Official Journal of the
Malaysian Medical Association

# The Medical Journal of Malaysia

## 5th International Conference on Tropical Medicine and Infectious Diseases 2022 (ICTMID 2022)

## Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP), Ipoh, Malaysia 23rd to 25th August, 2022

September 2022

Volume: 77

Supplement: 4

ISSN 0300-5283 PP 2121/01/2013 (031329) MITA(P) 124/1/91

# MJM

*Official Journal of the Malaysian Medical Association*

*Volume 77 Supplement 4 September 2022*


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PP 2121/01/2013 (031329) MCI (P) 124/1/91 ISSN 0300-5283

The Medical Journal of Malaysia is published six times a year.
MJM is published bimonthly ie. January, March, May, July, September and November.





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Printed by: Digital Perspective Sdn. Bhd.
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*The Medical Journal of Malaysia*

MJM

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The title page should state the brief title of the paper, full name(s) of the author(s) (with the surname or last name bolded), degrees (limited to one degree or diploma), affiliation(s), and corresponding author's address. All the authors' affiliations shall be provided after the authors' names. Indicate the affiliations with a superscript number at the end of the author's degrees and at the start of the name of the affiliation. If the author is affiliated to more than one (1) institution, a comma should be used to separate the number for the said affiliation.

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Scientific names, foreign words and Greek symbols should be in italic.

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When appropriate, particularly in the case of clinical trials, state clearly that the experimental design has received the approval of the relevant ethical committee.

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**Acknowledgements:**
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**Example references Journals:**
**Standard Journal Article**
Rampal L and Liew BS. Coronavirus disease (COVID-19) pandemic. Med J Malaysia 2020; 75(2): 95-7.

Rampal L, Liew BS, Choolani M, Ganasegeran K, Pramanick A, Vallibhakara SA, et al. Battling COVID-19 pandemic waves in six South-East Asian countries: A real-time consensus review. Med J Malaysia 2020; 75(6): 613-25.

NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. Lancet 2021; 11; 398(10304): 957-80.

**Books and Other Monographs:**
**Personal Author(s)**
Goodman NW, Edwards MB. 2014. Medical Writing: A Prescription for Clarity. 4 th Edition. Cambridge University Press.

**Chapter in Book**
McFarland D, Holland JC. Distress, adjustments, and anxiety disorders. In: Watson M, Kissane D, Editors. Management of clinical depression and anxiety. Oxford University Press; 2017: 1-22.

**Corporate Author**
World Health Organization, Geneva. 2019. WHO Study Group on Tobacco Product Regulation. Report on the scientific basis of tobacco product regulation: seventh report of a WHO study group. WHO Technical Report Series, No. 1015.

NCD Risk Factor Collaboration (NCD-RisC). Rising rural body-mass index is the main driver of the global obesity epidemic in adults. Nature 2019; 569: 260–64.

World Health Organization. Novel Coronavirus (2019-nCoV) Situation Report 85, April 14, 2020. [cited April 2020] Accessed from: https://www.who.int/docs/defaultsource/coronaviruse/situationreports/20200414-sitrep-85-covid-19.

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Ministry of Health Malaysia. Press Release: Status of preparedness and response by the ministry of health in and event of outbreak of Ebola in Malaysia 2014 [cited Dec 2014]. Available from: http://www.moh.gov.my/english.php/database_stores/store_view_page/21/437.

**Other Articles:**
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Panirchellvum V. 'No outdoor activities if weather too hot'. the Sun. 2016; March 18: 9(col. 1-3).

**Magazine Article**
Rampal L.World No Tobacco Day 2021 -Tobacco Control in Malaysia. Berita MMA. 2021; May: 21-22.

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# 5th International Conference on Tropical Medicine and Infectious Diseases 2022 (ICTMID 2022)

## Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP), Ipoh, Malaysia
## 23rd to 25th August, 2022

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# New paradigms in a microbe-threatened world

**Vincent Cheng**

Chief of Service & Consultant, Department of Microbiology, Queen Mary Hospital, Hong Kong, Infection Control Officer, Queen Mary Hospital, Hong Kong, Hon Professor, Department of Microbiology, The University of Hong Kong

## ABSTRACT

**Summary:** Emerging and re-emerging infectious diseases had inflicted devastating damage to the world. The plague pandemic had killed 30% of population in Europe and may eventually contribute to the collapse of the Mongol Empire. Several influenza pandemics also affected the world population over the course of the 20th and early 21st centuries. The recent global changes may have significant impact on the risk of infectious disease outbreak. In particular, climate change potentially expands the range of locations suitable to a particular pathogen or vector, and the increased international travel will enable pathogens to reach the new environments more rapidly. In response to the challenges of emerging infectious diseases, World Health Organization comes up with a list of diseases and pathogens which are prioritized for research and development in the context of public health emergency. It includes viral haemorrhagic fever, Middle East respiratory syndrome coronavirus, severe acute respiratory syndrome coronavirus (SARS-CoV-2), Nipah virus, Zika virus, and Disease X, which represents a pathogen currently unknown to cause human disease but requires cross-cutting preparedness. In fact, the first Disease X has appeared and caused by a highly transmissible virus, subsuqently identified to be a novel beta-coronavirus, SARS-CoV-2, which is the causative agent for Coronavirus disease 2019 (COVID-19). Our world is reshaped by the COVID-19 pandemic. To tackle the pre-symptomatic shedding and transmission of SARS-CoV-2, the most stringent public health measure was implemented to lockdown the cities in many parts of the world. Global lockdown may control the spread of the virus, but the impact of the lockdown has caused a significant impact in economy and different strata of our daily life. However, health is being prioritized above global economy in fight against COVID-19. Social distancing, universal masking, enhanced testing capacity for SARS-CoV-2, and mass vaccination for the population become a new norm in the COVID-19 pandemic. The COVID-19 pandemic will be eventually terminated. But our world is still threatened by emerging microbial agents which may have public health impact. It requires international collaboration to overcome the emerging threat and crisis.

# Human-animal spillover of SARS-CoV-2: Implications for public health

**Suresh V Kuchipudi**

Chair in Emerging Infectious Diseases, Pennsylvania State University, USA

## ABSTRACT

**Summary:** COVID-19 pandemic caused by the recently emerged severe acute respiratory syndrome coronavirus (SARS-CoV-2) is a significant public health catastrophe in a century. While the precise origin of SARS-CoV-2, and its mode of introduction into the human population, is not yet fully resolved, there is evidence that SARS-CoV-2 originated from bats. As zoonotic viruses infecting humans can spill back into susceptible animal hosts, SARS-CoV-2 has demonstrated the ability to infect many non-human animal host species. The list of animal species susceptible to SARS-CoV-2 infection continues to grow and includes domestic animals, primates, pet animals, and zoo animals. In addition, based on the ability of the spike protein to bind to the ACE-2 receptor, computational predictions have identified dozens of additional possible animal hosts for SARS-CoV-2. In addition, there are multiple reports of human infections from SARS-CoV-2 infected animals. We discovered widespread natural infection of wild white-tailed deer with SARS-CoV-2 in the USA, suggesting their role as a potential SARS-CoV-2 reservoir. Establishing an animal reservoir could facilitate the continued circulation of SARS-CoV-2 independent of circulation in humans. In addition, deer could pass on the infection to other susceptible wild animals such as rodents, foxes, and raccoons resulting in the establishment of SARS-CoV-2 enzootic transmission cycles. Such a scenario could result in virus adaptation and the emergence of novel variants that could escape the protection of current human SARS-CoV-2 vaccines. This presentation will discuss our recent findings on natural SARS-CoV-2 infection of deer and the long-term implications of human-animal-human spillover of SARS-CoV-2.

# Preparing for the next pandemic

**Awang Bulgiba Awang Mahmud**

Department of Social & Preventive Medicine, University of Malaya, Kuala Lumpur

**ABSTRACT**

**Summary:** Despite COVID-19 being the most severe pandemic to afflict the world since the Spanish Flu of 1918, the Malaysian response has not been outstanding even among developing nations. Pandemic preparation is a national responsibility, and the current Pandemic Preparedness Plan needs to be revised and updated if the country is to prepare properly for another pandemic. It has also become clear that the country needs to go beyond merely revising the Pandemic Preparedness Plan. Indeed, opportunities abound for a reset of the economy and the country in many ways. This reset is a great opportunity to push for widespread automation and adoption of artificial intelligence in the Malaysian economy, adoption of E- in work and life, introduction of a more efficient food supply chain, delivery of education through alternative means and to have vaccines and medicines security. In addition, future pandemic preparedness must heed lessons learned during this pandemic and use a whole-of-community approach in its planning. There is a great need to recognise the combined threats of unsustainable healthcare financing, climate change, the rise in lifestyle diseases, an ageing population and rapidly spreading infectious diseases which must be tackled and included in any future planning. Public health education also needs to change as pandemic resilience is not usually part of the usual public health curriculum. The link between infections and non-communicable diseases needs to be bridged and more research needs to carried out to understand this link better. Public health education also needs to incorporate adaptive thinking and scaling up response at speed and health promotion needs to adapt to social media and to counter misinformation. Advocacy for change is no longer a luxury or an option. It needs to happen quickly, and the country needs to adapt and innovate. If it fails to adapt and innovate then risks will emerge, it will be left further behind, and Malaysia will be even less prepared for another catastrophic health event.

# Antimicrobial resistance: Are we losing the fight?

**Suresh Kumar a/l Chidambaram**

Hospital Sungai Buloh, Malaysia

**ABSTRACT**

**Summary:** It has been estimated that there were an estimated 4·95 million (3·62–6·57) deaths associated with bacterial AMR in 2019, including 1·27 million (95% UI 0·911–1·71) deaths attributable to bacterial AMR. World bank in a report in 2017 postulated that if the antimicrobial resistance rates continue to increase the GDP fall due to resistance will be similar to what happened in 2008-2009 financial crisis. Resistance happens because of pressure to antibiotic usage. Between 2000 and 2015, antibiotic consumption, expressed in defined daily doses (DDD), increased 65% (21.1–34.8 billion DDDs), and the antibiotic consumption rate increased 39% (11.3–15.7 DDDs per 1,000 inhabitants per day). Of particular concern was the rapid increase in the use of last-resort antibiotics, such as glycylcyclines, oxazolidinones, carbapenems, and polymyxins. Drivers of AMR include over/suboptimal use in humans, animals and crops, sewage contamination of food pathways, environmental contamination of pharmaceutical products, sub standards drugs, poor vaccination rates, healthcare transmission and absence or suboptimal diagnostics.

# Tuberculosis: Are we anywhere close to eliminating it?

**Asmah Binti Razali**

Head (TB and Leprosy Control Sector) Disease Control Division, Ministry of Health, Malaysia

**ABSTRACT**

**Summary:** Tuberculosis (TB) remains the world's leading infectious killer and a quarter of the world's population is estimated to be infected with TB bacilli. WHO estimated each year 10 million people fell ill with TB disease and 1.5 million die from TB globally. The COVID-19 pandemic has affected TB services in Malaysia, in which TB notification rates reduced 10% between 2019 and 2020 and TB death increased by 5%. Various outreach activities, virtual consultation on Direct Observed Treatment (DOT) were practiced since the beginning of pandemic and concurrent testing for TB and COVID-19 were advocated. As for 2021, Malaysia is classified as a country with upper moderate burden with notification rate of TB was 64 per 100,000 population. The focus of National TB Programme is to increase case detection of TB, ensure treatment given effectively until patient is cured or completed treatment and reduce the occurrence of drug resistant TB. Global targets for reductions in the burden of TB disease have been set as part of the Sustainable Development Goals (SDGs) and the World Health Organization's (WHO's) End TB Strategy. The 2035 targets set in the End TB Strategy are 95% reduction in TB deaths and 90% reduction in the TB incidence rate, compared with 2015 achievement. To realize the End TB Strategy target 2035, Malaysia need to scale up rapid and early diagnosis of TB to reduce transmission; expand patient-centered care by moving it nearer to patients and their families for treatment efficient, enhance TB preventive therapy (TPT) to prevent development of TB active in the high risk groups, to boost intersectoral approaches to address inequities and active involvement of civil society organizations to reduce TB stigma, discrimination and enhance support to TB patients and their families.

# Monkeypox: the new global threat?

**Rafdzah Binti Ahmad Zaki**

University Malaya, Malaysia

## ABSTRACT

**Summary:** Monkeypox is a zoonotic disease caused by an orthopoxvirus, resulting in a smallpox-like illness in humans. This virus was first detected in monkeys in a Danish laboratory in the year 1958. Monkeypox disease is endemic and usually limited to West and Central Africa. However, its epidemiology has been reported to be changing and evolving in the last few years with cases being reported in other countries beyond Africa. Recently, multiple cases of monkeypox have been identified and reported to the World Health Organization (WHO). As of June 22, there were 3308 confirmed cases of monkeypox in more than 40 countries. This session will cover the description of the epidemiology and natural history of monkeypox, provide updates on the multi-country monkeypox outbreak situation, and discuss the potential threat to global health. The concept of One Health and how this approach can be used to prevent the emergence of new and existing zoonotic diseases will also be discussed.

# Vaccines and vaccinations

**Gowrisankar Rajam**

Principal Scientist/Scientific Director, Merck, Sharp & Dohme (MSD), Regulated Immunogenicity and Molecular, PA, USA

**ABSTRACT**

**Summary:** Science and knowledge have been a great catalyst for the progression of human health and wellbeing. In the past one and half centuries, average human life expectancy has doubled from 40 years to over 80 years. I believe, we were getting a tad bit complacent that health care is on the home run addressing all challenges with technical breakthroughs contributing to the extended quality of life besides the extended life expectancy (invincible?!). Well, a tiny virus, 1/1000th the size of a human hair reminded us of the fragility of life, and we are not sure when (or if) we will get off its grip. Having been given a reality check, it is time to take a pause and look back at the milestones that have contributed to the sustenance of life on this illustrious planet, earth. Vaccines, a serendipitous contribution to life has been the corner stone for the sustenance of life expectancy besides the quality of life and truly relevant to this date. The science of 'vaccinology' has come a long way, from a crude bacterial preparation to the exploitation of a fragment of RNA to protect life from exogenous and endogenous health threats. The knowledge explosion in biological and mathematical sciences culminated in the development of novel adjuvants, formulations and vaccine delivery strategies that are poised to take vaccines to another dimension in terms of human and animal health. Life is a continuous race for both the host and pathogen. As the pathogen evolves to evade the host strategies, the host conceives novel alternates to overcome the obstacles and in turn the pathogen…the race continues!!

# COVID-19 Vaccines

**V Gopalakrishnan**

Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Malaysia

**ABSTRACT**

**Summary:** COVID-19 episode was and is a devastating pandemic. The morbidity and mortality have skyrocketed at its peak. In the initial phase it was challenging to restrain the outcome of the disease and then in finding a suitable and effective control measure (a vaccine) to prevent further spread and occurrences. The production of the vaccine was fast tracked and a number of vaccines was the outcome of the global effort. Four major types of vaccines were made - whole virus vaccines, protein based vaccines, viral vector vaccines and nucleic acid vaccines. The outcome of these vaccines have been inconstant and at present emphasis in on the protection levels achieved due to the vaccines. Although there have been sporadic aftereffects of COVID vaccines, which is common outcome of vaccination, excessive limitations have been perceived as exceptions. On the whole there has been some amount of control of the viral infection, even if not for the expected long duration. As the protective levels are not as expected and due to the occurrence of many variants of SARS-CoV-2 and other reasons, multiple doses of the same or combination of the different vaccines is advocated at this present situation. In addition, antivaxxers have hindered or tried to hinder the vaccination process in many countries around the world. There are other aspects, such as non-availability of vaccines, non-compliance and others to be taken note in regards to COVID vaccines. Time will tell the factual outcome of the COVID vaccines. Get protected against COVID infection through COVID vaccines for whatever the outcome of the vaccination may be.

# Addressing vaccine hesitancy: Public Health perspective

**Saidatul Norbaya**

Family Health Division, Ministry of Health, Malaysia

**ABSTRACT**

**Summary:** Vaccination is the most effective public health intervention against vaccine preventable diseases. Success of vaccination lead to elimination of smallpox, polio in many parts of the world and efforts towards measles elimination is in progress. Today due to high childhood vaccination coverage, morbidity and mortality from various vaccine preventable diseases is rare and this leads to misinterpretation on importance of vaccination. Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Hesitancy ranges from outright refusals to vaccinate, delaying vaccination, agreeing with vaccination, and remaining uncertain about their effectiveness or safety or selective attitude toward certain vaccines. High vaccine hesitancy leads to low vaccination coverage in a community and could lead to disease outbreak leading to mortality from vaccine preventable disease. Various factors contribute to vaccine hesitancy in Malaysia. Population attitudes towards COVID-19 vaccination will be use to illustrate changes in behavior across pandemic time frame and efforts taken to address the situation.

# Key issues related to COVID-19 health care system: Lessons learnt from Thailand

**Sukhontha Kongsin**

Department of Public Health Administration, Mahidol University, Thailand

## ABSTRACT

**Summary:** Thailand is a high middle-income country with export-led economy based on trade and foreign direct investment. The COVID-19 pandemic has serious impact on health system, Thai economy and people due to unemployment in services and manufacturing sectors. First phase of the outbreak, Thai Government established the Centre for COVID-19 Situation Administration (CCSA) as special task force. Ministry of Public Health (MOPH) has formulated a management strategy focusing on comprehensive, proactive response by activating EOC (Emergency Operation Centre). Phase 2 was controlled by limited local transmission, emphasis on test, treat and immunization. Phase 3-4 were sustained local transmission and mitigation waves included patient care, prevention of large outbreak and vaccination. Five Key Lessons Learnt from Thailand's COVID-19 Response are 1) Invest in health facilities. Investment in healthcare infrastructure has prepared Thailand well for the pandemic. More than 1,000 public hospitals and 10,000 primary health care facilities provide medical and primary healthcare services and accommodate COVID-19 patients. 2) Universal health coverage (UHC). Since 2002, Thailand has achieved universal health coverage. During the outbreak, essential healthcare is provided to all infected people including foreigners without financial barriers. 3) The help of more than one million village health volunteers These volunteers who complemented primary healthcare services at community level undertook door-to-door visits for health education, active case finding, disease surveillance and quarantine. 4) Early action. Screening passengers from Wuhan, People's Republic of China (PRC) was initated within three days after PRC's announcement of cases of pneumonia. The first confirmed COVID-19 case outside PRC prompted strong public health measures and campaigns. A whole-of-government approach established the Center for COVID-19 Situation Administration (CCSA), chaired by the Prime Minister and top political leaders. 5) Nationwide public cooperation on effective social measures. Daily press conferences by CCSA's spokesperson and by MOPH executives/experts provided essential information to public. **Conclusion:** Strong, well-resourced and inclusive medical and public health systems, vaccination campaign and administrative systems has been integrated to fight the epidemic. A 'whole of society' approach means, "Nobody is safe unless Everybody is safe". We are strong, not because we are rich, because we fight and we do not give up.

# Regional support for outbreak preparedness/ enhancing regional health security in Asia through genomic surveillance

**Paul Michael Pronyk**

Duke-NUS Global Health Institute, Singapore

**ABSTRACT**

**Summary:** While the COVID-19 pandemic has been an unprecedented public health crisis, the SARS CoV-2 virus is just one of many zoonotic pathogens with outbreak potential. Many potential threats concentrate in South and Southeast Asia given high-levels of population density, environmental change, patterns of human-animal interaction and increasing human mobility. Genomic surveillance has emerged as an essential tool to enhance early pathogen detection. However, the application of these emerging tools and technologies in high-risk settings, particularly low and middle-income countries, remains limited. This presentation will profile the work of the Asia Pathogen Genomics Initiative (APGI). It will include a review of the current status of sequencing capacity across the region, highlight emerging challenges and bottlenecks, and discuss a strategy for adoption and scale in the context of improving the capacity of national surveillance systems.

# Role of molecular diagnostic capacity in COVID-19 control - South Indian experience

**Raju Sivadoss**

Deputy Director, State Public Health Laboratory, Chennai, India

## ABSTRACT

**Summary:** The COVID-19 pandemic has resulted in an unprecedented global emergency and has claimed more than 6.45 million deaths by August 2022. COVID-19 has had a devastating impact on global health and economy. While antiviral agents against the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing COVID-19, are yet to become widely available, vaccines and public health interventions recommended by the World Health Organization (WHO) remain the most promising approach against the global catastrophe. Being a new virus strain encountered by the human host, Molecular Diagnostic Capacity has played a vital role for the early detection of symptomatic cases for immediate isolation, preventing the further spread of infection in the community and to provide essential medical care. Early detection of infections in elderly (>60yr) and individuals with co-morbidities (diabetes, hypertension, chronic lung or kidney disease, malignancy, obesity etc) have saved innumerable lives. The presentation describes the challenges faced by Tamil Nadu, a southernmost state of India and the innovations implemented to augment the RT-PCR Testing Capacity during the international lock down during the first wave of the current pandemic. The SARS-CoV-2 virus also undergoes a series of mutations to adapt itself into the human population that likely could alter the disease spectrum, presentation and dynamics in the coming years. Eclectic variants of SARS-CoV-2 are increasingly evolving globally throughout the pandemic and Genomic Surveillance is an important Public Health Tool to monitor the emergence of new variants in the community.

# AMR in COVID-19 times

**Godfred A Menezes**

Medical Microbiology & Immunology Ras Al Khaimah Medical & Health Sciences University, UAE

**ABSTRACT**

**Summary:** The COVID-19 pandemic, due to SARS-CoV-2, has affected all facets of society, including actions to address antimicrobial resistance (AMR). AMR was already among the top priorities for global public health, before the COVID pandemic began. The propagation of COVID-19 around the globe has been followed by an increased use of antibiotics. This is related to the alarm for bacterial superinfection in COVID-19 patients. With the risk of COVID-19 spread, there has been a rising awareness of the importance of antimicrobial stewardship programs (AMSP), as well as infection prevention and control (IPC) measures that could help decrease the microbial load and hence circulation of pathogens, with a drop-in dissemination of AMR. Here is an overview of factors during the pandemic that influenced AMR. Patients with COVID-19 often needed multiple courses of broad-spectrum antibiotics, mechanical ventilation, other organ support, and/or other invasive devices. This amplified exposure to, and risk of, infections with hospital-associated pathogens that are often highly resistant such as methicillin-resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa, Candida auris,* and *Acinetobacter baumannii*. On the brighter side, vitamins C, D3 and Zinc micronutrients have shown immunomodulating activity & as epithelial and endothelial barriers. ICU patients with continued illness/intubation have more common detection of multidrug-resistant (MDR) Gram-negative pathogens, likely reflecting hospital-acquired infection. Biomarkers such as CRP and PCT help in diagnosing bacterial infections, which may be raised in severe COVID-19 patients. In the particular setting of SARS-CoV-2 infection, fluid and pus-filled pulmonary alveoli generate a nutritive setting for bacteria such as P. aeruginosa and S. aureus. Chief recommendation to battle AMR problem includes, to optimize antibiotic use by confirming that the apt antibiotic is directed at the correct dose, for the correct duration, and in a manner that checks the best consequence and restricts side effects and AMR. Investigation of resistance must endure and be strengthened, in both COVID-19 and non-COVID-19 patients. Among the many consequences of the COVID-19 pandemic, there is the dominant potential impact on AMR. If not addressed, AMR will likely have hostile consequences, though over a period.

# My experience in combating AMR

**Ker Hong Bee**

Infectious Disease Consultant, Hospital Raja Permaisuri Bainun, Ipoh, Malysia

**ABSTRACT**

**Summary:** Antimicrobial Resistance (AMR) is one of the most serious global public health crisis in the century. It threatens the effective prevention and treatment of an ever-increasing range of infections. The COVID-19 pandemic has clearly exacerbated the existing global burden of AMR. Overuse or misuse of antimicrobial agents are among the main drivers of AMR. Tackling AMR requires an interdisciplinary One Health approach involving human, animal and environmental health partners worldwide. As an Infectious Disease Physician and Infection Prevention and Control (IPC) doctor, combating AMR is among top priorities in my day to day practice.

# Paediatric nosocomial infections – what's new?

**Subhranshu Sekar Kar**

Associate Dean- Clinical Sciences, Ras Al Khaimah Medical & Health Sciences University, UAE

**ABSTRACT**

**Summary:** A patient when gets infected in the hospital for a reason other than that of the primary problem or infection acquired during a visit to hospital are labelled as nosocomial infections or hospital-acquired infections (HAIs). These also include infections acquired from hospital but appearing after discharge as well as the occupational infections among staff of the health care facility. Currently, the term healthcare-associated infections has replaced nosocomial, hospital-acquired or hospital-onset infections. Incidence of nosocomial infections in pediatric intensive care unit (PICU) vary between 6.1% and 28%. Children are more susceptible for infection than adults especially in the first two years of life. The infections broadly include blood stream infections (BSIs), respiratory tract infections (RTIs) and urinary tract infections (UTIs). The nosocomial pathogens vary depending upon the site of infection. BSIs related to central lines are usually polymicrobial. The commonly isolated pathogens from BSIs are Klebsiella pneumoniae, Coagulase-negative Staphylococci and Pseudomonas aeruginosa. Common organisms identified from RTIs are Pseudomonas aeruginosa and Staphylococcus aureus and for UTIs, E. coli and Candida albicans. Device-related infections have high risk of mortality. The risk of HAIs depend on host factors, duration of stay in hospital, number of interventions, invasive procedure, aseptic techniques employed and inappropriate use of antimicrobial agents. Concerns about spread of infection by air, water, and contaminated surfaces gradually changed practices in hospitals. Incidence and prevalence of many infectious diseases in developed countries have reduced due to Hospital-based programs of surveillance, prevention and control of healthcare-associated infections with effective implementation of antibiotic stewardship program and proper hand washing. However, the battle against healthcare-associated infections is far from over. Many opportunities for improvement remain and new challenges continue to arise. In addition to the important research contributions that arise directly from the core activities of outbreak investigation, laboratory support, and HAI surveillance, implementation of new strategies like innovative technological approaches and electronic monitoring system for hand hygiene, video monitoring for routine healthcare, peripheral venous catheter traceability, anthropological approaches, healthcare worker communication and biotechnological application of Quorum quenching enzymes will help in preventing transmission when caring for contagious patients.

# Prescription ethics: A primary care perspective

**Paranthaman**

Family Medicine Specialist, Greentown Health Clinic, Malaysia

## ABSTRACT

**Summary:** Antimicrobial resistance rate has increased by two folds in the last 20 years and has killed approximately 700,000 people per year globally. The number is estimated to escalate to 10 million deaths annually by 2050 whereas the financial burden could cost up to US$100 trillion (RM416.65 trillion). This situation highlights the urgency of an action plan to combat the issue comprehensively. As an emerging global health threat with major economic impact, it requires a comprehensive strategy at various aspects, including primary care. The emergence of antibiotic resistance in bacteria is directly linked to selective pressure exerted by the overuse of antibiotics. Indiscriminate antibiotic prescribing is defined both by excessive prescribing and by prescribing an inappropriate antibiotic. Although there has been a focus on antibiotic stewardship in the hospital setting, outpatient prescribing accounts for the majority of antibiotic consumption and is an important factor in the emergence of resistance in both the community and hospitals. Thus, preventing unnecessary antibiotic use in the primary care setting is essential for overall stewardship efforts. Over prescription of antibiotics is a continuing problem in primary care. To combat these, there is a need to use antibiotic appropriately and wisely, based on evidence-based guidelines, avoiding unnecessary and sub therapeutic antibiotic usage, besides educating patients regarding antibiotics. Algorithms and guidelines on managing common outpatient conditions eg acute rhinosinusitis, acute tonsillo-pharyngitis, acute otitis media, pneumonia/acute bronchitis, urinary tract infection, skin and soft tissue infection and acute gastroenteritis are available. These algorithms will assist primary care providers to decide whether antibiotics are needed or not, what antibiotics to use, the correct dose and duration of antibiotics and when to escalate antibiotics in cases not responding to current treatment. The choices of antibiotics are based on current national antibiotic guidelines. By implementing clinical pathways for common outpatient infections on antibiotics prescribing, declining prescriptions for non-pneumonia acute respiratory infections and the use of broad spectrum antibiotics over the first year was found in one study. Strategies on dealing with possible patient driven demands are also crucial to synergize these approaches for antibiotic stewardship.

# BCG vaccine: Its relevance in the prevention of tuberculosis and beyond

**Sekar Balaraman**

Consultant, BCG Vaccine Laboratory, India

**ABSTRACT**

**Summary:** BCG, a live attenuated vaccine was developed against tuberculosis at the beginning of the 20th century. It has been the most used vaccine in the world, with around 130 million children vaccinated every year. Although, there are varying estimates of its efficacy in preventing pulmonary tuberculosis, protection was higher in trials further from the equator, where environmental mycobacteria are less and with lower risk of diagnostic detection bias. Protection against meningeal and miliary tuberculosis also appeared greater than for pulmonary tuberculosis. BCG Vaccine has been shown to decrease neonatal mortality due to the prevention of neonatal sepsis and various upper respiratory tract infections (URTI). BCG vaccine also has nonspecific protective effects against protozoan infections. This nonspecific effects of BCG vaccine in humans and animal models have been attributed to Heterologous immunity and Trained Immunity. BCG as adjuvant immune therapy is shown promising results for patients of malignant melanoma. Intravesical BCG Vaccine is now being used as standard therapy for non-muscle invasive bladder cancer (NMIBC). . BCC vaccine administered at birth enhances many vaccine responses. Ecological studies suggested that countries and regions that mandate BCG vaccination for their population have a lower number of infections and a reduced mortality from COVID-19. It has been hypothesized that BCG vaccination might be a potent preventive measure against SARS- CoV-2 infection and/or may reduce COVID-19 disease severity. Countries with a low TB incidence and a low BCG coverage had the highest incidence of COVID-19 per 100,000 population. Countries with high TB incidence and BCG coverage had much lower rates of COVID-19 infection. In addition, the case rate fatality rate appeared to be lower in these countries. A study to evaluate the effectiveness of the BCG vaccine in reducing morbidity and mortality in elderly individuals in COVID-19 hotspots in India highlights, the effect of BCG vaccination in modulating the frequencies of both innate and adaptive immune cell subsets and in inducing heightened total antibody levels. Whether this translates to improved protective immunity to non – specific infections like SARS-CoV2 remains to be determined.

# Tuberculosis: A forgotten pandemic

**Kyaw Khaing**

United Nations Office for Project Services (UNOPS) Asia Region, Myanmar

**ABSTRACT**

**Summary:** Although Tuberculosis (TB) is a preventable and curable disease, it causes 1.5 million people to die, and 10 million people ill every year and is acting as the global top infectious killer. For HIV-infected people, it is the main cause of death and contributes to the main actor in antimicrobial resistance. Poverty, undernutrition, diabetes, tobacco smoking, and household air pollution are the main precipitating factors for TB. The progress is slow in addressing these problems and the world will not end TB as a global public health challenge by 2035 as aimed in the End TB Strategy. There is a reduction in providing treatment for DR-TB and a fall in global spending on prevention, diagnosis, and treatment services of TB these days. Drug-resistant TB (DR-TB) is still a public health crisis as only about one-third of patients with DR-TB accessed the treatment in 2020. TB diagnosis and treatment services encounter disruptions on both supply and demand sides like reducing health system capacity in providing services, inability to seek care in the lockdown context, and concerns about the risk of infection while going to health care facilities during the COVID-19 pandemic. TB notification decreased obviously during the early stages of the COVID-19 pandemic compared to previous years in most of the high-burden countries likely to have numerous undiagnosed cases of TB. Those people may face poor treatment outcomes due to delay diagnosis and treatment. Reallocation of TB funding to COVID-19 response and a significant decrease in TB funding is one of the factors worsening the TB pandemic during COVID-19. In the long run, TB-related deaths and structural lung diseases are expected to increase due to setbacks in tuberculosis control efforts by the COVID-19 pandemic. This trend is probably to continue in tuberculosis endemic regions with low coverage of SARS-CoV-2 vaccination and the emergence of new variants. To reduce the burden of mortality and morbidity associated with TB, countries and all partners will require advocacy, baseline preparedness, and more cohesive global coordination in areas of development of vaccines, improving funding in prevention and intervention strategies.

# Vector-borne diseases during COVID-19

**Jenarun Jelip**

Disease Control Division, Ministry of Health, Malaysia

**ABSTRACT**

**Summary:** Dengue, a mosquito borne viral disease, remains a public health threat in Malaysia due to its associated morbidity and mortality. Malaysia is endemic to dengue with the annual incidence hovering between 200 to 400 cases per 100,000 population for the past one decade. Nonetheless, the local dengue case fatality rate has been kept below 0.50% since 2012. Dengue in Malaysia has demonstrated a cyclical trends with four to five years interval between peaks. The last two peaks were observed in 2015 and 2019 and based on the observed cyclical trends, 2020 and 2021 were the years when dengue incidence was expected to be at the lowest level. Coincidentally the COVID-19 pandemic occurred in 2020 and 2021 with concurrent reduction of dengue incidence in Malaysia below 400 cases per week. During the pandemic, people spent less time in non-residential areas due to the movement control order implemented by the government and were less exposed to dengue infection risk. Among the public health measures implemented were closure of schools, closing of public transport system and cancellation of public events. The combined effect of the dengue cyclical trends and the public health measures implemented by the government during the COVID-19 pandemic gave rise to historically low dengue incidence in 2020 and 2021. Malaysia has recorded zero indigenous human malaria since 2018. However, Malaysia continues to report imported human malaria. Currently, most of the malaria cases in Malaysia are zoonotic malaria. During the COVID-19 pandemic, the incidence of zoonotic malaria increased from 2,609 cases in 2020 to 3,575 cases in 2021. The opposite was observed for imported human malaria whereby the number was reduced from 621 cases in 2019 to 111 cases in 2021. However, as the country opens its economy in 2022, imported cases of human malaria have started to increase again.

# Vector control: Where are we and where are we heading?

**Leo Braack**

Malaria Consortium Asia, Thailand

**ABSTRACT**

**Summary:** Malaria remains our priority vector-borne disease, resulting in an estimated 241 million cases and 627,000 deaths in 2020. Interestingly, it is only a little more than a century since we discovered what causes malaria and that Anopheles mosquitoes are the vectors. Since that discovery, mosquito control has been our primary strategy in combating malaria, initially through larval control and house-screening, later through spraying of insecticides such as DDT, and more recently by way of Insecticide-Treated Nets, but also Indoor Residual Spraying. Long-Lasting Insectide Nets were highly effective in reducing malaria incidence between the years 2000 and 2015, but effectiveness in vector control has declined largely due to a rise in resistance against synthetic pyrethroids and also a shift in biting behaviour, with more outdoor and early-evening biting. New vector control tools and approaches are necessary to address outdoor transmission and residual malaria. Arboviruses are on the rise globally, with an estimated 400 million cases of dengue alone occurring each year. In large parts of Asia and elsewhere in the world, arboviruses are escalating in numbers and geographic spread, and this increase in arboviral diseases such as dengue, Zika, Chikungunya and others will almost certainly continue due to expanding trade, tourism, urbanization, but also Global Warming. There is no effective vaccine yet for dengue, Zika or Chikungunya, and no drugs to cure people, which means vector control is our primary strategy to control such Aedes-borne arboviruses. Our tools to combat Aedes are also inadequate or poorly applied. We are also experiencing a global shortage of medical entomologists, and there are widespread shortfalls in capacity within national agencies to conduct optimal vector surveillance and control. This presentation reflects on the major role that vector control has had over the past century, the challenges facing vector control, and new tools and approaches that are now under development or being implemented.

# Role of media advocacy in vector-borne diseases control and management

**Kyaw Ko Latt**

Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Malaysia

## ABSTRACT

**Summary:** Due to rapid urbanization, climate change, and pollution issues, the burden and threat of vector-borne diseases are still challenging to human health. Developing drug resistances issue, evolving new strains of pathogens and increasing global travel and trade are also contributing the emergence or re-emergence of vector-borne diseases. Public health professionals and health care providers have recognized the importance of utilizing media in shaping public opinion, promoting disease prevention and control policy and also for the empowerment of the communities. In pursuit of Global Vector Control Response (2017 – 2030) by World Health Organization (WHO), media advocacy is one of the keys enabling factors for social mobilization, partner coordination and to develop the policies of all relevant agencies, organizations and civil society. The important role of media advocacy in vector-borne diseases control and management is to promote effective public policies by using the media to strategically apply pressure for policy change. To achieve effective media advocacy in vector-borne diseases control and management, it is critical to identify the relevant media platform and the content of the advocacy messages should also be adapted to the specific decision-makers based on their needs, issues, concerns and interests. Media advocacy provides a framework for enhancing the global preventive strategies from the health behavior of individuals to the actions of the stakeholders and policymakers whose decisions can structure the healthier environment for all.

# Engaging communities in tackling vector-borne diseases

**Khairunisa bt Mohamed**

Perak State Health Dept., Malaysia

**ABSTRACT**

**Summary:** A lot of efforts have been initiated by Malaysia's government to tackle vector borne diseases. This resulted with some significant success, most notably, reduction in reported Malaria cases and towards Malaria elimination. Malaysia, unfortunately, has not been so successful with Dengue. We continuously recorded an increment in total number of dengue cases every year since 1980, and Dengue has been declared as a major national health threat in Malaysia. Public health authorities have deployed several methods in fighting vector-borne diseases, Dengue/Chikungunya particularly. The methods range from larvaciding, space spraying, environmental control, and to the most challenging approach of community engagement and involvement. This presentation will focus on the challenges face by Perak Health Department in engaging communities as part of management of Dengue/Chikungunya. Community engagement is important in every single method of vector control. As in other states, Perak also experiences poor community participation in vector-borne disease control efforts, especially in Dengue control. Poor public acceptance and compliance during space spraying activity, caused insufficient coverage, thus undermine its effectiveness. Poor public cooperation during search and destroy (part of environmental control) activity also reduces the probability of success in controlling Dengue cases/outbreak. This similarly a pattern seen during communal outbreak locality cleaning (malay: gotong-royong), whereby most of the participants are from the public health department and government agencies, and only small number of participations from the community itself. Studies shown that, most Malaysians' knowledge on dengue is good. It also found that good knowledge does not necessary lead to good practices. Communication for Behavioural Impact (COMBI) introduced by WHO in 2001, aims to mobilize individuals, families, communities or any target groups to identify risk factors, change or adopt behaviour that required in preventing or control diseases that affect their health and community. Currently, our COMBI is limited to certain localities and to establish more COMBI in more localities is also a challenge, as it requires continuous commitment from the community. More studies needed especially on how to engage community effectively in vector control program. An innovative solution to bridge the 'know-do' gap in community is vital which subsequently creates resilient community in combating vector-borne diseases, particularly Dengue.

# Way forward managing mental health in COVID-19 endemic phase

**Mohammad Abdul Rahman**

Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Malaysia

## ABSTRACT

**Summary:** COVID-19 pandemic had contributed to widespread emotional distress and increased the number of mental disorders reported in 2020 and 2021. The pandemic had triggered a range of emotional reactions (fear, sadness, anger, disgust, frustration, confusion, boredom), and unhealthy behaviors (psychomotor agitation with abusive behaviour, excessive substance use), and noncompliance with public health directives (such as home confinement and vaccination) in the general population. The mental disorders include Acute Stress Disorder which complicates into Post-traumatic Stress Disorder, Major Depressive Disorder, Normal Grief which later develop Pathological Grief, Panic Disorder and Generalized Anxiety Disorder. COVID-19 endemic refers to the inability to eradicate the presence of coronavirus in the community. With more than 95% adult population fully vaccinated with booster dose, adolescents and children vaccination drive is well in place, together with decreasing number of serious respiratory symptoms and death, Malaysia declared the endemic phase in October 2021. In the context of COVID-19 endemic phase, psychosocial assessment, monitoring and deliver support is still relevant. Referral for mental health evaluation and care with supportive interventions to promote wellness will ensure the prevention of mental ill-health complications of COVID-19 infection. The mental health surveillance will allow for an adequate and appropriate response to the mental health issues. Individuals with mental health issues are continuously manage with pharmacotherapy, psychotherapies, cognitive therapy, behavioural therapy, psychosocial rehabilitation, psychoeducation and counseling. The awareness and health hygiene program is ongoing for the general population.

# Spread of zoonotic diseases: Are we to blame?

**Vickneshwaran**

Zoonoses Division, Ministry of Health, Malaysia

**ABSTRACT**

**Summary:** Prevalence of zoonotic diseases is increasing globally, one good example is COVID-19. Zoonosis (also known as zoonoses and zoonotic diseases) are infectious diseases caused by bacteria, viruses and parasites that spread between animals (usually vertebrates) and humans. Zoonotic transmission can occur in any context in which there is companionship (pets), economic (farming, etc.), predatory (hunting, butchering or consuming wild game) or research contact with or consumption of animals, animal products or animal derivatives. Studies have shown that 60% of human infectious diseases are zoonotic and about 75% of emerging infectious diseases of human have an animal origin. In Malaysia, zoonotic disease as part of emerging diseases may significantly impact health, social and economic facets of everyday life. So, reducing the risk of zoonosis should be prioritized by at all levels. Evidence has shown that to be effective in controlling zoonosis, we have to control and prevent it from the source i.e. from the animals. Interface which requires a one health approach involving effective communication, collaboration and coordination among human, animal and environmental health sectors.

# Whole genome sequencing of SARS-CoV-2: clinical applications and experience

**Jamal I Ching Sam**

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## ABSTRACT

**Summary:** SARS-CoV-2, cause of the COVID-19 pandemic, is a RNA virus with genome size of 29.9 kbases. The importance of genome sequences of SARS-CoV-2 is clear in epidemiological surveillance, tracking of variants, development of therapies and diagnostics, pathogenesis studies, and others. This has driven global expansion of sequencing facilities and sharing of sequences, such that over 11.5 million sequences were available, as of June 2022. Our research laboratory started whole genome sequencing (WGS) of SARS-CoV-2 in April 2020, and have since completed and shared over 800 sequences using Illumina and Nanopore technologies. In this talk, I will share how we used the generated SARS-CoV-2 sequences in conjunction with a clinical diagnostic microbiology service in our associated teaching hospital: (1) to contribute to surveillance of SARS-CoV-2 linages both nationally and within our hospital; (2) to investigate clusters within our hospital, and how this impacted clinical protocols; (3) to determine suspected individual cases of reinfection or persistent infection; and (4) to evaluate reduced performance in a commercial diagnostic PCR assay, leading to modified primers and probes. WGS has become increasingly accessible and affordable, with numerous publicly available databases, protocols, training and bioinformatics tools, to help overcome technical and analytical challenges. Sequencing data has a variety of clinical and epidemiological uses.

# Mortality risk factors among hospitalised COVID-19 patients

**Mohammad Al-Jafari[1], Mohammad Daradkeh[1], Mohammad Al Mse'adeen[1], Sadeen K Zein Eddin[1], Saja Zuaiter[1], Mohammad Abu-Jeyyab[1], Waqar Al-Kubaisy[2]**

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## ABSTRACT

**Introduction:** COVID-19 is an acute viral infection that mainly affects the respiratory system leading to mortality. Therefore, positive COVID-19 patients may require intensive care unit (ICU) admission in severe cases. Many factors are thought to exacerbate the symptoms of COVID-19 resulting in increased mortality, smoking, hypertension and type 2 diabetes mellitus (T2DM) are on the top of these factors. **Objective:** This study was designed to detect the strength of association between death rate among COVID-19 ICU admitted patients and being smokers, type 2 diabetes mellitus (T2DM), or hypertension. **Materials and methods:** A cross-sectional study was conducted. A sample of 302 patients included all COVID-19 patients admitted to the ICU of the central hospital in Amman, Jordan, in July 2021. **Results and conclusion:** Of the total 302 patients, 171 were smokers. the death rate among smokers (67.25%) was significantly higher than (53.43%) among non-smokers X2= 5.966, *p*=0.0145. We found that 118 cases had T2DM. the death rate among patient with T2DM (62.71%) was insignificantly higher than (60.32%) among non-diabetic patients X2= 0.172, *p*=0.67. Of the 130 COVID-19 patients with hypertension, the death rate was (70.76%) significantly higher than (54.1%) among those without hypertension X2= 8.70, *p*=0.0031. Moreover, by using the OR and 95% CI. Interestingly, we found that smokers were almost two times significantly more prone to death than nonsmokers (OR=1.79, 95%CI:1.12 - 2.86, *p*=0.015). Also, patients with hypertension were two times significantly more prone to death than normotensive patients, (OR=2.06, 95% CI: 1.27 - 3.33, *p*=0.0034). On the other hand, T2DM showed an insignificant risk factor (OR=1.11) for death. 95% CI: 0.687- 1.78, *p*=0.6780. Smoking and hypertension act as significant risk factors to increase mortality in COVID-19 patients.

**Keywords:** Risk factors, Hospitalised COVID-19, Death, Jordan

# Themes and issues of COVID-19: What is prolonging the pandemic?

**Sankaran RS[1,2], Padmavathy KM[3], Sankaran VR[1,4]**

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## ABSTRACT

**Introduction:** Prior to the COVID-19 pandemic, healthcare authorities and experts believed that the modern-time healthcare system was ready to face a global health crisis, but with over 5 hundred million cases, and 6 million deaths, the pandemic is still going on. This study aims to identify and classify factors into broad categories that had recurrent mentions as the reason for the prolonging pandemic. **Materials and methods:** A systematic review of 168 studies published between January and June 2022 available in PubMed, Scopus, Google Scholar database is being conducted. The search terms were 'COVID', 'issues', 'challenges', 'impact', and 'response'. Factors identified as homogenous were grouped together. **Results and conclusion:** The preliminary results showed that the factors for the continued pandemic can be classified into three broad categories: the characteristics of the virus, the adequate response of health authorities, and population attitude. All three identified categories had time-related variability throughout the pandemic. The success in controlling the pandemic relies on the harmony of the identified categories. The characteristics of the virus include virulence, pathogenicity, transmissibility, and variants of mutations. The second category concerns how international and local health authorities reacted to the early COVID infection by devising strategies to prevent the spread of the disease, cure the infected, and protect the population from the virus. Currently, global vaccination coverage is considered as one of the important factors in the end of the pandemic. Perhaps the most important factor is the attitude of the population. This includes compliance with local mandates and following appropriate hygiene practices. The pandemic is projected to transition into an endemic in the next few months where COVID-19 becomes less of an issue. The success of transition into an endemic lies in addressing the deficiencies of the identified categories.

# Potential therapeutic role of antimicrobial peptides against SARS-CoV-2 evidenced by computational analyses of peptide-protein interactions

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## ABSTRACT

**Introduction:** The pandemic of coronavirus disease 2019 (COVID-19) poses critical challenges for the public health, research, and medical communities worldwide. While vaccines were made available at record speed, there remains the need to develop effective therapeutic agents. Therefore, we evaluated the potential pharmaceutical role of naturally occurring antimicrobial peptides (AMPs) against SARS-CoV-2 by studying their peptide-protein interactions through computational analyses. **Materials and methods:** Antimicrobial peptides from the antimicrobial peptide database (APD3) were considered and shortlisted based on stringent physicochemical properties. Promising AMPs were subjected to 3D structure predictions by ab initio modeling, and the peptide best models were selected based on their higher confidence score (C-score). Schrödinger Maestro's protein preparation wizard was used to prepare and optimize the modelled peptides' structure. The spike protein of SARS-CoV-2 and peptide-protein docking were evaluated using the Piper module. Additionally, protein-protein non-bonding interactions were assessed. Furthermore, the stability of the top complex was subjected to explicit molecular dynamics. The study was funded by Malaysian Fundamental Research Grant Scheme [[ref no. FRGS/1/2020/SKK0/UNIKL/02/1]. **Results and conclusion:** Of the shortlisted thirty AMPs, five potential peptides that efficiently bound to the spike protein were identified based on the lowest Piper energy scores – HD-5, Rat NP-4, Kalata B8, HFIAP-3, and Circulin D. These potential AMPs were further analysed by molecular dynamic simulations to verify the stability of the docked complexes, and HD-5 was observed to have robust interaction with the spike protein. Thus, the findings of the computational analyses highlight the antiviral potential of AMPs in inhibiting host cell entry of SARS-CoV-2 and could serve as anti-SARS-CoV-2 therapeutic candidates, and further future *in vitro* and *in vivo* experimental studies are warranted.

# Prevalence of latent tuberculosis infection among medical students in a public university in Malaysia

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## ABSTRACT

**Introduction:** Exposure to *Mycobacterium tuberculosis* may result in latent tuberculosis infection (LTBI). A person may inhale the bacteria and become infected with *Mycobacterium tuberculosis* for many years without becoming ill or transmitting the organism to others. Medical students have high risk of exposure to active tuberculosis patients and are at risk of developing LTBI. Tuberculin skin test (TST) can be performed as a screening test to detect active tuberculosis infection or LTBI. A relatively newer test, the Interferon-Gamma Release assays (IGRAs) test, is recommended by WHO for countries with intermediate or high tuberculosis burden. IGRAs test was shown to be advantageous over TST with higher specificity and less cross reactivity with BCG vaccine. A previous study in Malaysia showed that the prevalence of LTBI among medical students was as high as 8%. **Objective:** This study aimed at determining the prevalence of latent tuberculosis infection among medical students in a public university in Malaysia. **Materials and methods:** A cross sectional study was conducted among medical students in clinical years (Year 4, 5 and 6) using stratified simple random sampling. TST was administered and any induration ≥ 10mm in diameter after 72 hours was considered as positive. Students with positive TST were further tested with IGRA test. **Results and conclusion:** A total of 171 medical students participated in the study. Six students (3.5%) had positive TST results. Out of this, one student had positive IGRA result. Further examination revealed no active tuberculosis infection. The prevalence of LTBI among medical students in a public university was 0.6%. The prevalence of latent tuberculosis infection among medical students in this public university is very low. Screening among medical students should continue as the exposure and risk of *Mycobacterium tuberculosis* infection are still high in Malaysia.

# Effect of diabetes mellitus on non-conversion sputum smear and the treatment outcome among working-age group pulmonary tuberculosis patients in Selangor, Malaysia

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## ABSTRACT

**Introduction:** Malaysia is a nation with intermediate Tuberculosis (TB) burden. However, diabetes mellitus (DM) is exceedingly prevalent in Malaysia and is considered to be rising, particularly in the mid-'30s. **Objective:** The primary purpose is to evaluate the effect of DM on TB treatment outcome and sputum conversion among working-age group patients in Selangor, Malaysia. **Materials and methods**: A retrospective cohort study used data from the Tuberculosis Information System (TBIS) from January 2019 to December 2019. Descriptive analyses and comparisons were made using the chi-square test and binary logistic regression analysis to determine the predictors of smear non-conversion and treatment outcomes. **Results and conclusion:** There were 2445 patients from the working-age group with newly diagnosed Pulmonary Tuberculosis (PTB), of whom 612 (25%) had DM. Among those with DM, a significantly higher proportion of men, patients aged 45 years and older, smokers, and persons were living in rural ($p$<0.001). In addition, in patients with DM, there was a higher proportion who had positive sputum smears at 2 months (17.9% vs 4.9%, RR 3.50, 95% CI 2.37–3.99), unsuccessful outcome (30.2% vs 21.9, $p$<0.001), and who were died (11.3% vs 3.3%, $p$<0.001) compared with patients who had no DM. Furthermore, the multivariable analysis demonstrated DM to be independently associated with the non-conversion sputum smear ($p$<0.001, RR = 3.01, 95% CI 2.09–4.32) after 2 months of intensive therapy. DM was related to failure to convert sputum smear at two months and adverse treatment outcomes of loss-to-follow-up and mortality in smear-positive patients with PTB. More study is needed to understand these findings and evaluate if the present treatment duration is sufficient.

# Larvicidal Activity against *Aedes albopictus* mosquito and metabolites profiling using gas chromatography-mass spectrometry of Sweet Basil (*Ocimum basilicum L.*) leaves

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## ABSTRACT

**Introduction:** *Aedes albopictus* (Culicidae) is one of the major vectors for human viral diseases. Applying plant-based larvicides to interrupt the mosquito's life cycle is an important strategy of vector control. **Objective:** This study was conducted to evaluate the hexane extract of sweet basil (Ocimum basilicum L.; family Lamiaceae) leaves for larvicidal activity against the wild strain of *Aedes albopictus*. **Materials and methods:** Sixty third instar larvae (20 larvae/replicate) of wild strain *Aedes albopictus* were exposed to six different concentrations of the extract (6.25–200 µg/mL), respectively, and the mortality rate was recorded at 24 and 48 h post-treatment. The extract was subjected to isolation using column chromatography (silica gel 60) to produce 14 fractions. The most active fractions were pooled and chromatographed again to obtain seven subfractions. The metabolites profiling of the most active subfraction was performed using gas chromatography-mass spectrometry (GC-MS). **Results and conclusion:** Probit analysis showed that the median lethal concentration and 95% lethal concentration (95% CI) of the extract at 24-h post-treatment were 16.0 (11.0-22.1) and 53.0 (34.6-136.8) µg/mL, respectively. The corresponding values at 48-h post-treatment were 12.8 (7.6-19.2) and 32.7 (21.1-152.0) µg/mL, respectively. Only the fractions F3, F4, and F5, which were eluted using hexane-acetone mixtures of 8:2, 7:3, and 6:4 v/v, respectively, displayed larval mortality rates of 91.7%-100% at 25.0 µg/mL after 24 h of exposure. The subfraction F345-S2 which was eluted using hexane-acetone (8:2, v/v) demonstrated the strongest larvicidal activity with 100% mortality at 12.5 µg/mL after 24 h of exposure. The GC-MS analysis unveiled the presence of 31 components in the subfraction. Estragole (57.67%), 2-(2-butoxyethoxy)ethanol (10.92%), tau-cadinol (9.92%), methyl eugenol (4.35%), 2,4,di-tert-butylphenol (2.39%), phytol (1.63%), and germacrene D (1.23%) were the major components in the subfraction with some of them being reported as larvicidal compounds. Sweet basil leaves have demonstrated substantial larvicidal activity against the *Aedes albopictus* mosquito and can serve as potential source of naturally-derived larvicides.

# Establishment of *Wolbachia* strain wAlbB and maintenance of dengue inhibition capacity in *Aedes aegypti* population

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## ABSTRACT

**Introduction:** wAlbB has been introduced into wild *Ae. aegypti* populations in several sites in Klang Valley, with the aim to assess whether wAlbB can be established and maintained at high frequency in urban settings. It is also to ensure wAlbB *Ae. aegypti* can maintain a good dengue inhibition capability after long establishment in the field. **Materials and methods:** Four generations of back-crossing to field-collected local material were carried out to ensure a fit, locally adapted, and competitive *Ae. aegypti* wAlbB line were released. Ovitraps were used to collect mosquitoes from the release sites (Section 7 Shah Alam). qPCR-HRM was performed to screen for the presence of *Wolbachia*. A year after the release cessation, wAlbB *Ae. aegypti* were collected and fed with and DENV-1 using patient blood via artificial feeding. Midgut and salivary gland tissues were dissected, and the viral load was quantified by multiplex RT-qPCR and normalized against the RpS17 mosquito genes. *Wolbachia* density from the mosquito carcasses of the dissected mosquitoes was quantified by multiplex qPCR. **Results and conclusion:** *Wolbachia* frequency increased rapidly to over 80% in the release site and subsequently fluctuated following cessation of release. Releases were resumed at a lower release rate whereby *Wolbachia* frequencies rapidly rise up again and maintained stable without further releases for more than 3 years. No reduction in *Wolbachia* density and a significant blocking of virus dissemination to the salivary glands were observed. Our findings demonstrate the capacity of wAlbB strain to become established and maintained itself at high frequency with unattenuated dengue inhibition capacities. These findings support the sustainability of interventions using wAlbB to control dengue transmission. It is also anticipated the Wolbachia spread is negatively affected by the immigration of wild mosquitoes from the surrounding areas, suggesting good natural boundaries to be considered for the design of release strategy.

# Dendritic Cell-Specific Intercellular Adhesion Molecule-3-Grabbing Non-integrin (DC-SIGN) genetic polymorphism is associated with dengue infection among Sabahan population

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## ABSTRACT

**Introduction:** Given that the primary dengue receptor on human dendritic cells is the C-type lectin DC-SIGN (CD-209), a single nucleotide polymorphism (SNP) in the gene encoding for this receptor may increase one's vulnerability to a variety of infectious diseases, including dengue. **Objective:** The aim of this study was to assess the association between SNP (rs11465393) and dengue susceptibility among Sabah community. **Materials and methods:** This is a matched case and control study involving Sabahan (focusing on Kadazan-Dusun and Bajau ethnicities) population. With the aid of Fluidigm SNPtrace panel Genotyping Assays, DNA was used to conduct the SNP genotyping. Consequently, statistical analysis using the STRATA software to ascertain whether the SNP rs11465393 is associated with dengue in the population. **Results and conclusion:** A total of 382 participants of Kadazan-dusun and Bajau ethnicity were recruited (191 cases and 191 control group). TT genotype (versus GG genotype) exhibited increased risk of dengue infection in pooled participants and Kadazan-Dusun ethics [35 (25.74%) compared 23 (14.37%) in cases and control, respectively; $p$=0.038] and 46 (24.47%) versus 26 (13.68%) in cases and control, respectively; $p$=0.020]. TT genotype (versus GG genotype) was significantly associated with dengue in pooled and female participants [23 (24.47%) versus 11 (12.50%) in cases and control, respectively; $p$=0.044; and 46 (24.47%) versus 26 (13.68%) in cases and control, respectively; p=0.020]. Overall, female Bajau ethnic with the TT genotype had a significantly higher risk to contract dengue [6 (24.00%) versus 1 (6.25%) in cases and controls, respectively, $p$=0.017]. Furthermore, a significant association between dengue and the male gender of the Kadazan-dusun ethic with the T allele was found [60 (44.78%) versus 59 (33.52%) in cases and controls, respectively, $p$=0.044; odds ratio: 0.62, 95% CI 0.38 - 1.01]. The CD209 rs11465393 SNP increased susceptibility to dengue infection. This GG genotype has an impact on how much DC-SIGN is expressed on cell surfaces, plausibly associated to boosted immunity and reduced viral replication.

# Combination oral hypoglycaemic drugs to initiate glycaemic control in patients with Type 2 Diabetes Mellitus with very high baseline fasting glucose

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## ABSTRACT

**Introduction:** Type 2 Diabetes mellitus (DM) is a complex metabolic condition characterized by persistent hyperglycaemia, initially without insulin deficiency. The underlying pathophysiology is multifactorial involving peripheral tissue insulin resistance, increased hepatic glucose output and impaired intestinal incretin response. Untreated, this condition leads to significant mortality and morbidity from cardiovascular diseases and microvascular organ dysfunction (retinopathy, neuropathy and nephropathy). Furthermore, untreated type 2 DM causes progressive beta cell failure, rendering oral hypoglycaemic drugs ineffective. The Malaysian clinical guidelines and American Diabetic Association guidelines recommends induction insulin therapy to initiate glycaemic control in type 2 DM patients with very high fasting blood glucose (exceeding 13mmol/L and 16.7 mmol/L respectively). The acceptance rate of insulin therapy amongst newly diagnosed diabetic patient is low for various reasons. We report a case of a type 2 DM patient in which glycaemic control was induced using combination oral hypoglycaemic agents. **Case Report:** A 71- year old woman of mixed race (Uzbek-Ukrainian) with no known co-morbid presented with exertional chest pain. Clinical, radiographic and electrocardiographic assessment yielded a diagnosis of stable angina. Her laboratory tests however revealed a random glucose of 17.3 mmol/L. She declined pharmacological therapy and was instituted on strict diet control for 2 weeks. Unfortunately, her fasting glucose after this period was 13.3 mmol/L. Along with aspirin and anti-anginals, she was instituted on a combination of metformin (1 g) with sitagliptin (50mg) twice daily and empaglifozin 25 mg daily which she tolerated well. Four weeks post-therapy, her fasting glucose was 7.5 mmol/L and 2- hour post-prandial glucose was 8.3 mmol/L. We utilized a combination of metformin, a dipeptidyl peptidase-4 inhibitor and a sodium-glucose co-transporter-2 inhibitor to minimize the risk of hypoglycaemic attacks and to target different pathophysiological aspects namely insulin resistance, incretin insufficiency and renal tubular glucose reabsorption. **Conclusion:** Combination oral hypoglycaemic drugs are effective in initiating glycaemic control in type 2 DM patients with high baseline fasting glucose. It may be an acceptable alternative to subcutaneous insulin.

# Deployable molecular detection of *Burkholderia pseudomallei* causing melioidosis in Northeastern Peninsular Malaysia during the monsoon season

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## ABSTRACT

**Introduction:** The deployable molecular detection of *Burkholderia pseudomallei* that cause melioidosis and the need for surveillance in epidemic areas are crucial for the control of disease progression and the environmental risk. There are high mortality of patients admitted in hospital. Melioidosis has occurred in remote areas where the laboratory support facilities were unavailable or limited. **Objectives:** The study were to determine the molecular detection of *Burkholderia pseudomallei* from the soil in various localities Northeastern Peninsular state of Terengganu. **Materials and methods:** The current methods involves the molecular detection of *Burkholderia pseudomallei* by extracting bacterial DNA from soil and confirmed by using portable real-time PCR thermocycler. Approximately 80gms of soil samples were taken from the surface and at 30 cm depth by using an augur and collected into sterile Falcon's Tubes. Each samples sites were located by using GPS system. The soil samples were collected from oil palm smallholdin, recreational area, agricultural park, village, orchids and school compound. RT-PCR were conducted by using the MyGo Mini with the use of a pair of primers for the detection of *B. pseudomallei* from the environment. **Results and conclusion:** High rate of isolation of *Burkholderia pseudomallei* from soil samples in Sekayu Agricultural Park (Durian Orchard 3/10), Sekayu Agricultural Park (Garden 3/10), Kuala Telemong Oil Palm Smallholding (6/10), Agro Park Orchard in Setiu (8/10), Jertih Village in Gong Kemuning (5/10) and Kuala Telemong Secondary School Teachers Quarters (3/10). The excessive disturbances of the soil from uncontrolled agricultural activities and recreational areas contributed to the distribution during monsoon. Improved techniques of molecular detection by deployable soil DNA extraction are needed for surveillance and control of disease outbreak in the environmental settings. The climate change with increase in rainfall pattern results in flooding has contributed to increase incidence of melioidosis in Malaysia

**Key Words:** *Burkholderia pseudomallei*, melioidosis, deployable, detection, polymerase chain reaction, DNA extraction

# Extended-spectrum Beta-Lactamase (ESBL) bacteremia: Looking into the risk factors of mortality from Malaysian's perspective

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## ABSTRACT

**Introduction:** Expanded-spectrum beta-lactamase (ESBL) bloodstream infection often leads to severe outcomes like mortality and treatment failure. We aimed to identify these risk factors in patients with ESBL bacteremia. **Materials and methods:** We performed a retrospective cohort analysis of those aged 13 years old and above admitted to Hospital Canselor Tuanku Muhriz (HCTM), for ESBL bacteremia, between January 2015 and August 2019. Patients with polymicrobial bacteremia were excluded. **Results and conclusion:** The all-cause in-hospital mortality rate was 30.2%, while the infection-related mortality rate was 22.5%. The all-cause in-hospital mortality risk factors include hypertension (OR 3.18; CI 1.21 – 8.40; *p*=0.02), diabetes mellitus (OR 2.65; CI 1.16 – 6.08; *p*=0.02), skin and soft tissue infections (SSTIs) (OR 5.27; CI 1.25 – 22.31; *p*=0.02) and mechanical ventilation (OR 3.53; CI 1.27 – 9.82; *p*=0.02). The independent risk factor associated with mortality was mechanical ventilation (AOR 3.12; CI 1.06 – 9.18; *p*=0.04). No association found between appropriate empirical antibiotic treatment and mortality (*p*=0.74). However, appropriate definitive treatment was associated with a lower mortality rate ($p < 0.01$). The risk factors for mortality in our study were different from previous studies, mainly due to the fact that we had lower critically-ill patients, lower ICU admission rate, and higher Diabetes Mellitus and Hypertension prevalence, compared to other South-East Asian countries. Despite that, our study echoed the previous paper with a comparable mortality rate and was in line with the IDSA guideline in treating ESBL bacteremia, which is by using carbapenem antibiotics. However, more study is needed to look into the risk factors for mortality in more critically-ill patients, for the empirical antibiotic.

# Evaluation of efficacy of *Parkia speciosa* Hassk. Pericarps methanolic extract as a potential antibacterial agent

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## ABSTRACT

**Introduction:** The persistent development of resistant strains of bacteria, which has resulted in antibiotic resistance, is a concerning situation. As a result, there is a high demand for the development of novel antibacterial agents, such as those derived from herbal medicine. *Parkia speciosa Hassk. (P. speciosa Hassk.)* is a plant commonly eaten by Malaysians, but its use in traditional medicine, particularly the pericarp, is limited. **Materials and methods:** The extract of *P. speciosa Hassk.* pericarps prepared with methanol as an extraction solvent was tested for antimicrobial activity and phytochemical compounds. The pericarps were dried and ground into powder before being immersed in methanol for about 24 days using the exhaustive method. *Staphylococcus aureus, Bacillus cereus, Salmonella typhimurium,* and *Escherichia coli* were used to test the extract against the selected bacterial strains. The antimicrobial activities were assessed using the agar diffusion and broth microdilution techniques. Antimicrobial susceptibility (AST), minimal inhibitory concentration (MIC), and minimal bactericidal concentration (MBC) were tested at concentrations of 1000, 500, 250, 125, 62.5, 31.25, 15.62, 7.81, 3.90, 1.90, and 0.9 mg/ml. **Results and conclusion:** The best inhibitory effects were observed against *S. aureus* and *B. cereus*, with no inhibitory effects observed against *S. typhimurium* and *E. coli.* The MIC and MBC values of *P. speciosa Hassk.* Pericarps extract against *S. aureus* were 7.8 mg/ml, while the MIC and MBC values of *B. cereus* were 1.9 mg/ml. The presence of alkaloids, glycosides, flavonoids, tannins, and amino acids in the extract, which are responsible for the antibacterial activity, was demonstrated by qualitative phytochemical analysis using standard protocols. The study demonstrated that a methanolic extract of *P. speciosa* pericarps has the potential to be used as an antibacterial agent. The preliminary antimicrobial activity testing revealed that *S. aureus* and *B. cereus* were more susceptible than *S. typhimurium* and *E. coli*. The presence of one or more of the detected phytochemical compounds within the extract could explain the medicinal activities.

# Multidrug-resistant *Salmonella* spp. isolated from environment of chicken farms

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## ABSTRACT

**Introduction:** Salmonellosis is one of the main causes of bacterial enteritis in humans with 64 cases reported in Malaysia, during 2020. Most studies in Malaysia focused on clinical samples, chicken meat, and the market to determine its epidemiology. The study aimed to determine antimicrobial resistance of *Salmonella* spp. isolated from chicken farm environments in Selangor, Malaysia. **Materials and methods:** Twenty-three soil and twenty effluent samples were collected from 23 poultry farms. Samples were enriched with buffered peptone water and incubated for 18 hours at 37°C. Subsequently, 0.1 ml of samples were incubated in 10 ml of Rambaquick liquid medium for 7 hours at 41°C. Further, spread plate method was used to inoculate samples on CHROMagar for Salmonella. The VITEK 2 system was used to identify the isolates and tested for antibiotic susceptibility according to Clinical & Laboratory Standards Institute (CLSI) guidelines. **Results and conclusion:** A total of 24 *Salmonella spp.* was isolated, with 65% (15/23) from soil samples and 45% (9/20) from effluent samples. Most of the isolates were resistant to ampicillin (63%), while 46% was resistant to ciprofloxacin. However, 87.5% of isolates were found to be susceptible to trimethoprim/sulfamethoxazole. On top of that, 67% of isolates were resistant to more than 3 types of antibiotics and were regarded as multidrug resistant organisms (MDR). The multiple antibiotic resistance (MAR) index was calculated, with mean of 0.42 (SD=0.096), and 95.8% of the isolates have MAR index of more than 0.2, which implies high source of contamination. Multidrug resistance *Salmonella spp.* was predominately observed in this investigation, with most isolates found to have high MAR index, implying that antibiotics are widely used and a source of instituted contamination in chicken farms. More stringent monitoring and control of antibiotic use in chicken farms by relevant authorities is required to prevent the spread of MDR bacteria in the environment, which might be fatal to humans in the event of food contamination with few treatment options.

# Investigation of antibacterial activity of copper oxide nanoparticles synthesised from *Aspergillus* species

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## ABSTRACT

**Introduction:** Nanoparticles (NPs) with size ranging from 10 to 100 nm, are classified as materials with vastly different properties compared to their bulk and molecular equivalents. Green synthesis of nanoparticles is the current buzzword due to its potential capability in reducing nanoparticle toxicity and its production to be scaled up efficiently. **Materials and methods:** *Aspergillus* species were isolated from the soil sample, Copper oxide nanoparticles (CuO NP's) were synthesised using aqueous extract of *Aspergillus*. Characterisation studies of CuO NP's were carried out using Ultra Violet spectrophotometric analysis (UV -Vis), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Dispersive X-ray analysis (EDX) & Thermo Gravimetric Analysis (TGA). Antibacterial activity of synthesised CuO NP's were tested against selected Gram positive and negative bacteria using disc diffusion method. Synergistic antibacterial activity of the CuO NPs was also studied using various antibiotics available in the market. **Results and conclusion:** *Aspergillus* was confirmed through microscopical examination, characterization results proved the biosynthesised CuO NPs were well in nano range scale, UV-Vis recorded the maximum absorbance at 265 nm. FTIR confirms various functional groups associated with the NP's, SEM analysis confirmed the surface topology of the NPs, furthermore mean particle size was measured as 37.39 ± 11.2 nm according to TEM image. EDX confirms the elemental purity of copper, TGA confirms the stability of nanoparticles at various temperatures. Antimicrobial testing demonstrated that *Staphylococcus aureus* had the greatest zone of inhibition (21mm) at a concentration of 80 µg/µl, however the synthesised CuO NP's showed good synergistic effect in combination with selected antibiotics against tested bacteria. To conclude the biosynthesised CuO NP's can be a potential antibacterial agent which has further to be studied exclusively for its toxicity and efficacy *in vivo*.

**Keywords:** *Aspergillus*, Copper oxide nanoparticle, TEM, Antibacterial activity.

# Factors associated with antibiotic use knowledge and practices among urban and rural adults in Malaysia

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## ABSTRACT

**Introduction:** Identifying gaps and factors related to knowledge and practices of antibiotic use among the Malaysian public from urban and rural areas is essential to effectively tailor interventional strategies to targeted population groups. Objectives: This study aimed to assess the differences in knowledge and practices of antibiotic use between the general public from urban and rural areas in Malaysia and identify factors influencing their knowledge and practices. **Materials and methods:** A nationwide cross-sectional study was conducted among adult Malaysian citizens from urban and rural areas in Malaysia, using a self-administered and validated questionnaire. **Results and conclusion:** A total of 1971 respondents were recruited. Respondents from urban areas scored significantly higher with knowledge of antibiotic use than those from rural areas (mean = 8.78 ± 4.28 versus 7.92 ± 4.02, $p<0.001$). However, there was no significant difference in engagement in inappropriate antibiotic use practices ($p=0.739$). Compared to those from urban areas, respondents from rural areas were less likely to answer correctly for identification ($p<0.001$), adverse effects ($p<0.001$), and administration ($p=0.003$) of antibiotics, and consequences of antibiotic resistance ($p<0.001$). From multiple logistic regressions, knowledge of antibiotic use was influenced by ethnicity, educational level, main occupation, occupation related to healthcare and monthly income; while practices related to antibiotic use were influenced by gender, ethnicity, main occupation, monthly income and knowledge of antibiotic use score. Residence status did not influence the knowledge and practices of antibiotic use. Differences in knowledge between the general public from urban and rural areas and socioeconomic factors associated with knowledge and practices of antibiotic use should be incorporated in designing interventional strategies tailored to the different needs of targeted audiences in Malaysia.

**Keywords:** Antibiotic, Knowledge, Practice, Predictors, Urban, Rural

# Modelling the third wave of the COVID-19 pandemic in Malaysia

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## ABSTRACT

**Introduction:** The COVID-19 pandemic has spread rapidly across the globe and negatively affected healthcare systems worldwide. The objective of this study was to develop Susceptible-Exposed-Infected-Recovered (SEIR) models to forecast daily COVID-19 cases during the third wave in Malaysia. **Materials and methods:** SEIR models were developed using the R programming software ODIN interface which were fitted into the Malaysian daily COVID-19 case numbers from 1 April 2021 to 14 July 2021, allowing for the approximation of parameters consisting of incubation period (I), removal rate (L) and disease transmissibility (R). Effects of vaccination was accounted by determining the time varying function for the vaccination rates based on two scenarios; achieve 80% population fully vaccinated by (a) 31 October 2021 and (b) 31 December 2021. Weighted vaccine efficacy was set at 70%. Subsequently forecasts of daily COVID-19 cases based on scenarios (a) and (b) were provided from 15 July 2021 to 31 December 2021. **Results and conclusion:** Our model calibration estimated that (I), (L), and (R) were 5.2 days, 0.25, and 1.2, respectively. A polynomial (y=20.452x2 – 2E + 06x + 4E +10) and Logarithm (y=-58000ln(x) + 327680) equations was determine to account for the vaccination rates. Scenarios (a) and (b) forecasted that the outbreak would peak on 25 August 2021 with 23,590 cases and 15 September 2021 with 27,051 cases respectively, and subsequently showed a reducing case trend till 31 December 2021. As of 31 December 2021, the highest daily case observed was on 26 August 2021 with 24,599 cases which was very close to the model estimation. The observed cases closely mirrored the down going trend forecasted in scenario (a) until 26 October 2021. Trend of observed cases from November to December 2021 was well within the model forecast range of scenario (a) and (b). SEIR models developed accounting for the effects of vaccination were able to provide reasonable forecasts of daily case trend during the third wave of COVID-19 in Malaysia.

**Keywords:** SEIR, COVID-19, modelling, outbreak

# Health systems response when COVID-19 hits Malaysia: Public perspective of border control during early phase of infectious disease threat

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## ABSTRACT

**Introduction:** In the early phase of the pandemic, confirmed COVID-19 cases spread globally from Wuhan, China. Similarly, Malaysia's first three cases were Chinese nationality travelers entering from Singapore to Johor. As the coronavirus spread rapidly across borders, World Health Organisation (WHO) declared the outbreak a Public Health Emergency of International Concern on 30th January 2020. One of the measures imposed to curb the spread was travelling restrictions between countries. **Objective:** This study aimed to explore the public's perspective on Malaysia's border control or point of entry during the early phase of COVID-19 pandemic. **Materials and methods:** WHO's Strategic Preparedness and Response Plan (SPRP) pillars were adopted to develop an online survey. The online survey was distributed to public respondents and identified healthcare experts from March to April 2020 via social media and email invitation. The survey includes open-ended questions where respondents gave their opinions with regards to eight pillars of SPRP strategies taken during the early phase of COVID-19. The fourth pillar emphasizes on country's point of entry. A qualitative content analysis approach was performed using NVIVO-12 software. **Results and conclusion:** Four domains were identified namely Entry/Exit Control, Screening Measures, Quarantine Policy and Information. Issues on the timeliness for border closure, quarantine policy and dissemination of information regarding disease management as well as Standard Operation Procedure were highlighted by the respondents. Respondents felt that the screening mechanism at points of entry was lacking in stringency and inconsistent. Respondents raised concerns regarding the competency of frontliners in implementing the screening process. Respondents believed that clear quarantine instructions and traveler tracking system are necessary upon entering the country. Containment of infectious diseases like COVID-19 during the initial phase of the pandemic were critical to slow down the spread of the disease. Country's authorities were expected to make judicious decisions on travel restrictions, border controls, travelers quarantine and point of entry screening to reduce imported cases.

# Searching for potential antiviral activity of medicinal plants against SARS-CoV-2

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## ABSTRACT

**Introduction:** COVID-19 is an infectious disease caused by the SARS-CoV-2, which severely affects the morbidity of people living with non-communicable diseases. Therefore, the Herbal Medicine Research Centre, Institute for Medical Research has taken the initiative to search for plant extracts and phytoconstituents with potential anti-SARS-CoV-2 properties *in vitro*. **Materials and methods:** The antiviral activities of potential plant-derived candidates against SARS-CoV-2 infection in Vero-E6 cells were assessed. The two steps viral induced-cytopathic effect (CPE) screening approach was used. Firstly, the SARS-CoV-2 was exposed with single doses (10 $\mu$g/mL or $\mu$M) of plant extracts and compounds after which the extracts and compounds with ≥20% viral inhibitory activities were evaluated for dose-response antiviral activities. The dose-response antiviral activity for each extract and compound was quantitatively analyzed via a dose response curve using the Graphpad Prism software. **Results and conclusion:** From more than 60 plant extracts and compounds screened against the SARS-CoV-2 infection *in vitro*, at single dose exposure, 8 plant extracts and compounds showed >20% inhibition. Dose response analysis identified three plant extracts and one compound with potent antiviral activity (EC50≤10 $\mu$g/mL or $\mu$M) and high selectivity (SI≥10) towards the SARS-CoV-2. One of the extracts with potent anti-SARS-CoV-2 activity was derived from the *E. longifolia* plant, a Malaysian medicinal plant. Further evaluation on the efficacy of this plant's extract and compounds in SARS-CoV-2 infected human lung cells and a COVID-19 animal model is warranted.

# Detection of salivary IgA among recovered COVID-19 Patients and non-infected subjects after the first dose of vaccination

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## ABSTRACT

**Introduction:** Mucosal immunity, including secretory IgA plays a vital role in host defence against respiratory pathogens, including SARS-CoV-2. Therefore, this study aims to analyse salivary IgA in response to the COVID-19 vaccines such as BNT162b2, CoronaVac, and AZD1222 in convalescents (RT-PCR-confirmed COVID-19) and naïve subjects (non-infected COVID-19) before receiving their second dose. **Materials and methods:** Saliva was collected in a sterile container, centrifuged and stored at -80 °C until analysis. Salivary IgA was detected using an Anti-SARS-CoV-2 ELISA (IgA) kit (Euroimun-Lübeck, Germany). **Results and conclusion:** The study involved 281 participants, with 145 convalescents and 136 naïve subjects. Before receiving the first dose of the COVID-19 vaccine, 81.4%, 15.2%, and 3.4% of the 145 convalescents had positive, negative, and borderline results, respectively. Then, before receiving the second dose, 100% positive results were observed with the salivary IgA ratio median of 4.95, 2.71 and 3.32 among BNT162b2, CoronaVac and AZD1222, respectively. There was evidence of a difference in salivary IgA ratio between BNT162b2, AZD1222 and CoronaVac ($p < 0.005$). However, there was no evidence of a difference in salivary IgA ratio between CoronaVac and AZD1222. For naïve subjects, 95.7%, 30.2% and 83.0% showed positive results before receiving the second dose of BNT162b2, CoronaVac and AZD1222, with the salivary IgA ratio median of 1.63, 0.74 and 1.43, respectively. There was evidence of a difference in saliva IgA ratio between BNT162b2 and CoronaVac as well as AZD1222 and CoronaVac ($p < 0.005$). However, no significant difference was observed between BNT162b2 and AZD1222. After the first dose of vaccination, the vaccines significantly increased the production of salivary IgA in convalescent compared to naïve subjects.

**Keywords:** SARS-CoV-2, COVID-19 vaccine, salivary IgA and mucosal immunity

# Systematic synthesis research on herbal medicine for COVID-19: An overview

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## ABSTRACT

**Introduction:** The number of review papers on coronavirus disease (COVID-19) related topics are on a sharp rise due to the abundance of new literature over the past two years. **Objective:** This review aimed to provide an overview of the attributes and quality of systematic synthesis research on COVID-19 pertaining to herbal medicine. **Materials and methods:** We performed a systematic search and screen on electronic databases to include articles of systematic synthesis research on herbal medicine for COVID-19. Information on review characteristics including review type, topic, and details of herbal interventions were extracted for descriptive and numerical analysis while quality of reviews was assessed using the A MeaSurement Tool to Assess systematic Reviews (AMSTAR-2) tool. **Results and conclusion:** Forty-eight reviews were included, half (n=23) were on Chinese Herbal Medicine while the remaining (n=25) were overall reviews on herbal medicine in general and phytoconstituents. Most were scoping reviews (n=23) and systematic reviews and/or meta-analyses (SR/MA) (n=21). All reviews address use of herbal medicine for acute phases of COVID-19. For AMSTAR-2 critical domains, only one third (n=15) had a protocol registered prior to commencement of the review while 21% (n=10) reported comprehensive literature search. When narrowed down to SR/MA, almost all (n=20) had an a priori protocol and 45% (n=9) reported comprehensive literature search. Risk of bias assessment was performed in almost all SR/MA while source of heterogeneity was not sufficiently addressed. The bulk of the evidence available on herbal medicine and COVID-19 are for its use during acute phases of COVID-19. Published SR/MA have lesser limitations than scoping reviews in critical domains of high-quality reviews but are highly concentrated on Chinese Herbal Medicine. This may be due to small number of clinical trials on other modalities of herbal medicine suitable to be pooled for SR/MA while there is no systematic synthesis research on post-COVID-19 complications, highlighting the research gaps.

# An *in vitro* COVID-19 causing virus culture model: Assessment of SARS-CoV-2 infectivity in Vero E6 cell

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## ABSTRACT

**Introduction:** Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) a virus from the Coronaviridae family that causes the Coronavirus disease (COVID-19), has emerged and spread since December 2019. Since then, many *in vitro* and *in vivo* models for COVID-19 research has been developed. **Objective:** This study aimed to determine infectivity rate of various SARS-CoV-2 strains in the Vero E6 cell line. **Materials and methods:** Four SARS-CoV-2 strains (Wuhan, Alpha, Beta, and Delta) were isolated from clinical samples. Virus titre concentration of all strains were measured using Tissue Culture Infectious Dose (TCID50) assay and Plaque assay. At similar virus titre concentration, all strains were incubated in the Vero E6 cells at 37°C for 72 hours. At the end of incubation period, all virus cultures were terminated and analysed using TCID50 assay. **Results and conclusion:** It was found that the Wuhan strain has the highest infectivity rate (3601 PFU/mL/72hours) towards the Vero E6 cells, followed by Alpha (2946 PFU/mL/72hours), Beta (1780 PFU/mL/72hours) and Delta (571 PFU/mL/72hours). Vero E6 cell is commonly used for virus isolation and propagation, however this cell does not mimic the primary entry sites in the human respiratory track. The successful isolation and culture of SARS-CoV-2 in the Vero E6 cell is multifactorial, with high viral titre in source clinical samples and low passage number of cell culture as key factors. Vero E6 cell is susceptible towards all SARS-CoV-2 strains and can be used as *in vitro* COVID-19 culture model. Further studies can be conducted to determine the influence of different cell lines on the COVID-19 infectivity.

# Epidemiology of the COVID-19 outbreak in Malaysia, 2020-2021

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## ABSTRACT

**Introduction:** The COVID-19 pandemic has spread rapidly across the global resulting in recurrent waves worldwide. This study aims to describe the epidemiological characteristics of COVID-19 cases and mortality during each wave of COVID-19 in Malaysia from the beginning of the outbreak in 2020 to 2021. **Materials and methods:** Data was sourced from GitHub repository and the Ministry of Health (MOH), Malaysia official COVID-19 website. Data was aggregated by epidemiological weeks and analysed by years (2020 and 2021) and COVID-19 waves (first, second and third wave). **Results and conclusion:** A total of 2,761,472 cases and 31,514 deaths were reported from 2020 to 2021. The COVID-19 incidence and mortality rates were 40.6 and 0.46 per 1,000 populations respectively from 2020 to 2021. By wave, a total of 22(0.001%), 10,145 (0.4%) and 2,751,305 (99.6%) cases were reported during the first, second and third wave respectively while 131 (0.4%) and 31,383 (99.6%) deaths were reported during second and third wave. Higher cases and deaths was reported in the year 2021 and during the third wave. We concluded that, the third wave of COVID-19 was the most severe in terms of number of infected individuals and deaths, which is due to the longer outbreak duration larger magnitude and severity compared to the previous waves. Close monitoring and surveillance of the COVID-19 outbreak would preventing future resurgence of COVID-19 case which could potentially have more devastating effects.

**Keywords:** COVID-19, epidemiology, waves, Malaysia

# Trend of COVID-19 cases in COVID-19 Assessment Centre (CAC), Selangor

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## ABSTRACT

**Introduction:** On January 2021, Selangor State Health Department took the initiative to set up COVID-19 Assessment Centre (CAC) in each district. Initially, all positive COVID-19 patient were to be assessed physically in CAC. However, on 23 July 2021, Ministry of Health, Malaysia (MOH) activated virtual CAC in Selangor in view of increasing number COVID-19 cases. The spread of the highly transmissible Omicron Variant drove an unprecedented surge of cases. Therefore, on 6 February 2022, MOH revised the criteria for CAC assessment which included only Category 2B and above to be assessed physically in CAC. The aim of this study is to determine the trend of CAC attendance during COVID-19 pandemic in Selangor. **Materials and methods:** A cross sectional study was conducted involving 9 districts in Selangor. Secondary data was obtained via Daily CAC COVID-19 Census from March 2021 until April 2022 and analysed using Microsoft Excel 2010. **Results and conclusion:** A total of 885, 594 Covid-19 cases were seen in CACs from Mac 2021 to April 2022. Majority of the cases presented to obtain release order and aged 18 to 39 years old. Petaling district recorded the highest number of Covid-19 cases in Selangor with 313, 664 positive cases and 50% of them attended CAC. There was an increasing trend of Covid-19 cases seen in CAC from epid week 23 to epid week 29/ 2021. The highest CAC attendance in Selangor was on epid week 29/ 2021 where more than 80% of positive Covid-19 cases were assessed in CACs. CAC attendance decreased and stable after implementation of virtual CAC and revised criteria for CAC assessment. Trend of CAC attendance depends on the CAC assessment criteria and burden of COVID-19 cases. Prompt public health measures and intervention during COVID-19 pandemic is very crucial to control the spread of Covid-19 and burden to primary healthcare services.

# Proinflammatory cytokine profiles of COVID-19 patients in Malaysia

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## ABSTRACT

**Introduction:** Increase of cytokines is often associated with inflammatory condition during infections and in autoimmune diseases. A sudden increase of pro-inflammatory cytokines, also known as "cytokine storm", can cause devastating damage on host cells as well as organs and has been frequently described in the recent COVID-19 infection. **Objective:** This study aimed to evaluate the levels of proinflammatory cytokines (IL-6, IL-8, TNF-α and IL-1□) among COVID-19 patients in comparison with non-COVID-19 patients in Malaysia. **Materials and methods:** We retrospectively analysed the data of samples sent for cytokine panel test (IL-6, IL-8, TNF-α and IL-1□) at Autoimmune Laboratory, Institute for Medical Research, Malaysia, from September 2021 until April 2022. A total of 58 samples were included in this study and were categorised into two groups: COVID-19 (37 samples) and non-COVID-19 (21 samples). Levels of cytokines were determined by microfluidic immunoassay system. **Results and conclusion:** Majority of the samples (75.9%) were from patients aged 17 and below, with the overall median age of 8 years. Between the two groups, COVID-19 patients had significantly higher cytokines levels (median IL-6: 25.2pg/ml; IL-8: 64.8pg/ml and TNF-α: 28.8pg/ml) compared with patients from non-COVID-19 (median IL-6: 9.5pg/ml; IL-8: 33.9pg/ml and TNF-α: 18.9pg/ml). As for IL-1β, the levels were comparable between the two groups. The results of this study showed that higher levels of proinflammatory cytokines were released during COVID-19 infection as compared with non-COVID-19 cases.

# Different containment strategies on COVID-19 infection and its impact

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## ABSTRACT

**Introduction:** In the earlier days of COVID-19 pandemic, the cases grew rapidly in an increasing number of countries, triggering bold policy responses. The impact of different containment strategies had yet to show any relationship with the cases. It became a question that would strict restriction in any way impact the spread of infection significantly and should it be a common practice among everywhere else in the world. Therefore, policy makers wondered if strict restrictions would impact the spread significantly and should this be practiced elsewhere in the world. **Materials and methods:** This rapid review assessed the effectiveness of different containment strategies used in suppressing COVID-19 infection in different countries from January 2020 to November 2020. Searches were done in PubMed, Cochrane Central Register of Clinical Trials, WHO database, ResearchGate. We identified 492 studies and screened for duplication. Using the inclusion and exclusion criteria, 25 studies were included. **Results and conclusion:** Different countries instituted containment strategies in different ways, such as Movement Control Order in Malaysia, Circuit Breaker in Singapore, COVID-19 Alert System Levels in New Zealand, etc. Most containment strategies had different success levels that depended on the time of implementation and whether the community accepted these new lifestyles and regulation. Sweden and New Zealand showed a high degree of success in combating COVID-19 despite their big population and less personal invasive methods in terms of containment strategies. Countries like United States, Japan, Singapore, Malaysia, and South Korean's responses to COVID-19 could be hard to replicate. However, all countries needed to improve on three main competencies, namely, technology enforcement, strong public health governance and public partnership. A nationwide lockdown could not promise a country to be free from the outbreak, but the response time and early detection with active surveillance was critical in slowing the spread and growth of new cases in managing this pandemic.

**Keywords:** COVID-19 infection, impact, containment strategy, pandemic management

# Interactions of terpenoid compounds with main protease and RNA-dependent RNA-polymerase protein targets of SARS-CoV-2

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## ABSTRACT

**Introduction:** The novel Coronavirus, SARS-CoV-2 causing the COVID-19 pandemic has become a serious public health issue worldwide. This has created a huge demand for discovering antiviral drugs for treating COVID-19. Phytocompounds especially terpenoids have potential for effective antiviral activities against SARS-CoV-2. In this study, a library of terpenoid compounds was screened for their interactions with protein targets of SARS-CoV-2 using the computational docking approach. **Materials and methods:** Terpenoid compounds were retrieved from data bases such as PubChem (NCBI, USA), Naturally-occurring Plant-based Anti-cancer Compound-activity Target (NPACT) and Kyoto Encyclopaedia for Gene and Genome (KEGG). Docking of terpenoid compounds with the main protease (Mpro) and RNA-dependent RNA-polymerase (RdRP) was performed using Autodock Vina. Drug-likeness properties were predicted using SwissADME web tool. **Results and conclusion:** Out of 850 terpenoid compounds docked with SARS-CoV-2 protein targets, Agavoside A showed the highest interaction energy value of -9.1kcal/mol against Mpro and formed hydrogen bond (HB) interactions with Lys137, Asp197, Thr199 and Leu287. Labriformidin and Absinthin showed interaction energy values of -9 and -8.8kcal/mol, respectively, with Mpro. Against RdRp, Absinthin showed the highest interaction energy value of -9.9 kcal/mol and formed HB interactions with Asp760, Asp623 and Cys622. Agavoside A and Labriformidin showed interaction energy values of -9.6 and -9.4kcal/mol, respectively, with RdRp. ADMET analysis revealed that all three compounds possess non-toxic and non-carcinogenic properties. The lead terpenoid compounds Agavoside A, Labriformidin, and Absinthin could be potential antiviral agents for treating COVID-19. However, further *in-vitro* and *in-vivo* studies are required.

# A description of ventilation system design in public hospitals: Health provider perspective

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## ABSTRACT

**Introduction:** Ventilation system serves as one of the methods for infection control within patient treatment areas amongst patients and staff. The High infectivity in confined areas raised concerns for patients and staff safety especially during the COVID-19 pandemic. **Objective:** To describe the ventilation system design approach applied in patient areas of a public hospital. **Materials and methods:** Four (4) patient-related areas in a 76 bed non-specialist hospital was assessed. The variables included are the airflow, supply air, return air and air filtration. **Results and conclusion:** The airborne infection isolation room has air flow from the staff area to the patient area. The air inlet provides 100% non-circulating fresh air with 12 air change rate per hour (ACH) located at entrance. The outlet is located on the lower left side of the patient's head. High-efficiency particulate air (HEPA) filter placed at the outlet with negative room pressure. The air conditioned multi bed area has air inlet at the entry point and outlet located farther away from patients and staff. While, the clinical examination room air inlet was placed near the staff area and outlet above the patient treatment area. Both the common multi-bed inpatient and clinical examination rooms have normal pressure. The ventilation system is served from central Air Handling Unit (AHU) and recirculated, however, MERV 13 grade filter is employed as recommended by American Standard Heating and Refrigeration Engineer (ASHRAE) in both multi-bed inpatient area and clinical examination room. Finally, the operation room was provided with laminar air flow from above the patient towards the lower four corners of the room. The room pressure would be relatively positive compared to the surrounding rooms. The HEPA filter is placed at the inlet. The ventilation system design approach in the public hospital assessed caters for airborne-related infectious diseases control. However, further assessment of its effectiveness is required particularly in the operation theater where the room pressure is relatively positive.

# Correlations between ultrastructures of corticotrophs, adrenocorticotropic hormone (ACTH) and corticosterone production affected by various diets

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## ABSTRACT

**Introduction:** Modern dietary habits were proposed to have contributed to metabolic and physiological stress. Adrenocorticotrophic hormone (ACTH) and corticosterone are two major stress hormones. Corticotroph in the anterior pituitary gland produces ACTH in response to hypothalamus-pituitary-adrenal (HPA) axis stimulation with the result of corticosterone production. This study aims at observing the effect of different diets on ultrastructures of corticotrophs and the relevant hormones. **Materials and methods:** Eight weeks old, 35 male Sprague-Dawley rats were acclimatized for 2 weeks. Then they were divided into 5 groups according to their diets, namely control (normal rat chow), high-fat diet, high-protein diet, high-sugar diet, and high-starch diet. Feeding was done for 8 weeks with tap water provided ad libitum. After the rats were euthanized, their blood was taken, processed, and analysed using High-Performance Liquid Chromatography (HPLC) processing, and their pituitary gland was harvested, fixed and processed according to electron microscope protocol. Funded by Malaysian Fundamental Research Grant Scheme [ref no: FRGS/1/2018/SKK08/UNIKL/03/1]. **Results and conclusion:** HPLC analysis showed high-fat diet and high-sugar diet increased corticosterone blood concentrations. There was not much difference of ACTH secretion among the groups. Ultrastructure analysis revealed a high-fat diet, and a high-sugar diet affected the corticotroph the most. Corticotrophs of the high-fat group exhibited a shrunken nucleus with numerous swollen mitochondria, while the high-sugar group showed swollen endoplasmic reticulum along with swollen mitochondria. From this study it was observed that certain diets affects the ultrastructure of corticotroph and the production of ACTH along with corticosterone hormone most probably due to metabolic and oxidative stress.

# Exclusive breastfeeding: Knowledge and attitudes of senior health professional students of a Malaysian medical college

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## ABSTRACT

**Introduction:** Despite improvement of sanitation and economical status of many countries, exclusive breastfeeding remained an established and important public health strategy to prevent infectious diseases, especially acute multiple respiratory and gastrointestinal diseases among infants. Mothers need effective motivation and support from healthcare professionals to opt for and maintain breastfeeding. **Objective:** This study aimed to assess the knowledge and attitudes regarding exclusive breastfeeding among senior medical and nursing students of Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP). **Materials and methods:** A total of 195 seniors (97 medical and 98 nursing students) participated in this cross-sectional study using a validated self-administered online questionnaire, between 19th Oct 2020 and 27th Nov 2020, in the time of COVID-19. **Results and conclusion:** The participants had moderate knowledge (mean = 20.32 ± 3.405, 70.08% correct), and positive attitudes regarding exclusive breastfeeding (mean = 64.34 ± 6.816). However, only 32.8% of the students knew that formula milk cannot be given to infants less than six months old and a lack of knowledge regarding expression and storage of breast milk was evident. Only less than half of the students strongly disagreed or disagreed with five out of nine negative statements which reflected a deficiency in positive attitudes. Using the means as cut-off point, only 63.1% and 56.9% of the students demonstrated good knowledge and positive attitudes, respectively. Against the impact of COVID-19 pandemic on medical education, overall, the students had moderate knowledge and positive attitudes towards exclusive breastfeeding. However, specific knowledge gaps and misconceptions were identified, and only less than two-thirds of the health professional students had good knowledge and positive attitudes, indicating an urgent need for interventions to promote exclusive breastfeeding skills of our future doctors and nurses to efficiently motivate and support mothers in exclusive breastfeeding which is crucial in infectious disease prevention amongst infants worldwide.

# The use of the Fourier Transform Infrared (FTIR) spectroscopy to determine the formalin in raw milk and its impact on milk composition

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## ABSTRACT

**Introduction:** Milk is an excellent source of nutrients for infants, children as well as adults. Milk's widespread consumption makes it a target for more potential adulteration. Formalin is a substance that is frequently added to milk because it inhibits bacterial growth and increase shelf life. Therefore, a high-precision machine is required to detect adulterations to ensure the safety of the milk and the quality of the milk composition. **Objective:** The purpose of this study was to validate the accuracy of the MilkoScan Mars FTIR spectroscopy machine in detecting formalin in raw milk samples and to investigate the effects of formalin on raw milk compositions. **Materials and methods:** Milk samples were obtained from samples received in Biochemical Section, Veterinary Research Institute (VRI). Milk that is free from any adulteration will be selected for this test. Five formalin concentrations (0.04%, 0.07%, 0.14%, 0.28%, 0.56% and 0% as a control) were used, with each concentration being read on the machine five times. **Results and conclusion:** The correlation between expected and observed values showed the best results with R2=0.9995 and accuracy value was 0.006. The addition of formalin was effect the level of milk compositions. Results demonstrated that there was significant impact for milk composition at each type of formalin concentration tested at p value <0.05 except protein at concentrations of 0.04% and 0.07% with p values 0.178 and 0.523 respectively. Based on the findings, we can conclude that Milkoscan machine using the FTIR technique have high analytical performance in detecting formalin in milk.

# Development and optimisation of multiplex RT-PCR for rapid detection of swine diseases

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## ABSTRACT

**Introduction:** Highly pathogenic zoonotic diseases that infect pigs due to viral infections can cause infections and deaths among animals as well as humans. To limit the effect and spread of severe illness epidemics, early detection is crucial. There is a strong demand for testing multiple types of swine diseases from a single sample, especially those involving molecular testing. However, the assays are costly, time-consuming, and labour-intensive to perform. **Objective:** This study describes the development and initial evaluation of a multiplex reverse transcriptase-polymerase chain reaction (mRT-PCR) assay for rapid and simultaneous diagnosis of Japanese encephalitis virus (JEV), Nipah virus (NiV) and swine influenza virus (SIV). **Materials and methods:** The method uses three primer sets, each one specific for the corresponding virus, amplifying RNA fragments different in length, allowing a gel-based differential detection of the PCR products. Each of the three target fragments produced a specific amplicon of 519 bp (JEV), 300 bp (NiV) and 200 bp (SIV) in a single RT-PCR (sRT-PCR). The optimal reaction conditions were explored and standardised by adjusting the annealing temperature and primer concentrations based on the sRT-PCR condition. mRT-PCR was used to analyse 70 samples that were previously received for surveillance and diagnostic testing for the detection of these three viruses, including plasma, nasal swab, brain, kidney, and pooled organ. **Results and conclusion:** The results indicated that the specificity of mRT-PCR was comparable to that of sRT-PCR. The mRT-PCR took 2 hours and 50 minutes to run and complete, whereas the sRT-PCR took 9 hours and 5 minutes to detect these three diseases. This approach is more convenient and reliable for routine swine disease diagnosis. The mRT-PCR developed in this study may thus pave the way for rapid and cost-effective detection of these important pathogens in a single reaction.

# Determination of sodium carbonate, potassium nitrate and urea in fresh milk

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## ABSTRACT

**Introduction:** Monitoring milk quality and adulteration is one of the responsibilities of Department of Veterinary Services Malaysia to ensure high quality milk is supplied to the consumers. There are several major adulterants in fresh milk such as sucrose, potassium nitrate, urea and sodium bicarbonate. These adulterants would be intentionally or unintentionally introduced into the milk throughout the milking process. **Objective:** This study aims to determine three types of adulterants, namely potassium nitrate, sodium bicarbonate and urea in fresh milk of dairy cattle. **Materials and methods:** Fresh milk samples were collected by Milk Collecting Centre (MCC) from cattle dairy farms in Perak and sent to VRI for testing. A total of 1524 fresh milk samples were received from 2019 to 2020 and tested using MilkoScanTM Mars. The results obtained were analyzed and referred to the Limit of Detection (LoD) for the true reading of detection for each adulterant. **Results and conclusion:** Overall, the highest adulterant detected is urea in 38 samples (2.5%) followed by sodium bicarbonate in 4 samples (0.3%) and potassium nitrate in 3 samples (0.2%). Fourteen fresh milk samples (2.59%) collected in 2019 were detected adultered with urea but none for potassium nitrate and sodium bicarbonate. However, all three adulterants were detected in 2020 with urea in 14 samples (2.51%), sodium bicarbonate in 4 samples (0.70%) and potassium nitrate in 3 samples (0.53%). In conclusion, potassium nitrate, sodium bicarbonate and urea are detected over LOD in the fresh milk and urea is recorded as the highest percentage. As for the further study, a confirmation test using such as Liquid Chromatography-Mass Spectrometry should be performed. Although the number of samples detected is small, MCC should implement close monitoring to ensure there is no source of harmful adulterants that may enter the food chain.

# Retrospective study on serological detection of leptospirosis in livestock in Malaysia

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## ABSTRACT

**Introduction:** Leptospirosis is caused by various species of *Leptospira*, a spirochete in the family Leptospiraceae. The detection of antibodies using microscopic agglutination test (MAT) against circulating serogroups and serovars is very important especially for import-export purposes as well as surveillance and confirmation of clinical cases. **Objective:** This study elucidates the seropositivity rate and the predominant serovars circulating among ruminants in Malaysia based on samples received in the Veterinary Research Institute (VRI) Ipoh from year 2011 until 2020. **Materials and methods:** A standard MAT was carried out against 15 available serovars in the VRI. Descriptive analysis was carried out to determine the predominant serovars circulating in the country from the year 2011 until 2020 (10 years). **Results and conclusion:** Throughout the study period, there were 39,103 cattle, buffaloes, sheep and goats samples tested. Out of the total samples, 54% (n=22,144) were from cattle, 27% (n=11,248) were from goats, 10% (n=4,088) from sheep and 3% (n=1,623) were from buffaloes. The overall seropositivity rate was 2.2% (n = 878). A total of 609 (2.8%) cattle samples were detected positive with *L. hardjo* (39.6%), *L. tarrasovi* (26.6%), and *L. pomona* (14.3%) as predominant serovars. In addition, 165 samples (10.3%) were positive in buffaloes and predominant serovars were *L. hebdomadis* (32.7%), *L. pomona* (29.0%), *L. hardjo* (18.2%). Moreover, 0.7% (n=82) goats samples were detected positive with *L. hebdomadis* (30.5%), *L. australis* (25.6%) and *L. hardjo* (19.5%) as common serovars. The most predominant serovars in sheep are *L. hardjo* (68.0%) and *L. tarrasovi* (32.0%) from 22 positive samples. Based on this study, the predominant serovar in cattle and sheep is *L. hardjo* and *L. hebdomadis* in buffaloes. In conclusion, these animals are continually being exposed to leptospires in the environment hence more effort are needed to determine the current status of leptospirosis with wide range of serovars.

# Molecular characterisation and phylogenetic analysis of H3N8 virus isolated from imported waterfowl at animal quarantine station

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## ABSTRACT

**Introduction:** Wild aquatic birds are natural reservoirs of influenza A viruses and H3 subtype is one of the most prevalent subtypes in waterfowl. Fecal swabs samples from imported barnacle goose and paradise shelduck at the animal quarantine station were sent to VRI for routine screening for Avian Influenza virus (AIV). **Objective:** To identify and genetically characterize the eight genomic RNA segments of AIV. **Materials and methods:** Virus was cultivated by chicken embryonated eggs. The eight segments (HA, NA, M, NP, NS, PB2, PB1 and PA) were amplified, sequenced, molecular characterized and phylogenetically analyzed. **Results and conclusion:** The viruses were identified as AI subtype H3N8 virus. The viruses were highly similar to the H3 virus from Netherlands and N8 viruses from Belgium with 99% and 100% nucleotide identity respectively. The phylogenetic analysis revealed that all eight segments were grouped in the Eurasian lineage. The cleavage motif PEKQTR in the HA gene showed that the viruses were of low pathogenic AI strains. In the HA gene, though four amino acid substitution were seen, the viruses retained avian-type receptor binding preference. No deletion in the NA stalk region was observed and the viruses were predicted sensitive to the antiviral drugs. No E627K mutation was detected in the PB2 protein. D622G and N383D mutations associated with increased polymerase activity were identified in PB1 and PA gene respectively. In NP gene, M105V and A184K related with enhanced viral replication and increased AIV virulence in chicken were noticed. V149A corresponding to the decreased host antiviral response in the NS gene was recognized. N30D, I43M and T215A in M gene that were linked to increased virulence in mice were seen. As H3 poses potential threats to both human and animals, and with the increase in international trade of birds; strict quarantine practice at the entry point and good laboratory capabilities is crucial to prevent the introduction of new AIV into our country.

# Molecular characterisation of low pathogenic avian influenza H9N2 virus from imported violet turaco

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## ABSTRACT

**Introduction:** Avian influenza (AI) H9N2 is an economical and public health threat. It has become a major problem in the poultry industry in many countries. Although H9N2 viruses are considered low pathogenic avian influenza (LPAI), they pose a significant threat to public health as they are considered viruses with pandemic potential. In 2021, H9N2 viruses were isolated from tracheal swabs of violet turaco *(Musophaga violacea)* that had been imported from Mali to Malaysia. **Objective:** In this study, we described the molecular characterization of H9N2 viruses based on hemagglutinin (HA) gene. **Materials and methods:** Reverse Transcription - Polymerase Chain Reaction (RT-PCR), DNA sequencing and phylogenetic analysis were used to characterize the H9N2 virus. **Results and conclusion:** The HA sequence of the isolate showed >97% nucleotide identity with those of H9N2 viruses isolated from chickens in African countries in 2017. The amino acids in the HA cleavage site showed a typical motif of the LPAI (PARSSR/GLF). Notably, the isolate had leucine (L) at position 226 at the receptor binding site, indicating that this isolate has the potential to infect mammals including humans. Phylogenetic studies showed that this H9N2 isolate belonged to lineage G1 and was very similar to viruses isolated from an outbreak in chickens in Senegal and Morocco. The isolate in this study was found to belong to the G1 lineage and this is the first time this lineage is reported in Malaysia. Previously, lineage Y-280 and Korean have been reported. In conclusion, the international trade of birds carrying AI viruses may pose a serious threat not only to the poultry industry but also to humans. Thus, the most important step in avoiding the spread of this disease is to screen imported birds for infections. Furthermore, effective quarantine system and diagnostic capabilities are critical in preventing the entry of foreign AI strains.

# Phylogenetic analysis and molecular characterisation of Newcastle Disease virus genotype VII in Malaysia

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## ABSTRACT

**Introduction:** Newcastle disease (ND) outbreaks in Malaysia cause serious economic losses to the poultry industry. The Newcastle Disease Virus (NDV) genotype VII has caused fatal infections in susceptible birds and is thought to be responsible for the fourth major ND panzootic worldwide. Analysis of GVII subtypes in birds revealed that they are highly divergent with different levels of virulence. **Objective:** The study aims to identify distinct subgroups of NDV genotype VII and to determine the pathogenicity of isolates based on fusion gene molecular motif bases from samples sent to the Veterinary Research Institute (VRI) between 2015 and 2021. **Materials and methods:** Randomly sample positive ND subgenotype VII were selected and phylogenetic analyses was conducted to identify distinct NDV subgenotype of GVII. Virulence of positive local isolates was determined based on the cleavage sites of the fusion gene. **Results and conclusion:** All twelve isolates in this study were clustered in subgenotype VII 1.2 NDV's based on partial sequencing of the hypervariable region of the fusion gene. Among isolates, five isolates were grouped in subgenotype VIIi and seven isolates in subgenotype VIIh. Besides that, five isolates subgenotype VIIi revealed the amino acid motif at the F cleavage site of 112RRQKRF117 whereas eight isolates subgenotype VIIh showed 112RRRKRF117. Based on both amino acid motifs, all isolates were virulence NDV. Furthermore, sequencing and phylogenetic analysis of all the study isolates indicated that they were all related to previous outbreaks in Southeast Asia. All of the isolates were identified as virulent strains of NDV and classified into subgenotype VIIi and subgenotype VIIh. Therefore, the current study offers essential information on the epidemiology, characteristics and prevalence of ND which is important for disease control in Malaysia.

# Preparation and evaluation of curcumin pickering emulsions stabilised by cellulose nanocrystals

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## ABSTRACT

**Introduction:** Curcumin, turmeric's primary yellow bio-component, is a popular spice that is extracted from curcuma longa. It has numerous pharmacological effects. However, there are a few limitations of curcumin like poor solubility and stability. Various approaches have been undertaken to enhance the solubility and stability of the curcumin. One of the approaches is preparing a Pickering emulsion wherein the emulsion contains a solid particulate emulsifier that can help to stabilise the emulsion. In this study, cellulose nanocrystals (CNCs) as solid particles were used to stabilise the emulsions. The objective of this study is to enhance the solubility and stability of curcumin Pickering emulsions by using CNCs. **Materials and methods:** The emulsions were prepared by homogenising the aqueous phase (CNCs and distilled water) and the oil phase (medium chain triglyceride oil and curcumin) using a high-speed homogenizer. Different formulations were prepared with different amounts (varied from 5% - 15%) and the concentration of CNCs (0.5% and 1%). The prepared emulsions were tested for phase separation, pH, viscosity, and solubility studies. Later, the emulsions were also subjected to stability studies by subjecting them to freeze-thaw cycles. **Results and conclusion:** All the prepared emulsions showed phase separation but, were able to redisperse easily upon moderate shaking. The results revealed that at pH 2.0, the emulsions were more stable at a concentration of 0.5% CNC. Results of the solubility studies revealed a marked increase in solubility of curcumin in Pickering emulsions. No significant changes in pH and viscosity were observed post freeze-thaw cycles. Hence, it is concluded that CNC is a good stabilizer for the preparation of Pickering emulsions as well as for enhancing curcumin solubility.

# Rising global health issue regarding arsenic contamination: Gestational arsenic exposure impacts on neuroimmune markers and anxiety in F1 offspring

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## ABSTRACT

**Introduction:** Arsenic is a developmental neurotoxicant and drinking water contaminated with arsenic is a still global health issue. However, little is known about the effect of arsenic exposure on anxiety-like behavior. This study aimed to detect the effect of gestational arsenic exposure on anxiety-like behavior and related gene expressions in F1 female mice. **Materials and methods:** Pregnant C3H/HeN mice (F0) were given drinking water containing 85 ppm sodium arsenite from gestational day 8 to 18. The control mice were given tap water only. 74-week-old F1 female mice were examined by open field test. Expression of neuroimmune markers and apoptosis-related genes in the prefrontal cortex was determined by real time RT-PCR. This protocol was approved by the Ethics Committee of National Institute for Environmental Studies, Japan (AE-22-12). **Results and conclusion:** The arsenic-exposed F1 female offspring showed decreased number of entries into center and shortened time spent in the center compared to the control mice. Down-regulation of brain-derived neurotrophic factor (BDNF) and upregulation of caspase-3, nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB), interleukin 1β (IL-1β), cyclooxygenase 2 (COX-2), Bcl2-associated X protein and microglial marker ionized calcium-binding adapter molecule 1 (IBA1) mRNAs in the prefrontal cortex were observed in the arsenic-exposed F1 offspring. BDNF plays a key role in the neuronal survival and anxiety. Our findings indicate that gestational arsenic exposure induces intergenerational effect on behavior and neuroimmune markers in the later life of F1 offspring. Government concerns should aware and develop cost-effective technologies for prevention of arsenic contamination in the community.

**Keywords:** Arsenic, Gestational exposure, F1 female mice, Anxiety, Apoptosis

# Phonophoresis of 4% Acetic acid on Haglund's Deformity- A case report of retrocalcaneal bursitis

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## ABSTRACT

**Introduction:** Haglund's deformity is a symptomatic osseous prominence of the posterolateral corner of the calcaneus resulting in retrocalcaneal bursitis, inflammation of the bursa between the calcaneus and the anterior surface of Achilles tendon. Posterior heel pain, morning stiffness, and swelling around the insertion of the Achilles tendon are the common clinical features of retrocalcaneal bursitis. It occurs commonly in both athletes and the general population. **Case Report:** Here, we report a case of a 55-year-old male who presented with prominence of the posterolateral corner of the calcaneus with pain even at rest for the past 6 months. The diagnosis was confirmed by an x-ray of the foot. The patient had difficulty in standing and walking for prolonged period due to pain. The patient also complained of early morning stiffness that may reduce his range of motion in the ankle. Prior to the treatment, his level of pain was assessed using a VAS scale and the range of ankle dorsiflexion and plantarflexion were assessed using a goniometer. He was treated with ultrasound therapy with 4% acetic acid being used as a coupling medium instead of ultrasound gel. Following the 10th session of phonophoresis, the prominence, early morning stiffness, pain in his posterolateral part of the calcaneus were reduced and range of motion was increased. This case report describes the process of physical therapy management in a patient with retrocalcaneal pain with an enlarged prominence of calcaneus by phonophoresis.

**Keywords:** Retrocalcaneal bursitis, phonophoresis

# Knowledge and perception towards vape among medical students of UniKL RCMP

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## ABSTRACT

**Introduction:** Vaping has recently become a public trend, due to its growing popularity through younger generations. Vaping is characterized as vapor or aerosol inhalation that can contain either nicotine or none via an electronic device such as e-cigarette. **Objective:** To explore the knowledge and perception towards vape among medical students of UniKL RCMP. **Materials and methods:** It was a cross sectional study conducted in UniKL RCMP, a university located in Greentown, Ipoh, Perak Darul Ridzuan, with a total of 589 medical students. Our sample size was 233 as calculated by Open Epi with 95% confidence interval. Total 268 respondents were participated in this research and the data were collected with systematic random sampling method. The raw data were inserted into Epi-info and Microsoft Excel software for data sorting and transferred to SPSS programme V.24. **Results and conclusion:** The majority of respondent had good knowledge and perception with the percentage of 83.58% (n=224) and 75.37% (n=202). Only 16.42% (n=44) and 24.63% (n=66) had poor knowledge and perception towards vape. The year of study, age category, gender, ethnicity, family history of vaping, smoking status, vaping status and duration of vaping, showed that the association between knowledge level and sociodemographic level factors were not significant. Gender (0.001), smoking status (0.003), vaping status (0.000) and duration of vaping (0.000), all had P value less than 0.05 which were statistically significant as it showed the association between perception level and sociodemographic factors. The respondents' knowledge level and perception towards vape directly correlate with each other as it was statistically significant with a *p* value (0.000). It can be concluded that there was correlation between knowledge and perception toward vape among medical students of UniKL RCMP.

# Immunocytochemistry: A method for purity assessment of primarily cultured cells

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## ABSTRACT

**Introduction:** Primary culturing outweighs transformed cell culturing with the genetic originality and in-vivo mimicry of samples derived from different organs. However, purity of primarily cultured cells is critical to ensure downstream analysis on the behaviour of the selected cells. During primary culture of cortical astrocytes, neighbouring cells like oligodendrocytes, neurons and epithelial cells could grow together with astrocytes. Therefore, establishing a purity assessment method is necessary to ensure the primary culturing efficacy. **Objective:** This study aimed to determine the purity of primarily cultured mouse cortical astrocytes through immunocytochemistry targeting astrocytes cytoskeletal marker, glial fibrillary acidic protein (GFAP). **Materials and methods:** Cerebral cortices of post-natal-day 2 mouse were mechanically crushed and viable cell counting was performed. Then seeded in plates containing pre-warm medium. Cells were seeded at the concentration of 1 x $10^5$ cells per well and grown until confluent. Confluent cells were reseeded in chambered cell culture slides and incubated. Cells were fixed with 4% paraformaldehyde and permeabilized with phosphate buffered saline containing Triton-X. Non-specific binding proteins were blocked with blocking buffer. Then incubated with monoclonal rabbit anti-GFAP antibody followed by Alexa Fluor 647 goat anti-rabbit IgG. Cell nuclei were stained with 4,6-Diamonidino-2-phenylindole (DAPI). Then, immunoreactivity was observed under the fluorescent microscope. The representative photomicrographs were taken for cell counting. The percentage was calculated for the number of GFAP and DAPI positive cells over the total number of DAPI positive cells. **Results and conclusion:** The number of GFAP positive cells obtained 98 ± 0.4% for four independent primary cultures. The immunocytochemistry targeting GFAP is a useful method for assessing the purity of primarily cultured astrocytes. Thus, immunocytochemistry technique could be applicable for purity checking of any primarily cultured cells with known makers.

**Keywords:** Astrocytes, Cell purity, Immunocytochemistry

# Prevalence of menstruation-related problems among the medical students in UniKL RCMP

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## ABSTRACT

**Introduction:** Menstrual cycle and menstruation-related problems are prevalent in the period around menarche and menopause. Early menstruation-related problems tend to disappear, and the menstrual cycle becomes normal and regular in few years after menarche. Awareness and early diagnosis of post-menarche menstruation-related symptoms are important in identifying problems that may concern woman's reproduction system. **Objectives:** To study the prevalence of menstruation-related problems involving female MBBS students of UniKL-Royal College of Medicine Perak (RCMP). The specific objectives were to identify the prevalence of each type of menstruation-related problems and to study the association of age, BMI and lifestyle measures on food and exercise with menstrual disorders. **Materials and methods:** A cross-sectional study was conducted in January 2022 among female medical students at RCMP. The research involved MBBS Year-1 to Year-5 female medical students, aged between 19 and 25 and were randomly selected. A self-administered questionnaire developed from published studies was used to collect data. **Results and conclusion:** Among the 209 study participants, 22 (10.53%) suffered from oligomenorrhoea, 9 (4.31%) suffered from menorrhagia and 170 (81.34%) suffered from dysmenorrhea, meanwhile 89.5% of the participants mentioned they had regular menstrual cycle. The mean Body Mass Index (BMI) of the participants was 22.53 ± 9.6 kg/m$^2$, where 19.1% were underweight, 61.7% were normal, and 19.6% were found to be overweight. In the dietary details, 71.4% of students have irregular eating habits. There were about 49.76% of female students were doing regular exercise and 20.57% female students were not exercising at all. No significant association between the variables and menstruation-related problems were found. Participants aged between 20 and 21 years had higher overall prevalence of menstruation-related problems.

# Characterisation of hydrocarbon degrading *bacteria Luteimonas terricola* isolated from oil spilled seawater

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## ABSTRACT

**Introduction:** Increased practice of automobiles and industrialization rapidly increased the environment exposure to toxic substances. Three different seawater samples were collected from harbor area (Tuticorin, India) for assessment of hydrocarbon degrading bacteria in oil spilled seawater samples. The objective of the present study was mainly focused on effective detection of the hydrocarbon degrading bacteria from oil spilled seawater sample. **Materials and methods:** The collected samples were screened for identifying and isolating the hydrocarbon degrading activity. Various methods such as blue-agar plate method, haemolytic assay, drop-collapse assay, oil spreading assay, microplate assay, penetration assay, stable emulsion index and BATH assay were performed to identify the ability of isolates in degrading hydrocarbons present in oil spilled seawater samples. **Results and conclusion:** Out of ten isolates used for the study, five strains exhibited hydrocarbon degrading activity. Among them, the strain *Luteimonas terricola* produced higher zone size in zobell marine agar medium. In GC-MS studies, the selected *Luteimonas terricola* isolate showed 100% disappearance of alkanes. Blue agar plate shows that the dark halo around the colonies indicated bio-surface active agents (BSs) production. Hemolytic assay produces a green zone around the colony (Beta hemolysis). Drop-collapse assay showed the drop collapse clearly. Oil spreading assay exhibited clear zone by displaying their ability to displace the oil thus indicating the presence of BSs. Micro plate assay indicates the presence of BSs qualitatively. Penetration assay revealed that the upper phase of the supernatant changing from red to cloudy white within 15mins. Colour change of *Luteimonas terricola* strain in Bushnell-Haas observed at 24 hrs, 48 hrs and 168 hrs at 37° C has effectively degraded the hydrocarbon. Thus, the strain *Luteimonas terricola* has been shown to exhibit potent hydrocarbon degrading activity and produced bio surface active agents.

# Prevalence of diabetes and the diabetic control among Malays residents of Tanjung Tualang, Perak

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## ABSTRACT

**Introduction:** Diabetes is a chronic disease which is rapidly rising in the incidence and prevalence worldwide. Various Intervention and treatment of the disease seems not successful in halting this pandemic. **Objectives:** The study is done to determine the prevalence of diabetes among Malay residents in Tanjung Tualang, Perak and the level of knowledge, attitude, and practice of diabetic control among diabetes patients. **Materials and methods:** A cross sectional study was conducted in two villages in this sub-district. A total of 253 Malay individuals aged 18 and above were selected for the study. Diabetes mellitus was defined as an individual who has been clinically diagnosed with diabetes from the medical facilities before and/or those who are currently taking medication for diabetes. All respondents were asked to answer the questionnaire on knowledge concerning diabetes and the diabetic patients were further asked about their attitude and practice in controlling the blood sugar levels and their awareness of the complications of the disease. **Results and conclusion:** Out of 187 respondents participated in the study (response rate of 74%), 64 (34.2%) were having diabetes mellitus. More than half (51.1%) were those aged 51 years and above. It was found that 59.4% of the respondents had good knowledge on diabetes. Among diabetic patients, 51.6% had a poor attitude towards their diabetic control, 54.7% of the diabetics practiced a good diabetic control and 73.4% had good awareness about diabetes complication. No association was found between patients' level of knowledge with their attitude and practice in controlling diabetes. However, diabetics aged 51 and above had a significantly more aware about diabetic complication as compared the younger age group. The study showed that the prevalence of diabetes in this area was higher than the national average and affected mostly the old age group. The knowledge, attitude, and practice on diabetic control among diabetics here were comparatively low. More efforts on education and behavior modification by the health authorities and the empowerment of the community should be activated to fight against this pandemic.

# Validity and reliability of a questionnaire on TB stigma among pulmonary tuberculosis patients in Selangor, Malaysia

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## ABSTRACT

**Introduction:** Tuberculosis (TB) is an old disease that continues to present a public health challenge globally. Stigma towards TB can be a barrier to the diagnosis and treatment of TB patients and subsequently hinder efforts to control the disease. **Objective:** This study aimed to evaluate the validity and reliability of a TB stigma questionnaire in a sample of Malaysian adult TB patients. **Materials and methods:** An adopted 15-item TB stigma questionnaire was administered to 711 patients. Principal component analysis (PCA) was performed to establish construct validity and internal consistency examined using Cronbach's alpha. **Results and conclusion:** The PCA identified 4 domains with 56.2% total variance. However, one item, "Is a girl unable to decide for getting pTB treatment?" had a low factor loading and another item, "Do you think there is less chances of marriage due to pTB diagnosis?" cross-loaded between two components, and therefore both were removed. The final PCA with varimax rotation on the remaining 13 items extracted three components with a Cronbach alpha of 0.81 and 54.1% total variance. The findings indicate that the trimmed 13-item questionnaire has moderate validity and reliability in measuring TB stigma in Malaysian adult patients. Further studies should be carried out to develop a more socio-culturally appropriate TB stigma questionnaire for the Malaysian population.

**Keywords:** tuberculosis, stigma, validity, reliability

# Characteristics and treatment outcome of tuberculosis in the elderly in Malaysia

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## ABSTRACT

**Introduction:** Tuberculosis (TB) remains a major global issue despite the World Health Organisation's goal to "end the TB epidemic by 2035". The TB burden is particularly challenging in the elderly due to immunosenescence and associated comorbidities. This imposes a continuous battle in managing elderly TB. **Objective:** Here we present the characteristics of TB cases in Malaysians aged 65 and above, and their treatment outcome. **Materials and methods:** Data was obtained from the Malaysian TB Information System (TBIS) between 2013 and 2018. All cases aged 65 and above were included in this study. Retrospective analysis and comparison of multiple patient and outcome variables, such as sociodemographic and clinical findings, were done. **Results and conclusion:** Total cases reported were 147,667 where 13.4% were aged 65 and above. 67.5% were 65 to 74 years old, 28.3% were 75 to 84 years old and 4.2% were 85 years old and above. Elderly TB cases were found to be higher in males (69.3%), Malaysians (97.6%), Malay (39.7%), rural residents (52.7%), and had only primary schooling (34.3%). 30.8% had Diabetes Mellitus, 28.3% were smokers and 0.7% had HIV. Pulmonary TB was the most common type (88.9%), and 0.7% had miliary TB. 0.2% were reported to be multidrug-resistant TB. 49.7% had minimal lesions on X-ray, 37.1% had moderately advanced lesions, 7.3% had no lesion and 4.4% had far advanced lesions. Treatment were completed in 94.9%, where 28.86% were unsuccessful. Unsuccessful TB treatment were found to be higher in males (73.69%), Malaysian (97.90%), Malay (34.46%), rural residents (60.76%), those who had no formal education (40.70%), those with pulmonary TB (90.10%) and minimal lesions on Xray (49.44%). Elderly TB in Malaysia is prevalent, with a high rate of unsuccessful treatment. The rise in the elderly population will likely cause a higher elderly TB burden in the future, posing a grave challenge to the WHO strategy in Malaysia.

**Keywords:** Elderly, Tuberculosis, unsuccessful treatment, Malaysia

# Development of tuberculosis disease among infected close contacts in 2019-2021

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## ABSTRACT

**Introduction:** World Health Organization (WHO) estimated the global prevalence of Latent Tuberculosis Infection (LTBI) is almost ¼ of the world's population. It was shown that 5-10% of LTBI patient will develop TB and the chances of developing tuberculosis (TB) is up to 50% within the first two years after being infected. **Objective:** To determine the incidence rate of TB disease among infected (LTBI) close contacts in 2019-2021. **Materials and methods:** This is a retrospective cohort study that utilized the data on TB contacts from the national Information System (TBIS) and LTBI registry from year 2019 – 2021. The samples selected were those 5 years old and above and were registered as TB contacts from the date of 1st July 2019- 31st December 2019 and have undergone and tested positive for Interferon Gamma Release Assay Test (IGRA). The data from these respondents were followed up for two years until 31st December 2021 to see the development of TB and their socio-demographic characteristics. **Results and conclusion:** A total of 15581 contacts were registered from July to December 2019 that undergone IGRA testing from all over Malaysia. A total of 3494 (22.4%) contacts were positive for IGRA test and listed in LTBI registry. Of these, 92 (2.6%) patients developed TB over the two years follow-up. Only 14 (15.2%) of them developed TB in 2019, 8 (8.7%) in 2020 and 70 (76.1%) of them in 2021. The incidence of tuberculosis among infected contacts is relatively low in Malaysia. However, contact tracing and investigations still needs to be done promptly to identify and treat latent infection to prevent the tuberculosis disease.

# Prevalence and characteristics of tuberculous meningitis in Malaysia 2015-2020

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## ABSTRACT

**Introduction:** Globally, tuberculosis (TB) is one of the top 10 causes of death and the leading cause of morbidity from a single infectious agent. As stated by WHO Global Tuberculosis Report 2020, in 2019 an estimated of 10million people fell ill with TB worldwide, while 1,400,000 people died of TB. Tuberculous meningitis (TBM) is a subtype of tuberculosis which constitutes about 5% of all extrapulmonary tuberculosis and about 1-2% of active tuberculosis. **Objective:** This study was conducted to analyse the prevalence of tuberculous meningitis in Malaysia from 2015-2020. Through this study we were also able to analyse the demographic characteristics and clinical profiles of TBM patients. **Materials and methods:** This is a cross sectional study using data collected from Malaysia national case-based TB registry (MyTB) between year 2015 and 2020. These data were analysed using SPSS version 21.0 for windows (SPSS Inc., USA). All the statistical analyses with p-value less than 0.05 is considered significant with the 95% confidence interval. **Results and conclusion:** There were total of 2072 TBM cases from year 2015 till 2020, which comprised of 1.38% of total TB cases within 6 years. Most of the patients were Malaysian (1682 cases (81.2%)) while only 390 (18.8%) cases were reported among foreigners. Most cases were detected among the age group of 35-44 with average of 77.8 (22.5%) cases per year, followed by age group 35-44 with average of 66.8 (19.35%) cases per year. Of all the TBM cases, 23.2% (481 cases) patients were known case of HIV. TBM is a disease with poor prognosis as the consequence of the half of the affected patient is death or severe disability which is evidenced by 42.7% (885) patients who were passed away. Tuberculous meningitis imposes a great challenge in both diagnosis and management, as most affected patients will be left with severe long-term complications even with treatment. It is important to understand the epidemiology and characteristics of tuberculous meningitis in Malaysia to improve the management and enhance the control of this deadly disease.

**Keywords:** Tuberculous meningitis, epidemiology, Malaysia

# Knowledge and impact of COVID 19 pandemic on residents of Batu Gajah township

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## ABSTRACT

**Introduction:** Since the COVID-19 outbreak in Malaysia, the government had introduced measures to reduce the number infected including lockdowns, wearing facial masks, frequent handwashing and social distancing. Everyone had to follow and cope with this new lifestyle which affected them socio-economically and mentally. **Objective:** To determine the level of knowledge and impact of Covid-19 on residents of Batu Gajah township. **Materials and methods:** This cross-sectional study was conducted in February 2021 on Batu Gajah Township residents in Kinta District, Perak, Malaysia. The sample size calculated was 96 with a precision of 10% for 95% confidence interval, assuming 50% of respondents will have socio economic and mental health issues. As only one week was allotted for data collection, the sample size of 96 was chosen. Prior ethical approval and consent of respondents were obtained. Batu Gajah residents were invited to participate via WhatsApp and Facebook groups. They answered a pre-tested questionnaire (online using google form) which had 12, 10 and 16 questions respectively on knowledge, socioeconomic status and mental health. **Results and conclusion:** In total 109 responded and most of them 104 (95%) had good knowledge on COVID-19. Socioeconomic impact in terms of problem in paying bills was 40 (36.7%); whilst 53 (48.6%) stated they had no other resources to support themselves and 44 (40.4%) had to use their savings to make ends meet. Forty-five respondents (41.2%) stated they were worrying too much; 34 (31.2%) had trouble relaxing, 37 (37%) had trouble sleeping and 14 (12.8%) had thoughts about ending their lives. Overall, 20% had poor psychological health. The association between the socioeconomic status and mental health was statistically significant with p-value = 0.00896. Most of the respondents had good knowledge of COVID-19 with a substantial number affected financially and psychologically by the COVID-19 pandemic.

# Comparison of side effects between different brands of COVID-19 vaccines among Malaysian adult population

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## ABSTRACT

**Introduction:** : In January 2020, COVID-19 was declared a public health emergency of international concern which targets the human respiratory tract. Since then, scientists have been developing vaccines to curb the spread and reduce the likelihood of severe effects from the infection. Several brands of vaccines are available (Pfizer-BioNtech, AstraZeneca/Oxford and Sinovac) and it was reported that people experienced a various range of side effects from them. **Objective:** This study was conducted to compare the side effects between different brands of COVID-19 vaccines among Malaysia adult population. **Materials and methods:** A cross-sectional study was conducted among 410 Malaysian adults by distributing online questionnaires via various platforms. Descriptive data was presented as frequency and percentages or means and standard deviations of means. The severity of side effects among different age group and gender of Malaysian population who has received three doses of COVID-19 vaccination were analysed by using Chi square test. P-value of <0.05 was considered statistically significant. **Results and conclusion:** The most common side effects experienced were fever, pain or swelling at the injection site, sleepiness and exhaustion, stiffness in joints and muscles, and headache following vaccination. It was found out that majority of the respondents experienced most severe side effects with Pfizer-BioNtech compared with two AstraZeneca/Oxford and Sinovac. Majority of the respondents also reported mild symptoms following the first, second and third dose. There was also a significant association between gender, age, level of severity and type of brands of vaccines. Findings from this study can provide data on the most suitable coping as well as solution or treatment to treat the side effects. In addition, this study will also benefit the researchers and scientists in vaccinology to create and produce new vaccines with fewer side effects or without any rare adverse event.

Keywords: vaccine, COVID-19, side effects, pandemic

# Online teaching-learning and assesment during COVID-19 period: Perception and fondness of preclinical MBBS Students of UniKL RCMP

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## ABSTRACT

**Introduction:** The COVID-19 pandemic has had a severe impact on education as the premises of the universities and schools were closed, and countries shut their borders in response to lockdown measures. Majority of the higher education institutions were quick to replace face-to-face teaching-learning (T&L) sessions with online learning. But these closures affected learning and assessments severely, and in some places the course had to defer or extended for weeks or months. **Objective:** The objective of the study was to determine the perception and fondness of preclinical MBBS students of UniKL RCMP on online teaching learning and assessment during COVID-19 period. **Materials and methods:** This was a cross-sectional study, conducted in December 2021 to January 2022, the study population included MBBS preclinical students. A set of questionnaire was prepared and distributed to the students who were willing to respond. The participants' responses were then entered and the analysis was done by using SPSS-25. **Results and conclusion:** Among the 162 students who responded, 43 (26.5%) were male while 119 (73.5%) were female, and 79 (48.8%) were from year 1 while 83 (51.2%) were from year 2. In this study, there was no significant relationship on perception and preference of online teaching-learning and assessment with gender distribution or year of study of the respondents. COVID-19 has given an unexpected, 360 degree impact on every spheres of life and especially in education sector. Students all around the globe were pushed to online classes that really has impacted badly on the medical students. Unfortunately, this study has shown that perception and fondness on online T&L activities and assessment are not significantly associated with gender or year of study of the respondents. Hence, there is a need for further study to uncover the impact of online teaching and assessment.

# Knowledge, Attitude and Practice (KAP) towards COVID-19 preventive measures and symptoms: A cross-sectional study among individuals living in Kedah

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## ABSTRACT

**Introduction:** Coronavirus disease (COVID-19) is a serious global health problem that was first detected in Wuhan, China. Insufficient level of knowledge, attitude, and practice (KAP) towards the preventive measures of COVID-19 lead to the economic downturn, rise in the number of infected people daily and increase mortality rate. **Objective:** This study was conducted to evaluate KAP towards COVID-19 preventive measures and symptoms among individuals living in Kedah. **Materials and methods:** A cross-sectional study was conducted by distributing online questionnaires among 388 individuals living in different districts in Kedah. Descriptive frequency analysis was used to summarise the socio-demographic characteristics. Chi-Square Test and Fisher Exact Test were used to identify the association between demographic characteristics and level of KAP. Spearman's correlation was used to assess the relationship between the dependent variables. **Results and conclusion:** The mean score obtained for knowledge, attitude, and practice were 9.67 ± 1.64, 20.89 ± 3.03 and 10.13 ± 1.12, respectively. A significant association ($p< 0.05$) was found between respondent's demographic characteristics with the level of knowledge (age, gender, level of education, marital status, occupation), and level of practice (gender, level of education). This study also reported no significant association between respondent's demographic characteristics with the level of attitude. There was a positive correlation between knowledge – attitude (rs =0.103, $p<0.05$), knowledge – practice (rs =0.111, $p<0.05$) and attitude – practice (rs =0.207, $p<0.05$). This study shows that the greater a person's level of knowledge, the higher the level of attitude and practice. This study will provide essential groundwork data to help health officials facilitate the implementation of effective policy regarding COVID-19 preventive measures in Kedah.

**Keywords:** COVID-19, knowledge, attitude, practice

# Knowledge, Attitude and Practice on prevention of COVID-19 among nursing students in UniKL Royal College of Medicine Perak

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## ABSTRACT

**Introduction:** COVID-19 infection is a serious global public health problem and prevention activities are ultimately important to combat this infection. It is more important for the Health Care Workers (HCW) to know and follow the preventive measures effectively as they are front liners in attending the infective patients. Therefore, this study aims to evaluate Knowledge, Attitude and Practice (KAP) towards prevention on COVID-19 among nursing students in UniKL RCMP which can be an indicator of KAP level of health care worker and the community. **Materials and methods:** A cross-sectional study was conducted among Diploma course student nurses in January to February 2022 using online questionnaire on KAP towards prevention of COVID-19. Descriptive statistics were used for elaborating demographic characteristics and the KAP levels. Knowledge, attitude and practice of the participants were assessed using a scoring system and categorized to level of KAP. Kruskal Wallis tests were performed as the data were not normally distributed, to determine significant differences among various group year of study with KAP scores while correlation test was used to identify relationship between knowledge with attitude and practice. The significant level is set as < 0.05. All analyses were performed using SPSS version 25. **Results and conclusion:** Two hundred and fifty questionnaires were distributed and 210 were returned which response rate was 84.0%. Median scores of knowledge, attitude and practice were 18.0 ± 1.9, 8.0 ± 1.7 and 7.0 ± 1.25 respectively. There are significant association between year of study with knowledge ($p$=0.024) with attitude ($p$=0.002). However, there is no significant association between year of study practice ($p$=0.179). Significant positive linear correlations between knowledge-attitude (r=0.466, $p$<0.01) and knowledge-practice (r=0.575, $p$<0.01) were observed. Level of Knowledge, Attitude and Practice of nursing students on prevention of COVID-19 in this study were good. There were also positive linear correlations confirms that better knowledge can lead to positive attitude and subsequently in good practices. This is expected finding among healthcare workers as they are future health care workers. Therefore, continuous teaching and emphasize should be provided to ensure the KAP level are good among the nursing students.

# Why medical students prefer hybrid classroom over online classroom for clinical case presentation on infectious disease? A qualitative study

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## ABSTRACT

**Introduction:** With Malaysia beginning its transitional phase into COVID-19 endemic phase on 1 April 2022, hybrid teaching which combines online and face to face teaching became a popular teaching method for many learning institutions. UniKL RCMP has introduced hybrid classroom where the lecturer and some students are physically present in the classroom while other students are online via video conferencing system during the same teaching session. **Objective:** To explore UniKL RCMP medical students' preference in using hybrid classroom versus online classroom for clinical case presentation on infectious disease during Year 4 Primary Care Medicine module. **Materials and methods:** A total of 12 medical students from different subgroups who undergone Year 4 Primary Care Medicine module were invited to the focus group discussions at the end of the module. Discussion topics were their experience, limitation and preference of hybrid versus online classroom method. All students went through three clinical case presentations, one of which was on infectious disease using hybrid classroom method and five other clinical case presentations using online method. **Results and conclusion:** All 12 students preferred hybrid over online classroom because they felt that learning was more effective in the hybrid classroom. Thematic analysis showed benefits of hybrid classroom were easier to understand and visualise the case, encouraged to ask questions, easier to interact with friends and less environmental distraction. Limitation of hybrid classroom was occasional technical difficulty especially for online students to hear physical classroom students and for online students to see notes written on the physical classroom's whiteboard. Hybrid classroom provided medical students with a better learning environment than online classroom for clinical case presentation especially on infectious disease. Improvement in technical setup will enhance the students' learning experience with hybrid classroom.

# Knowledge, Attitude and Perspective of community pharmacists in the sale of COVID-19 self-test kits in Ipoh, Perak

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## ABSTRACT

**Introduction:** Malaysia experienced a surge in the number of active COVID-19 cases. As a result, the government came out with several measures and standard operating procedures to manage the COVID-19 pandemic. One of the most significant measures is by allowing the sale of COVID-19 self-test kits. This enables the public to do a self-test when they are close contacts or exhibiting symptoms. It enables immediate self-quarantine when found positive. This will restrict the spread of the COVID-19 virus. Community pharmacies around the country have been in the forefront in selling the COVID-19 self-test kits. Their accessibility and role in counselling has made community pharmacists as an important figure in selling and counselling the public on the sale and use of COVID-19 self-test kits. **Objective:** The objective of the study is to evaluate the knowledge, attitude and perspectives of community pharmacists in the sale of COVID-19 self-test kits in Ipoh, Perak. **Materials and methods:** A cross-sectional survey study design was used to conduct this study. It was carried out via an online structured questionnaire distributed among the community pharmacists in Ipoh, Perak. 62 community pharmacists in Ipoh responded to this survey. **Results and conclusion:** It was found that 88.71% of the respondents have a good knowledge about the COVID-19 self-test kits. Around 58% of them portrayed a moderate attitude while selling the COVID-19 self-test kits, which included the demonstration and counselling. Whereas 58.2% of the community pharmacists showed moderate level of perspective while selling COVID-19 self-test kits sales. There is a need for the community pharmacists to undergo more training on COVID-19 self-test kits to improve their level of attitude and perspective when they sell the kits to the public. This will improve the management of the COVID-19 pandemic in the country.

**Keywords:** COVID-19, self-test kits, sale, knowledge, attitude, perspective, community pharmacist, Ipoh, Perak

# Stigmas and challenges experienced by various healthcare worker divisions diagnosed with positive COVID-19: A qualitative analysis in a Northern Malaysian tertiary centre

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## ABSTRACT

**Introduction:** The COVID-19 pandemic has had a significant impact on the working environment, job demand, and psychosocial well-being. The dual role of healthcare providers and family members may cause psychological conflict. If left unresolved, these internal conflicting thoughts increase the risk of burnout, anxiety, and performance degradation. **Objective:** The study aims to explore the stigmas and challenges faced by various categories of Healthcare Workers (HCWs) diagnosed with positive COVID-19 and their coping and mitigation strategies adopted. **Materials and methods:** A qualitative study was conducted through a one-to-one semi-structured interview involving 15 HCWs who were diagnosed with COVID-19 from January 1st, 2021 to December 31st, 2021 in Hospital Tuanku Fauziah, Perlis, Malaysia. The HCWs were further divided into sub-categories covering administrators, clinical support staffs, doctors, and nurses. Emerging themes were identified using thematic analysis. **Results and conclusion:** There was no salience difference in the types of stigmas and challenges faced by all categories of HCWs. Four emerging themes were: 1) HCWs reported social stigma from neighbors and coworkers, which caused overthinking and contributed to the psychological impact of infection; 2) The main challenges faced by all categories of HCWs were quarantine-related basic needs, professional responsibilities, and post-COVID symptoms. 3) Apart from knowledge of self-monitoring and preventive measures to avoid transmission during quarantine, a supportive work environment and empathy from employers, coworkers and family were essential to reduce their psychological burden; 4) Effective management strategies and frequent dissemination of up-to-date COVID-19-related information were vital in combating stigmas and anxiety during a pandemic. Multifaceted strategies aimed at social stigmas and challenges should be implemented to maintain the psychosocial well-being of infected HCWs in the face of unprecedented pressure, allowing them to continue providing high-quality healthcare services.

# Factors related to children`s social interaction skills during the Movement Control Order (MCO) of the COVID-19 outbreak

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## ABSTRACT

**Introduction:** Acquiring communication and social skills takes place during early years of any individual`s life. Being a child born or, living the early years of life during the COVID-19 outbreak would mean that your social skills might be affected. Concerns about the impact on children's social skills were raised when schools began closing due to the implementation of movement control order (MCO). **Materials and methods:** We did a cross-sectional study through a survey over a period of 3 weeks in January 2021. A set of pre-designed and validated questionnaires with 3 components, which identified parents' social interaction with children, children's social skills in interaction with others and children's social skills during MCO were applied. The questionnaires were distributed online through social media applications to targeted populations, who were parents with children aged 7-12 years old in Selangor. The final sample size was 157. **Results and conclusion:** Overall, 49.68% of the children showed good social interaction skills during school closure (online classes). Moreover, 52.87% of parents had average/poor level of interaction with their children. Children's social interaction skills during school closure were significantly associated with the gender of the child (P value 0.03). Last but not least, Children's social interaction skills during school closure were significantly associated with the level of parents' social interaction with children (P value 0.001). COVID-19 outbreak adversely affected many aspects of our lives. One important aspect affected was the social interaction skills of the school age children because of the communication restrictions. However, Parents can play a major role in improving the social interaction of their children. We do recommend parents to get enrolled in social skills classes or workshops to overcome similar social problems in the future.

# Impacts of online learning: Evaluation of the graduating nursing students

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## ABSTRACT

**Introduction:** The COVID-19 pandemic declared in March 2020 has disrupted education at all levels, forcing it to switch to online learning. Prompt actions were taken by the Faculty of Medicine, UniKL RCMP, to change the physical classroom teaching to online learning in ensuring that medical and nursing education can be carried out during the pandemic and students were able to graduate on time. **Objective:** To explore the final year of graduating Nursing students' experiences in online learning and the effects of the pandemic on their education. **Materials and methods:** A total of 52 students from the graduating cohort of January Semester 2022 were invited to provide feedback on the Nursing education conducted in the "new normal" after they have sat for the Malaysian Nursing Board Examination. Evaluation forms were given and explained to students, areas evaluated include factors that support or hinder online learning, their experiences, and effects on their education. A total of 47 completed evaluation forms were received. **Results and conclusion:** Over 95% of students perceived online learning as less effective and preferred to learn in the conventional method of face-to-face classes. The impact of the pandemic has caused multiple stressors in lives including financial concerns, lack of family and peer support, feeling alone and isolated, role confusion, and conflicts between home and college environments when studying online. They have difficulty understanding the diseases' pathophysiology and nursing management when learning in the virtual environment, which leads to a loss of interest or failure to stay focused in their study. Technical challenges, intermittent or poor internet connectivity, lack of student engagement, and camera usage remains the main limitations of online learning. Nursing education was interrupted by the COVID-19 pandemic. The evaluation showed some negative impacts of online learning among the students who preferred to learn in traditional face-to-face classes. However, students' and lecturers' experiences, their readiness for online teaching and learning, their effectiveness, technical support, and resources needed in this new learning platform need further evaluation.

# Mental health and health-related quality of life during coronavirus pandemic: A Study among higher education academicians

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## ABSTRACT

**Introduction:** Coronavirus (COVID-19) pandemic has affected most people. In Malaysia, to reduce the spread, several interventions were implemented, which have also affected the higher education system, and impacted the academicians who are the pillar of the system. This study was conducted to evaluate mental health (MH) and health-related quality of life (HRQOL) during the pandemic among university academicians of various ages, nationalities, and mental illness history. **Materials and methods:** A cross-sectional survey was conducted using online MOS 36-Item Short-Form (SF-36). A total of 1482 UniKL academicians were invited to participate. Sample size was calculated using Raosoft, Inc. Software. Confidence level was set at 5%, hence a total of 306 participants were needed for the study. Data analysis was done using SPSS 21.0. **Results and conclusion:** A total of 265 academicians responded to the survey. In all HRQOL domains, male respondents outperformed females. Significant differences between two genders were found in physical functioning (PF), body pain (Bp), and vitality (Vt). Except for general health and PF, older respondents appeared to have better conditions for each HRQOL scale. There were substantial differences in MH between respondents > 40 years old, but not in HRQOL. No significant differences found between nationalities in terms of HRQOL and MH, except for role physical (RP). Foreign academicians appeared to have higher mean scores for each HRQOL and MH sections of SF-36, which indicated as having higher QOL, and in comparison, foreign academicians were found to have better physical and mental conditions. There were also differences among respondents with previous history of mental illness. Almost half of those who have had a mental illness in the past believed that the pandemic worsened their mental health. The pandemic did impact the academicians' mental health and HRQOL in various ways. More studies can be conducted to identify other possible factors that could have contributed to the issues.

# Knowledge, Attitude and Practice of Malaysian society toward herbal medicine in response to COVID-19

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## ABSTRACT

**Introduction:** Herbal medication is gaining popularity among the general public, especially in the wake of the COVID-19 outbreak. However, there is lack of information regarding the side effects of herbal medicine, which should be taken into consideration by Malaysian society. **Objectives:** This study was conducted to assess the knowledge, attitude and practices (KAP) of Malaysian society towards herbal medicine in response to COVID-19. The association between KAP and sociodemographics were also investigated. **Materials and methods:** A cross-sectional online survey was conducted among Malaysian society aged 16 years and above. A total of 405 respondents were approached for the study. The study was assessed by using an online self-administered questionnaire to measure KAP towards herbal medicine. Descriptive statistics were used to summarize respondents' demographic characteristics and KAP. Chi square tests were used to investigate the association between sociodemographics and KAP of the respondent. All analyses were performed using SPSS 26.0. A $p$ value $< 0.05$ was considered statistically significant. **Results and conclusion:** The results showed that majority of respondents had moderate knowledge (43%), moderate attitude (61.7%), and moderate practice (44.9%) towards herbal medicine in response to COVID-19. The study also showed that sociodemographic (gender, education level and marital status) had a significant relationship with the practice of Malaysian communities toward herbal medicine in response to COVID-19 ($p<0.05$). It can be concluded that Malaysians had a moderate degree of knowledge, attitude and practice toward herbal medicines in response to COVID-19. The Ministry of Health (MOH) should raise awareness campaigns and educate society about the side effects and consequences of using herbal medicines in response to COVID-19. The community education program is also very important to improve the knowledge about herbal medication towards COVID-19.

Keywords: Knowledge, Attitude, Practice, Herbal Medicine, COVID-19

# Knowledge, Attitude and Practice of Malaysians in maintaining immunity during COVID-19 endemic

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## ABSTRACT

**Introduction:** The Coronavirus (SARS-CoV-2) that causes COVID-19 compromises immunity and primarily affects the human respiratory system. Although the disease has been declared endemic in Malaysia (as of April 1, 2022), it can still be easily transmitted if people's immunity is not maintained. A variety of nutritional, cognitive, and physical aspects are required to optimise the immune system. **Objectives:** To investigate the knowledge, attitude, and practice of Malaysians in maintaining immunity during COVID-19 endemic. **Materials and methods:** This cross-sectional survey-based study targeted Malaysian adult aged 18 to 65. A validated questionnaire was distributed via online platforms using Google Form. It consists of questions to assess knowledge, attitude, and practice of Malaysians in maintaining immunity during the COVID-19 endemic. All data analysis was performed using SPSS 23.0. Descriptive analysis was used for categorical data and Spearman correlation test were used to assess the correlation between study parameters. Results and conclusion: Out of 398 respondents, 66.8% were female and the majority were Malay (97.0%) aged 18-24 years (70.4%). The majority of respondents (99.5%) have adequate knowledge, a positive attitude (99.2%) and good practice (88.2%) towards some measures to maintain immunity during the COVID-19 endemic. Although the correlation is weak, significant and positive linear relationships were found between the attitude and practice (r= 0.148, $p< 0.01$). The participant's characteristics that significantly associated with their mean KAP were gender with knowledge, occupation with attitude, and residence status (living alone or with family) with practice ($p<0.05$). The positive linear correlation between attitude and practice demonstrates that Malaysians are aware of the importance of maintaining immunity during the COVID-19 endemic. However, in order to improve their practice, health educational campaigns on immunity maintenance should constantly be carried out.

**Keywords:** knowledge, attitude, practice, immunity, COVID-19

# COVID-19-related Knowledge, Attitude and Practice among medical students in UniKL RCMP, Ipoh, Malaysia

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## ABSTRACT

**Introduction:** The value of prevention and control of infectious diseases is much effective and less costly than the management and therapeutic measures. This concept is greatly applicable in the current COVID-19 pandemic, since there is still no proper understanding in its exact pathogenesis and long term complications. Before the intervention of effective vaccines and antiviral drugs it is a critical necessity to understand and apply the basic knowledge, attitudes, and practices (KAP) for this condition. **Aims and objectives:** Medical students are the future potential healthcare workers who need to play a major role in the community for the preventive measure. As such, they need to be trained with a good KAP. This study intended to explore the KAP of medical students in Universiti Kuala Lumpur Royal College of Medicine Perak Malaysia toward COVID-19 prevention and control. **Materials and methods:** The approval for this study was obtained from the Medical Research Ethics Committee (MREC) UniKL RCMP. A cross- sectional study on COVID-19 related KAP was conducted using SKAPCOV-19 questionnaire developed by Saefi et al. (2020). Subjects included a total of 250 undergraduate medical students from year 1 to 5 and the subjects were recruited by systematic random sampling. The data were analyzed using SPSS version 26 on chi square and t-test. **Results and conclusion:** The respondents consisted of students from both gender. However, there is minimal effect on knowledge and practice scores regarding gender. Age has a significant effect on all three KAP scores. Out of the data, 52.3% of respondents had reasonable knowledge, 51.4% had acceptable attitudes, and 59.2% had satisfactory practices toward COVID-19. The KAP survey reflects the importance of this infection to be included in the undergraduate medical curriculum. The findings of this research will help improve students' capability for the community in the future.

# Blood cultures positive for coagulase-negative Staphylococci: First study in Malaysia on clinical significance, financial impact, treatment outcomes

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## ABSTRACT

**Introduction:** Coagulase-negative Staphylococci (CoNS) are increasingly recognised as a common cause of nosocomial bloodstream infections and the leading cause of blood culture contaminants in the medical field. Determination of clinical significance of coagulase-negative staphylococci and its profound impact on antibiotics administrations in hospitals and mortality rate was based on published study. **Materials and methods:** Patients above 13 years old with at least one positive blood culture from January 2017 to May 2020 with CoNS bacteremia were screened and those who fulfilled the inclusion criteria were analysed. True CoNS bacteremia was defined based on a previous study and any CoNS bloodstream infection that does not fulfill these criteria was regarded as a contaminant. **Results and conclusion:** A total of 1,119 positive blood cultures for CoNS were found. After applying the inclusion and exclusion criteria, only 318 episodes of CoNS bacteremia remained and were analyzed. 147 (46.2%) were detected as true BSI and 171 (53.8%) were deemed as contaminants. Patients with central venous lines were associated with true CoNS bacteremia, accounting for 11.6% compared to those in the contaminant group with less than one percent (0.6%), P<0.001. There was no significant difference in hospital mortality between patients defined as true CoNS BSI who were appropriately treated 19(27.5%) and those who were not appropriately treated 15 (19.2%) P=0.233. A staggering 78(24%) of true CoNS bacteremia was not treated appropriately. However, only 6 (2%) of the contaminant episodes were treated resulting in an additional total cost of RM 3,081.60 compared to the cost of treating true CoNS bacteremia episodes in our study which amounted to RM 35,438.40.

# The effect of *S. mutans* on the growth and virulence expression of *C. albicans* in a mixed species biofilm

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## ABSTRACT

**Introduction:** It is known that in polymicrobial biofilms, interactions among inhabitant species can alter gene expressions to affect physiological and pathogenic properties. Candida albicans and Streptococcus mutans are major components of the oral microbiome co-existing in biofilms adherent on dental surfaces. **Objective:** In this study, the effect of *S. mutans* on the biofilm growth and expression of virulence in *C. albicans* is studied in a mixed species biofilm populated by both organisms. **Materials and methods:** Biofilms of *C. albicans* ATCC 10231 and a 1:10 mixture of *C. albicans* and *S. mutans* ATCC 25175 were grown in 6-welled cell culture plates. At the end of incubation, RNA extracted from the biofilms were tested in RT-qPCR assays for the expression of *C. albicans* quorum sensing genes CHK1 and PBS2, and virulence genes HWP1 and EFG1. The viable counts of *C. albicans* and *S. mutans* were also obtained separately using the Miles and Misra method. The results from single species and mixed species biofilms were compared. **Results and conclusion:** In both pure and mixed biofilms, the viable count of *C. albicans* increased at end of biofilm formation, indicating no suppression of *C. albicans* growth in the presence of *S. mutans*. In contrast, the viable count of *S. mutans* in the mixed species biofilm decreased at end of biofilm formation, suggesting that *C. albicans* suppressed the growth of *S. mutans* and increased its cell death. The RT-qPCR results did not show a significant difference between the expression of the four genes in pure and mixed species biofilms. This could be explained by the attainment of the same *C. albicans* viable counts in pure and mixed biofilms and non-interference from *S. mutans*. In an in vitro mixed species biofilm, *C. albicans* was not adversely affected by *S. mutans* in its growth or expression of virulence. Instead, it apparently suppressed the growth and survival of *S. mutans*.

# Improper handwashing practices among households in Malaysia during the COVID-19 pandemic

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## ABSTRACT

**Introduction:** Proper handwashing practices are encouraged as they are the best and low-cost preventive and control measures to protect people from virus that causes infectious diseases such as COVID-19. This study aimed to examine the prevalence and determinants of improper handwashing practice among households in Malaysia in the year 2020, during the COVID-19 pandemic. Any household that did not have soap or detergent for handwashing was considered to be practicing improper handwashing. **Materials and methods:** Data on Malaysian population aged 15 years and above were obtained from the National Health & Morbidity Survey (NHMS) 2020: Communicable Diseases, which was conducted between August and October 2020. This nationwide cross-sectional study employed a complex survey design with a two-stage stratified cluster random sampling. All household members from randomly selected living quarters were interviewed face-to-face. **Results and conclusion:** Respondents (N=4,205) from 1,876 living quarters were interviewed during this survey. Prevalence of households with improper handwashing practices was 5.0%, 95%CI: 3.5-6.9%. Rural area (aOR: 2.2, 95%CI: 1.7-2.8), divorcee (aOR: 4.9, 95%CI: 1.8-13.8), unhygienic toilet facilities (aOR: 5.4, 95%CI: 3.4-8.6) and sharing toilet with non-household members (aOR: 10.8, 95%CI: 7.0-16.7) were found to be significantly associated with improper handwashing practices. The remaining variables, house type and ownership status, age group, ethnicity, citizenship, educational background, occupation, monthly household income status and drinking water source were found to be insignificant. Unhygienic toilet facilities and sharing toilet with non-household members not only identified as determinants to improper handwashing practices, but also exacerbated the spread of infectious diseases. Health education interventions targeted at divorcees and rural residents are needed, emphasising the importance of using soap or detergent for proper handwashing, especially during the COVID-19 pandemic.

**Keywords:** improper handwashing practice, handwash, soap, detergent, COVID-19 pandemic

# A case of missed disseminated histoplasmosis in a patient with advanced retroviral disease

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## ABSTRACT

**Introduction:** Histoplasmosis is a systemic fungal infection caused by inhalation of *Histoplasma capsulatum* spores from the soil contaminated with bird or bat excreta. Malaysia is one of the Asian regions with pockets of endemicity for histoplasmosis based on sporadic case reports and histoplasmin skin test surveys. Histoplasmosis was also often misdiagnosed as tuberculosis (TB) as the disease is prevalent in many Asian countries. Human immunodeficiency virus (HIV) is a well-known risk factor in histoplasmosis, with a high mortality rate in this patient population. We present a case of missed disseminated histoplasmosis in an immunocompromised patient. Written informed consent was obtained from the patient to publish this case report. **Case report:** A 33-year-old male with a newly diagnosed retroviral disease and HAART naive presented with a two-week history of fever, cough, and night sweats, as well as significant weight loss. Patient worked as a spa therapist in a hotel and was unmarried. He had a history of unprotected sexual intercourse with multiple male partners. On physical examination, the patient appeared septic and had a temperature of 40 degrees. The patient was cachexic, dry, and had oropharyngeal candidiasis. The chest and abdominal examinations were unremarkable. The chest x-ray revealed homogeneous miliary nodules in both lung fields. On day 3 of his admission, he was given akurit-4 three tablets daily after a CT chest and abdomen revealed numerous ill-defined tiny nodules suggestive of military tuberculosis with intraabdominal lymph nodes. The patient was still feverish despite being on anti- tuberculous drugs for over a week and subsequently he developed pancytopenia. Following that, a bronchoscopy with transbronchial biopsy and bone marrow aspiration and trephine were performed. Transbronchial biopsy histopathology staining revealed the presence of fungal bodies, most likely histoplasmosis, and bone marrow trephine revealed dimorphic fungal bodies, indicating disseminated histoplasmosis. The patient was initiated on systemic antifungal therapy however he succumbed to death soon after. **Discussion:** This case illustrates the importance of considering fungal infections as a potential opportunistic infection especially in immunocompromised patient apart from tuberculosis. Tuberculosis is certainly an important consideration in the context of its high prevalence in developing country like Malaysia. If the patient does not respond to treatment, clinician should consider other locally unexpected opportunistic infection like histoplasmosis. Histoplasmosis and tuberculosis have comparable clinical symptoms making diagnosis difficult. Early consideration of diagnostic tests for highly clinical suspicious cases of histoplasmosis may result in a better outcome.

# Seropositivity of *Bartonella henselae* in cat scratch disease suspected patients in Malaysian population 2017-2019

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## ABSTRACT

**Introduction:** *Bartonella henselae* is an aerobic, facultative intracellular, gram negative bacillus and fastidious bacterium. It can cause a worldwide preventable zoonotic disease called Cat Scratch Disease (CSD). The predominant features are tender, unilateral lymphadenopathy and general symptoms such as prolonged fever, malaise and headaches. **Objective:** The aim of this retrospective study was to determine the seroprevalence of B. henselae in CSD suspected patients within three years 2017-2019 in Malaysia. **Materials and methods:** There were a total of 2481 serum of CSD suspected patients sent to Institute of Medical Research (IMR) from 2017-2019. Serum samples were tested for the detection of specific human antibodies to B. henselae IgM and IgG using indirect immunofluorescent antibody (IFA) test. Titre IgM of ≥1:12 and IgG of ≥1:64 was considered seropositive. **Results and conclusion:** There were 2481 serum tested and 49.8% were IgM seropositive. About 69% (1589/2307) were IgG seropositive. The highest state with IgM seropositive samples were Selangor (11%) followed by Sabah (6%) and Johor (6%). Seropositivity of IgG also showed similar result (Selangor, 15.3%; Sabah, 9.6%; Johor, 7.7%). The highest titre of IgM was ≥ 1:24 (42.7%; 1059/2481) and Selangor state had the highest titre of 9.3% compared to other state. The highest titre of IgG was ≥ 1:128 (54.4%; 1254/2307) and Selangor state had the highest titre of 11.7%. Patients in age group of 30-50years old had highest in both IgM and IgG seropositivity compared to the other age group respectively (16.2%, 21.8%). There was no gender difference in seropositive samples in this study. Study findings shows that CSD is endemic in Malaysia. It provides an epidemiological and serological framework for future CSD studies in human. CSD is common and medical staffs need to have high suspicion to diagnose CSD due to its high seropositivity rate.

# Knowledge of medical students in Jordan regarding Monkeypox outbreak

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## ABSTRACT

**Introduction:** Human Monkeypox (HMP) is an infectious disease attributed to the orthopoxvirus. HMP was firstly documented in humans in 1970 in the Congo. Since May 2022, multiple cases of HMP were identified in several non-endemic countries including some Middle Eastern countries. Objective: To assess the knowledge about HMP among medical students in Jordan. **Materials and methods:** A cross-sectional study was conducted using online based questionnaire. A sample of 565 medical students completed the questionnaire during May 2022. The questionnaire collected data regarding source of knowledge, causative organism, natural host, mode of transmission, incubation period, signs and symptoms, duration diagnosis prevention, treatment and complications of the disease. **Results and conclusion:** Males constituted (39.6%) of the total sample. Significantly higher rate of knowledge was detected among males (35.7%) vs. females $\chi^2$ =10.0, $p$=0.002, fifth (60.9%) and sixth (43.8%), vs. first, second and third academic years, $\chi^2$=83, $p$<0.001. Correct knowledge about signs and symptoms showed the highest rate (43.0%), followed by an Incubation period, duration and prevention of disease, (33.3%, 32.6% & 31.0%, respectively). On the other hand lowest knowledge exhibited regarding; natural host (5.0%), mode of transmission, (9.2%), psychosocial impact (9.2%), vulnerable age group (14.2%), and complications (14.2%). Majority of students (82.3%) claimed that their knowledge was earned from social media followed by TV (16.3 %,), and the university (8,5%). TV had the highest rate (47.8%) with adequate knowledge, $\chi^2$=20.6, $p$<0.001 interestingly, 71.7% of the respondents had inadequate knowledge about the outbreak and 70.7% of them, the social media was their source of knowledge. Gender and higher academic year are significantly associated with adequate knowledge. Social media is significantly associated with inadequate knowledge among students.

**Keywords:** Knowledge, Monkeypox, Social Media, Infectious Disease

# Pattern of influenza viral infection in a private hospital in Sarawak

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## ABSTRACT

**Introduction:** Influenza or flu is a contagious acute respiratory infection that spreads through viral-containing droplets in the air. Its symptoms vary from mild to severe, and can progress to serious complications leading to death. Globally, seasonal influenza causes significant morbidity and mortality. Yet, the disease burden remains under-appreciated in many developing countries due to misperceptions that it is a disease of temperate climates. In Malaysia, influenza surveillance reports are still lacking since the first pandemic case reported in 2009. **Objectives:** This research aimed to study the prevalence and seasonal pattern of influenza in Sarawak. **Materials and methods:** This was a 3-year retrospective study involving all influenza-like illness (ILI) cases presented at Borneo Medical Centre, Kuching from 2017-2019. **Results and conclusion:** From a total of 2758 ILI cases, 811 were laboratory confirmed as influenza by serological or RT-PCR assays, giving a prevalence of 30.1%. Influenza A (79.9%) was more prevalent than B (20.1%). Influenza in Sarawak demonstrated a year-round activity with multiple peaks. The highest peak occurred during Northeast monsoon (October-April) that coincided with winter (November-March) in Northern Hemisphere. Notably, influenza A consistently peaked ahead of B, and B was constantly low throughout the years. Incidence and hospitalisation rates were significantly higher in high-risk age groups (<5 and >50 years old), although hospitalisation rate was not associated with influenza types. This study had shed light on values of haematological parameters in differentiating influenza A and B. Patients with influenza A showed significantly lower counts of red cell, lymphocyte and monocyte, indicating a more severe illness. To the best of our knowledge, this is the first report on the pattern of influenza in Sarawak. The yearly incidence of influenza is considerably high with year-round activity. Vaccine formulation for Northern Hemisphere is highly recommended for high-risk populations, and should be given before October for optimal efficacy.

# Influence of nutritional and environmental conditions on the biofilm formation of bacterial isolates of oral cavity and probiotics

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## ABSTRACT

**Introduction:** Microbial cells that produce Extracellular Polymeric Substances (EPSs) encounter a transition from planktonic phase into an organized mass/aggregates within this biofilm and become resistance to antimicrobial substances. *Streptococcus mutans* in the oral cavity forms biofilm and secretes chemicals that results in dental caries and diseases associated with gum. Recent studies state that probiotic bio-therapeutics can decrease oral pathogens including caries-causing *Streptococcus mutans* and oral inflammation. Current study aims to screen biofilm forming bacteria from oral cavity of infected adult individuals and commercially available probiotic capsules and study the effect of various physiological conditions like nutrients, NaCl, pH and temperature on the biofilm forming efficacy of the isolates. **Materials and methods:** Bacteria were isolated from oral cavity of adult individual and probiotic capsules using Congo red agar plate method. Biofilm production of these isolates were tested under various physiological conditions like sucrose (2%, 5%, 10%), amino acids (Tryptophan and Leucine), NaCl (15%, 2%, 5%), pH (4, 7, 9) and temperature (4°C, 25°C, 37°C) by tube method and micro titre plate method. **Results and conclusion:** Among 25 isolates, isolates A1 from the oral cavity of the adult individual and LS from probiotic showed maximum growth at 10% sucrose. Amino acid tryptophan induced more biofilm formation than leucine. All the isolates showed high level of biofilm formation at 5% NaCl. Isolate LS produced increased biofilm at pH 4 while A1 showed increased biofilm at pH7. Both the isolates showed better biofilm production at 25°C. Staining and biochemical tests revealed that the isolates A1 was gram positive, non-motile, non- spore forming *Streptococcus* sp. and isolate LS was gram positive, spore forming *Lactobacillus* sp. This preliminary analysis indicates the optimum conditions required for biofilm formation by different isolates. Further studies can be done to screen the presence of bioactive compounds from probiotics with anti-biofilm activities that could be used against the bacteria causing oral cavities.

# Study of knowledge and attitude of sexual transmitted disease among Malaysian Students

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## ABSTRACT

**Introduction:** Sexual transmitted disease is one of the common illnesses that may attack human especially the youth that are more exposed to unprotected sex and unusual sexual activities. Due to that, it is important for the youth to have some knowledge about sexual transmitted disease. Most youth had lack awareness about the consequences and even had unprotected sex with their partners, which are worrying. This all happens because of the lack of sexual education and awareness given to the youths since sexual education is considered as taboo topics makes the parents unwilling to discuss about sexual education. **Materials and methods:** This study is done to assess the level of knowledge and attitude of sexual transmitted disease among Malaysian students since most Malaysian students are young adults. Therefore, a cross-sectional online survey has been done to 118 Malaysia university students to assess their level of knowledge and attitude of sexual transmitted disease. The survey instrument consisted of 6 items of demographic characteristics, 10 items on knowledge and 10 items on attitude that has been modified from a previously published questionnaire on sexual transmitted disease. By using SPSS, frequency and descriptive analysis were conducted to determine the level of knowledge and attitude. **Results and conclusion:** Most respondents have good knowledge that was 78.56% and the rest 21.44% have fair level of knowledge about sexual transmitted disease. Same goes to the level of attitude, majority of the respondents have good attitude that was 86.36% of respondents and the rest 13.64% have fair level of attitude about sexual transmitted disease. In conclusion, this study was done because of the STDs cases that has been rising these days in most country especially among the youths because they are the riskiest age that are easier to be exposed with STDs due to the exposure of pre-marital sex among the youths.

# An assessment of the knowledge and attitude toward HIV/AIDS among medical students of UniKL RCMP

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## ABSTRACT

**Introduction:** Human Immunodeficiency virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) have been one of the major health care issues of the world for several decades. Assessing the knowledge and attitude toward HIV/AIDS among medical students is a must do as they are the ones who provide standard health care, and they themselves have a risk of acquiring HIV infection. **Objective:** To assess the level of knowledge and attitude toward HIV/AIDS among MBBS students of UniKL RCMP. **Materials and methods:** A total 198 medical students participated in this cross-sectional study. The data collection was done through online google forms by using simple random selection method. The data were analysed with SPSS v. 27 and Excel 2016. The one-way anova and T test were used to access the knowledge and attitude difference, and Chi-square test was used to analyse the association of knowledge and attitude with the gender and years of study. **Results and conclusion:** High percentage (83.9%) of fifth-year students scored good knowledge whereas a relatively low percentage (63.2%) of third-year students and 65% of first-year students expressed good knowledge. While 60.4% of male scored good knowledge, 77.6% of female had achieved the good knowledge score. Most students had a neutral attitude yielding the data of 66% fifth-year students, 66% of third-year students and 75% of first-year students. There was a positive association between knowledge and gender ($p$=0.03) as well as knowledge and years of study ($p$=0.02). Strong association ($p$<0.05) was noted between the attitude and years of study but there was no association between the attitude and gender ($p$=0.9). Although knowledge and attitude toward HIV/AIDS can progress in accordance with the years of study, high percentage of students express neutral attitude. Further studies need to find ways to improve the attitude toward HIV/AIDS among medical students.

**Keywords:** HIV/AIDS, Knowledge, Attitude

# *Mycobacterium abscessus* Complex Catheter Related Blood Stream Infection (CRBSI) – A rare presentation

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## ABSTRACT

**Introduction:** Nontuberculous mycobacteria (NTM) bloodstream infection (BSI) is relatively rare. Among the rapidly growing mycobacteria (RGM), *Mycobacterium abscessus* complex (MABC) is considered the most pathogenic of this group of pathogens. The most common source of blood stream infection among NTM is intravascular catheter, however, the majority of MABC BSI originated from skin and soft tissue infection. **Case report:** A 36-year-old Malay man with ESRF, presented to district hospital with fever and pus discharges from internal jugular catheter (IJC) site for 1 week duration and fluid overload symptoms. His chest radiograph revealed overload features and loculated right pleural effusion. Preliminary report from both central and peripheral line blood culture (differential positivity of >2 hours) were Acid Fast Bacilli (AFB) isolated as there were no growth on routine culture media. Infective screening was non-reactive and sputum for AFB were negative. Patient was started on anti-TB regime and treated as TB CRBSI while waiting for full identification and susceptible report from National Health Laboratory. Anti-TB regime was changed to NTM regime as patient condition worsen after almost 3 weeks of treatment. Repeated blood culture in HRPZ shows persistent *Mycobacterium abscessus* complex. Tiny translucent colonies appeared on blood agar, gram-positive branching filaments, which further identified by of matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) as *Mycobacterium abscessus* complex. The isolate was susceptible to clarithromycin and amikacin, and resistant to trimethoprim-sulfamethoxazole, moxifloxacin, doxycycline, Imipenem, and tobramycin. **Discussion:** Non-tuberculous mycobacteria (NTM) should be suspected in non-responding to anti-tuberculous treatment. Particularly, if the patient presented with non-respiratory symptoms while a central catheter was in place. Even though bloodstream infections-NTM are typically observed in immunocompromised patients with underlying malignancies or HIV, catheters in situ pose a risk as they can form biofilms and more resistant to disinfectants and sterilizing agents. NTM should be suspected in the background immunocompromised and presence of intravascular catheter, especially in non-responding to treatment.

# Pregnant mothers with HIV — Do medical students have the right knowledge and attitude?

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## ABSTRACT

**Introduction:** Vertical transmission of HIV from a pregnant mother to the child is still a major challenge in the world, especially in developing countries. Malaysia has reached zero vertical transmission since 2018, however, much more knowledge and proper attitude need to be conveyed and practiced by the public. This study is to evaluate the knowledge and attitude of UniKL RCMP medical students on HIV infected pregnant mothers. **Objective:** To determine the knowledge and attitude of medical students towards HIV infected pregnant mothers. **Materials and methods:** This is a cross-sectional study, which was conducted through a structured online questionnaire, in July 2022. The study population included medical students of UniKL RCMP from year 1 to 5. Using OpenEpi, the sample size was calculated to be 234 with 95% confidence level. The sampling method was done using systematic random sampling. A set of questionnaires was given to the students to be answered and all the recorded responses were computed as the variables of this study. Analysis was done in SPSS 16 using appropriate statistical tests, $p<0.05$ was considered significant. **Results and conclusion:** Out of the 234 samples collected, 72 (32%) of them had good knowledge and 97 (41.5%) of them had a good attitude towards HIV infected pregnant mothers. Knowledge has significant correlation with attitude with $p<0.022$. A percentage of 58.5% preclinical students had a good attitude, which showed a higher percentage than the clinical students (30.4%) did. Overall, knowledge and attitude of medical students in UniKL RCMP towards HIV infected pregnant mothers are still low. Serious attention needs to be given to the education of students and the public on HIV infected mothers.

**Keywords:** knowledge, attitude, HIV, pregnancy, medical students

# *In-silico* characterisation of reverse transcriptase gene of HIV-1 Drug Resistant Strains from Southern India

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## ABSTRACT

**Introduction:** HIV-positive patients in India are experiencing drug resistance due to a lack of adherence to Antiretroviral Therapy (ART). ART regimens currently in use are challenged by drug resistance that occurs as HIV accumulates key mutations. In the present study, we examined naïve ART patients from ART centres, Government Hospitals, Salem district, Tamil Nadu where subtype C is highly prevalent and reverse transcriptase gene sequences were used for modelling protein structure and molecular docking. **Objective:** To characterize the HIV-1 drug-resistant viruses by the *in-silico* molecular docking method. **Materials and methods:** Of 33 first-line ART failure cases we took the reverse transcription sequences of 2 for further analysis. For docking studies, the NRTI drugs Stavudine, Tenofovir, Zidovudine and Lamivudine were selected against GMKMC-4 and GMKMC-17 HIV proteins. The docking studies are in concert with the *in-silico* drug ligand interactions of four NRT1 drugs with the GMKMC-4 and 17 HIV proteins. Docking scores (binding energies) and Stanford DR online database (Stanford University, CA, USA) to predict which mutants would affect the docking scores of different reverse transcriptase inhibitors based on RT sequences of two isolates of first-line therapy failures. **Results and conclusion:** The observed binding energies against GMKMC-17 protein were Stavudine –6.5122 kJ/mol, Tenofovir –7.1293 kJ/mol, Lamivudine –5.0554 kJ/mol and Zidovudine –5.2476 kJ/mol. While the energy binding values against GMKMC-4 protein were Tenofovir –6.3462 kJ/mol, Stavudine –3.2453 kJ/mol, Zidovudine –4.1982 and Lamivudine –2.4572 kJ/mol. *In-silico* evaluations show that Tenofovir inversely correlates with the level of drug resistance. The present study shows that computational modelling could be effectively used for drug design.

# Knowledge, attitude, and prevention of leptospirosis among preclinical medical students in Universiti Kuala Lumpur Royal College of Medicine Perak

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## ABSTRACT

**Introduction:** Leptospirosis is a disease of epidemic potential, especially after heavy rainfall or flooding. In recent years, an increase in the incidence of human leptospirosis in Malaysia has been observed to coincide with severe flooding in some major states, including Kelantan and Selangor. **Aim:** The aim of this study was to analyse the knowledge, attitude, and preventive measures of Leptospirosis among preclinical medical student of Universiti Kuala Lumpur, Royal College of Medicine Perak (UniKL RCMP). **Materials and methods**: A cross-sectional survey was conducted among Year 1 and 2 pre-clinical MBBS students. The participants were randomly selected to participate in this study and were required to answer the questionnaire on Google™ Forms platform. The responses were recorded as 'Yes' and 'No'; and a mean score was used to classify the respondents into two groups; good and poor respectively. **Results and conclusion:** In total 154 preclinical students had participated in this study. The study had found that only 55.2% of the respondents had good knowledge and 52.6% of respondents had good attitude towards leptospirosis. However, majority of them (64.9%) had poor practice towards the prevention of leptospirosis. Even though good knowledge will lead to better attitude and prevention, this was not observed in this study. Inadequacy in preventive practice indicated the need to increase the knowledge among the respondents through continuous education.

**Keywords:** Knowledge, Attitude, Practice, Leptospirosis, UniKL RCMP

# Clinical findings and outcomes of chronic osteomyelitis in an orthopaedic hospital in Mandalay

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## ABSTRACT

**Introduction:** Chronic osteomyelitis is an infection of the bone that not only result from acute hematogenous infection but also from penetrating injury with adjoining spread and infection had been present for many weeks. Chronic osteomyelitis remains a challenging problem for the clinician because appropriate antibiotic therapy is necessary to combat the infection along with adequate surgical therapy. **Materials and methods:** During the period from January 2014 to January 2019, the mechanism of infection, clinical findings, infecting organism, antibiotic sensitivity results and outcomes of chronic osteomyelitis were analyzed among patients admitted to Mandalay Orthopaedic Hospital, Myanmar. The study population included 206 patients and the outcomes were measured by overall cure rates without relapse after 1 year of treatment of chronic osteomyelitis. Associations between the complications and the factors were investigated and a p-value of <0.05 was considered significant. **Results and conclusion:** Of the 206 patients (123 male and 78 female) studied, the mean age was 32.52 years and the tibia bone was the most affected site (46.8%). There were significant relationships between one-year follow-up complication and the factors such as (Waldvogel Classification, Site, Culture organism, First Diagnosis Age (group)) with p<.001. The overall cure rates without relapse after 1 year of treatment were analysed in the study population. Chronic osteomyelitis continues to be a serious health problem. Prognosis depends on various factors, including the infection-causing organism, sensitivity, antibiotic types and also various surgical procedures. Antibiotic regimes are the empiric treatment of chronic osteomyelitis after surgical management.

**Keywords:** Osteomyelitis, infection, bone, therapy, antibiotic

# Impact of microbial growth on frozen meat based on defrost time and freeze-thaw process

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## ABSTRACT

**Introduction:** Contamination can occur with good practice of food storage but with poor handling. However by leaving it to defrost and through multiple cycle of defrosting and refreezing, there is an increase in bacterial count. Thus, objective of this study was to determine the correlation between growth of bacteria and defrost time interval and number of freeze thaw cycles. **Materials and methods:** This experimental study was conducted in Microbiology Lab, Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP). Two types of meats were used in this study which are beef and chicken. After defrosting, a meat cubes were allowed to stand at room temperature and chopped into little pieces. One inch incisions were made in the refrozen meat and streaked on nutrient agar and incubated for 24 hours at different one-hour time interval; 1, 2, 3 and 4 hours. Nutrient and MacConkey agar medium were used for both Gram positive and negative bacteria to assess their growth. Experiment was repeated two times after 24 and 48 hours. Bacterial growth was counted using colony forming unit (CFU) and their characteristics properties were identified using gram staining, catalase test, coagulase test and qualitative biochemical test. The results were analysed by using SPSS. **Results and conclusion:** The colony count was significantly increased in every defrosting time interval and also in second cycle ($p<0.01$). Based on the tests provided, *Staphylococcus aureus*, Coagulase negative *Staphylococcus aureus* (ConS) and *Salmonella* species were identified from both red and white meat. Therefore, we conclude that defrosting and refreezing process at different time intervals accelerated growth of bacteria to be increased significantly on meat.

# The preferred breeding habitats for vector mosquitoes at construction sites

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## ABSTRACT

**Introduction:** Construction sites are often blamed for dengue outbreaks in surrounding localities. The environment is suitable for immature mosquitoes to develop without predators and the convenience of female mosquitoes to feed on the exposed construction workers. Therefore, targeted vector prevention and control measures at construction sites are needed to break the chain of dengue transmission. **Objectives:** The purposes of this study were to identify the species of mosquitoes present at construction sites and the types of their preferred breeding habitats. **Materials and methods:** Nineteen construction sites in the Federal Territory of Kuala Lumpur were cross-sectionally surveyed for the presence of immature mosquitoes in the year 2018. The site surveillance was carried out on fully constructed buildings without installed windows or doors, which allows free passages for mosquitoes. All water-holding containers were inspected for the presence of immature mosquitoes. Types of water-holding containers were recorded and counted. The number of immature mosquitoes were counted from each positive container and then transported to the laboratory for species identification. **Results and conclusion:** A total of 1,643 immature mosquitoes were collected, comprising 1,287 larvae and 356 pupae. *Aedes aegypti* immature was the most abundant mosquito species (76%), followed by *Culex quinquefasciatus* (19%), and the *Aedes albopictus* (5%). The most preferred breeding site for *Ae. aegypti*, *Cx. quinquefasciatus*, and *Ae. albopictus* was the flooded floor, elevator shaft, and plastic container respectively. The average of the Container Index (CI) at the construction sites was 10.24%, which was higher than the threshold index (CI < 10%). This study has provided useful information to the health department regarding the preferred breeding habitats of vector mosquitoes at construction sites. Consequently, it contributes to effective and efficient vector prevention and control measures, thus saving time and manpower.

# Association between serotypes of dengue virus and viremia level with clinical presentations among dengue patients admitted to Hospital Canselor Tuanku Mukhriz (HCTM): A pilot study

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## ABSTRACT

**Introduction:** Despite the multiple studies conducted to determine the association between DENV serotypes with clinical presentation, studies that investigate the association of DENV serotype and viremia levels with clinical presentation are still lacking. This study aims to determine the prevalence of DENV serotype among dengue patients admitted to HCTM, to determine the association between DENV serotype and viremia levels in patients with warning signs and determine the reliability of quantitative NS1 antigen level against the rapid dengue test kit. **Materials and methods:** This is a prospective pilot study done in HCTM from January 2021 till January 2022 which involved 35 patients admitted to our centre with a positive dengue nonspecific antigen 1 (NS1 Antigen) detected using a rapid antigen test kit. The serotype of the dengue virus was determined using a quantitative reverse transcriptase-polymerase chain reaction (qPCR) that was specific for each serotype and the CT values were in correlation with the virus viral load. The quantitative NS1 antigen level was determined via Panbio Dengue Early ELISA test kit. **Results and conclusion:** We did not find any correlation between DENV serotypes with the clinical manifestations nor any association between the warning signs and the viremia level probably due to the small sample size and most of our samples were DENV4 serotypes. However, lower CT values were associated with higher temperature, febrile phase, DENV 4 serotype, and quantitative NS1 antigen positive value. Only 17 patients (48.6 %) were positive for the quantitative NS1 antigen likely due to false-negative results mainly contributed by DENV 4 serotype. A bigger study is needed to determine the association between clinical manifestations with the serotypes and viremia levels.

# The application of spatial analyses to assist dengue control strategy at main public parks in Kuala Lumpur, Malaysia

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## ABSTRACT

**Introduction:** The role of urban parks in viral transmission of dengue should not be underestimated, and urban parks should be included in current vector control programs. This study implemented spatial analyses in order to map and analyse the spatial distribution of Aedes sp breeding through a spatial statistics method. **Materials and methods:** Five main and popular public parks in Kuala Lumpur were selected based on high number of visitors and located within 400 metres radius from dengue outbreak localities in 2019. Entomological survey was done for 3 cycles at each park. Variables such as coordinates and characteristics of the water containers were also recorded during the survey. Two spatial statistical analysis; Average Nearest Neighbourhood (ANN) and hotspot analysis using Kernel Density estimation were performed to access spatial distribution of the *Aedes sp* breeding at each study site. **Results and conclusion:** ANN showed observed mean distance of Aedes sp. breedings for KL botanical park was 35.55 metre (z-score= - 6.18), Tasik Pemaisuri 61.19 metre (z-score = - 2.11), Tasik Titiwangsa 67.77 metre (z-score = 4.62), Kepong Metropolitan 110.14 metre (z-score = - 0.88) and Alam Damai 25.43 metre (z-score = -2.73). Based on the calculated z-score, this study found clustered breeding pattern at KL Botanical Garden, Tasik Pemaisuri and Alam Damai; dispersed pattern was observed at Tasik Titiwangsa and random pattern was found at Kepong Metropolitan. Hotspot maps were produced using Kernel Density estimation for each park. These hotspot maps offered important information on specific areas within each park to be targeted for dengue control measures. Our study showed that spatial statistical tools could be an effective means to establish the spatial density of dengue vectors in public parks. The mapping of dengue vectors would serve as guidance for public park management to identify sources of breeding and target areas within the parks for dengue control activities.

# Comparing methods for mosquito collection: Is Human Landing Catch (HLC) still relevant?

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## ABSTRACT

**Introduction:** The distribution of mosquito species is essential in vector surveillance. It is the key component in initiating the specific vector control intervention for interrupting vector-borne disease transmission. The objective of this study is to compare the effectiveness of two methods in capturing vector mosquitoes at the recreational parks in Peninsular Malaysia, Malaysia. **Materials and methods:** This study was conducted at four selected recreational parks in Peninsular Malaysia from April 2017 until April 2018. Adult mosquitoes were collected using two techniques; Human Landing Catch (HLC) and CDC- Light Trap (CDC-LT). **Results and conclusion:** A total of 768 mosquitoes were captured from four recreational parks during this study consisting of 41 species belonging to five genera of mosquitoes: *Anopheles* (21 species), *Aedes* (4 species), *Culex* (8 species), *Mansonia* (3 species) and *Armigeres* (4 species). This study proves that mosquitoes' collection using the HLC technique was more significant compared to CDC-LT, where the HLC technique successfully captured 98% of mosquitoes compared to CDC-LT (mean significance 4.664 ± 16.636, with $p<0.05$). This study showed that HLC technique is an efficient technique in capturing mosquitoes compared to CDC-LT. Although HLC has proven to be the better method, its implementation requires humans as bait, and therefore it can raise safety issues related to accidental infection if this method is performed in an area that is endemic to mosquito-borne diseases.

**Keywords:** mosquito collection, distribution of mosquito, Human Landing Catch (HLC), CDC-Light Trap, vector surveillance

# Key breeding containers for Aedes mosquito in Melaka Tengah

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## ABSTRACT

**Introduction:** Classification of Aedes breeding container is important to help in managing dengue outbreak. Targeting the suitable breeding containers will help to break dengue transmission. In this study, the most common breeding container and location of breeding (indoor/outdoor) in dengue outbreak localities were evaluated. **Materials and methods:** Indoor and outdoor premise inspection was performed in 11 dengue outbreaks localities in year 2016 in Melaka Tengah district. Type of breeding containers and total amount of immature Aedes (L1-L4 larvae and pupae) stages were identified, recorded and analysed. Identification was performed using stereo microscope. Statistical analyses were performed using SPSS software version 24 from IBM. **Results and conclusion:** A total of 20 breeding containers were found. The most profound breeding container was discarded paint container (20%). Other common breeding containers were cistern tank, pail, garbage bin and plastic container (all at 10%). Most breeding containers were found outdoor (80%) compared to indoor (20%). There was significant difference between breeding found in indoor and outdoor with U=19.5 and $p$=0.008. In term of species, *Ae. aegypti* species was the most dominant with mean±SE value of 7.65±3.92 compared to *Ae. albopictus* with 4.3±2.3. However, t-test analysis showed that was no significant difference between both species with $p$ value= 0.36. Most of the Aedes breeding in Melaka Tengah dengue outbreak localities was found outdoor with discarded paint container being the most profound. It is hoped these findings will give insight to health authority to focus on the breeding containers especially during outbreak in Melaka Tengah district to effectively manage dengue outbreak.

**Keywords:** Aedes breeding container, Aedes aegypti, Aedes albopictus, Melaka Tengah

# Prevalence of malaria cases in Johor: The cleave on the wall

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## ABSTRACT

**Introduction:** Malaysia made public its intention to eradicate malaria, with the staged objective of attaining zero local transmission of the disease in Malaysia. This strategy was to be implemented according to the guidelines outlined in the National Malaria Elimination Plan. Air travel has developed at a rate that has never been seen before, and this trend is expected to continue. The rates of imported cases of malaria, local outbreaks in non-endemic areas, and the global spread of the disease have all increased as a result of its impacts. Recently, Malaysia is facing a re-emergence in the spread of malaria infections. **Objective:** The objective of this study is to describe the epidemiology of Malaria in Johor this year and to highlight the increase in malarial cases as a result of imported cases following the reopening of international borders during Malaysia's transition to COVID-19 endemicity. **Materials and methods:** Malaria is a notifiable disease in Malaysia. A cross-sectional investigation was carried out using the secondary data gathered from the Vector unit JKN Johor. Data analyses was performed using Microsoft Excel and SPSS. **Results and conclusion:** A total of 18 cases of Malaria were notified until May 2022, with 94% male and 6% female. Malaria parasites identified from the cases are *Plasmodium falciparum* 17%, *P.vivax* 28% and *P. knowlesi* 55%. In addition, 56% of the cases were indigenous and 44% were imported cases. Bivariate correlation test was conducted to determine 2 continuous variables. The results show a significant relationship between traveller admissions and cases notified in Johor (*p* value <0.01, correlation coefficient 1.00). Malaria control in Malaysia has reached the eradication stage. Imported Malarial cases, on the other hand, are re-emerging and are becoming a major public health concern. In order to establish a more coordinated effort to restrict imported cases, improved inter-sectoral collaboration is essential. Local political commitment and World Health Organization technical assistance will help to generate focused and coordinated efforts to ensure the success of the National Malaria Elimination Strategic Plan.

**Keywords:** Malaria, Johor, Elimination, import cases

# Seropositivity of rickettsioses in East Malaysia 2016-2020

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## ABSTRACT

**Introduction:** Rickettsioses is one of the zoonotic diseases that can cause febrile illness in affected people, mainly in the Asia-Pacific region. It is caused by obligate intracellular cocco-bacilli bacteria that are transmitted through bites of mites, fleas, and ticks. This organism can be classified into spotted fever group and typhus group. **Objective:** This retrospective study aimed to study the trend and distribution of rickettsial infections throughout the 5 years 2016–2020 in East Malaysia, i.e., Sabah and Sarawak. **Materials and methods:** Institute of Medical Research (IMR) received a total of 556 serum samples from suspected patients of rickettsial infection who were admitted to hospitals in Sabah and Sarawak from 2016 until 2020. All the samples received were tested for the presence of rickettsial antibodies (IgM and IgG) using the indirect immunoperoxidase (IIP) method. There are 3 types of rickettsial antigens fixed to each antigen slide, i.e., *Orientia tsutsugamushi*, *Rickettsia typhi*, and TT118. A titre of ≥1:50 is considered seropositive. **Results and conclusion:** About 74.6% (415/556 cases) of total serum showed the presence of rickettsial antibodies, either single or co-infection within these three groups of infection. Sarawak showed higher seropositivity cases of rickettsial infection at 57.3% (238/415 cases) compared to Sabah at 42.7% (177/415 cases). In 2016, about 90.9% (60/66 cases) of suspected patients had antibodies against rickettsioses. Out of 415 seropositive cases, 67.0% (278/415 cases) were male patients compared to females, about 33.0% (137/415 cases). Patients in the age group of 50–59 years old had the highest number of seropositive cases, 19.5% (81/415 cases) compared to other age groups. Only 5.1% (21/415 cases) of patients under 10 years old were infected by rickettsioses. This finding shows that rickettsioses is still endemic in East Malaysia. Even though this disease is treatable with antibiotics, it is commonly misdiagnosed as its manifestations are likely similar to other bacterial febrile illnesses. Awareness of the diseases by medical staff is important in order to reduce morbidity and mortality related to rickettsioses.

# Association between Incidence of dengue cases and rainfall precipitation in Perak Darul Ridzuan

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## ABSTRACT

**Introduction:** Dengue is a significant global public health concern for many decades, especially in the tropical and sub-tropical regions. According to the World Health Organization (WHO), 390 million cases of dengue cases are reported each year, with Asia accounting for 70% of them. Statistically, Malaysia recorded 130,101 cases in 2019 with almost a 60% increase over 2018, with 182 mortalities. The ongoing hyperendemicity has called for an effective early warning system. **Objective:** The objective of this study is to determine the association between average rainfall precipitation and dengue incidence in Perak state. Subsequently, it aimed to serve as a preliminary study to further explore the use of weather forecast in predicting dengue incidences. **Materials and methods:** This is a correlational study on the association between rainfall precipitation and the number of dengue cases in Perak state between year 2014 and 2021. All confirmed dengue cases in Perak from 2014 to 2021 notified in the dengue surveillance database were included in this study. Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25. To assess the relationship between dengue incidence/ month and rainfall precipitation/ month (mm/day) in 2014, a bivariate Pearson's correlation coefficient (r) analysis was performed. **Results and conclusion:** Based on the results, a strong positive correlation was observed between dengue incidence/ month with rainfall precipitation/ month (mm/day) in the year 2014 and 2015. Thereafter, a strong negative correlation was seen between both these variable from 2016 to 2021. However, this study did not adjust for other meteorological factors such as temperature and wind speed in this locality. The study has provided relatively strong statistical evidence of the association between rainfall and dengue outbreaks in Perak, thereby indicating that it is a factor worthy of careful surveillance and monitoring. Methodology and evidence observed from this study could serve as a strong preliminary baseline to further associate other meteorological factors to develop an efficacious spatio-temporal weather forecasting model in predicting dengue outbreaks in Malaysia. This could strengthen the control of dengue outbreaks by developing early warning systems.

**Keywords:** Dengue incidence, rainfall precipitation, increasing trend, hyperendemicity, public health concern

# Comparison of Knowledge, Attitude and Practice among communities living in hotspot and non-hotspot areas of chikungunya in Gopeng, Perak, Malaysia

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## ABSTRACT

**Introduction:** Chikungunya disease is one of the mosquito-borne diseases that established in Malaysia. For year 2020, there have been reported 2556 cases of chikungunya in Malaysia. Perak state itself has the second highest amount cases registered which was 1048 cases. In Gopeng, Perak, 72 cases of chikungunya were reported in 2020. The number of chikungunya cases reported in Gopeng in year 2020 is 3 times higher compared to year 2019 which was 20 cases only. **Objective:** This study was conducted to compare the level of knowledge, attitude and practice among communities living in hotspot and non-hotspot areas of Chikungunya in Gopeng, Perak. **Materials and methods:** Communities from 3 hotspot and 3 non-hotspot areas of chikungunya in Gopeng were selected using the cluster sampling approach. A total of 422 participants were selected from communities using proportionate sampling in each selected area. 1 respondent in every 2 houses will be given questionnaires to answer questionnaires distributed at their housing area. **Results and conclusion:** About 51.8 % of hotspot areas and 56.9% % non-hotspot areas have a good knowledge on chikungunya. 96.4 % living in chikungunya hotspot areas and 93.1 % living in non-hotspot areas have a positive attitude toward the disease. When comparing practice, non-hot spot areas have 82.2 % better practice in vector control than hot spot areas, which only have 51.8 %. However, there is no significant difference found in the mean mark of knowledge, attitude, and practice between both communities. The results indicate that comprehensive chikungunya health education is necessary for Gopeng communities to better understand the disease prevention control.

**Keyword:** chikungunya , knowledge attitude practice(KAP) ,chikungunya hotspot.