integral part of health promotion in general, as Oral Health is a determinant of general health. Dental care systems should focus more on promoting and maintaining Oral Health and achieving greater Oral Health equity (P. J. Petersen 2020).

One systemic review showed the effectiveness of educational interventions performed in health services in the improvement of clinical behaviours and outcomes in Oral Health. Most studies evaluating behavioural and periodontal outcomes have shown significant improvements in favour of interventions. All studies evaluating caries have shown a reduction in new lesions or cases of the disease in the groups receiving the interventions, although only five of the eleven articles reviewed have found a statistically significant difference. Educational interventions carried out by health professionals in the context of their practice have the potential to promote Oral Health in the population (Menegaz AM 2018).

The effectiveness of educational interventions for Oral Health helps in the identification of the best strategies to be applied in the context of health practices. Unlike classical clinical interventions, carried out under optimum conditions to produce the expected effect, success in educational interventions depends on a range of players involved in the implementation and evaluation (Bhor KB 2021).

Such services should be focused on an integrated perspective and offer continuous support to users, using health education as a tool to achieve this purpose. The understanding on how this type of intervention should work is crucial to achieve improvements in Oral Health.

- **Goal 2 - Integration of Oral Health into National Health Policy**

Oral Health needs to be integrated in the National Health Policy, especially for the benefit of medically compromised patients.

a) Diabetes

In a recent study in Mauritius, people with diabetes are found to be mostly unaware of their increased risk of oral complications. Moreover, awareness of both oral and systemic complications appears to be largely linked with level of education, duration of diabetes and the experience of adverse outcomes. This may suggest that people with diabetes are not being informed of their increased risk of complications at the beginning of treatment and that Oral Health promotion and disease prevention is not prevalent. Therefore, customised educational programmes should be implemented at the earliest. A closer collaboration between oral and medical care providers should be encouraged (Paurobally 2021). These patients can be referred to dental surgeons of the catchment area.

b) Cardiovascular Diseases

Studies have shown that gum disease (periodontitis) is associated with an increased risk of developing heart disease, poor dental health increases the risk of a bacterial infection in the blood stream, which can affect the heart valves. Oral Health may be particularly important if one has artificial heart valves. Tooth loss patterns are connected to coronary artery disease. There is a strong connection between diabetes and cardiovascular disease and evidence that people with diabetes benefit from periodontal treatment (Liccardo 2019).

c) HIV

Oral manifestations of HIV infection are common, with 40%-50% of infected and up to 84% of patients with AIDS showing oral lesions like candidiasis (Reznik 2005). Steps should be taken to ensure the prevention of oral disease associated with HIV/AIDS, and the promotion of Oral Health and quality of life for people living with HIV, involving oral-health professionals or staffs who are specially trained in primary health care, and applying primary oral-health care where possible. There is a need to strengthen the management of HIV/AIDS through oral-health professional screening for HIV/AIDS-related oral disease, early diagnosis, prevention and treatment, with emphasis on pain relief and improved quality of life and on reduction of the double burden of oral disease and HIV infection.

d) Thalassemia

The main oral manifestations of thalassemia are Class II malocclusion, maxillary protrusion, high caries index, severe gingivitis. Any dental surgical procedure for such patients should be done under antibiotic cover and immediately after transfusion. Caution should be exercised in thalassemia patients due to complications related to compromised immunity and cardiovascular issues. Multidisciplinary approach involving dental surgeon, haematologist and orthodontist is the best advised approach (Helmi 2017).

e) Radiotherapy

Elimination of oral disease and implementation of oral protocols designed to maintain maximum Oral Health must form part of components of patients' assessment and care before RT begins. Patients should receive a comprehensive oral evaluation several weeks before radiation begins. This time provides an appropriate interval for tissue healing if invasive oral procedures, including tooth extraction, dental scaling/polishing, and endodontic therapy are necessary (Devi 2014).

f) Dialysis

Literature review reveals that the Oral Health is compromised in the patients undergoing haemodialysis therapy. The oral health-related parameters get worsened with increasing duration of haemodialysis as well. The primary reason behind the debilitated periodontal condition among the patients may be attributed to the neglect of proper oral hygiene practices by the patient as they are preoccupied by more time-consuming and life-threatening kidney disease (Jain 2014). There is a need for further interdisciplinary research with emphasis on preventive dental treatment for the patients undergoing haemodialysis ensuring optimum outcome.

g) Common risk factors of other non-communicable diseases.

One of the main lines of WHO's global strategy for the prevention and control of chronic non-communicable diseases is to reduce the level of exposure to major risk factors. Prevention of oral disease needs to be integrated with that of chronic diseases based on common risk factors. Most oral diseases and chronic diseases have common risk factors. As is the case for major chronic diseases, oral diseases are linked to unhealthy environments and behaviours, particularly widespread use of tobacco and excessive consumption of alcohol or sugar. In addition to healthy behaviour, promotion of Oral Health depends on proper oral hygiene and appropriate exposure to fluoride. National Oral Health programmes should include health

promotion and measures at individual, professional and community levels that are cost-effective in preventing oral diseases.

Acknowledging the intrinsic link between oral health, general health and quality of life, the need to incorporate programmes for promotion of Oral Health and prevention of oral diseases into programmes for the integrated prevention and treatment of chronic diseases must be emphasised.

There is a need to focus on reduction of sugar consumption and describe how this can be achieved through the adoption of a range of upstream policies designed to combat the corporate strategies used by the global sugar industry to promote sugar consumption and profits. Promotion of a healthy diet, particularly lower consumption of sugars and increased consumption of fruits and vegetables, in accordance with WHO's Global Strategy on diet, physical activity and reduction of malnutrition is required (World Health Organisation 2016).

h) Tobacco

Oral Health professionals need to be involved in tobacco cessation programmes and discouraging children and young people from adopting the tobacco habit. Close follow up on the objectives of the 'National Action Plan for Tobacco' to incorporate Oral Health in the activities of the strategic goals therein.

- **Goal 3 - Oral Health Prevention Strategies**

Focus must be on preventive strategies as opposed to approaches that emphasise treatment of existing disease which will help to strengthen prevention and early intervention programmes. The fact that oral diseases are largely preventable and yet present high prevalence is worrying. Healthy behaviours, such as daily tooth brushing, regular contact with fluoride sources, and controlled consumption of sugar are the most effective ways to prevent major oral diseases, as well as reduce costs for health services. The strong social and behavioural character of these diseases disclosures the importance of the implementation of educational interventions for the appropriation of self-knowledge about the health-disease process, stimulating the autonomy and change in health behaviours leading to prevention.

- **Goal 4 - Consideration of workforce models that maximise efficiency**

There is a need to analyse the current workforce, to determine future workforce needs and identify the gaps between the present and the future human resource requirements and implement solutions so that the organisation can accomplish its mission, goals, strategies and objectives of the National Action Plan.

- **Goal 5 - Infrastructural development and facilities**

(i) Dental Clinics

Infrastructure and services, including prevention and health promotion, should be accessible to all who need them, across cultures, communities, location, interests, abilities and socio-economic groups, with recognition and respect for individual needs and views.

(ii) Purchasing dental equipment

Appropriate budgetary provisions need to be made, dedicated to the prevention and control of oral and craniofacial diseases and conditions.

(iii) Ergonomics of Dental Clinics

This is the process of designing or arranging workplaces, equipment and instruments so as to fit the users and to ensure a conducive work environment for more efficiency and efficacy. This will improve accessibility for children, old-aged patients and those with handicapped conditions requiring the use of wheelchairs, stretchers and lifts.

(iv) Facilities for dental staff

In future, all new clinics, need to be equipped with changing rooms (male & female) to enable the use of scrubs and surgical gowns and make them compulsory.

(v) More frequent visits by the occupational health professionals

Advice is required on the safety of the dental cadre for assessment of work conditions in relation to many factors, notably noise, made by the equipment which is an invariable inherent disturbing factor.

- **Goal 6 - Development of accurate surveillance systems**

Mauritius lacks majorly in clinical audits. Surveillance systems will help to define the oral disease burden which will improve population data on Oral Health status and enhance Oral Health promotion research. The focus should be on quality of services but also on the numerical increase in facilities.

- **Goal 7 - The need to evaluate and monitor the concentration of fluoride for caries control**

This is an effective public health approach to reduce caries. Fluoride has been used as anti caries agent world widely. There is sound evidence that preventive dental visits improve Oral Health and reduce later costs and good evidence that fluoridation therapy decreases the rate of dental caries, particularly in high-risk populations. Community water fluoridation is a cost-effective and equitable means of increasing exposure to the protective effects of fluoride, thereby reducing tooth decay across the population, and subsequently reducing pain, suffering and costs to individuals and Government. The impact of community water fluoridation on tooth decay is supported by overwhelming scientific evidence and recognised by health and professional organisations as one of the most important public health interventions. Paediatricians and family physicians play an important role in identifying children at high risk for dental disease and in advocating for more comprehensive and universal dental care for children. For Mauritius, the actual situation of optimal levels of fluoride needs to be studied and for the establishment of systematic fluoridation programmes.

- **Goal 8 - Phasing down the use of mercury in dental amalgam**

The phasing down of the use of mercury in dental amalgam gradually, together with other African countries, is another important goal. This is particularly relevant regarding the medium-term end of the use of amalgam, which was decided within the framework of the Minamata Convention of the United Nations for the elimination of mercury in the environment. The measures are being taken by the Ministry to phase down the use of dental amalgam; these are enumerated in the Strategic Plan Table 17.

➢ Goal 9 - Oral Health Rehabilitation Strategies

A high prevalence of tooth loss is observed among Mauritians and thus the need to improve the facilities of removable prosthesis is fundamental. Appropriate measures are mentioned in Table 18.

Proposed new Dental Specialised Services: Prosthodontics

It is a dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth or oral and maxillofacial tissues using biocompatible substitutes.

Numerous dental extractions are being carried out daily in our dental clinics. Unfortunately, not all patients can afford a denture to replace the missing teeth due to financial constraints. It is essential to replace the extracted teeth as loss of the teeth is accompanied by dietary restrictions. Providing dentures will alleviate this problem and improve the quality of life of patients especially for those who suffer from diseases like diabetes where a proper diet is mandatory.

In the starting phase, it is proposed that this new branch of specialist treatment in the dental services will help those who have lost their teeth by replacing their missing teeth by either partial or full removal dentures depending on their individual needs.

➢ Goal 10 - Oral Health Research Approaches

Research is one of the pillars to improve oral health. Research is a key activity in the implementation of the National Action Plan. The main aim is to authenticate data collection procedures, to measure change or to develop indicators for reporting. The research aspect promotes a better understanding of oral health, encourages analytical reflection and collects data to provide evidence of outcomes, achievement and effectiveness of programmes.

Research activities provide concrete measures of effect and the research process guides monitoring of projects and evaluation of the plan. Research and surveys need to be conducted and reports released which would allow the documentation of Oral Health care needs of vulnerable populations, including elderly and children. In Oral Health research, important aspects of life that are affected by oral conditions and that may be amenable to treatment can be identified.

11.0 NATIONAL ACTION PLAN STRATEGIC GOALS 2022-2027

11.1 Goal 1 - Oral Health Promotion

Table 7: Activities for the Oral Health Month 2022

SN	Strategic Objective	Strategic Action	Activities	Immediate Estimated Cost (Rs)
11.1.1	Oral Health promotion event for all primary school children in Mauritius and Rodrigues.	Launching of an Oral Health Month to be scheduled in **June 2022**.	(i) Distribution of an Oral Health Kit comprising of a pamphlet, bookmark, toothpaste and toothbrush) to approximately **76, 000** students. (ii) Sensitisation and awareness campaigns on Oral Health in schools targeting primary students in collaboration with Ministry of Education, Tertiary Education, Science and Technology. (iii) Production of Oral Health Information and Education Campaign materials (posters, pamphlets, bookmarks) and 50 banners (5 Regions x 10) to be used during exhibitions. (iv) Demonstration of tooth brushing techniques and flossing for good oral hygiene. (v) Social Media Campaign whereby a **smile contest** would be organised targeting adolescents and children and gift vouchers would be offered to winners. (vi) Production and broadcast through MBC of short videos on Oral Health. (vii) Oral Health talks on MBC Radio and TV channels both in Creole and Bhojpuri. (viii) Nutritional guidelines on **diet** for optimum Oral Health in collaboration with the Nutrition Unit of this Ministry.	4,500,000 Initial amount funded by MOHW

Table 8: Strategies for Enhancing Oral Health Promotion

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.1.2	All the population should have access to Oral Health promoting environments and to appropriate evidence-based information and programmes. These will support them to make informed decisions about their Oral Health.	The use of mass media in form of radio or television advertisement should be a major means which should be promoted.	**Target population: Overall** More Oral Health talks on radio.	-	-	-	-	No additional funds required as per agreement for MBC radio and TV
			Development of audio-visual demonstration videos on Oral Health hygiene and tooth brushing techniques to be broadcast on the National TV.	32,500	-	-	32,500	In collaboration with the Chief Health Information, Education and Communication Officer
		Broadening the availability of evidence based Oral Health Promotion programmes and information to professionals and the public.	**Patients visiting dental facilities** Audio-visual demonstration videos in waiting areas. (Tooth brushing technique and flossing) and Emphasise on Oral Health talks.	360,000	-	-	360,000	By Oral Health professionals in all dental set-ups.

		Strengthening the promotion of Oral Health in respect to early childhood caries for preschool and school children as part of activities in health-promotion in schools e.g., Supervised tooth brushing programme in targeted childhood settings.	**Children < 5 years** Involves the delivery of a nursery/school-based daily tooth brushing programme for under 5 years old in schools and nurseries.	-	-	-	-	In collaboration with ECCEA
		An integrated approach that combines school health policy, skills-based health education, a health-supportive school environment and school health services.	**Primary school children of 5 to 12 years old** Developing and implementing a national programme to control oral disease as part of the integrated management of childhood illness.	-	-	-	-	In collaboration with the Ministry of Education, Tertiary Education, Science and Technology.
			Persons 12 years old and above Supervised tooth brushing programme in all childhood educational settings.	-	-	-	-	

			Adults -To reinforce the promotion of Oral Health in specific targeted working places e.g., industrial zones. -Awareness of the different specialised treatment offered by MOHW, namely Oral Surgery, Orthodontics and Endodontics.	-	-	-	-	In collaboration with the Ministry of Labour and Employment
			Elderly population, socially disadvantaged population, residential aged care and disability settings Incorporating Oral Health into general health and well-being through a life-course perspective in health promotion and emphasis on age-friendly primary health care with regular check-ups and appropriate treatment. -NGO's, homes, orphanage, shelters can be contacted to provide appropriate dental care.	-	-	-	-	In collaboration with Ministry of Social Integration, Social Security and National Solidarity as well as the Ministry of Gender Equality and Family Welfare
SUB TOTAL Oral Health Promotion				**392,500**	**-**	**-**	**392,500**	

Table 9: Summary of Proposed activities for the school children on Oral Health

SN	Activities	Timeframe	Target Groups	Write-up	Resource Persons	Remarks
1	Early Childhood Dental Care Programme	Academic Year	• Pre-Primary school children • Parents • Teachers at Pre-Primary schools	• Oral Health Education (OHE)	• Dental Assistant/Senior Dental Assistant	In collaboration with ECCEA
2	Primary School Dental Care Programme	Academic Year	• Primary School Children, Grade 4 • Other Grades	• Oral Health Education + Tooth brushing • OHE	Senior Dental Assistant	In collaboration with the Ministry of Education, Tertiary Education, Science and Technology.
			• Primary School Children Grades 2, 3, 5	• OHE • Comprehensive dental treatment in clinics upon appointment	• Dental Surgeon • Dental Assistant	
			• All Primary School children in selected schools (usually remote from dental clinics)	• Provision of dental care in Mobile dental clinics	• Dental Surgeon • Dental Assistant	
3	Secondary School Dental Care Programme	Academic Year (Mainly 1st and 2nd Terms)	• Secondary school children Grade 7	• Oral Health Education • Routine Dental Check-up + Referral for treatment	• Dental Surgeon	

11.2 Goal 2 - Integration of Oral Health into National Health Policy

Table 10: Strategies for the integration of Oral Health into General Health

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT-TERM	MID-TERM	LONG - TERM	TOTAL	
11.2.1	Strengthen national advocacy, leadership and partnerships for addressing oral diseases as part of NCDs through a multi-sectoral approach.	To adopt measures to ensure that Oral Health is incorporated as appropriate into policies for the integrated prevention and treatment of chronic non-communicable diseases.	To incorporate measures pertaining to Oral Health into national policies as appropriate for integrated prevention and control of non-communicable diseases.	-	-	-	-	In collaboration with the NCD, Health Promotion and Research Unit
		Focus on systemic population-wide health promotion giving special attention to medically compromised patients.	- **Diabetes** Educational programmes increased risk of developing complications and integrate oral and periodontal examination.	-	-	-	-	In collaboration with the already established NCD routine follow-up.

			- **Cardiovascular** Promoting a closer collaboration between oral and medical care providers. - **HIV** Strengthening the management of HIV/AIDS through oral-health professional screening for HIV/AIDS related oral disease, early diagnosis, prevention and treatment, with emphasis on pain relief. - **Thalassemia** Implementing a multidisciplinary approach involving dental surgeon, haematologist and orthodontist.	-	-	-	-	In collaboration with HIV & AIDS UNIT

			- **Radiotherapy** Counselling, awareness and treatment of several oral complications in patients before, during and after radiotherapy. - **Dialysis patients** To conduct interdisciplinary research/survey with emphasis on preventive dental treatment for the patients undergoing haemodialysis ensuring optimum outcome.	-	-	-	-	In collaboration with the Oncology Unit. In collaboration with the Haemodialysis Unit.

11.2.2	To incorporate Oral Health in the framework of enhanced primary health care for chronic non communicable diseases.	Common risk factors of other non-communicable diseases; prevention of oral disease needs to be integrated with that of chronic diseases based on common risk factors. Sugar, alcohol, and tobacco consumption, and their underlying social and commercial determinants, are common risk factors shared with a range of other non-communicable diseases (NCDs).	As is the case for major chronic diseases, oral diseases are linked to unhealthy environments and behaviours, particularly widespread use of tobacco and excessive consumption of alcohol or sugar.	-	-	-	-	In collaboration with integrated programme for the prevention of chronic non-communicable diseases.
		Prevention of oral cancer and other diseases related to tobacco use.	Discouraging children and young people from adopting the tobacco habit.	-	-	-	-	By involving oral-health professionals in tobacco cessation programme.

		To work together with the Tobacco and Alcohol Actions Plans.	Coherent and comprehensive regulation and legislation are needed to tackle these shared risk factors.	-	-	-	-	
		Curbing Commercial Health Determinants	Combating the commercial determinants of oral diseases and NCDs should be a policy priority through effective political control measures to protect vulnerable population. E.g., advertising bans, selective tax increases and other fiscal measures.	-	-	-	-	
		Integrate Oral Health care information management systems in the forthcoming launching of E-Health system.	This will help in the proper monitoring and evaluation system.	-	-	-	-	Costed in the E-health project.
SUB TOTAL Integration of Oral Health into National Health Policy				**-**	**-**	**-**	**-**	

11.3 Goal 3 - Strategies to strengthen prevention and early intervention programmes

Table 11: Strategies for Oral Health Prevention

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.3.1	Raise awareness on preventive measures of Oral Health.	It is proposed that all children be referred to a Dental Surgeon, as a first contact, whenever they attend the health centres for vaccination.	Encouraging parents to bring their babies to see a dentist within 6 months of getting their first tooth instead of bringing them only when there is tooth decay, tooth pain or emergencies.	-	-	-	-	In collaboration with ECCEA
		Advice to expectant and nursing women and new parents and focus on infants and children < 5 years old.	The child will then receive his/her dental card for subsequent regular dental check-ups.	71,500	71,500	35,750	178,750	

		Prevention of Early Childhood Caries.	- Breast milk is best for babies and does not have an increased risk for dental caries. Additionally, encourage parents/ infants after 6 months of age to use infant feeding cups rather than infant feeding bottles. -Sugary fluids should not be placed in infant feeding bottles. -Comfort sucking on a bottle should be discouraged.	-	-	-	-	In collaboration with ECCEA
		Improving healthy eating and reduced intake of sugar.	Promoting compliance to dietary guidelines to be encouraged. -Focus on drinking sufficient water; limiting sugary foods and drinks; and choosing healthy snacks. -Limiting free sugars consumption to less than 10% of total energy intake – and ideally even further, to less than 5% – minimises the risk of dental caries throughout the life course.	-	-	-	-	In collaboration nutritionist

			-Including increase in the use of sugar-free medicines for children.					Public Pharmaceutical Services
		Healthy food policies in children's settings and workplaces.	To reinforce laws about the restrictions of the sale of sweets/chocolates and sugary drinks and juice in school canteen.		-	-	-	In collaboration with the Ministry of Education, Tertiary Education, Science and Technology.
		Appropriate exposure to fluoride for caries control.	**To recommend the brushing of teeth with the appropriate fluoride toothpaste twice a day.**	-	-	-	-	Essential preventive action for all.
		Reduction in the rates of potentially preventable oral injuries by advice on the use of mouth guards for all sports	Where there is a reasonable risk of a mouth injury e.g., football, martial arts, boxing, basketball, squash, bike riding, skateboarding, in-line skating, cricket (wicket keeping), water skiing as few examples.	-	-	-	-	In collaboration of the Ministry of Youth Empowerment, Sports and Recreation
SUB TOTAL Strategies to strengthen prevention and early intervention programmes				**71,500**	**71,500**	**35,750**	**178,750**	

11.4 Goal 4 - Consideration of workforce models that maximise efficiency

Table 12: Workforce Development Goal

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.4.1	To analyse the current workforce, determining future workforce needs, identifying the gap between the present and the future and implementing solutions so that this organisation can accomplish its mission, goals and strategic plan.	To address human resources and workforce planning for Oral Health as part of every National Plan for Health.	Scale up capacity to recruit oral-health personnel. -Ensure proper service back-up of dental personnel through appropriate recruitment process.	-	-	-	-	Request has been made in the Human Resource Budget Proposal 2022-2023
			Set up of additional specialised dental clinics (Endodontics, Oral Surgery, Orthodontics) at New Flacq Teaching Hospital - Recruitment of Specialists/Senior Specialists (Dental Services) and Dental Assistants	-	3,156,075	3,236,415	6,392,490	Request to be made in next Human Resource Budget Proposal.

		The workforce for Oral Health is of an appropriate composition and size and is appropriately trained and distributed.	All dental clinics to be operational daily. Full-time: -1 Dental Surgeon -2 Dental Assistants - Attached HCA to monitor vitals of patients in hospitals. - 1 Attendant/Handy Worker where applicable.	-	-	-	-	Request made in budget proposal 2022/2023 for additional 6 Dental Surgeons and 43 Dental Assistants.
		Training for health, educational and social care professionals.	Provide training to front line staff working with children and vulnerable adults to be able to promote good Oral Health.	60,000	135,000	75,000	270,000	In collaboration with MIH/In Hospital training programmes
		Undertake a feasibility study to establish dental emergency services after working hours.	Extending opening hours for Dental Clinics on a pilot basis.	-	-	-	-	Under consideration
			-Recruitment of DA on shift system.					Request made in HR Budget Proposal 2022-2023
SUB TOTAL Consideration of workforce models that maximise efficiency				**60,000**	**3,291,075**	**3,311,415**	**6,662,490**	

11.5 Goal 5 - Infrastructural Development and Facilities

Table 13: Infrastructure of Public Dental Clinics

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.5.1	Ensure universal access to quality Oral Health Services in a clinically appropriate timeframe.	Upgrade existing dental clinics and setting up of additional ones.	Upgrading of Dental clinic at Y. Cantin C. Hospital	-	-	-	-	Still under discussion with the Operations Support Services
			Upgrading of the 3 dental clinics at Prisons	-	-	-	-	
			New Dental Clinics operational at Ste Croix CHC, Baie du Tombeau CHC and Goodlands Mediclinic (No.2)	-	-	-	-	Shifting from part time to full time.
			To follow the example of Odette Leal dental clinic child-friendly set-up for other clinics.	350,000	950,000	550,000	1,850,000	To be implemented at Rose-Belle AHC (Region 4), followed by one Dental Clinic in each Regions 2, 3 and 5.

		Modernise infrastructure and facilities in all dental clinics:	- External extractor fans to be mandatory	-	-	-	-	To be costed in Procurement Plan A & B
		Provide dental clinics with modern technology.	- Procurement of Extra-Oral Aerosol Suction Apparatus for all Dental Clinics	-	-	-	-	Already costed under 12.5.2 (Dental equipment and logistics)
			- Portable Air Purifier to be procured and installed in all dental clinics	-	-	-	-	Awaiting approval
SUB TOTAL Infrastructural development				**350,000**	**950,000**	**550 000**	**1,850,000**	

Table 14: Dental Equipment and logistics

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.5.2	Dental Equipment	Procurement of equipment	1) For Existing Dental Clinics and for New Dental Clinics	-	-	-	-	Funds for the purchase of equipment will be allocated under annual budget as and when required.
			2) Specialised Dental Clinics at New Flacq Teaching Hospital	-	-	-	-	Already costed
			Purchase of a fully equipped mobile dental caravan.	-	15,750,000	-	15,750,000	
SUB TOTAL Dental Equipment and Logistics				**0**	**15,750,000**	**0**	**15,750,000**	

11.6 Goal 6 - Development of accurate surveillance systems

Table 15: Accurate surveillance systems

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.6.1	An Oral Health surveillance system must be established to evaluate and monitor future trends of the dental caries and other oro-dental diseases and monitor progress of planned programmes to define the oral diseases burden.	Development of oral-health information systems as an integral part of National Surveillance of Oral Health and risk factors.	To incorporate oral-health information system into health surveillance plans so that oral-health objectives are in keeping with international standards, and to evaluate progress in promoting Oral Health.	-	-	-	-	Software will be included in E-Health

11.6.2	Adopt and monitor the frequency of access guidelines as a benchmark to guide Oral Health service planning.	Enhance workforce data collection and analysis to assist planning.	To routinely collect, report and share population Oral Health care data, including priority populations throughout the island.	-	-	-	-	
11.6.3	Research and Evaluation Goal	Appropriate and timely data should be available at both the population and service level for planning, monitoring and evaluation.	Strengthening collection, compilation and interpretation of data by Health Statistics Unit.	-	-	-	-	
11.6.4	Develop and implement a National Oral Health research strategy to identify priorities and coordinate activities	Support research that develops and evaluates Oral Health Promotion programmes.	Awaiting WHO to respond to our request for grant and expertise.	-	-	-	-	Under WHO Biennium.
11.6.5	Clinical Audits	To find out if dental care is being provided in line with standards.	Assessing, evaluating and improving care of patients in a systematic way.	-	-	-	-	
SUB TOTAL Development of accurate surveillance systems				-	-	-	-	

11.7 Goal 7 - To evaluate and monitor the concentration of fluoride for caries control

Table 16: Fluoride as an effective public health approach for prevention of caries

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LON TERM	TOTAL	
11.7.1	Extend access to the preventive effects of fluoride for caries control.	A major preventive strategy is to spread the awareness of use of fluoride containing toothpastes and mouth rinses among the population.	Tooth brushing, twice a day, with a fluoride containing toothpaste should be promoted for effective plaque control.	-	-	-	-	
			Increase fluoride varnish application rates and other recommended preventative measures in dental practices.	-	-	-	-	To be included in the annual procurement plan.
		The need to consider the development and implementation of fluoridation programmes.	The establishment of a multidisciplinary national panel to provide technical advice and support the implementation and maintenance of water fluoridation.	-	-	-	-	Discussion to be made in collaboration with Environmental Health Engineering Unit and relevant authorities and stakeholders.

			Giving priority to equitable strategies such as the automatic administration of fluoride, for example, in drinking-water, salt and to the provision of affordable fluoride toothpaste.	-	-	-	-	
			Explore the possibility if salt fluoridation programmes can be linked to iodisation schemes.	-	-	-	-	Consultation will be held with relevant authorities
SUB TOTAL To evaluate and monitor the concentration of fluoride for caries control				**-**	**-**	**-**	**-**	

11.8 Goal 8 - Phasing down the use of mercury in Dental Amalgam

Table 17: Provisions for dental Amalgam in the Minamata Convention

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.8.1	Phasing down the use of mercury in dental amalgam.	Setting national objectives aiming at dental caries prevention and health promotion, thereby minimising the need for dental restoration.	Strengthen promotion of Oral Health and oral disease prevention in schools and communities as the strategy to reduce the use of all restorative dental materials.	-	-	-	-	
		Setting national objectives aiming at minimising use of mercury.	Preventive care reinforced by widespread use of fluoride and pits and fissure sealants among children.	-	-	-	-	Included in the annual procurement plan.
		Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration.	Ensure phasing out dental amalgam in pregnant women and young children.	-	-	-	-	Implemented
			An increased focus on the use of 'white fillings', glass-ionomer cements and resin-based composite materials.	-	-	-	-	Included in the Annual Procurement Plan

		Encouraging representative professional organisations to educate and train dental professionals and students on the use of mercury-free dental restoration alternatives and on promoting best management practices.	These subjects can be discussed by professional dental bodies during CPD training programmes.	-	-	-	-	In collaboration with Dental Council
		Restricting the use of dental amalgam to its encapsulated form.	Already implemented in ALL dental clinics.	-	-	-	-	
		Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.	Use of amalgam separators, together with other measures of BMP contemplated to reduce mercury discharge to the environment.	-	-	-	-	Ministry of Environment, Solid Waste Management and Climate Change
		Procurement of other restorative material for posterior teeth in 2023.	Introducing composite restorative material for posterior teeth.	-	-	-	-	To be included in the Annual Procurement Plan
SUB TOTAL Provisions for dental Amalgam in the Minamata Convention				**-**	**-**	**-**	**-**	

11.9 Goal 9 - Oral Health Rehabilitation

Table 18: Strategies for Oral Health Rehabilitation

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.9.1	To introduce the rehabilitation services in the public Oral Health Services.	Introduction of prosthetics in the dental services in the long term.	Recruitment of prosthodontists and dental technicians as well as setting up of prosthodontics clinics.	-	-	-	-	Under study
11.9.2	Social Security Grants	Government is already facilitating the partial payment of the dentures. A one-off payment of Rs 3,518 to beneficiaries of BRP whose income does not exceed Rs 30,000 (BRP= Basic Retirement Pension)	To review the payment scheme.	-	-	-	-	In collaboration with the Ministry of Social Integration, Social Security and National Solidarity
SUB TOTAL Oral Health Rehabilitation				-	-	-	-	

11.10 Goal 10 - Oral Health Research approaches

Table 19: Strategies for Oral Health Research Approaches

SN	Strategic Objective	Strategic Action	Activities	Estimated Cost for Financial Year (Rs)				Remarks
				SHORT TERM	MID TERM	LONG TERM	TOTAL	
11.10.1	Promotion of research in Oral Health and translation of knowledge about oral-health promotion and disease prevention into public-health action programmes.	Setting up of a Dental Public Health/Epidemiology department to be able to monitor epidemiological information.	Recruitment of appropriate specialist in the domain of public health, epidemiology, research and with hospital services management skills to improve the Dental Services.	-	-	-	-	
		High quality research is important for identifying Oral Health needs and for the planning, implementation and evaluation of Oral Health promotion initiatives.	A coordinated international research agenda with clear priority for implementation and health system research is necessary, therefore expertise from WHO needs to be taken.	-	-	-	-	Technical Assistance from WHO

		Increasingly, interdisciplinary and qualitative methods should be used to shift the previous focus on clinical research in the direction of closing important evidence gaps in population-based health services research.	As WHO has agreed to provide technical support for and guidance on, the design, implementation and evaluation of evidence-based community demonstration projects worldwide, contribute to sharing of experiences among countries and disseminate lessons learnt/the publication of guidelines.	-	-	-	-	WHO
11.10.2	To conduct a National Oral Health Survey	Request has already been made to the WHO regarding its expertise and fund to conduct the survey.	Awaiting decision from WHO.	-	-	-	-	WHO
		To strengthen oral-health research and use evidence-based Oral-Health promotion and disease prevention to	Development and standardisation of new parameters and indicators in clinical and social dental research.	-	-	-	-	WHO

		consolidate and adapt Oral-Health programmes and to encourage the inter-country exchange of reliable knowledge and experience of community Oral-Health Programmes.	Provide standard recording protocols, criteria, methods for use by various potential investigators so that the data collected is nationally and internationally comparable.	-	-	-	-	WHO
			Organise training and calibration for trainers and various investigators for ongoing Oral Health surveillance and maintain the country's Oral Health data bank.	-	-	-	-	WHO
SUB TOTAL Oral Health Research approaches				**0**	**0**	**0**	**0**	
TOTAL ESTIMATED COST				**874,000**	**20,062,575**	**3,897,165**	**24,833,740**	

12.0 RECAP OF THE INDICATIVE ESTIMATED COSTS FOR 2022-2027

Table 20: Recap of the indicative estimated costs for 2022-2027

	DETAILS OF ACTIVITIES UNDER NAP-Oral Health	Short Term Estimated Cost for 2022-2023 to 2023-2024 (Rs)	Mid Term Estimated Cost for 2024-2025 to 2025-2026 (Rs)	Long Term Estimated Cost for 2026-2027 (Rs)	Total Estimated Cost for 2022-2027 (Rs)
1	Oral Health Promotion	**392,500**	-	-	**392,500**
2	Integration of Oral Health into National Health Policy	-	-	-	-
3	Strategies to strengthen prevention and early intervention programmes.	**71,500**	**71,500**	**35,750**	**178,750**
4	Consideration of workforce models that maximise efficiency: a) For existing and new dental clinics	**Funds will be earmarked in Annual Budget as and when required.**			
	(ii) Recruitment of Specialists and Dental Assistants for the introduction of specialised dental services at New Flacq Teaching Hospital (Endodontics, Oral Surgery, Orthodontics)	-	**3,156,075**	**3,236,415**	**6,392,490**
	(iii) training	**60,000**	**135,000**	**75,000**	**270,000**
5	Infrastructural development: i) Infrastructure of Public Dental Clinics a) For child-friendly dental clinic	**350,000**	**950,000**	**550,000**	**1,850,000**

	(ii)Dental Equipment and logistics: (a)Upgrading of existing dental clinics and for new dental clinics	**Funds will be earmarked in Annual Budget as and when required**			
	b) Introduction of specialised dental clinics at New Flacq Teaching Hospital	-	-	-	-
	© Purchase of 1 fully equipped mobile dental caravan	-	**15,750,000**	-	**15,750,000**
6	Development of accurate surveillance systems	-	-	-	-
7	To evaluate and monitor the concentration of fluoride for caries control.	-	-	-	-
8	Provisions for mercury in dental Amalgam in the Minamata Convention	-	-	-	-
9	Oral Health Rehabilitation	-	-	-	-
10	Oral Health Research approaches	-	-	-	-
	TOTAL ESTIMATED COSTS	**874,000**	**20,062,575**	**3,897,165**	**24,833,740**
Average estimated cost per year			**Rs 4,966,748**		

13.0 MONITORING AND EVALUATION OF THE ACTION PLAN

The National Action Plan for Oral Health will cover a period of five years (2022 – 2027). In this aspect, the monitoring of the advancement of the highlighted strategies will need a robust monitoring and evaluation plan which will be of vital importance. Annual work plans will need be established aiming at the priority actions in the implementation of this plan. Thus, giving suitable possibilities to understand any emerging concerns during the implementation period.

There will be a need for a mid-term evaluation for appraisal of the effectiveness of the developments, as well as performance regarding set objectives. This will be followed by an end-term evaluation at the end of the five-year period which will be conducted to monitor the overall achievements on all objectives.

With the execution of the National Action Plan for Oral Health 2022-2027, a set of actions in the entity and collective areas will be developed, with reference to Oral Health promotion, disease prevention, diagnosis, treatment and rehabilitation.

The actions undertaken will help in several ways to develop access and the quality of dental care performance that it is capable to offer significant and adequate dental care within the Health System. Adverse Oral Health has a major impact on the overall systemic health, quality of life and economic yield of the nation. Dental caries and periodontal diseases contribute to the major burden of oral diseases and individual efforts are highly needed to meet the needs of the country.

This will contribute to reducing the burden of oral diseases and NCDs at large, and to improving the health of populations. Its implementation will necessitate country ownership encouraged by a dedicated global and regional partnership to guarantee the availability and efficient usage of resources.

It is necessary to continually promote international cooperation and interaction with and among all stakeholders concerned with implementation of the Oral Health Action Plan, including WHO collaborating centres for Oral Health and non-Governmental organisations. Thus, we can all work together to achieve the best of Oral Health status for one and all.

References

Akar, H., Akar, G. C., Carrero, J. J., Stenvinkel, P., & Lindholm, B. 2011. "Systemic consequences of poor oral health in chronic kidney disease patients." *Clinical journal of the American Society of Nephrology : CJASN* 6(1): 218-26. https://doi.org/10.2215/CJN.05470610.

Aljohani, M., Alshammari, F., Alamri, H., Rahmah, A. B., Ashley, M., & Yates, J. 2021. "Evaluation of Oral Health-related Quality of Life for Adult Individuals with Cleft Lip and/or Palate Using OHIP-49 and Compared with a Control Group: A Cross-Sectional Study." *Journal of International Society of Preventive & Community Dentistry* 11(5): 516-524. https://doi.org/10.4103/jispcd.JISPCD_100_21.

Aoun, A., Darwiche, F., Al Hayek, S., & Doumit, J. 2018. "The Fluoride Debate: The Pros and Cons of Fluoridation." *Preventive nutrition and food science* vol. 23,3: 171-180. https://doi.org/10.3746/pnf.2018.23.3.171.

Baiju, RM, Peter E, Varghese NO, Sivaram R. 2017. "Oral Health and Quality of Life: Current Concepts." *J Clin Diagn Res* 11(6): ZE21-ZE26.

Batra, P., Saini, P., & Yadav, V. 2020. "Oral Health concerns in India." *Journal of oral biology and craniofacial research* 10(2): 171-174. https://doi.org/10.1016/j.jobcr.2020.04.011.

Benzian, H., Guarnizo-Herreño, C. C., Kearns, C., Muriithi, M. W., & Watt, R. G. 2021. "The WHO global strategy for Oral Health: an opportunity for bold action." *Lancet* 398: 192-194. https://doi.org/10.1016/S0140-6736(21)01404-5.

Bernabe, E., Marcenes, W., Hernandez, C. R., Bailey, J., Abreu, L. G., Alipour, V., Amini, S., Arabloo, J., Arefi, Z., Arora, A., Ayanore, M. A., Bärnighausen, T. W., Bijani, A., Cho, D. Y., Chu, D. T., Crowe, C. S., Demoz, G. T., Demsie, D. G., Dibaji. 2020. "Global, Regional, and National Levels and Trends in Burden of Oral Conditions from 1990 to 2017: A Systematic Analysis for the Global Burden of Disease 2017 Study." *Journal of dental research* 99(4): 362-373. https://doi.org/10.1177/0022034520908533.

Bhor KB, Vinay V, Ambildhok K, Shetty V. 2021 . "Effectiveness of Oral Health educational interventions on Oral Health of visually impaired school children: A systematic review and meta-analysis." *Spec Care Dentist* 41(3): 291-308.

Boggess, K. A., & Edelstein, B. L. 2006. "Oral Health in women during preconception and pregnancy: implications for birth outcomes and infant Oral Health." *Maternal and child health journal* 10(5 Suppl): S169-S174. https://doi.org/10.1007/s10995-006-0095-x.

Devi, S., & Singh, N. 2014. "Dental care during and after radiotherapy in head and neck cancer." *National journal of maxillofacial surgery* 5(2): 117–125. https://doi.org/10.4103/0975-5950.154812.

Fiorillo, L. 2019. "Oral Health: The First Step to Well-Being." *Medicina (Kaunas)* 55 (10): 676. https://doi.org/10.3390/medicina55100676.

Gauba, K., Goyal, A., & Mittal, N. 2016. "A CAMBRA Model For High Caries Risk Indian Children: A Pragmatic Comprehensive Tailored Intervention." *The Journal of clinical pediatric dentistry* 40(1): 36-43. https://doi.org/10.17796/1053-4628-40.1.36.

GBD Collaborative Network. 2020. "Global Burden of disease study 2019 (GBD 2019)." *Institute of Health Metrics and Evaluation.* http://ghdx.healthdate.org/gbd-results-tool.

GBD, Disease and Injury Incidence and Prevalence Collaborators. 2017. "Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016." *Lancet* 390(10100): 1211–1259. https://doi.org/10.1016/S0140-6736(17)32154-2.

Gil-Montoya, J. A., de Mello, A. L., Barrios, R., Gonzalez-Moles, M. A., & Bravo, M. 2015. "Oral health in the elderly patient and its impact on general well-being: a non systematic review." *Clinical interventions in aging* 10: 461-467. https://doi.org/10.2147/CIA.S54630.

Global Monitoring Report. 2021. *Tracking universal health coverage.* World Health Organization. https://cdn.who.int/media/docs/default-source/world-health-data-platform/events/tracking-universal-health-coverage-2021-global-monitoring-report_uhc-day.pdf?sfvrsn=fd5c65c6_5&download=true.

Gobin, R., Tian, D., Liu, Q., & Wang, J. 2020. "Periodontal Diseases and the Risk of Metabolic Syndrome: An Updated Systematic Review and Meta-Analysis." *Frontiers in endocrinology* 11: 336. doi:https://doi.org/10.3389/fendo.2020.00336.

Goldstein, B. Y., Chang, S. C., Hashibe, M., La Vecchia, C., & Zhang, Z. F. 2010. "Alcohol consumption and cancers of the oral cavity and pharynx from 1988 to 2009: an update." *European journal of cancer prevention : the official journal of the European Cancer Prevention Organisation (ECP)* 19(6): 431–465. https://doi.org/10.1097/CEJ.0b013e32833d936d.

Health Statistics Unit. 2020. *HEALTH STATISTICS REPORT 2020.* Ministry of Health and Wellness. http://health.govmu.org.

Helmi, N., Bashir, M., Shireen, A., & Ahmed, I. M. 2017. "Thalassemia review: features, dental considerations and management." *Electronic physician* 9(3): 4003–4008. https://doi.org/10.19082/4003.

HSSP. 2020. *HEALTH SECTOR STRATEGIC PLAN 2020-2024.* Mauritius: Republic of Mauritius. https://health.govmu.org/Communique/HSSP%20Final%2015%20September%202020.pdf.

Jain, S., Singla, A., Basavaraj, P., Singh, S., Singh, K., & Kundu, H. 2014. "Underlying kidney disease and duration of hemodialysis: an assessment of its effect on oral health." *Journal of clinical and diagnostic research: JCDR* 8(5): ZC65–ZC69. https://doi.org/10.7860/JCDR/2014/7853.4402.

James, P., Worthington, H. V., Parnell, C., Harding, M., Lamont, T., Cheung, A., Whelton, H., & Riley, P. 2017. "Chlorhexidine mouthrinse as an adjunctive treatment for gingival health." *The Cochrane database of systematic reviews* 3(3): CD008676. https://doi.org/10.1002/14651858.CD008676.pub2.

Jin, L. J, Lamster, I. B., Greenspan, J. S., Pitts, N. B., Scully, C., & Warnakulasuriya, S. 2016. "Global burden of oral diseases: emerging concepts, management and interplay with systemic health." *Oral Diseases* 22(7): 609-19. https://doi.org/10.1111/odi.12428.

Johnson, N.W., Glick M., & Mbuguye T.N. 2006. "Oral Health and general health." *Advances in dental research* 19(1): 118-121. https://doi.org/10.1177/154407370601900122.

Kassebaum, N. J., Smith, A., Bernabé, E., Fleming, T. D., Reynolds, A. E., Vos, T., Murray, C., Marcenes, W., & GBD 2015 Oral Health Collaborators. 2017. "Global, Regional, and National Prevalence,

Incidence, and Disability-Adjusted Life Years forOral Conditions for 195 Countries, 1990-2015: A Systematic Analysis for the Global Burden of Diseases, Injuries, and Risk Factors." *Journal of dental research* 96(4): 380-387. https://doi.org/10.1177/0022034517693566.

Koon, SP, M Manraj, M Fauzee, J Sewsurn, S Parkin, & Manraj, S. 2019. "Trends in cancer incidence in the Republic of Mauritius, 1991-2015." *Cancer epidemiology* 63: 101616. https://doi.org/10.1016/j.canep.2019.101616.

Lamster, I.B. 2021. "The 2021 WHO Resolution on Oral Health." *International dental journal* 71(4): 279-280. https://doi.org/10.1016/j.identj.2021.06.003.

Liccardo, D., Cannavo, A., Spagnuolo, G., Ferrara, N., Cittadini, A., Rengo, C., & Rengo, G. 2019. "Periodontal Disease: A Risk Factor for Diabetes and Cardiovascular Disease." *International journal of molecular sciences* 20(6): 1414. https://doi.org/10.3390/ijms20061414.

Linard, C., Gilbert, M., Snow, R. W., Noor, A. M., & Tatem, A. J. 2012. "Population distribution, settlement patterns and accessibility across Africa in 2010." *PloS one* 7(2): e31743. https://doi.org/10.1371/journal.pone.0031743.

Lockhart, P. B., Brennan, M. T., Thornhill, M., Michalowicz, B. S., Noll, J., Bahrani-Mougeot, F. K., & Sasser, H. C. 2009. "Poor oral hygiene as a risk factor for infective endocarditis-related bacteremia." *Journal of the American Dental Association* 140(10): 1238-44. https://doi.org/10.14219/jada.archive.2009.0046.

Machiulskiene, V., Campus, G., Carvalho, J. C., Dige, I., Ekstrand, K. R., Jablonski-Momeni, A., Maltz, M., Manton, D. J., Martignon, S., Martinez-Mier, E. A., Pitts, N. B., Schulte, A. G., Splieth, C. H., Tenuta, L., Ferreira Zandona, A., & Nyvad, B. 2020. "Terminology of Dental Caries and Dental Caries Management: Consensus Report of a Workshop Organized by ORCA and Cariology Research Group of IADR." *Caries research* 54(1): 7-14. https://doi.org/10.1159/000503309.

Menegaz AM, Silva AER, Cascaes AM. 2018. "Educational interventions in health services and Oral Health: systematic review." *Rev Saude Publica* 52:52.

Meurman, J. H., Sanz, M., & Janket, S. J. 2004. "Oral Health, atherosclerosis, and cardiovascular disease." *Critical reviews in oral biology and medicine : an official publication of the American Association of Oral Biologists* 15(6): 403-413. https://doi.org/10.1177/154411130401500606.

Moynihan, P. 2016. "Sugars and Dental Caries: Evidence for Setting a Recommended Threshold for Intake." *Advances in nutrition (Bethesda, Md.)* 7(1): 149–156. https://doi.org/10.3945/an.115.009365.

Ogundele, M. O. 2018. "Behavioural and emotional disorders in childhood: A brief overview for paediatricians." *World journal of clinical pediatrics* 7(1): 9-26. doi:https://doi.org/10.5409/wjcp.v7.i1.9.

Oral Health Foundation. 2021. https://www.dentalhealth.org/.

Oswal, K.C. 2010. "A common risk approach for oral health promotion and prevention." *Indian Society for Dental Research* 21(2): 157. https://doi.org/10.4103/0970-9290.66623.

Park, J. B., Han, K., Park, Y. G., & Ko, Y. 2016. "Association between socioeconomic status and oral health behaviors: The 2008-2010 Korea national health and nutrition examination survey." *Experimental and therapeutic medicine* 12(4): 2657-2664. https://doi.org/10.3892/etm.2016.3679.

Patrick, D. L., Lee, R. S., Nucci, M., Grembowski, D., Jolles, C. Z., & Milgrom, P. 2006. "Reducing Oral Health disparities: a focus on social and cultural determinants." *BMC Oral Health* 6 Suppl 1(Suppl 1): S4. https://doi.org/10.1186/1472-6831-6-S1-S4.

Paurobally, N., Kruger, E., & Tennant, M. 2021. "Awareness About the Oral and Systemic Complications of Diabetes Among a Cohort of Diabetic Patients of the Republic of Mauritius." *International dental journal* 71(5): 438–448. https://doi.org/10.1016/j.identj.2020.12.019.

Petersen, P.E., Baez, R.J., Ogawa, H. 2018. "Promoting Oral Health and Quality of Life of Older People - The Need for Public Health Action." *Oral health & preventive dentistry* 16(2): 113-124. https://doi.org/10.3290/j.ohpd.a40309.

Petersen, P.E.,Baez,R. J., & Ogawa, H. 2020. "Global application of oral disease prevention and health promotion as measured 10 years after the 2007 World Health Assembly statement on oral health." *Community dentistry and oral epidemiology* 48(4): 338-348. https://doi.org/10.1111/cdoe.12538.

Pitts, N. B., Zero, D. T., Marsh, P. D., Ekstrand, K., Weintraub, J. A., Ramos-Gomez, F., Tagami, J., Twetman, S., Tsakos, G., & Ismail, A. 2017. "Dental caries." *Nature reviews. Disease primers* 3: 17030. https://doi.org/10.1038/nrdp.2017.30.

Public Health Reports. 2015. "Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries." Washington, D.C., 318-331. https://doi.org/10.1177/003335491513000408.

Raphael, C. 2017. "Oral Health and Aging." *American journal of public health* (American journal of public health) 107(S1): S44–S45. doi:https://doi.org/10.2105/AJPH.2017.303835.

Regional Office for Africa. 2016. *REGIONAL ORAL HEALTH STRATEGY 2016–2025: Report of the Secretariat.* World Health Organization, Africa: Regional Committee for Africa. https://apps.who.int/iris/bitstream/handle/10665/250994/AFR_RC66_5-eng.pdf?sequence=1&isAllowed=y.

Reznik, DA. 2005. "Oral manifestations of HIV disease." *Topics in HIV medicine : a publication of the International AIDS Society, USA* 13(5): 143-8. https://pubmed.ncbi.nlm.nih.gov/16377852/.

Rowan-Legg, A. 2013. "Oral Health care for children - a call for action." *Paediatr Child Health* 18(1): 37-50.

Slots, J. 2017. "Periodontitis: facts, fallacies and the future." *Periodontology 2000* 75(1): 7–23. https://doi.org/10.1111/prd.12221.

Statistics Mauritius. 2019. "Population and Vital Statistics." Mauritius. https://statsmauritius.govmu.org/Documents/Statistics/ESI/2020/EI1505/Pop_Vital_Yr19.pdf.

Tellez, M., Zini, A. & Estupiñan-Day, S. 2014. "Social Determinants and Oral Health: An Update." *Current Oral Health Reports 1* 148–152. https://link.springer.com/article/10.1007/s40496-014-0019-6.

Tettamanti, L., Lauritano, D., Nardone, M., Gargari, M., Silvestre-Rangil, J., Gavoglio, P., & Tagliabue, A. 2017. "Pregnancy and periodontal disease: does exist a two-way relationship?" *ORAL & implantology* 10(2): 112–118. https://doi.org/10.11138/or.

Umberson, D., Montez, J.K. 2010. “Social relationships and health: a flashpoint for health policy.” *Journal of health and social behavior* 51(Suppl): S54-66. https://doi.org/10.1177/002214651038350.

Varenne, B. 2015. “Integrating Oral Health with Non-Communicable Diseases as an Essential Component of General Health: WHO's Strategic Orientation for the African Region.” *J Dent Educ* 79(5 Suppl): S32-7.

Verrecchia, R, Thompson R, Yates R. 2019. “Universal Health Coverage and public health: a truly sustainable approach.” *The Lancet. Public health.* 4(1): e10–e11. https://doi.org/10.1016/S2468-2667(18)30264-0.

WHO. 2021. “Model list of essential medicine - 22nd List.” Geneva. https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2021.02.

World Health Organisation. 2016. “Action Plan for the Prevention and Control of Noncommunicable Diseases in the WHO European Region.” https://www.euro.who.int/__data/assets/pdf_file/0008/346328/NCD-ActionPlan-GB.pdf.

World Life Expectancy. 2020. “WORLD HEALTH RANKINGS.” https://www.worldlifeexpectancy.com/mauritius-oral-cancer.

Xiao, J., Alkhers, N., Kopycka-Kedzierawski, D. T., Billings, R. J., Wu, T. T., Castillo, D. A., Rasubala, L., Malmstrom, H., Ren, Y., & Eliav, E. 2019. “Prenatal Oral Health Care and Early Childhood Caries Prevention: A Systematic Review and Meta-Analysis.” *Caries research* 53(4): 411-42. https://doi.org/10.1159/000495187.

Yete, S., D'Souza, W., & Saranath, D. 2018. “High-Risk Human Papilloma virus in Oral Cancer: Clinical Implications.” *Oncology* 94(3): 133-141. https://doi.org/10.1159/000485322.

Zhang, Y., He, J., He, B., Huang, R., & Li, M. 2019. “Effect of tobacco on periodontal disease and oral cancer.” *Tobacco induced diseases* 17: 40. https://doi.org/10.18332/tid/106187.

Design and Print:
The Government Printing Department