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THE MALDIVES NATIONAL UNIVERSITY

Report of the Feasibility Study to Establish a Medical School in the Maldives

Prof. MD Lamawansa &
Dr. D Fernando

University of Peradeniya

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in the Maldives

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2015

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The Feasibility Study to Establish a Medical School in the Maldives

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Executive Summary

Background

The population of the Maldives which is currently 345000, has a growth rate of 1.8%. The GDP of the Maldives is USD 2.3 billion. It has recorded a growth rate of 3.7-6% per annum over the past decade. A growth in the GDP of approximately 5% is expected in 2014 and 2015.

In the back ground of a fairly stable economy and the current development taking place, the strategic plans for health has identified the need to ensure all citizens have equitable access to comprehensive primary health care. Currently the Maldives does not have a medical training facility. Consequently the physician workforce largely consist of expatriate doctors. However, given the expected population growth and the difficulties in recruiting expatriate doctors due to high costs and some other concerns, the MNU is contemplating establishing an institution for medical training. To accomplish this task, the MNU selected two academics from the University of Peradeniya, Sri Lanka to conduct a feasibility study.

Methodology

This report is a result of two visits by the Sri Lankan consultants to the Maldives and relevant institutions during which extensive consultations were done with all the stake holders, and also a visit to the Faculty of Medicine, University of Peradeniya by senior management of the MNU. In addition, online consultations were made when required.

Health care system

The health care delivery system of Maldives, which is provided by both, the private and state sector, is organized into a four-tier referral system; health posts/ health centers located on islands inhabited by a small population, Atoll hospitals, caters to all the islands in a atoll, regional hospitals which draw patients from several atoll hospitals and one referral hospital- Indira Gandhi Memorial Hospital (IGMH). The cost of health care, both local overseas is covered by a universal health insurance scheme (Aasandha), financed by the government.

It remains a daunting task for Maldives to sustain equitable access to health services country-wide, due to geographical constraints such as the existence of small islands scattered throughout a vast area and extreme seasonal weather conditions.

As the facilities for treating many critical and complex health problems have not been well developed, patients seek treatment in overseas hospitals, mainly in Sri Lanka and India.

The physician workforce at present and forecast for the future

The total number of doctors in the Maldives is 525 (97 local and 428 expatriates) with one practicing doctor for 657 people (15.21 doctors for every 10000 population). Of this 195 are specialist doctors. Of the non-specialist doctors about 280 are expatriates. The cost to sustain them is expensive and is about USD 5.5-7.0 million annually. Considering the existing requirements of the state (specialists and non specialists), private and resort sectors, and population growth and attrition Maldives will need a total of about 1120 Maldivian doctors by the year 2035. There are about 100 Maldivian doctors practicing in the Maldives already, and about 200 Maldivians undergoing training in medicine in overseas universities. The balance 800 need to be produced if the Maldives is to be self-sufficient by 2035. Training this number in overseas University will cost the country USD 80 Million at the current rate. As the training of Maldivians in foreign countries is expensive, diverse and may not be tailor made to the requirements of Maldives, establishing a local mechanism will have a beneficial effect on the economy and health care. Further, the unquantifiable effect that a medical school has on continuing medical education, post graduate training and patient care due to the establishment of academic environment is a substantial reason to establish a local mechanism of medical training.

Most appropriate mechanism to establish medical training in the Maldives

A foreign university establishing a hospital and a medical school which has been attempted earlier is rather unlikely, and also is associated with several disadvantages such as the high cost of training, paucity of clinical material in a newly established private hospital for training needs and the inability of it to exert a direct impact on Maldives health system which a homemade medical faculty could exert. Establishing a medical school with foreign participation is one that is more favourable. The foreign collaboration could be done as a PPP if MNU alone cannot finance the project. Although in the short term, the financial burden to the country/MNU is less under PPP, the long term benefits are more if MNU were to finance the establishment of a medical school. Therefore we recommend that the MNU establishes a medical school by itself with input from a foreign university under an MOU. The collaborating foreign university will be expected to develop curriculum, provide material, teaching staff, evaluation until the medical school is mature enough to be independent. This might take about 12-15 years during which the input from foreign university could be gradually phased out. This mechanism is suggested as the most appropriate by considering the cost, paucity of human resources, acceptance by stake holders and the effect that a medical school would have on the long term development of MNU and the health care system in the Maldives.

Infrastructure facilities and human resource for medical training

The Maldives Medical Council has stipulated the requirements to be met by a medical school which includes infrastructure, human resources and clinical material. Physical infrastructure facilities for early years of training, mainly lecture rooms, laboratories and office space need to be put up, while taking into account the strong possibility of sharing existing resources at Faculty of Health Sciences, which are of very good quality. Teaching faculty, until MNU recruits its own staff, will have to be sought from overseas (collaborating university).

The clinical training facilities which are an essential pre-requisite for medical training are available in several national health institutions; the major one being the IGMH. Health care facilities in Male and in some regional hospitals and Atolls too will need to be used for training and require some extra facilities. Additional facilities should be provided to hospitals to meet the medical training needs, including establishing hospital facilities for the clinical staff to be appointed by the MNU.

Doctors working in the hospitals will form the bulk of the clinical teaching staff supplemented by university appointed clinical staff.

Some short term training in an overseas center (collaborating university) as an elective rotation may be required as in anatomy practical and clinical disciplines yet to be well established in the Maldives.

Curriculum

We recommend that the new medical school commences with a curriculum which is easy to administer, less labour intensive, which has sound medical education principles embedded. The one which will satisfy all these, is a system based model (compared to problem based curriculum). Once the faculty is well established with its own staff, revision of the curriculum could be considered.

Accreditation

Maintaining standards in line with established norms acceptable to accreditation agencies is a must. MMC which has established guidelines for such recognition should be involved from the planning stages of the medical faculty.

Long term sustainability

Maldives is unlikely to be able to enroll a large number of students for training due to the limitations on clinical material. About 30-40 per batch would be the recommended number. With this number of enrolment it will take 25-30 years to satisfy the numbers of doctors needed. Thereafter, around 40 doctors will need to be produced per year to cater to attrition, population growth and overseas employment. Therefore, the medical school will have a purpose in the long term, too. In addition, postgraduate training, continuing medical education, research into health problems pertinent to Maldives, are other areas which the medical school will be expected to dwell into.

Financial implications

Training 800 Maldivians in overseas universities will cost USD 80 Million while obtaining of the service of expatriate doctors of that number would cost USD 15.3-19.2 Million/annum at the current rate. The cost of establishing a medical school and running cost of training should be worked out as a separate financial proposal. But suffice to say that establishing a medical school will prevent the hemorrhaging of a substantial amount of foreign exchange, by students getting trained in Maldives, and patients who are going abroad opting to seek treatment with confidence in Maldives in an improved set up centered around medical training.

The necessity of commitment of all stake holders

Successful establishment of a medical school depends on the continued commitment of the MNU, cooperation of the stake holders, the political and economic stability of the country, establishing a mutually beneficial partnership with a foreign university and the will of the decision makers.

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Acronyms & Annexures

Acronyms and Abbreviations

BSc	–	Bachelor of Science
CPD	–	Continuing Professional Development
CT	–	Computerised Tomography
ENT	–	Ear, Nose & Throat
FRCS	–	Fellow of The Royal College Of Surgeons
GDP	–	Gross National Product
ICU	–	Intensive Care Unit
MBBS	–	Bachelor of Medicine Bachelor Of Surgery
MC	–	Medical Council
MCQ	–	Multiple Choice Questions
MD	–	Doctor of Medicine
MMC	–	Maldives Medical Council
MoH	–	Ministry of Health
MoE	–	Ministry of Education
MLT	–	Medical Laboratory Technician
MRCP	–	Member of The Royal College Of Physicians
MRI	–	Magnetic Resonance Imaging
MNU	–	The Maldives National University
MSc	–	Master of Science
NICU	–	Neonatal Intensive Care Unit
O&G	–	Obstetrics & Gynaecology
OPD	–	Out Patient Department
OT	–	Operating Theatre
SLMC	–	Sri Lanka Medical Council
TOR	–	Terms of Reference
UNFPA	–	United Nations Population Fund
UNICEF	–	United Nations Children's Fund
USD	–	US Dollars
USS	–	Ultra Sound Scan
WHO	–	World Health Organization

List of Annexures

Introduction

Purpose of the study

Currently the Maldives does not have a medical training facility. Consequently, about %80 of the physician work force in the Maldives are expatriates. Given the increasing demand for physicians and the difficulties in recruiting expatriates due to high costs, the Maldives National University (MNU) is contemplating establishing an institution for medical training. To accomplish this task, the MNU has embarked on a feasibility study for which the responsibility has been entrusted to two academics from the University of Peradeniya, Sri Lanka. According to the terms of reference, the main objective of the study was to assess the feasibility of establishing an institution (medical school or faculty) within MNU for medical training in the Maldives. Further, the study was expected to inform governing authorities regarding the requirements for such an endeavour.

The specific objectives of the study were directed towards,

1. Evaluating the external environment, especially with regard to curative practices and personnel available at national level.
2. Evaluating the status quo with regard to the provision of health services and medical training.
3. Assessing the demand/supply situation with regard to medical training.
4. Identifying the options available for starting a medical school/faculty in the Maldives with regard to international best practices and long-term sustainability.
5. Identifying the extent of and areas in which capacity building and human resource development will be required for medical training.
6. Identifying physical space requirements, the best location and the human resource requirements for such a facility.
7. Determining possible barriers to establishing a medical training facility.
8. Proposing an administrative structure for the medical school.
9. Identifying critical risks, problems, assumptions and the means to mitigate them
10. Proposing an action plan.

Planning process of a new medical school for MNU

Establishing a new medical school requires a process that will ensure its success. This is a process which would require a considerable commitment of time, effort, and financial resources. The MNU›s motivation to establish a medical school emanates from the absence of such a facility in the Maldives to meet the needs of society and a belief that a medical school would have a favourable institutional impact on the MNU and the hospitals and health system as a whole. Furthermore, there is no doubt that the economic advantages of establishing a medical school to the MNU and the nation, too, have been considered. These factors are not unique to MNU but are the motivating factors for any university to embark on the kind of project referred to in this document. The favourable economic impact, though not a primary motivating factor, provides an argument to solicit the support of the government. This is an important factor to be considered in the setting of the Maldives, especially due to the drain of foreign exchange for training doctors in overseas universities and recruiting expatriate doctors.

The attempt by the MNU to establish medical training is a response to a national requirement and should be applauded. In this endeavour, it is envisaged that the MNU will utilise all the resources available in the Maldives, and off-shore if bridging of gaps is required, to produce a diverse physician work force to meet the needs of the country.

The planning of a medical school involves in the first instance a conduct of a feasibility study. Feasibility analysis entails an assessment of the MNU in aspects such as ability to invest adequate funds for initiation and sustenance, availability of space and material to satisfy administrative and instructional needs (both short term and long term), availability of a

suitably qualified faculty and the ability to provide an adequate, broad and high quality clinical experience. Subsequent to the feasibility analysis, approval by the Council of the MNU and the government of Maldives is required for progress.

The experience of the two consultants embarking on the feasibility study, in university administration, clinical service and teaching, accreditation of new institutions and learning in newly established medical schools under trying and dynamic conditions (both have studied in medical schools in their teething periods) have guided us in this endeavour.

Study methodology

This report was a result of the activities accomplished during two visits made to the Maldives by the Sri Lankan consultants and a visit by senior management of the MNU to the Faculty of Medicine, University of Peradeniya. Prior to visiting the Maldives the consultants perused the health profile and developmental plans of the Maldives, and other relevant reports. During the first visit of 8 days, the consultants met with relevant stake holders, including several key decision makers of the nation in order to obtain their views on establishing a medical school. During this period, the consultants also visited the MNU and several health care facilities to understand how the MNU and the health care system operates and to obtained data on available physical and human resources.

The visit to the Faculty of Medicine, University of Peradeniya by the Chancellor, Vice Chancellor and two deputy vice chancellors of the MNU was made prior to the consultant's second visit to the Maldives. During their visit to the Faculty of Medicine, Peradeniya they were able to exchange ideas with the academic staff of the Faculty and were able to gain first-hand experience on the functioning of a medical faculty. During the second visit of the consultants to the Maldives, which was for six days, an in-depth study was conducted on the infrastructure available for a medical faculty. Several hospitals were visited and further deliberations were held with some key stake holders. (see annexure 01 for list of meetings held and institutions visited)

Mr. Hussain Haleem, Deputy Vice Chancellor of MNU who was the focal point and the two Consultants had to work hard to obtain necessary data from different institutions.

Structure of the report

The main objective of the study was to inform the administration of the MNU regarding the feasibility and requirements of establishing a medical faculty within the MNU, through the 10 specific objectives given above. Therefore, initially in chapter 01, the need for a medical school in the Maldives is discussed. Thereafter, options available to start a medical school in the Maldives, an appropriate curriculum in the context of the Maldives, and an administrative structure for the medical school were considered in Chapter 02. The infrastructure, teaching facilities and human resources required, available, and areas in which capacity building, human resources and infrastructure development is required is discussed in Chapter 03. The organization of chapters, in general, corresponds to the objectives stated in the terms of reference (TOR) mutually agreed by the consultants and the MNU. However, certain chapters contain material related to more than one objective of the TOR. For example, chapter 01 analyses objectives 3 & ,2 ,1, chapter 02 addresses objectives 8 & 4, while objectives 6 & 5 are discussed in chapter 03. Thereafter, chapter 04 addresses possible barriers and includes factors that may have negative effects, risks, assumptions and means of mitigating these adverse effects (objectives 9 & 7). Finally, recommendations on the next steps to be taken to establish a medical school is discussed in chapter 05. Some other aspects like the cost of maintaining expatriate medical officers, economics and an appropriate curriculum, which were not in the TOR, have also been discussed.

In this report, the terms, Medical School, Faculty of Medicine and Faculty of Medical Sciences have been used interchangeably and denotes the same.

The consultants facilitated a visit of MNU staff to the Peradeniya University. Discussions were held on areas of mutual interest.

Chapter 1

The Need for a Medical School

1.1 The profile of the Maldives

The Maldives is a country consisting of a double chain of 26 natural atolls and 1200 islands. The distance from north to south is approximately 820 km while from east to west is 120km and is spread over 90,000 square kilometres, making Maldives one of the most dispersed countries in the world. The capital Male', is situated slightly to the north on the eastern row of islands and is one of the most densely populated capitals in the world. Two thirds of the population of Maldives lives outside the Male' atoll. About 200 islands are inhabited, of which, one third have fewer than 500 people. About 107 Islands are designated as tourist resorts. The population of Maldives was approximately 345,000 in 2013 with 50.7% being males and 49.3% females . There are about 100,000 expatriate workers in Maldives while about 900,000 tourists visit the Maldives annually .

The population growth is 1.8/annum. The population forecast for the year 2030 is 462,000 and for 2050 is 592,000 .

The literacy rate of Maldives is 98%, in both men and women. The population pyramid indicates that 51% of the Maldivian population is below the age of 25 years of which 24% are youth between the ages of 18 and 24 years – the category seeking university education. The life expectancy of Maldivian males is 76 years and that of females is 78 years.

The Maldives is a republic with an executive presidency. After a period of political uncertainty following a new constitution in 2008, the country is now politically stable. Consequently there is renewed interest and commitment by the government for development of the country. Education has been a key area which has generated much interest. The current net primary school enrolment rate is high (94% for females and 95% for males) .

1.2 The economic status of the Maldives

The economy of the Maldives which is largely dependent on tourism and fisheries is improving. The GDP of the Maldives is USD 2.3 billion with a per capita income of over USD 6300. The Maldives has recorded a growth rate of 5-6% per annum over the past decade . The economy which showed a down turn in 2012 is picking up and the GDP growth in 2013 was 3.7%1. The expected growth of GDP in 2014 and 2015 is approximately 5%5. On the whole, macroeconomic and public investment policies in place have lifted the Maldives from being one of the 20 poorest countries in the 1970's to one that shares many characteristics of a lower middle-income country today. The expenditure on health in Maldives is about 9% of the GDP . The government spends 44% of the above while the private expenditure is 52.7%, and external resources contributes 3.3%. There is a favourable environment to improve services to its people of which opportunities for university education and improved health care service are of utmost importance.

1.3 Health care delivery system of Maldives

The health care delivery system of Maldives, which is provided by both, the private and state sector, is organized into a four-tier referral system. The most basic of these is the health posts/health centres located on islands inhabited by a population of over 650 inhabitants . The next level, Atoll Hospitals, caters to all the islands in the atoll. Regional hospitals draw patients from several atoll hospitals. The highest level is the tertiary care hospital. There is only one such a hospital which is the Indira Gandhi Memorial Hospital (IGMH). The health care institutions have an established system of referral.

Table 1: The type and number of health care institutions.

Type	*Number available*
Health centres/health posts	121
Regional/atoll hospitals	20 (6 regional and 14 atoll)
Referral centre	1 (IGMH)

All citizens of the Maldives are insured under a universal health insurance scheme (*Aasandha*), financed by the government. Consequently, many patients seek medical treatment outside the Maldives in hospitals in Sri Lanka and India.

State sector

The state health care delivery system which is the main health care provider of Maldives is organized under the Ministry of Health and Gender.

1.3.1 Health Centres/Posts

Health posts/health centres are located on islands inhabited by a sizeable population. Each atoll has 3 to 13 health centres serving 500-10,000 population with an average of one health centre for 2300 population. The health centres are graded as level 1-4 depending on the population covered, patient load and bed occupancy. About 85% of the health centres are level 1-3 and are staffed by a medical officer. The remaining 15% are level 4 centres (categorized as health posts) and staffed by other categories of health care workers.

Health centres/posts provide service in primary health care which includes immunization, prevention and treatment of communicable diseases, maternal and child health care, emergency and laboratory services. Some health centres provide basic emergency obstetric care, medical and surgical care under a limited inpatient service. (See annexure 02 for details)

1.3.2 Regional/Atoll hospitals

The six regional hospitals provide secondary-level curative service and are active in preventive health too. Regional hospitals have in-patient service including emergency and speciality care. Although the Hulhumale› hospital is considered a level 1 hospital the close proximity to IGMH has resulted in it being by-passed by patients from other Atolls.

1.3.3 Atoll Hospitals

There is one atoll hospital for each atoll, except in the atolls which has a regional hospital. Atoll hospitals cover a population of 10 000-15 000. Services provided by atoll hospital include maternal and child health care, immunization, comprehensive emergency services, laboratory services, major surgical service and radiology. The in-patient workload in regional hospitals varies from 1368 to 22677 of patients/annum with a bed occupancy rate ranging from 5% to 41%.

1.3.4 National referral hospital (Indira Gandhi Memorial Hospital)

IGMH has a capacity of 300 beds. Over 250,000 patients are seen at the outpatient department each year and about 14000 patients treated as in-patients. Its in-patient services accounts for 37% of the in-patient care in the Maldives. The bed occupancy of the hospital is 77% with an average hospital stay of 6 days. The over-utilization of this hospital, and under utilization of atoll and regional hospitals, is a major concern and is determined by the current trends in the health seeking behaviour of the population which includes low confidence in other hospitals.

Hospital statistics show that a wide range of disease conditions are treated at IGMH, as both out patients and in-patients. These diseases are related to major specialities like internal medicine, surgery, paediatrics, obstetrics and gynaecology and sub specialities like urology, nephrology, pulmonology, neurology, endocrinology, orthopaedics, ophthalmology, ENT, neonatology, oncology, dermatology and rheumatology.

Private sector

There are three private hospitals in Maldives: ADK and Medica located in Male and another one in Hithadhoo (International Medical and Diagnostic Centre). In addition there are nearly 100 private clinics which account for 11% of the total health care expenditure.

1.4 Policy goals of the Maldives Health system

It remains a daunting task for Maldives to sustain equitable access to health services country-wide, due to geographical constraints such as the existence of small islands scattered throughout a vast area. While it is impractical to establish health centres in each inhabited island (as the population is only a few hundred in some islands), the sea transportation of the sick is also affected by seasonal, extreme weather conditions. In addition, the lack of manpower is stated as a major concern in health sector development in the Maldives and is highlighted in the policy goals set by the government of Maldives given below. To sustain equitable access of health services country-wide establishing hospitals or health centres in each island is not practical, or cost effective or sustainable as the population in some islands is only a few hundred. On the other hand due to the limited and unreliable public transport system, people in many islands are required to incur high costs when attempting to reach appropriate health care. As a result, provision of health care is a costly undertaking in the Maldives.

Table 2: Utilization of regional hospitals (2011)

Name	*Outpatients*	*Inpatients*	*Bed occupancy*
Kulhudhuffushi R Hospital	48357	2911	67%
Ugoofaaru R Hospital	34017	1444	60%
Muli R Hospital	12752	411	6%
Gan R Hospital	31908	2303	26%
Thinadhoo R Hospital	37430	2649	41%
Hithadhoo R Hospital	51786	3572	74%

(see annexure 03 for details and data on all regional hospitals)

Health Policy Goals of the Maldives

1. To ensure people have appropriate knowledge and behaviours to protect and promote their health
2. To ensure safe and supportive environments are in place to promote and protect health and wellbeing of the people
3. To reduce burden of disease and disabilities and improve quality of life
4. To ensure all citizens have equitable access to comprehensive primary health care
5. To establish and enforce appropriate quality assurance and regulatory framework for patient and provider safety
6. To build public private partnerships in health
7. To build a competent and professional health workforce
8. To ensure health system is financed by a sustainable and fair mechanism

Table 3: Twenty most common ailments treated at the out patients department of IGMH, from January to March, 2014.

Disease	*Number*
Acute upper respiratory infections	5468
Persons encountering health services in other circumstances	3951
General symptoms and signs	2600
Persons encountering health services for examination and investigation	2488
Diseases of oral cavity, salivary glands and jaws	2061
Diseases of oesophagus, stomach and duodenum	1424
Arthropod-borne viral fevers and viral haemorrhagic fevers	1344
Injuries to unspecified part of trunk, limb or body region	1266
Dorsopathies	961
Soft tissue disorders	767
Disorders of ocular muscles, binocular movement, accommodation and refraction	667
Other diseases of urinary system	602
Intestinal infectious diseases	517
Hypertensive diseases	476
Disorders of conjunctiva	466
Arthropathies	454
Symptoms and signs involving the digestive system and abdomen	453
Symptoms and signs involving the circulatory and respiratory systems	444
Diabetes mellitus	399
Dermatitis and eczema	386

Table 4: Twenty most common ailments treated in-ward at the IGMH from January to March, 2014

Disease	*No.*
Delivery	501
Haemorrhagic and haematological disorders of foetus and new-born	160
Complications of labour and delivery	134
Maternal care related to the foetus and amniotic cavity and possible delivery problems	133
Ischaemic heart diseases	98
Chronic lower respiratory diseases	98
Pregnancy with abortive outcome	88
Arthropod-borne viral fevers and viral haemorrhagic fevers	79
Cerebrovascular diseases	78
Persons encountering health services for specific procedures and health care	78
Diseases of appendix	77
Other acute lower respiratory infections	72
General symptoms and signs	65
Injuries to the knee and lower leg	59
Infections specific to the perinatal period	56
Hernia	53
Other diseases of urinary system	53
Acute upper respiratory infections	49
Other diseases of intestines	47
Infections of the skin and subcutaneous tissue	44

Table 5: Specialist consultation at the outpatient department of IGMH from January to March 2014

Department	*No.*
Pulmonology	245
Urology	474
Cardiology	740
Obstetrics and Gynaecology	1108
ENT	1388
Psychiatry	1510
Orthopaedics	1955
Surgery	2690
Dermatology	3317
Dental	3903
Internal Medicine	5608
Total	**27365**
Casualty consultation	*50216*

9. To enhance the response of health system in emergencies

10. To build a culture of evidence based decision making within the health system

In relation to human resources, there are several major issues currently experienced by the Maldives health care system. They include weak health workforce leadership, difficulties in retaining health workers in atolls and Islands leading to inequitable distribution, overdependence on expatriate health professionals and variability in the quality of pre-service and continuous professional education .

In order to achieve the stated health policy goals of imparting appropriate knowledge to people, reducing burden of disease, ensuring equitable access to comprehensive primary health care and enhancing the response in emergencies, it is necessary to develop human resources. Since goals 4 and 7 attempt to ensure all citizens have equitable access to comprehensive primary health care and build a competent and professional health force, it is relevant at this stage to examine the adequacy of quantity and quality of medical professionals needed, both in the short term and long term to achieve the stated goals. However, critical evaluation of the health care system in the Maldives is not addressed in detail in this report.

1.5 The demand for medical professionals based on the health needs

1.5.1 Health Indices, Morbidity and Mortality

The infant mortality rate in Maldives of 9/1000 live births4 is lower than that of several countries in the region (Nepal 34, India 44, Pakistan 69, Bangladesh (33) and is comparable to Sri Lanka (8/1000 live births) The maternal mortality rate of 31/100,000 live births compares well with the Sri Lankan rate (29) and is much lower than that of Pakistan (170), India (190), Nepal (190) and Bangladesh (170). Antenatal care and immunization coverage compares well with that of Sri Lanka. Immunization has helped to virtually eradicate diseases like polio, neonatal tetanus, whooping cough and diphtheria. Notable achievements have been made in the control of many infectious diseases too. For example no indigenous cases of malaria have been detected in the recent past.

In the back ground of these achievements, life style changes associated with development have resulted in a rise in injuries (accidental and other) and chronic and non-communicable diseases(cancers, chronic respiratory illnesses, obesity, diabetes, smoking related illnesses) Thalassaemia is a serious concern with a prevalence of 20%. End stage renal failure is a significant health problem. Maternal health and psychosocial well-being are areas which need attention. Dengue, diarrhoeal disease and acute respiratory infections cause significant morbidity. Toxoplasmosis and scrub typhus are endemic in Maldives.

The above mentioned trend in morbidity and mortality are similar to other middle income countries where epidemiological transition from communicable to non-communicable diseases is seen. Another important factor to be taken into consideration is the emerging and re-emerging infections. No country can be complacent on strategies adopted for the control and treatment of emerging and re-emerging communicable diseases. This is especially true for the Maldives due to its high vulnerability of imported infections due to tourism.

1.5.2 Aging population

The aging population of Maldives is increasing. The life expectancy of Maldivian males is 76 years and that of females is 78 years at birth4. This is better than the overall figures for South East Asia (66 years and 69 years for males and females respectively) and several South Asian countries (eg. Pakistan, India, Nepal, Bangladesh and Sri Lanka). The aging population will change the dynamics of society and the morbidity associated with it. Consequently, there will be a demand for more health manpower and health care resources in the near future to look after the elderly, if equity is to be maintained.

1.6 Medical work force

1.6.1 The current Medical work force and the existing gap

Lack of adequately trained medical practitioners is a major concern in the health sector. Currently a large expatriate workforce contributes to the delivery of health services both in the public and the private sectors. An expatriate workforce presents challenges such as difficulties in doctor-patient communication and interaction, especially at community level and the adverse impact on the quality of services due to high staff turnover. Another issue is affordability: the expatriates are paid more than Maldivian doctors, the loss of foreign exchange, the rising costs as supply countries are developing and doctors salaries are increasing in those countries.

The consultants were not able to get approved official staffing standards for medical practitioners for Maldives. Currently the number of positions approved by the Civil Service Commission is used for recruitment and as a proxy for planning process. The WHO World Health Statistics (2014)4 reports the presence of a total of 470 physicians (14.2 medical practitioner for every 10000 population) in the Maldives. The Maldives Health Profile published by the Ministry of Health in March 20149 reports the total number of medical practitioners as 525 (195 specialists and 330 non-specialists) thus making available one doctor for 657 people.

Of the non specialists doctors of 330, 280 are expatriates and of the 195 specialists doctors 148 are expatriates. Of the non specialists expatriates only a negligible 9 or so are working in the private sector.

As the task of the present study is to examine a local mechanism of training MBBS graduates, emphasis is not given for the specialist cadre requirement, training of them or costs of maintaining specialist service.

1.6.2 Confounding factors in the interpretation of physician/population ratio

Although the ratio of physicians to the population of the Maldives is better than that of the neighbouring countries (India 7, Pakistan 8.3, Sri Lanka 6.8 for 10,000 people) 4 it is far below that of developed countries and largely consists of expatriate doctors. However, geographical features of the country, such as numerous scattered islands pose a problem in interpretation of the physician/population ratio to provide equitable health care and adequacy of it.

Although views were expressed that the government intends training/providing one general practitioner for every 2500 people we were not able to get any documentary proof. However we are aware that a request has been made to the Postgraduate of Institute of Medicine, Sri Lanka to train general practitioners. We are not certain whether this would entail increasing the number of practicing doctors in Maldives or only a further training of existing doctors.

The government has not taken a serious note of the requirement of doctors for resorts numbering 107. Currently the requirement at many resorts is being met by employing expatriate doctors (data is not available). At present the full time expatriate doctors at resorts work around the clock, but if they were to be replaced by Maldivian doctors, a greater number will be required as they will be working in shift basis (or in rotation).

1.7 The cost of maintaining an expatriate physician work force

Sustaining an expatriate workforce drains a considerable amount of foreign exchange. According to data obtained from the Ministry of Health, the salary of a general medical officer varies from 25000–30000 Rufiyaa/month (USD 1600–2000) and that of a specialist from 40,000–60,000 Rufiyaa/month (USD 2,500-4,000) depending on the seniority and place of work (Male or Atoll). The Maldivian doctors are paid less than the expatriates by about 20%. Therefore, it may be assumed that the 280 expatriate non specialist physicians working in the Maldives are paid a total of 0.44 to 0.56 million USD/month, which would result in loss of USD 5.3–6.72 Million of foreign exchange every year. The above mentioned salary includes the service allowance, food allowance and accommodation allowance. Extra duty and the cost of air tickets for annual leave is not included. The air ticket would cost approximately 250 USD to a neighbouring country. This alone would cost additional USD (300x600) 180000/annum. Taking these into consideration a conservative estimate of the cost of maintaining the current non specialist physician workforce of 280 expatriate doctors would be in the range of 5.5-7.0 Million USD/annum. Official figures on this, if available, would be highly valuable.

1.8 Physician workforce requirement

In the absence of official staffing standards we used available data to work out a hypothetical number of doctors required in addition to the currently available numbers and the number of Maldivians to be trained if the country were to replace expatriates with local doctors.

The Maldives have 525 doctors working in different health care institutions. Given the population growth of about 6000/annum there is an additional requirement of 10 doctors per annum if the current doctor: population ratio is to be maintained. To provide uninterrupted service to resorts there needs to be at least 3 doctors per 2 resorts to work in rotation. This would come to about 160 doctors. With the expansion of specialist medical service more doctors of local origin will be required. However, it is difficult at this stage to work out numbers of doctors required for expansion of specialist service. But replacing the current expatriate specialists with Maldives would require at least 148 local doctors. Attrition which is 3-4% for the medical profession will become a significant concern once the health system is filled with local doctors. Attrition which is partly contributed to by migration is an issue even now as more Maldivian doctors are requesting certificates of good standing from the MMC for emigration purposes (from 3 in 2008 to 20 in 2013).

Table 6: Forecast of physician workforce requirement by year 2035

Non specialists doctors employed in the government institutions at present	330
Additional requirement by 2035 (10/ annum on account of population growth)	200
The requirement of resorts (not a government priority)	160
Doctors to be trained as specialists to replace the current expatriates	148
Attrition*	280
Total requirement by 2035	1118

* The current number of Maldivian doctors is 97 and once all expatriates are replaced by local doctors the total would 148+200+330+160=838. Therefore average attrition for the period from 2015 to 2035 would be 3% of 97 (the current number of locals) +838/2 over next 20 years. This equals to 280 .

The increasing requirement of specialists or the expansion in the health service envisaged have not been taken into consideration in the above calculation as solid data on these are not available. The number of general practitioners required have not been taken into the above calculation as the policy on this is not known.

Of the 1120 (approximate) or so required there is only about 97 Maldivian doctors at present and 1000 doctors should be produced during the next 20 years. As there may be up to 200 or so Maldivians currently undergoing medical training abroad, and assuming that all of them return during the next five years (which is unlikely), 800 Maldivian doctors should be produced by 2035.

Assuming the MNU produces 30 Maldivian doctors each year, achieving a target of 800 doctors will take 27 years (note: with a lag period of six years since it will take five years of training and one year of internship) Therefore a lot of hard work has to be done during the coming 33 years to achieve the target set above to meet the needs of the country.

1.9 Medical training overseas for Maldivian students

In the absence of a local mechanism for training of medical undergraduates, the high school products of Maldives consider opportunities overseas for medical training. There are medical undergraduates in universities in Sri Lanka, Bangladesh, India, Nepal, Pakistan, Malaysia and also in the Philippines, China, Turkey, Egypt, Australia, UK etc. Some students are funded by government scholarships or soft loans whilst others are self-funded. The exact number of students studying medicine overseas is difficult to ascertain. Data obtained from the Ministry of Education (MoE) and MoH indicate that the number overseas at present is 189. However, the actual number may be more than 200 as some who have gone on private funding may not have been registered with the authorities.

The overseas medical training is on fee levying basis. This is not in the best interest of the Maldives due to high cost, over dependency on foreign universities, drain of foreign exchange, lack of incentive for academic development and patient care in the local setting. The cost of medical training varies from country to country. The direct cost (mainly tuition fee) of a Maldivian student obtaining a medical training in various countries are given in annexure 4 (source Department of Higher Education). Those students who are supported by a loan scheme, spend USD 68,000–150,000, whilst those who have been funded by government scholarships, spend USD 33,000–256,325 for the entire duration of the course (The indirect cost to the family or to the student is not taken into account in this calculation).

The average direct expenditure of producing a doctor abroad, therefore, can be assumed to be around USD 80,000–100,000. Thus, training 30 doctors annually would result in an expenditure of USD 3 Million at the current cost and the expenditure of training 800 Maldivian nationals in overseas universities would be USD 80 Million (only the direct expenditure at the current rate).

In the context of Maldives, there are non-financial disadvantages of overseas training. Students may choose medical schools which are of low quality, as the cost of medical training in good medical schools is high, resulting in improper training. The question of adequacy and quality of some of the overseas trained medical graduates to practice in Maldives was raised at several meetings the two consultants had with stakeholders. This belief emanates from the experience with graduates of some overseas medical schools who have not had hands-on training in a clinical setting. However, these perceptions are rather subjective in the absence of a system in place in Maldives to evaluate an overseas trained doctor with a view to the suitability to practice in the Maldives (similar to the ERPM in Sri Lanka, AMC in Australia, PLAB in the UK). Therefore, determining the magnitude of this problem is not possible. The Maldives Medical Council (MMC) claims that an instrument (i.e licentiate examination) has been developed (an MCQ bank has been initiated) to rectify this problem. Further problems have arisen due to some medical schools where Maldivian students are currently studying being de-registered by the accreditation bodies in those countries. Since the MMC registers graduates purely on the basis that the country from which they graduated recognises that particular medical school, the students studying in the de-registered schools are left stranded. Furthermore, the reluctance of parents to send their children (especially girls) to foreign countries has been identified as a drawback of the system of overseas training.

1.10 The need for a medical school in the long term

It is estimated that the average age of a physician at the time of qualifying is 26 years. Since it may also be speculated that he/she would work till 65 years, the estimated number of working years would be 40. As has been stated above, if Maldives produces 30 doctors/annum the health system will be saturated with 800 doctors in approximately 33 years (in year 2048). The first group of locally qualified doctors will start retiring in 2061, 13 years after reaching the saturation point. Consequently, if demand is considered static, for 13 years Maldives will continue to produce physicians in excess of its requirement. However, it is predicted that there would be an increased demand during this period due to the expansion of the services and population growth after 2035 which has not been taken into consideration in the above calculation. Therefore, it is highly unlikely that producing approximately 30 doctors/annum would be excessive in the long term. The Maldives will need to continue to produce around 30 doctors a year to maintain after 2050, to maintain the status quo due to the loss from attrition alone.

1.11 The impact of establishing a

medical school on the Nation

There are diverse advantages of establishing a medical school other than purely economic reasons. Health care delivery in Maldives for Maldivians is likely to improve with the Faculty of Medicine providing an academic environment in the hospitals and at community level. The people of Maldives will trust the system more and many would seek treatment locally. This will have a positive impact on the country, economically. Confidence in the health system would encourage more tourists to visit the Maldives. Once the medical school is established and accredited, there is the likelihood of attracting foreign students from the region. There will be job opportunities for Maldivian graduates overseas including in organizations such as the WHO, UNICEF, UNFPA, etc. The presence of an undergraduate training system, improvement of hospital facilities, the creation of an academic environment and availability of doctors in sufficient numbers is likely to culminate in establishing postgraduate training programs in clinical disciplines. This will have a substantial impact on the country's health and higher education system. Another point in favour of having a medical training facility locally is that the curriculum can be more suited to local issues. Additionally, MMC would have direct control of the quality of the training which it does not have on students undergoing training in overseas universities.

1.12 The cost of in-country training of a physician workforce

As alluded earlier the requirement of approximately 800 doctors by 2035 is taken into consideration for the discussion to follow. The cost of medical training in Maldives includes the cost of establishing a medical school and subsequent running cost. The cost of establishing a medical school has been quoted as 12 Million USD. This figure has probably come from the private organization which attempted to establish a branch of a foreign Medical Faculty and a hospital in the Maldives. But no documentary evidence on this cost estimate is available.

Estimating the cost of producing a doctor in the Maldives is complex. The initial cost of establishing a medical faculty has not been figured out if it were to be established by MNU. The extent to which the MNU is hoping to establish hospital facilities is another issue. Establishing more hospital facilities anyway is a requirement in the Maldives to improve health care even if a Medical training program is not established. The cost of training in the hospital setting may not directly accounted to the university except the salary/ allowances of the teaching staff and material that may be purchased for medical training. The training programs conducted by MNU using hospital settings have not been calculated fully leaving a vacuum for us to extrapolate the same to arrive at a figure for medical training. Therefore the consultants at this stage cannot give an exact cost estimate for establishing medical training facility or the running cost of it. A separate financial proposal would address this.

One way of looking at the finances at this stage would be that if the cost of establishing a medical faculty is to be shared by all 800 doctors to be produced in the future, each one would have to contribute about USD 15,000. Then one need to see whether recurrent cost of training could be kept below USD 85,000 considering the overseas training cost of USD 100,000/student. This appears doable.

In essence, investing on a medical school appears to be cheaper for the country than depending on expatriate doctors or training of Maldivians overseas, in the long term.

1.13 Summary

There is a need to establish a local mechanism for medical training. By producing about 30 doctors/ annum, it will take about 33 years or so to produce sufficient numbers to meet the requirement of the country. In addition, producing doctors by a local mechanism of medical training will have several beneficial effects on the health care system.

An essential component of medical education is clinicals. These require cooperation with large hospitals. MNU staff visited the hospital used by Peradeniya University medical students.

Chapter 2

Mechanism, Curriculum, administrative Structure for Medical Training

2.1 Introduction

As a preface to making suggestions on options available to establish a faculty of medical sciences and an appropriate curriculum, it is pertinent to briefly assess the organisation and facilities of the MNU.

2.2 The Maldives National University

2.2.1 A brief description

The forerunner of the MNU was started in 1973 as an Allied Health Services Training Centre. It received University status in 2011. Over the years it has developed and has a robust management structure under a Chancellor supported by a Vice Chancellor and three deputy Vice Chancellors. The council is headed by the Chancellor and the academic senate by the Vice Chancellor. There are several committees dealing with aspects of finances, procurement, governance of campuses etc. The management of MNU is complex, with several campuses located in islands far away from the main island, Male. The visit to Hithadhoo campus in the deep South and Kulhudhufushi campus in the North presented an opportunity to experience the functioning of a system well interconnected with the main university campus. The campuses have their own staff and resources and are supported by the main university administration. Approximately 8000 students are currently studying in the eight faculties and two centres of the MNU as shown below.

Currently there are eight faculties, two centres and several campuses located across a vast area. The MNU is an independent organization with approximately 2/3rd of the finances being provided from the national budget and the remaining generated independently. The independence of the university has not been compromised by the source of funding. All students are enrolled on fee-levying basis. The students who are economically disadvantaged have the opportunity of seeking bank loans. Welfare provided to students where needed is commendable. The accommodation facilities provided in the Hithadhoo and Kulhudhufushi campuses highlight the commitment of the MNU towards student's welfare. An unannounced visit to these hostels revealed favourable facilities and a pleasant environment. Therefore, we believe that MNU possesses the required experience in administration, providing facilities and considering the welfare of the students.

Total Enrolment Long Term & Short Term Courses

Faculty/Centre	2010			2011			2012			2013		
	Long Term	Short Term	Total	Long Term	Short Term	Total	Long Term	Short Term	Total	Long Term	Short Term	Total
Centre for Maritime Studies	15	858	873	0	536	536	25	421	446	—	1224	1224
Centre for Open Learning	1090	—	1090	955	—	955	1252	—	1252	1225	-	1225
Faculty of Arts	150	-	150	106	-	106	212	66	278	285	56	341
Faculty of Education	847	—	847	670	—	670	1102	—	1102	1029	-	1029
Faculty of Engineering Technology	373	—	373	199	—	199	172	96	268	119	-	119
Faculty of Health Sciences	666	—	666	532	—	532	940	198	1138	779	155	934
Faculty of Hospitality & Tourism Studies	524	145	669	459	259	718	593	72	665	527	47	574
Faculty of Management & Computing	915	NA	915	646	NA	646	1030	22	1052	971	250	1221
Faculty of Shari›ah & Law	235	—	235	190	—	190	277	533	810	272	-	272
Faculty of Islamic Studies	195	—	195	209	—	209	427	43	470	538	-	539
Foundation Studies	393	—	393	235	—	235	294	—	294	309	-	309
Total	5403	1003	6406	4095	795	4890	6324	1451	7775	6055	1732	7787

2.2.2 The organization of academic programs conducted by MNU

The MNU has adopted the semester system, with two terms per annum, each of 14 weeks duration. The rest is for assessment and holidays. The course content is delivered according to a course unit system and is credit based. The final result of a course is expressed as a Grade Point Average. This system is well established in the university and is the one likely to be adopted for medical training by the MNU.

The MNU follows a standard process in establishing new courses. Prior to the implementation of an academic program it is first submitted by the originating faculty to the Academic Senate of the MNU, stating objectives of the course, entry criteria and need. Following a desk evaluation by subject matter experts both internally and externally, it is then presented to the Committee on Courses which peruse it in detail. Once approval had been granted by the committee of courses it is submitted to the Maldives Qualifications Authority of the Ministry of Education.

2.2.3 Faculty of Health Sciences and facilities therein

Faculty of Health Sciences (FHS) is a facility built in 2005, on its own premises, with modern facilities. This Faculty possess many well established facilities which are similar to those required for medical training such as a skills training laboratory, an anatomy laboratory and a procedure laboratory. It is also noteworthy that the Health Science Library caters to the demand of all courses conducted by the FHS and subscribes to HINARI, CINAHL Plus and Health Sources consumer edition. This highlights the desire and ability of the MNU to establish facilities required for student learning.

The interaction that the Faculty of Health Sciences has established with the hospitals will be important for initiation of the proposed medical school.

2.3 Mechanisms available to commence a Faculty of Medical Sciences

Due to lack of trained and experienced academics, MNU establishing a medical school and conducting the medical training programme independently is not an option to be considered at this stage, and, hence will not be discussed further. The following discussion examines the merits and demerits of the other options available.

1. Establishing a medical school as a branch of a foreign University/private university

Inviting a foreign university to establish a satellite campus on surface appears to be an attractive option since there would be minimal preparatory effort and cost to the MNU/Maldives. Prospective foreign universities could do their own assessment on the feasibility of such a venture. Foreign university can bring with it an established curriculum, experienced human resources and teaching material. It would be easy for such a venture to attract foreign students too, as the degree offered is already recognized internationally. The foreign university will have the total responsibility of producing quality graduates. The government of Maldives will have only a facilitatory role.

However, the primary interest of a foreign university is to provide a medical degree which is internationally acceptable for a fee–a profit making venture. Tuition fee will be high. Concerns that quality may get compromised for making a profit is difficult to address or disprove. The foreign university will have to establish all the facilities including clinical facilities for medical training. The option of providing state hospitals for a private university is likely to meet with resistance. Establishing a hospital by the private university and attracting patients of all types required for medical training require time, funds and human resources. The hospital has to be established first and when it is up and running only a medical school should be initiated. Establishing a hospital is essential as no alternatives could be worked out in case a school is started prematurely and found eventually be short of patients. Since there will be competition by other health care institutions for patient care, a strong justification exist to establish a hospital well before embarking on establishing a medical school. As the initial expenditure of establishing the medical school (with a hospital) is high the foreign university will look for high numbers of student enrolment possibly straining limited clinical training facilities.

Foreign university can easily overlook the local requirements in a curriculum. They will find it difficult to obtain the services of local expertise available for clinical training in state institutions. The ability of MNU/Maldives exerting an effective influence on a totally foreign and a private university could be limited. Establishment of a satellite campus of a foreign university will prevent, for a long time, MNU establishing a medical school by themselves as providing clinical facilities for two medical schools will be difficult. Another disadvantage is that the interest and contribution of a foreign university to the development of the health sector in the Maldives will be low.

The failure of the previous attempt of establishing a private medical school by an Indian organisation may have been due to uncertainty of the clinical training facilities.

Although no documents were made available to this effect, it is noted that there has been an attempt to establish a Medical faculty and a hospital through a public private partnership in the year 2011. Universal Empire Structure, an Indian company, was granted 150 hectares of land to build a medical university, resort and spa in Laamu Atoll Gan. The resort was to subsidize the costs of the university. Land included

one kilometer of a beautiful beach with hinterland. Also given were management of the secondary school in the island, two hostels, a sports complex and the Gan Hospital. The company wanted to register the medical university without any work being done on the site. The contents of the agreement have not been seen by the island people and the island council had passed a resolution in 2012 making whatever remains of the agreement null and void. The terms of the agreement expired in 2013. Cautious of the intentions of the company, the Maldives Medical Council had decided upon a set of criteria for establishing a medical school within Maldives with the support of the WHO. This document was prepared by consultants from the Nepal Medical Council.

2. Establishing a medical school as a Public-Private Partnership (PPP)

In this model both parties have shared responsibility as per an agreement including financial responsibility. The main advantage is that the contribution of an experienced medical school to establish a medical school in Maldives and the financial commitment. Developing infrastructure and curriculum could be done with ease due to the experience the foreign medical school possess. MNU has the advantage of having to spend less on the project. MNU partnership is likely to facilitate the availability of government owned hospitals necessary for training thereby obviating the need to establish a private hospital. Thereby a considerable cost saving could be achieved. MNU being a partner will be able to influence the curriculum development and delivery to suit local needs. Further the role played by MNU is more likely to bring in the support of the state health sector more than the first option. Until such time MNU is able to award its own degree acceptable internationally, students will be able to earn a medical degree from the foreign university. Agreement could be arrived with the foreign university for paced out independence.

However, the main disadvantage of this model is by investing money the foreign university will expect a substantial profit and the other disadvantages are related to this.

Table 7: Advantages and disadvantages of establishing a medical school as a branch of foreign university

Advantages	Disadvantages
MNU does not have to do any preparatory work	Lack of commitment from local medical specialists for such a venture and also them losing the opportunity to improve in teaching
There is no cost to the government or MNU	High tuition fee for the students
The Foreign university will do their own assessment and feasibility on establishing a medical school	Inability of local organizations/institutions to exert influence on a foreign university
Implementation of an established curriculum, experienced human resources and teaching material	Lack of hospital facilities and uncertainty of having adequate clinical load
Internationally recognized degree	Quality may be compromised to make a profit
	The necessity to establish a hospital well in advance and therefore training will start years later.
	MNU loses the opportunity of establishing a medical school and along with it all the advantages a new medical school has on MNU/Maldives health system

Table 8: Advantages and disadvantages of establishing a medical school as a PPP

Advantages	Disadvantages
Shared responsibility including financing	The foreign university will expect a profit
Contribution from an established and experienced medical school from the beginning.	The partner university would like a long term commitment from MNU
The partner university will have the responsibility of organising the curriculum and delivery.	MNU has limited input into the medical training to suit local needs
Elective appointment can be done in the partner university when necessary.	Involves cost
Facilitate off site training of academic staff recruited by the MNU, by the partner university.	Involves cost
Awarding the degree of the partner university/or MNU.	MNU will be slow/never to get recognized-only the partner university
Facilitate postgraduate training overseas if the partner university is involved in similar training for its own graduates.	Involves cost
Provision could be made available for MNU to become an independent medical school with maturity.	This will take few decades as the investing University would insist on a long term financial gain
MNU will get an opportunity of learning/sharing experience with the partner university due to availability of expertise on site.	

3. Establishment of a medical school by MNU with academic contribution from a foreign university.

In this model MNU will establish a medical school by self funding. MNU will have to come to an agreement with a foreign university/ies to provide expertise to conduct training until a National Faculty is developed. It will be the responsibility of the foreign university to provide its service as per the agreement, for which they need to be adequately compensated. In this arrangement most of the functional aspects of medical training will be looked after by the foreign university at the beginning. MNU will be expected to develop physical infrastructure, facilitate the involvement of local stake holders etc.

By adopting this model, it is possible to phase out for the FMS of MNU to become an independent entity, once the expertise has been developed locally. According to this model the MNU may provide medical training locally utilising their own facilities but with the assistance of overseas academics and some elective training in the partner University. A significant proportion of clinical training would be done by specialists of the Ministry hospitals.
To its credit the MNU has successfully established ten faculties including a Faculty of Health Sciences and developed the curricula. Therefore, providing the necessary administrative structure for a medical school and coordinating with different stake holders, especially in the health sector would be a possible task. The primary objective being education (not profit) this model will help to maintain standards at a low cost. As the medical school is a local organisation, MNU will be able to muster the support of clinical staff for clinical training in the hospitals.

However necessary finances need to be made available by MNU. As the paucity of human resources is likely to persist for approximately ten years or so until Maldivian graduates assume academic positions, MNU has to recruit a large number of foreign academics to conduct instructions in pre-clinical and most of the para-clinical subjects.

Table 9: Advantages and disadvantages of establishing a Faculty of Medical Sciences by MNU with academic contribution from a Foreign University.

Advantages	Disadvantages
As the foreign university is not expected to finance the project a profit is not the main focus	Maldives/MNU has to bear the cost of establishing a Faculty of Medicine
Low running cost Possibility of offering a low fee structure	Most of the planning and hard work should be done by MNU (can be dedicated to an academic who could be hired)
MNU has control over medical training to suit local needs.	Degree should be recognised by the accreditation bodies (to work with MMC from the beginning)
High acceptance by the key stake holders	
High possibility of securing the support of state institutions to conduct the training programs (therefore obviate the necessity to establish a hospital)	
Designing the curriculum, administration and delivery could be done collaboratively.	
The possibility of MNU coming to an agreement only for functioning of the faculty for a specified period.	
MNU will get an opportunity of learning/sharing experience with the partner university due to availability of expertise on site.	
Facilitate off site training of academic staff recruited by the MNU, by the partner university.	
Awarding the degree of the partner university/or MNU.	
Facilitate postgraduate training overseas if the partner university is involved in similar training for its own graduates.	
MNU medical school is likely to progress fast for independence while closely interacting with the foreign university.	

The degree offered will be a MNU degree and will require to work closely with the MMC.

Recommendation

A foreign university establishing a hospital and a medical school is rather unlikely. MNU may have to establish a Faculty of Medical Sciences with foreign participation. The foreign collaboration could be done as a PPP if MNU alone cannot finance the project. Although in the short term financial burden to the country/MNU is less, the long term benefits are less. The consultants suggest that MNU establishes a medical school with input from a foreign University, until such time the MNU becomes self-sufficient. This mechanism is suggested as the most appropriate by considering the cost, acceptance by stake holders and the effect on the long term development of MNU and the health care system in the Maldives.

2.4 Instrument of Medical training

The nomenclature of the instrument to be established is a choice for the University. At present the University has provision to establish Faculties, Centres, Colleges and Schools. The Faculty of Health Sciences, by definition, encompasses Medicine. Even though there are many examples of Faculties of Health and Medical Sciences together across the world, it appears that the FHS conducts programmes only in Allied Health Sciences at present.

If a new Faculty is established for medical training (Faculty of Medicine/Medical Sciences) it may be necessary to rename the existing FHS. (E.g. as Faculty of Allied Health Sciences). As the MNU is currently examining the nomenclature of the faculties and reorganization of the faculties, renaming the FHS to have an identity separated from the medical training facility can be accomplished.

The merits and demerits of starting medical training under FHS

Advantages

1. Can share the facilities subject to availability
2. Availability of staff to organise/guide health

related training
3. Garner the cooperation and support from existing FHS staff
4. Possibility of starting medical training program early
5. Enhancing effect of medical training on FHS programmes
6. Additional facilities and staff obtained for the medical programme will also be available for FHS programmes

Disadvantages
1. Extra burden to FHS
2. Diluted emphasis on both medical and allied health training programmes

Considering the above, if additional support is given to FHS, the consultants recommend starting the medical training under FHS, with provision for it to separate into a Faculty of Medicine/Medical Sciences, eventually. Stakeholders need to be convinced that the extra facilities and staff required for medical training will be established. Subject to the above, for easy reference hereafter the proposed medical training facility will be called Faculty of Medicine/Medical Sciences.

2.5 The Medical Curriculum

2.5.1 The factors to be taken into consideration in the context of Maldives

The proposed medical curriculum of the MBBS program should be acceptable to the Maldives Medical Council and should be based on internationally recommended principles and bench marks. It should also take into consideration the following factors.

1. The “ground realities” of the Maldives.
2. The fact that human and material resources are in the formative stages.
3. Flexibility and dynamism of the curriculum and to make allowance for modifications during implementation.
4. The curriculum in the international partnership university that MNU expects to establish in the future.

MMC guidelines recommend that the medical curriculum should reflect core principles advocated by international accreditation bodies, global trends in medical education and innovations like student centeredness, problem based learning, integration, community based learning, electives and systematic approach. It is important that the curriculum reflects these concepts as appropriate, with cognisance to modalities of implementation.

Broadly, medical curricula may be problem based, body system based or discipline (subject wise) based. In many medical schools in the South Asian Region discipline based curricula are practiced with introduction of concepts like patient centeredness, integration, etc.

2.5.2 The types of medical curricula available

This exercise is not meant to be prescriptive by means of recommending a detailed curriculum. However, based on the Sri Lankan bench mark statements and WHO guidelines on quality, regulation and accreditation of medical schools we attempt henceforth to propose one that is considered appropriate both with regard to the type of instrument, and administrative structure of the medical training facility

2.5.2.1 System based curriculum

System-based integration enables students to appreciate associations between subjects (eg. anatomy, physiology and biochemistry) and relevance of basic sciences in clinical practice. Curricula components could be integrated, both horizontally (concurrent) and vertically (sequential). This requires the teachers themselves to be able to integrate subject matter across disciplines or sometimes the presence of teachers representing different disciplines at a single teaching/learning session. Therefore, this method is labour intensive. Furthermore, rigid departmental identities and boundaries hinder the successful implementation of system based curricula.

2.5.2.2 Problem based curriculum

A Problem based curriculum is structured around carefully identified scenarios. The scenarios require a multidisciplinary approach. The teacher assumes the role of a facilitator and helps students to learn. This model, too, requires heavy staff commitment and intense coordination

2.5.2.3 Discipline (Subject) based curriculum

This is a conventional curriculum being practiced widely in the region modified by the inclusion of new concepts. This model provides a general understanding on a variety of subjects relevant to medical practice. The presence of teachers across disciplines are not required at a given time. The subjects are generally classified as pre-clinical, para-clinical and clinical. The teaching of a subject could be oriented to allow horizontal or vertical integration, problem based teaching/learning (or problem solving). The delivery of the course may be done in an integrated manner by concurrent teaching by 2–3 subject based teachers.

The advantage of this type of curriculum for a new medical school is that it is possible to set up the infra-structure and recruit teachers for the first two years and commence the course while organizing the rest of the facilities during this time. It is also easier to administer the programme since it is not dependent upon other specialties.

In this model, the pre-clinical subjects of anatomy (including gross anatomy and histology), physiology and bio-chemistry are taught in the first four terms. During this time instruction is mainly classroom (theory) and laboratory (practical) based, with some exposure to patients. There is no intensive hospital based teaching during this period. However, the basic skills required for hospital based training is taught and practiced in the laboratory. Vertical integration to reinforce clinical relevance is achieved by the contribution of clinicians to this program; for example, a surgeon accentuating the anatomical basis for surgical procedures, a physician emphasising the physiological basis for certain signs and symptoms and a pathologist elucidating the histological basis for diagnoses.

Para-clinical subjects such as public health, pharmacology, microbiology, parasitology, pathology and forensic medicine, will be taught in the next four terms. During this time, the students are exposed to clinical practice in an incremental fashion. There is a greater degree of vertical integration in these two years and students observe the clinical relevance of what they have learnt. Problem solving becomes an integral part of their training.

The university clinical staff is responsible for the training in the last two terms, which is mainly in the hospital setting. This requires a strong foundation being laid during the first four years. After successful completion of the final year examinations, the students are required to follow one year of internship prior to registration. The internship program has to be structured according to the requirements of the country. The members of the MMC suggested a one year internship program with 3 months each for O&G, medicine and surgery, one month each for paediatrics and community medicine and 2 weeks each for ophthalmology and otolaryngology.

2.5.3 Recommendation of the type of curriculum

It is recommended that the new medical school commences with a discipline based model with horizontal integration and a certaindegree of vertical integration. Concepts such as student centeredness, integration, problem based learning and small group discussion could be introduced to the curriculum from its inception. Once the faculty is well established with its own staff, revision of the curriculum could be considered.

It is emphasized that it is essential to incorporate behavioral and social sciences (medical ethics, communication skills, doctor-patient relationship, etc.) into the curriculum.

2.6 Proposed structure for the administration of the curriculum

2.6.1 Introduction

The management structure of the proposed school needs to be decided considering the type of curriculum envisaged. Both the curriculum and management structure of the Faculty of Medicine should take into account the fact that there is no established system of medical training in Maldives, and therefore, there is a scarcity of academics. Consequently, the enormous contribution that is expected from clinicians practicing in the hospital sector and academics from overseas should be taken into consideration.

The present administrative structure where the administrative and academic head of each department of study is under a Dean who reports to the Vice Chancellor is a system which could be adopted.

2.6.2 The administrative structure of existing faculties of the MNU

The Dean is the academic and administrative head of the faculty. A senior administrator manages non-academic matters, procurement, maintenance etc. The faculty is independent of the central administration in taking decisions on allocated funds. The Academic Review Committee which is the academic body of the faculty consists of all heads of departments headed by the Dean. A Faculty Management Committee consisting of heads of department, senior administrator and the dean manages administrative matters and advises the dean on matters brought to the meeting. In addition, in every faculty there is a Faculty Advisory Committee with half of the members drawn from external bodies, such as professional societies, employers, and outstanding persons in the discipline. This body advises on curriculum changes and entry criteria for programs to align the programs with emerging market realities and discipline innovations. The curriculum changes within a faculty are coordinated through the Curriculum Committee of the faculty. The tenure of office of a head of department is two years. The examinations are conducted under the purview of the respective heads. The results are scrutinized by a committee consisting of all the examiners. This system appears effective and efficient. Therefore, a similar system is suggested for the Faculty of Medicine.

2.6.3 Dean

The Dean will be the academic and administrative head of the faculty. It is preferred that s/he be a medical professional with experience in university or hospital administration. The dean should be provided with support staff, officers to coordinate student activities, examination matters, academic program (non clinical and clinical) student welfare, leave of the staff.

2.6.4 Committees at faculty level

Separate committees for curriculum development and coordination, infrastructure, monitoring and evaluation, higher degrees are not essential in the initial stages since activities related to these committees could be addressed by the faculty board and/or the Medical Education division/unit. However, establishment of a research committee and ethical review committee may be needed at an early stage.

2.6.5 Departments

It is prudent at the outset to establish three departments for the purpose of implementing the curriculum, with provision for separation into discipline based departments if the need arises with expansion of the faculty.

It is not essential, and also may not be possible, to establish departments for each discipline in the early stages due to scarcity of academics. The following is a model which could be followed.

Year 1 Year 2	Pre clinical (basic sciences) department	Anatomy Biochemistry Physiology
Year 3 Year 4	Para-clinical department Clinical department	Community Medicine Forensic Medicine Pathology Microbiology Parasitology Pharmacology
Year 5	Clinical department	Obstetrics & Gynaecology Medicine Paediatrics Surgery Psychiatry Family Medicine

Each of these departments would have an administrative Head under whom the academic head (coordinator or subject Head) of each discipline will be appointed from amongst the academic staff to implement the teaching program.
University academic staff in disciplines such as anaesthesiology and radiology are not essential as at present. Training in these specialties is expected to be performed by specialists of the Ministry of Health as associates or extended staff. Training in subspecialties such as orthopaedics, ophthalmology, otorhinolaryngology, urology, neurology, respiratory medicine, cardiology, neurosurgery, cardiothoracic surgery, paediatric surgery and dermatology would also be by the specialist staff of the Ministry of Health.

2.6.6 Examination Unit

It would be pertinent to create an examination and evaluation unit from the inception of the faculty. It is proposed that an academic staff member is appointed as head of this unit and trained in different forms of assessments and evaluation.

2.6.7 Medical Education and Training Unit (Staff Development Unit)

The requirement for training staff at all levels (including clinical staff working in the hospitals) would be high. This would include training in clinical teaching methods, evaluation and research. This unit is a prerequisite for maintaining the academic standards, accreditation and liaising with the Maldives Medical Council. One senior academic staff member of this unit should be responsible for liaising with foreign faculty and coordinating activities for them to contribute to the academic program. An audio-visual technician who can provide facilities for distant mode learning through video conferencing and the web is essential.

2.7 Accreditation/supervision and maintaining standards

Accreditation and supervision of a Medical Faculty and medical education is an essential prerequisite for recognition of the degrees offered. This is may be done by the institute responsible for higher education in the country (i.e., Ministry of Education in Maldives) and the Maldives Medical Council. The Ministry of Education may set bench marks and minimum standards and follow a defined process to maintain quality while the Medical Council would determine the fitness to practice medicine.

Since the Maldives has only one university and no medical school yet, a mechanism needs to be developed afresh to maintain standards. To this end the MMC with the assistance of the WHO has developed accreditation standards for Bachelor of Medicine and Bachelor of Surgery . These guidelines have been developed at a time when a private organization expressed interest in the establishment of a medical school and a hospital in the Maldives. This document provides details on the fundamental requirements of a medical curriculum, the competencies of the MBBS graduate and many other aspects related to medical education and a medical school. It has detailed the facilities required for admission of 50 students annually. However, whether this document has been approved and accepted by the Ministry of Health is unclear.

Furthermore, it was observed that some aspects detailed in this document are difficult to fulfil and not available even in well-established medical schools in the region. (A dialysis unit and 22 departments.) The Faculty of Medicine, Peradeniya which was established 52 years ago consists of 16 departments, of which the newest, radiology, was established after 50 years. Therefore, it advisable that the MMC, MNU and other stakeholders initiate discussions on the minimum facilities and standards expected of a medical school and develop a road map for accreditation. Participation of the MMC is essential from the planning stage of the Faculty. A continued two way feedback process is an essential feature as establishing a medical school successfully in the Maldives will be a collective responsibility of all stake holders. The fact that the MMC is a member of the medical council consortium of South East Asia allows it to seek assistance from Medical Councils in the region, if and when required. Furthermore, the Memorandum of Understanding signed between the government of Maldives and Sri Lanka in June 2014 on health sector development, would allow the Sri Lanka Medical Council to be approached for assistance on licensing requirements of graduates and quality assurance in medical education.

2.8 Student enrolment

Student could be enrolled to the faculty when the facilities for the first two years of training are established (administrative structure, teaching staff, three departments, namely, basic sciences, para-clinical sciences and clinical sciences, laboratory facility for basic sciences, i.e., anatomy, physiology and biochemistry). Planning for the subsequent three years of training should occur simultaneously. It is preferable that the first intake of students be small with provision to increase numbers with subsequent intakes. The second intake may be enrolled after a lapse of one year, allowing time for the MNU to improve its facilities further. As detailed later, the recommended number for the initial batch has been calculated as 30 students

2.9 Summary

It is recommend to establish a Faculty of Medical Sciences at the MNU with a strong partnership with a foreign university. The curriculum should be discipline based and managed by three composite departments. Then the question will arise as to the human and physical resources required and capacity building which is addressed in the next chapter.

The academic staff of the Peradeniya University Medical Faculty explained the administration of the faculty to the visitors from MNU.

Chapter 3

Resources for Medical Training

3.1 Introduction

Establishing a new FMS requires forethought that will ensure the likelihood of success. The benefits of establishing a medical school include favourable institutional impact on the university, hospitals and health systems that are critically important in their operations. There is no doubt that a medical training program enhances the reputation and academic standing of a university, while enhancing the reputation of hospitals and health systems as providers of care. In addition, a favourable economic impact on the community where the school is located is anticipated. However, the nature of the process is such that it requires considerable commitment of time, effort, and financial resources with a significant proportion of this being on capacity building and human resource development.

Guidelines, specifications and requirements of infra-structure facilities and clinical material for teaching a medical course are available from medical training programs of other countries. Even though Maldives do not have a medical training programme, the MMC has formulated a set of guidelines. The requirement to be met for new FMS will be discussed according to the "Accreditation standards for the MBBS" by the Maldives Medical Council14, "Guidelines and specifications on standards and criteria for accreditation of medical schools in Sri Lanka" by the Sri Lanka Medical Council (2011) , Subject benchmark statement in medicine by the committee of vice chancellors and directors, university grants commission, Sri Lanka (2006)11 and the guidelines for accreditation of medical schools in countries of the south-east Asia region by the WHO (2009)12.

3.2 Physical and human resource requirements for an independent Facility

Even though the initial charter batch is suggested to be 30 students, the projected regular number of students to be enrolled each year would be 50. Therefore, in the future the total number of students in the faculty will be 250. Therefore, the human resource and physical space requirements for an independent FMS have been calculated for 250 students.

3.2.1 Physical resource requirements

The following has been worked out based on the space provided at FHS and the experience of consultants gained from other universities.

Table 10: Physical space requirement for Administration

Space name	Area (sq ft)	Function/requirements
Deans room	350	Personal room of dean with space to have a sofa and chairs, cupboard
Deans office	1000	Secretary, clerks, office assistants cubicles and space for cupboards
Registrar's room	100	Personal room for registrar
Accounts office	250	Accountant, assistants, shroff's cubicles and space for safe and cupboards
Exams unit with confidential room	250	Preparation and storage of examination papers. Needs copier, printer/ risograph, secure cupboards
Board room	500	Should be able to accommodate all the projected staff members (60-50)
Meeting room (large)	250	Should be able to accommodate all the projected academic staff (30-25)
Meeting room (small)	150	Should be able to accommodate the department heads, and each subject head (20-18)
Common room	250	Large table, chairs and sofas
Documents room	500	Storage of past exam question and answer scripts and other documents such as minutes of meetings, accounts ledgers, inventory, receipt books etc.
Washrooms	80	Two, each of 40 sq.ft.
Total	**3680**	

Table 11: Physical space requirement for teaching/learning

Space name	Area (sq ft)	Function/requirements
Lecture hall	2100	Three lecture halls, each 700sq.ft. equipped with audio-visual aids and a sound system. Preferably the chairs, with an arm for writing on, will be on a sloping or tiered floor
Skills laboratory	1000	Well-equipped clinical skills learning laboratory
Library	1500	Should contain at least five copies of all recommended texts (given by each subject head) for borrowing and one copy of reference texts. Computer assisted learning facility to be available. Should have a seating capacity for at least 50 students at a time
Tutorial rooms	1200	Six rooms with a seating capacity of 15 (each 200sq.ft.)
Examinations hall	1000	Should be able to accommodate 50 tables and chairs with adequate space between
Auditorium	2000	Should be able to accommodate at least half the students in the faculty at one time
Canteen	800	Should be able to provide seating for one batch of students
Total	**9360**	

Table 12:Physical space requirement of the Pre clinical department

Space name	Area (sq ft)	Function/requirements
Heads room	250	Personal room of department head
Senior lecturer room	450	Three rooms, each, 150 for subject heads
Lecturer room	300	Three rooms, each, 100 for subject lecturers
Anatomy cum pathology laboratory	1000	Need exhaust fans, chemical resistant sinks, work tables
Preparation room	200	For storage of prosected specimens, preparation, mounting, first aid
Bio-chemistry cum physiology laboratory	1000	Need exhaust fans, chemical resistant sinks, work tables
Preparation room	200	For storage of chemicals, preparation, washing , first aid
Technical officers room	100	One technical officer for the department
Office	300	Office with furniture for three clerks (one for each subject)
Washrooms	80	Two, each of 40 sq.ft.
Total	**3880**	

- *A body storage facility with formalin baths and a dissection room for anatomy has not been included. This may be built if a body donation programme is initiated*

Table 13:Physical space requirement of the Para-clinical department

Space name	Area (sq ft)	Function/requirements
Heads room	250	Personal room of department head
Senior lecturer room	900	Six rooms, each, 150 for subject heads
Lecturer room	600	Six rooms, each, 100 for subject lecturers
Forensic cum pathology Museum	1000	Need display cupboards, work tables
Preparation room	200	For preparation, mounting, first aid
Microbiology cum parasitology laboratory	1000	Need exhaust fans, chemical resistant sinks, work tables
Preparation room	200	For storage, preparation, washing , first aid
Pharmacology cum community medicine laboratory	1000	Need exhaust fans, chemical resistant sinks, work tables
Preparation room	200	For storage, preparation, washing , first aid
Technical officers room	200	Two technical officers for the department
Office	600	Office with furniture for six clerks (one for each subject)
Washrooms	80	Two, each of 40 sq.ft.
Total	**6230**	

Table 14:Physical space requirement of the clinical department

Space name	Area (sq ft)	Function/requirements
Heads room	250	Personal room of department head
Senior lecturer room	900	Six rooms, each, 150 for subject heads
Lecturer room	600	Six rooms, each, 100 for subject lecturers
Staff and student clinic	100	Examination bed, table and chairs for examination of staff or students who require consultations
Drugs storage room	200	For storage of medicines and equipment for the examination and treatment of staff/students
Clinical lecture demonstration room	300	To demonstrate examination/interpretation to a group of students
Technical officers room	200	Two technical officers for the department
Office	600	Office with furniture for six clerks (one for each subject)
Washrooms	80	Two, each of 40 sq.ft.
Total	3230	

Total space requirement excluding corridors, walkways and open areas– 26620 sq.ft.

The above space requirement is based on an independent facility purpose built for teaching a medical curriculum. However, in the initial stages, facilities available at the FHS may be used. Therefore, the adequacy of the existing facilities at FHS is considered based on the MMC and SLMC guidelines on infrastructure requirement for medical training.

The above has not considered certain improvement of physical space needed in the hospital settings (e.g. Tutorial rooms, Student rest room).

Classrooms at FHS

3.2.1.1 Lecture theatres and tutorial rooms

During the first two years, since medical students undergo classroom based teaching, lecture halls are required. The SLMC and MMC guidelines recommend lecture halls that can accommodate 25-30% more than the actual intake of students with independent audio-visual aids such as overhead projectors, multimedia and a sound system. These bodies also specify the requirement of 3-4 tutorial/small group discussion rooms (for a batch of 30) prior to the first intake of students. However, if the second batch is taken in the subsequent year following the first batch, another such lecture hall will be required for the second year since both intakes of students will have lectures concurrently. The other option is to skip an year and take the second batch when the first batch have reached the third year.

Tutorial rooms at FHS

Currently the FHS has 7 class rooms with an area of 600 square feet that can accommodate 40 students. These can accommodate a batch of 30 with space for 30% more than the batch. This is in line with the requirement stated by the medical council. In addition they have 8 class rooms (400 sq.ft.) and tutorial rooms (330 sq.ft.) that can accommodate 30 students. There are also empty rooms of 300 sq.ft. that may be adopted for small group discussions. However, since these class rooms are currently used by the FHS students, scheduling of classes needs to be studied closely, to ascertain the possibility of allocating these rooms for medical students. Therefore, lecture halls and tutorial rooms available at the FHS currently are adequate for medical training but proper timetabling and planning is required since it will be a shared facility.

3.2.1.2 Auditorium

According to the SLMC guidelines, one auditorium which can accommodate at least half the number of students in the faculty is required while the MMC states the requirement as "one of adequate capacity for holding scientific and other activities". Currently the auditorium of the FHS can accommodate approximately 120 students which is more than adequate for a intake of 30 students. Furthermore, it is considered adequate even with a projected increase in the number of students with each intake to 50 and a total of 250 students considering all five years. However, it is necessary to be cognisant of the fact that this facility is currently used by the FHS students. Therefore, the current FHS auditorium is adequate for the purpose of medical training, but a new auditorium for the medical faculty needs to be constructed due to complications which may arise as a result of sharing this resource.

3.2.1.3 Examination hall

The SLMC guide specifies that the examination hall should be able to accommodate one intake of students at any one time. Examinations can be conducted initially in the examination hall of the FHS which is adequate for 30 students, with spaced out seating. However, since this is also used by the FHS students, attention must be paid to the examinations calendar in reserving it for medical students. Therefore, even if the current FHS examination hall is adequate at present, a new hall for the medical faculty has to be constructed to minimise complications which may occur as a result of sharing this utility and to accommodate increasing numbers of students.

The auditorium and the examination hall of FHS

3.2.1.4 Teaching/learning laboratory facilities

3.2.1.4.1 Medical Council guidelines on laboratory requirements

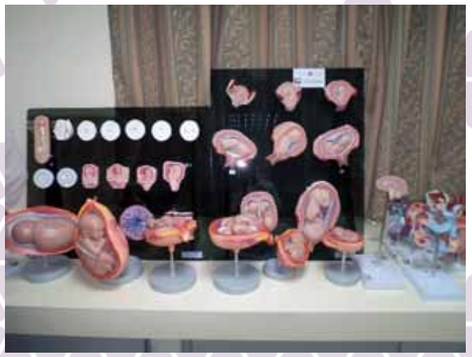
The MMC guide does not specify the nature of laboratory facilities, except for the clinical skills laboratory which is required to possess up-to-date teaching aids. The SLMC guidelines specify that laboratories of anatomy, physiology, bio-chemistry, microbiology, parasitology and pathology should accommodate at least 1/3rd of the batch at a time, or alternatively, possess multidisciplinary laboratories that can accommodate and provide facilities (eg., microscopes), for the entire batch, simultaneously. It is proposed that laboratories be multidisciplinary, initially. To this end, it may be pragmatic for anatomy/ pathology, biochemistry/physiology and microbiology/ parasitology to share laboratory facilities. Since 20–25sqft of laboratory space is recommended per student and considering that multidisciplinary laboratories are to be used 600 – 750 sqft of space is required for each (three) laboratory for 30 students.

3.2.1.4.2 Anatomy laboratory of MNU

The FHS has a well-equipped anatomy laboratory of 800sqft. It is proposed that the existing anatomy laboratory be used for teaching of anatomy and pathology lab. Dissection of bodies for anatomy teaching is practised in medical schools in the South Asian region. The bodies are obtained through self-donations or relative donations through body donation programs in established medical faculties. This can be initiated in Maldives. However, a paradigm shift is needed within the Maldivian society for donation of bodies for medical teaching. Therefore, for the study of anatomy of the human body sets of articulated and disarticulated skeletons need to be obtained from other medical schools. These will need to be supplemented by prosected, plastinated and bottled specimens of soft tissues. Several models of articulated skeletons obtained commercially are available in a well-equipped FHS laboratory with a large number of anatomy models that may be used for teaching purposes. There are medical schools which teach anatomy using only models and prosected specimens instead of hands-on body dissection and in the initial phase this may need to be done. Three dimensional computer graphic programmes on the human body, available commercially, can also be used. It is also suggested that the students do a short elective appointment in an anatomy dissection room in the partner university. In addition partner university can provide some prosected specimens to the FMS.

Training in pathology will require bottled specimens of diseased human organs. These will need to be obtained from overseas, specimens can be obtained locally. This process should be initiated at the inception in order to possess a sufficient number of specimens for teaching, when the first intake of students reach the third year. Therefore, supplementation of the existing anatomy models, prosected specimens and obtaining pathological specimens is required. Partner medical faculty should be able to help in this regard for both anatomy and pathology. It is suggested that the FHS anatomy laboratory be used as the anatomy/pathology laboratory.

Some of the available anatomy models in FHS



Skills training laboratory

3.2.1.4.3 Skills training laboratory of MNU

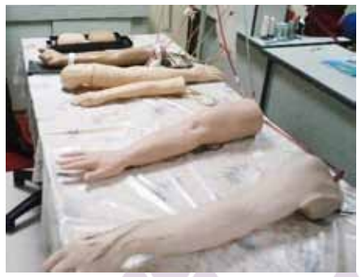
The FHS has a very large, well equipped skills laboratory (nursing art laboratory) of 2000 sq. ft. It is proposed that this be used as the combined physiology, skills training and biochemistry laboratory of the medical school.

The spacious skills laboratory is exceptionally well equipped with more than the required number of mannequins for training of procedures such as suturing, vene-puncture, insertion of catheters, naso gastric tubes and endo-tracheal tubes, cardio pulmonary resuscitation, neonatal resuscitation, etc. (see Annexure 09 for list of some relevant equipment). These facilities could be used for training of medical students in clinical skills and procedures. It is suggested that this laboratory be used for physiology and biochemistry.

Equipment required for physiology and biochemistry practical will need to be purchased. The two non-utilised rooms adjacent to this laboratory (of 240 &135 sq. ft.) may be used for storage of chemicals and preparation.

Resuscitation mannequin

Intravenous cannulation training models



Intravenous cannulation training models

Suturing training model

Rooms adjacent to the skills laboratory that may be used for chemical storage and preparation

3.2.1.4.4 Bio-Medical laboratories of MNU

The FHS has a histology and microbiology laboratories (bio-medical laboratory), each with a floor space of 750sqft. The microbiology laboratory has 25 microscopes and other relevant equipment for histology and microbiology practical classes. (see annexure 10 for list of some relevant equipment) The available microscope laboratories can be used to teach medical undergraduates in histology, microbiology, parasitology and pathology. However, histology, pathology and forensic pathology slides will be required. Pathology slides will be available in pathology departments of hospitals. Histology and forensic pathology slides can be obtained from established medical schools in the region. It is envisaged that with time the FHS will be able to prepare their teaching material.

Therefore, these three laboratories (anatomy, skills and medical) are adequate for 30 students according to the SLMC guidelines.

In addition, the FHS has a 440 sq. ft. pharmacy laboratory and several other empty rooms of 330sq.ft. If required, there is free space to construct temporary offices or class rooms.

Microbiology laboratory has two sections as shown in the irst four photographs below

Pharmacy laboratory

Expansion space

Hulhumale hospital lab

Hithadhoo hospital lab

3.2.1.5 Diagnostic laboratories

Diagnostic laboratory facilities of the hospitals where the training is to be done can be utilised. In addition, the forensic lab of the police which is an advanced facility and the Food & Drug Authority laboratory may be used for training.

3.2.1.5.1 Laboratories in hospitals

For the training of medical students in certain areas of clinical bio-chemistry, haematology, microbiology, histopathology and clinical pathology a laboratory based clinical appointment is done. The laboratories in the IGMH, Hulhumale, Hithadhoo and Kulhudufushi hospitals (L1 level) are fully automated, well developed with facilities available to do all the investigations required for undergraduate teaching. At IGMH about 800-1000 investigations are done per day. The consultant pathologists (one chemical pathologist and two histopathologists at IGMH) attached to the lab will be able to conduct the clinical appointment. They would require a teacher training course prior to the students entering the third year. They currently have the FHS students following the MLT course coming to the lab for their training.

3.2.1.5.2 Laboratory of the police forensic directorate

The directorate consists of five laboratory units. These are the fingerprint, drugs & chemical, DNA, digital evidence and physical evidence units. These are well equipped and have trained personnel that are competent and willing to train medical students. During the 3rd or 4th years the students are required to do a forensic medicine clinical appointment. During this time they can visit the forensic science lab in order to understand the basics in forensic science investigations.

3.2.1.5.3 Laboratory at the Food & Drug Authority

There is a non-medical (MSc qualified) microbiologist who has been involved with the teaching of FHS students who is willing to also teach the medical students. A short clinical appointment may be done here.

3.2.1.6 Museums

The SLMC guidelines specify that separate or collective museums for anatomy, pathology and forensic medicine should be available. The MMC guidelines have not addressed this issue. With the commencement of the medical faculty specimens can be collected with the help of the affiliated medical faculty. In addition the surgeons in the IGMH can also collect specimens from their routine surgeries. With the commencement of autopsies specimens may be collected with the consent of the next of kin. It is also possible that there will be bodies donated to the medical faculty which may be used for anatomy dissections and also to collect specimens.

3.2.1.7 Student/staff welfare

This is an essential component for the successful completion of any university program. Hostel facilities, recreational facilities, canteens are areas that need to be carefully planned. In, particular since students would spend much time in the hospital, hostel facilities need to be provided and this should in the vicinity of the hospital.

The SLMC guide states that the food service area should have seating for at least one batch of students. Currently the FHS has a common room of 800 sq.ft. which can easily provide seating for staff and 30 students. In addition for visiting staff, accommodation needs to be provided for overnight or a stay of a few days. Currently the MNU have apartments that are used by the visiting staff and can also be used for the visiting staff of the medical faculty. There should also be facilities for sports and recreation.

Canteen

3.2.2 Human resource requirements

This includes Administrative, Academic, Non-academic and support staff. The clinical teaching component of para-clinical and clinical subjects will require the staff in the hospital, in addition to university academics.

Apartment

3.2.2.1 Academic staff

Currently, there is scarcity of trained medical teachers in the Maldives. The ultimate aim of developing high end clinical care and research requires the attraction of illustrious academics with varying

Table 15: The requirement of Academic staff

Subject	No.	Qualification/expertise	Training required
Anatomy	02	MBBS/BDS/BVSc/BSc and MSc/PhD	Anatomy dissection
Bio-chemistry	02	MBBS/BDS/BVSc/BSc and MSc/PhD	Clinical bio chemistry
Physiology	02	MBBS/BDS/BVSc/BSc and MD/ MRCP /MSc/PhD	Clinical physiology
Microbiology	02	MBBS/BDS/BVSc/BSc and MD/ MSc/ PhD	Medical microbiology
Parasitology	02	MBBS/BDS/BVSc/BSc and MD/ MSc/ PhD	Medical parasitology
Community medicine	02	MBBS +/- MSc, DPH MD (Community medicine) or equivalent +/- PhD	Community paediatrics
Forensic medicine	02	MBBS +/- MD (Forensic medicine) +/- DMJ, PhD, MRCPath or equivalent	Clinical forensic medicine and forensic pathology including forensic anthropology, dentistry and toxicology
Pharmacology	02	MBBS/MRCP/FRCP/PhD	Clinical pharmacology
Pathology	02	MBBS +/- postgraduate qualifications in Pathology +/- PhD	Histopathology, haematology and chemical pathology
Medicine	02	MBBS + MRCP/FRCP/MD or other acceptable/equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.
Surgery	02	MBBS + FRCS/MS or other acceptable/ equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.
Obstetrics and gynaecology	02	MBBS + MRCOG/MD or other acceptable/ equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.
Paediatrics	02	MBBS + MCRCPCH/MD or other acceptable/ equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.
Psychiatry	02	MBBS + MRCP (Psych)/MD or other acceptable/ equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.
Family medicine	02	MBBS + MRCGP/MD (family medicine) or other acceptable/ equivalent post graduate qualifications	Post graduate clinical training is inbuilt in the degrees in column 3.

expertise. This will require focused attention from the initial stages of recruitment. Remuneration and avenues for career advancement should be attractive to encourage distinguished academics to apply locally and from overseas. It is not mandatory for all the teachers to be medically qualified. It is more feasible and desirable to recruit a multi-professional team with a range of expertise and from different professional backgrounds. Professionals such as nurses, dentists, pharmacists, nutritionists and psychologists can play an important role in training of medical students.

Academic staff in pre-clinical disciplines is essential to commence the medical school. Currently, the MNU and the FHS which is an established faculty within the MNU, conduct several undergraduate, graduate and doctoral courses which include professional degree courses such as nursing and law. The staff in the department of biomedical sciences of the FHS include four members who have majored in biochemistry and, therefore, are qualified to teach the same. In addition, it may be assumed that the hospital based chemical pathologist too, can contribute to the teaching of biochemistry. However, the teaching of applied medical biochemistry may require the recruitment of a medically qualified clinical biochemist. Recruitment of academics to teach anatomy and physiology is essential to commence the teaching programme. These academics may be permanent employees of the MNU or visiting staff on assignment basis. Some medical specialists, such as surgeons can contribute to the teaching of anatomy, while physicians can contribute to the teaching of physiology. However, teachers with experience in teaching anatomy and physiology are required. To this end, it may be possible to enlist the support of an established medical faculty in the region to conduct the teaching programme until the MNU recruit permanent staff to the departments. During this transient period the newly recruited staff will observe and assist (shadow) the visiting staff. Thereby, the newly recruited permanent staff will get an opportunity for training in teaching methodology and would be able to gradually assume responsibility.

The students will need to pass the 2nd MBBS examination (or a similar examination) consisting of the pre-clinical subjects at the end of the second year, prior to commencing their para-clinical studies. The para-clinical subjects which consist of public health, pharmacology, microbiology, parasitology, pathology and forensic medicine, will be taught in the third to fourth years. The staff of the FHS consist of a medically qualified doctor who can teach public health and other members who can contribute to the teaching of parasitology and microbiology, especially in practical training. The clinicians in the hospitals may also be able to contribute towards the teaching of para-clinical subjects; clinical pharmacology by physicians/surgeons, pathology, microbiology, parasitology and clinical biochemistry by pathologists. However, staff needs to be recruited for the teaching of all these subjects. Of particular concern is the teaching of Forensic Medicine as currently there are no specialists in the Maldives. This vacuum needs to be filled by recruitment and training of medical officers in this field. As in the pre-clinical subjects, the recruitment of permanent teaching staff is essential. Until MNU recruit their own staff, it may be necessary to enlist para-clinical teaching staff from overseas. Nonetheless, the permanent staff when recruited would assume responsibility, gradually. Since the students will also be visiting hospitals for their clinical rotations the specialists in IGMH (73), Hulhumale, (12), Hithadoo (12), Kulhudhufushi (13), other regional hospitals and ADK (30) can provide clinical teaching. Since they have expressed concerns about being part of medical education, they will require training in the basic concepts of medical education during the first two years (before the students commence the clinical rotations).
The final year students spend most of their time with patients. Customarily, the final year subjects are taught mainly by university academics including the practicals. Qualified teachers should be recruited and hospital facilities be provided for them.

As for making academics available for teaching, one model which could be considered is to appoint the specialists working in the hospitals with university title and responsibilities. Experienced members of respective disciplines could be appointed as Heads/ Departments and coordinators to implement the teaching/learning programs. However, the MNU will need clinical specialists who will spend a considerable time dwelling into many matters related to university and academic activities.

According to the MMC standards14, the pre and para clinical departments require a total of 25 academic staff while the clinical department requirement is 50 making a total of 75 academic staff for institutions admitting 50 students annually. Since the medical curriculum is five years, in five years after the first intake, there will be a total number of 250 students, giving a student: staff ratio of 3.3:1. The consultants are of the opinion that this ratio is unrealistic and not essential. In the UK, the top three ranked universities for medicine is Cambridge, University College, London and Oxford. Of these, the best ratio is 10.2:1 at the University College, London whilst the ratio in Oxford is 11:1 and in Cambridge is 11.6:1 . According to the SLMC guidelines16, the student: staff ratio should be between 7:1 and 14:1. We feel that this ratio required by the SLMC is appropriate for the new medical school and therefore, suggest that for the total number of 250 students, envisaged in the future, 18 to 35 permanent academic staff be recruited. The three departments encompass 15 subjects. Each subject (three in pre-clinical, six in para-clinical and six in clinical) requires a senior academic as the subject head. In addition, another academic may be recruited for each subject (another 15) making a total of 30 academic staff giving a ratio of 8.3:1. This could be cut down by enrolling the staff of the hospitals in clinical and para-clinical disciplines.

At the outset, the staff for the pre-clinical department needs to be available. The staff for the other departments may be gradually recruited as the first batch progresses over the years. However, in keeping with the concept of vertical integration, it is advisable to also recruit the clinical teaching staff at an early stage, in order to contribute to the pre-clinical teaching programme from the inception. Prior to the students entering the third year, this staff can be in the pre-clinical department and while setting up the clinical department. In the pre-clinical department and the subjects of microbiology and parasitology of the para-clinical department, one academic staff member may be graduates from a non-medical field such as dentistry (BDS), veterinary (BVSc), or a science graduate (BSc) with post graduate qualifications (MSc, MPhil, PhD). If a PhD holder, the area of study ought to be relevant to the subject. The others ought to be medically qualified MBBS graduates with post graduate qualifications in the relevant speciality. In the para-clinical department, the staff teaching the subjects of forensic medicine, community medicine and pathology, and all those in the clinical department need to be medically qualified MBBS graduates with post graduate qualifications in the relevant speciality. It is advisable that persons who have previous experience in undergraduate/postgraduate teaching (ideally of a medical curriculum) be recruited. If not, the new recruits will need to undergo a teacher training programme. It is also suggested to expose the academic staff to the teaching/learning programme of an established medical school in the region

The subject of medicine is characterized by the need for students to acquire not only knowledge and understanding but also clinical skills and appropriate attitudes. Professional standards are of great importance, as is the ability to work together with other healthcare professionals. The acquisition of clinical skills involves access to patients under the supervision of clinical teachers, usually medical practitioners. While universities are responsible for the core organization and assessment of training programmes in medical education, the clinical training is arranged and provided with the active participation, guidance and cooperation of those specialist clinicians that constitute the ‹extended› faculty. The success of MNU›s medical faculty will depend on the establishment of mutually beneficial affiliations and partnerships with the stake holders, hospitals, Ministry of Health (and an established medical faculty of a foreign University). These affiliations and partnerships will be critical to offering students a broad range of experiences amidst limited resources available in a country with diversity. Teaching of medicine requires the support of medical specialists in the hospital to contribute to clinical teaching in the form of bed-side teaching and lectures, when required. They have expressed concerns about their lack of experience in medical education. This issue may be addressed by appointing specialists in the hospitals (IGMH, Hulhumale, Hithadoo, Kulhudhufushi, ADK, etc.) as visiting lecturers (with titles), with teacher training in medical education. This training could be executed in a medical education unit of a neighbouring country which administers such programmes. Therefore, it is imperative that clinical staff be appointed early (even though the students are in the first year). It is believed that at least an year will be required subsequent to the teacher training to prepare teaching materials based on the objectives of the curriculum and updated knowledge.

3.2.2.2 Non-academic staff

The number of non-academic staff: academic staff is around 1.5:1 for faculties of medicine. Therefore, approximately 45 non-academic staff, of which approximately 1/3rd technical staff, 1/3rd clerical and 1/3rd support staff are needed. Initially the number required for the pre-clinical department and the administrative (Dean's) office can be recruited. Gradually, together with the recruitment of the academic staff to the other departments, the non-academic staff could also be recruited.

Initially, it would be necessary to recruit technical staff familiar with requirements of laboratories for training of medical students, from established medical schools. At the outset, a common laboratory for pre and para-clinical practical work is suitable with facilities for specialisation with expansion and increase in number of students. It is possible that technical staff recruited to pre-clinical departments may later contribute to para-clinical departments as well or may provide services in several departments. To this end it is advisable that they be recruited to the FMS, and not to a particular department of the faculty. Technical officers currently employed by the FHS may be trained in medical laboratory technology and may be useful, while it is also possible to provide short duration training in a medical school in the region.

3.2.2.3 Administrative staff

Since eight faculties have already been established in the MNU with an on-going administrative system, the management of a medical faculty will not be too arduous. The administration of a medical faculty would differ from that of other faculties in areas such as coordination of clinical appointments, organising patients for clinical examinations, and providing remuneration for patients used in examinations. In addition to being the administrative head, a medically qualified dean is required to be the academic head of the faculty. The dean should be an experienced academic, preferably with previous experience in a similar capacity. The other functions of a faculty like students registration, welfare, accounts could be performed by the central administration of the MNU as is the current practice for other faculties.

Minimal administrative staff are required for the medical faculty as the brunt of the administration at MNU is carried out from the central administration. However, it is advisable for the MNU to consider a senior assistant registrar/assistant registrar or equivalent, for the medical faculty. In addition to the normal duties associated with students as in other faculties the medical training requires additional administrative functions such as coordinating clinical attachments and maintaining records and coordinating with the extended clinical teaching staff in the hospitals. In

addition to the exam related functions that are carried out in other disciplines, in medical examinations there is a clinical component, which entails the patients in the hospital being used as exam material and this, too, requires coordination, transport and payment. It may also be needed to have an assistant bursa or some accounts department staff

3.2.2.4 Technical officers

Initially the pre-clinical departments will need to recruit technical officers who are qualified and experienced. Ultimately, each department can have 03 or 04 technical officers of which at least two ought to be knowledgeable, trained and experienced in the relevant areas of medical laboratory technology (MLT). They will ideally be BSc (biology) graduates with a post graduate diploma or advanced certificate and training in MLT. In addition there can be trainee technical officers who can gain experience by working with the others and get a training in a nearby overseas institution. The technical officers would also require a specialised training relevant to the department they are working in and any specialised areas required. Other post graduate courses, trainings or certificates will be an added advantage. The skills laboratory should be managed by a technical officer who is familiar and trained in the handling and maintenance of mannequins. The audio visual (AV), copying, and other equipment to be maintained by another officer while the E library and IT (information technology) equipment is handled by another. Another who is knowledgeable and experienced in maintain bio-medical equipment is preferable. These officers will preferably have a diploma in the relevant areas of expertise or have experience in a similar capacity. They can be divided amongst the departments or be under the dean's office.

3.2.2.5 Clerical staff

The dean's office will require clerical staff to coordinate activities such as the academic programme, timetabling, examinations, student affairs, staff leave, medical education programmes as well as the committees such as ethical review, higher degrees, research etc. Therefore approximately 7-8 staff will be required. Each department may require 2-3 clerical staff.

3.2.2.6 Support staff

This will include clerical staff, laboratory attendants, labourers, drivers etc. No obstacles may be foreseen in this regard since they are presently employed in the established faculties of the MNU. Therefore, new recruitment or transfers within the system can be implemented. The support staff too, can be divided as per the clerical staff

3.3 Clinical training facilities

A significant concern affecting a decision to establish a medical school is the availability of hospital training facilities and an adequate number of patients. Patients cannot be purchased or obtained as required, unlike other facilities required for medical training. The main reason for non progression of proposals to establish medical schools is due to the lack of such facilities. Medical schools conduct their clinical training in state run hospitals, private hospitals and in the community. The type of clinical facilities available for training should include the very basics as well as the more advanced facilities in order to provide students with a range of learning experiences which would be useful. Further, the exposure to clinical facilities and training in different settings (eg metropolitan and rural areas)

Table 16: The requirement of technical staff

Department	No.	Qualifications and training
Dean's office	01	Training in handling and maintenance of mannequins and equipment in skills laboratory
	01	Qualification or experience in maintaining AV systems and other equipment
	01	Qualification or experience in maintaining IT systems
	01	BSc and experience in maintaining and repairing bio-medical equipment
Pre-clinical	02	BSc +/- MSc with training and diploma/certificate in MLT
	01	BSc or certificate in MLT or equivalent
Para-clinical	03	BSc +/- MSc with training and diploma/certificate in MLT
	01	BSc or certificate in MLT or equivalent
Clinical	02	BSc +/- MSc with training and diploma/certificate in MLT
	01	BSc or certificate in MLT or equivalent
	01	ECG/Echo/EEG/Radiology technician
Total	**15**	

would be equally important. Therefore, a few health care facilities in the Maldives, were evaluated to determine the suitability for clinical training. Of these the Indira Gandhi Memorial Hospital (IGMH) is the largest, and the only tertiary hospital in the country, and is situated in the capital, Male'. The other main hospital in Male' is ADK— a private hospital. Hithadhoo Hospital (in the South) and Kulhudhufushi (in the North) are regional hospitals. Hulhumale Hospital and Vilingili Hospital are situated in islands very close to Male›. The atoll hospitals or health posts were not visited.

3.4 Resources and facilities available for clinical training

3.4.1 Indira Gandhi Memorial Hospital

Information regarding the hospital was obtained from available statistics from the MoH, meetings with senior consultants and a guided tour of the hospital.

This tertiary care hospital has a capacity of 300 beds. The hospital has been instituted 18 years ago. The OPD caters to more than 250,000 patients per year from which approximately 14,000 are admitted for in-ward investigation and treatment. The bed occupancy is 77% with an average hospital stay of approximately 6 days.

The specialities like general surgery, general medicine, general paediatrics, obstetrics and gynaecology are well established. Sub specialities in cardiology, dermatology, orthopaedics, ophthalmology too are available. There are departments for anaesthesiology and radiology. A pulmonologist and a psychiatrist are available. Nephrology, respiratory medicine, paediatric neurology and cardio-thoracic surgical units have been planned. The services of a consultant microbiologist or a consultant Haematologist is not available.

The wards which are shared by several consultants in the same speciality, are fairly spacious and have cubicles assigned around a nursing station. The hospital has a well-equipped, ten bed intensive care unit with ventilators and a 20 bed neonatal intensive care unit. There are five operating theatres. Investigations like ECG, EEG, Echocardiogram, Exercise ECG, Holter monitoring are available but there is no cardiac catheterization laboratory. Upper and lower gastrointestinal endoscopy facilities, a dialysis unit and echocardiography are available. Radiology department has basic X-ray facilities, contrast X-ray facilities, ultrasound scanning and Computerized Tomography (CT) scanning. This is the only hospital in the government sector which has CT scanner. There is a well-equipped laboratory with facilities for haematological, biochemical and microbiological tests.

Table 17: Patient numbers and bed occupancy in Indira Gandhi Memorial Hospital, 2006-2012

Type	2006	2007	2008	2009	2010	2011	2012
Out-patients	-	-	-	-	-	284462	268237
In-patients	13,455	12,488	14,041	13,752	13,568	13,996	13,935
In-patient Days	72,231	69,645	80,768	80,377	79,813	81,674	79,657
Average Duration of Stay	5.4	5.6	5.8	5.8	5.9	5.8	5.7
Average Occupancy Ratio	83.5	74.8	84.5	84.4	80.7	82.6	76.8

Table 18: Patients by type of surgical intervention in IGMH, 2004 – 2012

Type of operation	2004	2005	2006	2007	2008	2009	2010	2011	2012
All Parts	4,164	4,337	4,591	4,750	5,581	5,518	5,229	5,321	5,484
Anaesthesia	-	-	-	3	3	-	-	8	26
Cardiology	-	-	-	1	-	-	-	1	-
Dental	-	-	-	2	5	2	17	13	7
E.N.T.	419	363	437	425	507	328	252	270	280
Eye	324	282	337	361	434	435	433	322	310
Orthopaedic	333	425	641	658	956	982	980	1,166	1,092
Gynaecology*	1,174	1,275	1,229	1,307	1,459	1,585	1,380	1,451	1,376
General surgery	1,594	1,642	1,579	1,849	2,059	2,056	2,119	1,977	2,288
Urology	110	176	153	132	143	126	45	91	105
Plastic surgery	42	6	26	-	-	-	-	-	-
Neurology	7	20	20	12	15	4	3	22	-
Laparoscopy	161	148	169	-	-	-	-	-	-
Dermatology	-	-	-	-	-	-	-	-	-

* Of the 3023 deliveries in 2013, 1207 were delivered by caesarean section.

Histopathology and cytology services are provided by two consultant Pathologists. Blood transfusion facilities are available but component separation has not been well established. There appear to be plans to expand these services in the near future.

The IGMH being the main hospital in the Maldives is overburdened with patients. This institution not only accepts referrals, but is also a first contact facility for patients. The emergency department is organised according to the triage system with three zones and is managed by two consultant physicians. The patient load and the occupancy of IGMH is given in Table 17 and the surgical interventions in table 18. The in-patient and out-patient according to the morbidity is given in Annexure 05.

According to the "Guidelines and specifications on standards and criteria for accreditation of medical schools in Sri Lanka" by the Sri Lanka Medical Council (2011)16, for an intake of 100 students the teaching hospitals should have 700 beds with an occupancy of 80% which works out to 5.6 patients per student. According to the "accreditation standards for the MBBS" by the MMC14, for 50 students the student: hospital bed ratio ought to be 1:6 with an occupancy of 70% which works out to 4.2 patients per student. IGMH being a tertiary care hospital with a bed capacity of 300 and occupancy of 77% can cater to a medical school which has an annual intake of 50. The MMC guidelines require a minimum of 180 OPD patients a day for annual intake of 50 students. IGMH caters to almost 700 a day. Therefore, the number of patients, both OPD and in-ward, required by both the guidelines for a batch of 30 is fulfilled by IGMH alone. Further, the number is adequate for a batch of 50 according to the MMC guidelines. The clinical workload as given in tables 17 and 18 are substantial and will form the backbone of clinical training of a local medical school.

According to the above SLMC guidelines, 60% of the hospital beds are to be shared by the 4 basic specialities (66% according to the MMC guidelines) and the balance 40% by the other specialities such as orthopaedics, psychiatry, eye, ENT, dermatology, cardiology, neurology, urology, neurosurgery (3.5% each), paediatric surgery, cardio thoracic surgery (2.8% each) and ICU (1.4%). In addition to the above, the MMC guidelines require specialists in dental surgery and emergency medicine. All the basic specialties and some of the other specialties, including emergency medicine, are available at IGMH. Currently, IGMH lack specialists in ENT, neurology, urology, neurosurgery and paediatric surgery.

According to the above SLMC guidelines, there should be a minimum of three operating theatres and radiological facilities should include USS, Doppler and access to CT/MRI. The MMC guidelines have not specified the requirements. IGMH has five theatres, and the required radiological facilities except for MRI. Both SLMC and MMC require 5 ICU beds for 50 students. IGMH have a 10 bed ICU. Therefore, if the clinical teaching is to be done in both IGMH and ADK, the required OT, Radiological and ICU facilities are currently available.

As per the diagnostic facilities, the SLMC guidelines require trained personnel in histopathology, haematology, bio-chemistry and clinical microbiology. The lab at IGMH does about 800-1000 investigations per day under three specialist pathologists (two consultant histo-pathologists and one clinical bio-chemist) with trained technicians conducting all of the above diagnostic investigations. IGMH lack a microbiologist. In addition, the FDA have a qualified senior micro-biologist who is happy to assist in the training of medical students. Therefore, IGMH alone has the laboratory facilities required except for a microbiologist.

Both guidelines require training for the students in forensic medicine and community medicine. However the required forensic medicine services for training is currently not available. Currently autopsies are not conducted in Maldives. Although clinical forensic medicine services are being provided by the treating medical officers. The lack of facilities and trained personnel could be addressed by constructing an autopsy suite, ideally, at IGMH. If not, a possible location would be the police directorate since they are the investigative officers and beneficiaries of the service. In addition the examination of the clinical cases need to be streamlined and ideally be done under a specialist in forensic medicine.

Both guidelines require training for the students in community medicine. There is a public health system in operation in Maldives. However, there is a lack of specialists in community medicine/public health. Currently, there is a non specialist medical doctor in the department of public health who is willing to contribute to the medical teaching. However, a specialist in public health is required and a community health region needs to be identified for field training. Therefore, the required community medicine services for training is currently not available.

3.4.2 ADK Hospital

During discussions with the managing director, chief medical officer and other senior staff of ADK hospital (private), it was intimated that the hospital will support the medical faculty and were happy to provide patients and facilities for teaching of students. ADK has 68 beds with an occupancy of 86-87%. They are staffed with 60 doctors of which about 50% are specialists. Of the specialists 70% are expatriates who usually work for 2–4 years. Of the non-specialists, 90% are Maldivian. They work 8 hours/day on 6 days/week. There are 140 nurses of which 60% are expatriates. They are one of two referral centers in the Maldives. They possess two operating theatres, Accident & Emergency (A & E) unit, a fully equipped laboratory, a cardiac (non interventional) and respiratory medicine unit, nephrology and dialysis unit. A specialist OPD clinic, an ICU and a neonatal ICU are available. Three to five specialists are available in each of the basic specialties such as general surgery, general medicine, paediatrics, dermatology, anaesthesia, obstetrics and gynaecology. In addition, there are specialists in the other specialties such as otorhinolaryngology, ophthalmology, orthopaedics, urology and neurology. Importantly, they have two ENT specialists, a urologist, a microbiologist and neurologist who are not available at IGMH. The three subjects of ENT urology, neurology comprise about 10% of the clinical rotation as per the requirement of the SLMC and the MMC. The specialists at ADK could be used for training by getting them as external lecturers and also during the clinical rotation in the ward. The radiology department provides services such as CT, MRI, mammography, bone densitometry, plain X-ray and ultrasound scanning. ADK is the only hospital in the Maldives which has a MRI scanner. The hospital maintains service in pathology, haematology and microbiology with a consultant microbiologist. The pathology service consists of cytology and basic histopathology. However, no immunohistochemistry is currently being done.

An expansion project consisting of 80 beds, 3 theatres, catheterisation laboratory and an ICU is planned, while there is a prospect of initiating interventional procedures, transplantation and open heart surgery. Since of late, elective students have been accepted from the UK and China (Maldivian students training in China).

The administration of ADK is happy to provide facilities for teaching and is confident that the consultants and patients will be co-operative. If ADK is affiliated as a teaching hospital, ADK will benefit by the glory that a hospital acquires when designated as a teaching hospital. Students would benefit by the greater exposure from training in a private hospital under different specialists. Therefore, including ADK as a teaching hospital is suggested.

3.4.3 Hulhumale Hospital

Information about the hospital was obtained from the MoH statistics and a visit to the hospital. The hospital is situated in a rapidly developing planned city (current population ~ 35,000) on a beautifully landscaped island 20 minutes away from Male' by ferry, and with access to the airport by road. The hospital is a new, modern, well maintained 61 bed hospital However due to the close proximity to Male' most of the patients by-pass this hospital and proceed to Male'. Even though the OPD caters to about 100 patients a day (the MMC guide requires 180 patients), only 4 of them are admitted and stay for an average period of 4 days. Therefore, the bed occupancy is low at around 25% which means that at any given time there are likely to be only about 15 in-ward patients. This means that there will only be one patient for two students which is not satisfactory.

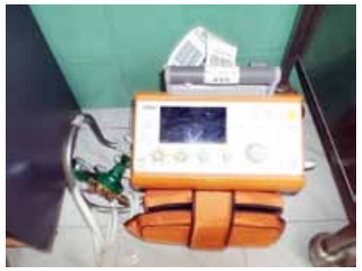
About 75 deliveries take place annually, of which about 30% is by caesarean section. Specialists are available in internal medicine, general surgery, paediatrics, obstetrics and gynaecology, anaesthesiology and dermatology.

Even though this hospital has a laboratory, digital and mobile X-ray, ultra sound scanning, an emergency department with five beds, a physiotherapy unit, and a hemo dialysis unit, these are greatly underutilised. Since there are eight specialists, teaching of the students can be done if the patient numbers are greater.

There is ample land for expansion, it has been proposed to add a new wing comprising another 62 beds, ICU, high dependency unit, neonatal ICU, nephrology unit and the purchase of new laboratory equipment by mid-2015. However, that will not be of benefit if the patients continue to by-pass this hospital. Therefore, we recommend that the new wing be established as a professorial unit of the MNU and be staffed by the university academics. This unit should comprise one ward each of medicine, surgery, O&G, paediatrics and psychiatry. The private sub-speciality private hospital which is to be set up in Hulhumale, may also be used for some clinical appointments in the future. It is envisaged that the prestige associated with a university hospital and the recognition of a care given by academics will increase the patient numbers. Since during the final year the students spend most of their time in the professorial unit, it is also suggested to build the student hostel at Hulhumale. The proposed

Hulhumale'

Four-bed dialysis unit at Hulhumale' Hospital



Hithadhoo Regional Hospital — ICU with ventilators and portable ventilator

bridge between Male' and Hulhumale' will make land travel an option, especially when the sea is rough.

3.4.4 Hithadhoo Regional Hospital

Information about the hospital was obtained from the MoH statistics and a visit to the hospital.

Hithadhoo hospital is located in Addu Atoll and is one hour by air from Male. The population of the Addu atoll is approximately 30,000. The hospital has 10 specialists including an ENT surgeon, dermatologist, ophthalmologist, radiologist, paediatrician, anaesthetist, orthopedician, and chest physician, 10 medical officers and two dentists. There is an ICU, NICU, two bed dialysis unit and the OT is being upgraded. An automated laboratory, digital X-ray facility and USS are available. There is no blood bank.

Currently, the hospital has a total of 89 beds of which 57 are for in-patients. In order to upgrade the facilities, 10 million MVR has been allocated for 2015, and a further 20 million USD has been allocated to develop and purchase equipment for a 50 bed wing. It is expected that by 2017 the bed strength will be 100 with the addition of CT scanning.

This is the busiest hospital in the Maldives for road traffic injuries (about 3/day) since there is a long causeway joining up several islands. Around 50,000 patients are seen annually on an outpatient basis (about 140/day). About 10 patients are admitted daily with an average hospital stay of 3 days. The bed occupancy is around 75% (annexure 07).

The administration and medical personnel are amenable to training medical undergraduates, including training in obstetrics and gynaecology, against the general belief that culture in Maldives is not conducive for using O&G patients for training. They envisaged no reasons for refusal to consent for examination, assist in deliveries, assist in surgical procedures such as suturing, passing tubes, etc. The fact that the community had been appreciative of the services of medical students from Australia who were doing elective appointments in this hospital further supports this opinion. This hospital may be used for peripheral posting to gain experience in several fields concurrently such as maternity care and field work in community medicine (which is apparently acceptable in Addu Atoll).

Since the most number of road traffic injuries in Maldives is seen in this hospital, it is highly desirable that the students do an appointment here so that they get an opportunity of seeing these patients, whom they may not see anywhere else in Maldives.

Kulhudhuffushi Regional Hospital — Dialysis unit

Kulhudhuffushi Regional Hospital — Lab

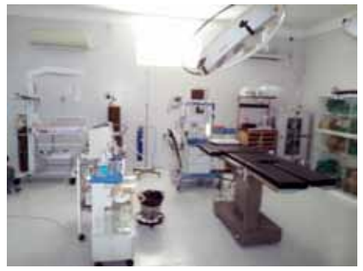
3.4.5 Kulhudufushi Regional Hospital

Information about the hospital was obtained from the MoH statistics and a visit to the hospital. This is another regional hospital located north of Male in the Haa Dhaalu Atoll and is about one hour by air and another 25 minutes by boat. The population of this atoll is around 24,000 while that of Kulhudhufushi is about 10,000.

The hospital has new buildings and a pleasant ambience. The bed strength is 72 of which 52 are for in-patients. Almost 60000 patients are seen annually on an outpatient basis. About 10 patients are admitted every day with a bed occupancy of around 50% which means at a given time there will be an average of 25 patients (see Annexure 08).

The hospital has facilities such as emergency care unit, paediatric wards, medical, surgical and obstetrics. The hospital has 13 specialists including physician, surgeon, obstetrician, paediatrician, psychiatrist, anaesthetist an ENT surgeon, dermatologist, ophthalmologist, radiologist, eight medical officers and two dentists. The consultant staff of the hospital are expatriates.

An automated laboratory facilities, ultrasound scanning and X-ray facilities are available. The ICU comprises four beds with the capacity to ventilate two patients. The physiotherapy unit has three beds, the dialysis unit has four beds, while the NICU can accommodate 8 babies at one time (3 warmers, 3 cots and 2 incubators), and also have one ventilator. There is an OT and a three bed labour room.



Kulhudhuffushi Regional Hospital OT

3.4.6 Vilingili Hospital

Information about the hospital was obtained from a visit to the hospital. This is a small 10 bed hospital located close to Male.

This is 10-bed, 6-doctor facility catering to a community of approximately 16000 people. The OPD serves about 100–150 patients/day with an occasional admission. Specialists in paediatrics and orthopaedics visit the hospital 1–3 times a week. The haematological, biochemical, some serological and microbiological investigations in blood, urine and stools are performed. In addition, liver, cardiac, lipid, bone and renal profiles are done. There is an ambulance. The community health worker of the hospital interacts with community by way of health education. This hospital which has features of a good general practice with some extra facilities, is a very good model for training in general practice.

Kulhudhuffushi Regional Hospital – NICU

3.4.7 Facilities for radiology training in hospitals

IGMH, ADK, Hulhumale, Hithadhoo and Kulhudhufushi hospitals have digital imaging facilities and USS facilities. In addition CT and doppler is available in ADK and IGMH. MRI is available at ADK. CT will be available at Hithadhoo in 2017. According to the SLMC guidelines, radiological facilities should include USS, Doppler and access to CT/MRI. The MMC guidelines have not specified the requirements. IGMH has the required radiological facilities except for MRI. The other hospital all have the basic radiological facilities required.

Viligili Hospital – ward

Viligili Hospital – Lab

Hulhumale' Hospital – radiology department

Hithadhoo Regional Hospital – radiology department

3.4.8 Overview of the facilities available in the major hospitals

The group of major hospitals available in Male and other islands have sufficient bed strength and all general specialist facilities required for medical training. The required bed strength in an appropriate setting is indicated in the guidelines of the Maldives Medical Council (Student: Hospital bed ratio 1:6). The IGMH has a strength of 300 beds, Hulhumale 61 beds and other regional hospitals, approximately, 50 beds each.

In medical curricula, to achieve appropriates kills and competencies the students are expected to experience different clinical settings during the clinical years. In the Maldives this could be achieved by the inclusion of IGMH, Hulhumale and regional hospitals like Hithadhoo and Kulhudhufushi in the training of students. Students would also benefit from exposure to the setting at the ADK hospital for specific requirements.

The numbers of patients in different categories and the type of procedures which should be performed in a hospital which caters to teaching needs are not described in the medical council guidelines of many countries. However, the skills and competencies which need to be acquired by students are available in the SLMC and MMC guidelines.

Several facts were brought forth in the argument against the establishment of a local training institution. One argument was that the Maldives lacks adequate numbers and variety of patients required for medical training, since patients go to countries like Sri Lanka and India for medical treatment. However, the statistics shown above indicate that the numbers are more than adequate. It is also envisaged that the number of patients seeking treatment outside the Maldives is likely to decline with the establishment of a medical school within the country. It has also been argued that certain disease conditions are not present in Maldives. In spite of the fact that one could argue that there is no relevance of these diseases to students, if they are absent in the local environment, a counter argument may be raised as to the relevance since Maldives is a tourist destination (e.g., Malaria is not indigenous in origin now in the Maldives but an important disease to know due to tourism).

Many medical schools have introduced elective rotations either in their own country/region or overseas to address aspects of training which are not achievable in their own setting. This requirement is generally determined by examining the goals of the medical school curriculum and the opportunities available for training in the local setting. Therefore, if the MNU establishes a medical school an elective clinical rotation in a neighbouring country for a given time duration will provide the students the exposure which may not be available in the local environment.

3.5 Location of teaching and training facilities

The first two years (or so) of a traditional medical program comprise of classroom and laboratory based teaching with little hospital based clinical training. Therefore, the physical location of training for these two years is independent of the availability of a teaching hospital in close proximity. However, a hospital where students can gain clinical exposure with a specialist is required in the subsequent three years. Since university academics, too, have to carry out the service function (treating patients under their care) and conduct ward teaching for students, a hospital in close proximity to the medical faculty is preferable. This requirement is further compounded by the fact that the university clinical staff may need to attend to emergencies occurring in the hospital. This underscores the importance of the proposal to locate the medical faculty in close proximity to the main hospital/hospitals where the training is to be done. Therefore, a suggestion was made to the MNU administration that until the MNU constructs buildings to house the medical faculty (which is required) the first two intakes of students be accommodated on one floor of the FHS building.

Paraclinical departments may require teaching facilities in hospitals. For example, forensic medicine teaching requires clinical patients as well as the deaths that occur in the hospital, pathology, microbiology and parasitology investigations are done on the samples taken from the patients in hospital. Clinical departments require clinical teaching facilities from collaborating hospitals.

3.6 Conclusion

The FHS has a very large, well equipped skills laboratory (nursing art laboratory), an anatomy laboratory and histology and microbiology (medical laboratory), each with adequate floor space and equipment like microscopes. They are adequate to accommodate the practical classes for an intake of 30 medical students on sharing basis if FMS to be started soon.

As far as the clinical training facilities are concerned, taking into consideration the physical infrastructure, equipment, human resources and patient load of the above health care institutions, it is apparent that most of the requirements, as per both SLMC and MMC are available in Male'. If all the above hospitals are taken into consideration, collectively there will be about 1000 patients per day in the OPD's. Some aspects that are lacking as mentioned above need to be addressed before the first intake complete their 2nd year. Specifically, these include training in community medicine and forensic medicine and training in some super specialties. If required certain clinical appointments (rotations) can be done in the units of the affiliated university overseas. Therefore, it is recommended the medical school ought to be located in Male' and that most of the clinical rotations in the 3rd and 4th years be done at IGMH and some at ADK. Peripheral appointments may be done in Hithadhoo and Kulhudufushi. In addition short appointments for specific purposes, such as Community medicine field appointment, Traffic medicine, some obstetrics etc. to be done in Hithadhoo and general practice in Vilingili. The professorial appointments to be done in Hulhumale and to facilitate this, the new wing of the hospital to be the professorial unit. In addition, a student hostel needs to be built in Hulhumale'.

Sri Lankan Medical Council requires all medical schools to have museums of specimens. The Peradeniya museum is particularly large.

Chapter 4

Risks and Challenges

4.1 Introduction

For successful completion of a project of the nature envisaged it is prudent to examine the risks, and challenges to take appropriate measures in advance. For this purpose discussions were held with different stake holders including the political hierarchy of the country (see annexure 01 - list of meetings).

4.2 Evaluation of the external environment

4.2.1 MNU administration

Discussions with MNU decision makers revealed that the MNU had identified the need to produce Maldivian doctors and specialists to serve the needs of the country and was strongly committed to exploring the possibility of establishing a medical faculty of high standard in the Maldives. The University being an autonomous organization is able to make independent decisions and is prepared to secure funds for the purpose. However, the MNU will have to ensure that this remains a priority for the next five years with a large proportion of its budget allocated to make this venture a success.

At present the courses conducted by the MNU are subsidized. The government funds 67% of the total budget of the MNU while the remainder is collected from the students. For sustenance of the medical training program without a major impact on other programs the MNU will have to explore different avenues. Options like instituting a system where students pay a higher percentage of medical training costs need to be considered seriously. It should also be borne in mind that although the cost of medical training is high so is the starting salary for the average physician. Considering this fact, the MNU/government may implement a loan scheme at concessionary rates on long term basis.

The MNU has clearly understood the importance of working with the health care system and is willing to do so. Failure to do so will be a significant hindrance to the progress of the proposed project. To this end appointing a coordinator from among the medical fraternity to help the MNU administration is a priority.

The MNU is willing to explore alternatives for providing facilities for medical training. That degree of flexibility in the initial stages is essential. The fact that the MNU has established a FHS and good facilities therein for training is noteworthy. The same facilities could be used for medical training since it appears that the FHS laboratories are not used to their full potential (the duration of semester studies is 28 weeks. Therefore, the laboratories are not used for 24 weeks of the year or used only partially to conduct examinations).

4.2.2 Political stability of the country

The constitution of the Maldives republic came into effect in 1968 and has been amended a few times subsequently. After several years of some uncertainty in the recent past the country is now stable and it is expected to remain so. However it is advisable that the MNU establish a medical school at the earliest opportunity when the country is stable, since once established, it is hoped that any unexpected political turmoil will have only a limited effect on continuation of a national venture like a medical faculty. This is not merely wishful thinking but based on observations made on the situation in neighbouring countries where even during the periods of political instability medical education has continued unabated.

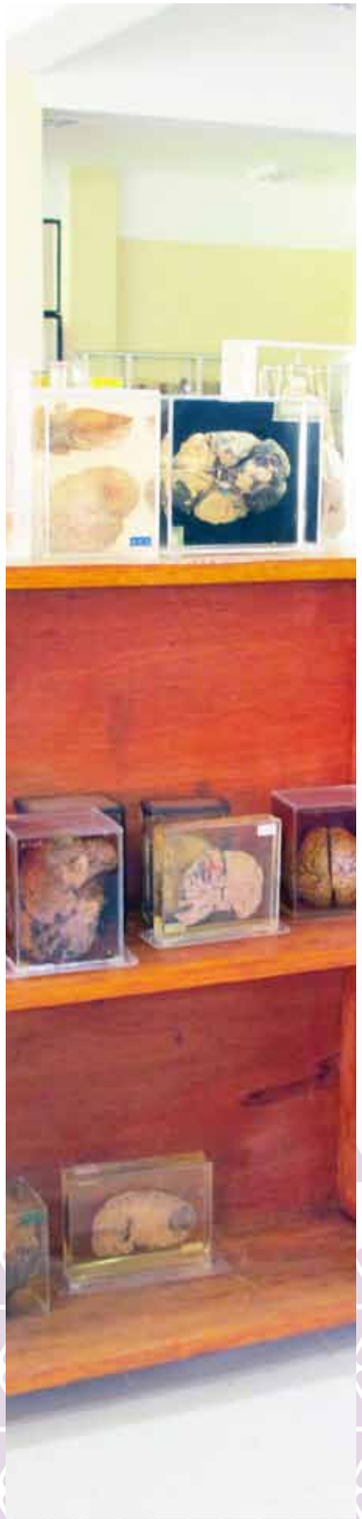
4.2.3 Economic stability of the country

Financial planning of such a project has to be meticulous considering the initial cost for infrastructure and recruiting academics (including from overseas). It is envisaged that the overseas contribution would dwindle during the first decade. The most expensive component of the medical school is the establishment and maintaining of clinical services of high standard. It is expected that the government would allocate funds for this (through the Ministry of Health, Ministry of Education, Foreign direct investment) since it is a basic requirement of a health system in any country even without the presence of a medical training program. The establishment of a medical school in turn is a catalyst to the improvement of health care.

The economy of the Maldives largely depends on tourism and the fishing industry. Tourism is subject to the world economic situation and many other factors (outbreaks of diseases, terrorism, etc). Maldives had a slight dip in the economy in 2012 due to the effect of recession in some strong economies but is progressing well. Interestingly, even during the world recession the per capita income in Maldives had remained highest in South Asia. In the unforeseen future, during an economic crisis having a functioning medical faculty is likely to be beneficial to the country more than during the stable times. Having a medical school producing doctors locally would help the economy of the country in crisis by saving foreign exchange. This is a result of students not only having to be trained abroad but the availability of locally produced doctors; thereby, importation of doctors becomes redundant. Therefore, there is a strong argument to support the notion of establishing a medical school at the earliest opportunity when the economy is sound.

4.2.4 The commitment of the government

The government will have to consider its ability to fund the establishment and maintenance of a medical school. In order to address this issue it would be prudent to consider the benefits of having a local medical school. They include, reducing the drain of foreign exchange on medical training, positive impact of a medical school on MNU and the country›s higher education, improvement of health care system disproportionate to the funds spent, establishing an internship program, saving of foreign exchange by less patients seeking treatment abroad and reducing the number of expatriate doctors, the positive effect on tourism, providing equitable health care to the nation, the FMS becoming the nucleus for postgraduate training programs and top-up programs, ability to earn foreign exchange by recruiting foreign students and eventually earning foreign exchange by exporting doctors. There is also a need to



enhance medical research in diseases and disease prevention specific to the Maldives. This can be accomplished by the staff of FMS who will explore these areas of research and contribute in no small measure to the improvement of health care. The pride that a medical school brings to the country boosts the concept of self-reliance and provides a platform for development and innovation in both the medical and non-medical sectors.

A sizable portion of the cost of medical training is required for establishing and maintaining patient care and hospitals. This expenditure on improvement of hospitals is currently borne by the Ministry of Health. The medical training will utilize the hospital facilities at little or no additional cost. In the event of the MNU building and maintaining its own hospital it will serve a dual purpose by addressing the health care needs of the country as well as by providing medical training facilities.

During consultations with the Hon Ministers of Education, Health, the Acting Minister for Health who is also the Minister of Defence and His Excellency the Vice President of the Maldives, the commitment of the government and the need for local medical training was expressed. They intimated that the medical school should be affiliated to an established overseas medical school and be of sufficient standard to attract foreign students as well. They requested information on financial implications of establishing medical school. It is clear that considerable commitment by the government is required especially in the initial stages. However, it is envisioned that once established, the need for government contribution would be minimal.

The Ministry of Health is aware of the benefits of a medical school and is committed to assist in its establishment. It is considered that both IGMH and Hulhumale hospitals could be utilised for major part of training. Further, there is a proposition for the 50 bed hospital at Hulhumale to be upgraded to a Multi-specialty tertiary care hospital with the addition of 50beds and units for chemotherapy, oncology and renal transplantation. The hospital in Guraidhoo Island could be used for training in psychiatry and geriatrics.

The commitment of the Ministry of Health is essential for successful establishment of medical training. Involvement of key figures of the Ministry of Health and the senior medical staff of the Hospitals in decision making would facilitate the process of finding solutions to existing problems. The need to train hospital staff in teaching methodology by giving them short term exposure on medical education/clinical teaching and assessment overseas is important. The Ministry of Health needs to consider a remuneration package and leave for fellowships for Ministry of Health doctors involved in teaching.

It is important to note that eventually the Ministry of Health would benefit from the Medical School by way of having more local doctors at a lesser cost than expatriates at a higher cost. It needs to be borne in mind that a medical school should not be established without adequate planning. Furthermore, the MNU should not be requested by the civil society or the political establishment to admit large numbers of students before the MNU is ready to do so.

4.2.5 Ministry of Education

It is the responsibility of the higher education department of the ministry of education to provide opportunities to students for higher education. The presence of a Medical school would help fulfil this obligation. Discussion held with the high school students from Villa International School and CHSE revealed the enthusiasm of students to study medicine in the Maldives. Of the 800 students in Villa approximately 70% are studying in the science stream. Of approximately 600 students at CHSE 50% are studying science subjects. However, very few can afford the high cost of medical training overseas (approx. MVR 250,000/year) and some parents are reluctant to send their children overseas.

At present the Ministry of Education provides funds to students for medical training overseas. The ministry comprehends the benefits of local medical education and the need to provide funds to the MNU to establish a medical school. Furthermore, creating provision for admitting some students based on a quota system, for underprivileged areas in Maldives is considered as a remedial measure to prevent inequalities in the distribution of funds and facilities across the Maldives. After the establishment phase of the FMS the higher education department would assume a peripheral and limited role other than to ensure that standards are maintained.

4.2.6 Some negative feelings of the stakeholders

Although the concept of establishing a medical school in the Maldives had been mooted on a few occasions, none has proceeded even as far as a serious feasibility study. The last discussion of stake holders on the subject of establishing a medical school and a hospital had been held in 2009/10 as a possible public private partnership. In 2011, the Maldives Medical Council with the assistance of a consultant from Nepal developed criteria for accreditation of a medical school locally.

The general ‹perceptions› of stake holders on obstacles in establishing a medical school in the Maldives can be summarized as below.

1. High cost.
2. Uncertainty of long term sustainability.
3. Inadequate number, variety and distribution of patients.
4. The clinical staff in hospitals have not been trained and lack experience in teaching.
5. Lack of facilities in hospitals.
6. Lack of confidence of stakeholders to accept the challenge.
7. The concern that the public may not accept locally groomed physicians as adequately trained and skilled.
8. Easily available treatment facilities for patients in neighbouring countries (Sri Lanka and India) which results in loss of ‹interesting› or ‘teaching material’ patients.
9. The concern that Maldivian patients may not like to be ‹used› for training purposes.
10. Unavailability of human bodies for dissection (e.g., teaching/ learning of anatomy).
11. Lack of a local mechanism to maintain standards of medical education and possible non-adherence /interference to such a mechanism.
12. Since the Maldives imports almost everything, medical education need not be an exception (Although this was not explicitly mentioned by anybody, it was the feeling that we got).

Most of above are mere perceptions and not evidence based facts. However, these perceptions need to be addressed to change the disposition of key stake holders. For this purpose it is necessary for the MNU to demonstrate that adequate facilities and funds are available and that appropriate mechanisms are in place to maintain quality. Reluctance of stake holders to collaborate and to examine the different options available will be a key factor for failure. Therefore, the MNU should function as the nucleus for all stake holders from the inception. Sharing of available human and material

resources in the government sector, private sector and other organizations is mandatory for successful implementation. Even though it is naïve to have unrealistic expectation especially at the inception, it is necessary to work towards a high end common goal. It is imperative that the Maldives establish a Faculty of Medical Sciences of comparable standards to those in the region, thereby gaining access for postgraduate training abroad. Furthermore, it is necessary to strive for accreditation/recognition by international bodies like the General Medical Council, UK and being recognised by the WHO.

The success of MNU's teaching model will depend on the establishment of mutually beneficial affiliations and partnerships with the stake holders, hospitals, Ministry of Health and an established medical faculty of a foreign University. These affiliations and partnerships will be critical to offering students a broad range of experiences in the face of limited resources (especially human resources) available in the country.

4.2.7 Concerns raised on local training

Three concerns were raised taking into account local perspectives. They were the lack of human bodies for dissection, lack of confidence on locally trained graduates and reluctance of patients to be 'used' as training material.

4.2.7.1 Body donation

There is no law in Maldives preventing donation of bodies for dissection and training. Establishing eventually an anatomy dissection facility will be an accomplishment and help to be self-sufficient. There may be Maldivian citizens who would like to donate their bodies, like a school student who said that she would do so. One step towards inaugurating a body donation program would be to establish a forensic medicine service and post mortem examination in the Maldives. The aversion people currently have towards handling of human bodies may diminish thereafter. It is noted that in Pakistan, a predominantly Muslim country, autopsies are conducted regularly as part of the teaching programme.

4.2.7.2 Acceptance of locally trained graduates

If people perceive that local training is of high standard it is unlikely that patients will not be confident of locally trained doctors. In this regard it is necessary to be cognisant of the fact that foreign trained expatriate doctors are not necessarily considered by the Maldivians as 'better' than Maldivian student strained abroad. There appears to be a growing concern that the training imparted in some medical schools is not sufficient to practice safe medicine in the Maldives. Additionally, MMC is interested in conducting examinations of new MBBS graduates from overseas institutions because MMC has had misgivings about the training and the institutes which train them. A local institution supervised and licensed by MMC for MBBS training would be quality assured.

4.2.7.3 Perception of patients

The FHS has not experienced any reluctance by patients to being used for training purposes. In fact, it may be assumed that patients feel that they are in a better environment with adequate facilities for advanced treatment, etc. in a Medical Faculty. It is the responsibility of the specialists, MNU and students to create an academic ambience which will help to cultivate an attitude of cooperation from patients. A strict code of practice for students would minimise mishaps and misunderstanding by patients. The

Forensic medicine is an integral part of the Sri Lankan Medical Curriculum.The consultants recommend that this subject be made compulsory.

positive experience gained by the ADK, a private hospital in training some elective students is exemplary.

4.2.8 Maldives Medical Council

The view of MMC is that subject specialists are required to teach the subjects in pre-clinical and para-clinical years. For example, an anatomist should teach anatomy, a physiologist should teach physiology, a bio chemist bio chemistry–not the clinicians. We find that some teaching, as happening in most medical schools, in these subjects could be shared between clinicians and non-clinicians. This will help the students from early years to understand the practical implication of what they learn.

The MMC is of the view that as there is no culture of teaching in the hospitals, teachers may be less experienced in teaching. Therefore, the clinical teachers should undergo some teacher training programs. The MMC feels that a medical school should be started with a small number, for example, with 25 students and with best practices. Maldivians should be part of the new medical school.

MMC has initiated a document on the accreditation of medical schools and standards required. The function of the MMC at present is to register the foreign qualified graduates without subjecting them for a licensing examination. It registers all students graduating from medical schools accepted by the Medical Council of that country. The MMC has initiated some activities to conduct a licensing examination in Maldives for foreign trained graduates. A question bank of MCQ's is being established. The MMC is of the view that if a medical faculty is to be established in Maldives then the MMC will look into maintaining standards with the help of a medical council in a neighbouring country. Currently there is an MOU between the governments of Maldives and Sri Lanka which will provide a platform for the two medical councils to work together15.

4.2.9 Views of the senior medical professionals

The consultants felt that it is pertinent to listen to the physicians who have practiced for a long period of time in Maldives and also who have had some exposure overseas, for their views. The consultants met ten senior physicians of whom some are still working in the government hospitals, others in private clinics and hospitals. The majority felt a medical school should be started and maintain good standards acceptable internationally. A twinning programme was suggested as a remedy to address the difficulties in the initial stages. They felt that a model of training specific to Maldives should be established taking into account the ground realities in Maldives with a lot of flexibility in the first five years. The long term aim should be to commence postgraduate training programs.

They raised concerns about the knowledge and skills of some of the graduates trained overseas who are currently practising in Maldives. They also mentioned that there are quacks practicing in Maldives. In fact, in 2014, the Minister of Health announced that some 40 "doctors" had been deported for failing to meet MMC registration.

4.3 Internship training

The internship training of medical graduates which is an essential extension of medical undergraduate training for Maldivian graduates has been taking place in other countries (e.g. Bangladesh). In addition, some graduates may have undergone internship training in the hospitals in the countries they have studied. All the other

countries in South Asia except Maldives have internship training program for medical graduates. Irrespective of establishing a medical school in the Maldives, a mechanism for local internship has now become a need to cater to foreign trained Maldivian medical graduates. This has not been seen as a major problem until recently as all this time the Maldives has depended on fully trained expatriate doctors who have completed internship training program in their own countries. Establishing and maintaining a quality internship program lay with the Health Authorities and MMC. During this process the medical councils and health authorities in turn gain the experience of training, supervising and registering medical graduates to practice medicine. The extended benefits of such experience helps to maintain a high quality service output from medical profession, at all levels.

Already steps have been taken by the Ministry of Health, with the help of WHO, to commence an internship program. This is pivotal for establishing a medical school as the training of medical graduates is considered to be complete only after the internship. Establishing an internship program creates an academic environment which has a collateral effect on medical education/training. Assistance from countries in the region in establishing internship program is available. The MOU signed recently between Sri Lanka and Maldives have specifically addressed the issue of supporting in establishing internship programmes and licensing exam for medical students/graduates in Maldives.

4.4 Paucity of medical postgraduate training programs and CPD programs

The lack of medical training programs and internship have adversely affected any postgraduate training programs being established in the Maldives. Access to postgraduate training programs in other countries by Maldivian doctors is limited due to the unavailability of slots, the difficulty of obtaining registration with medical councils in those countries, time away from home and also cost constraints.

Continuing Professional Development (CPD) programs in some disciplines are being conducted in the Maldives (e.g., in General Medicine at IGMH, clinical meetings at ADK). Conducting meaningful CPD programs partly depend on the availability of professional associations/clinical societies in medical specialities. There is a paucity of such organizations in Maldives. The currently available associations are limited to three. They are in orthopaedics, anaesthesia and in surgery. The latter was established only very recently.

The general impact of the professional associations/colleges due to the nature of activities they perform, fellowships they establish with overseas associations, direct interaction they make on reciprocal visits, all will have a catalytic effect on postgraduate training/CPD programs. All these activities will have a positive influence on the local undergraduate training programme.

Establishment of a medical school will facilitate the activities of medical associations, clinical societies and hospital based forums.

4.5. SWOT analysis

The main objective of the study is to determine the feasibility of medical training in Maldives. The mission would be to produce a well-trained medical graduate with a profile which is to be determined by MNU. Whether this task is possible depends on

a multitude of factors. Like in any new projects, therefore, it is important to consider strengths, weaknesses, opportunities and threats related to establishing medical training in the Maldives to ascertain whether the objective could be achieved.

The authors of this report have given some comments where appropriate and also how to mitigate the problems (conversion strategies) so that weaknesses or threats could be converted to strengths or opportunities.

4.5.1 Strengths

1. The current stability of the economy and political climate of the country.
2. High priority given by the government for higher education and health.
3. The presence of a functioning university which has academic and administrative independence. It has independence on spending.
4. The presence of a well-established Faculty of Health Sciences with its laboratories and human resources (academic staff are fairly fully occupied with current work).
5. The strong desire of the MNU, Ministry of Education and the Ministry of Health to start a medical school.
6. The need for more medical graduates trained locally to supplement the healthcare workforce (as estimated by WHO).
7. The availability of most of the clinical disciplines and specialists in the hospital sector (both government and private sectors) (but specialists are fairly busy).
8. The availability of retired specialists to conduct teaching sessions.
9. The plans by the MoH to develop hospitals in the Maldives.
10. The mandate given to the board of management of the IGMH to facilitate training of health professionals.
11. The health master plan for the Maldives in under preparation, by the Ministry of Health.
12. The easy access to Maldives for teachers from neighbouring countries to contribute to medical training.
13. The presence of a Medical Council in the Maldives and availability of accreditation standards for medical training program (but no experience in conducting licensing examination).
14. The MNU›s experience in using newer distance teaching modalities which could be used for medical training as well (This will help for conducting teaching sessions from overseas countries).
15. Availability of short term learning opportunities for students in nearby countries as electives. (The courses which are difficult to be taught due to lack of established facilities could be taught in Universities in nearby countries eg anatomy dissection, forensic medicine clinical appointment, management of cancer patients, etc.
16. The presence of agencies like WHO for technical advice and training.
17. The plans being developed to implement an internship program.

4.5.2 Weaknesses

1. The partial dependence of MNU on the government for funding.
2. Absence of human resources in several disciplines (Measures should be taken to appoint expatriates to the teaching staff and clinical staff. Adequate compensation package to be in place for being away from the home country).

3. Medical specialists lacking training in medical education, teaching and assessment methodology (Measures should be taken to train them in-house and also by exposing to an established medical school).
4. The high initial cost to establish a medical school.
5. The need of intense coordination in the initial phase.
6. Unavailability of purpose built physical resources. (building an independent purpose built medical training facility)
7. Lack of an internship program (the guidelines have been developed with the help of the WHO to start an internship program).
8. MNU lacking its own clinical training facility.
9. Lack of physical facilities in the hospitals to spare for students teaching activities.
10. Lack of certain laboratory equipment and tests.
11. The scarcity of a broad range of patients in one hospital (training in Male and regional hospitals will largely address this problem).
12. Patients with cancer, seeking treatment abroad so that clinical material for training is not available (Establishing a cancer treatment facility and training of existing doctors on cancer treatment, training surgeons on cancer surgery would mitigate this issue)
13. Negative attitude of certain individuals (keep them engaged).

4.5.3 Opportunities

1. To be able to contribute to the fulfilment of health care workforce in the country (therefore job opportunities are available).
2. To be able to recruit foreign students for training.
3. Make available more doctors for postgraduate training and specialization.
4. To provide doctors for the international market.
5. To contribute to international agencies by joining and holding positions in them.

4.5.4 Threats

1. Losing the cohesion and interest after the initial phase by the stakeholders.
2. Unexpected political and economic instability of MNU or in the Maldives.

4.6 The risks that the MNU is taking and assumptions and suggestions to mitigate them

The authors of this report assume that once a decision is taken to establish a medical school that the MNU and the Maldives government will continue to work for next six years intensively, giving it a high priority. Failure of the government or other agencies to fund the project will leave the MNU with an unmanageable burden. In that hypothetical situation the MNU will find it difficult to discontinue the project once the students have been enrolled. The resultant inertia among those involved in the project and training can lower the quality of medical training or lower the quality of other training programs or MNU could go bankrupt. Therefore, for the government and MNU should have some strategies to implement. In developing strategies it is useful to note that the country is spending about 100,000 USD/per student for medical training abroad. That money spent whether by government or students on training in foreign countries could be spent on the establishment of a medical school in the Maldives. Assuming that the cost of training is constant, if 100 doctors are produced in the Maldives the country would not have sent one million USD out of the country. This amount may be invested in the country itself in the initiation of the medical school. In 5-6 years this investment will start to yield results since the doctors produced, will gradually start replacing the expatriate doctors, resulting in a further reduction of money going out of the country. In addition to levying fees from the students it also is suggested that soft loans are given to the students, which may be paid back once they start earning.

Establishing medical training should be considered as a collective responsibility for which the medical profession in the country should become a strong stakeholder to support the leadership taken by MNU. The authors assume that the stake holders will consider the necessity of collective responsibility to make this a successful project. Clear understanding based on a central mechanism supported by necessary code/regulations is a requirement.

The Ministry of Health/MNU is expected to expand and improve the facilities of the hospitals and provide necessary academic environment for clinical training of undergraduates. The other reason for expansion of hospital facilities is for conducting internship training program.
MNU establishing a strong partnership with a foreign university for material, human resources and training is a must. The measures in place and compensation should be adequate to attract and retain foreign teachers until local expertise is developed.

4.7 MNU starting its own Medical School

The authors believe that the time is ripe to start a medical school. The fact that the health sector expansion is necessary and the same is envisaged by the government is clear. Many students are being sent abroad for training. The authors believe that spending that money locally will see graduates produced in adequate numbers and also the establishment of a medical school.

If the nation continues to send students abroad in large numbers, with time there will be a sense of adequate number of doctors in the country. Justification to start a medical school at a future time will be faint although more human resources will be available locally for such an endeavour. It will be an opportunity lost to the Maldives, and with it, all the associated benefits of having a medical school.

With experience and expertise the MNU has, the establishment of a medical school is not a difficult task. It has some facilities for training and some facilities should be improved. It may take up to approximately three years to construct adequate facilities under one roof, considering that in 2005 it has taken 2.5 years to construct the 7 storied FHS building. For conducting the training program foreign collaboration is required for material, training of staff, lecturers and human resources. In this model the MNU is expected to assume a significant responsibility of the development of infrastructure facilities and hiring human resources. The MNU will hire the human resources and pay for the material.

Another alternative would be a model where there is outsourcing of training, where the first intake of students would be provided with learning facilities in a collaborating (foreign) university for the first two years or so. It should preferably be done in a single university for logistical reasons. However, training in different universities which share a similar curriculum could be an option to consider.

Chapter 5

NEXT STEPS

5.1 Introduction

The feasibility of establishing a medical training facility in the Maldives has taken into consideration the financial, physical, human resource and clinical training needs of a medical training program. There is a need to produce Maldivian physicians and this is to be done preferably in Maldives with some elective training in a setting outside Maldives. MNU has the capacity to establish a medical school. The country has fairly adequate clinical facilities for medical training but need certain improvement of laboratory facilities, hospital facilities and human resources. Establishing these facilities and a medical school will have a long term beneficial effect on health care of the country. All the stake holders need to come to one platform to effect the suggestions made in this report.

In the initial ten years or so, there is a need for strong collaboration with a foreign university. This requirement will fade away gradually.

Subsequent to the feasibility report MNU will need to undertake an extensive plan for implementation. This will require the active involvement of all stakeholders – MNU, Ministry of Health, MMC, clinical staff - as this will be the first Faculty of Medicine in the country, and is likely to remain so for decades to come.

The key points should be to discuss the report by a road map committee and decide on one option and ratification of the same by the MNU. A strong confirmation on the financial commitment is a must based on a financial proposal. With the above provision satisfied, an implementation plan with a Gantt chart needs to be developed

5.2 The weakness and strengths of this study

While it is left for a critical evaluation of the feasibility study to be done by another party, the authors of the report would like to highlight the following:

1. A considerable time was spent assimilating views of stake holders which we felt has an educational impact on the stakeholders.
2. Key facilities which could be used for training medical students were visited.
3. Perusal of frontline statistics were done.
4. The ground realities in the Maldives were considered.

5.3 The key recommendations

1. It is feasible to establish a medical school in the Maldives.
2. It requires collaboration with an overseas medical school.

5.4 Sequence of sub events to be followed

The time line for the activities in the table below to be largely decided by the road map committee. The activities listed in the table need not be attended to in a sequential manner. There are several of them which should (and could) be started simultaneously.

Task	Activity	Resources/ Collaboration Needed	Expected Outcome	Anticipated Obstacles	Solutions/ Actions	Remarks
1. Analysis of report	Peruse by MNU	Chancellor, VC, Three DVCs, Dean FHS	Accept to proceed to the next step	Disagreement to implement or time line	Leave it for a decision later on	Interact with the consultants
	Discuss with road map committee	MNU senior management, Chairman Hospital Board, Two specialists, DGHS, Member form Finance Ministry Senior consultant, President MMC- responsible to the HE the President	Recommendation on a option	More agreement and also disagreement	Respect each other's view and continue to discuss	Two consultants may be called in for further clarification. This committee to be in operation until the first batch graduates.
	Develop an implementation plan	Road map committee	Develop an action plan	Uncertainty of the financial commitment	Proceed to the next step anyway	
	Discuss with financial authorities	Ministry of Finance, MNU, MOHG, MOE	Devise a system for fu	No funds could be made available	Defer the implementation, seek other options	Financial authorities will have to work with MNU to find all the options before taking a decision
2. Planning the Faculty	Establish an instrument and provisional management structure	MNU	Establishment of an coordinating office ano appointment of a coor from Maldives	No suitable coordinator	Seek help from outside	
	Establish a working relationship with an overseas university directly or through government to government initiative	Government of Maldives and a Foreign Government	MOU and a specific agreement with an ove university	Taking a decision without in depth understanding of contribution expected from both parties	Examine similar agreement reached elsewhere	
	Appointment of Heads for the departments and subject coordinators	MNU and partner university (PU)	At least heads for pre and para clinical depa and Coordinators for e subject are appointed both universities	No local expertise	Recruit recently retired medical specialists or import from the partner university	At this stage heads could be appointed on part time basis

Task	Activity	Resources/ Collaboration Needed	Expected Outcome	Anticipated Obstacles	Solutions/Actions	Remarks
2. Planning the Faculty (continued)	Allocate transitional space in MNU or elsewhere	Discuss with FHS, local and foreign coordinator	Office space for all departments, Deans office and some laboratories which needs to be established	No adequate space found	Rent office space for three-four years	If space could be found in FHS some facilities therein could be shared.
	Develop a Master plan for physical space	MNU	MMC to examine the master plan	MMC has not stipulated the accreditation process	MMC and MNU to agree to a process	The MNU has to have a plan
	Development of the curriculum	Coordinators and Heads	Acceptance of the curriculum by MMC, forward to MOE for quality assurance	Minor revisions may be required during implementation	Keep MMC informed of any change	Input from another Medical council may be required
	Human resources development	The Faculty of Medical Sciences (FMS)	Recruitment of technical and other staff and training them in the partner university	Not sufficient technical staff locally	Explore with the partner university	
		The Faculty of Medical Sciences	Recruitment and training the academic staff in the partner university	Not sufficient academic staff locally	Explore with the partner university	HR development is a long process and planning to be done accordingly
	Collect the teaching material required for first two years of training.	FMS and PU	MMC to give the eligibility certificate for the FMS to proceed	All the material may not be in place but in the procurement phase	MMC to take the procurement process in to consideration and grant approval to proceed.	Some material required for second year training could be given low priority
	Develop curriculum delivery plan	FMS and PU	A detailed chart to be ready almost like a time table	As the exact dates of first enrolment is not known this may be difficult	Have time periods on chart so when date is known can insert accordingly	To decide on a tentative date of commencement
	Find suitable accommodation for students and visiting academic staff	FMS and Central administration (CA), upgrading the existing facilities		Student hostel may not be ready	Students to find their own accommodation	Construct a hostel for 200 students

Task	Activity	Resources/ Collaboration Needed	Expected Outcome	Anticipated Obstacles	Solutions/Actions	Remarks
3. Commence academic program	Enrol the first batch	FMS, CA	Detailed time table for the first year should be in the web	Strict semester boundaries may be a hindrance	Redefine the semesters for the medical course by the academic senate	
	Monitoring, evaluation and modifying the implementation process	FMS	Criteria should be developed	Lack of expertise locally	PU to help	
4. Development of Physical facilities	Purpose built faculty	CA, FMS-funds, land and a swift process	The construction work should be started before enrolling the first student.	Lack of funds	Delay taking in the first batch	This building should be ready for occupation when the first batch enter the third year of training
	Improvement of teaching facilities at IGMH and other hospitals and the community	MOH/IGMH board	The MMC to agree with the improvements in place before starting the third year of training.	Lack of space and slow process	Delay taking in the third batch, the lectures and practical's to be taught in the first months of the third year and delay starting the clinical.	The process should be started with the development of physical space for the faculty in the planning stage
	Establishment of a new wing for the university clinical departments	MOH/MNU	The wing to be ready by the time the students enter the fourth year.	Lack of space at IGMH	Look for space in Hulhumale	MNU funding the construction of a new wing and the MOHG to fund the equipment..etc may an option.
	Construction of hostel for 200 students	MNU	The hostel to be ready by the time students enter the third year	Lack of space in Male	In a nearby Island	The hostel is ideally be located near where the final year training take place-if it is one hostel
5. Recruitment of Academic staff	Preclinical departments	FMS	The presence of heads and coordinators before enrolling the first batch	Lack of local expertise	Teaching to be done mainly by PU	
	Paraclinical departments	FMS	The presence of heads and coordinators before starting the third year	Lack of local expertise	Teaching to be done by PU and also hospital staff of MOH	

Task	Activity	Resources/ Collaboration Needed	Expected Outcome	Anticipated Obstacles	Solutions/Actions	Remarks
5. Recruitment of Academic staff (continued)	Clinical departments	FMS	The presence of heads and coordinators before starting the third year	Lack of local expertise	Teaching to be done by hospital staff of MOH with some input from PU	
6. Accreditation	MMC		Full Accreditation to be given in the middle of the final year			The MMC and FMS to work hand in hand
	Regional Medical councils	FMS and MMC	The MMC to keep the MCN-WHOSEAR in the loop from the beginning			
	Wider international recognition	Appoint a committee at an appropriate stage to work towards this (in the third year)				
7. Adjusting the partnership with the PU	Phase I	FMS and PU	Slow down the dependency for instructional component followed by assessment			To begin the process after the first batch graduates
	Phase II	FMS and PU	Establish links for research and academic exchange			This should be started from the beginning of the academic recruitment and build with time
8. Curriculum revision		FMS, PU and MMC				The documentation for this should be commenced with the first academic activity of the new faculty

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ANNEXURES

Annexure 1
List of meetings held and institutions visited

All the meetings and visits were attended by a senior member of the administration. Deputy Vice Chancellor, Mr Hussain Haleem accompanied consultants for all the meetings and where relevant, the Vice Chancellor and Chancellor too attended the meetings.

1. Visit to Maldives National University.
2. Meeting at the Faculty of Health Sciences with the Dean of the Faculty of Health Sciences and Heads of Departments.
3. Visit to ADK hospital and meeting with the Director.
4. Discussion with administration and senior consultants of IGMH.
5. Meeting with the Hon. Minister of Health and Director General of Health Services.
6. Visit to the Forensic Science Laboratory of the Police Department.
7. Meeting with Asst. commissioner of police and Head of the Forensic Directorate.
8. Meeting with the Hon. Minister of Education, the Deputy Minister and the Director General.
9. Meeting with advanced level students and staff from Villa International College and Centre for Higher Secondary Education.
10. Visit to Hulhumale hospital.
11. Tour of IGMH.
12. Meeting with senior consultants and staff of the Laboratories of IGMH and Food & Drug Authority.
13. Meeting with His Excellency the Vice President of Maldives.
14. Meeting with the members of the Maldivian Medical Association and Maldivian Medical Council.
15. Meeting with ten senior specialist doctors.
16. Visit to Hithadhoo campus, MNU.
17. Visit to Hithadhoo regional hospital.
18. Meeting with the Mayor and council of Addu.
19. Meeting with the Hon Minister of Defence and Acting Minister of Health.
20. Meeting with Chancellor, Vice Chancellor, deputy vice chancellors, Mr Haleem and Dr Ali Shareef.
21. Meeting with the medical director and five senior consultants of IGMH.
22. Meeting with the Board of Management of IGMH.
23. Visit to Vilingili Hospital.
24. Visit to maritime training centre of MNU.
25. Meeting with the managing director and administrative staff of ADK hospital.
26. Meeting with officials of the WHO.
27. A tour of the FHS.
28. Visit to Kulhudhufushi hospital and meeting with acting manager and consultants.

Annexure 2
Data relevant to Health Centres

Island population data from National Registration 2012

Region	No	Name of Health Centre	Level	Island Population
Haa Alif Atoll	1	Ha. Hoarafushi Health Center	1	3277
North Region	2	Ha. Ihavandhoo Health Center	1	2988
	3	Ha. Kealaa Health Center	1	2142
	4	Ha. Baarah Health Center	2	1847
	5	Ha. Uligam Health Center	3	495
	6	Ha. Thakandhoo Health Center	3	927
	7	Ha. Filladhoo Health Center	3	1040
	8	Ha. Thuraakunu Health Center	3	675
	9	Ha. Maarandhoo Health Center	3	949
	10	Ha. Utheem Health Center	3	880
	11	Ha. Vashafaru Health Center	3	870
	12	Ha. Muraidhoo Health Center	3	832
	13	Ha. Molhadhoo Health Center	4	382

Region	No	Name of Health Centre	Level	Island Population
Haa Dhaalu Atoll	1	Hdh. Hanimaadhoo Health Center	1	1885
North Region	2	Hdh. Nolhivaram Health Center	1	2423
	3	Hdh. Makunudhoo Health Center	2	1593
	4	Hdh. Vaikaradhoo Health Center	2	1814
	5	Hdh. Neykurendhoo Health Center	2	1338
	6	Hdh. Kumundhoo Health Center	3	1464
	7	Hdh. Nellaidhoo Health Center	3	1219
	8	Hdh. Nolhivaramfaru Health Center	3	1714
	9	Hdh. Naivaidhoo Health Center	3	806
	10	Hdh. Kurinbi Health Center	3	698
	11	Hdh. Hirimaradhoo Health Center	3	540
	12	Hdh. Finey Health Center	3	561

Region	No	Name of Health Centre	Level	Island Population
ShaviyaniAtoll	1	Sh. Milandhoo Health Center	1	2280
North Region	2	Sh. Komandoo Health Center	1	1794
	3	Sh. Kanditheemu Health Center	2	1410
	4	Sh. Foakaidhoo Health Center	2	1602
	5	Sh. Maaungoodhoo Health Center	3	1074
	6	Sh. Bileyfahi Health Center	3	659
	7	Sh. Feydhoo Health Center	3	1214
	8	Sh. Lhaimagu Health Center	3	800
	9	Sh. Feevah Health Center	3	1022
	10	Sh. Maroshi Health Center	3	931
	11	Sh. Noomaraa Health Center	3	449
	12	Sh. Narudhoo Health Center	3	564
	13	Sh. Goidhoo Health Center	3	704

Region	No	Name of Health Centre	Level	Island Population
Noonu Atoll	1	N. Velidhoo Health Center	1	2500
North Central Region	2	N. Holhudhoo Health Center	1	2143
	3	N. Kendhikulhudhoo Health Center	2	1738
	4	N. Landhoo Health Center	3	978
	5	N. Maalhendhoo Health Center	3	856
	6	N. Lhohi Health Center	3	876
	7	N. Maafaru Health Center	3	1136
	8	N. Miladhoo Health Center	3	1437
	9	N. Kudafari Health Center	3	798
	10	N. Henbaidhoo Health Center	3	707

Region	No	Name of Health Centre	Level	Island Population
Raa Atoll	1	R. Alifushi Health Center	1	2589
North Central Region	2	R. Dhuvaafaru Health Center	1	4368
	3	R. Maduvvari Health Center	2	2208
	4	R. Hulhudhuffaaru Health Center	2	1400
	5	R. Meedhoo Health Center	2	1955
	6	R. Inguraidhoo Health Center	2	1799
	7	R. Maakurath Health Center	3	1209
	8	R. Rasgetheemu Health Center	3	960
	9	R. Innamaadhoo Health Center	3	798
	10	R. Rasmaadhoo Health Center	3	843
	11	R. Vaadhoo Health Center	3	541

Region	No	Name of Health Centre	Level	Island Population
Baa Atoll	1	B. Thulhaadhoo Health Center	1	2795
North Central Region	2	B. Hithaadhoo Health Center	2	1284
	3	B. Dharavandhoo Health Center	2	1058
	4	B. Kendhoo Health Center	3	1176
	5	B. Goidhoo Health Center	3	748
	6	B. Kudarikilu Health Center	4	587
	7	B. Maalhos Health Center	4	627

Region	No	Name of Health Centre	Level	Island Population
Lhaviyani Atoll	1	Lh. Hinnavaru Health Center	1	4676
North Central Region	2	Lh. Kurendhoo Health Center	2	1945
	3	Lh. Olhuvelifushi Health Center	3	631
	4	Lh. Maafilaafushi Health Center	4	

Region	No	Name of Health Centre	Level	Island Population
Kaafu Atoll	1	K. Kaashidhoo Health Center	1	2243
Central Region	2	K. Thulusdhoo Health Center	1	1357
	3	K. Himmafushi Health Center	2	1003
	4	K. Maafushi Health Center	2	1555
	5	K. Guraidhoo Health Center	2	1764
	6	K. Gaafaru Health Center	3	1291
	7	K. Dhiffushi Health Center	3	1196
	8	K. Gulhi Health Center	3	863
	9	K. Huraa Health Center	3	952

Region	No	Name of Health Centre	Level	Island Population
Alifu Alifu Atoll	1	AA. Thoddoo Health Center	2	1735
Central Region	2	Aa. Feridhoo Health Center	3	756
	3	Aa. Ukulhas Health Center	3	943
	4	Aa. Mathiveri Health Center	3	842
	5	Aa. Himandhoo Health Center	3	729
	6	Aa. Maalhos Health Center	3	680
	7	Aa. Bodufulhadhoo Health Center	-	715

Region	No	Name of Health Centre	Level	Island Population
Alifu Dhaalu Atoll	1	Adh. Maamingili Health Center	1	2639
Central Region	2	Adh. Dhigurah Health Center	3	608
	3	Adh. Hangnaameedhoo Health Center	3	673
	4	Adh. Dhangethi Health Center	3	956
	5	Adh. Fenfushi Health Center	3	918
	6	Adh. Omadhoo Health Center	3	964
	7	Adh. Kuburudhoo Health Center	4	580

Region	No	Name of Health Centre	Level	Island Population
Vaavu Atoll	1	V. Keyodhoo Health Center	3	790

Region	No	Name of Health Centre	Level	Island Population
Meemu Atoll	1	M. Kolhufushi Health Center	2	1390
South Central Region	2	M. Dhiggaru Health Center	2	1306
	3	M. Mulah Health Center	2	1672
	4	M. Maduvvari Health Center	3	712

Region	No	Name of Health Centre	Level	Island Population
Faafu Atoll	1	F. Magoodhoo Health Center	2	744
South Central Region	2	F. Bileydhoo Health Center	2	1307
	3	F. Feeali Health Center	3	1142

Region	No	Name of Health Centre	Level	Island Population
Dhaalu Atoll	1	Dh. Meedhoo Health Center	2	1293
South Central Region	2	Dh. Hulhudheli Health Center	3	846
	3	Dh. Bandidhoo Health Center	3	907
	4	Dh. Maaemboodhoo Health Center	3	945

Region	No	Name of Health Centre	Level	Island Population
Thaa Atoll	1	Th. Guraidhoo Health Center	1	1982
South Central Region	2	Th. Thimarafushi Health Center	1	2548
	3	Th. Vilufushi Health Center	2	2052
	4	Th. Hirilandhoo Health Center	2	1106
	5	Th. Kimbidhoo Health Center	3	1349
	6	Th. Madifushi Health Center	3	1206
	7	Th. Buruni Health Center	3	579
	8	Th. Omadhoo Health Center	3	754
	9	Th. Dhiyamingili Health Center	3	815

Region	No	Name of Health Centre	Level	Island Population
Laamu Atoll	1	L. Maavah Health Center	1	1901
South Central Region	2	L. Isdhoo Health Center	1	2248
	3	L. Fonadhoo Health Center	1	2147
	4	L. Hithadhoo Health Center	2	1093
	5	L. Maabaidhoo Health Center	2	1023
	6	L. Maamendhoo Health Center	3	1234
	7	L. Dhanbidhoo Health Center	3	969
	8	L. Kunahandhoo Health Center	3	805

Region	No	Name of Health Centre	Level	Island Population
Gaafu Alifu Atoll	1	Ga. Dhaandhoo Health Center	1	1930
South Region	2	Ga. Maamendhoo Health Center	2	1487
	3	Ga. Kolamaafushi Health Center	2	1632
	4	Ga. Gemanafushi Health Center	2	1606
	5	Ga. Dhevvadhoo Health Center	3	1199
	6	Ga. Kanduhulhudhoo Health Center	3	898
	7	Ga. Nilandhoo Health Center	3	877

Region	No	Name of Health Centre	Level	Island Population
Gaafu Dhaalu	1	Gdh. Gahdhoo Health Center	1	2953
South Region	2	Gdh. Vaadhoo Health Center	2	1459
	3	Gdh. Fares Maathodaa Center	2	1720
	4	Gdh. Fiyoree Health Center	2	1464
	5	Gdh. Rathafandhoo Health Center	2	1373
	6	Gdh. Madaveli Health Center	2	1794
	7	Gdh. Hoadehdhoo Health Center	3	1235
	8	Gdh. Nadellaa Health Center	3	1100

Region	No	Name of Health Centre	Level	Island Population
Seenu Atoll	1	S. Hulhumeedhoo Health Center	1	6428
South Region	2	S. Feydhoo Health Center	1	5172
	3	S. Maradhoo Health Center	2	3489

Annexure 3
Data of Regional and Atoll Hospitals

Region	Hospital	Island Population: Data collected from National Registration 2012	Atoll Population	Total Outpatients (2012)	Total Admissions (2012)	Bed Occupancy Rate (2012)	Number of Inpatient Beds (2012) (used to calculate bed occupancy rate)	Total Number of Beds (2012)
Male' Region	Indhira Ghandhi Memorial Hospital	536	25	421	446	—	1224	1224
LEVEL 1								
North	Kulhudufushi Regional Hospital	8,974	25,116	58,672	3,586	49.0	38	72
South Central	Gan Regional Hospital	4,385	16,496	27,761	1,526	18.0	54	75
South	Dr. Abdul Samad Memorial Hospital	7,108	20,206	36,541	2,088	31.0	49	74
South	Hithadhoo Regional Hospital	5,183	31,999	48,075	2,783	45.0	57	89
Central	Hulhumale Hospital	30,000	30,000	41,667	1,334	20.0	50	61
LEVEL 2								
North	Haa Alif Atoll Hospital	3,848	21,152	19,550	823	14.0	18	28
North Central	Ungoofaaru Regional Hospital	1,528	21,678	34,599	1,206	40.0	28	45
North Central	Lhaviyani Atoll Hospital	5,133	12,385	28,335	1,164	27.0	26	39
South	Gaaf Alif Atoll Hospital	3,460	13,653	20,280	682	9.00	17	26
South	Gnaviyani Atoll Hospital	11,857	11,857	34,297	1,570	30.0	22	28
LEVEL 3								
North	Shaviyani Atoll Hospital	2,317	16,820	11,953	398	29.0	15	25
North Central	Noonu Atoll Hospital	1,802	15,815	14,137	859	11.0	18	25
North Central	Baa Atoll Hospital	3,123	13,483	10,784	543	19.0	15	21
Central	Alif Dhaalu Atoll Hospital	2,214	10,180	21,169	627	16.0	25	31
South Central	Muli Regional Hospital	904	7,028	10,399	334	6.00	31	44
South Central	Dhaalu Atoll Hospital	2,544	7,259	18,201	911	17.0	21	27
South Central	Thaa Atoll Hospital	1,197	15,286	16,503	802	15.0	25	31
LEVEL 4								
Central	Alif Alif Atoll Hospital	1,090	7,490	7,154	305	11.0	18	25
Central	Vaavu Atoll Hospital	626	2,452	2,647	75	2.00	2	6
South Central	Faafu Atoll Hospital	1,929	5,613	10,633	358	16.0	11	24

Number of Inpatient Beds(2012) (used to calculate Bed occupancy Rate): Medical Ward, Surgical Ward, Maternity Ward (Gynae ward cots/LIU/ labour room, Nursery (NICU), Paediatric Ward, ICU, Isolation Ward, Private Ward, General ward, END ward, Feeding mothers› ward)

Total Number of Beds (2012): Medical Ward, Surgical Ward, Maternity Ward (Gynae ward cots/LIU/ labour room, Nursery (NICU), Paediatric Ward, ICU, Isolation Ward, Private Ward, General ward, END ward, Feeding mothers' ward), Emergency room, Dressing room, Operation Theatre, Bassinets, Physiotherapy, Consultation rooms & others

Annexure 4
Cost of medical training in various countries

The values shown are in Maldivian Rufiyaa (1USD = 15.45 MVR)
Data source: Department of Higher Education

Student following MBBS programs overseas under Loan Scheme

Country	No. of students	Total cost per student (2013)	Total cost per student (2014)
Bangladesh	22	1,018,720.80	1,168,327.14
China	24	1,093,154.84	1,568,462.88
India	4	1,592,515.92	-
Malaysia	10	2,300,000.00	-
Nepal	35	1,467,058.80	-
Pakistan	3	1,298,541.60	-
Philippines	2	1,254,031.80	-
Sri Lanka	8	1,359,966.90	-
Ukraine	13	1,409,082.00	-

(Added by the authors: The above in USD ranges from 68,000–150,000 for the whole duration of the course)

Student following MBBS programs overseas under Scholarship Schemes

Country	No. of students	Total cost per student (2013)	Total cost per student (2014)
UK	2		32,742(GBP)
Malaysia	2		88,960(RM)
Cuba	2	6,554.4 (USD)	6,554.4 (USD)
Bangladesh	5	347,913.75(MVR)	
Nepal	2	337,628.81(MVR)	
China	2	573,095.14(MVR)	341742.84(MRV)
Pakistan	2	70,278 (RS)	70,278 (RS)
India	2	20,000 (USD)	20,000 (USD)

(Added by the authors: The above in USD ranges from 3,300–256,325 for the whole duration of the course)

Annexure 5

Outpatient and inpatient morbidity at IGMH (Jan-March 2014)

Disease	No
Acute upper respiratory infections	5468
Persons encountering health services in other circumstances	3951
General symptoms and signs	2600
Persons encountering health services for examination and investigation	2488
Diseases of oral cavity, salivary glands and jaws	2061
Diseases of oesophagus, stomach and duodenum	1424
Arthropod-borne viral fevers and viral haemorrhagic fevers	1344
Injuries to unspecified part of trunk, limb or body region	1266
Dorsopathies	961
Soft tissue disorders	767
Disorders of ocular muscles, binocular movement, accommodation and refraction	667
Other diseases of urinary system	602
Intestinal infectious diseases	517
Hypertensive diseases	476
Disorders of conjunctiva	466
Arthropathies	454
Symptoms and signs involving the digestive system and abdomen	453
Symptoms and signs involving the circulatory and respiratory systems	444
Diabetes mellitus	399
Dermatitis and eczema	386
Other diseases of upper respiratory tract	375
Chronic lower respiratory diseases	371
Persons encountering health services in circumstances related to reproduction	342
Other acute lower respiratory infections	330
Symptoms and signs involving cognition, perception, emotional state and behaviour	276
Injuries to the ankle and foot	266
Noninflammatory disorders of female genital tract	254
Maternal care related to the fetus and amniotic cavity and possible delivery problems	251
Other diseases of intestines	219
Viral infections characterized by skin and mucous membrane lesions	212
Infections of the skin and subcutaneous tissue	206
Injuries to the head	173
Neurotic, stress-related and somatoform disorders	154
Diseases of middle ear and mastoid	150
Other and unspecified effects of external causes	148
Episodic and paroxysmal disorders	144
Disorders of skin appendages	142
Symptoms and signs involving the skin and subcutaneous tissue	132
Disorders of thyroid gland	129
Disorders of eyelid, lachrymal system and orbit	126
Injuries to the elbow and forearm	116
Diseases of external ear	115
Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified	107
Injuries to the wrist and hand	107
External causes of morbidity and mortality	103
Other disorders of ear	98
Metabolic disorders	94
Mycoses	91
Mood [affective] disorders	89
Injuries to the knee and lower leg	87
Urolithiasis	85
Ischaemic heart diseases	84
Other disorders of the skin and subcutaneous tissue	81
Disorders of breast	78
Effects of foreign body entering through natural orifice	69
Osteopathies and chondropathies	60
Urticaria and erythema	58
Persons encountering health services for specific procedures and health care	58
Other diseases of the respiratory system	55
Benign neoplasms	49
Inflammatory diseases of female pelvic organs	48
Aplastic and other anaemias	46
Other maternal disorders predominantly related to pregnancy	46
Renal failure	45
Other obstetric conditions, not elsewhere classified	44
Diseases of male genital organs	42
Persons with potential health hazards related to communicable diseases	38
Diseases of appendix	37
Hernia	37
Disorders of lens	34
Injuries to the shoulder and upper arm	32
Persons with potential health hazards related to family and personal history and certain conditions influencing health status	29
Cerebrovascular diseases	28
Symptoms and signs involving the urinary system	28
Disorders of other endocrine glands	27
Nerve, nerve root and plexus disorders	26
Glomerular diseases	26
Burns and corrosions	25
Influenza and pneumonia	23

Disease	No
Symptoms and signs involving the nervous and musculoskeletal systems	22
Papulosquamous disorders	21
Other viral diseases	20
Other infectious diseases	20
Disorders of gallbladder, biliary tract and pancreas	19
Haemorrhagic and haematological disorders of fetus and newborn	19
Mental and behavioural disorders due to psychoactive substance use	17
Schizophrenia, schizotypal and delusional disorders	17
Pregnancy with abortive outcome	17
Other disorders of eye and adnexa	16
Diseases of liver	16
Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium	16
Injuries involving multiple body regions	16
Toxic effects of substances chiefly nonmedicinal as to source	16
Certain early complications of trauma	16
Malignant neoplasms	15
Injuries to the neck	14
Pediculosis, acariasis and other infestations	13
Other diseases of pleura	13
Other congenital malformations	13
Polyneuropathies and other disorders of the peripheral nervous system	11
Injuries to the hip and thigh	11
Coagulation defects, purpura and other haemorrhagic conditions	10
Injuries to the abdomen, lower back, lumbar spine and pelvis	10
Persons with potential health hazards related to socioeconomic and psychosocial circumstances	10
Abnormal findings on examination of blood, without diagnosis	9
Glaucoma	8
Noninfective enteritis and colitis	8
Congenital malformations and deformations of the musculoskeletal system	8
Other forms of heart disease	7
Renal tubulo-interstitial diseases	7
Squeal of injuries, of poisoning and of other consequences of external causes	7
Haemolytic anaemias	6
Extrapyramidal and movement disorders	6
Cerebral palsy and other paralytic syndromes	6
Disorders of sclera, cornea, iris and ciliary body	6
Lung diseases due to external agents	6
Other diseases of the digestive system	6
Congenital malformations of the circulatory system	6
Injuries to the thorax	6
Poisoning by drugs, medicaments and biological substances	6
Infections with a predominantly sexual mode of transmission	5

Disease	No
Obesity and other hyperalimentation	5
Disorders of psychological development	5
Diseases of inner ear	5
Chronic rheumatic heart diseases	5
Tuberculosis	4
Other bacterial diseases	4
Other disorders of glucose regulation and pancreatic internal secretion	4
Organic, including symptomatic, mental disorders	4
Systemic connective tissue disorders	4
Infections specific to the perinatal period	4
Congenital malformations of eye, ear, face and neck	4
Viral hepatitis	3
Protozoal diseases	3
Nutritional anaemias	3
Other disorders of the nervous system	3
Cleft lip and cleft palate	3
Congenital malformations of genital organs	3
Congenital malformations of the urinary system	3
Chromosomal abnormalities, not elsewhere classified	3
Rickettsioses	2
Sequelae of infectious and parasitic diseases	2
Neoplasms of uncertain or unknown behaviour	2
Unspecified mental disorder	2
Diseases of myoneural junction and muscle	2
Visual disturbances and blindness	2
Other respiratory diseases principally affecting the interstitium	2
Radiation-related disorders of the skin and subcutaneous tissue	2
Complications of labour and delivery	2
Delivery	2
Birth trauma	2
Symptoms and signs involving speech and voice	2
Abnormal findings on examination of urine, without diagnosis	2
Other diseases caused by chlamydiae	1
Helminthiases	1
Malnutrition	1
Other nutritional deficiencies	1
Behavioural syndromes associated with physiological disturbances and physical factors	1
Disorders of adult personality and behaviour	1
Mental retardation	1
Acute rheumatic fever	1
Pulmonary heart disease and diseases of pulmonary circulation	1
Diseases of arteries, arterioles and capillaries	1

Disease	No
Other and unspecified disorders of the circulatory system	1
Suppurative and necrotic conditions of lower respiratory tract	1
Diseases of peritoneum	1
Other disorders of kidney and ureter	1
Respiratory and cardiovascular disorders specific to the perinatal period	1
Transitory endocrine and metabolic disorders specific to fetus and newborn	1
Other congenital malformations of the digestive system	1
Abnormal findings on diagnostic imaging and in function studies, without diagnosis	1
Ill-defined and unknown causes of mortality	1
Complications of surgical and medical care, not elsewhere classified	1
Disease	No
Delivery	501
Haemorrhagic and haematological disorders of fetus and newborn	160
Complications of labour and delivery	134
Maternal care related to the fetus and amniotic cavity and possible delivery problems	133
Ischaemic heart diseases	98
Chronic lower respiratory diseases	98
Pregnancy with abortive outcome	88
Arthropod-borne viral fevers and viral haemorrhagic fevers	79
Cerebrovascular diseases	78
Persons encountering health services for specific procedures and health care	78
Diseases of appendix	77
Other acute lower respiratory infections	72
General symptoms and signs	65
Injuries to the knee and lower leg	59
Infections specific to the perinatal period	56
Hernia	53
Other diseases of urinary system	53
Acute upper respiratory infections	49
Other diseases of intestines	47
Infections of the skin and subcutaneous tissue	44
Other maternal disorders predominantly related to pregnancy	41
Dorsopathies	40
Noninflammatory disorders of female genital tract	35
Aplastic and other anaemias	34
Arthropathies	34
Injuries to the hip and thigh	32
Influenza and pneumonia	30
Respiratory and cardiovascular disorders specific to the perinatal period	30
Injuries to the elbow and forearm	30
Intestinal infectious diseases	29

Disease	No
Benign neoplasms	28
Disorders of gallbladder, biliary tract and pancreas	28
Diabetes mellitus	27
Hypertensive diseases	26
Diseases of veins, lymphatic vessels and lymph nodes, not elsewhere classified	26
Injuries to the head	25
Other obstetric conditions, not elsewhere classified	24
Schizophrenia, schizotypal and delusional disorders	23
Disorders of breast	23
Haemolytic anaemias	20
Metabolic disorders	20
Diseases of oesophagus, stomach and duodenum	20
Injuries to the ankle and foot	20
Injuries to the wrist and hand	19
Malignant neoplasms	18
Renal failure	18
Other diseases of the digestive system	17
Diseases of male genital organs	17
Effects of foreign body entering through natural orifice	17
Nutritional anaemias	16
Injuries to unspecified part of trunk, limb or body region	16
Other bacterial diseases	15
Transitory endocrine and metabolic disorders specific to fetus and newborn	15
Other diseases caused by chlamydiae	14
Other forms of heart disease	14
Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium	14
Mood [affective] disorders	13
Diseases of liver	12
Injuries to the shoulder and upper arm	12
Other respiratory diseases principally affecting the interstitium	11
Glomerular diseases	11
Disorders related to length of gestation and fetal growth	11
Other diseases of upper respiratory tract	10
Urolithiasis	10
Other congenital malformations	9
Symptoms and signs involving the circulatory and respiratory systems	9
External causes of morbidity and mortality	9
Mental and behavioural disorders due to psychoactive substance use	8
Other disorders of the skin and subcutaneous tissue	8
Congenital malformations and deformations of the musculoskeletal system	8
Tuberculosis	7
Disorders of thyroid gland	7

Disease	No
Renal tubulo-interstitial diseases	7
Complications of surgical and medical care, not elsewhere classified	7
Sequelae of injuries, of poisoning and of other consequences of external causes	7
Neoplasms of uncertain or unknown behaviour	6
Viral infections characterized by skin and mucous membrane lesions	5
Coagulation defects, purpura and other haemorrhagic conditions	5
Other disorders of glucose regulation and pancreatic internal secretion	5
Neurotic, stress-related and somatoform disorders	5
Cerebral palsy and other paralytic syndromes	5
Other diseases of pleura	5
Osteopathies and chondropathies	5
Congenital malformations of genital organs	5
Symptoms and signs involving the digestive system and abdomen	5
Symptoms and signs involving the urinary system	5
Persons encountering health services in circumstances related to reproduction	5
Episodic and paroxysmal disorders	4
Disorders of eyelid, lacrimal system and orbit	4
Other diseases of the respiratory system	4
Soft tissue disorders	4
Congenital malformations of the circulatory system	4
Injuries to the abdomen, lower back, lumbar spine and pelvis	4
Burns and corrosions	4
Poisoning by drugs, medicaments and biological substances	4
Certain early complications of trauma	4
Persons encountering health services for examination and investigation	4
Inflammatory diseases of the central nervous system	3
Polyneuropathies and other disorders of the peripheral nervous system	3
Disorders of lens	3
Diseases of external ear	3
Diseases of middle ear and mastoid	3
Lung diseases due to external agents	3
Disorders of skin appendages	3
Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery	3
Congenital malformations of the nervous system	3
Congenital malformations of eye, ear, face and neck	3
Other congenital malformations of the digestive system	3
Symptoms and signs involving cognition, perception, emotional state and behaviour	3
Sequelae of infectious and parasitic diseases	2
Obesity and other hyperalimentation	2
Pulmonary heart disease and diseases of pulmonary circulation	2
Dermatitis and eczema	2
Urticaria and erythema	2

Disease	No
Other diseases of urinary system	2
Complications predominantly related to the puerperium	2
Conditions involving the integument and temperature regulation of fetus and newborn	2
Chromosomal abnormalities, not elsewhere classified	2
Symptoms and signs involving the skin and subcutaneous tissue	2
Toxic effects of substances chiefly nonmedicinal as to source	2
Infections with a predominantly sexual mode of transmission	1
Viral infections of the central nervous system	1
Mycoses	1
Bacterial, viral and other infectious agents	1
Other diseases of blood and blood-forming organs	1
Malnutrition	1
Organic, including symptomatic, mental disorders	1
Unspecified mental disorder	1
Diseases of myoneural junction and muscle	1
Other disorders of the nervous system	1
Disorders of conjunctiva	1
Disorders of sclera, cornea, iris and ciliary body	1
Glaucoma	1
Acute rheumatic fever	1
Suppurative and necrotic conditions of lower respiratory tract	1
Diseases of oral cavity, salivary glands and jaws	1
Papulosquamous disorders	1
Systemic connective tissue disorders	1
Other diseases of urinary system	1
Other diseases of urinary system	1
Other diseases of urinary system	1
Birth trauma	1
Other disorders originating in the perinatal period	1
Injuries to the thorax	1
Persons encountering health services in other circumstances	1
Persons with potential health hazards related to family and personal history and certain conditions influencing health status	1

Annexure 6

List of clinics and laboratory tests done in Male'

Name	Endoscopy	Ultrasound	X-ray	CT Scan	MRI Scan	Echocardiogram	Pathology Services	Haematological	Microbiological laboratory test
Yaganegi's Clinic	-	Yes	-	-	-	-	-	Simple Blood Test	-
Dr. Mohamed Ahmed Clinic									
Azmi Naeem Medical & Diagnostic Centre									
Dhilshad Clinic									
The Clinic	-	Yes	-	-	-	Yes	Yes	Yes	Yes
Crescent Medical Services	-	-	-	-	-	-	-	-	-
Poly Clinic	-	-	-	-	-	-	-	-	-
Male' Medicals	Yes	-	-	-	-	-	-	-	-
Central Clinic	-	Yes	Yes	-	-	-	-	-	-
F & C Medicare	-	Yes	-	-	-	-	-	-	-
M.N.D.F Medical Services	-	Yes	Yes	-	-	Yes	-	-	Yes
Youth Health Café'									
Family Care Clinic and Scan Center	-	Yes	-	-	-	-	-	Collects Blood samples and sent for other laboratory	Collects Blood samples and sent for other laboratory
Listen Clinic	Yes	-	-	-	-	Yes	-	-	-
MedLab Diagnostic									
CHINESE HEALTH CARE PVT LTD									
National Thalasaemia Center									
Central Medical Center	-	Yes	-	-	-	Yes	Yes	Yes	Yes
My Clinic									
Imperial Medical Center		Yes							
Mind Matters Psycology and consulting service									
IGMH	Yes	Yes	Yes	Yes	-	-	Yes	Yes	Yes
ADK	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
Medica	Yes	Yes	Yes	-	-	Yes	Yes	Yes	Yes
Regional Hospitals	-	-	Yes	-	-	-	Yes	Yes	-
Atoll Hospitals	-	-	Yes	-	-	-	Yes	Yes	-
Advance Medical Center	-	Yes	-	-	-	-	Yes	Yes	Yes
Maya Clinic	-	Yes	-	-	-	-	-	-	-
Eve Clinic	-	Yes	-	-	-	-	-	-	-

Annexure 7

Data on Hithadhoo Regional Hospital
Staff Data

No.	Name	Designation	Speciality
1	Dr. Wali Muhammed	Assoc.sp. in Peadiatrics gr. 2	paediatrics
2	Dr. Rafiq Hussain	Assoc.sp. in Anesthetist gr. 4	Anaesthetics
3	Dr. Ramasree Yaramsetty	Assoc.sp. in chest medicine gr. 3	Chest Physcian/Internal Medicine
4	Dr Ram Kumar Thota	Conslt.in Orthopeadics gr. 2	Orthopaedics
5	Dr. Jithendra Neminath Kutte	Assoc.sp. in Opthalmologist gr. 4	Ophthalmology
6	Dr. Aishath Ali	Consultant in ENT GR. 5	ENT
7	Dr. B.Laxmi Narayana Bhat	Conslt. in Dermatologist gr. 5	Dermatology
8	Dr. Singh Lakshman Shkhim	Assoc.sp in Psychiatrist gr. 3	Physchiatry
9	Dr. Ali Elsaid Elsaid Elasyed Sharaf	Consultant in Radiology gr. 3	Radiology
10	Dr. Zulfiqar Ahmed Khan	Senior Medical Officer gr. 5	General Medicine
11	Dr. Imthiyaz Ahmed Zaki	Consultant in Surgery	General surgery
12	Dr. Ahsan Furqan	Dental Officer gr. 1	Dental
13	Dr. Mohamed Umar Farooq	Dental Officer gr. 1	Dental
14	Dr. Sarmad Rasool	Medical Officer gr. 1	General Medicine
15	Dr. Irum Ghazanfar	Medical Officer gr. 1	General Medicine
16	Dr. Amany Ahmed Naseer	Medical Officer gr. 1	General Medicine
17	Dr. Ali Moosa	Medical Officer gr. 2	General Medicine
18	Dr. Juwaria Sardar	Medical Officer	General Medicine
19	Dr. Fahad Ul Fazal	Medical Officer	General Medicine
20	Dr. Kashif Minhas	Medical Officer gr. 1	General Medicine
21	Dr Anchu Chirayil Thomas	Medical Officer gr. 1	General Medicine
22	Dr. Maeesha Solih	Medical Officer gr. 1	General Medicine

Data on Hithadhoo Regional Hospital
Patients in August, September and October of 2014 (Ramazan included)

No.	Department	Patients (Totals)	August		September		October	
			inpatients	outpatiets	inpatients	outpatiets	inpatients	outpatiets
1	Medicine	10865	47	4195	42	3905	37	2765
2	General Surgery	559	15	228	6	190	50	141
3	Gynaecology/Obstetrics	353	37	158	32	157	45	38
4	Paediatrics	2610	39	444	55	1417	42	749
5	Orthopaedics	1086	11	385	10	357	9	344
6	Physchiatry	402	5	147	3	130	3	125
7	Opthalmology	1084	0	207	0	470	0	407
8	Dental	487	0	162	0	177	0	148
9	Dermatology	456	0	0	0	346	0	110
10	ENT	1199	0	312	2	471	1	416

Annexure 8

Data on Kulhudhuffushi Regional Hospital

Patient data for 2014

Medicine

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	COPD	Medicines, O2, Nebulization, X-ray, Blood investigation	7882	130
2	HTN	Anti Hypertensive medicines, Lipd profile		
3	DM	Medicines with diet control		
4	Rheumatoid arthiritis	Medicines - MTX Suplhr		
5	MI	Medicines with investigation		
6	Thalaseemia	Blood transfusion		
7	CKD	Dialysis		
8	Pneumonia	Medicines,CXR, investigation		
9	CVA	Medicines, physiotheraphy,investigation		

Orthopedics

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Osteoarthritis knee	Analgesics, Antacid,Calcium,Physiotherapy	1391	25
2	Lumber Spondylosis Lumber Canal Stenosis	Medicine + Physiotherapy		
3	Prolapsed Intervertebral disc Cervical + Lumbar	Medicine + Physiotherapy		
4	Cervical Spondylosis	Medicine + Physiotherapy		
5	Frozen Shoulder	Medicine + Physiothrapy SOS manipulation Under GA + inj Teencort intraarticular		
6	Tennis + Golfer's elbow	Medicine + (brace if available)		
7	Planter fascitis	Medicine +		
8	Fracture of upper limbs and lower limbs	Slab/Cast/CR+GA		

Psychiatry

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Depressive disorder	Antideprressants, counselling, Physiothrapy	240	5
2	Schizophrenia	Anti psychortics, sedatives		
3	Bipolar Mood disorder	Mood stabilizess		
4	Seizure disorder	Anticanvulasants		
5	Anxiety disorder	Anti anxiety medication		
6	Headache	Anti deprrenants		
7	Sleep problem	Sleep hygine sedatives + hyphotics		

General Surgery

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Constipation	Syp Cremafin	510	25
2	Fissure in Ano	Fissurectomy		
3	Gastiritis + Colitis	Medicines		
4	UTI	IV antibiotics Medicine		
5	Sebacious Cyst	Excission		
6	Circumcision	Surgery		

Opthalmology

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Allergic conjuntivitis	Medicine	1000	2
2	Refractive errors	A/R and correction		
3	Iridocyclitis	Medicine		
4	Episcleritis	Medicine		
5	Conjuctivitis	Medicine		
6	Pterigium	Excision with autograft		
7	Chalazion	Incision and curettage with excision of cyst wall		
8	Chronic Dacryocystitis	Medicine		
9	Corneal Ulcer	DCR		

ENT

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Headache	Anti depressents	717	8
	- Tonsillitis	Surgery		
	- Sinusitis	Medicine		
2	Allergic rhinitis	Medicine		

Paediatrics

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Neonatal Hyperbilirubinemia	DSPT (Double Surface Photo Theraphy)	2182	151
2	Fever	Medicine		
3	URTI	Medicine		
4	LRTI	Medicine		
5	Fever	Medicine		

Obstetrics and Gynaecology

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Antenatal Care	T.Folic acid,T.Doxinate	2816	154
2	Vomiting in Pregnancy	T.Emset,T.Doxinate		
3	Threatened abortion	rest,T.Duphastan		
4	Irregular Mensuration	T.Ovral L		
5	Dysfunctional Uterine Bleeding	T. Trenxa, T.Ethamysylate		
6	PIH	T.Aldomet, T.Nifedipine		
7	DM in Pregnancy	Insulin mixtard		
8	Anaemia in Pregnancy	Folic acid		
9	Endometriosis	C.Dmozol		

Dermatology

No.	Diagnosis	Specilialized treatment provided	Patients for 3 months	
			inpatients	outpatients
1	Atopic Dermatitis	Elcon cream	1122	4
2	Allergic Contatct Dermatitis	T.Wysolon		
3	Psoriasis	Dipralic ointment		
4	Eczema	Betnovate ointment		
5	Lichen planus	T.Wysolon		
6	Seboric Dermatitis	Elcon cream		
7	Tinea capitis	Griseofilvim		
8	Tinea corporis	Candid ointment		
9	Candidiasis	Candid ointment		

Doctors in Kulhudhuffushi Regional Hospital

No.	Name	Designation	Speciality
No	Name of the Doctor	Department	Position
1	Dr. Haranahalli Rudrappa Surendhra	Opthalmology	Ophthalmologist
2	Dr. Tharwat Louis Hennallah	Gynecology	Gynaecologist
3	Dr. Pankaj Makkar	Pediatric	Paediatrician
4	Dr. Simi Garg	Dental	Dentist
5	Dr. Sanjay Shivram Bembade	Anesthesiology	Anesthetist
6	Dr. Richa Mina	ENT	ENT Specialist
7	Dr. Kapil Sunderkant Kulkarni	Psychology	Psychiatrist
8	Dr. Kasamalla Narayana	Dermatology	Dermatologist
9	Dr. Satyakit Singha	Anesthesiology	Anaesthetist
10	Dr. Pritam Baburao Takawale	Orthopedic	Orthopedician
11	Dr. Hakim Salim -UL Zaman	Internal Medicine	Physician
12	Dr. Rajeev Beohar	Internal Medicine	Physician
13	Dr. Marappan Balachandar	Surgical	Surgeon
14	Dr. Allu Rama Krishna Rao	Medicine	S.Medical Officer
15	Dr. Arifa Nasrin Asha	Medicine	S.Medical Officer
16	Dr. Ayan Pratim Chakraborty	Medicine	Medical Officer
17	Dr. Najeeb-Ur-Rahman	Medicine	Medical Officer
18	Dr.Nitish Kumar	Medicine	Medical Officer
19	Dr. A S M Mahfuzur Rahman Akanda	Medicine	Medical Officer
20	Dr. Arain Atif Iqbal	Medicine	Medical Officer
21	Dr. Ibrahim Hassan	Medicine	Medical Officer
22	Dr. Khadheeja Ibrahim	Dental	Dentist

Annexure 9

Some relevant equipment available at the FHS skills laboratory

Equipment name	Quantity
Patients Transfer Stretcher	1
Cardiac Table	4
Stature meter	4
Height measuring instruments	5
Weight measuring instruments	5
Weight measuring instruments (digital)	12
Weight measuring instruments (baby)	11
Cylinder Trolley (s.s)	5
Dressing Trolley (s.s)	2
Instrument Trolley (s.s.)	11
IV rod (s.s.)	12
IV stand (s.s.)	11
Oto-opthalmoscope (diagnostic set)	1
Laryngoscope (set) s.s.	7
Patient care manikin (adult)	3
Patient care manikin (infant)	3
Patient care manikin (pedia)	4
Suture simulator	3
Tracheostomy care simulator (adult)	4
Wound care simulator	2
Nursing Kelly, non vitalsim	3
Nursing anne vital sim	4
Ambu bag (adult)	4
Ambu bag (infant)	4
Ambu bag (paedia)	1
Oxygen mast (adult)	2
Oxygen mask (child)	6
Oxygen mask (baby)	7
Nebulizer	6
Sphygmomanometer (aneroied)	18
Sphygmomanometer (mercury)	28
Stethoscope (adult)	46
Stethoscope (two-way)	1
Ear scope	5

Annexure 10

Some relevant equipment available at the FHS medical laboratory

Equipment name	Quantity
Binocular microscope	25
pH meter	2
Cell counter	8
Hematocytometer	12
Hydrometer	1
Mechanical Balance	2
Electronic Balance	2
Water bath	1
Boiling water bath	1
Incubator	2
Pharmaceutical refrigerator	1
Anaerobic Jar	2
Safety Cabinet	1
Autoclave	1
Microtome	1
Timer	15
Stopwatch	1
Hot air oven	1
Dry air Sterilizer	1
Centrifuge	2
Colorimter	1
Spectrophotometer	1

Terms of Reference

For a Feasibility Study on Establishing a Medical School in The Maldives National University

1. Introduction

The Maldives National University (MNU) is the only State-funded University in the Maldives established by the merger of all Government-run institutions of post-secondary education in the Maldives. At present there are eight faculties and centres offering programs from sub-degree level to the masters level. The first division of MNU, the Faculty of Health Sciences, was established in 1973 as the Allied Health Services Training Centre. At present there are nearly 5000 students enrolled in over 100 programs at MNU. The University also runs many short-term programs.

The total number of residents in the Maldives is about 320,000 with about 100,000 expatriates. There are 70 local and about 200 doctors in the Maldives. The ratio of number of physicians to the population is about 1 is to 1600. All local doctors had their training overseas. The population growth rate is about 2.1%. The local population is likely to exceed 400,000 by 2030. Therefore, there is a need to develop local capacity to train doctors soon.

This Feasibility study is to examine and analyse the local context to establish a medical school. A team of two consultants for a period of 14 days is required to conduct the study.

2. Objectives of the Study

The main objective of the study is, given the expected population growth and the difficulties in recruiting expatriate doctors due to high costs, to find out the feasibility of medical training in the Maldives. The purpose of study is to inform decision making regarding the establishment of a medical school or faculty within MNU and to estimate the requirements of such an endeavour.

More specifically, the study will

1. Evaluate the external environment, especially with regard to the curative practices and personnel at hand at the national level.

2. Evaluate the current situation in the nation with regard to the provision of health services and medical training.
3. Assess the demand/supply situation with regard to medical training/
4. Identify the options for starting a medical school/faculty in the Maldives with regard to international best practices and long-term sustainability.
5. Identify the extent of and areas in which capacity building and human resource development at local levels will be required for medical training.
6. Advice on a list of physical space requirements for a medical facility, its best location and the human resource requirements for such a facility. It is not necessary to draw up equipment lists or book lists.
7. Determine possible barriers to the project to establish a medical training facility.
8. Advise on a management structure for the medical school.
9. Advise on critical risks, problems, and assumptions and the means to mitigate them
10. Make recommendations on next steps.

3. Place of Work

Male', Maldives

4. Inputs from MNU

MNU will

- Assign a staff as a counterpart;
- Provide a furnished office for the work of the consultant;
- Arrange appointments and letters of introduction to facilitate relevant consultations between the Consultants and relevant stakeholders;
- Provide logistical support for travels within the country, if needed; and
- Provide technical comments and feedback on the outputs of the Consultancy.

5. Deliverables and Schedule

The deliverables and meetings defined below are the minimum requirements for the execution of the study. Should the respondent feel that it is desirable to produce additional information, these should be described explicitly in the proposal.

- Work Plan
- Draft Report
- Final Report

Where meetings are planned to review the deliverables, the

respondent shall allow for a minimum of one week between the date when the deliverable is available for circulation and the date of the meeting.

1. Work plan: Upon notification that a respondent is the successful bidder, and before commencing the project, the respondent shall prepare a Work Plan, which shall take the form of a detailed description of the steps to be followed in the study process. This plan will indicate the sequencing and staging of tasks, key decision points, the expected completion date for each task and the interrelationship between the completion of the tasks and the preparation of the project deliverables. This plan should be submitted before the field work starts.

2. Progress Report: Written progress report, highlighting activities undertaken, results achieved and outlining any unexpected delays, problems or difficulty that arise as the project progresses shall be submitted fourteen days after the field work starts.

3. Initial Final Report: A copy of the initial draft report covering all the work efforts described above shall be submitted at least two weeks after the field work.

4. Final Report: One month after the initial draft report the final report should be submitted addressing the objectives of the study and incorporating any suggestions received on the initial report.

6. Qualifications of the Consultant Team

The consultant team shall consist of two persons of reasonable experience in the medical education field one of whom should be a dean or a former dean of a medical school. Both persons must hold an MBBS degree or equivalent. Advanced qualifications will be an added advantage.

Academic Requirements:
- MBBS or equivalent degree

Experience:
- At least 5 years' experience in medical education.
- Professional qualifications and competencies.
- Registration in the medical council of the native country.
- At least one consultant must be a dean/head or a former dean of a medical faculty/school.
- Ability to synthesize large amounts of information to develop a comprehensive, well structured report.
- Excellent writing, editing, and oral communication skills in English.

7. Terms of Payment

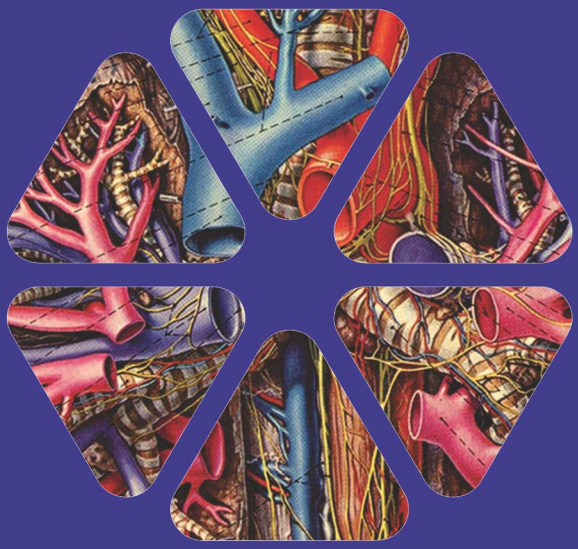
1. 20% of the fees will be made on the selection on the appointment and the submission of the work plan.
2. 20% of the fees will be made on accepting the Progress Report.
3. 30% of the fees will be made on the Draft Final report.
4. 30% of the fees on the acceptance of the Final report.

8. Submission dates and address for proposal

1. 2nd April 2014, Before 3:00 pm.

2. Address:
   Mr Hussain Haleem
   (Deputy Vice Chancellor, Administration and Finance)
   The Maldives National University
   Central Administrative Office
   Radhdhebai Hin'gun, Male
   Republic of Maldives

For inquiries:
Hussain.haleem@mnu.edu.mv
+(960) 7788319



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The Maldives National University