

## Measuring societal health preferences: an introduction to the research protocol for establishing the EQ-5D-5L value set

*Luo Nan*

### **Abstract**

The general public's opinions about the utility of health services and technologies are important to policy makers. However, direct measurement of such opinions is technically difficult and expensive. The EQ-5D-5L, a generic health-status instrument, provides a solution for this challenge. Recently, a standard research protocol was developed and successfully implemented in several countries to establish the EQ-5D-5L value set, a key component of this instrument. The protocol proposes a cross-sectional survey of 1,000 randomly selected members of the general public. Using a specially designed computer application, respondents' preferences for a subset of EQ-5D-5L health scenarios are elicited in face-to-face interviews. A linear regression model which provides the best fit of the data will be used to estimate the utility of all the 3,125 EQ-5D-5L health scenarios to an average member of the general public. The utility values are measured on a 0.0 (death) to 1.0 (full health) scale. With this set of values available, the utility of a health service can be determined simply by mapping the persons who receive the service into the EQ-5D-5L health scenarios using the self-administered EQ-5D-5L questionnaire, the other component of this instrument.

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## Work-related Chemical Exposures Presenting to an Emergency Department

*Sylvia Teo Tzu Li*

### **Abstract**

Chemical injuries can occur during work and a study of these exposures would help improve worksite safety and health. We studied a series of patients who presented with work related chemical exposures to the Emergency Department of a hospital in Singapore, a small industrialized island state 5 million people. Work related chemical exposure cases were identified from Emergency Department (ED) computerised records for the period 2007 to 2010. Injuries due mainly to heat, electricity, trauma and mechanical injuries were excluded. The case records were traced and abstracted by trained assistants. 240 cases were identified with an average of about 60 cases per year. Most of the patients were male (92%) and young adults (73% between 20-40 years old). 49% of the workers were foreign workers. Most of them are technicians, cleaners and labourers (53%) and worked mainly in the construction and manufacturing industries (47%). All the exposures were acute and the majority of the workers present within 4 hours of incident (51%) with chemical exposure to their eyes (52%) and skin (31%). There are some cases of inhalation (27 cases) and ingestion of chemicals (10 cases). The majority of the chemicals involved were corrosives (41%), hydrocarbons (17%), and cleaning solutions (9%). However, the chemical names were identified in only 35% of cases and the safety data sheet is only available in 2% of cases. 84% of the workers did not have any personal protective equipment documented. Pre-hospital decontamination (eye and skin irrigation) was performed for 53% of the workers. Similar decontamination was performed for 48% of the workers in the ED. Antidote treatment with calcium gluconate for hydrofluoric acid exposure was used for 5 patients. There are 6 incidents with 2 or more casualties involved and 3 of these incidents involved inhalational exposure. Only 11% of patients were admitted and most of the patients recovered uneventfully. 4 patients had surgical procedures and 5 patients had complications. Work related chemical exposure that presents to the ED are mainly exposures to the skin and eye. Most of the workers do well with immediate decontamination and first aid but antidotes are required for some exposures.

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## The Cost Of Noise Induced Hearing Loss In Malaysia

*Azlan Darus*

### **Abstract**

Adult onset hearing loss can be a major cause of disability, with the likely high contribution of occupational induced hearing loss causing this impairment. Much has been written about prevention of hearing loss among workers. In a developing country such as Malaysia, legislations and guidelines had been produced to enable organizations to take actions to prevent noise induced hearing loss among their workers. This study will look at the cost of occupational noise induced hearing loss among workers in Malaysia, to enable a more informed decision to be made in formulating strategies for prevention. We analyze the compensations of occupational noise induced hearing loss in the country over a period of 5 years. We looked into the basic socio-demographic, impairment rating, temporary disablement, monetary compensation and other benefits provided for the employees. A total of 369 employees were analysed, mostly were male (91.3%) with the mean age at diagnosis of 46.5 ( $\pm 8.0$  SD) years old. The mean whole person impairment rating was 12% ( $\pm 9.9\%$  SD). The mean of total compensation paid per employee was Ringgit Malaysia (RM)42625(+39) per person or a total compensation over the 5 years for NIHL of RM15.8 million. The cost of NIHL is indeed very high in a developing country such as Malaysia. Not all such cases are compensated or reported to the authority, therefore these figures may be an underestimation of the actual extend of the problem. As NIHL is a permanent disease, the impairment suffered by the employees remained throughout their life, and without proper prevention, may become worse.

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## CuDDler – Interactive Pet Companion with Emotion Recognition for Elderly

*Tan Yeow Kee*

### **Abstract**

In this presentation, we present CuDDler, an interactive pet companion with the unique patent pending technology to recognize verbal (e.g. laughing, crying, shouting and talking) and non-verbal (e.g. squeezing, hitting, patting and stroking) acts that are tied to the emotional state of a person. CuDDler, a cuddly and affectionate interactive robotic pet companion, can provide un-conditional companionship to the elderly. This will positively impact their emotional wellbeing and their quality-of-life, ultimately leading to improved overall health and reduced healthcare cost. The use of CuDDler will also provide geriatricians with reports related to the interaction behavior of the elderly performed towards the robotic platform. Such report will assist Geriatricians to make better judgment about the mental-wellbeing of the elderly.

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Individual and Area Level Socioeconomic Status and Its Association with Cognitive Function and Cognitive Impairment (Low MMSE) among Community-Dwelling Elderly in Singapore

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**Abstract**

Neighborhood socioeconomic status (SES) can affect cognitive function. We assessed cognitive function and cognitive impairment among community-dwelling elderly in a multi-ethnic urban low-SES Asian neighborhood and compared them with a higher-SES neighborhood. The study population involved all residents aged  $\geq 60$  years in two housing estates comprising owner-occupied housing (higher SES) and rental flats (low SES) in Singapore in 2012. Cognitive impairment was defined as  $< 24$  on the Mini Mental State Examination. Demographic/clinical details were collected via questionnaire. Multilevel linear regression was used to evaluate factors associated with cognitive function, while multilevel logistic regression determined predictors of cognitive impairment. Participation was 61.4% (558/909). Cognitive impairment was found in 26.2% (104/397) of residents in the low-SES community and in 16.1% (26/161) of residents in the higher-SES community. After adjusting for other sociodemographic variables, living in a low-SES community was independently associated with poorer cognitive function (beta =  $-1.41$ , SD =  $0.58$ ,  $p < 0.01$ ) and cognitive impairment (adjusted odds ratio  $5.13$ , 95%CI  $1.98-13.34$ ). Among cognitively impaired elderly in the low-SES community, 96.2% (100/104) were newly detected. Living in a low-SES community is independently associated with cognitive impairment in an urban Asian society.

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## Vietnamese Version of the Rowland Universal Dementia Assessment Scale (RUDAS): Translation and pilot Study

*Dang Nguyen Tuong Van, Nguyen Xuan Cam Huyen.*

### **Abstract**

To translate the Rowland Universal Dementia Assessment Scale (RUDAS) into Vietnamese and to conduct a pilot study in a hospital- based geriatric setting. The dementia epidemic is under-concerned in Vietnam where primary care services are inappropriate and the disease's underestimation is popular among practitioners other than geriatricians, neurologists or psychiatrists. The two commonly used screening instruments are the Mini-Mental State Examination (MMSE) and the Clinical Dementia Rating (CDR). However, the MMSE shows educational, and language/cultural bias while CDR takes too much time to evaluate both patients and their caregivers. The Rowland Universal Dementia Assessment Scale (RUDAS) is expected to avoid limitations of MMSE and CDR. The study was completed in 2 stages. Stage 1: forward and backward translation of RUDAS in order to give the prefinal version of RUDAS-Vietnam. Stage 2: pilot study in 30 elderly patients ≥ 60 years old of Geriatric, Cardiology and Kidney Departments of Nguyen Tri Phuong Hospital, HCMC. The study involved 14 males and 16 females, all Vietnamese, with average age  $68.6 \pm 8.2$  yrs old (range 61 - 91 yrs) and mean score  $24.8 \pm 3.1$  points (range 18- 30 pts) (the recommended cut-off point of RUDAS was 23); 23.33% scored < 23 pts. Concerning education, 30.0% were illiterate, 26.7% were of elementary school level and 43.3% secondary school or higher level with respective mean scores 21.6, 25.8 and 26.3. Two blind patients scored 18 and 20. Poor performance was observed in 26.6% for item 4 (cube drawing) and in 40% for item 5 (safety in crossing road) that might reveal education and cultural bias. Time to complete the RUDAS sheet was 7-10 minutes.

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Early diagnosis of Alzheimer's disease

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**Abstract**

Due to increase in life expectancy throughout the world the incidence of Alzheimer's disease (AD) is on the rise. By the time AD is diagnosed clinically, usually it is too late for proper treatment of the disease. Therefore, there has been an enormous interest in the development of early diagnostic markers of AD. Traditionally the focus of previous studies has been the cortical regions of the brain. Our study for the first time sheds light on the use of magnetic resonance spectroscopy (MRS) in inferior colliculus nucleus as the diagnostic tool which could be utilized for the early diagnosis of the disease. Twenty seven (27) healthy volunteers were recruited for the study and MRS of the inferior colliculus was done using various voxel sizes (from 7-15) to look for the one with reproducible results and with minimum noise. Results of this study will be discussed in the presentation. Our results indicate the reliability and specificity of this method for tracking changes for early detection of AD.

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Screening and production of a human single chain Fv antibody against H1N1/2009

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**Abstract**

Single chain variable fragments (scFvs) are very useful as diagnostic tools and therapeutic agents. According to the quick production of scFv antibodies by phage display technique, nowadays it becomes more attractive than hybridoma technique. Here, scFv antibodies against H1N1/2009 viruses, causing 2009 flu pandemic, were produced by phage display for quick and reliable detection of this infection by ELISA. Isolation of H1N1/2009-specific scFvs from Tomlinson J library was performed by using purified H1N1/2009 as an antigen in phage biopanning. To prevent cross-reactivity with other antigens, seasonal influenza and recombinant nucleoprotein (rNP), which is conserved in all influenza A subtypes, were used for subtraction during biopanning rounds. Phages expressing scFvs that are specific to H1N1/2009 were isolated as the consequence and then used to generate H1N1/2009 specific scFvs in a bacterial system. An H1N1/2009 specific scFv was expressed in a soluble form. The entire process was completed in less than 6 weeks. Although this scFv was found to slightly cross-react with seasonal influenza, this study demonstrated the possibility of applying this approach for rapid isolation and production of antibodies for other emerging needs.

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## The Hippo Pathway and its Downstream Transcriptional Coactivators, YAP and TAZ, in Cancer

Chan Siew Wee

### Abstract

The Hippo signaling pathway is a newly discovered tumor suppressor pathway. It was originally identified in fruit fly *Drosophila* and later was shown to be conserved in mammals as well. The pathway was shown to restrict organ size by inhibiting cell proliferation, cell growth and inducing apoptosis. Growing evidence shows that deregulation of the pathway often leads to cancers. The core kinase complex of the pathway consists of two kinases, Hippo and Warts (Mst1/2 and Lats1/2 in mammals) and two adaptors, Salvador and Mats (WW45 and Mob1A/B in mammals). The core kinases phosphorylate and inhibit downstream transcriptional coactivator Yorkie (YAP/TAZ in mammals). Phosphorylated Yorkie/YAP/TAZ are translocated to cytoplasm, otherwise they stay in nucleus to activate genes required for cell proliferation and cell growth. Our lab found that TAZ is overexpressed in a number of breast cancer cells and breast tissues. TAZ was shown responsible for the oncogenic property of the breast invasive cells. Using proteomic approach, we have isolated and identified a number of important interacting proteins of TAZ and YAP, among them Wbp2 was shown to cooperate with TAZ in inducing cell proliferation and transformation. In addition, we also identified some negative regulators of TAZ and YAP, for example, Angiomotin was shown to be one of the potent negative regulators of TAZ/YAP and physically translocate TAZ/YAP to cytoplasm. Although the core kinase complex of the Hippo pathway is known to phosphorylate and inactivate downstream effectors Yorkie/YAP/TAZ, how the core kinases regulate the less investigated upstream regulators of the Hippo pathway is not clear. In this talk, I will present evidence on how the upstream regulators of the Hippo pathway, especially the apical-basal polarity proteins, are regulated by core kinases of the Hippo pathway and propose mechanisms on how the apical-basal polarity and cell growth of epithelial cells are achieved through these interplays between the core kinases and the upstream regulators.

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## DNA Sequencing Service and Research at IMCB

Alice Tay Wan Ngee

### Abstract

The DNA Sequencing Facility (DSF) at IMCB provides a service for in-house staff as well as for external users (chargeable) using Applied Biosystems 3730xl instrumentation and BigDye terminator chemistry. DSF also collaborates with the Comparative and Medical Genomics lab led by B. Venkatesh and Sydney Brenner (please see <http://www.imcb.a-star.edu.sg/php/venkatesh.php>) on genome sequencing projects for the Fugu, the Elephant Shark and the lamprey. In the early days, DSF engaged in research that included shotgun sequencing of *Helicobacter pylori*, ESTs from *Mycobacterium*, selected genes from *Plasmodium falciparum* as well as different strains of equatorial microbes. More recently, DSF collaborated with clinicians in a study using functional genetic variants to understand the mechanism of metabolic diseases like diabetes. The talk will cover the origin of the service at IMCB, the challenges of running a service as well as future plans for NGS work. For more information about DSF, please see <http://www.imcb.a-star.edu.sg/php/ittd-i-dna.php>

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## Quality in Discharge Planning in the Neonatal Intensive Care Unit as Perceived by Mothers

*Khatijah Abdullah @ Lim Geok Khim*

### **ABSTRACT**

Supporting and involving mothers in the discharge process from the neonatal intensive care unit is important as it can reduce risk of readmission and also give mothers confidence in caring for their infant at home. This study aims to identify the quality of nursing activities and behaviours during the discharge. In this study critical incidence technique was used. After ethical approval was obtained, fifteen mothers in a regional neonatal intensive care unit were interviewed face to face using an interview guide. Audio recorded interviews were transcribed verbatim and analyse using critical incident technique. The mothers highlighted three facilitative nursing interventions; sharing, sensitive caring and ownership while care was perceived as inhibitory when there was inadequate information and unmet parenting skills needs. The findings indicated that effective discharge was influenced by external influences such as support system, resources as well as the mothers' experiences. Premature infants in the neonatal unit need intensive medical and nursing care in order to survive but if the premature infant is to integrate into the family unit, the family /parents also require intensive preparation. Understanding and determining facilitative nursing interventions will enable neonatal nurses to implement effective care in the knowledge that they are grounded in the values of the parents.

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An exploratory study on transition from acute care to the home among the elderly with chronic end stage renal disease (ESRD) in Brunei Darussalam– “minding the care gap”

*Fatimah Arni Binti Haji Md Daud*

### **Abstract**

The dearth of studies have indicated that transitional care has proven to help prevent health complications of chronic illnesses once elderly patients have been discharged from the hospital and moved back home. It is a proven medium for connecting the gap between the different levels of care (acute to home based), may it be within as well as across care settings. The different sectors in the healthcare systems often operate in silo and currently it is observed that the health care model is very disease focused and not patient focused. More often, the cracks or care gap is due to fragmented or segmented health care or service delivery system. Communications between or across care settings experience a breakdown or a conflict. One of the major impacts of this care gap is a discontinuity in patient's care, dissatisfaction of patient's and families, adverse health effects such as compromised safety related to non compliance of treatments, medication errors and development of complications which lead to readmissions after discharge. This study will mainly examine the preparation process of returning this elderly back to their homes by reviewing the discharge process. Another big chunks of this study will try to explore the experience of the patients and families and care givers during the transition process specifically eliciting the main issues, challenges and problems and perceptions on the level of support they receive from the health care system. Factors contributing to poor care transitions will be exploited in order to find the ground root level of the problem. Although this area has been widely researched in other countries, but this is very novel in Brunei. Up to date, In Brunei, there is no published data to indicate the health status of the chronically ill elderly patients after their discharge form hospitalization. There is also no statistic available on neither the rates of readmissions among elderly patients nor any published data on cases of errors for examples adverse effects of medication errors due to misinformation about treatment. The only available data in the Health Information Booklets and Brunei's ministry of Health Website are the number of admissions, duration of hospital stay and the number of discharge in general. There has been no study conducted to explore the current status of the care transition practice in Brunei on any ground may it be patients' or caregivers' or families experiences nor the health care system per se.

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An Exploratory Study on the Practice of Episiotomy during Childbirth among Women in Brunei Darussalam

*Sarena Haji Hashim*

**Abstract**

The practice of episiotomy has long been a debatable procedure in the midwifery practice. The procedure is considered to be effective in facilitating delivery and preventing vaginal tear. Even though this is part of the indications of episiotomy however, not all published research papers support this practice. Thus, a considerable number of studies have been published regarding how to avoid an episiotomy. In Brunei Darussalam, there is no published statistic available on the rates of episiotomy performed among women during delivery or any studies conducted to explore the practice of episiotomy. However, from my personal communication with the principal nursing and midwifery officer in the maternity unit suggested that the rate of routine episiotomy performed to primiparous women in Brunei Darussalam is estimated to be 100% for normal vaginal childbirth. This may possibly place Brunei Darussalam among the highest rate in the South East Asian region to practice routine episiotomy on primiparous women. Furthermore, this number does not include the rate of episiotomy performed on multigravida women with no apparent indications. Therefore, the indications of episiotomy among multigravida women during labour needs to be thoroughly reviewed in order to reduce unnecessary intervention and undesired sequel of episiotomy. To date, there are no known studies on the current practice of episiotomy among midwives and other relevant health professionals in Brunei Darussalam. Therefore, there is a need to explore this area based on the anecdotal data presented. This study aims to explore the practice of episiotomy among women during childbirth performed by health professionals specifically the midwives and obstetricians in Brunei Darussalam. This includes reviewing the birth records and relevant hospital documents pertaining to the practice of episiotomy and its significance to the health professionals' practice.

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## Autologous skin cell-based therapy for the rapid treatment of severe burns

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### Abstract

Acute wounds precipitated by trauma, such as burns and abrasions involving the loss of more than 10% total skin may become life threatening. Split skin graft is the current gold standard treatment of skin loss. However, creation of secondary wound and inadequate donor site in extensive injury prompted the development of novel strategies to treat the wounds. Tissue engineering offers the potential to create functional skin tissues, starting from simpler single layer cultured epidermal autografts developed 3 decades ago to much advanced bilayer composite grafts that produce faster healing and better aesthetic outcome. In our laboratory, we developed a fully autologous bilayered skin construct, namely MyDerm<sup>®</sup>, for the treatment of both acute and chronic wounds. Although the application of MyDerm<sup>®</sup> can promote the wound healing, however, the requirement of culturing the cells within the accredited cGMP laboratory for prolong period caused delay graft application and inflated cost. Although allogeneic skin grafts are readily available but it causes some immunological rejection by host. To overcome the problem, non-cultured autologous skin cells were applied to the wounds to promote healing. ReCell<sup>®</sup>, developed by Wood et al., is one of the commercially available kits for harvesting skin cells from partial thickness skin graft for the spraying on partial thickness wounds. In our current study, we aimed to develop an alternative treatment strategy for the rapid treatment of full thickness wounds. For this purpose, skin cells were harvested from full thickness skin graft and characterized for the cell yield, viability, stem cell property and population balance. The effects of plasma and platelet rich plasma on skin cells were compared using in vitro co-culture system to determine the healing potential of the compounds. It was found that cell yield and viability by co-isolation techniques is comparable to the other commonly used techniques, and, it produces  $58.35 \pm 2.84$  fibroblasts,  $40.12 \pm 2.72$  keratinocytes and  $1.69 \pm 0.49$  melanocytes, suggesting the suitability for full thickness wound healing. In addition, early results showed that addition of plasma and platelet rich plasma enhanced the production of collagen type I and collagen type III of fibroblasts, those responsible for wound healing. Moreover, uses of plasma and platelet rich plasma could also provide the 3D environment for skin cells to cover the full thickness wound. In summary, application of non-cultured skin cell suspension supplemented with plasma and platelet rich plasma could be a potential strategy for the rapid treatment of full thickness skin wound.

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## Hypotensive effects of the Aqueous Extracts of *Syzygium polyanthum* Wight. Walp. Var. *Polyanthum* Leaves on Normotensive and Hypertensive Rats

Wan Amir Nizam Wan Ahmad

### Abstract

*Syzygium polyanthum* Wight (walp.) var. *Polyanthum* leaves are commonly consumed by the Malays as fresh salad. Traditionally, the concoction from *S. polyanthum* leaves is consumed as a treatment of hypertension. Initial study has shown the aqueous extracts of *S. polyanthum* leaves (AESP) significantly lower the blood in normotensive rats (*in vivo*). However, the effects is never been documented in hypertensive rats. In this study, male Wistar Kyoto (WKY) and Spontaneously Hypertensive (SHR) rats ( $n=5$ ), age ranging from 3 to 5 months-old were anesthetized with sodium pentobarbital (50 mg/kg, via intra peritoneal route). Right common carotid artery was cannulated and connected to a pressure transducer (BIOPAC Inc., USA). The vehicle (0.9% normal saline; as a control) and the extracts solution were administered through a cannulated left external jugular vein. The AESP were tested by increasing doses sequentially (10, 20, 40, 70 and 100 mg/kg). The responses for each dose were recorded within 20 min. In between the doses, the vessels were flushed with heparin 5 IU/ml to avoid the intravascular blood clotting. The changes of mean arterial blood pressure (MAP) and the heart rate (HR) responses were recorded with Biopac Student Lab Pro® software. Where appropriate, the results were analyzed using 1-way or 2-way repeated measured ANOVA, followed by *post-hoc* Bonferroni's multiple comparison test (GraphPad PRISM 6). At the dosages of 20 to 100 mg/kg, AESP induced significant dose-dependent hypotension ( $19.6 \pm 3.00\%$ ,  $33.3 \pm 3.8\%$ ,  $41.8 \pm 3.1\%$  and  $42.9 \pm 3.2\%$ , respectively) ( $p<0.001$ ) in WKY; whereas  $15.1 \pm 2.2\%$ ,  $19.1 \pm 2.8\%$ ,  $30.6 \pm 4.7\%$  and  $31.3 \pm 4.9\%$ , respectively in SHR ( $p<0.001$ ). Only the highest dose of AESP (100 mg/kg) induced significant bradycardia;  $14.5 \pm 2.3\%$ ; ( $p<0.001$ ) in WKY and of  $10.8 \pm 2.1\%$  ( $p<0.001$ ) in SHR. The magnitude and the onset time for the hypotensive and bradycardic effects by AESP in both models were not significantly different. Similarly, at 40 mg/kg the dose response curves for AESP-induced hypotension in both rat models started to be plateau. The  $ED_{50}$  value for hypotensive effects of AESP in WKY ( $26.5 \pm 3.6$  mg/kg) was not significantly different than the  $ED_{50}$  value for hypotensive effects in SHR ( $31.5 \pm 5.6$  mg/kg). However, the sustainability of the hypotensive and bradycardic effects produced by AESP between both models were different. In WKY, the hypotensive effects of 20, 40, 70 and 100 mg/kg AESP were fully recovered within 2, 3, 4 and 6 min, respectively whereas in SHR the effects were fully recovered within 1, 1, 2 and 3 min, respectively. The bradycardic effects by 100 mg/kg AESP achieved full recoveries within 20 min in WKY and 5 min in SHR. In conclusion, AESP significantly reduced the blood pressure of the normotensive and hypertensive rats to a comparable extent. The rate of MBP to recover for AESP in hypertensive rats was much faster than in the normotensive rats.

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The effect of oxidative stress-responsive genes in pathogenicity

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**Abstract**

During infection, host generates reactive oxygen species (ROS) as a primary immune response. ROS is toxic to the pathogens because it can damage DNA, proteins, and lipids and leads to death. On the other side, the pathogens have evolved many systems to facilitate themselves for surviving from ROS toxicity, including increased expression of the oxidative stress-responsive genes. OxyR is one of the most important transcription regulator, which senses and responds to the presence of hydrogen peroxide, one kind of ROS. OxyR regulates many antioxidative genes, such as *kata*, encodes monofunctional catalase, *katG*, encodes a catalase-peroxidase, and *ahpC*, encodes alkyl hydroperoxide reductase. The expression of these genes is increased in response to hydrogen peroxide exposure. Once the hydrogen peroxide is eliminated by the powerful activity of antioxidative enzymes, the pathogen would successfully infect the host. The study also showed that these genes are required for its virulence on the host models. Another important transcription regulator is SoxR, a global superoxide anion/redox cycling drugs sensing regulator. The mutant strain lacking of functional SoxR shows avirulent phenotype. Taken altogether, these genes could possibly be drug targets for controlling bacterial infection.

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Rare sugar D-allose inhibits osteoclast differentiation in vitro and in vivo via induction of the expression of thioredoxin interacting protein (TXNIP)

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## Abstract

Oxidative stress modulates the osteoclast differentiation via redox systems, and thioredoxin 1 (Trx) promotes the osteoclast formation by regulating the activity of transcription factors. The function of Trx is known to be regulated by its binding partner, thioredoxin-interacting protein (TXNIP). We previously reported that the expression of TXNIP gene is strongly induced by a rare sugar D-allose. In this study, we tested the hypothesis that D-allose could inhibit the osteoclast differentiation by regulating the Trx function. We used a murine Raw264 cell line that differentiates to the osteoclast by the receptor activator of nuclear factor- $\kappa$ B ligand (RANKL) treatment. The effect of sugars was evaluated by tartrate-resistant acid phosphatase (TRAP) staining. The expression and localization of TXNIP and Trx protein were examined by Western blotting and immunohistochemistry. The activity of the nuclear factor- $\kappa$ B (NF- $\kappa$ B), nuclear factor of activated T cells (NFAT), and activator protein 1 (AP-1) transcription factors was measured by the luciferase reporter assay. The addition of D-allose (25 mmol/L) inhibited the osteoclast differentiation down to  $9.53\% \pm 1.27\%$  of a receptor activator of nuclear factor- $\kappa$ B ligand-only treatment. During the osteoclast differentiation, a significant increase of TXNIP was observed by D-allose treatment. The immunohistochemical analysis showed that both Trx and TXNIP existed in the nucleus in preosteoclasts and osteoclasts. Overexpression of TXNIP by plasmid transfection also inhibited the osteoclast formation, indicating the functional importance of TXNIP for the osteoclast differentiation. Transcriptional activity of the activator protein 1, nuclear factor- $\kappa$ B, and nuclear factor of activated T cells, known to be modulated by Trx, were inhibited by D-allose. We further examined the effect of D-allose on the ovariectomized mice as an osteoporosis model. Oral administration of D-allose to ovariectomized mice decreased the Trx level and significantly up-regulated TXNIP in the tibial bone marrow cells. Furthermore, D-allose increased the density of total bones in diaphyseal region (control:  $723.4 \pm 46.1 \text{ mg/cm}^3$ , D-allose:  $769.6 \pm 66.3 \text{ mg/cm}^3$ ;  $p < 0.05$ ) and the quantity of total bones (control:  $1.69 \pm 0.16 \text{ mg/mm}$ , D-allose:  $1.71 \pm 0.10 \text{ mg/mm}$ ). In conclusion, D-allose is a potent inhibitor of the osteoclast differentiation, and this effect could be caused by TXNIP induction subsequently resulting inhibition of the Trx function. Further study would be helpful to understand the effect of D-allose and its mechanisms on the bone remodeling.

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Searching for antimetastatic and antiangiogenic agents from herbal plants and natural products  
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## Abstract

The ability of cancer cells to invade surrounding tissues is essential in allowing them to spread throughout the body or undergo metastasis. The tumor also induces formation of new blood vessels termed angiogenesis, which not only supports tumor growth but also provides an escape path for metastasis. Vasculogenic mimicry (VM) is the phenomenon where cancer cells mimic endothelial cells by forming blood vessels. VM capability is associated with invasiveness of cancer cells. The presence of VM leads to problems in cancer therapy, because conventional angiogenesis inhibitors fail to inhibit VM formation. This study aimed to find novel antimetastatic agents from Thai medicinal plants or natural products, and to investigate their mechanism of actions. Juice prepared from *Eclipta prostrata* showed a potent inhibition of cancer invasion in an *in vitro* anti-invasion screening, and this was shown to be due to inhibition of cell migration. The *E. prostrata* juice inhibited cell migration in a variety of human cancer cell types and also in human endothelial cells. The juice could inhibit *in vitro* VM formation of liver cancer cells. *In vivo* antiangiogenic activity of the juice was revealed in a chick chorioallantoic membrane (CAM) model. Vanillin, the vanilla flavoring agent, could suppress metastasis of breast cancer cells in a mouse model. Vanillin could inhibit *in vitro* cancer cell invasion and migration, while vanillic acid, a major metabolite of vanillin, did not inhibit. Structure activity relationship of vanillin derivatives and its molecular mechanism for inhibiting cell migration were investigated. Western blot analysis and *in vitro* lipid kinase assay revealed that PI3K/Akt signaling pathway was a target of vanillin, and inhibition of phosphoinositide 3-kinase activity was the underlying mechanism. The aldehyde or ketone group at C-1 position of vanillin and apocynin was important for the inhibitory effects, but antioxidant activity was not important. Vanillin and apocynin were also able to inhibit angiogenesis in the CAM model.

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## Using ICT to Improve efficiency of health care in Brunei Darussalam

*Au Thien Wan*

### **Abstract**

Selecting appropriate ICT can benefit and improve the efficiency and the process of health care. For example, one of the options to replace the manual registration and scheduling of appointment has been the implementation of online system to avoid the hassle of queuing and filling out forms. But it was found to be inefficient mainly due to the risk of online security issues, no prioritization facility available for the online registered patients, delay in entertaining them before they are called for outpatient consultation and lack of reminder system on any platforms. Various technologies like sensors networks, advanced interfaces between objects such as Radio Frequency Identifier (RFID) or Near Field Communication (NFC) and cloud computing have been expanding significantly and applied in various fields including health care. According to 2012 world economic forum, many industries including healthcare now rely on integrated information technology (IT) systems and infrastructure to monitor, control, manage and deliver their services. And this study attempts to address the issue of using appropriate technology to improve efficiency for health care in Brunei Darussalam context using a case study.

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## Flood Risk Assessment and Management for Brunei Darussalam: A case study in Menglait

*Vanessa Teo*

### **Abstract**

Flooding is natural phenomenon that has the potential to cause disastrous outcomes. There is a need to move away from traditional flood measures to more sustainable flood mitigation and adaptation measures. These measures will also need to cope with increasing climate extremes due to climate change and the impacts of rapid urbanization. Sustainable flood management aims to provide flood protection measure that considers the environment, society and economy. Menglait is located in the capital city of Bandar Seri Begawan of Brunei Darussalam. It is a developed urban center consisting of both commercial and residential properties. Menglait has a history of flooding as exemplified by the devastating flash flood event in 2009. A case study on Menglait was done to identify the main causes of flooding and how this can be mitigated. A flood risk assessment was done which followed a source-pathway-receptor-consequence model. This flood risk assessment was based on a combination of techniques such as modeling SAGA GIS, semi-structured interviews and literature review. The outcome of this flood risk assessment allowed better understanding and identification of the main factors that contribute to the flooding issue in Menglait. From the results, flood adaptation and mitigation measures were recommended. These recommendations focused on integrating sustainability, environmental protection and amenity value into the overall approach of flood management. The recommendations provided aims to create optimal solutions using technical and non-technical options that not only give flood protection but also give long-term benefit to the environment, economy and society.

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Communication technology using Self-efficacy Theory for diet and physical activity interventions to reduce weight among overweight and obese adolescents: A review protocol.

*Siti Norrasidah Haji Zahiri*

### **Abstract**

The escalation of obesity rate globally – “globesity”; is alarming. Many countries struggle to cope with this problem including Brunei Darussalam. Local statistics from the School Health Services, Ministry of Health stated that prevalence of obesity among schoolchildren in 2011 had increased by 3.5% in just one year. More worrying fact is that an estimate by the Ministry Of Health through the Health Promotion Centre shows that, in 2008, one in four of Brunei’s schoolchildren were obese. Obesity in general, and particularly in children and adolescents, has serious adverse health consequences. Health problems appear invisibly earlier in children with excess weight compare to the normal-weight children. More likely to retain their weight into adulthood, consequently the overweight becomes obese; the obese become severely obese and so on. Multi-disciplinary weight management program encompassing diet changes, increased physical activity, improved psychological ability, the use of pharmacology and surgical treatment had been known to be potentially effective in weight management. However, preliminary literature review found a possible gap within weight management: limited contact hours between the health professionals and the participants. Moreover, the review also found that the mode of delivery for education/intervention heavily influences the results of weight management program. Thus, a Cochrane systematic review aims to explore the use of communication technology with self-efficacy theory to potentially change behaviour, particularly on diet and physical activity. The review may determine the effectiveness of different communication technology and which approach is the most effective. Collaboration with Cochrane network group will be established to achieve the aims. The review will be expected to complete in 2015. Upon completion of the review, hopefully it will provide extensive and in-depth review on effectiveness of the communication technology use in enhancement of weight management program and thus provides solid evidence of such.

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