



# e-catalyst

ACCELERATING RESEARCH

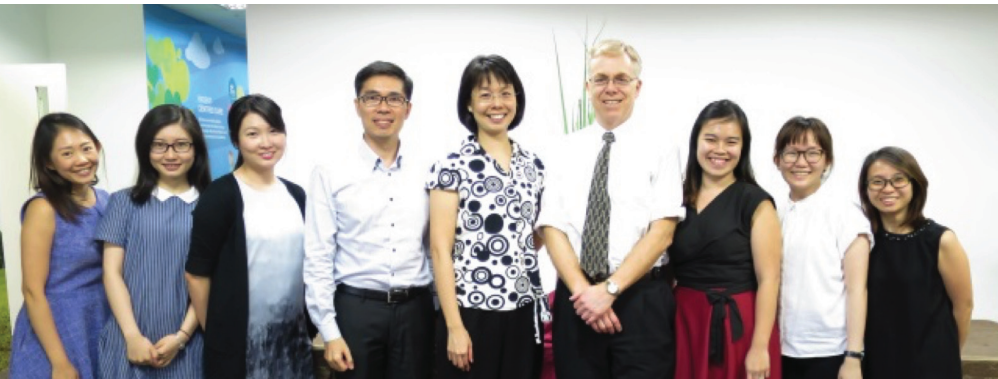


## Affect Regulation Based on Brain-Computer Interface Towards Treatment for Depression

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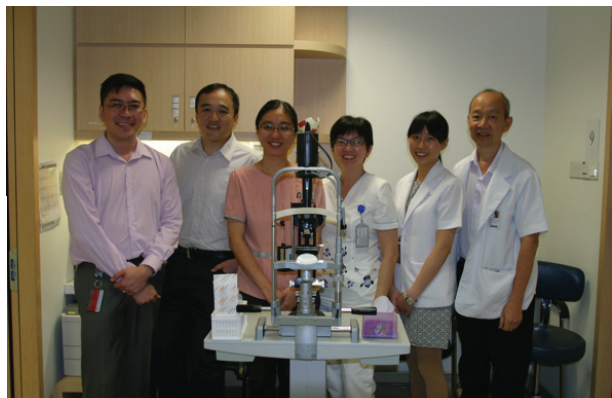
LKCmedicine Boosts Family Medicine with New Initiative - Prof Helen Smith

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## Visiting Expert Sheds Light on Research in Primary Care

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## Enhancing Accessibility for Physically Challenged Patients

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## Advancing Mental Health Research, One Stat at a Time



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Congratulations to the Awardees of the FY2017 Clinician-Scientist Preparatory Programme (CSPP) and RRIS Rehabilitation Research Grant!

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## EDUCATION

- Out on a (Upper) Limb for Research
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## Affect Regulation Based on Brain-Computer Interface Towards Treatment for Depression

**Major Depressive Disorder (MDD), commonly known as depression, is a potentially disabling mental condition with a multi-factorial aetiology.** Individuals with MDD may experience persistent low moods, irritability, changes in appetite, anhedonia and suicidal ideations. Available treatment options for MDD include medications, psychotherapy and neurostimulation.

Though effective, these treatments require an individual to seek services from a clinic, healthcare institution or facility. Local studies have reported a **treatment gap of 59.6% for MDD**, which implies that the majority of individuals with MDD are not receiving appropriate care. Therefore, there is a need to develop new and effective modalities of treatment that is safe and easily accessible by community at large. In recent years, **neurofeedback modalities**

**have emerged as promising and safe alternative treatments for improving mood states of individuals.**

The present study, funded by the A\*STAR MedTech Innovation Grant, aims to develop a portable prototype that will be low-cost and with the intention of allowing patients to have extended sessions of neurofeedback training at ease.

### Methods

1

Participants recruited will undergo 8 weeks of neurofeedback treatments. In each session, participants will put on wireless electroencephalogram (EEG) headsets which will monitor the cortical activity. The obtained EEG signal will be feedback to the participant in the form of music.

2

Participants will be assessed using a series of psychological scales and undergo neuroimaging at specified study visits.

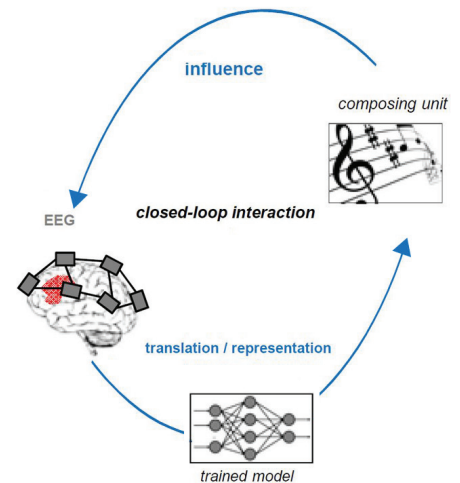
3

The study will evaluate for user acceptability, tolerability and adverse events.

The study was awarded the A\*STAR MedTech Innovation Grant (1 Nov 2016 to 30 Apr 2018)

### The study team:

**Dr Jimmy Lee** (Clinical PI), Consultant and Dy Chief, General Psychiatry 1, IMH  
**Dr Zhang Hai Hong** (Technical PI), Institute for Infocomm Research (I<sup>2</sup>R), A\*STAR  
**Dr Guan Chuntai** (Co-Investigator), Institute for Infocomm Research (I<sup>2</sup>R), A\*STAR  
**Asst Prof Helen Zhou** (Co-Investigator), Duke-NUS  
**A/Prof Tan Bhing Leet** (Co-Investigator), Principal Occupational Therapist, IMH



Illustrative Diagram of the Operation

## Visiting Expert Sheds Light on Research in Primary Care

**Prof Kurt Stange, Professor of Family Medicine & Community Health, Epidemiology & Biostatistics, Oncology and Sociology at Case Western Reserve University and Editor of the Annals of Family Medicine, visited National Healthcare Group Polyclinics (NHGP) from 13th to 17th February 2017 under the Ministry of Health's Health Manpower Development Plan (HMDP) – Visiting Experts (VE) scheme.** This five-day programme, organised by NHGP Clinical Research Unit (CRU), aimed to impart skills necessary to develop successful and sustainable research in primary care.

During the visit, Prof Stange conducted lectures and workshops on research

methodologies and medical writing. Highlights included group activities on designing research studies, evaluating innovations and outdoor fieldwork to collect qualitative data. Prof Stange also visited Toa Payoh Polyclinic, met with NHGP Senior Management to discuss on evaluation of NHGP's initiatives, and engaged in several project discussions. The interactive sessions proved fruitful with many exchanges of ideas.

Prof Stange was impressed with the health services research and evaluation being carried out at NHGP and enthused that these research initiatives play an important role in addressing the challenges arising from the local ageing population and increasing

multi-morbidity, therefore having the potential to contribute to medical knowledge internationally.

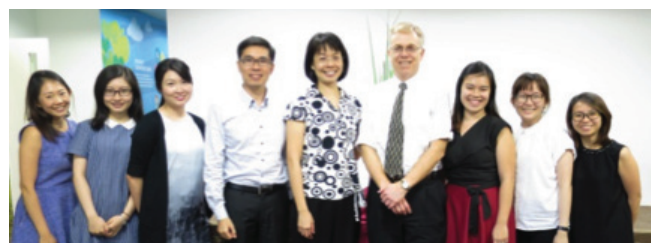
Besides offering deeper insights into research, Prof Stange's visit also provided a **platform for the exploration of new research initiatives by the participants from the various healthcare and academic institutions.** These have given further impetus to the advancement of family medicine and primary care research in NHGP.

A big Thank You to all who participated in the programme for making this HMDP visit a fruitful and successful one!

**Contributed by NHGP**



Prof Kurt Stange (6th from right) with NHGP Senior Management



Prof Kurt Stange (4th from right) with the team from NHGP CRU



## Congratulations to the Awardees of the FY2017 Clinician-Scientist Preparatory Programme (CSPP)!

The CSPP aims to provide clinicians with an exposure to research in the early phase of their career through research training and project experience. Visit NHG Research Website [www.research.nhg.com.sg](http://www.research.nhg.com.sg) (Announcements) for more information of the awardees.

Name	Designation	Department, Institution	Project Title
Dr Sim Sai Zhen	Family Physician	Hougang Polyclinic, NHGP	The Impact of Multimorbidity on Patients in the Singapore Primary Healthcare Setting
Dr Cao Taige	Seamless Trainee	Dermatology, NSC	Pathophysiology of Itch in Atopic Dermatitis: a 3-Dimensional Study of Itch Mediators and Cutaneous Innervation
Dr Sophie Cai	Seamless Trainee		Elucidating the Role of Innate Immunity involving IL-1 Cytokines and Inflammasome Signaling Pathways in the Pathogenesis of Psoriasis
Dr Kenneth Fong	Seamless Trainee		Assessing the Functional Significance of Candidate Genes Associated with Acne Vulgaris using Inducible Mutation System in Sebocyte Organoid Models
Dr Tan Seng Kiong	Senior Resident	Endocrinology, TTSH	Personalised Medicine - Effect of Genetic Polymorphisms on the Management of Hypothyroidism
Dr Kwek Liling	Registrar	General Surgery, TTSH	Measurement of Psoas Muscles can Accurately Predict the Nutritional Status of a Colorectal Patient
Dr Chia Po Ying	Senior Resident	Infectious Diseases, TTSH	A Better Vital Sign in Dengue Fever: Shock Index, Modified Shock Index or a Novel Shock Index
Dr Bryan Tan	Senior Resident	Orthopaedic Surgery, TTSH	Prospective Evaluation of Clinical Profile and Treatment Outcomes (Effectiveness, Safety Functional Outcomes and Cost) of Proximal Humerus Fracture
Dr Ang Mu Liang	Resident		Stable Ankle Fractures for Early Steps Trial - Weber B (SAFFEST - B)
Dr Michael Yam	Senior Resident / Clinician Scientist		Does Physical Therapy increase Hamstring Tendon Size and preserve Mechanical Properties?

## Congratulations to the Awardees of the 2nd RRIS Rehabilitation Research Grant

The 2nd Rehabilitation Research Institute of Singapore (RRIS) Rehabilitation Research Grant (RRG2) was jointly launched by Agency for Science, Technology and Research (A\*STAR), National Healthcare Group (NHG) and Nanyang Technological University (NTU) in August 2016.

The grant serves to promote collaborative rehabilitation research in order to generate

new knowledge to improve rehabilitation clinical practices for the local and/or Asian population. Submitted applications for RRG2 have to fall within one of the four themes of focus for RRIS: Psychosocial Rehabilitation, Neuro-Rehabilitation, Frailty & Nutrition Management in Rehabilitation, and Advanced Technology for Rehabilitation Continuum of Care.

In order to promote academic excellence for student training in the area of rehabilitation research, RRG2 has also included an NTU Research Student Scholarship (RSS) component.

After a rigorous selection by the Rehabilitation Selection Panel, six applications were selected for funding based on merit.

Project Title	Clinical Lead- Principal Investigator	Technical Lead- Principal Investigator
Technology Assisted Upper Extremities Movement Measurement System for Tele-rehabilitation	<b>Mr Kuah Wee Keong Christopher</b> Department of Rehabilitation Medicine, TTSH	<b>A/Prof Ang Wei Tech</b> School of Mechanical & Aerospace Engineering, NTU
Device-free Passive Tracking and Fall Detection for Home-based Rehabilitation	<b>Dr Kong Keng He</b> Department of Rehabilitation Medicine, TTSH	<b>A/Prof Cheah Chien Chern</b> School of Electrical & Electronics Engineering, NTU
Novel Support Surface Based on Smart Materials to Alleviate Pressure Ulcer Formation During the Rehabilitation of Immobile Patients	<b>Dr Adela May Tow Pei-Er</b> Department of Rehabilitation Medicine, TTSH	<b>Dr Chiam Keng Hwee</b> Bioinformatics Institute, A*STAR
Virtual Integrated Therapy for Active Living (VITAL) Health Box: A Monitoring and Motivating Companion to Reduce Frailty and Maintain Health for Older Adults	<b>Dr Loh Yong Joo</b> Department of Rehabilitation Medicine, TTSH	<b>Prof Theng Yin Leng</b> Wee Kim Wee School of Communication and Information, NTU
Smart Rehabilitation Exosuits for Clinic and Home Assistance	<b>Ms Ng Chwee Yin</b> Department of Rehabilitation Medicine, TTSH	<b>Asst Prof Lorenzo Masia</b> School of Mechanical & Aerospace Engineering, NTU
Evaluating the Clinical Utility of Speech and Motor Characteristics in Psychiatry	<b>Dr Jimmy Lee Chee Keong</b> Department of General Psychiatry, IMH	<b>A/Prof Justin Dauwels</b> School of Electrical & Electronic Engineering, NTU

## LKCMedicine Boosts Family Medicine with New Initiative

LKCMedicine is committed to advancing academic family medicine in Singapore. To this end, **the School appointed its first Professor of Family Medicine & Primary Care - Prof Helen Smith. Prof Smith will work alongside Assoc Prof Chong Phui-Nah, CEO, National Healthcare Group Polyclinics (NHGP), to drive the formation of the Centre for Primary Health Care Research & Innovation** which was first announced during the Opening Ceremony of the 2016 Singapore Health & Biomedical Congress.

**Jointly helmed by LKCMedicine and NHGP, the Centre will look at introducing new technologies and innovative ways of delivering quality family medicine and primary care to patients**, including better management of chronic and multiple diseases and improved support for caregivers.

The Centre will also enhance the awareness of medical practitioners who are active in

research on the latest developments in the field of family medicine.

As Professor of Family Medicine & Primary Care, Prof Smith contributes expertise gained over more than 20 years of experience in academic general practice in the UK and Canada. Prior to joining LKCMedicine, she was the Foundation Chair of Primary Care and Head of the Division of Public Health & Primary Care at the then-newly established Brighton & Sussex Medical School in the UK.

A leading exponent of Primary Care Research Networks, Prof Smith has an extensive track record of establishing such networks in the UK, and advising on their development in the Netherlands, Canada, Thailand and Australia.

One of the biggest challenges facing primary healthcare in Singapore is the increasingly complex needs of our ageing population.

“Prof Smith said, “The care provided for the ageing population needs to be attentive to all their concerns, be they physical, social or psychological. To better manage the growing number of patients with multi-morbidity requires the evaluation of novel approaches to care. Our evidence will be derived from research that is very patient-centred, unlike the traditional disease-focussed studies. We very much want our Centre’s research to address those problems encountered commonly, and for our findings to impact on the wellbeing of many patients, carers and health professionals.”



To read more about Prof Smith, please click [here](#).

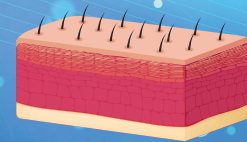
*Adapted from The LKCMedicine article. Click [here](#) for the full article.*

## GOOD TO READ!

### Detection of Residual Lentigo Maligna Using the In Vivo Reflectance Confocal Microscopy.

Find out how Reflectance Confocal Microscopy (RCM) imaging is used to detect residual lentigo maligna in this first-of-its-kind study in the region.

Click [here](#) to read now!



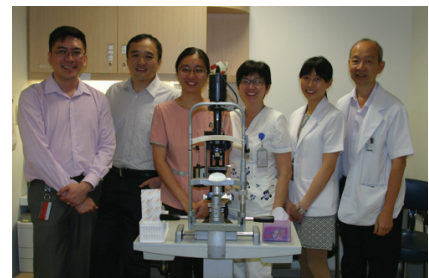
## Enhancing Accessibility for Physically Challenged Patients

The idea to work on redesigning the slit lamp came from a constant problem we have with patients that present at the clinic in a wheelchair. As the existing wheelchairs used were not optimally compatible with the current slit lamp table, patients are constantly forced to adopt awkward positions or need to be transferred from the wheelchair to the slit lamp examination chair. This transfer increases the risk of a fall and can require the support of up to four staff.

As this problem is prevalent in various services that the Eye Clinic provides, we formed a multi-disciplinary team comprising of a patient service associate (PSA), an ophthalmic technician, a clinician and optometrists to look into the development of an improved table that would meet our needs.

Our preliminary data collected revealed that an improved table could potentially contribute to the reduction in clinic waiting time by as much as 18.5 hours a month. This is in addition to the manpower savings as it would only require a single staff to position the patient. The patient’s experience would also likely be improved as he/she would no longer be subjected to adopting uncomfortable postures.

At present we have engaged a contract manufacturer to design and fabricate the improved slit lamp table based on our requirements. This prototype will then be used in a pilot study in Clinic 1A to fine-tune the design. The team is eagerly awaiting the results of the pilot test to see the fruits of our labour. We have high hopes that this table could eventually be used for any other table-mounted equipment that needs to be accessible to the patients.



*Multi-disciplinary team (From left) : research manager Dr Jason Tang, senior resident Dr James Ng, PSA Lau Tiam Choo, Ms Soo Hoo Wai Cheng, optometrist Joannabell Tan and optometric technician Mr Bong SW Siong.*

Contributed by:

**Ms Soo Hoo Wai Cheng**

Assistant Nurse Clinician  
National Healthcare Group Eye Institute  
Tan Tock Seng Hospital



## Advancing Mental Health Research, One Stat at a Time

The past eight years of working in mental health research have been immensely rewarding for me. I have learnt the importance of stringent data collection, appropriate use of statistical techniques and modelling and reporting relevant research findings for planning of mental health policies and services for the country.

My first research experience was with the research team for the Singapore Mental Health Survey led by principal investigator Prof Chong Siow Ann (Vice Chairman Medical Board (Research)) which yielded a rich body of information on the prevalence of mental disorders and the co-occurrence of chronic medical conditions in the community. Subsequently, I played a key role in the analysis of a number of our recently completed studies including the Well-being in Singapore Elderly (WISE) Study and the Mind Matters Study which established the rates of dementia among older adults and mental health literacy. I have also analysed the clinical database from the Early Psychosis Intervention Programme extensively to assess programme outcomes as well as explore interesting hypothesis-driven queries from the clinicians.

It was through these research projects with the continued guidance and support of my mentors, Prof Chong and Asst Prof Mythily Subramaniam (Director, Research Division) that **I have had the opportunity to explore different statistical techniques to enhance our understanding of the pathways that link socio-demographic factors, chronic mental and physical conditions to health outcomes from cross-sectional and longitudinal studies.** These experiences have motivated me to continue applying advanced statistical techniques such as mediation analysis within a structural equation modelling framework to examine the complex relationship between predictors, mediators and outcome data in mental health studies.

**I am really grateful to the NHG Research Support Scheme (RSS) for providing me an unique opportunity to further my research interest in statistical modelling by providing me grant support to conduct research on 'Mediation analysis using structural equation modeling: Application in Early Psychosis Intervention Programme and WISE Study'.** I hope that this project will be able to provide greater insights into the nature of

treatment effects of an existing local intervention programme and pathway relationship between multiple factors with health outcome in people with mental illness using mediation models based on structural equation model frameworks.

Going forward, I hope I will be able to **replicate these statistical models in other local population-based survey data that are available and focus on the methodological work on causal mediation analysis, particularly its use in population health and contribute to better policies and intervention.**

*Dr Abdin is an awardee of the FY2015 NHG Research Support Scheme (RSS), a research manpower development programme administered by the NHG Research & Development Office.*



Contributed By:  
**Dr Edimansyah Abdin**  
Senior Biostatistician  
Research Division  
IMH

## An Eye-opening Research Experience from a Medical Student's Perspective

My first foray into the realm of clinical research started off in my fourth year of medical school, when I first met my mentor, Dr Rupesh Agrawal, to discuss potential research opportunities. Not having had much research experience then, I was eager to learn its processes but was also apprehensive as to whether it would be beyond my capabilities as a medical student.

With much support and guidance from Dr Agrawal as well as colleagues at the National Healthcare Group Eye Institute (NHGEI), **I embarked on a number of research projects on ocular immunology and inflammation, from review articles, to a case series analysis, and to a retrospective cohort study on the epidemiology of ocular inflammation in**

**Singapore.** It was a great honour and privilege to be able to present our work at the International Colloquium of Intraocular Inflammation in Chennai, India, and at the XXII Biennial Meeting of the International Society for Eye Research in Tokyo.

Being bombarded with a barrage of new terminologies and the struggle to acquire new skill sets was rather disorientating at first, but it was ultimately fulfilling to see the fruition of our hard work collecting data to answer the original research question. It was truly an enlightening experience to have Dr Agrawal as my mentor, as he inspired me with not just the extensive depth and breadth of his knowledge, but also his inquisitive mind, and his zealous passion and enthusiasm for his work. He

**demonstrated how the roles of clinician and scientist are intricately interwoven and how they work synergistically to improve the lives of our patients.**

I am grateful to have had this opportunity, and I believe that **such experiences will motivate medical students like myself to hold on to the passionate and unceasing curiosity about medicine.**



Contributed By:  
**Ms Elizabeth Chen Jiahui**  
Final Year Medical Student  
National University of Singapore  
Yong Loo Lin School of Medicine

## Research Training Events

Date	Training Programme	Course Provider
Ongoing	Good Clinical Practice (Online)	NHG RDO
Ongoing	Proper Conduct of Research - Basic I and III (PC101 & PC103) Online	
08 May 2017	To Start a Research Project: How?	TTSH CRIO
18-19 May 2017	Project Management for Clinical Research Professionals	NHG RDO
24-25 May 2017	Cochrane Workshop on Network Meta-Analysis	TTSH CRIO
3-4 July 2017	Good Clinical Practice	NHG RDO
11-13 July 2017	Biostatistics	
18 July 2017	Grant Writing and Management	

*\*Dates are subject to changes without prior notice.*

For registration and full details on courses by:

~ NHG Research & Development Office (RDO), please visit [www.research.nhg.com.sg](http://www.research.nhg.com.sg)  
(Training & Education > Register for Courses and Other Events)

~ TTSH CRIO, please contact Ms Siti Aisha Binte Jaffar ([Siti\\_Aisha\\_JAFFAR@tsh.com.sg](mailto:Siti_Aisha_JAFFAR@tsh.com.sg))

**Qualité** (Issue 26, Mar 2017)

### Education to facilitate high standards of research conduct

- Prohibition Against Commercial Trading of Human Tissue under the Human Biomedical Research Act (HBRA)
- Revision of DSRB Policy to Allow Dentists Under Temporary or Conditional Registration to be Principal Investigators
- DSRB Update: Financial Conflict of Interest Annual Declaration Cycle for 2017

Click on each of the above points to find out more

## Out on a (Upper) Limb for Research

**Helping patients recover has always been and will always be my first love.** It gives me joy to see my patients recover but it also saddens me to see patients struggling to get better, particularly for some who may never fully recover. It is this desire to help them that drives my passion in research.

**A recent study showed that only 28% of the patients suffering from stroke in Singapore regain the use of the affected upper limb (UL).** The other two-thirds of stroke patients have to live with the devastating loss of the affected hand after stroke. It is more than just being able to use the affected UL; it represents a hope of recovery for the patients.

Research in UL recovery after stroke has been growing but the translation of the research into clinical practice has been limited. Clinicians have been bound by many constraints. **To improve clinical practice, we need evidence that supports translation from bench to bedside, and practical research that works in a constraint-driven real clinical world.**

As a National Medical Research Council (NMRC) training fellow, I explore practical ways to increase the use of patients' affected UL, with scientific evidence of neuroplastic changes in the brain after stroke. By improving our understanding of such changes, we can be more precise and efficient in our quest to optimise post-stroke management.

It is my hope that my findings will drive therapy delivery by empowering patients to take ownership of their recovery and perform exercises independently which would complement the therapy at the early phase of recovery.

This sounds straightforward but it is in fact a challenge to implement in the real world. Stroke patients are not always willing, or able to, perform the recommended exercises on their own, despite the research evidence supporting the need to. The way forward would be to **tap on available technologies such as social robots and mobile devices to optimize compliance on self-exercise.** The ultimate aim is to optimize patients' UL recovery after stroke in the most efficient and effective manner.

It is a big dream. However, I am not worried because I know that I am working with a wonderful team of allied health professionals, nurses and doctors who share the same passion as me. We will work together to achieve this big dream.

*Ms Chin is a recipient of the 2016 NMRC Research Training Fellowship (RTF). Click [here](#) to find out more about the RTF.*



Contributed By:  
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Principal Physiotherapist  
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