MOH/S/RAN/201.21(TR)

RESEARCH AND TECHNICAL SUPPORT (R&TS) PROGRAMME

STRATEGIC PLAN 2021-2025

FIRST EDITION

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Ministry of Health Malaysia

ISBN 978-967-25839-2-9
eISBN 978-967-25839-2-9

Published by:
Planning Division
Ministry of Health Malaysia
Level 6, Block E6, Parcel E
Federal Government Administrative Centre
62590, Federal Territory of Putrajaya
Tel: +603-8883 3899
Fax: +603-8883 3388
Website: www.moh.gov.my

Printed by:
Reka Cetak Sdn. Bhd.
Shah Alam, Selangor
www.rekacetak.com

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Secretary-General

The Research & Technical Support Programme (R&TS) plays an important role in carrying out activities to support the Ministry of Health in terms of health policy formulation, as well as providing technical support for health facility operationalisation. The research arm under the R&TS Programme is important in supporting evidence-based policy decision-making through the various research institutes.

The Research & Technical Support Programme Strategic Plan 2021-2025 was developed at the Programme level as a referrence to prioritise activities that will be carried out in the next five years which will ultimately help to improve the health outcomes of the population. This document has been delivered at the right moment to ensure that the Programme's strategies and activities are aligned to the national priorities in the 12th Malaysia Plan and contributes its share towards the wellbeing of the nation.

Last but not least, I would like to take this opportunity to congratulate the committee members and those who were involved in developing the Research & Technical Support (R&TS) Programme Strategic Plan 2021-2025.

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DATO' SRI MOHD SHAFIQ BIN ABDULLAH
Secretary-General
Ministry of Health, Malaysia

FOREWORD
Director-General of Health

I am delighted to acknowledge the first publication of the Research and Technical Support (R&TS) Programme Strategic Plan which outlines its future directions for the next five years (2021-2025).

R&TS Programme collaborates with other programmes in the Ministry of Health to formulate MOH's policies towards improving the health outcomes of the Malaysian population in Malaysia. This endeavour is achieved through evidence-driven planning, excellent research, and provision of health technical support services.

The current pandemic crisis had escalated health care cost and increase the burden on the Malaysian health system. Thereby, meticulous planning supported by evidence-based decisions is vital to optimise our resources to ensure a sustainable health system. In addition, we must be receptive to new innovative solutions including using appropriate technologies to improve the efficiency and effectiveness of the health sector.

Well done and congratulations to R&TS Programme for developing this strategic plan. It is my greatest hope that all the respective divisions and institutions work together to achieve the objectives set in this strategic plan.

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TAN SRI DATO' SERI DR. NOOR HISHAM BIN ABDULLAH
Director-General of Health, Malaysia

FOREWORD
Deputy Director-General of Health (Research & Technical Support)

I am honoured to present the Research and Technical Support (R&TS) Programme Strategic Plan (2021-2025). It is my aspiration that this document would help the programme to fully realise its potential and better fulfil its function as a programme under the Ministry of Health.

First of all, I would like to express my appreciation to all technical committee members and contributors who had been working hard to develop this strategic plan. The preparation of this document began in June 2020. Its formulation took into consideration the achievements, issues and challenges faced by the programme in the last five years.

I believe that this carefully organised strategic plan will guide the programme's work over the next five years, albeit facing the challenges of rapidly changing healthcare ecosystem. Beside highlighting four expected outcomes, the programme's future directions are clearly defined through various strategies, action plans, performance indicators and achievement targets as documented.

Hence, let us work together to implement this strategic plan so that we can realise our vision of a truly healthy nation.

.....

DATUK DR. HISHAMSHAH BIN MOHD IBRAHIM
Deputy Director-General of Health, Malaysia (R&TS)

GLOSSARY

12MP	12th Malaysia Plan
7MP	7th Malaysia Plan
A&E	Accident and Emergency Department
AELB	Atomic Energy Licensing Board Department
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASEAN	The Association of Southeast Asian Nations
ASIS	Asset and Services Information System
BAKAS	*Bekalan Air dan Kebersihan Alam Sekeliling*
BCA	Building Condition Assessment
BEE	Building Energy Efficiency
BEMS	Biomedical Engineering Maintenance Services
CCG	Country-Core Group
CCTI	Completing Cancer Treatment Incentive
CEM	Certified Energy Manager
CePSTPO	Certified Environmental Professional in Sewage Treatment Plant Operation
CHFM	Certified Healthcare Facility Manager
CIDB	Construction Industry Development Board
CLS	Cleansing Services
CM	Corrective Maintenance
CO_2	Carbon Dioxide
COC	Certification of Coders
COMBAT	Covid-19 Mobile Test Unit
COMSTECH	Committee on Scientific and Technological Cooperation Programme
COP	Code of Practise
COVID-19	Coronavirus Disease 2019
CSS	Clinics Support Services
CWM	Clinical Waste Management
CW	Construction Work
DAP&E	Diploma in Applied Parasitology and Entomology
DDSA	Public Sector Data Dictionary
DHRi	Digital Health Research and Innovation
DMM	Diploma in Medical Microbiology
DOSH	Department of Occupational Safety and Health
DOSM	Department of Statistics Malaysia
DRL	Diagnostic Reference Level
EBE	Existing biomedical equipment
EHRI	Environmental Health Risk Inventory
EMR	Electronic Medical Records
EnPHC	Enhanced Primary Health Care
EPC	Energy Performance Contract

EPF	Employee Provident Funds
EPU	Economic Planning Unit
ERU	Engineering Research Unit
ESD	Engineering Services Division
ETS	Environmental Tobacco Smoke
e-RADIA	Computer Licensing and Monitoring System for Radiation
e-UPA	*Data Unit Pencemaran Air/* Water Pollution Unit Data
FEMS	Facility Engineering Maintenance Services
FMS	Facility Management Services
GATS	Global Adults Tobacco Surveys
GDP	Gross domestic product
GHED	Global Health Expenditure Database
GLP	Good Laboratory Practice
GMEC	Governance, Monitoring and Evaluation Committee
GovEA	Government Enterprise Architecture
HRH	Human Resources for Health
HRPS	Health Research Priority Setting
HSS	Hospital Support Services
HWMS	Healthcare Waste Management Services
IAEA	International Atomic Energy Agency
IAQ	Indoor Air Quality
ICD	International Classification of Diseases
ICD-9-CM	ICD 9th Revision – Clinical Modification
ICD-10	ICD 10th Revision
ICNIRP	International Commission on Non-Ionising Radiation Protection
ICOP	Industry Code of Practice
ICR	Institute for Clinical Research
ICU	Intensive Care Unit
IHBR	Institute for Health Behavioural Research
IHM	Institute for Health Management
IHSR	Institute for Health Systems Research
IKU	Institute for Public Health
ILPKKM	*Institut Latihan Pergigian Kementerian Kesihatan Malaysia*
IMR	Institute for Medical Research
INSPP	Integrated Security Support Plan
INTROM	Inter-Islamic Network in Tropical Medicine
IoMT	Internet of Medical Things
IPH	Institute of Public Health
IPPAS	International Physical Protection Advisory Service
IR	Ionising Radiation
IR 4.0	Industrial Revolution 4.0
ISO	International Organization for Standardization
JLN	Joint Learning Network
JPICT	*Jawatankuasa Pemandu* ICT/ ICT Steering Committee

JPPKK	*Jawatankuasa Pemandu Perancangan Kementerian Kesihatan*/ MOH Planning Steering Committee Meeting
KPI	Key Performance Indicator
KPWKM	Ministry of Woman, Family and Community Development
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LHR	Lifetime Health Record
LLS	Linen and Laundry Services
MAFI	Ministry of Agriculture and Food Industry
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
MBOD	Malaysian Burden of Disease
MBS	Modified Budgeting System
MCMC	Malaysian Communications and Multimedia Commission
MDA	Medical Device Authority
MEA	Ministry of Economic Affairs
MEET	Medical Equipment Enhancement Tenure
MGTC	Malaysia Green Technology and Climate Change Centre
MHSR	Malaysia Health System Research
MINDEF	Ministry of Defence
MNHA	Malaysia National Health Accounts
MOE	Ministry of Education
MOF	Ministry of Finance
MOH	Ministry of Health
MOHA	Ministry of Home Affairs
MOHE	Ministry of Higher Education
MOSTI	Ministry of Science, Technology and Innovation
MOTAC	Ministry of Tourism, Arts and Culture
MRSD	Medical Radiation Surveillance Division
MVAC	Mechanical Ventilating and Conditioning
MyCREST	Malaysian Carbon Reduction and Environmental Sustainability Tool
MyEHIS	Malaysia Environmental Health Information System
MyHDD	Malaysian Health Data Dictionary
MyHDW	Malaysian Health Data Warehouse
MyHIX	Malaysia Health Information Exchange
MyHRDM	Malaysian Health Reference Data Model
MyWASH	Malaysian Waste, Sanitation & Hygiene
NBE/PBE	New Biomedical Equipment/ Purchased Biomedical Equipment
NCD	Non-Communicable Disease
NDWQSP	The National Drinking Water Quality Surveillance Programme
NGO	Non-Governmental Organisation
NHA	National Health Accounts
NHF	National Health Financing
NHMS	National Health and Morbidity

NHSI	National Healthcare Statistics Initiative
NIA	National-level Indicators Approach
NIH	National Institutes of Health
NIR	Non-Ionising Radiation
NLP	Natural Language Processing
NRS	New Remuneration Scheme
OECD	Organisation Economic Co-operation and Development
OHS	Online Healthcare Services
OOP	Out-of-pocket
ORS	Office of Radiological Security
PAP	Pre-Approved Plans
PDPK	*Perancangan Dasar dan Pelan Kesihatan*
PDRM	*Polis Diraja Malaysia*/ Royal Malaysia Police
PeKa B40	*Skim Peduli Kesihatan Untuk Kumpulan B40*
PHCorp	ProtectHealth Corporation Sdn. Bhd
PHM	ProtectHealth Malaysia
PIK	*Pusat Informatik Kesihatan*/ Health Informatic Centre
PNNL	Pacific Northwest National Laboratory
PPM	Planned Preventive Maintenance
PRIS	Patient Registry Information System
PWD	Public Work Department
QA/QI	Quality Assurance/ Quality Improvement
QAP	Quality Assurance Programme
QLASSIC	Quality Assessment System in Construction
QUANUM	Quality Audit Management
R&D	Research and Development
R&TS	Research and Technical Support Programme
RESP	Rural Environmental Sanitation Programme
RPO	Radiation Protection Officer
RPP	Radiation Protection Programme
RSS	Radiation Safety Section
RSU	Radiation Safety Unit
SARS	Severe Acute Respiratory Syndrome
SDG	Sustainable Development Goals
SEAMEO	Southeast Asian Ministers of Education Organization
SEAMEO-TROPMED	Southeast Asia Ministers of Education Organization for Tropical Medicine
SEDA	Sustainable Energy Development Authority
SHA	System of Health Accounts
SME	Subject Matter Expert
SMRP	*Sistem Maklumat Rawatan Pelanggan*
SNOMED CT	Systematized Nomenclature of Medicine Clinical Terms
SOCSO	Social Security Organisation
SP	Sustainability Programme

SPIKPA	*Skim Perlindungan Insurans Kesihatan Pekerja Asing*
SPU	Science Physics Unit
ST	Suruhanjaya Tenaga
T&CM	Traditional & Complimentary Medicine
TC	Technical Committee
TEH	Total Expenditure on Health
TG	Test Guideline
TGP	Talent Grooming Programme
TI	Transport Incentive
TNB	Tenaga Nasional Berhad
UHC	Universal Health Coverage
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nation Industrial Development Organization
UV	Ultraviolet
VHI	Voluntary Health Insurance
VOCs	Volatile Organic Compounds
VR/AR	Virtual Reality/ Augmented Reality
WASH	Water, Sanitation and Hygiene
WG	Working Group
WHO	World Health Organization
WP	Wilayah Persekutuan

Chapter 1

INTRODUCTION

INTRODUCTION

1.1 BACKGROUND

The Research and Technical Support (R&TS) Programme is one of the programmes under Ministry of Health (MOH) Malaysia, headed by the Deputy Director-General of Health (R&TS). This programme currently consists of the Planning Division, Engineering Services Division (ESD), Medical Radiation Surveillance Division (MRSD) and the National Institutes of Health (NIH).

Historically, R&TS Programme was established in 1991 and it initially comprised of three (3) divisions, namely, the Planning and Development, Pharmacy Services and Health Engineering Services and two (2) research institutes, namely, the Institute for Medical Research (IMR) and Institute for Public Health (IPH).

The Traditional and Complementary Medicine Division (T&CMD) was gazetted under R&TS Programme in February 2004, but it transitioned from R&TS Programme to the Medical Development Programme in 2013.

Establishment of the Planning Division

The Planning and Development Division was established in 1972. This division underwent various changes to improve its performance as well as to keep abreast with health planning and development needs. In effort to enhance each respective branch's functions, the Planning Division was separated from the Development Division in 2012.

Establishment of the National Institutes of Health (NIH)

Back in 1991, there were only two (2) research institutes under R&TS Programme, namely, the Institute for Medical Research (IMR) that was established in 1900 and the Institute for Public Health (IPH) in 1967. Four (4) more research institutes were established later which include the Institute for Clinical Research (ICR), previously known as the Clinical Research Centre, in 1998, the Institute for Health Management (IHM) in 2000, the Institute for Health Systems Research (IHSR) in 2002, and the Institute for Health Behavioural Research (IHBR) in 2005.

NIH concept was introduced in the 7th Malaysia Plan (7MP) and was officiated by the Minister of Health on 11 August 2003. NIH establishment was to bring together under one umbrella six (6) existing institutions to create a seamless continuum from identification of research priorities and research questions to translating evidence to policy.

Establishment of the Engineering Services Division (ESD) and the Medical Radiation Surveillance Division (MRSD)

The Radiation Safety Unit (RSU) was formed in 1974 under the Public Health Department to enforce The Radioactive Substances Act 1968. Subsequently in 1981, RSU and the Public Health Engineering Unit were combined to establish ESD.

In 1984, the Radioactive Substances Act 1968 was repealed and replaced with the Atomic Energy Licensing Act 1984 (Act 304). Later in 2016, the Radiation Safety Section (RSS) and the Science Physics Unit (SPU) which were initially part of ESD, parted to form MRSD.

1.2 VISION STATEMENT OF R&TS PROGRAMME

A leader in evidence-based research and technical services for a healthy nation.

1.3 MISSION STATEMENT OF R&TS PROGRAMME

Ensuring a sustainable and responsive health system through evidence-driven planning, implementation, monitoring and evaluation of policies and health activities through:

- Conduct of applied and innovative research
- Provision of quality health data and information
- Capacity development
- Provision of health technical support services

Organisational values

- Knowledge-seeking
- Competent
- Resilient
- Integrity
- Creative and innovative
- Visionary
- Enthusiastic

1.4 PURPOSE OF THIS STRATEGIC PLAN

R&TS Programme Strategic Plan (2021-2025) will serve as the main reference document for activity planning and implementation of R&TS Programme for the next five (5) years.

R&TS Strategic Plan is guided and aligned to these aspirations:

- Sustainable Development Goals (SDG)
- Universal Health Coverage (UHC)
- Shared Prosperity Vision 2030
- 12th Malaysia Plan (12MP) 2021-2025
- MOH Strategic Plan 2021-2025

Therefore, the overall objective of R&TS Programme Strategic Plan (2021-2025) is to provide a holistic support to MOH towards achieving the vision and goals according to the national and international benchmarks.

1.5 ORGANISATIONAL STRUCTURE

MOH is led by the Health Minister, assisted by two (2) deputies, and directed by the Secretary-General of Health and Director-General of Health.

MOH is made up of eight (8) programmes (Figure 1)

- Management
- Finance
- Medical
- Public Health
- Oral Health
- Research and Technical Support
- Pharmaceutical Services
- Food Safety and Quality

R&TS Programme headed by the Deputy Director-General of Health (R&TS) carries out activities that are aimed at providing technical and support services to the other programmes within MOH. R&TS Programme consists of the Planning Division, Engineering Services Division (ESD), Medical Radiation Surveillance Division (MRSD) and six (6) research institutes under the National Institutes of Health (NIH) (Figure 2).

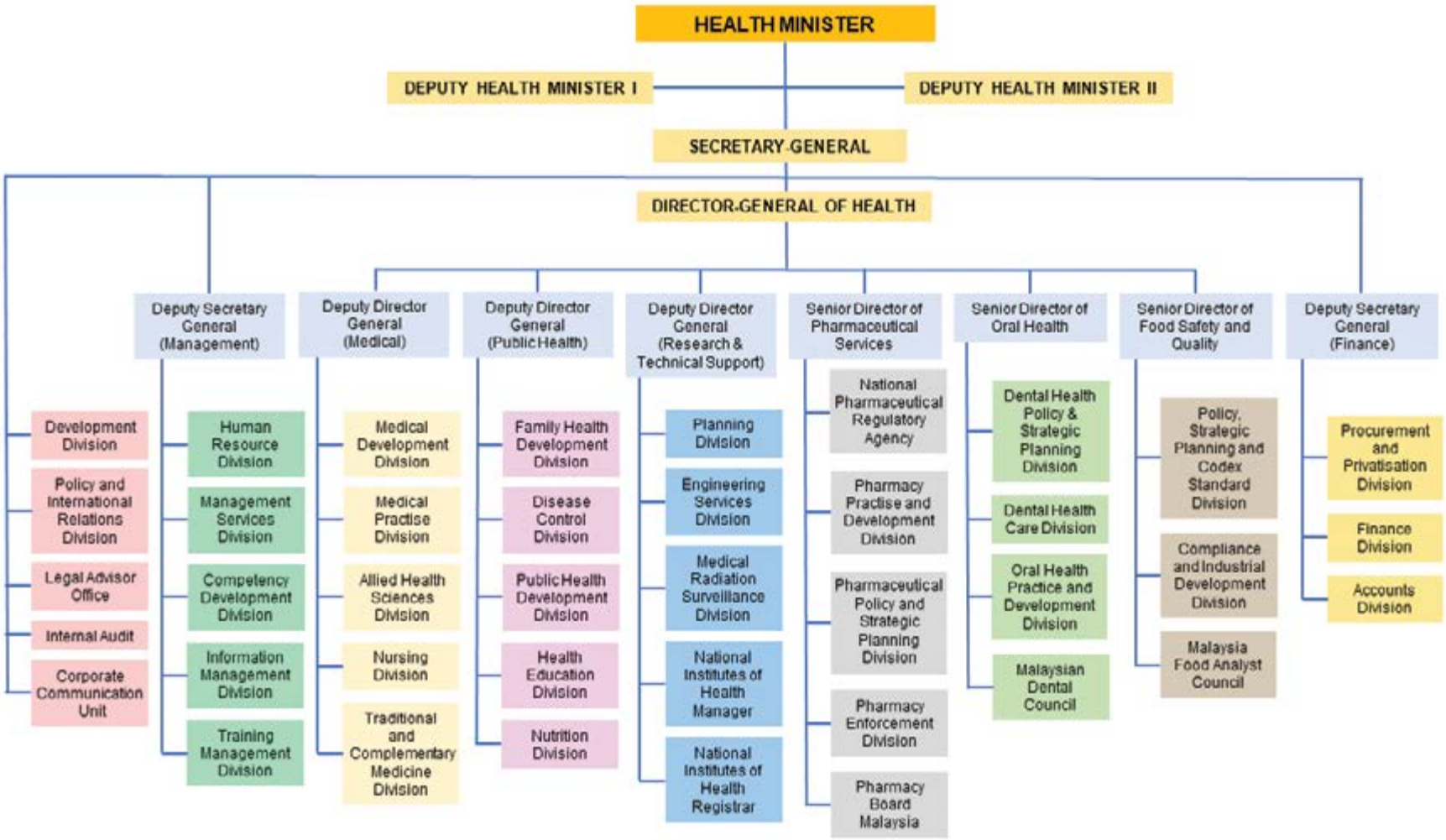

Figure 1: MOH Organisational Structure

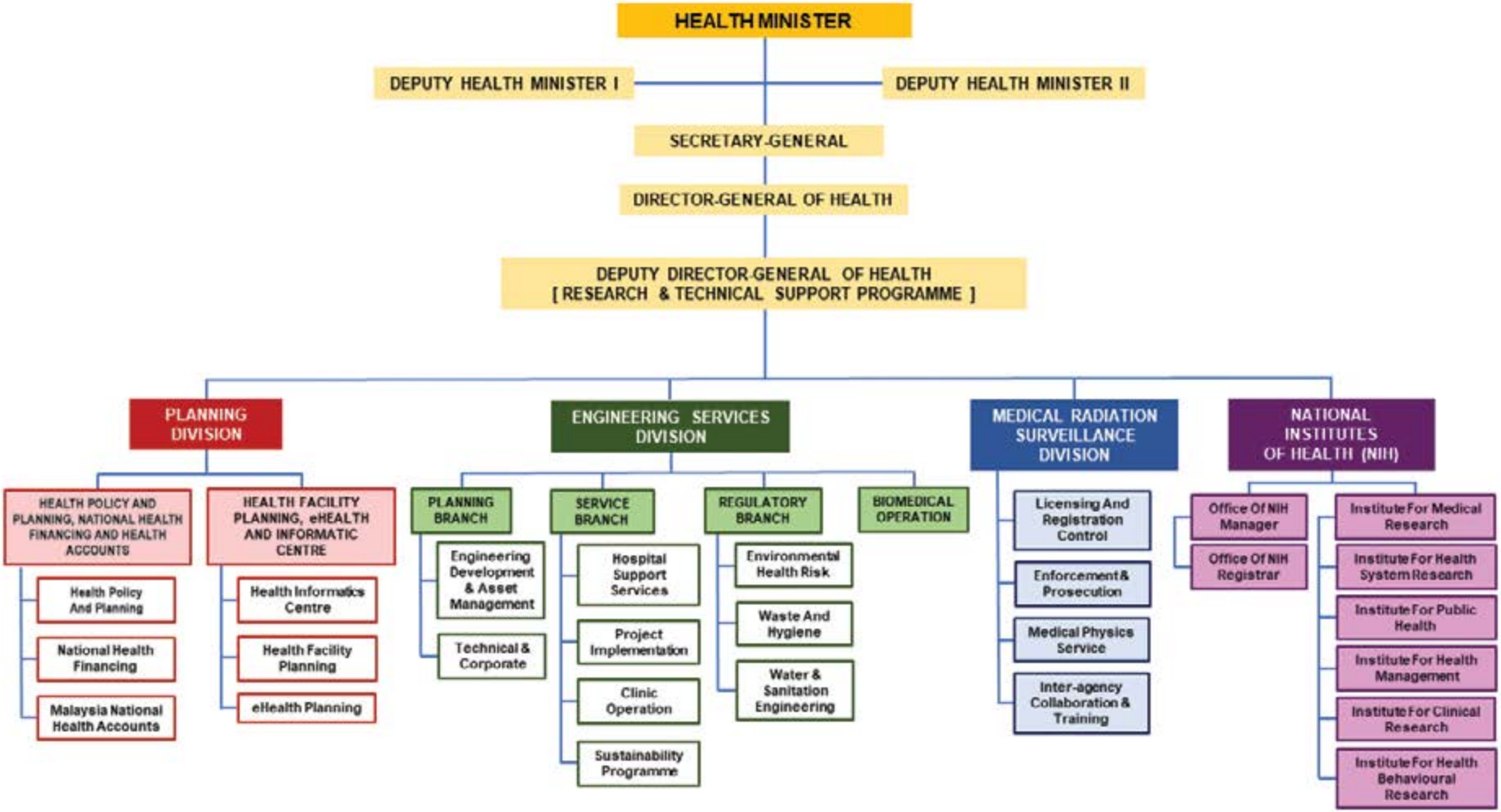

Figure 2: R&TS Organisational structure

1.6 SCOPE AND FUNCTION

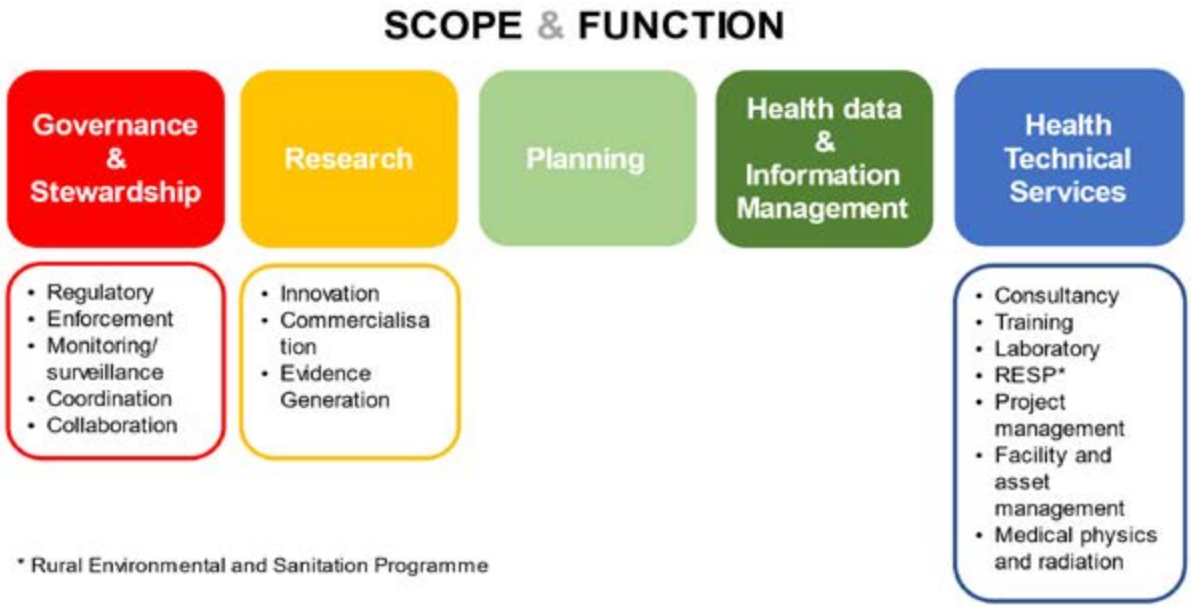

Figure 3: Scope and function of the R&TS Programme

1.6.1 Planning Division

Main functions of the Planning Division:

- To coordinate the formulation of health policy and health plans
- To conduct situational analysis and research related to Human Resource for Health (HRH)
- To plan the national health financing reform towards an affordable, accessible, equitable and sustainable health care system
- To plan and implement development projects of new and existing healthcare facilities
- To develop and implement the national digital health strategic plan towards attaining an integrated health information system
- To develop, maintain, and monitor the utilisation of the Health Informatics Standards in Malaysia
- To analyse and produce macro-level national health expenditure estimates through a standardised and acceptable methodology
- To commission research related to health planning
- To provide consultation and expert opinion related to health planning

1.6.2 Engineering Services Division (ESD)

Main functions of ESD:

- To provide engineering and technical support services for the medical and health programmes
- To ensure all public water supply is safe and to protect the public from adverse air quality and indoor environment conditions
- To improve the environmental sanitation, proper management of solid, clinical and toxic wastes, and to ensure proper wastewater management system
- To support effective and proper functioning of building, appropriate maintenance of healthcare facilities and medical equipment
- To monitor and evaluate the project implementation of new or upgrading

of healthcare facilities and engineering system replacement in healthcare facilities

1.6.3 Medical Radiation Surveillance Division (MRSD)

Main functions of MRSD:

- To develop sustainable policy and plan in Medical Radiation & Physics Programme
- To regulate and enforce all activities related to the Medical Radiation & Physics Regulatory Control Programme in medicine
- To provide consultation, technical expertise, and regulatory advisory in medical radiation and physics services
- To manage public health and safety issues related to radiation and medical physics

1.6.4 National Institutes of Health (NIH)

Main functions of NIH:

- To conduct effective and high impact health research that will improve the quality of life of the people
- To govern and manage health research in Malaysia that will address national health priorities
- To conduct training related to health research
- To provide consultancy for health research
- To provide lab-based research on diagnostic services

There are currently six (6) institutes under the ambit of the NIH each with its own niche area of expertise and research:

i. Institute for Medical Research (IMR) was set up to address biomedical research needs with the focus on lab-based research on diagnostic and treatment of patients as well as disease control measures
ii. Institute for Public Health (IPH) was established to improve public health in the country through epidemiological and public health research, MOH staff training in the field of epidemiological research and public health field, consultancy, and technical support services
iii. Institute for Clinical Research (ICR) addresses clinical demands for improving patient care via clinical research
iv. Institute for Health Systems Research (IHSR) conducts health policy and systems research for continual improvement of health systems and for the provision of quality health service delivery
v. Institute for Health Management (IHM) conducts health management related research
vi. Institute for Health Behavioural Research (IHBR) conducts communication and health behaviour research

Chapter 2

ACHIEVEMENTS (2016-2020)

ACHIEVEMENTS (2016-2020)

The R&TS Programme has made significant contributions to the overall improvement of the health sector in the country. Its major achievements are categorised under these main topics:

2.1. GOVERNANCE AND STEWARDSHIP

2.1.1. Governance, Monitoring and Evaluation Committee (GMEC) for PeKa B40

NHF had led the efforts to establish ProtectHealth Malaysia (PHM) as the holding company and its subsidiary, ProtectHealth Corporation Sdn Bhd (PHCorp), both non-profit entities, wholly owned by the Ministry of Health (MOH) which lays the groundwork for transforming the financing of Malaysia's health system.

GMEC is responsible for monitoring and evaluating the performance of PHM and PHCorp, ensuring both companies attain their social objectives and long-term visions, and are aligned with the health system and health financing priorities of MOH.

The committee was established in 2019 and is chaired by the Deputy Director-General of Health (R&TS). It comprises representatives from within MOH, academia and other government agencies. Planning Division acts as the secretariat for this committee.

GMEC receives and reviews periodic reports and data of both PHM and PHCorp performances through various performance indicators, identifying areas for improvement and providing recommendations to the Health Minister.

2.1.2. Radiation Health Control Programme

The Radiation Health Control Programme was implemented to ensure Malaysians are safe from the harmful effects of ionising radiation. MRSD is responsible to ensure all public and private medical facilities including veterinary services using ionising radiation comply

with the minimum radiation safety, security, and safeguard requirements. The license or registration of the facilities will be issued upon compliance with specific requirements.

Up to December 2019, there was a total of 4,594 private and public medical institutions which were licensed or registered. There was a total of 8,513 irradiation apparatus and 734 radioactive sources (576 sealed sources and 158 unsealed sources) that were registered or licensed in the public and private medical institutions. Nine (9) medical physics consultancy companies were licensed to carry out medical physics services as well as to support the programme.

In 2019, MRSD had issued and circulated ten (10) legal and non-legal documents related to the use of ionising and non-ionising radiation. To ensure the compliance to all regulatory requirements, MRSD also conducted surveillance and enforcement activities. As of 2019, a total of 1,129 medical institutions were inspected which included 214 government facilities and 915 private premises.

2.1.3. Sustainable Development Goals (SDG) and Universal Health Coverage (UHC)

The Planning Division is the SDG and UHC Secretariat for the health sector. MOH reports SDG and UHC achievements to two (2) main bodies namely the World Health Organization (WHO) and the Department of Statistics Malaysia (DOSM).

SDG and UHC Technical Committee was established in 2018 to monitor the health sector's progress towards achieving the 2030 Agenda. The committee, comprising of members from various divisions in MOH, is responsible to report the achievements of SDG and UHC indicator, analyse and suggest remedial actions for targets not achieved. These reports are submitted to the secretariat, who then subsequently submit the final report to WHO and DOSM.

The Planning Division together with relevant stakeholders had published the first SDG UHC achievement report namely Health in the Sustainable Development Goals (SDG) and Universal Health Coverage (UHC): Progress Report for Malaysia 2016 – 2019.

2.1.4. Quality Assurance/ Quality Improvement (QA/ QI) Initiatives

As WHO Collaborating Centre for Health Systems Research and Quality Improvement, IHSR has the role of working with WHO and its affiliates not only via research that focuses on strengthening the health systems and improvements in the quality of care but also in developing highly motivated human capital. On the national level, IHSR is also acknowledged as the Quality Assurance (QA) Secretariat that coordinates the training and development of QA Programmes within the MOH.

In 2019, IHSR was involved in the development of the Association of Southeast Asian Nations (ASEAN) Recommendation on Quality Health Care in Primary Care. It also successfully organised the 10th National Quality Assurance Convention, themed "Quality-Driven Healthcare: The Heart of Universal Health Coverage", which was officiated by the Deputy Director-General (R&TS). The QA coffee-table book entitled The Decades-Long QA Odyssey was officially launched during the convention.

2.1.5. Strategic Partnership

Collaboration with the Joint Learning Network (JLN)

JLN is an innovative, country-driven network of practitioners and policymakers from

around the world who co-develop global knowledge products that help bridge the gaps between theory and practice.

The Planning Division had been appointed as the secretariat for the JLN Country-Core Group (CCG) Malaysia, led by the Director of the Planning Division. CCG Malaysia had organised various country specific activities, such as the Conference on The Country Progress in Harmonizing Provider Payment Mechanisms for UHC by the JLN Provider Payment Mechanisms (PPM) Technical Initiative: Primary Health Care Financing and Payment Collaborative on 16 to 18 April 2019. In addition, the Planning Division had been involved in other international JLN activities including:

- JLN 3rd In-Person Meeting on Domestic Resource Mobilization (DRM) Collaborative and The Efficiency Collaborative Product Launch in Manama, Bahrain (2 to 3 December 2019)
- JLN Global Meeting 2019 in Manama, Bahrain on 4 to 5 December 2019 under the theme "Drawing on the JLN's 10 years of knowledge to act on UHC commitments"
- JLN Learning Exchange on IT for Health Insurance Systems on 23 to 25 June 2019 in Kathmandu, Nepal

Protection and Security of Radioactive Sources

The technical cooperation activities with national and international agencies including peer review mission, physical protection and security of radioactive sources and training programmes.

MRSD has been actively involved in activities and programme to equip our medical facilities compliance through:

- International Atomic Energy Agency (IAEA) Integrated Security Support Plan (INSPP)/ The Office of Radiological Security (ORS) US Department of Energy, Pacific Northwest National Laboratory (PNNL)
- International Physical Protection Advisory Service (IPPAS)
- Security of Radioactive Sources Programme
- Security Culture Programme

Asia Pacific Health Accounts Experts Collaboration

Annual meetings of the Asia Pacific Health Accounts Experts convene health accounts experts from more than 25 countries in the WHO Western Pacific, South-East Asia, and Eastern Mediterranean regions. This collaborative meeting which is jointly organised by WHO, the Organisation for Economic Co-operation and Development (OECD) in Paris and the OECD Korea Policy Centre was established to promote regional collaboration in technical areas related to National Health Accounts (NHA). It also offers a platform for sharing expertise and experiences on the development of health accounts in the Asia Pacific region enabling an open discussion about methodologies and approaches in tracking various dimensions of health expenditures. During these annual meetings, the Planning Division actively participated and shared its experiences in producing NHA and transition to System Health Accounts (SHA) 2011 framework.

Systematized Nomenclature of Medicine (SNOMED)

Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT) is the most comprehensive clinical terminology in use globally which is owned, maintained, and distributed by SNOMED International. MOH was elected to co-host the 2019 SNOMED CT Expo and Business Meeting organised from 26 October until 1 November 2019.

Malaysia is also involved in SNOMED CT User Support Group for Dentistry and Oral Health, and Drug Extension/ Pharmacy to discuss and verify the implementation of SNOMED CT on the stated group. Malaysia also contributed to the SNOMED CT Web Series on sharing the

experience and knowledge on using Natural Language Processing (NLP) to generate analysis based on SNOMED CT code.

WHO Collaborating Centres

Two (2) agencies in R&TS Programme have been designated as WHO Collaborating Centres namely:

- IMR as WHO Collaborating Centre for Ecology, Taxonomy and Control of Vectors of Malaria, Filariasis and Dengue (MAA-13 WPRO)
- IHSR as WHO Collaborating Centre for Health Systems Research & Quality Assurance/ Quality Improvement (MAA-14 WPRO)

Southeast Asia Ministers of Education Organization for Tropical Medicine (SEAMEO TROPMED)

Southeast Asian Ministers of Education Organization (SEAMEO) is a regional intergovernmental organisation. The network serves as a focal point in education and research in tropical medicine and public health.

SEAMEO TROPMED Regional Centre for Microbiology, Parasitology and Entomology (Malaysia) is located at IMR. Its function is to facilitate the strengthening of national and institutional capabilities in research and human resource development through training and post-graduate's degree programmes, linkages, personal exchanges, scientific forums, technical consulting services, publications, and information dissemination.

Inter-Islamic Network for Tropical Medicine (INTROM)

INTROM is one of Inter-Islamic Network of Ministerial Standing Committee on Scientific and Technological Cooperation Programme (COMSTECH) established under OIC (Organisation of Islamic Cooperation). Since the establishment of INTROM, IMR which was entrusted to be the secretariat of INTROM has conducted several trainings and workshops on tropical related diseases. Until 2018, IMR had conducted eight (8) technical workshops under the flagship of INTROM. These workshops were successfully conducted with participations from various OIC states and non-OIC states.

2.2. HEALTH RESEARCH

2.2.1. Malaysia Health System Research (MHSR)

MHSR is a collaboration between the Government of Malaysia and Harvard University to produce a comprehensive, rigorous, and evidence-based analysis of the Malaysian health system, as well as to recommend policy changes for improvements. Three strategic recommendations were proposed by MHSR study:

a. Reform of service delivery with the development of the Enhanced Primary Health Care (EnPHC)
b. Development of a not-for-profit voluntary health insurance (VHI) as an initial step in the long-term strategy towards a sustainable health financing system
c. Organisational transformation of MOH to support the implementation of recommendations (a) and (b)

2.2.2. Wolbachia Project

IMR has been given a mandate to conduct a Wolbachia-based control strategy utilising the population approach to stop the escalating number of dengue cases every year. IHBR conducted the Risk Communication and Community Engagement for Wolbachia Project and launched the Guidelines for Community Engagement on Wolbachia. A kick-off ceremony was held on 7 July 2019 to officiate the release of Wolbachia-infected *Aedes aegypti* eggs for the control of dengue virus transmission.

Figure 4: Visit by His Excellency Dr. Takeshi Kasai, The WHO Regional Director for The Western Pacific to the Wolbachia Laboratory at IMR in July 2019

2.2.3. Community-Based Research and Public-Health Related Studies

IPH had conducted several population-based National Health and Morbidity Survey (NHMS); the first survey was conducted in 1986 and the latest one was in 2019. The survey served as an important platform in providing health related community-based data and information to support MOH in reviewing its health priorities, programme strategies, activities and planning the allocation of resources.

IPH had also conducted other community-based research and public-health related studies such as the Malaysian Burden of Disease (MBOD) Study. MBOD provides a comprehensive assessment of premature mortality and morbidity attributable to diseases, injuries, and various risk factors among the Malaysian population.

In addition, IPH also conducts numerous collaborative studies, locally and internationally in areas related to public health such as Global Adults Tobacco Surveys (GATS) and Global School-based Students Health Survey with WHO and Centre for Disease Control, Atlanta.

2.2.4. Radiation Safety Research Project

MRSD is currently involved in conducting research with the IAEA as listed below:

- IAEA Study on Used of CT in Patient with COVID-19 Pneumonia
- IAEA RAS9098 Strengthening Radiation Safety Infrastructure (Project cycle: 2018-2021)
- IAEA MAL2018055 Strengthening Legal and Infrastructure for Radiation and Nuclear Safety in Malaysia (Project cycle: 2020 -2021)

2.2.5. Biomedical Research

ESD is currently involved in conducting research as listed below:

- Dual-Patient ventilation using a single ventilator for use during ventilator shortage situation (Time frame: April 2020-December 2021)
- Application of 3D printing in ventilator development during ventilator shortage situation (Time frame: April 2020-December 2021)

2.2.6. Establishment of the Digital Health Research and Innovation (DHRi) Unit

DHRi Unit was established under the Director's office of ICR in 2020. The formation of DHRi is in line with 12MP planning that emphasises on Industrial Revolution 4.0 (IR 4.0) and the priority of niche areas, especially precision medicine, digital health, and clinical trials hub. The unit was established to support, coordinate and conduct research in digital health and innovation, especially within MOH.

DHRi also aims to strengthen collaborative digital health and innovation research between government agencies, academic institutions, private agencies, and NIH. DHRi leads research related to digital technology by focusing on the Internet of Medical Things (IoMT), big data analytics, artificial intelligence and robotics, medical websites and mobile applications, digital clinical trials, and medical devices.

2.2.7. Establishment of the Engineering Research Unit (ERU)

The establishment purpose of ERU was for it to become the main research platform in the field of health facilities and biomedical engineering in Malaysia. This unit which combines expertise from universities, industry and MOH aims to produce engineering solutions, various innovations and technologies made in Malaysia to be used in the delivery of MOH services.

The main objectives of the establishment of ERU are as follows:

- To implement research activities for the healthcare facility
- To study, design and produce innovative local products in the field of healthcare facilities and biomedical engineering
- To develop local expertise in the field of healthcare facilities and biomedical engineering
- To coordinate and create a platform for discussion, research and cooperation with universities and industry for the implementation of research in the field of healthcare facility and biomedical engineering
- To carry out a systematic assessment of existing technologies, innovation projects or the production of prototypes related to the healthcare facility

2.3. HEALTH PLANNING

2.3.1. Formulation of Policy and Health Plans

Health planning is done based on needs assessment and allocation efficiency in order to attain the appropriate level of access and equitable distribution of scarce resources. To ensure that the development of health services is congruent with the needs of the community, a bottom-up and top-down planning approach is followed. This process is coordinated by the Planning Division.

These health plans are developed in line with the National Economic Development Plans: The Five-Years Malaysia Plans which are compiled at the central level by the Economic Planning Unit (EPU). These plans are then translated into MOH Strategic Plan to achieve the level of health status the population enjoys today.

Figure 5: MOH Strategic Plan 2016-2020, MOH Action Plan 2016-2020 and Mid Term Review of 11th Malaysia Plan 2016-2020

2.3.2. Consent Model Framework for Health Information Exchange

The Malaysia Health Information Exchange (MyHIX) is an integrated health information platform that enables secure and timely exchange of patient's health information between health care providers. Following a series of workshops in 2019 and 2020, a Consent Model Framework for Health Information Exchange was developed. This framework had been presented to the National Health Informatics Committee in September 2020 and was endorsed by the committee.

2.3.3. Establishment of the Regulatory Framework for Online Healthcare Services (OHS)

MOH Planning Steering Committee in its meeting on 9 November 2018 had agreed upon the establishment of a regulatory framework for OHS to align with MOH way forward of "bringing services to the home". OHS is a method of delivering healthcare services which are enabled by digital health platforms. The inception of planning activities and initial stakeholder engagement began in 2019, and formal work towards the establishment of the regulatory framework commenced in March 2020.

2.3.4. Government Enterprise Architecture (GovEA)

The Business Reference Model for the Health Sector document was presented during MOH Planning Steering Committee meeting in November 2018. A business reference model is a reference model, concentrating on the functional and organisational aspects of the core business of any enterprise, service organisation or government agency.

The Planning Division was instructed to lead the activity of refining the model with inputs from all Programmes within MOH. Subsequently, a series of workshops on GovEA was conducted in 2019, with knowledge transfer sessions by subject matter experts from the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU). The refined model was accepted by MAMPU in 2020, as the Business Reference Model for the Health Sector in Malaysia.

Figure 6: Malaysia Government Enterprise Architecture (MyGovEA) Public Sector Reference Model, October 2020

2.3.5. Establishment of *Skim Peduli Kesihatan Kumpulan B40* (PeKa B40)

PeKa B40 is an initiative by the Malaysian Government and MOH which aims to address the health needs of lower income groups, with an emphasis on non-communicable diseases (NCDs). It focuses on improving accessibility to primary care and strengthening public-private partnerships through the involvement of private medical clinics and private laboratories in providing health screening services.

PeKa B40 is operationalised through PHCorp, a not-for-profit company under MOH. The four (4) benefits offered through PeKa B40 are Health Screening, Health Aid, Completing Cancer Treatment Incentive (CCTI), and Transport Incentive (TI). Following the success of PeKa B40 in 2019, the scheme has been expanded to cover the B40 group aged 40 years and above.

2.4. HEALTH DATA AND INFORMATION MANAGEMENT

2.4.1. Establishment of Annual National Health Expenditure and Primary Health Care Expenditures Reporting

MOH regularly submits the macro-level national health expenditure estimates according to WHO request formats to the Global Health Expenditure Database (GHED). Since 2019, to keep in line with the revised version of SHA 2011 produced by related international organisations such as OECD and WHO. The Planning Division developed a manual coding system that will enable the health expenditure data to be reported based on the Malaysia National Health Accounts (MNHA), SHA 1.0 and SHA 2011 frameworks.

The Planning Division maintains accountability and transparency by establishing MNHA Technical Advisory Committee to review and validate the data and analysis on a regular basis. In addition to this, MNHA Steering Committee comprising of representatives

Table 1: Total beneficiaries for PeKa B40 benefits since 2019

BENEFITS	BENEFICIARIES 2019	BENEFICIARIES 2020 (Up to 31 December)
Health Screening	**236,235**	**225,103**
Health Aid	**5,610**	**14,738**
Completing Cancer Treatment Incentive (CCTI)	**1,684**	**1,842**
Transport Incentive (TI)	**5,649**	**2,891**

of various public and private agencies co-chaired by the Secretary-General of MOH and the Director-General of Health annually reviews and endorses the health expenditure estimates produced. All endorsed reports are published and broadly shared locally and internationally. Upon endorsement of the boundaries by the Technical Advisory Committee and Steering Committee, the Planning Division successfully produces the Primary Health Care and Primary Care health expenditure estimates on an annual basis.

2.4.2. Human Resources for Health (HRH) Country Profiles

The Planning Division had published three (3) HRH reports, namely:

- HRH Country Profiles Malaysia 2013
- HRH Country Profiles Malaysia 2015
- HRH Country Profiles Malaysia 2015-2018

The first two (2) reports were published in collaboration with WHO. The latest report was published using the National Health Workforce Account framework in line with the Global Strategy on Human Resources for Health Workforce: Workforce 2030.

2.5. HEALTH TECHNICAL SERVICES

2.5.1. Talent Grooming Programme (TGP) for Healthcare Professionals

TGP was initiated and developed in 2014 by IHM in response to the need for MOH to develop its own systematic and specialised programme for succession planning and developing good healthcare leaders of the future. Prior to this, succession planning was found to be a troublesome exercise even though there was informal coaching done at various levels through various methods.

Therefore, through TGP's framework, MOH would be able to identify, nurture, and harness the leadership potential among our very own technical healthcare professionals, in a more integrated approach that can be carried out at all levels of MOH. The aim is to improve the health system performance and the health status of the population through effective healthcare leadership. Up to 2019, there had been 11 cohorts with a total number of 202 talents and among them, 51 talents had successfully completed the programme.

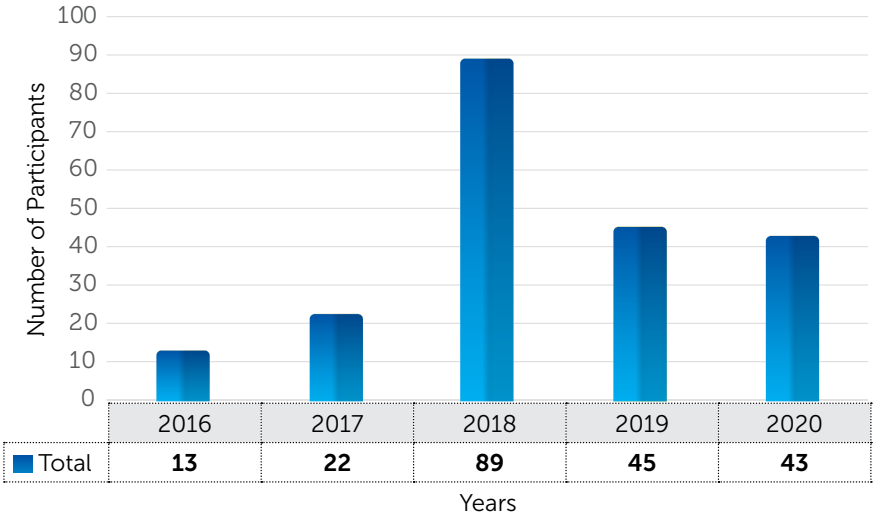

Figure 7: Number of new ICD-10 expert coders (2016-2020)
Source: Health Informatic Centre, MOH

2.5.2. Training and Certification of Coders (ICD-10 and ICD-9-CM)

International Classification of Diseases (ICD) is an internationally recognised disease classification standard. Malaysia adopted ICD 10th Revision (ICD-10) for diagnosis and ICD 9th Revision – Clinical Modification (ICD-9-CM) for procedures recording since 1999. The Certification of Coders (COC) for ICD in Malaysia is a formal process to assess and certify ICD coding competency at least twice annually. The activities involve formal lectures with hands-on practice sessions and written examination at the end of the course.

2.5.3. Development of Pre-Approved Plan (PAP) Designs for Healthcare Facilities and Room Data Standardisation

In the process of planning and development of healthcare facilities, it is crucial to identify the needed services together with the project costs from decision makers at all levels. Standard plans are used as the basic reference in meeting specific needs and requirements to ensure functionality of the healthcare facilities.

With collaboration of the Public Work Department (PWD), the Planning Division had produced standard designs, also known as the Pre-Approved Plan (PAP) for seven (7) different types of primary healthcare centres to cater for different categories of the population. There have been several new health clinics which utilised PAP designs in their constructions, such as Batu Muda Health Clinic (Type 2), Bandar Tun Hussein Onn Health Clinic (Type 3) and Maran Health Clinic (Type 5).

The application of PAP designs in health clinics construction allows a shorter period of planning and design phase, thereby resulting in the reduction of project implementation costs. The PAP also provides alternatives in health clinic building design. The introduction of PAP design for health clinics is one of the initiatives by the Planning Division to ensure construction projects are completed within the stipulated time.

Currently, the Planning Division is developing PAP designs for non-specialist hospitals and standard room data for all rooms (clinical and non-clinical) in hospitals and health clinics. Existing PAP designs are being modified and the concept of flexibility is also incorporated into existing designs to accommodate a sudden surge of patients. All these modifications are important for better health service delivery.

2.5.4. Specialised Diagnostic Services

Laboratory diagnostic support is of great importance for modern clinical medicine. It helps clinicians to make early and accurate diagnosis of disease states as well as monitor disease progression and response to treatment intervention. There are certain diagnostic tests that either require an expensive outlay for any centre to start services, or require laborious techniques to demand highly specific expertise, or simply are not so often requested to be economically done by each hospital in the country. There are also other tests that if left undeveloped locally would then demand samples be sent overseas at great costs in terms of time and money.

Because of these, IMR takes the challenge to continually develop and provide the specialised diagnostic tests in accordance with the technology advancement in medicine. The number of specialised diagnostic tests provided by IMR is 402 (updated Dec 2020). Please refer to https://www.imr.gov.my/testlist for the updated IMR test list. IMR also provides services through research, for example in the COVID-19 case, IMR

conducted genome sequencing of COVID-19 viral isolates and clinical samples to provide new knowledge on the virus and patients infected by the virus.

2.5.5. Test Kit Evaluation

IMR is one of the reference laboratories along with the National Public Health Laboratory that is authorised by the Medical Device Authority (MDA), Malaysia to evaluate diagnostic test kits. IMR evaluates 100-200 test kits in a year.

2.5.6. Good Lab Practice (GLP) Services

The certified organisation for OECD GLP facility in IMR focuses on conducting in vivo toxicology studies on rodents to determine the safety level of products proposed to be registered with Regulatory Authorities worldwide. The preclinical data is required for the product, such as pharmaceutical, herbal and others before it can proceed to human clinical trials.

OECD GLP compliance is the highest standard of laboratory practice thus ensures data quality and integrity when safety evaluations are conducted during product development. IMR has conducted a total of ten (10) GLP studies so far.

IMR is also one of the laboratories with GLP certification for testing vector control products. This is part of the effort by WHO Vector Ecology and Management unit to strengthen the capacity of research laboratories towards compliance with OECD GLP principles for the testing of vector control products submitted by pesticide manufacturers.

2.5.7. Technical Advice and Consultation

Consultation on Research-Related Activities

Consultation is one of services provided by R&TS Programme. NIH provided consultation on research-related activities to local and international agencies includes:

- IMR participates and sits in Advisory Boards especially within the Ministry of Science, Technology and Innovation (MOSTI), Ministry of Agriculture and Food Industry, Department of Veterinary Services Malaysia and others through its various technical centres
- IPH provides consultation services to various local agencies such as the Ministry of Women, Family and Community Development in sexual reproductive health studies and the Ministry of Education in Disability study, as well as international organizations such as UNICEF on Disability Study and Violence against Children review
- IHSR regularly received visitors from foreign countries who wished to learn more about Malaysia's health system through the network as a WHO Collaborating Centre
- Sector of Biostatistics and Data Repository, NIH provides consultation and technical support on research methodology and biostatistics to researchers within and outside NIH

On the other hand, MRSD provides medical physics and medical radiation services, particularly to the hospitals and clinics under MOH. In 2019, a total of 1,080 technical advices pertaining to ionising radiation (IR) and non-ionising radiation (NIR) activities were provided to MOH hospitals and clinics. Besides, MRSD also addresses public health issues resulted from the use of NIR in

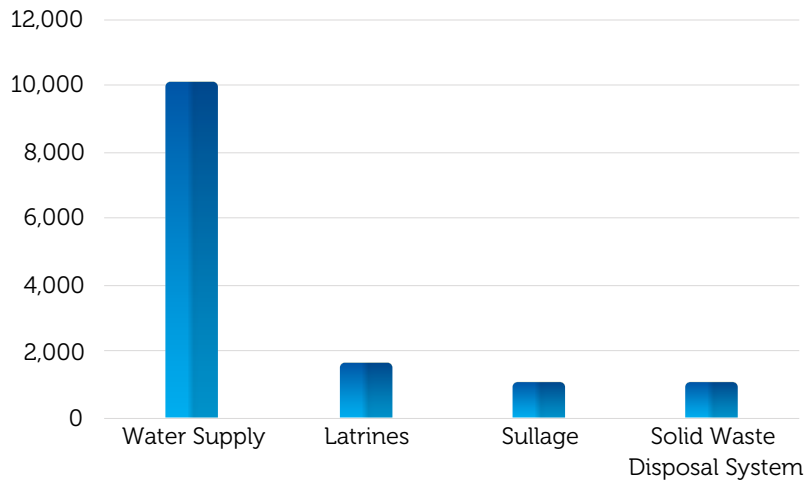

Figure 8: Total construction of rural water supply, latrine, and solid waste management system by the Ministry of Health (2016-2019)
Source: Engineering Services Division, MOH

telecommunication systems, high voltage cables, electrical substations, and home appliances.

While ESD provides technical advices in the study of new and innovative technologies such as UV light, screening booths (e.g., COVID-19 Mobile Test Unit (COMBAT), Isolate, Examine & Sampling (I3S)), and disinfection chambers conducted by universities and industries.

Rural Environmental Sanitation Programme (RESP)

RESP or *Program Bekalan Air dan Kebersihan Alam Sekeliling* (BAKAS) is the oldest programme in ESD where simple and low-cost technologies are adopted with respect to design, construction, and maintenance of alternative water supply schemes and sanitation systems in rural areas.

Under this programme the basic amenities provided to the rural areas involve water supply systems such as gravity feed systems, sanitary wells with or without home-connections, rainwater harvesting systems and connections to the public water supply systems (if available). As for basic sanitation amenities, sanitary latrines, solid waste management systems and sullage disposal management systems are provided.

National Drinking Water Quality Surveillance Programme (NDWQSP)

The key objective of NDWQSP is to enhance the quality by ensuring the safety and acceptance of drinking water delivered to the general populations through effective surveillance activities. For public water supplies, the National Drinking Water Quality Standards has been established. It sets limit for physical, microbiological, chemical, and radiological parameters. From 2016 to 2019, a total of 758,424 water samples were taken for testing from 561 public water supply systems.

Indoor Air Quality (IAQ)

IAQ issues occur mainly in buildings operated by a Mechanical Ventilating and Conditioning (MVAC) system including air-cooled split units. Numerous sources of indoor air contaminants such as Environmental Tobacco Smoke (ETS), biological contaminants, and Volatile Organic Compounds (VOCs) or insufficient ventilation may cause IAQ problems.

IAQ activities under ESD include the annual monitoring of 11 parameters in 13 health state departments and five (5) MOH main blocks in Putrajaya. IAQ compliance to the Industry Code of Practice (ICOP) for Indoor Air Quality (IAQ), 2010 for MOH premises (2014-2019) are shown in **Table 2**.

Table 2: Percentage of Indoor Air Quality (IAQ) compliance to the Industry Code Of Practice (ICOP) for IAQ, 2010 for MOH Premises (2014-2019)

IAQ Parameters & Contaminants	MOH (Putrajaya) %	Health State Department %
Physical	18-93	52-87
Chemical	83-100	83-100
Biological	88-98	93-100
Ventilation Rate	58	68

Source: Engineering Services Division, MOH

2.5.8. Healthcare Facility Management

Hospital Support Services (HSS) and Clinics Support Services (CSS)

Privatisation of health facility support services was initiated by the Government with the aim to increase the efficiency of health facility support services. The new HSS Agreement effective date commenced from 1 April 2015 until 31 March 2025. HSS Agreement composed of six (6) services:

- Facility Management Services (FMS)
- Facility Engineering Maintenance Services (FEMS)
- Biomedical Engineering Maintenance Services (BEMS)
- Healthcare Waste Management Services (HWMS)
- Cleansing Services (CLS)
- Linen and Laundry Services (LLS)

The agreement also consists of Sustainability Programme and the development of Asset and Services Information System (ASIS). **Table 3** indicates the asset brief descriptions for implementation of HSS in hospitals and institutions between 2016 to 2019.

ESD has implemented a Clinics Support Services (CSS) project at selected health clinics in 14 states throughout the country. The project consists of four (4) services which include:

- Facility Engineering Maintenance (FEMS)
- Biomedical engineering maintenance (BEMS)
- Cleansing services (CLS)
- Clinical waste management (CWMS)

The scope of the project involves the implementation of planned preventive maintenance (PPM) and corrective maintenance (CM) works.

Table 3: Asset brief details for the implementation of HSS in hospitals and institutions (2016-2019)

ITEM	2016	2017	2018	2019
Number of hospitals and institutions	148	148	148	148
Floor area (m^2)	6,111,210	6,111,210	18,278,987	17,400,388
FEMS assets	492,493	592,378	701,841	831,666
BEMS assets	278,032	277,380	201,795	290,071

Source: Engineering Services Division, MOH

Biomedical Engineering

The monitoring of BEMS for 148 MOH hospitals within the HSS contract is performed through monitoring of key performance indicator (KPI) on uptime which is shown in **Table 4.** Besides that, the Medical Equipment Enhancement Tenure (MEET) contract was signed with Quantum Medical Solutions Sdn. Bhd. on 17 April 2014 for a period of 13 years with the scope involved as follows:

- Perform comprehensive maintenance of biomedical equipment at Health and Dental Clinics involved (Selangor, Malacca, Negeri Sembilan, Johor, Perak, Penang, Sabah, Sarawak, WP Kuala Lumpur & Putrajaya, WP Labuan and ILPKKM (Georgetown)).
- Supply new biomedical equipment categorized as Gap equipment.
- Perform construction and renovation work (CW) for the supply of equipment involved.

By the end of 2019, the total number of clinics involved was 3,038. The Uptime Guaranteed KPI referring to the percentage of biomedical equipment that reaches uptime where equipment is functional and can be used in the delivery of effective health services for the Medical Equipment Enhancement Tenure (MEET) programme is also being monitored. The uptime KPI for MEET is shown in **Table 4.**

In line with contract requirements and the Medical Device Act 2012 (Act 737), ESD also published the Handbook on Competency in BEMS to be used by all technical personnel involved with BEMS maintenance activities. Additionally, the guideline for testing and commissioning for medical equipment in MOH facilities was also published in 2019.

Sustainability Programme (SP)

In order to adopt green and low carbon initiatives to achieve smart and sustainable healthcare facilities, MOH has embarked on sustainable programme in all healthcare facilities. Under the programme, MOH has been leading by example in the public sector and aims to be at the forefront in implementing sustainable strategies towards green building certification in the country.

MOH witnessed many achievements since the introduction of green building policy in its facility management in 2015. The most notable achievement of the programme was the green building certification in Hospital Sultanah Maliha, Langkawi under Leadership in Energy and Environmental Design (LEED). The hospital is currently the only Gold Level certified under LEED (Operation & Maintenance) version 4 in the world and the only LEED certified Government building in Malaysia. Among the achievements of the programme are as shown in **Figure 9.**

Table 4: Uptime Achievement for BEMS Engineering Asset/ System for HSS Contract and Biomedical Equipment within MEET programme

INDICATOR	TARGET (%)	ACHIEVED TARGET	
		Number	Percentage
Uptime for total BEMS engineering asset/ system for HSS contract (119,678 equipment)	92.0	118,481	99.0
Uptime for total medical equipment for MEET contract (79,265 equipment)	90.0	77,534	97.8

Source: Engineering Services Division, MOH

Figure 9: Sustainability Programme Achievement up to 2019

Source: Engineering Services Division, MOH

2.5.9. Development of Engineering Professionals

Health services in Malaysia including its health facilities have been recognised by many parties including WHO as one of the best in the world. This success would not have been possible without the contribution of ESD as a technical reference source to MOH, which is a link between engineering and medical and general healthcare that is not implemented by other technical agencies in Malaysia.

Due to the hands-on experience and expertise in healthcare facilities, ESD is often referred to as a consulting agency by other government agencies and the private sector in the construction of health facilities and problems arising in the design and operation of such facilities. In meeting a long-term strategic requirement of specific high-skilled engineering expertise, six (6) MOH engineers are currently qualified with PhD degree while 30 others are with Master's degree qualifications from both local and foreign

universities. To date, the status of employees who have received professional recognition is as shows in **Table 5.**

2.5.10. Disaster Management

ESD plays a significant role in helping to provide treatment facilities and control measures and prevention of COVID-19. In helping to combat the COVID-19 outbreak, ESD has undertaken the following tasks:

- Upgrading the isolation room, Accident and Emergency Department (A&E) and Intensive Care Unit (ICU) wards in COVID-19 hospitals such as Hospital Sungai Buloh, Hospital Permai, Hospital Umum Sarawak, Hospital Sultanah Maliha, Langkawi, Hospital Bintulu, Makmal Kesihatan Awam, Kota Kinabalu, Makmal NIH and other COVID-19 hospitals.
- Acquisition and installation of ultravilot (UV) light equipment and negative pressure isolation tents such as those installed at the Hospital Sultanah Maliha, Langkawi and Hospital Sungai Buloh.
- Installation, testing & commissioning of medical equipment such as ICU beds and ventilators.
- ESD has also been responsible for ensuring the provision of linen, cleansing services, clinical waste management and management of engineering assets in the designated facilities.

Table 5: Number of MOH engineers with professional and competency recognition (as of July 2020)

NO.	PROFESSIONAL	NUMBER OF ENGINEERS
1.	**Professional Recognition**	**27**
2.	**Professional Technologies**	**10**
3.	**Competency Recognition**	
	Certified Healthcare Facility Manager (CHFM)	34
	Quality Assessment System in Construction (QLASSIC) from the Construction Industry Development Board (CIDB)	1
	Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST) from CIDB	5
	Leadership in Energy and Environmental Design (LEED) Green Associate from US Green Building Council	1
	LEED Accredited Professional from US Green Building Council	1
	Certified Environmental Professional in Sewage Treatment Plant Operation (CePTPO) from DOE	3
	IAQ Assessor from DOSH Malaysia	1
	Certified Energy Manager (CEM)	20
	Total	**66**

Source: Engineering Services Division, MOH

Chapter 3

ISSUES AND CHALLENGES

ISSUES AND CHALLENGES

There is concern regarding the sustainability of Malaysia's health system and its ability to meet the health needs of the population. This is due to changing of the socio-demographics and economics, as well as the evolving disease burden and current organisation of the health system.

Some of the key issues and challenges encountered are as follows:

3.1. AGEING HEALTHCARE FACILITIES AND EQUIPMENT

There are 78 hospitals in the Ministry of Health that is over 30 years old. Therefore, proper maintenance and upgrading are very much needed to ensure that the state of our infrastructure is able to cope with the continuous expansion of services. Health facilities such as hospital and laboratory are complex in design and construction due to their services requirement and the need to function 24 hours per day without fail. Quite often local consultant firms have limited experience and expertise in the design of health facilities.

Other than that, old medical equipment especially those beyond economic repair, including ambulances need to be replaced to keep abreast with the latest development of technology. Replacement and investment in non-medical equipment should be regarded as important as medical equipment, thus require proper planning.

There are a few issues involving ambulance services that can affect the function and delivery of pre-hospital and ambulance services. Strategic issues are as follows:

- Inadequate number of ambulances (additional facilities, emergency calls and ambulance disposal)
- Quality of ambulance manufacturing
- After-sales and maintenance services
- Ambulance accidents

Parking congestion in hospitals also pose a significant challenge and often gave rise to public complaints especially at the State Hospitals and Major Specialist Hospitals. Considering the fact that private vehicles are the preferable choice for commuting in Malaysia, this issue could not be resolved adequately.

3.2. COSTS AND FUNDING ISSUES

Intending to provide universal access to health care, healthcare facility planning and development face numerous challenges, particularly due to the increase of requirement and construction cost of new facilities and upgrading and replacement of obsolete health facilities. It is undeniable that health care costs and spending continue to rise and is expected to increase further in the future, especially with the advancement of technology and its implementation in health care services.

Therefore, financial constraint needs to be overcome with a new business model. For example, the EMR system cannot be implemented well without an adequate budget. This is because EMR implementation requires high initial costs which include hardware procurement and installation, software development, procurement, installation and deployment costs, staff change management programme, ongoing network fees and maintenance.

Other than that, there is a lack of sufficient funds to conduct research. Many researchers indicated the difficulty of completing quality research without the necessary resources such as dedicated research grant either for discovery or pre-commercialisation activities. Apart from that, the inability to utilise fund efficiently (e.g., bringing forward unused fund to the subsequent years) has contributed to sub-optimal management of fund which often leads to delay or failure to achieve the research objective.

Moreover, the cost of licensed electronic databases is remarkably high. Hence, NIH needs a sustainable fund for online database subscription to ensure the researchers have access to high impact journals. Hence, a flexible and efficient funding mechanism is required.

3.3. TIMELINESS OF DATA

It is well recognised that reliable data is vital for analysis and decision making. This is contributed by limitations in the availability of data across sectors, data inconsistency from various sources, poor human resource information management, method of data collection and submission. Hence, there is a crucial need to consolidate data collation and improve inter-sectoral coordination and collaboration.

Other than that, the lack of appropriate data backup and storage tools gives rise to the possibility of a loss of processes and database. Furthermore, reporting of official health data is highly dependent on data quality and completeness.

3.4. RAPID CHANGES IN TECHNOLOGY

The future of health care is progressing fast with advances in digital health care technologies, such as artificial intelligence, VR/AR, 3D-printing, robotics, or nanotechnology. Yet, we have not familiarised with the latest developments to be able to control technology and not the other way around. The future of healthcare lies in working hand-in-hand with technology. Healthcare workers need to embrace emerging healthcare technologies to stay relevant in the upcoming years.

Rapid changes in technologies require knowledgeable and experienced personnel in their specific field to provide maximum benefit and reduce special risk to patients and quality of service. The inability and incapability of the current electronic system to meet and perform current basic management need such as data analytics and remote office especially during the current pandemic COVID-19 situation.

The technology on Data Science and Big Data Analytics is rapidly evolving and the technology of the current platform in use seems to lag. Equipping the workforce with the necessary knowledge and skills with continuous Transfer of Technology is needed to ensure up-to-date knowledge and skills.

However, there are health practitioners who resist the idea of technological implementation in their organisation due to the lack of computer skills. Furthermore, smaller healthcare facilities like health and dental clinics do not own in-house technical teams to resolve technical problems immediately.

Interoperability, which is the capability of disparate EMR systems to exchange and share data from a range of sources, is a major barrier to adopt the EMR system. Interoperability is critical to get a complete picture of patients' health, whereby an interoperable system enables a seamless transfer of information among multiple healthcare providers. Lack of interoperability consequently leads to mismatched data entry or poor data integration.

3.5. SAFE HEALTHCARE FACILITIES AND EQUIPMENT

Recent attention in healthcare has been on the actual architectural design of a hospital facility, including its technology and equipment, and its effect on patient safety. At present, there are major advances in medical technologies that have been responsible for earlier and more accurate diagnoses, more effective treatments, and the ability of people to live longer, healthier lives. But new technology is the primary driver of rapidly rising health care expenditures, these advances do not come without a cost.

To address the problems of errors in health care and serious safety issues, fundamental changes of health care processes, culture, and the physical environment are necessary and need to be aligned, so that the caregivers and the resources that support them are set up for enabling safe care. The facility design of the hospital, with its equipment and technology, has not historically considered the impact on the quality and safety of patients, yet billions of dollars are and will be invested annually in healthcare facilities.

3.6. HUMAN RESOURCE CAPACITY AND CAPABILITY DEVELOPMENT

It is a well-known fact that the job-scope in the health sector is broad and challenging. In this regard, the level of competency of health care workers is crucial in providing quality health care services for the nation. Health care workers with basic qualifications need further training and experience before they can be proficient, and they need continuous training to update and upgrade themselves.

Insufficient and unequal distribution of human resources in addition to the lack of manpower in diverse categories hinders the implementation of various activities. The rapid turn-over of staff in all fields leads to inability to retain talents, resulting in shortage of trained personnel and subject matter experts thus becomes an enormous challenge for a sustainable quality healthcare delivery.

3.7. INCONCISE AND INCOMPREHENSIVE LEGISLATIVE ACTS

There are some WASH-related policies and regulations in place, but most of them have gaps with the enforcement which is often uneven. There is also no national programme targeting the implementation of WASH in healthcare facilities. No full picture of the national situation of WASH is captured in healthcare facilities in Malaysia. Some routine and ad-hoc surveillance are in place at the setting level, but the surveillance data are not all collected centrally and adopt for policy improvement. Therefore, there are concerns about the quality of data due to the application of non-harmonised indicators or poor methodology.

Another issue that needs to be addressed is regulatory oversight especially that involves exposure to patient radiation due to the promulgation of new subsidiary regulations under Act 304 including draft medical-related regulations. The development of concise and comprehensive regulations for more efficient and effective control will take some time.

3.8. INSUFFICIENT DISASTER PREPAREDNESS

Natural disasters and pandemics during the past several years had highlighted the issue of insufficient disaster preparedness in most countries. Over the years, there had been

many major disasters and crises that affected our nation resulting in loss of lives along with significant socioeconomic and health impacts such as:

- The 2002-2003 Severe Acute Respiratory Syndrome (SARS) outbreak, caused by the SARS coronavirus, had claimed 774 lives out of the 8,096 people infected globally after it was first detected in Beijing. Malaysia reported five (5) cases with two (2) deaths.
- Flood disaster in December 2014 especially in the East Coast, had affected several MOH hospitals and health clinics in six (6) states with displacement of more than 200,000 people and resulted in 21 casualties.
- Fire outbreak at the Sultanah Aminah Hospital, Johor, in 2016 with six (6) casualties.
- COVID-19 pandemic was declared by WHO on 11 March 2020. As of 31 December 2020, there were 113,010 confirmed cases and 471 deaths in Malaysia.

Therefore, improving disaster preparedness in the healthcare system is a critical issue. MOH should always remain vigilant and need to further intensify efforts to strengthen and enhance our preparedness and response capacity. ESD was involved directly and indirectly in providing health facilities during the disaster.

Chapter 4

STRATEGIC PLAN

STRATEGIC PLAN

This strategic plan was developed with a view to the future direction of R&TS Programme in aligning with the needs and the current situation of the government's plans.

Based on achievements, issues and challenges identified, R&TS Programme has come out with four (4) outcomes:

- Improved Access to Quality Healthcare
- Strengthened Governance, Regulations and Enforcement
- Quality, Impactful Research and Timely Data and Information
- Safe, Green and Efficient Healthcare Facilities and Services

In order to achieve these outcomes, there are six (6) strategies with related KPI's formulated as below:

- Strengthening Governance, Stewardship and Strategic Partnership
- Conducting Relevant and Impactful Research
- Enhancing Health Planning and Development, and Facility Management
- Accelerating Digital Trajectory and Data Analytics
- Enhancing Consultancy and Provision of Technical Services
- Intensifying Capacity Building

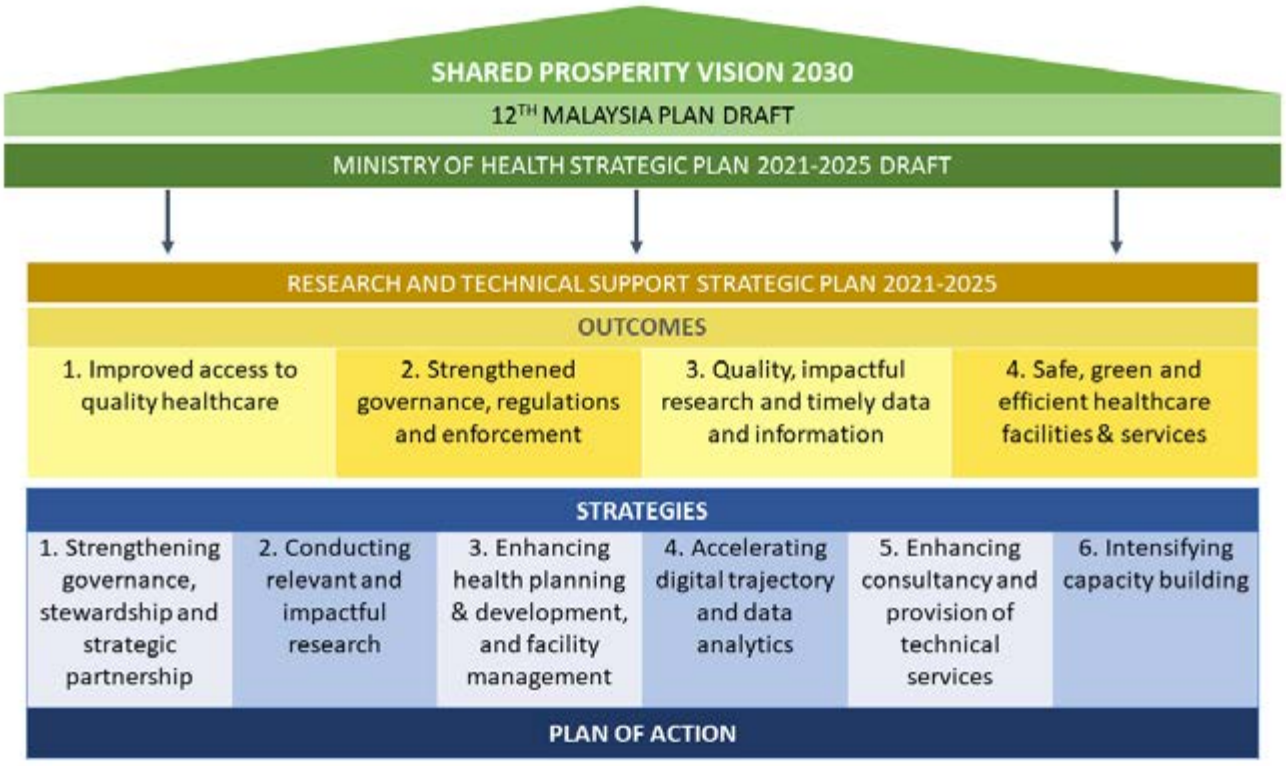

Figure 10 : R&TS Programme Strategic Plan 2021-2025

4.1. OUTCOMES

OUTCOME 01 **Improved Access to Quality Healthcare**

NO.	INDICATOR	TARGET						SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
		BASELINE ACHIEVED	2021	2022	2023	2024	2025	
1.	UHC score* **Consists of 14 indicators*	72.9	73.0	73.5	74.0	74.5	75.0	Planning
2.	Total Beds* per 1,000 population **Official beds*	1.95	1.98	2.00	2.02	2.04	2.06	Planning
3.	Total Consultation and Examination (CE) rooms in MOH Health Clinics per 10,000 population	-	3.04	3.04	3.04	3.04	3.04	Planning
4.	Percentage of Negeri Sembilan's population who are registered at MOH healthcare facilities with online Lifetime Health Record	-	-	-	40%	50%	60%	Planning
5.	Percentage of newly detected NCD under PeKa B40 health screening	-	30%	30%	30%	30%	30%	Planning
6.	Provision of water supply and sanitation facilities for rural area	96.75%	97.00%	97.00%	97.50%	97.50%	98.00%	ESD
7.	Percentage of research registered with NMRR approved within 3 months		80%	83%	85%	87%	90%	NIH

OUTCOME 02 Strengthened Governance, Regulations and Enforcement

NO.	INDICATOR	TARGET						SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
		BASELINE ACHIEVED	2021	2022	2023	2024	2025	
1.	Percentage of license issued under the Act 304* within 7 days after the completed document received ***Atomic Energy Licensing Act 1984***	90% (2020)	90%	90%	90%	92%	92%	MRSD
2.	Percentage of licensed premises comply with regulatory requirements under the Act 304	80% (2020)	85%	85%	90%	90%	90%	MRSD
3.	Percentage of premises comply with the Standard Image Quality Audit Criteria	60% (2019)	60%	65%	65%	70%	70%	MRSD

OUTCOME 03

Quality, Impactful Research and Timely Data and Information

NO.	INDICATOR	TARGET						SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
		BASELINE ACHIEVED	2021	2022	2023	2024	2025	
1.	Error Rate Study on ICD Coding	<15%	<15.0%	<12.5%	<10.0%	<5.0%	<5.0%	Planning
2.	Percentage of MOH facilities* in Negeri Sembilan integrated through a health information exchange platform **Hospital, Health Clinic, Dental Clinic*	-	-	-	20%	100%		Planning
3.	Number of health policy and clinical practices documents citing research output		2	3	4	5	6	NIH
4.	Percentages of research funding generated from extra-mural sources **Denominator: total research grant*		3%	4%	5%	6%	7%	NIH

OUTCOME 04

Safe, Green and Efficient Healthcare Facilities and Services

NO.	INDICATOR	TARGET						SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
		BASELINE ACHIEVED	2021	2022	2023	2024	2025	
1.	Number of facilities achieve Green Building certification	2	10	10	15	15	20	ESD
2.	Amount of electrical energy saving in kWh through energy efficiency and renewable energy initiatives	73mil (kWh)	75mil (kWh)	75mil (kWh)	80mil (kWh)	80mil (kWh)	85mil (kWh)	ESD
3.	Assets/ system meeting uptime target in hospital/ institution	93%	93%	93%	93%	93%	93%	ESD

4.2. STRATEGIES AND PLAN OF ACTION

Strategy 01

Strengthening Governance, Stewardship and Strategic Partnership

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	Develop Government's strategic health plans	Health plans prepared	MOH Strategic Plan 2021-2025		12th Malaysia Plan Mid-Term Review		13th Malaysia Plan (2026-2030)	Planning
2.	Monitor the achievement of health-related SDGs and UHCs	Health related SDG and UHC Progress Report prepared		Progress Report (2020-2021)		Progress Report (2022-2023)		Planning
3.	Inter-agency corporation and coordination	Number of collaborative platforms	6	6	6	6	7	Planning
		National Environmental Health Action Plan (NEHAP)	Planning of Action Plan	Implementation of Action Plan	Implementation of Action Plan	Implementation of Action Plan	Review of Action Plan	ESD
		Monitor the achievement of relevant SDG at various level through Water, Sanitation and Hygiene (WASH) initiatives	Related WASH progress report to WHO (bi-yearly)		Related WASH progress report to WHO (bi-yearly)		Related WASH progress report to WHO	ESD
4.	Establishment of Regulatory Framework for Online Healthcare Services (OHS)	Regulatory Framework for Online Healthcare Services is established	Develop policy for OHS registration	OHS Registration in Regulatory Lab	Refinement of OHS Regulatory Framework	Drafting of OHS Bill	Approval of OHS Bill	Planning
5.	The development of National Health Research Priority Area (NHRPA) for RMK13	RMK13 NHRPA document completed	-	-	Mid-term review of RMK12 NHRPA	-	100%	NIH

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
6.	Governance and Monitoring of MOH's Quality Assurance/ Quality Improvement Activities	Number of new collaborators engaged for QA/QI activities	1	1	1	1	1	NIH-IHSR
		Number of QA/ QI projects presented at national/ international platforms	-	≥ 70	-	≥ 70	-	
		Number of QA/ QI articles published in Journal QA/ QI	5	5	8	8	10	
7.	Development of relevant Act and regulation for enhancement of public health	Gazettement and enforcement of the Drinking Water Quality Act (DWQA) and regulations	Gazettement of the DWQA		Regulation of DWQA prepared	Enforcement of the DWQA and regulations		ESD
8.	Establishment of standards/ guidelines and code for practice for advancement in environmental and healthcare engineering service provision	ISO/ TC210/ WG7 on NP5137 – Good Engineering Maintenance Management of Active Medical Devices	Drafting	Public Comment/ Approval	Publication/ Implementation	-	Review	ESD
		Malaysian Standards (MS)/ Code of Practise (COP) - Publish	TC/ R/ 3 Anaesthetic/ Respiratory and Electro-mechanical Devices TC/ R/ 10 COP of Med-ical Devices and Facilities for Healthcare TC/ E/ 6 Electromag-netic Field Permanent	TC/ R/ 10 COP of Medical Devices and Facilities for Healthcare	TC/ R/ 10 COP of Medical Devices and Facilities for Healthcare	Review of COP on WG/ R/ 10-1 to 5	-	
		Guidelines established	BEE Index guideline	IAQ guideline for Hospital	-	-	-	

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
9.	Study on regulatory requirement for the usage of IR and Non-Ionising Radiation (NIR) equipment in medical	Report study on regulatory framework	Literature review and feasibility study	Expert mission / technical advice from international agencies	1st draft prepared	Final draft prepared	Implementation	MRSD
10.	Strengthening radioactive waste management in medical facilities	Guidance on radioactive waste management prepared	Preparation of criteria in line with current international standard	Data collection each facility	1st draft prepared	Final draft prepared	Guidance issued	MRSD
11.	Review Diagnostic Reference Level (DRL) in Radiology Services	Guidance on national DRL prepared	Methodology, measurement, and data collection	-	Data analysis and 1st draft	Final draft	Guidance issued	MRSD
12.	Strengthening on Implementation of Quality Assurance Programme (QAP) in accordance to Act 304	Quality Assurance Programme (QAP) in Radiology Services	Implementation data collection	Analyse implementation data	Final draft prepared	Implementation	Monitoring of QAP implementation	MRSD
		Quality Assurance Programme (QAP) in Nuclear Medicine Services	Implementation data collection	Analyse implementation data	Final draft prepared	Implementation	Monitoring of QAP implementation	
		Quality Assurance Programme (QAP) in Radiotherapy Services	Implementation data collection	Analyse implementation data	Final draft prepared	Implementation	Monitoring of QAP implementation	
13.	Quality Audit Management Programme	Percentage of implementation/ participation in the Quality Audit Management (QUANUM) Programme in Nuclear Medicine Services	20%	40%	60%	80%	100%	MRSD
		Number of Nuclear Medicine premises audited by national external auditors	2	2	2	2	2	

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
14.	Strengthening on security of radioactive sources	Percentage of medical facilities to comply with security requirement (Baseline – 2019: 83%)	83%	92%	92%	100%	100%	MRSD
15.	Development of Technology Foresight Roadmap in Medical Radiation	Report study on Technology Foresight Roadmap in Medical Radiation developed	Situational Analysis and need	Strategy alliance, budget, and approach identification	Training and Workshop 1 and 2	Training, Workshop 3, and draft report prepared	Finale medical physics and radiation technology foresight mapping report	MRSD

Strategy 02

Conducting Relevant and Impactful Research

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	Commissioning research related to planning	Number of research related to planning	5	2	2	3	-	Planning
2.	Increase collaborative research projects	Percentage of collaborative research projects with non-MOH researchers (government agencies, academia, industries, and others)	70%	75%	80%	80%	85%	NIH
3.	Conducting research in identified research domain based on RMK12 National Health Research Priority Area	Total number of new research conducted for all research domains by MOH researchers: 1. Improving the quality of and accessibility to health system 2. Communicable Disease 3. Non-communicable Disease 4. Elderly Population 5. Mental Health 6. Environmental and Disaster Risk 7. Nutrition, Food Safety, Food Security and Food Quality 8. Oral and Dental Health	50	50	50	50	50	NIH

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
	Conducting evidence-based R&D projects for prioritised environ-mental and healthcare engineering areas	2	2	2	2	2	ESD	
4.	Dissemination of research evidence produced by NIH	Percentage of completed re-search present-ed to engaged stakeholders	75%	80%	85%	90%	100%	NIH
		Percentage of publication in indexed journals	85%	85%	85%	90%	90%	
		Number of presentations at international conferences and scientific meetings	100	110	125	135	150	

Strategy 03

Enhancing Health Planning and Development, and Facility Management

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	Develop health facility masterplan	Health facility and human resource masterplan developed	Facility masterplan prepared				Facility masterplan reviewed	Planning
2.	Expand *Skim Peduli Kesihatan Untuk Kumpulan B40* (PeKa B40)	Wellness programme (6th Benefit) introduced	i. Feasibility study conducted ii. Pilot project conducted, focusing on selected models of delivery	Continuation of pilot project	Pilot project evaluated	Successful models scaled up in terms of funding and number of beneficiaries		Planning
3.	Reforming health financing system	Building capacity to run a health financing scheme (SPIKPA)	Electronic Service Provider function		Claims management function		Takaful operator role	Planning
4.	Develop and review MOH health facility planning norms and guidelines	MOH health facility planning norms and guidelines developed and reviewed	Develop standard list of equipment for KK2 to KK7	Develop standard list of equipment for non-specialist hospital	Review existing hospital planning norms & guidelines			Planning
5.	Develop standard room data in collaboration with PWD	Standard room data completed (specialised clinical rooms)	Additional 10 rooms	Additional 10 rooms	Review existing standard room data			Planning
6.	Revise Pre-Approved Plans (PAP) in collaboration with PWD for non-specialist hospitals and health clinics	Pre-Approved Plans revised	Type 2, 3, 5 and 7 Health Clinic PAP revision completed	Type 4 and 6 Health Clinic PAP revision completed			Non specialist hospital plans completed	Planning

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
7.	Safe, green, and efficient healthcare facilities and services	Building Condition Assessment (BCA) and improvement measures of identified aging hospital for health and safety compliance	BCA for 21 hospitals	BCA for 26 hospitals	Capital renewal and improvement based on BCA			ESD
			Implementation of upgrading aging hospital (3 Nos)					
		Improvement of telecommunication reception in hospital/ institution	1 pilot project		5	5	5	ESD
8.	Expansion of a comprehensive Facility Management to all MOH hospital/ institution/ clinic	Number of assets/ systems retrofitting, replacement and major rectification projects	50 projects	50 projects	50 projects	50 projects	50 projects	ESD
		New clinic support services (Existing-228 clinics)	50 Clinics	50 Clinics	50 Clinics	50 Clinics	50 Clinics	
		Expansion of Medical Equipment Enhancement Tenure (MEET) Programme in 5 states (Kedah, Perlis, Terengganu, Kelantan and Pahang)	5,255 EBE and 1,370 NBE/ PBE	5,255 EBE and2,781 NBE/ PBE	5,255 EBE and 3,986 NBE/ PBE			
9.	Monitoring of Radiation Protection Programme (RPP) implementation	Percentage of hospital that has established RPP	60%	60%	65%	75%	85%	MRSD

Strategy

04

Accelerating Digital Trajectory and Data Analytics

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	Enhance the Malaysian Health Datawarehouse (MyHDW) and all its components (SMRP, PRIS, eReporting etc)	Malaysian Health Datawarehouse (MyHDW) and all its components enhanced	Specification and Procurement	Project Initiated	Testing and commissioning			Planning
2.	Adoption of ICD 11	Transition to ICD 11 completed	Pilot at Hosp Port Dickson (HPD)	ICD-11 implementation at 70% facilities by end of 2022	Full ICD-11 at all government facilities implemented			Planning
3.	Revise My-Health Data Dictionary (MyHDD)	MyHDD revised	MyHDD version 2021 completed		MyHDD version 2023 completed		MyHDD version 2025 completed	Planning
4.	Enhance data access and information through technology	Number of projects completed	1	2	3	3	4	Planning
5.	National Electronic Medical Record (EMR) initiative	National Electronic Medical Record (EMR) initiative in Negeri Sembilan implemented	Procurement and project initiation	Project rolling out	Project rolling out	Project completion and evaluation	Project evaluation	Planning
6.	Publish MOH official reports on health statistics and health expenditure	Number of reports published every year	5	4	5	4	5	Planning
7.	System Health Accounts (SHA) 2011 expansion	Consumer interface for SHA 2011 implemented	Engagement with relevant sections and agencies conducted		Methodology for consumer interface finalised		MNHA report incorporates consumer interface for SHA 2011	Planning

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
8.	Development and validation of new tools and instruments	Development of integrated environmental health information system i. Malaysia Environmental Health Information System (MyEHIS) ii. Enhancing Environmental Health Risk Inventory (EHRI) iii. Malaysian Waste, Sanitation and Hygiene (My-WASH) *iv. Data Unit Pencemaran Air* (e-UPA)	E-UPA System developed	EHRI System developed	MyEHIS System developed	-	MyWASH System developed	ESD
9.	Upgrading of e-RADIA application system in meeting current basic computerisation need as well as national agenda in digitalisation and IR 4.0	e-RADIA application system upgraded	Assessment report prepared	Prepare replacement system design and proposal for JPICT approval	Tender Approved	1st Phase project implementation	2nd Phase project implementation	MRSD

Strategy 05

Enhancing Consultancy and Provision of Technical Services

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	International consultation	Number of international consultations	80	85	90	95	100	NIH
2.	Consultancy services provided to other agencies	Number of consultancy services provided to other agencies	10	10	10	10	10	NIH
3.	Inter ministry technical services	Percentage of technical services given to other ministries and agencies	10%	13%	15%	17%	20%	NIH
4.	Development of Integrated Engineering Service in MOH	Established consolidated multi-disciplined engineer positions in MOH facilities	Framework planning	Approval process	Established Integrated Engineering Service in MOH facilities	Implementation of Integrated Engineering Service		ESD
5.	Implementation of environmental health engineering program	Monitoring of drinking water quality for urban and rural areas	70% sampling analysis planned	75% sampling analysis planned	80% sampling analysis planned	85% sampling analysis planned	90% sampling analysis planned	ESD
		Water pollution monitoring activities for different setting (i.e. pool water, recreational water and tourism setting)	80%	85%	90%	95%	100%	
		Indoor air quality auditing in identified healthcare facilities	80%	85%	90%	95%	100%	

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
6.	Strengthening Technical Corporation Program in Safety, Security and Safeguard with international agencies	Number of identified programs implemented	1	2	2	3	3	MRSD
		Number of peer-reviewed on-site security plan	3	5	8	8	8	
7.	Information sharing on the awareness and safety of IR and NIR medical equipment to the public	Number of national programmes conducted	5	5	5	5	5	MRSD

Strategy 06

Intensifying Capacity Building

NO.	INITIATIVE/ ACTIVITY	KPI	TARGET					SECTION/ DIVISION/ INSTITUTE RESPONSIBLE
			2021	2022	2023	2024	2025	
1.	Conduct training for capacity building	Number of training conducted for planning expertise	8	10	8	8	10	Planning
		Number of training conducted on radiological emergency preparedness and responses	2	2	2	2	2	MRSD
2.	To set up modules of international standards for training and consultation	Number of new modules produced in 12MP	1	1	1	1	1	R&TS
3.	Capacity building of expertise	The number of experts-trained in identified areas	5	5	5	5	5	NIH
4.	Empowering human resource capacity and capability to improve quality of healthcare delivery system	Enhance competencies through the development of Subject Matter Experts (SMEs) in environmental and health-care engineering	SMEs competency module developed	Build-up skills and knowledge through engineering centre of excellence program	No. of competent and certified engineers achieved as planned	No. of competent and certified engineers achieved as planned	Recognition by relevant bodies	ESD
5.	Strengthening the competency of MOH physicist through training programme	Develop comprehensive module training	-	Competency module developed	Implementation of training module	-	-	MRSD
		Percentage of registration of competent MOH physicists				10%	15%	
6.	Establishment of Radiation Protection Officer (RPO) Certification Programme	Radiation Protection Officer (RPO) Certification Programme established	Manual and document criteria prepared and approved	Preparation of examination questions	Approval of training centre	-	-	MRSD
		Percentage of certified RPO registered				Phase 1 Implementation (50%)	Phase 2 Implementation (50%)	

Chapter 5

MONITORING & EVALUATION

MONITORING & EVALUATION

This R&TS Strategic Plan will be monitored annually. This monitoring, evaluation and review mechanism will be an annual exercise from 2021 until 2025. The list of performance indicators is as listed in the Outcomes and Plan of Action tables.

During the last cycle of evaluation, the overall performance from 2021 to 2025 (throughout the five (5) year period of the 12MP) will be evaluated and measures for improvement will be proposed in developing the next strategic plan for R&TS Programme.

Chapter 6

CONCLUSION

CONCLUSION

R&TS Programme will continue to support all programmes and activities within MOH and other sectors towards achieving the best in all health-related endeavours and play an important role in ensuring that MOH activities are geared towards achieving national objectives.

Therefore, R&TS Strategic Plan 2021-2025 was created to provide direction to all relevant sectors. This strategic plan was developed through an inclusive and participatory process involving all stakeholders in MOH. It is hoped that this strategic plan will be a reference for all divisions/ institutions under the R&TS Programme to develop their respective activities and programs for the next five years.

This strategic plan represents a commitment towards improving the health of the people of Malaysia by providing the way forward towards the development of a sustainable health system for future generations.

Figure 11: The R&TS Strategic Plan Workshop on 1-3 October 2020 at Lexis Hotel, Port Dickson

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ANNEX I

LISTS OF CLIENTS AND STAKEHOLDERS

CLIENTS

External	Internal
• Other ministries such as: - Ministry of Finance (MOF) (including Bank Negara Malaysia) - Ministry of Home Affairs (MOHA) - Ministry of Economic Affairs (MEA) - Ministry of Woman, Family and Community Development (KPWKM) - Ministry of Education (MOE) - Ministry of Higher Education (MOHE) - Ministry of Defence (MINDEF) - Royal Malaysia Police (PDRM) - Ministry of Tourism, Arts and Culture (MOTAC) - Ministry of Science, Technology, and Innovation (MOSTI) - Ministry of Agriculture and Food Industry (MAFI) - Ministry of Energy and Natural Resources - Ministry of Environment and Water • Industries • Public/ community	• MOH - Management Programme - Finance Programme - Medical Programme - Public Health Programme - Oral Health Programme - Pharmaceutical Services Programme - Food Safety and Quality Programme

STAKEHOLDERS

Public Sectors

- National Economic Action Council
- Public Service Department
- Ministry of Finance
- National Security Council
- Department of Statistics
- Department of Occupational Safety and Health (DOSH)
- Sustainable Energy Development Authority (SEDA)
- Suruhanjaya Tenaga (ST)
- Malaysian Nuclear Agency (NM)
- Atomic Energy Licensing Board Department (AELB)

Private Sectors

- Industry
- Private health care service providers
- Managed Care Organisations
- Private Higher Education & Institutions
- Insurance companies

Non-Governmental Organisations (NGO)
International Organisations

- World Health Organization (WHO)
- United Nations International Children's Emergency Fund (UNICEF)
- United Nations Development Programme (UNDP)
- International Atomic Energy Agency (IAEA)
- International Commission on Non-Ionising Radiation Protection (ICNIRP)
- Japan EMF Centre
- Office of Radiological Security (ORS), US Department of Energy
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
- United Nation Industrial Development Organization (UNIDO)
- International Universities/ Academicians

Public/ community

ANNEX II

TECHNICAL COMMITTEE

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