

MOH SINGLE DOOR FOR HEALTH INDUSTRY

By Mdm. Ku Nurhasni Ku Abdul Rahim



Health Technology Hub under the National Technology and Innovation Sandbox (NTIS) initiative was launched by the former Minister of the Ministry of Science, Technology and Innovation (MOSTI) and former Minister of the Ministry of Health (MOH) on 2 September 2022. The NTIS Health Technology Hub aims to test and facilitates the commercialisation of health technology innovation in a safe and regulated environment. The establishment of the NTIS Health Technology Hub will accelerate the development, application and commercialisation of local technology and innovation in the health sector. Seven MOH hospitals have been recognised as Health Technology Hub that will have access to test sites, funding and regulatory facilitation support.



MaHTAS has officially collaborated with Malaysian Research Accelerator for Technology and Innovation (MRANTI) as a joint secretariat in the Health Technology Hub Committee, which is co-chaired by the MOH's Deputy Director-General of Health (Medical) and the Ministry of Science, Technology, and Innovation's Deputy Secretary-General (Technology Development).

MaHTAS is honored to be appointed as the Ministry of Health's (MOH) Single-Door for the Health Industry, a role recently launched by Deputy Minister of Health, Dato Lukanisman Awang Sauni, during the HealthTech Innovation Connect, a satellite event of the I-Nation Global Summit 2024. This initiative is designed to streamline the development, assessment, adoption, and implementation of health technologies by establishing the HealthTech Hub as a centralised platform. The Single-Door Initiative offers numerous benefits, including fostering innovation, strengthening partnerships, and promoting collaboration among agencies, ministries, and industries.



It provides a transparent and efficient approach to health technology development and adoption, ensuring optimal resource utilisation and alignment with national healthcare priorities. Ultimately, this initiative accelerates the introduction of innovative solutions, builds trust, and fosters synergy among stakeholders, driving sustainable improvements in healthcare delivery.



DIGITAL HEALTH

By Dr. Syaquirah Akmal

The Future of Healthcare Delivery

The future of digital health technology in healthcare delivery is nothing short of a revolution—a bold, transformative leap into a world where healthcare is smarter, faster, highly accessible and more personalised than ever before. Innovations such as virtual reality, telemedicine, mobile health apps, and wearable devices are already transforming patient interactions with the healthcare system.

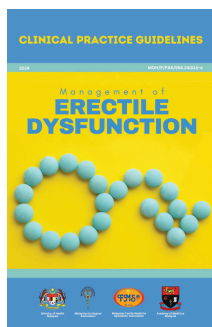
At the heart of this transformation is artificial intelligence (AI), the game-changer that's redefining what's possible in medicine. AI isn't just assisting doctors—it's revolutionising diagnostics, predicting health risks before they become emergencies, and crafting personalised treatment plans tailored to patient's unique genetic makeup. AI algorithms that are trained adequately - analysing mountains of data, has the potential to uncover the breakthroughs in disease prevention and treatment. For instance, AI-powered diagnostic tools can assist radiologists in detecting abnormalities in medical images with greater accuracy and speed.



Additionally, AI-driven chatbots and virtual health assistants can provide patients with instant access to medical information and support, reducing the burden on healthcare providers and improving patient satisfaction. The integration of AI into electronic health records (EHRs) can also streamline administrative tasks, allowing healthcare professionals to focus more on patient care.



But this exciting future isn't without its challenges—and overcoming them will require innovation, collaboration, and a shared vision. Data privacy and security must be ironclad to protect sensitive health information in an increasingly digital world. Bridging the digital divide is essential to ensure that no one is left behind, regardless of their location or resources. As technology races ahead, regulations must evolve to keep pace, ensuring that every breakthrough is safe, ethical, and effective. Collaborative efforts between governments, technology industries, healthcare providers, and patients are paramount in ensuring a healthcare system that's not just high-tech but also human-centered—a system that empowers patients, supports providers, and delivers care that's as exciting as it is transformative. The future of healthcare is already here, and it's digital.



MANAGEMENT OF ERECTILE DYSFUNCTION

By Dr. Tengku Noor Farhana Tengku Khalid

There are **various risk factors** associated with ED e.g. age, lifestyle behaviours, cardiovascular, metabolic, neurological, psychological and hormonal risks.

A **validated questionnaire related to ED** should be used to assess all sexual function domains (e.g. International Index of Erectile Function [IIEF]).

All patients with ED should be advised on **lifestyle and risk factor modifications**.

Mechanical devices (e.g. vacuum erection device or shockwave therapy) may be offered in ED while penile prosthesis may be considered for **those who have failed other interventions**.

Prompt referrals need to be made to relevant specialties based on the patient's conditions e.g. urology, cardiology, endocrinology and/or mental health.

Erectile dysfunction (ED) is a prevalent and multifaceted medical condition characterised by the **persistent inability to achieve or maintain an erection sufficient for satisfactory sexual performance**. It substantially impacts the quality of life of the affected couples, leading to emotional distress and strained relationships.

A **comprehensive medical, psychosocial and sexual history** should be taken in every patient presenting with ED.

Patients with ED **should have cardiac risk assessment and vice versa** as ED could be the initial manifestation of coronary artery disease (CAD) and peripheral vascular disease.

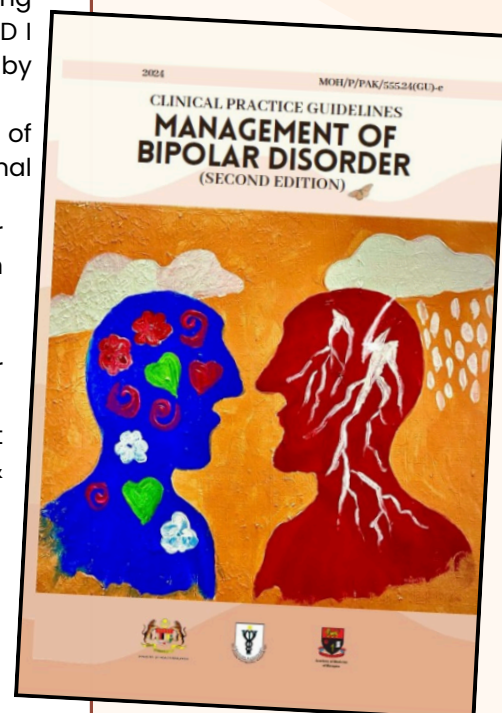
Phosphodiesterase-5-inhibitor (PDE5i) should be offered to all patients with ED unless contraindicated.

An **integrated and collaborative approach** with psychological interventions should be considered in the treatment of psychogenic ED.

MANAGEMENT OF BIPOLAR DISORDER (SECOND EDITION)

By Dr. Mohd Aminuddin Mohd Yusof

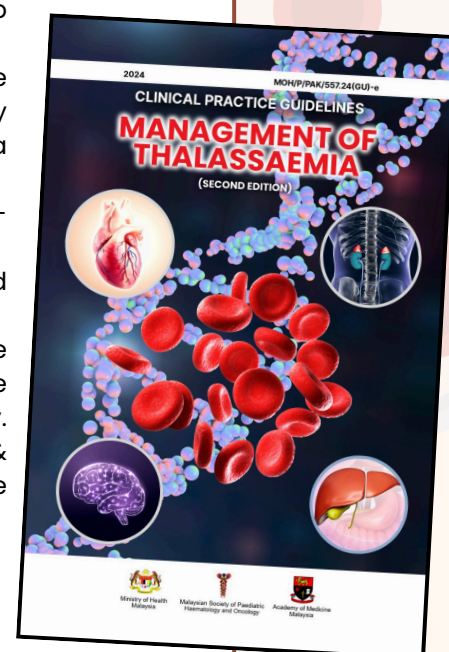
1. Bipolar Disorder (BD) is a potentially life-long condition presenting commonly as either bipolar I disorder (BD I) or bipolar II disorder (BD II). BD I is characterised by episodes of mania, whilst BD II is characterised by episodes of hypomania and depressive episodes.
2. BD should be diagnosed based on the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition, Text Revision (DSM-5-TR) or International Classification of Diseases Eleventh Revision (ICD-11).
3. Antipsychotics (APs) or mood stabilisers, either as monotherapy or combination, should be used to treat acute episodes of mania/depression & as maintenance therapy in BD; and may be used in mixed features.
4. For BD with anxious distress, atypical antipsychotics (AAPs) may be used.
5. For BD with rapid cycling, a combination of mood stabilisers with AAPs or another mood stabiliser is the preferred treatment of choice.
6. Antidepressants (AD) may be used as short-term adjunctive treatment but not as monotherapy in BD. It should be avoided in mixed episodes & used with caution in rapid cycling BD.
7. Electroconvulsive therapy should be considered in both bipolar manic & depressive episodes in indicated situations.
8. Psychosocial interventions & psychotherapies should be offered as an adjunctive treatment for BD especially in relapse prevention.
9. Shared decision-making in weighing risks vs benefits of pharmacological treatment should be done in pregnant & lactating women with BD.
10. Shared decision-making in weighing risks vs benefits of pharmacological treatment should be done in pregnant & lactating women with BD.



MANAGEMENT OF THALASSEMIA (SECOND EDITION)

By Dr. Mohd Aminuddin Mohd Yusof

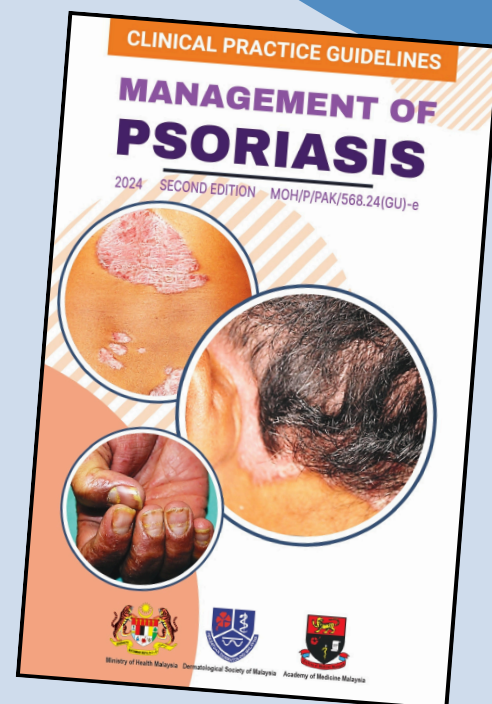
1. Thalassaemia is a group of hereditary haemoglobin (Hb) disorders characterised by decreased or absent synthesis of normal globin chains & can be categorised into transfusion-dependent thalassaemia (TDT) & non-transfusion-dependent thalassaemia (NTDT).
2. Diagnosis of thalassaemia is made by screening with full blood count (FBC) & Hb typing, followed by confirmation with molecular/DNA analysis when indicated.
3. Targeted screening programmes & comprehensive genetic counselling are essential in increasing public awareness of thalassaemia. Pre-pregnancy counselling in at-risk couples is crucial to reduce the birth of thalassaemia babies.
4. All thalassaemia patients requiring blood transfusion should receive antigen-matched & leucodepleted blood.
5. Regular monitoring of iron burden in all thalassaemia patients is performed using serum ferritin (SF) & magnetic resonance imaging (MRI).
6. Iron overload results in deposition of iron in the organs commonly involving the heart, liver & endocrine organs. Excessive iron & transfusion can also predispose patients to infections. They should be regularly assessed & treated appropriately.
7. Optimisation of iron chelation therapy (i.e. dual oral iron chelators etc.) & ensuring adherence via patient counselling is important to minimise complications of iron overload in thalassaemia.
8. Pre-pregnancy counselling, optimisation of Hb level & intensive iron chelation in thalassaemia patients are essential to ensure safe & optimal pregnancy outcomes. Close monitoring of pregnant thalassaemia mothers under combined multidisciplinary care is important for the well-being of both mother & child.
9. Children of at-risk couples should have their thalassaemia status confirmed by 18 months to ensure early diagnosis & commencement of therapy for their disease.
10. In TDT, haematopoietic stem cell transplantation should be offered at an early age in those with matched sibling donor.



MANAGEMENT OF PSORIASIS (SECOND EDITION)

By Dr. Mohd Aminuddin Mohd Yusof

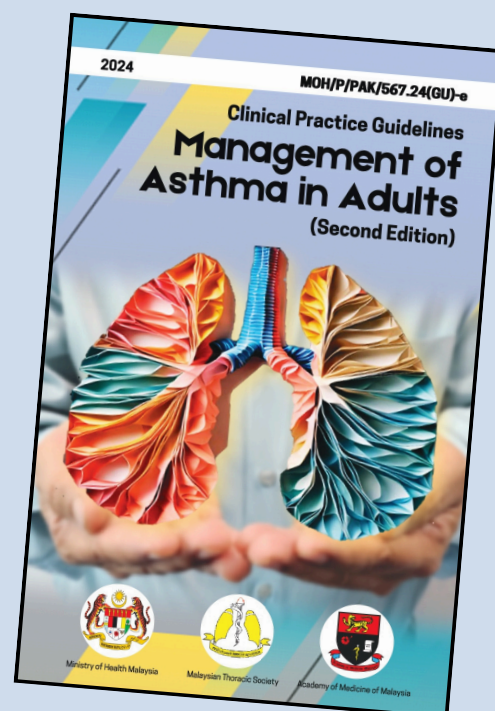
1. Psoriasis is a chronic inflammatory disease that primarily affects the skin and joints with a prevalence in Malaysia estimated to be at 0.34% and an incidence of 34.2/100,000 person-year.
2. Genetic susceptibility, streptococcal infection, stress, smoking, obesity and alcohol consumption are established risk factors for psoriasis.
3. All patients with psoriasis should be screened for cardio-metabolic disorders, psychiatric disorders and other associated co-morbidities.
4. All psoriasis patients should be assessed for disease severity and quality of life using Body Surface Area, Psoriasis Area and Severity Index and Dermatology Life Quality Index.
5. Topical corticosteroids is used as first-line topical treatment either as monotherapy or in combination with other treatment options.
6. Narrowband ultraviolet B given 2 - 3 times/week should be considered as first-line phototherapy in moderate to severe psoriasis.
7. Methotrexate should be used as the first-line conventional systemic therapy for moderate to severe psoriasis. Ciclosporin and acitretin are other alternatives.
8. Biological therapy should be offered to patients with moderate to severe psoriasis who have intolerance/contraindication or failed phototherapy and conventional systemic therapy. It may be considered as a first-line treatment in severe disease.
9. Screening for early detection of psoriatic arthritis should be performed at least annually.
10. Psoriasis clinical features, diagnosis, disease severity assessment and treatment in paediatrics are similar to the adults.



MANAGEMENT OF ASTHMA IN ADULTS (SECOND EDITION)

By Dr. Mohd Aminuddin Mohd Yusof

1. Asthma is a chronic inflammatory airway disease triggered by external stimuli in genetically-predisposed individuals.
2. Diagnosis of asthma is based on typical clinical history, physical examination and evidence of airway obstruction variability, with spirometry being the preferred diagnostic tool.
3. The assessment of asthma control should be performed before considering stepping up or down the treatment.
4. All asthma patients should be prescribed inhaled corticosteroids-containing therapy.
5. Inhaled short-acting β_2 -agonists should not be used as monotherapy.
6. All asthma patients should be offered self-management education including asthma action plan.
7. Inhaler technique should be reviewed by Respiratory Medication Therapy Adherence Clinic pharmacist when available.
8. Adherence to treatment should be assessed at every clinic visit.
9. During an exacerbation, treatment should be initiated immediately based on severity and all patients should be provided a follow-up plan upon discharge.
10. In severe asthma, biologics should be considered as add-on treatment after optimising therapy and conducting a phenotype assessment prior to initiation.



BIOLOGICS IN SEVERE ASTHMA

By Mdm. Maharita Ab Rahman

ABOUT

T2-asthma, prevalent in severe cases, is characterized by cytokine production (IL-4, IL-5, IL-13, TLSP). Approved biologics targeting these cytokines are omalizumab, mepolizumab, reslizumab, benralizumab, dupilumab, and tezepelumab.

ORGANISATIONAL IMPACT

A study on tezepelumab showed fewer unscheduled specialist visits, healthcare provider calls, ambulance transports, and home visits compared to placebo, indicating reduced healthcare utilisation.

EFFICACY

Mepolizumab, benralizumab, dupilumab, and tezepelumab significantly reduce exacerbations, emergency visits, hospitalizations, and corticosteroid use while improving lung function, asthma control, and quality of life, particularly in patients with BEC ≥ 300 cells/uL.

SAFETY

Some adverse events led to discontinuation, including anaphylaxis, malignancy, liver abnormalities, severe asthma events, TB, non-asthma issues, severe headaches, joint pain, allergic reactions, and persistent eczema. Death rates were similar between biologics and control groups.

CONCLUSION

Biologics like mepolizumab, benralizumab, dupilumab, and tezepelumab show benefits for severe asthma patients with high BEC levels (≥ 300 cells/uL) and those unresponsive to optimal therapy. Effective price negotiations could improve their cost-effectiveness.

ECONOMIC

Biologics improve QALYs but come with high costs. ICERs for tezepelumab, benralizumab, mepolizumab, and dupilumab were RM 759,126, RM 623,901.46, RM 1,543,407, and RM 883,807 per QALY gained, exceeding the cost-effectiveness threshold of one GDP per capita per QALY.



COMPUTER-AIDED DETECTION (CAD) OR ARTIFICIAL INTELLIGENCE (AI)

About

Advances in artificial intelligence (AI) technology for radiological image analysis, also called computer-aided detection (CAD) have led to the recent development and commercial availability of software that automate the interpretation of CXR for detecting TB.

Efficacy

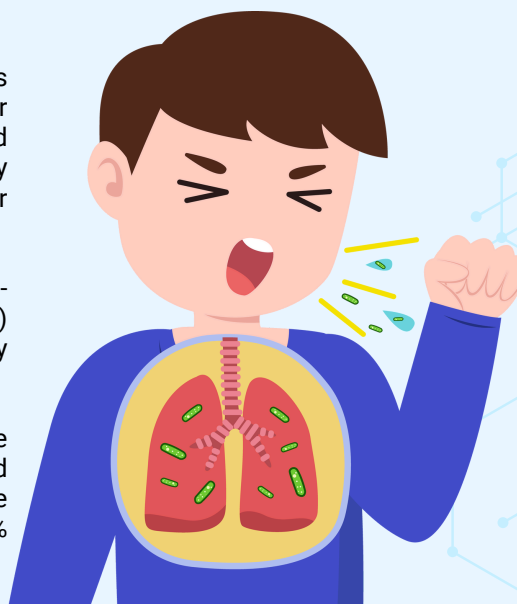
Based on the review, CAD achieves diagnostic accuracy comparable to or exceeding experienced, certified radiologist in detecting bacteriologically confirmed TB (via sputum Xpert and/or culture) on CXR.

It is effective for both screening (non-facility-based) and triage (facility-based) use, with an AUC of 0.80-0.91, sensitivity of 0.88-0.91, and specificity of 0.61-0.76.

Updated versions of CAD software have significantly improved TB detection and meets WHO's Target Product Profile (TPP) for TB triage test, requiring $\geq 90\%$ sensitivity and $\geq 70\%$ specificity.

FOR CHEST X- RAY IN EARLY DETECTION OF TUBERCULOSIS

By Mr. Lee Sit Wai



Organisational Issue

WHO recently endorsed CAD for TB screening in high-prevalence settings. However, some countries lack clear guidelines on integrating CAD into their national TB programmes (NTPs).

Safety

CAD has a superior safety profile with no severe adverse events or mortality directly related to the software.

Economic

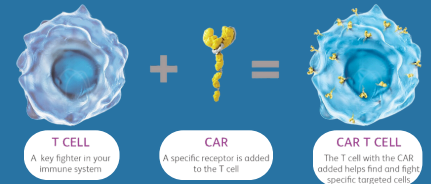
An economic evaluation based on Malaysia context comparing CAD to human readers for CXR interpretation in early TB detection showed an ICER of RM1,293.86 per TB case detected.

Conclusion

CAD or AI for CXR interpretation can be used to assist in early TB detection among high-risk groups in Malaysia.

CHIMERIC ANTIGEN THERAPY (CAR)-T CELL THERAPY FOR RELAPSED /REFRACTORY B-CELL ACUTE LYMPHOBLASTIC LEUKAEMIA (R/R B-ALL)

By Dr. Roza Sarimin



About

CAR-T cell therapies is individualised cell-based gene therapy (Advanced Therapy Medicinal Product), that use genetically modified, autologous T cells to target and destroy cancer cells. CD19 is the most commonly targeted antigen. This procedure involves leukapheresis (harvesting the patient's T cells), manufacturing in certified laboratory using viral or non-viral method, and infusion as one-off intravenous administration.

Efficacy

Overall, CAR-T cells appeared beneficial in achieving complete remission (CR)/ complete remission with incomplete haematologic recovery (Cri) and improving in OS, compared to blinatumomab, inotuzumab ozogamicin, and standard chemotherapy in patients with r/r B-ALL. CAR-T cells demonstrated ability to achieve minimal residual disease (MRD) negative CR, best complete response with low incidence of relapse.

Safety

Tisagenlecleucel received regulatory approval from USFDA, EMA, Health Canada, Ministry of Health and Welfare, Japan. Following CAR-T cell therapy, evidence showed adverse events commonly encountered was cytokine release syndrome (CRS, any grade). However severe CRS affect only up to 27% cases. Other adverse events were neurotoxicity (any grade) and infection.

Economic

Cost-utility analysis conducted in various countries from payer and provider perspective estimated the incremental cost-effectiveness ratio (ICER) for CAR-T therapies ranged from: \$21,623 to \$97,511 per QALY in adults; and \$18,753 to \$246,177 per QALY in paediatric patients. At cost-effectiveness threshold of one time the Malaysia's gross domestic product, commercialised CAR-T therapy was not a cost-effective treatment option for r/r B-ALL in paediatric and young adult patients.

Organisational

Given the complexity of ALL treatment regimens

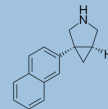
- Implementation of CAR-T cells require collaboration across the MDT and adequate training of personnel
- Pharmacovigilance surveillance post-infusion is essential through dedicated registry
- A robust clinical infrastructure is required for its safe delivery
- CAR-T is best delivered within an accredited haematopoietic cell transplantation (HCT) program

Conclusion

CAR-T cell therapy could be used in the treatment of paediatric and young adults, as well as adult patients with B-cell ALL that relapse and/or refractory, either never achieve remission, relapse for a second or later time, or relapse after a transplant. In view of the current therapeutic gap in these patients, a committee refining patient selection criteria and access could be established to facilitate CAR-T cell therapy adoption in the local context.

TECHBRIEF

Centanafadine



in Adults with Attention-Deficit Hyperactivity Disorder

By Mdm. Nurfarah Aqilah Ahmad Nizam

ABOUT

First-in-class Serotonin-norepinephrine-dopamine (ratio 1:6:14) reuptake inhibitor developed for the treatment of attention deficit hyperactivity disorder (ADHD).

CONCLUSION

Early evidence had shown improving symptoms ADHD in adults with consistent favourable safety profile.

However, further research is needed to determine the clinical efficacy, safety, and cost implication of centanafadine compared to current treatment.



EFFICACY

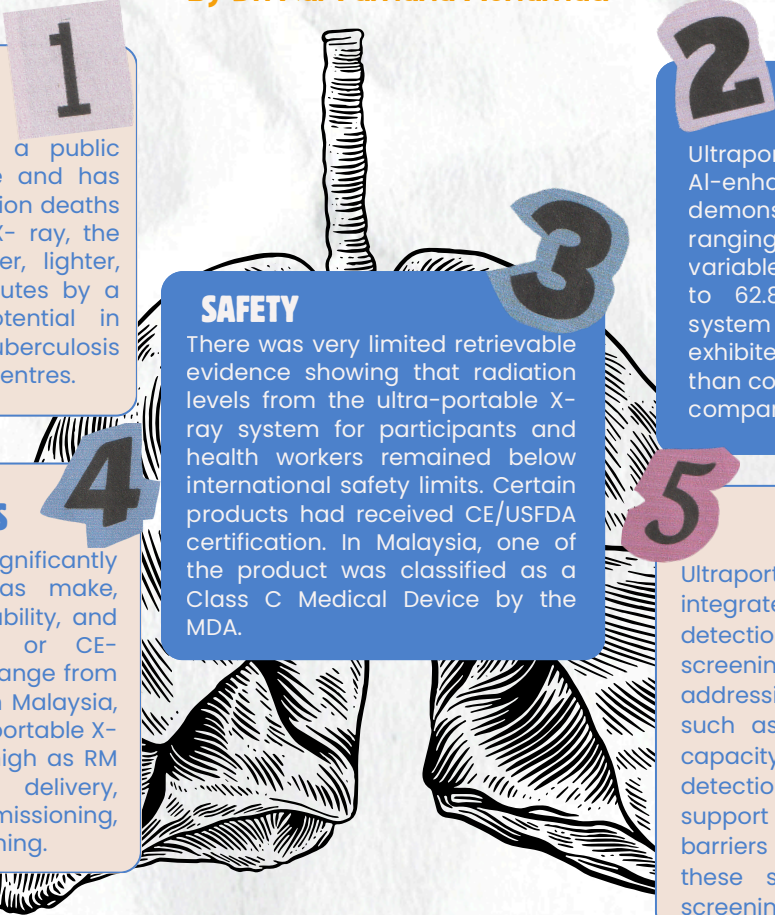
In two Phase 3 trials, centanafadine (200-400 mg daily) significantly improved ADHD symptoms compared to placebo, as measured by the Adult ADHD Investigator Symptom Rating Scale (AISRS). These improvements included reductions in inattentive and hyperactive/impulsive symptoms over 42 days. It also demonstrated improvements on the Clinical Global Impression-Severity scale (CGI-S).

SAFETY

Most reported adverse event: headache & decreased in appetite - 4.1% discontinued trial.

ULTRAPORTABLE DIGITAL XRAY FOR TB SCREENING

By Dr. Nur Farhana Mohamad



1 ABOUT
Tuberculosis (TB) remains a public health challenge worldwide and has caused an estimated 1.3 million deaths in 2022. The ultraportable X-ray, the latest technology, is smaller, lighter, and can be set up in minutes by a single person. It has potential in improving access of tuberculosis screening outside of health centres.

4 ECONOMIC IMPLICATIONS
Instrument costs vary significantly based on factors such as make, regulatory clearance, availability, and procurement terms. FDA or CE-approved models typically range from US\$ 40,000 to US\$ 70,000. In Malaysia, the price of one unit of ultraportable X-ray system may reach as high as RM 400,000, inclusive of delivery, installation, testing, commissioning, and a three-day on-site training.

3 SAFETY
There was very limited retrievable evidence showing that radiation levels from the ultra-portable X-ray system for participants and health workers remained below international safety limits. Certain products had received CE/USFDA certification. In Malaysia, one of the product was classified as a Class C Medical Device by the MDA.

2 EFFICACY
Ultraportable digital x-ray system with AI-enhanced interpretations demonstrated variable sensitivity ranging from 89.4% to 95.3% and variable specificity ranging from 29.8% to 62.8%. While the ultra-portable system met operational standards, it exhibited slightly lower image quality than conventional systems, yet yielded comparable TB detection rates.

5 RECOMMENDATIONS
Ultraportable digital X-ray system, integrated with AI and computer-aided detection, can be used to enhance TB screening in remote areas. However, addressing organisational challenges such as integration complexities and capacity building for computer-aided detection is essential. Comprehensive support is necessary to overcome barriers and leverage the potential of these systems for decentralized TB screening programs in Malaysia.

BREATH TEST FOR TUBERCULOSIS

By Mdm. Nur Hazlinda Khalidi

About

A breath test for TB uses a breath analyser to detect Mycobacterium tuberculosis's volatile organic compounds (VOCs). The process involves collecting breath sample, analysing breath sample's VOCs and analysing data using artificial intelligence or software for results.

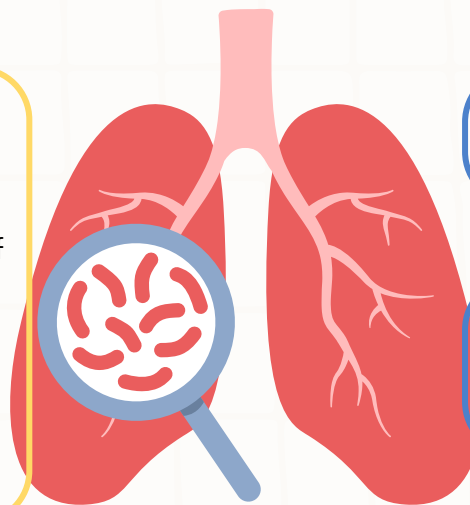
Efficacy

Electronic Nose (E nose)

- Sensitivity: 52.3% to 90.8%
- Specificity: 36.4% to 99.0%
- The studies included in this review varies in terms of type of electronic nose used and population tested.

Other than E nose

- Sensitivity: 80.4% to 95.7%
- Specificity: 80.3% to 91.3%
- AUC: 0.87 to 0.94



Conclusion

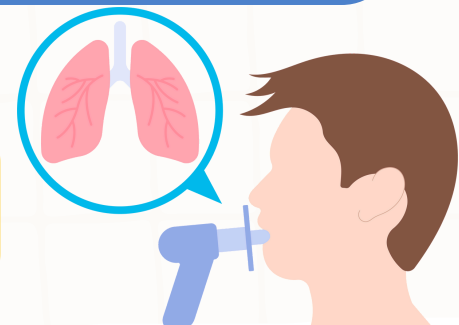
- Based on this review, the point-of-care breath test has **moderate to good diagnostic accuracy in detecting TB** in high incidence setting.
- **No safety issue** has been reported on the use of the device.
- **No evidence on its cost- effectiveness.**

Organisational

All practices regarding test analysis shall follow related international or local guidelines.

Safety

- Adverse events US FDA
- CE approval

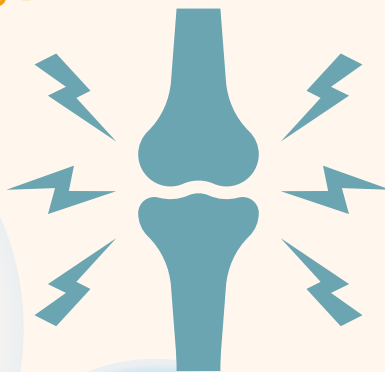


HYALURONIC ACID INJECTION FOR VARIOUS JOINT DISORDERS

By Dr. Aidatul Azura Abdul Rani

ABOUT

Hyaluronic acid (HA), a key component of synovial fluid and cartilage, supplements joint lubrication, reduces inflammation, alleviates pain, and supports tissue healing. This review focuses on HA injections for disorders of the spine, shoulder, hip, knee, and ankle.



EFFICACY

HA injections provide short-term benefits (<6 months), including pain relief, improved functionality, mobility, and quality of life, especially when combined with rehabilitation.

SAFETY

Generally well-tolerated with mild, temporary side effects; serious adverse events are rare.

ORGANISATIONAL ISSUE

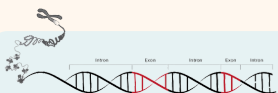
Administered in outpatient settings by skilled practitioners using image guidance for accuracy. Patient satisfaction peaks 12 weeks post-injection.

CONCLUSION

1. Suitable for non-surgical management of conditions like rotator cuff tears, mild osteoarthritis, and tendinopathies.
2. Should not be used as first-line management for symptomatic osteoarthritis.
3. Prioritise shared decision-making and informed consent.
4. Ensure injections are performed by experienced providers using aseptic techniques.

WHOLE EXOME SEQUENCING (WES) FOR CHILDREN WITH SUSPECTED GENETIC DISORDER

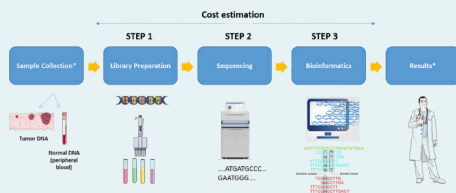
By Dr. Roza Sarimin



ABOUT

Whole Exome Sequencing (WES) can be performed as singleton testing (individual) or trio testing (with both biological parents). The process involves:

- DNA Extraction - Obtaining high-quality genomic DNA, typically from peripheral blood leukocytes.
- Exome Library Preparation - Using exome capture kits (e.g., Agilent, Illumina, NimbleGen), involving DNA fragmentation, adaptor ligation, and target enrichment.
- Sequencing - The exome library is sequenced using massively parallel sequencing technologies (e.g., Life Technologies SOLiD, Illumina), generating millions of reads. Sequencing determines the exact order of DNA bases (A, T, G, and C).
- Bioinformatics Analysis - Geneticists and bioinformaticians interpret sequencing data to identify mutations and variations.



EFFICACY

Fair level of evidences on WES for children with suspected genetic disorders, showing benefits in diagnostic utility, clinical management, and reducing hospital stays, including in infants. Some insurers cover WES when criteria are met.

ORGANISATIONAL ISSUE

Provision of this service require laboratories with extensive bioinformatics support and hardware infrastructure, and well trained professional.

CONCLUSION

WES has the potential in identification of disease causing genes in children, especially rare diseases. It helps clinician in early diagnosis and thus provide early intervention. Hence, WES may be used early in diagnosing children including infants with suspected genetic disease. Its use as a first-tier diagnostic tool for children with suspected genetic disease will maximise its cost-effectiveness. WES should be conducted by accredited genetic laboratories that is able to conduct high and complex genetic testing, as it involve the use of high end equipment, and sophisticated softwares for the bioinformatics platform. This service requires skilled laboratory personnel, genetic scientists, and genetic pathologists in interpreting large genomic data. Pre- and post-test genetic counseling, as well as informed consent is required for any individual undergoing WES. The test should be ordered by appropriately trained clinician/provider.

ECONOMIC

WES testing were more likely to be cost saving when used earlier compared to later in the testing pathway, or pathway that used WES as a last-resort strategy.

Wearable Robotic Glove Device FOR NEUROLOGICAL CONDITION

By Mdm. Nurul Nashriq Md Hamsin

ABOUT

The wearable robotic gloves are designed to assist individuals with impaired hand function due to neurological disorders. Aim to enhance rehabilitation by providing assistance and feedback during hand movements.

SAFETY

No adverse effects were reported from application. Some patients complained of difficulty in donning and doffing off the glove and discomfort due to material thickness.

CONCLUSION

Wearable soft robotic glove appeared effective in improving motor function, range of motion (ROM), finger mobility, reducing spasticity at most joints in hand rehabilitation compared to the conventional therapy in patients with neurological disorders. Thus, wearable soft robotic glove can be used for rehabilitation of patients with neurological disorders.

EFFICACY

Based on fair level of retrievable evidence, the wearable robotic gloves improved hand function in patients with neurological conditions such as post stroke.

COST

Estimated to be in the range of RM2,000 to RM4,000.



Picture Reference: RoboHand by InnoRehab

FAECAL MICROBIOTA TRANSPLANT (FMT) FOR INFLAMMATORY BOWEL DISEASE (IBD)

By Mdm. Nurul Nashriq Md Hamsin

1 ABOUT

FMT targeted to re-establish a balanced microbiome in the gastrointestinal tract of a recipient, transferring stool from a healthy donor to IBD patients.

2 EFFICACY

FMT showed increased rates of clinical remission and endoscopic remission in patients with IBD. Following the single and multi-donor strategies of FMT, patients were reported to achieve better remission compared to placebo. Multi-donor FMT achieved higher rates of steroid free remission compared to autologous FMT.

3 SAFETY

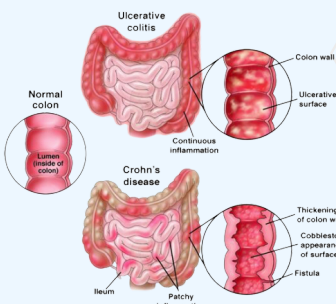
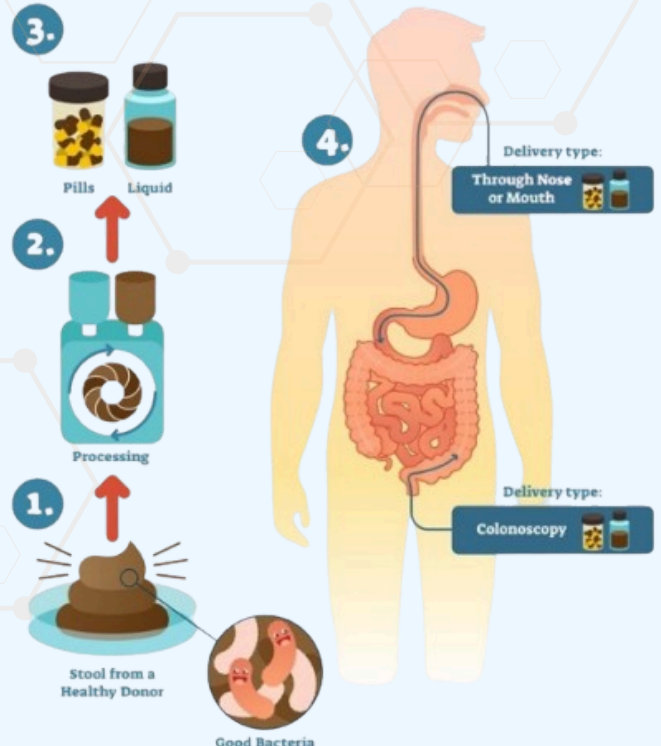
FMT is associated with short-term minor adverse effects (abdominal tenderness, abdominal pain, flatulence, bloating) as well as rare potential long-term adverse effects (infection, transmission of enteric pathogens). It is treated as investigational therapy by American Gastroenterological Association (AGA) and report by European consensus.

4 ECONOMIC

Limited evidence on cost-effectiveness. Shown to reduce the physician's visits, hospitalization days, societal cost and loss of working time.

5 CONCLUSION

FMT has potential in achieving remission of IBD. It may be used in a research environment as an option for selected patients with IBD.

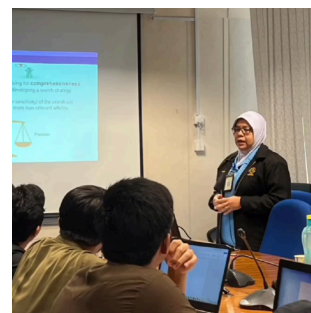
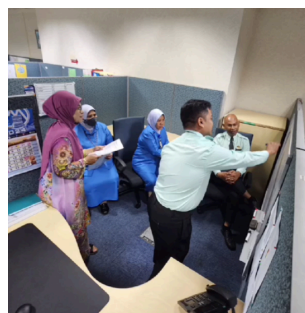
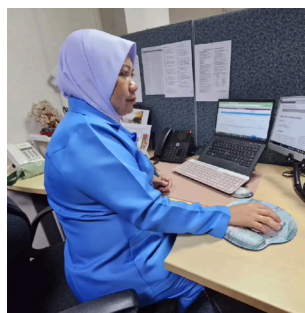


The Pivotal Role of Information Specialists: Guardians of Data-driven Healthcare
 By Dr. Khairil Idham Ismail

At MaHTAS, our paramedics and nurses go beyond their roles as healthcare providers. They are vital information specialists shaping the future of healthcare! These unsung heroes of data excel in gathering, analysing and transforming complex medical information into actionable insights that power our health assessments. Their commitment ensures that every data point contributes to informed decision-making and advancements in health technology assessment.

By providing accurate and up-to-date information, they enable our healthcare team to conduct thorough research and make informed decision-making. Their expertise, precision, and dedication are the cornerstones of our mission to deliver evidence-based healthcare guidance to Malaysians.

Trained in systematic search methodologies, these information specialists apply their medical knowledge to identify and include relevant studies in assessments and CPGs.



Introducing a Groundbreaking Service: Health Industry Development

By Dr. Norrina Jamaluddin

The health industry is a cornerstone of a nation's healthcare system and economy, playing a pivotal role in providing essential medical devices, pharmaceuticals, and cutting-edge technologies for patient care. Recognising its critical contributions and challenges, MaHTAS partnered with MOSTI in April 2022 and was appointed as the single gateway for health industry development within the Ministry of Health (MOH). This initiative aims to empower health industry players and local innovators to drive technology advancements.

MaHTAS offers a comprehensive suite of services, including early dialogue and scientific advice for new technologies and health innovations, evidence generation for assessments, evaluating demand signals for health technologies, co-managing proof-of-concept (PoC) projects, and fostering partnerships between MOH and key stakeholders such as regulatory bodies, ministries, agencies, universities, and research institutions. Notably, the health industry serves as the secretariat for the Health Tech Hubs Program and collaborates with MRANTI as co-secretariat for the Health Tech Hub Committee under MOSTI's National Technology Innovation Sandbox (NTIS) initiative.

In addition, MaHTAS works closely with prominent stakeholders like Ministry of Investment, Trade and Industry (MITI), the Malaysia External Trade Development Corporation (MATRADE), MRANTI, the Malaysian Investment Development Authority (MIDA), the Malaysian Technology Development Corporation (MTDC), and the Malaysia Digital Economy Corporation (MDEC) to align its efforts with Malaysia's broader innovation ecosystem. These collaborations create invaluable opportunities for local industry players and innovators to develop impactful, high-value healthcare technologies. By championing innovation and fostering strategic alliances, MaHTAS envisions the health industry as a driving force in revolutionising Malaysia's healthcare system and advancing transformative technologies.

Exciting News on new myMaHTAS website! | By Dr. Ahmad Tasnim Muslim

We are excited to launch **MyMaHTAS**, a cutting-edge platform designed to enhance access and engagement within the Malaysian community. Tailored for researchers, healthcare professionals, and stakeholders, **MyMaHTAS** serves as a comprehensive resource hub for CPGs, medical and health technology assessment (HTA). Explore evidence-based research, scientific databases and in-depth analyses that empower informed decision-making and advance healthcare excellence.

Join us on a journey to elevate scientific discourse and healthcare standards with **MyMaHTAS!**



More ways to communicate with us:



mymahtas.moh.gov.my



Malaysian Health Technology Assessment Section

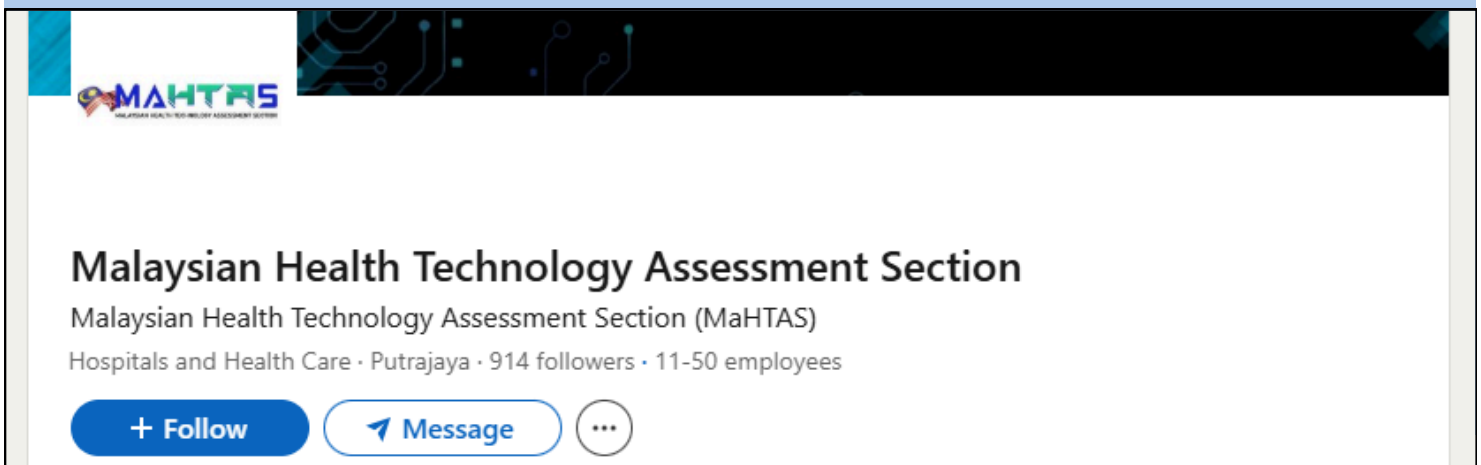
We are Live on LinkedIn! | By Dr. Norrina Jamaluddin

We are excited to announce a new milestone – the launch of our LinkedIn platform for knowledge-sharing and professional networking. Stay updated on:

- HTA and Technology Reviews
- CPG development and implementation
- Economic evaluations and value-based assessments
- Public Health Intervention (PHI) assessments
- Local and international MaHTAS activities

This platform underscores the importance of HTA and value-based medicine for informed decision-making, connecting healthcare professionals, agencies, researchers, innovators, industry players, patients, and the global public.

Join us to expand knowledge and network with the healthcare community worldwide!

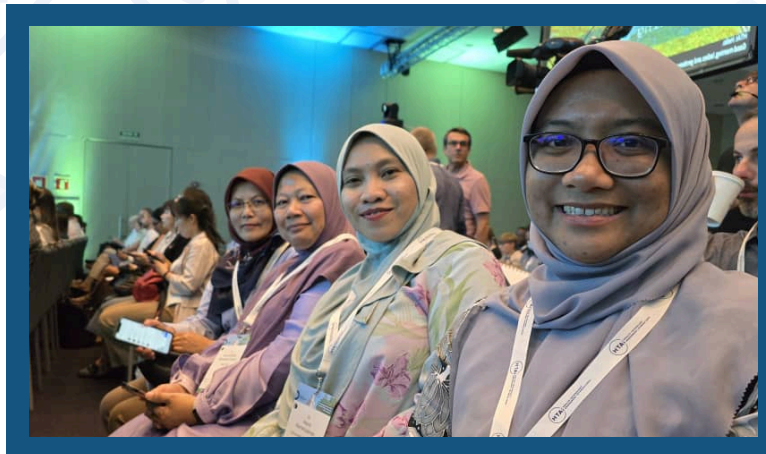


Experience as a Recipient of HTAi Educational Scholarship

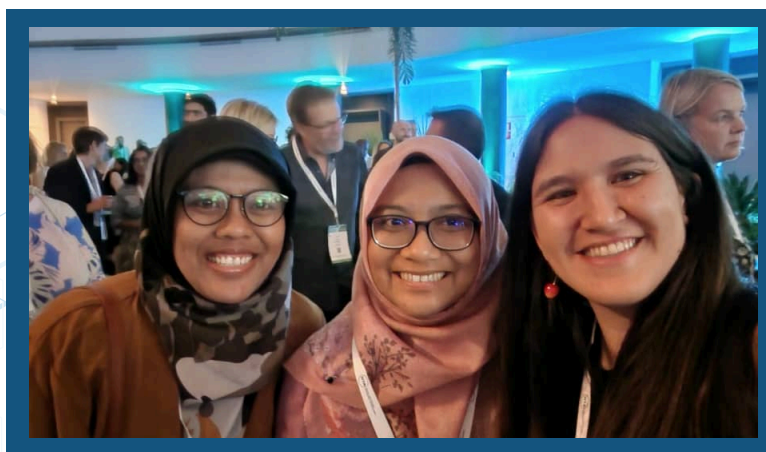
By Mdm. Siti Mariam Mohtar



Receiving the HTAi Educational Scholarship in 2022 to pursue my Master's in Public Health at Universiti Malaya while working was an honour. The scholarship covered my tuition fees for one year, significantly easing my financial burden and allowing me to focus on my studies and research. Balancing a full-time job with postgraduate studies requires perseverance and dedication, but the experience was incredibly fulfilling.



The scholarship not only provided financial relief but also has opened new opportunities for me. One of the most significant was the chance to present the results of my research at the HTAi Annual Meeting 2024 in Seville. Looking back, it was an intense but enriching journey. For those considering applying for the HTAi Educational Scholarship, I highly encourage you to do so. It offers more than just funding – it is an opportunity to connect with the global HTA community and contribute to evidence-based decision-making in healthcare.



WHO 4th Fair Pricing Forum ☞ 7 February 2024



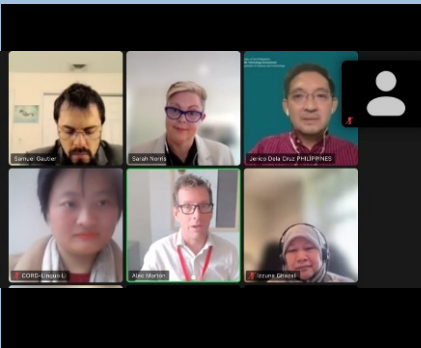
A parallel session of WHO 4th Fair Pricing Forum on “How to pay for universal access to medicines for rare diseases and by whom? The great conundrum” was organised. It was an honour for Dr. Izzuna Mudla Mohamed Ghazali to be invited as one of the speakers to share Malaysia experience on Assessment Framework for Rare Diseases in connection with trust fund initiative.

Workshop on the Implementation of Public Health Intervention (PHI) Assessment ☞ 26 February 2024



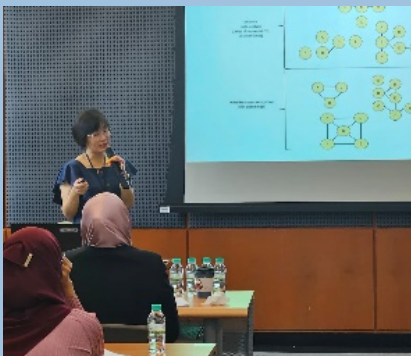
With the objective of providing a deeper understanding of the field of PHI. During the workshop, participants also learned about various aspects of evaluating interventions aimed at improving public health outcomes. This included topics on introduction to PHI, type of models to be applied during assessment, integrated HTA framework as well as details on writing reports and workflow. With the first pilot project in hand, it was hoped that this workshop will be a stepping stone for the reviewers in producing a robust PHI assessment.

ISPOR HTA Roundtable ☞ 5 March 2024



Dr. Izzuna Mudla Mohamed Ghazali had successfully completed her term as the Chair of the ISPOR HTA Roundtable Asia Pacific from 2022 to 2024. Her dedication and expertise to advancing HTA had been recognised on a global scale. A remarkable roundtable discussion was held under Dr. Izzuna's leadership, focusing on the theme of **"Challenges and Successes Using HTA for Innovative New Technologies."** Representatives from HTA agencies worldwide, including Malaysia, Australia, China, New Zealand, Singapore, the Philippines, Korea and Brunei, gathered to share insights and experiences.

Introduction to Network Meta-analysis Workshop ☞ 7 - 8 March 2024



The session was presided over by the esteemed Prof. Dr. Goh Siew Li from the University of Malaya. Network meta-analysis produces estimates of the relative effects between any pair of interventions in the network, and usually yields more precise estimates than a single direct or indirect estimate. During this engaging workshop, the principles, methods and interpretation of network meta-analysis were discussed, and practical examples were delved to understand its relevance in research and clinical practice. The valuable insights into its application, assessment and evaluation were gained.

Training on CPG for Private General Practitioners: CPG Management of e-Cigarette or Vaping Products Use-associated Lung Injury (EVALI) ☞ 9 March 2024



The training was a collaboration with mainly Malaysian Medical Association. About 460 GPs attended the virtual training which consisted of lectures on vaping products, notification, diagnosis, treatment and follow-up plus a case discussion. All of these were delivered by the CPG development group themselves. Post-training quiz showed most participants had a better understanding of the subject.

Systematic Review (SR) on Evidence-based CPG Development and Implementation Workshop 1/2024 ☞ 2 - 4 April 2024



The CPG Unit of MaHTAS had successfully conducted the above-mentioned training with 36 attendees who were mainly development group members of **CPG on Use of Growth Hormone in Children and Adults (Second Edition)** and **CPG on Management of Polycystic Ovarian Syndrome**. There were also six new Technical Advisory Committee CPG members who attended the session on Appraisal of Guidelines Research and Evaluation II as they need to appraise evidence-based CPG as part of their terms of reference.

Proposal for MOH Research Grant (MRG) Workshop ☞ 23 - 25 April 2024

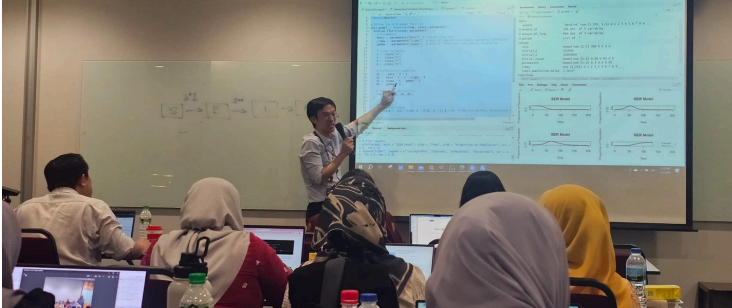


The second series of workshop on **"Enhancing MOH Research Grant (MRG) Application Process for Universal Access of Quality Healthcare (UAQH) Clusters,"** was conducted at the esteemed National Health Institute (NIH). MaHTAS was represented by the Dr. Izzuna Mudla Mohamed Ghazali, as well as Mdm. Ku Nurhasni Ku Abdul Rahim and Dr. Khairil Idham Ismail among others. The project focuses on **"Establishing a Framework for National Health Benefit Packages."** During the workshop, the participants were rigorously drilled by facilitators on the clarity and alignment of their research proposal with stakeholders.

World Intellectual Property Day Forum: Shaping the Future of Innovation and Business Development ☞ 25 April 2024



The forum delved into issues related to innovation, funding, commercialisation and intellectual property (IP). From MaHTAS's perspective, the forum brought a platform for MOH to understand available opportunity and process in facilitating innovators for product/ technology development, the importance of rights granted for product invention and innovation as well as driving a research and development (R&D) value and market value in the healthcare sector.



INTRODUCTION TO SIMULATION MODELLING WORKSHOP

6-7 May 2024

Led by experts from the Institute for Health System Research, the workshop explored the methods, principles, and methodologies of the Dynamic System Model, Discrete Simulation Model, Agent-based Model, and SEIR Model

REGIONAL HTA COURSE - SOUTHERN ZONE

28-30 May 2024

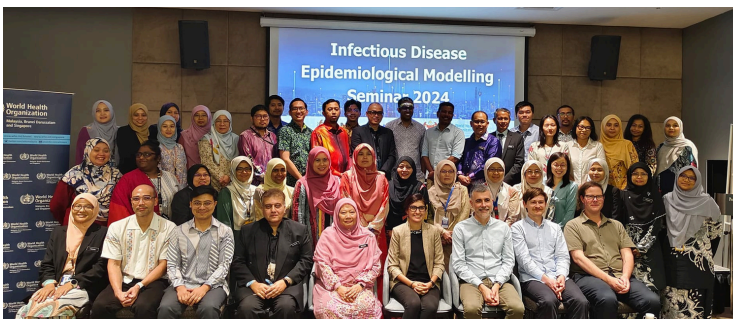
Organised by Mahtas, the course was attended by TPKN representatives, hospital directors, and district health officers from Johor, Melaka, and Negeri Sembilan, with virtual participation from other JKN officers. It emphasised the importance of evidence-informed decision-making, resource allocation, and using HTA findings to guide healthcare policies and interventions.



INFECTIOUS DISEASE EPIDEMIOLOGICAL MODELLING SEMINAR 2024

6-7 June 2024

Organised by MaHTAS with WHO, NIH, and the Disease Control Division, the seminar highlighted epidemiological modelling's importance for public health decisions. Led by experts from Monash University, Australia, focusing on capacity building.



PARAMETERIZING HEALTH ECONOMIC MODELS WORKSHOP

22–23 JULY 2024

Organised by MaHTAS, the workshop focused on parameterizing health economic models. Led by Prof Dr. Asrul Akmal Shafie from USM, participants explored decision modeling, and health utilities through discussions and exercises.



DEMAND SIGNALLING FOR HEALTH TECHNOLOGIES WORKSHOP

29–31 JULY 2024

Organised by MaHTAS, the workshop gathered division directors, national clinical heads, and their representatives. Facilitated by INTAN's, it explored healthcare needs, gaps, and future health technologies through Future Thinking and Scenario Planning (FTSP).



INTRODUCTION TO DIGITAL HEALTH TECHNOLOGIES ASSESSMENT FRAMEWORK WORKSHOP

7–8 AUGUST 2024

This workshop brought together healthcare professionals, policymakers, technologists, and innovators. Participants explored digital health technology assessment, cybersecurity, AI integration, ethical considerations, and economic evaluations to modernise healthcare systems.



Bengkel Pengurusan Stres dan Jati Diri MaHTAS 2024

▣ 18 - 20 September 2024



MaHTAS organised a *Bengkel Pengurusan Stres dan Jati Diri* at Kalumpang Resort, Selangor. The 3-day event included engaging activities aimed at building teamwork, resilience, and collaboration among 37 officers.

Workshop on Horizon Scanning and Disinvestment: Key Insights and Future Directions ▣ 24 - 25 September 2024



Held at PICC, this workshop gathered diverse stakeholders to discuss horizon scanning and disinvestment—key HTA processes in tech lifecycle management. The event highlighted the need for strategic planning, stakeholder engagement, and effective report dissemination to support value-based healthcare.

Venture to the Institute for Medical Research ▣ 30 September 2024



MaHTAS and the HTA Expert Committee visited the Institute for Medical Research (IMR) as part of the CAR-T cell therapy assessment for B-ALL. The visit provided valuable insights into the manufacturing process and technological infrastructure, supporting a comprehensive HTA.

Bengkel Pemurnian Program Hab Teknologi Kesehatan KKM

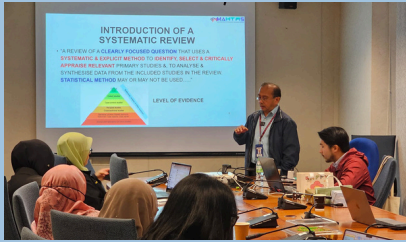
▣ 20 - 22 October 2024



MaHTAS hosted the *Bengkel Pemurnian Program Hab Teknologi Kesehatan* in Penang, bringing together stakeholders from MOH, MRANTI, MOSTI, and others to review progress, address challenges, and align future strategies for the HealthTech Hub program.

Internal Training - Systematic Review: Why Bother to Review?

▫ 30 October 2024



MaHTAS held an internal training on conducting high-quality systematic reviews, including meta-analysis interpretation and appraisal tools like CASP and ROBIS. Special thanks to Dr. Aminuddin and Dr. Tengku Noor Farhana for leading the session.

MIH Megatrend ▫ 25 - 27 October 2024



Congratulations to all from MOH and KPJ Healthcare Berhad for making the MIH Megatrends Conference 2024 a success! A great showcase of collaboration and progress in Malaysian healthcare.

Knowledge Exchange Visit: Maldives Delegates & World Bank South Asia with MaHTAS ▫ 26 November 2024



MaHTAS hosted delegates from the Maldives and World Bank South Asia for a knowledge exchange session on HTA's role in value-based healthcare. Led by Dr. Izzuna Mudla, the visit strengthened international collaboration towards better global health systems.

Development Group CPG on Management of Systemic Lupus Erythematosus (SLE) during CPG launching on 19 May 2024 in conjunction with Walk-A-Payung, Putrajaya .



Development Group CPG on Management of Geriatric Hip Fracture (GHF) during CPG launching on 23 May 2024 in conjunction with 53rd MOA ASM, Kuantan.



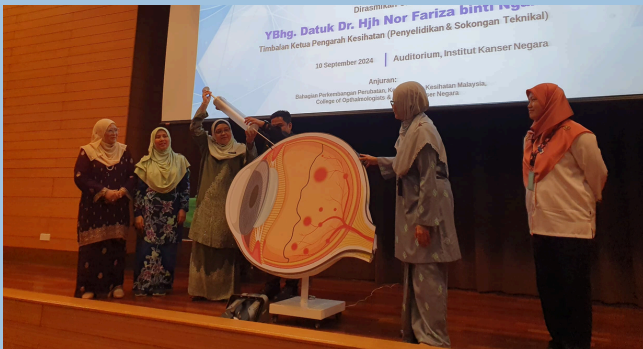
Dr. Habibah Mohd Yusof, Chairman CPG on Management of SLE, explaining an algorithm during CPG Training of Core Trainers (TCT) on 2 July 2024 at IKN, Putrajaya.



Dr. Kunalan A/L Ganthel @ Annamalai, representing Chairman, Dr. Mohd Yusof Ibrahim, CPG on Management of GHF, addressing participants' questions during CPG TCT on 4 July 2024 at JPM, Putrajaya.



Dr. Chan Yee Fai, Chairman CPG on Management of Dementia (Third Edition), welcoming participants of online CPG Training for Primary Care Providers on 13 July 2024 at MoH, Putrajaya.



Training of Core Trainers (TCT) on CPG Management of Retinopathy of Prematurity (Second Edition) was conducted on 10 September 2024 at Institut Kanser Negara (IKN) and attended by 113 participants. In collaboration with College of Ophthalmologists, Academy of Medicine Malaysia (AMM), the CPG was officially launched by YBhg Datuk Dr. Nor Fariza Ngah, Deputy Director-General of Health (Research and Technical Support) on the same day.



The Systematic Review on Evidence-based CPG Development and Implementation 2/2024 was held on 1 - 3 October 2024 at Pearl Hotel, Kuala Lumpur and participated by 49 participants.



The CPG on Management of Cancer Pain (Second Edition) was launched by YBhg. Dato' Dr. Mohd Azman Yacob, Director of Medical Development, during World Hospice Day and Palliative Care Day 2024 on 16 October 2024 at IKN. It was continued with TCT of the CPG till 17 October 2024 and attended by 113 participants.



The final Training on CPG for General Practitioners was conducted with MMA, entitled CPG Management of Gout (Second Edition) and participated by 472 participants virtually.



Dr. Izzuna Mudla Mohamed Ghazali
24th Southeast Asian Healthcare and Pharma Show 2024

- The concept of healthcare innovation and challenges in scaling up health innovation
- The role of HTA in fostering health innovations through scientific advice and early dialogue with industry players, accelerated innovation access, test beds, horizon scanning activity and value-based assessment for health technology in Malaysia

HTAI 2024

- Proactive Approaches to Innovation: International experience to develop a standardised framework
- HTA in Resource-Restrained Settings: Optimisation, adaption, and collaboration to avoid reinventing the wheel
- International Networks from Equity and Resilience: Building bridges for an efficient and sustainable healthcare system

2024 INAHTA Congress

- Decision-making and Future Challenges in HTA – MaHTAS Experiences

15th MOH-AMM Scientific Meeting 2024

- Value-based Medicine: Role of Health Technology Assessment

Critical Appraisal Workshop 2024

- Critical Appraisal in Evidence-based medicine

Malaysia Antimicrobial Resistance (MyAMR) Conference 2024

- New Technologies in Disinfection & Sterilization

Critical Appraisal Workshop for Restorative Dentistry Specialization

7th Health Economics Forum 2024

- Enhancing HTA Evaluation Frameworks in Malaysia

ISPOR HTA Global Roundtable

- The Challenges and Successes Using HTA for Innovative New Technologies in Asia Pacific

HTAi Asia Policy Forum 2024 - Collaboration: Building Bridges in HTA

- Malaysia Health Tech Hub

4th International Conference on Medical Science Technology

- Determining the Value of Artificial Intelligence in Healthcare

Mount Hood Diabetes Economics Conference in Clinical Decision Making 2024

- Advancing Health Economics in Asia: The Malaysian Health Technology Assessment Section [MaHTAS] Journey Towards Stronger Health Technology Assessment in Malaysia

Dr. Syaquirah Akmal
Sharing Session at Universiti Sains Islam Malaysia (USIM)

- Future of Medical Devices - What to Expect

International Symposium on Advancing National Immunization Programs in Asia (China)

- Evidence-based Decision Making in Vaccine Introduction - Malaysia's Journey





Dr. Roza Sarimin
HTAI 2024

- Instituting or Refining the Deliberative Process in HTA: Are We Delivering on the Promise?



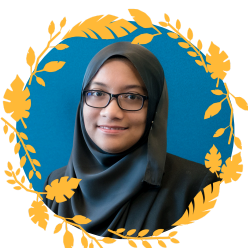
Dr. Tengku Noor Farhana Tengku Khalid
Critical Appraisal Workshop 2024

- Critical appraisal in evidence-based medicine and on selected study designs



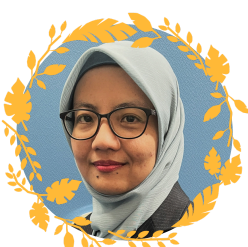
Dr. Nur Farhana Mohamad
HTAi - HTAsiaLink Joint Webinar - Patient and Citizen Involvement in HTA Across the Asia-Pacific Region

- Contributed her expertise and insights alongside other esteemed speakers



Mdm. Siti Mariam Mohtar
HTAi Webinar – HTAi Scholarships: Opportunities, Experiences, and Challenges

- From Guidelines to Practice: Understanding Gout Management Among Private GPs in Urban Malaysia



Dr. Syaharatul Patimah Kamarudin
Symposium on Updates in Healthcare

- The Current and Future Healthcare Technology for Better Patient Outcomes



Mr. Lee Sit Wai
Critical Appraisal Workshop 2024

- Critical appraisal in evidence-based medicine and on selected study designs



Critical Appraisal Workshop for Restorative Dentistry Specialization



MaHTAS staff (especially those from CPG Unit)
Course on Systematic Review on Evidence-Based Clinical Practice Guidelines Development and Implementation

- Invited as speakers/facilitators in the course for Dental Specialists and Dental Officers for the 2024 session on 1 - 3 October 2024 at Pearl Hotel, Kuala Lumpur.





Dr. Khairil Idham Ismail

Successfully graduated in **PhD of Community Health** at Universiti Kebangsaan Malaysia.



Mdm. Siti Mariam Mohtar

- Successfully graduated in **Master of Public Health** at Universiti Malaya
- Recipient of HTAi Scholarship



Dr. Nur Farhana Mohamad

Had an article published in **International Journal of Technology Assessment in Health Care** entitled **Preparing Future Doctors for Evidence-based Practice: A Study on Health Technology Assessment Awareness and Its Predictors in Malaysia**.



Mdm. Ku Nurhasni Ku Abd Rahim, Ms. Nurkhodrulnada Muhamad Lattepi, Dr. Roza Sarimin, Dr. Foo Sze Shir, Dr. Syaquirah Akmal, Mr. Lee Sit Wai, Dr. Izzuna Mudla Mohamed Ghazali



Successful publication on **Development of an Multicriteria Decision Analysis Framework for Rare Disease Reimbursement Prioritization in Malaysia**.



Dr. Foo Sze Shir, Mr. Lee Sit Wai, Ms. Nurkhodrulnada Muhamad Lattepi, Mdm. Wong Wai Chee, Mdm. Norharlina Che Zakaria



Recipients of '*Anugerah Perkhidmatan Cemerlang 2023*'



MaHTAS

Awarded The Most Attractive Booth among the others during the Medical Program Raya Opening Ceremony.



Dr. Izzuna Mudla Mohamed Ghazali

Appointed as the Vice President for Health System Demands and Policy Integration at i-HTS.



Dr. Hanin Farhana Kamaruzaman

The successful publication of her PhD research project in collaboration with the MaHTAS team and the Medical Development Division titled '**Stakeholders' Perspective on the Disinvestment of Low-value Healthcare Interventions and Practices in Malaysia: An Online Survey**' in the International Journal of Technology Assessment in Health Care.

Congratulations!

Congratulations!



Dr. Khairil Idham Ismail

Winner for poster presentation titled 'Modeling of Tezepelumab for Severe Asthma in Malaysia: An Economic Evaluation' and participated in second poster presentation titled 'Navigating Health Priorities: A Policy Delphi Method Study for Malaysia's Explicit Health Benefit Package Framework' for the Malaysia International Healthcare (MIH) Megatrends Conference 2024.



Mdm. Balqis Abdul Ghani

Gave a poster presentation titled 'Capivasertib: A New Frontier in Targeted Therapy for Breast Cancer' for the Malaysia International Healthcare (MIH) Megatrends Conference 2024.



Mdm. Fatim Nabila Mokhtar

Gave a poster presentation titled 'Systematic Review: Far Infrared Therapy for Arteriovenous Fistulas and Wound Healing' for the Malaysia International Healthcare (MIH) Megatrends Conference 2024.



Dr. Che Sarida Che Ismail

Winner for oral presentation titled 'Wide Field Digital Eye Imaging System for Universal Neonatal Eye Screening [UNES] - A Systematic Review' during the 4th International Conference on Medical Science Technology.



Dr. Syaharatul Patimah Kamarudin

Participant for oral presentation titled 'Empowering Employees to Quit: Effectiveness of WhaSTOP, a mHealth Intervention for Smoking Cessation in Malaysia' during the 4th International Conference on Medical Science Technology.



Mdm. Nur Hazlinda Khalidi

Winner for poster presentation titled 'Breath Test: Point-of-Care for Tuberculosis. How Effective?' during the 4th International Conference on Medical Science Technology.



Mdm. Nurul Akhma Abdul Hamid

Third place for *Cabaran Bacaan Naskhah Jawi Klasik* in conjunction with *Dekad Bahasa Kebangsaan 2024*.



Mdm. Nurfarah Aqilah Ahmad Nizam

Participant of *Cabaran Bacaan Naskhah Jawi Klasik* in conjunction with *Dekad Bahasa Kebangsaan 2024*.

Editorial Board

Advisor

Dr. Izzuna Mudla Mohamed Ghazali

Designer

*Mdm. Fatin Nabila Mokhtar
Ms. Amanina Maisara Shamsulzaman*

Editors

*Dr. Mohd Aminuddin Mohd Yusof
Dr. Roza Sarimin
Dr. Syaqirah Akmal
Mdm. Ku Nurhasni Ku Abdul Rahim
Dr. Tengku Noor Farhana Tengku Khalid
Mdm. Siti Aisah Fadzilah*

Contributors

MaHTAS Team

Turn Over of Staff



**Dr. Syaharatul Patimah
Kamarudin**

Graduated in
Doctor of Public Health
from Universiti Teknologi Mara



**Dr. Che Sarida
Che Ismail**

From *Cawangan
Perkembangan
Perkhidmatan Perubatan*



**Mr. Syful Azlie
Md Fuzi**



**Dr. Amir Hazman
Kamarudin**



**Dr. Ahmad
Tasnim Muslim**