



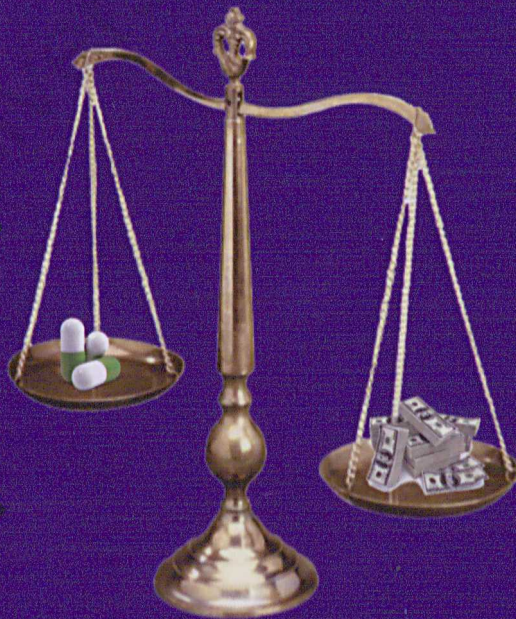
UNIVERSITY
OF MALAYA

INAUGURAL LECTURE

ECONOMIC EVALUATION FOR HEALTH ADVOCACY AND INFORMED POLICY

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UNIVERSITY OF MALAYA



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**UNIVERSITY
OF MALAYA**

Economic Evaluation for Health Advocacy and Informed Policy

Inaugural Lecture

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15 March 2018



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Synopsis

Economic Evaluation for Health Advocacy and Informed Policy

Globally, economic evaluation is gaining prominence as a potential tool for advocacy in health care programmes. Economic evaluations can inform decisions concerning the efficiency and allocation of resources to implementation strategies which are explicitly designed to inform care providers and patients about the best available research evidence and to enhance its use in their practices. These strategies are increasingly popular in health care, especially in light of growing concerns about quality of care and limits on resources. However, such concerns have hardly driven health authorities and other decision-makers to spend on some form of economic evaluation in their assessments of implementation strategies.

The goals of economic evaluation are to measure efficiency or the value of money utilised on one health intervention programme in comparison to another and also to provide advice to decision-makers or stakeholders on health care intervention program, and thus help in the healthcare resources allocation. Decision on health care program can be made from the analysis of the information obtained on the cost and consequences of the various alternative health programs.

Teaching and training on health economics may not be difficult; however, conducting economic evaluation research has many challenges. Evaluating the effectiveness of a health program is taxing especially if the program has been initiated without proper justification and evaluation was not planned from the beginning. Getting the cost faces many obstacles not only because of the lack of data and appropriate accounting system but also because confidentiality and sensitivity are issues which need to be considered.

It is my utmost delight to share with others, from my wealth of experience as trained Public Health Practitioner, health economist, lecturer, and researcher in various economic evaluation health intervention programs in Malaysia and other countries for the past eleven years. These studies cut across different programs such as treatment for Thalassemia, breast cancer, rotavirus vaccine, cervical screening, PCI, antenatal monitoring, outpatient and daycare visit, HIV Harm Reduction Program, Hepatitis C treatment, and Haze impact on health. Many of the findings have been used for advocacy to shape the delivery of more effective health intervention programs.

Biography

Professor Dr Maznah Dahlui is a Public Health Medicine Specialist who had served for several years with the Ministry of Health, Malaysia and was an Entrepreneur before becoming an academician in the University of Malaya in 2003. Her speciality is health economics, with a major interest in the evaluation of health programs. She had conducted many economic evaluations of the country's policies and programs, working with various ministries in Malaysia such as Ministry of Health, Ministry of Labor and Prime Minister's Department. She has good linkages with international institutions such as the UNFPA, UNESCO, World Bank, WHO which have led to several consultancy projects centered on the evaluation and monitoring of health programs.

Maznah's research interest extends to cancer screening, infectious diseases such as HIV and Hepatitis C, adolescents health and obesity prevention; applying the economic evaluation approaches. She has been actively engaging NGOs (such as Breast Cancer Welfare Society and MAKNA) and the communities (the urban poor community and rural populations) for breast cancer screening and combating chronic diseases such as hypertension and diabetes. Her international research experiences include working with collaborators from Sanger Institute, University Cambridge, United Kingdom on the Salt Reduction Study, Kirby Institute, University of New South Wales, Australia on Return of Investment of Harm Reduction Program, University of Usmanu Danfodia, Sokoto, Nigeria on sexual reproductive health issues under the auspices of the Africa-Asia Development University Network (AADUN), and several others.

Maznah was appointed as the Regional Director of APACPH (Asia Pacific Academic Consortium for Public Health) in 2013 and used this as an avenue for her to initiate research collaborations on community obesity prevention with several of the 87 APACPH member institutions. With the backing of her university, in 2012 the APACPH Secretariat was successfully transferred to the University of Malaya where she had been the Secretary until now. Her appointment as the Chair for the National Clearinghouse for Adolescent Health in Malaysia and as the Chair of Technical Advisory Committee of Health Technology Economic Evaluation (TACHTEE), Malaysia are acknowledgments of her expertise and close working relationship with the Ministry of Health.

Her outstanding contributions to public health in such a short span of time contributed significantly to her election as a Fellow of Public Health Medicine Specialist Association, Malaysia and of the Distinguished Fellow of Faculty of Public Health, Royal College of Physicians in the UK. Maznah's leadership capabilities has been acknowledged by the university with her appointment as the head of department of public health (2011 to 2016), and as the Deputy Dean of Faculty of Medicine since 2016. She is the senate representative of University Malaya for 2016 to 2018 and sits in the AP Promotion Panel and Curriculum Review Committee of the university.

Economic Evaluation for Health Advocacy and Informed Policy

Globally, economic evaluation is gaining prominence as a potential tool for advocacy in health care programmes. Economic evaluations can inform decisions concerning the efficiency and allocation of resources to implementation strategies which are explicitly designed to inform care providers and patients about the best available research evidence and to enhance its use in their practices. These strategies are increasingly popular in health care, especially in the light of growing concerns about quality of care and limitation of resources. However, such concerns have hardly driven health authorities and other decision-makers to spend on some form of economic evaluation in their assessments of implementation strategies.

Economic evaluation strives to analyse inputs (health resources) and outputs (changes in health outcomes) concurrently and thus provide the decision/policy maker a yardstick as to whether the outputs level achieve worth the amount of resources used to produce it, bearing in mind that resources are scarce and also have alternative uses¹. It provides basis for decision between alternative strategies or programmes or projects that have different costs and consequences. This helps in ensuring that the limited resources are properly allocated such that the benefits of such programmes are worth the costs.

The goals of economic evaluation are to measure efficiency or the value of money utilised on one health intervention programme in comparison to another and also to provide advice to decision-makers or stakeholders on health care intervention programme, and thus help in the healthcare resources allocation. Decision on health care programme can be made based on the information obtained on the cost and consequences (outcome) of the various alternative health programmes/strategies². Morris et al. (2012)³, advanced four reasons for employing economic evaluation in health care decision making thus: 'maximisation of benefits from health care spending; overcoming regional variations in access; to contain costs and manage demand; to provide bargaining power with suppliers of healthcare products'.

Economic evaluation starts with assessing the effectiveness of a program and its alternative.

Evaluation encompass the set of tools that are used to measure the effectiveness of public health interventions by determining what works. Traditional evaluations in public health have focused on assessing the impact of specific program activities on defined outcomes.

Economic evaluation entails a sound evaluation on the effectiveness of a health programs before incorporating the cost to determine which of the intervention is cost-effective.

Ideally, we should perform cost-effectiveness analysis on a health intervention before a policy is made on its implementation. Since performing such analysis can be difficult, often determining the effectiveness and cost of intervention separately would be sufficient when data are not complete.

A good example of evaluating the effectiveness of a program could be seen from a study which was conducted to assess the adequacy of care and pregnancy outcomes for the different risk groups among women attending antenatal care at public health facilities in our country. We observed that the current risk-oriented approach often results in a tendency to focus on the risk conditions of the women resulting in disproportionate utilization of antenatal care according to risk level. From the study, we concluded that the existing antenatal care warrants for better scheduling and improvement of its contents^{4,5}

Many policies had been developed and adopted to combat obesity and NCD in general. However, the effectiveness of the planned health interventions would not be possible if implementation is not carried out accordingly. Therefore, a study was conducted to determine the availability and assess level of implementation of policies for prevention of obesity among children in Malaysia. We found that relevant policies are adequate however their implementation need improvement especially by the school canteen operators⁶.

It is imperative to quantify the burden of diseases before the application of any intervention so that the effectiveness of the proposed intervention could be assessed. The estimation of Hepatitis C as a disease burden to the country had been conducted so that economic analysis can be performed to determine the most cost-effective treatment of Hepatitis C patients in our country⁷.

It is important to know the cost of any consequences; either a disease or the intervention to treat or prevent a disease. It starts with identification of the type and assessing the quantity of resources used. With those, the cost could be estimated, and subsequent allocation and distribution of resources could be planned.

An elaborate cost study was performed to determine the cost and cost predictors of patients undergoing percutaneous coronary intervention at UMMC, in comparison with other cardiac centres in Malaysia. There are many PH implications derived from the findings of this study. On the government side, it provides evidence on cost-effectiveness of PCIs and how prioritization of budget and allocation of personnel should be made. These are important to maintain an equitable basis for financing health services in the face of escalating

health care cost. For the participating cardiac centres, the comparative analysis of clinical and cost management were able to show the areas of improvement that are necessary to improve efficiency of service provision^{8,9}.

Getting the cost of a program or treatment faces many obstacles not only because of the lack of data and appropriate accounting system but also because confidentiality and sensitivity are issues which need to be considered. However, cost finding is important since it a part of cost-effectiveness analysis. A cost analysis was performed at UMMC in 2012 to determine the cost per diem at the various wards, the day-care and for outpatient visit¹⁰. These cost had been utilized to obtain the cost for treatment of several diseases treated at UMMC such as the cost to treat breast cancer, upper gastrointestinal adverse events in rheumatoid patients¹¹ and in determining whether HLA-B*15:02 screening is a cost-effective option among relatives of breast cancer patients¹².

The aim of economic evaluations of health care programs is to serve as an aid to decisions and to affect policymaking. If economic evaluations of health care programs are not going to have any impact on decisions on the allocation of resources to health care interventions, this is a pointless activity. Economic evaluations are used as aids to the development of treatment guidelines, judgements within healthcare organizations, introduction of new medical technologies, reimbursement decisions, and pricing decisions.

A full economic evaluation looks at the benefits and the cost in obtaining the benefits, simultaneously (i.e. CEA, CUA and CBA). Evidence of efficiency derived from an economic evaluation of a health programme can play a significant role in priority settings and coverage decisions of such a programme. Three basic approaches to economic evaluation are cost-effectiveness analysis, cost-utility, and cost-benefit analysis^{13,14}.

The first full economic evaluation I conducted was in 2005 as my PhD thesis to determine whether it would be more cost-effective for MOH to subsidize Desferrioxamine (iron chelator drug) to Transfusion-Dependent Thalassemia Patients (TDTP). The findings showed that although the drug was expensive, Quality of Life scores were higher among TDTP on Desferrioxamine compared to none and that the cost to treat the complications of iron overload was much higher than the cost to treat TDTP with Desferrioxamine^{15,16}. The MOH had considered these findings to justify in getting the drug listed and since then Desferrioxamine is available for free at all government hospitals.

Libya as a developing country was burdened with a high incidence of diarrhoea among her children, of which majority was due to rotavirus infection especially in children under 5 years old. In order to justify on assistance from WHO for rotavirus vaccination program in the country, a cost-effectiveness analysis of introducing Rotavirus Vaccine in Libya was conducted as a PhD thesis. The

findings revealed that rotavirus vaccination would be a very cost-effective program to reduce the incidence of rotavirus infection and diarrhoea in general. These findings led to the Libyan government decided to provide the vaccine for free to all children below 5 in Libya, even without aids from WHO^{17,18}.

In 2012 MOH wanted to increase the uptake of PAP smear among the women in the population, and a pilot project was conducted in Klang whereby women in the community were called to attend cervical screening via letter; similar to what had been done under UK NHS. Thus, a CEA was conducted to compare the various mode of calling women to come for PAP smear, between posting posted, registered letter, sending message via SMS and talk to them via telephone call, the women would respond better if we talk to them personally¹⁸.

An economic evaluation has also been conducted to determine the cost of various breast cancer screening types in Malaysia and to see whether its worth for MOH to provide mammogram as a community screening for breast cancer. We found that the current practice of CBE followed by mammography when abnormality is detected, and mammogram of women with risk factors should be strengthened as the costs of breast cancer detection were relatively cheap. It is recommended that efforts should be focused on improving the participation rate for CBE and increasing the budget allocation for mammogram for women with breast abnormality and risk factors of breast cancer.

Presently, the economic evaluation works in progress are "Economic Analysis and Quality of life of hepatitis C infection in Malaysia" and "Economic impacts of Haze to Health in Malaysia".

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CURRICULUM VITAE:

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Education and Qualifications:

2009 PhD (Health Economics), National University of Malaysia

1996 Master of Public Health, University of Malaya

1989 Medical Degree, University Science of Malaysia

Employment Record:

2016-2018 Deputy Dean Development and Infrastructure

2011-2016 Head of Department, SPM

2009-2011 Post graduate coordinator, SPM

2003 - Lecturer, Health Policy and Management Unit, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya

2000 – 2003 Childcare (Health) Officer, School for Special Children, Newcastle Upon Tyne, United Kingdom

1999 – 2000 Director/ Medical Officer, Clinic Nur Aqila, Rawang

1997 – 1998 Health Officer, Management & Training Unit, Public Health Institute

1994 – 1996 Assistant Director, Food Quality Control Division, Ministry Of Health

1991 – 1994 Health & Medical Officer, Bukit Pancor Health Centre, Penang.

1990 – 1991 Medical Officer, Penang General Hospital

1989 – 1990 House Officer, Penang General Hospital

Administrative Post

1. Deputy Dean (Development and Infrastructure): August 2016 –
2. Head (Department Social and Preventive Medicine): July 2011 – July 2016
3. Coordinator (Department's Post Graduate Unit): 2008-2011
4. Entrepreneurships Coordinator (Faculty of Medicine): 2007-2010

Appointments/Recognition

1. Regional Director, Asia Pacific Academic Consortium of Public Health (APACPH) since 2012
2. Honorary Secretary, APACPH, 2013-2017
3. Vice President APACPH, 2017-2021
4. International Technical Advisory Committee of ASEAN University Network (AUN) – Health Promotion, 2016 –
5. Technical Committee member of Health Technology Assessment for Economic Evaluation Studies, Malaysia (TACTEE): 2014-2016
6. Chair, TACTEE :2016-2018
7. Honorary Visiting Professor, University of Anglia Ruskin, United Kingdom: 2014-2016
8. Visiting Professor, University of Airlangga, Surabaya, Indonesia

Awards received

1. Fellowships of Faculty Public Health (Distinction), Royal College of Physician, United Kingdom (2014)
2. Fellowships, Public Health Medicine Specialist Association, Malaysia (2016)

Research Projects:

1. Principle Investigator "Risk and Protective Factors of Mental Health among Adolescents in Malaysia (**2 Heal**)". UMRG Program
2. Co-Investigator **PACED** study (Newton grant – partner with Queen's Belfast University): 2017-
3. Co- Investigator **MyHeART Beat** Study (Newton grant – partner with Uni. of Bristol): 2017-
4. Co-Investigator "Study on Economic Evaluation of Hepatitis Management in Malaysia": 2016-
5. Head of Program: **Healthy Campus Initiatives** – Ecological Approach towards Healthy Lifestyles. U009A/2014, RM700,00.00

6. Principal Investigator on “Enabling School Environment towards Healthy Eating and Physical Activity in the Prevention of Obesity among Adolescents”. RU009/2014 RM80,000.00
7. Principal Investigator on CEA of PCI in Various Cardiology Centers in Malaysia (STEM_HIR sub project), RM200,000.00
8. Principle Investigator Salt Reduction Study (an extension of **PARTNER** sub project grant FL009/2011) RM100,000.00
9. Principal Investigator and Coordinator for **APACPH** Obesity Community Intervention Program (OCARTNC R&I) and extended project under UMRG 543/13HTM) RM200,00.00
10. Principal Investigator and Public Health Leader for Asia-Africa University Development Network - Public Health Program (**AADUN**, 2013) RP026/2012C , RM150,000.00
11. Principal Investigator “Training and Screening of Breast Cancer among Rural Women in Selangor via a Mobile Clinic” (**MURNI**, UMRG 2012-2014), RM160,000.00
12. Consultant on Study of Supply and Demand Gap Analysis for Healthcare Human Resource (UPUM project, 2012)
13. Principal Investigator Malaysian Paper on developing Healthcare Service Hub in ASEAN (ERIA project, 2012)
14. Consultant on the study Return of Investment of HIV/AIDS Harm of Reduction Program, Malaysia. (World Bank, 2012)
15. Principal Investigator Economic Evaluation of Breast Cancer at UMMC, part of Malaysian Breast Cancer Cohort Study (MyBCC), UMMC HIR Breast Cancer grant project (2011-)
16. Co-researcher, Malaysian Adolescents Health Study (MyHeART): 2012-2016
17. Principal Investigator for Unit Cost of In-patient, Out-patient and Daycare health services at UMMC, 2010 (UMRG)
18. Principal Investigator on Study of Status of Female Circumcision in Malaysia, 2010 (WHO)
19. Principal investigator in research on Increasing Breast Cancer Awareness and Practice of BSE among female Staff of University Malaya (PJP), 2008/2009.
20. Project Leader in Study on Economic Evaluation of Thalassaemia Treatment. Collaboration with Min. Of Health Malaysia. (MASPO), 2009/2012
21. Consultant for the Monitoring and Evaluation Study on HIV/AIDS NSP 2007-2010 by Association of Public Health Specialist, 2009/2010.
22. Co-researcher in Disease and Injury Burden Study, 2012, MOH

23. Co-researcher Cost-effectiveness Analysis of Influenza among Pilgrims of Malaysia, 2012
24. Co-researcher in the Study on Impact of Case-mix System on Efficiency of Teaching Hospitals in Malaysia. Collaboration with HUKM and HUSM, 2007/2010.
25. Co-researcher in the Study on Progressivity of Healthcare Finance in Malaysia, 2008/2011.

Completed Post Graduate Supervision:

1. PhD (2011) "Hospital as Extension of Home in Perception and Meaning". (Dr Anahita, a lecturer at University Tehran, Iran)
2. DrPH (2012) "Determinants of Sexual-Risk Behavior Among Incarcerated Adolescents in Malaysia- A Mixed method Study". (Dr. Nik Daliana a Senior Lecturer, SPM, UM)
3. DrPH (2014) "Stress Relaxation Program in Auto-Mobil Factories: A Quasi-experimental Study". (Dr Bala Murali, MOH)
4. DrPH (2014) "Cost Effective Analysis (CEA) Of Different Types of Recall for Cervical Cancer Screening Among Women in Klang". (Dr. Rima Marhayu, MOH)
5. PhD (2015) "Economic Evaluation of Rotavirus Immunization in Libya". (Dr. Salem Alkoshi, Health Policy Officer, CDC, Libya)
6. PhD (2015) "Assessing the Adequacy of Antenatal Content: The Quality of ANC in Malaysia". (Dr. Pingling, Executive Officer/ Scientist MediConsult Company)
7. Master of Medical Science (2015) "The Healthcare Experience of Japanese Retirees in Malaysia: A Qualitative Study". (Ms Ayako Kohno, PhD graduate at Kyoto University)
8. DrPH (2016) "The Effects of Telephone Lactation Counselling on Breast Feeding Practices among Mothers who attended A Public Hospital in Kuala Lumpur". (Dr. Zakiah, MOH)
9. DrPH (2016) "Assessing Equity In Health Care Utilization, Malaysia". (Dr. Mohd. Ridzwan, MOH)
10. DrPH (2017) "The Cost Dengue Vector Control Activities in Malaysia by Different Service Providers". (Dr Ravichandran, MOH)
11. DrPH (2017) "Cost-effectiveness Study on Mammogram and Clinical Breast Examination for Breast Cancer Screening in Malaysia". (Dr. Sophia Ramli, MOH)
12. PhD (2017) "Impact of Health Insurance on Healthcare Utilization in Sudan". (Dr. Isam Baloul, MOH, Saudi Arabia)

13. DrPH (2017) "Percutaneous Coronary Intervention at Public Cardiac Centers, Malaysia". (Dr. Lee Kun Yun, MOH)
14. Master of Medical Science (2017) "Review of Policy on Obesity Prevention among School Children in Malaysia". (Ms Camelina)
15. Master of Medical Science (2017) "Use of Complementary and Alternative Medicine among the Newly Diagnosed Breast Cancer Patients in Malaysia". (Ms Aina Farhana)
16. PhD (2018) "Delay in Presentation, Diagnosis and Treatment of Breast Cancer: The Time Intervals and its Associated Factors Amongst Women Attending Public Hospitals in Malaysia". (Dr. Noor Masturah)

Publications

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Presentations/Proceedings

1. Capacity Building on Health Promotion – Role of Academicians. Asia Pacific Health Promotion Capacity Building Forum, Taipei, 6-7 Sept. 2017. (Invited Speaker)

2. Drug Finance in Malaysia. 4th IHEA Annual Scientific Meeting, Surabaya, Indonesia. 13th-14th August 2017. (Forum Panelist)
3. Challenges Promoting Health amongst ASEAN communities, 1st APACPH Region Conference, Bangkok, 24th May, 2017. (Invited speaker)
4. The Economics Perspective of Thalassaemia Care, 8th National Thalassaemia Conference, Sunway Putra Hotel, 20th to 21st May, 2017 (Invited Speaker)
5. Health Impact of Haze in Malaysia: Economic Implications, Academy Science Malaysia 2017 Forum on Haze, MATRATE Building, 21st April, 2017 (Plenary Speaker)
6. Universal Health Coverage and the challenges in Malaysia. Uni. Of Kyoto, 14th Dec 2016 (Invited Speaker)
7. Costing analysis of percutaneous coronary intervention in Malaysia. CRC and UM Research Meeting, PAUM, November 2016 (Invited Speaker)
8. Critical Review on Obesity Prevention Policies in Malaysia. 48th APACPH Conference, Tokyo, Japan, 16th-19th September, 2016 (Oral Presenter)
9. Prevalence of Overweight and Obesity and its associated factors among Urban School Children in Kuala Lumpur: A Pilot Study. Malaysia Public Health Conference, Malacca, 22nd to 24th August, 2016 (Invited Speaker)
10. Malaysia Healthcare System: The Role of Social and Cultural Factors on the Health Status of Malaysians. Uni. of South Carolina, California, 14th November 2015 (Guest Speaker)
11. Applying Cost-Effectiveness Analysis Study For Evidence Based Health Policy, Taipei Medical S University, 1st September, 2015 (Guest Speaker)
12. The Role of Public Health Professionals in Health Development Lessons from Malaysia, 47th APACPH Conference, Bandung, 20-23 October, 2015 (Plenary speaker)
13. Evaluation on the Implementation of Policies towards Obesity Prevention among School Children in Selangor, 47th APACPH Conference, Bandung, 20-23 October, 2015 (Co-author, Oral)
14. Healthy Campus Initiatives_ collaboration among ASEAN universities. 4th ASEAN Deans Summit, University of Philippines, 23-24th June, 2016 (oral presenter)
15. Healthcare Experience of Japanese Retirees in Malaysia A Qualitative Study, Symposium on Young Investigators, Kyoto University, Japan, 18-19 June, 2015 (Co- author, poster)
16. Economic Evaluation of Public Health Program, Seminar on Global Health, University Malaya, 11-15 June, 2015 (Speaker)
17. CEA of Rotavirus Vaccination in Libya, ISPOR European Congress, Amsterdam November 2014 (oral presenter)

18. Evaluation and Review of Obesity Prevention Programs in Malaysia, 3rd ASEAN Deans Summits, Singapore, September 2014 (oral presenter)
19. Economic Evaluation Study To Justify For Investment On Harm Reduction Program, National Aids Conference, Kuantan, June 2014
20. Cost-effectiveness Analysis of Desferal versus Desjet for the treatment of transfusion dependent thalassaemia patients. National Seminar of Thalassaemia, Kuching, November 2013.
21. Opportunistic CBE versus Outreach CBE via a Mobile Clinic for breast cancer screening, 45th APACPH Conference, Wuhan, China, 2013.
22. Community Intervention to Enhance Breast Cancer Screening: Partnerships with NGO. ASEAN Medical Research Meeting, Uni. Mahidol, Bangkok, 2013
23. UMMC Costing Analysis: Outpatient and Inpatient Healthcare Services, 44th APACPH, Colombo 14-18 October 2012.
24. Predictors of Breast Cancer Screening Uptake: a Pre Intervention Community Survey. 4th APCOP, Kuching, 26-27 April 2012
25. Cervical Cancer among Rural Women of Perak, ICC4, Seoul, South Korea, 2-4th November, 2011.
26. Elderly status in Perak, 42nd APACPH Annual Conference, Bali, 25-26 November, 2010.
27. Policy on Breast Cancer Prevention in Malaysia, University of Leeds, United Kingdom, 15-17th November, 2010.
28. Healthcare Utilization and Expenditure of Pahang Residents, 41st APACPH Annual Conference, Taipei, 3-6 December 2009.
29. Breast Self- Examination: Is it Still Relevant. 7th Scientific Meeting of the Australasia Breast Cancer Society, Marriot Gold Coast, Australia, 1st to 3rd October, 2009.
30. Desferrioxamine Treatment in Thalassaemia Patients: A Cost Utility Analysis. 5th National Public Health Conference, Berjaya Times Square, 12-14th November 2008.
31. Breast Cancer Awareness and Practice of BSE among Females of Pahang. 40th APACPH Annual Conference, Renaissance Hotel, 7-9 November 2008.
32. Quality of Life in Transfusion Dependent Thalassaemia Patients on Desferrioxamine Treatment at HUKM and HKL. 3rd Asia-pacific ISPOR Conference, Seoul, Korea, 7-9 September 2008.
33. Cost-effectiveness Analysis of Desferrioxamine Treatment. 3rd International Case-mix Conference, Berjaya Times Square. 15-16 November 2007.

34. Prevalence of Iron Overload Complications in Thalassaemia Patients. 2004. 1st Regional Conference on Global health at Legend Hotel Kuala Lumpur, 20-21 December 2005

Books

1. ISPOR Taxonomy of Patient Registries: Classification, Characteristics and Terms. ISPOR, USA
2. A chapter on "Healthcare Service Industry in Malaysia" in the book on "Developing ASEAN Economic Community (AEC) into a Global Services Hub. ERIA ISBN 978 602 8660 54 9
3. A Chapter on "Healthcare Industry: Development and Direction" in the book on "Malaysian Economy: Economic Transformation Programme-Next Economic Experience". MIER ISBN 978 983 9716 26 9

Reports (unpublished)

1. Guidelines on Female Circumcisions Practice in Malaysia, MOH (Co-author)
2. Guidelines on Pharmaco-economic studies in Malaysia, MOH (Co-author)
3. Criteria for Credentialing of Public Health Physician – sub specialist. Public Health Conjoint Committee (Co-author)
4. Guidelines on APACPH Accreditation. APACPH (Co-author)
5. Evaluation and Monitoring Report on National Strategic Planning of HIV/AIDS, Malaysia. Public Health Specialist Association, Malaysia (Co-author)

Health Economics Courses attended

1. Workshop on Big Data Processes, 39th Annual Meeting SMDM, Oct. 22-25, 2017, Wyndham Grand Pittsburgh Downtown, USA
2. Regression Analysis for Health Economics Methods, Uni. Of York, UK, March 2015.
3. Workshop on Data Analysis (Costing), IHEA 2011, Toronto, 9-14 July 2011 (JCUM)
4. HIV/AIDS Costing Methodology, Bangkok, Thailand, 20-24 June 2011. (UNAIDS)
5. Advanced Health Economic , Oxford Uni. United Kingdom, Sept. 2010 (UM)
6. National Aids Spending Assessment (NASA), Hanoi, Vietnam, May 2009 (UNAID)

Memberships

1. Public Health Specialist, National Specialist Registrar, Academic Medicine Malaysia (2013-), NSR Number 130099.
2. Malaysian Public Health Medicine Specialist Association
3. Malaysian Conjoint Board of Master in Public Health
4. International Pharmaco-economics Organization of Research (ISPOR)
5. Treasurer, Malaysian Health Economic Association (MAHEA)
6. Member, National Council of Professors

Research Area

Health Economics and Program Evaluation

Community Engagement

Subjects of Interest

1. NCD- Breast Cancer and Obesity Prevention
2. Infectious Diseases - HIV/AIDs Harm Reduction Programs, Hepatitis C Management and Dengue Control and Prevention
3. Healthcare Tourism

Contributions

1. External Examiner IMU , 2016-2018
2. University Malaya Senate member, 2016-2018
3. Master of Sc PH Program assessor, MAHSA University, 2017
4. Advisor, 47th APACPH Conference, Tokyo, September 2016
5. Panel for IMU Master of Science (PH) Curriculum Reviewer (2016)
6. APACPH MPH Accreditation Reviewer – University of Indonesia (2015)
7. APACPH MPH Accreditation Reviewer – University Mahidol, Thailand (2014)
8. MyGrant panel for FRGS and LRGS grants (2015-2017)
9. Chair of the 46th APACPH Conference, Kuala Lumpur (October 2014)
10. Chair Faculty of Medicine Research Week, UM (2014)
11. Chair (Symposium) of the 45th APACPH Conference, Wuhan, 2013
12. Chair, National Clearinghouse Centre for Adolescent Health, Malaysia (2012-)
13. Chair, Conjoint Committee, Public Health Programs (2011-2013)
14. Co- Chair 1st Asia Pacific Evidence Based Medicine, Kuala Lumpur (Sept. 2009)
15. Chair of UM Health Awareness Day (2011-2013)
16. Co-Chair of Community Health Campaign, Kuala Langat (2012)

17. External Examiner – University Kebangsaan Malaysia (2012-2015)
18. External Assessor – University Technology Melaka(2011)
19. External Assessor for Professor promotion, UIA (2015)
20. Reviewer MQA for MPH Program, University Perdana (2015)
21. Reviewer MQA for MPH Program, UniKL (2014)
22. Journal Reviewer – Dewan Bahasa dan Pustaka, Malaysian Medical Journal of Public Health, Academy of Medicine Malaysia, APACJPH, APJCP, ISPOR, Value in Health, Plos Medicine, Plos One, etc

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