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**Hong Kong Pharmacy Conference 2018**

March 10 - 11, 2018

**30<sup>th</sup> Pearl Anniversary:  
Pharma-Collaboration for New Frontiers**



*The Pharmaceutical Society of Hong Kong  
The Practising Pharmacists Association of Hong Kong  
The Society of Hospital Pharmacists of Hong Kong*

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# Welcoming Message

Dear Colleagues and Friends,

It is with great pleasure to extend you a warm welcome to the 30<sup>th</sup> Hong Kong Pharmacy Conference (HKPC) in 2018 with the theme “30<sup>th</sup> Pearl Anniversary: Pharma-Collaboration for New Frontiers”, to be held on 10-11 March, 2018 at the Hong Kong Convention & Exhibition Centre. This year’s conference will be a special occasion for the pharmacy profession in celebration of the 30<sup>th</sup> Pearl Anniversary of Hong Kong Pharmacy Conference.

Building on the success on “*To Innovate and Excel*” in last year’s conference, HKPC 2018 has been correspondingly designed to advocate collaboration among pharmacists and other healthcare professionals to explore on new frontiers. In the light of ‘*Pharma-Collaboration*’, this year’s theme is a prospective and united one aims to strengthen the practice collaboration in the healthcare system. Successful collaboration will affirm the pharmacists’ roles in the healthcare system that helps enrich the advantages in emerging new frontiers of pharmacy practice.

The Organizing Committee has endeavored to make the conference programme both a thematic and groundbreaking one in the context of practice collaboration. The conference programme will feature renowned speakers of keynote and theme speeches on both local and international perspectives of pharmacy development as well as the nine major streams of evolving new frontiers of pharmacy practice to showcase the latest research findings and innovations. Opportunity comes once in a year, don’t miss your chance to ignite sparks of innovative ideas and creative inspirations in the plenary session as the most exhilarating programme before closing.

The HKPC has become the premier platform not only for the presentation of new practice and science, but also for unique networking opportunities with leading experts, pharmacists, scientists, researchers, friends and colleagues as well as sponsors and exhibitors. The mission of ‘*Pharma-Collaboration*’ can only be accomplished with conducive cooperation among various stakeholders of the pharmacy profession and let’s avail yourselves of the opportunity to explore potential collaborations for future frontiers.

I sincerely wish you will find the HKPC 2018 enlightening and inspiring. Come share new perspectives about the new frontiers of pharmacy profession and your joy in the celebration of the Pearl Anniversary of HKPC. Above all, “*Pharma-Collaboration for New Frontiers*” will pave your journey forward to new destination. I look forward to welcoming you at the conference.

Sincerely yours,



Simon So, DCLinPharm, MHA, BCPS, BCGP, BCCCP  
Chairman, Organizing Committee  
Hong Kong Pharmacy Conference 2018





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### **Keynote Address and Theme Speech 1**

## **Prospects of Pharmacists in the Health Care Services Provision of Hong Kong**

Abstract is not available

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### **Theme Speech 2**

## **Strategic Planning for Pharmaceutical Services 2017–2022, Hospital Authority of Hong Kong**

**LEE, Anna**

Chief Pharmacist, Hospital Authority, Hong Kong

The Hospital Authority (HA), as the major public healthcare service provider in Hong Kong, delivers a comprehensive range of subsidized healthcare services for the local community. In the face of rapid changes in the external environment, like ageing population, rising public expectations, escalating costs and advanced technological developments, HA has formulated a Strategic Plan for 2017–22 to guide its service planning and development with strategic foci on providing patient-centred care, developing a committed and competent workforce and enhancing financial sustainability. Along these strategies, HA has been steering its pharmaceutical services to a new paradigm. With the growing service demand and heightened awareness of medication safety, the scope of pharmaceutical care in public hospitals has gone beyond the conventional boundary of drug supply and dispensing. In recent years, HA has implemented various initiatives in both inpatient and outpatient settings and introduced different clinical shared care and service delivery models with the support of advanced technologies in order to further enhance pharmaceutical care, improve medication safety, address the long waiting time for drug dispensing, reduce drug wastage and empower patients for better self-care. The professional roles of pharmacists have also been extended in both breadth and depth while the overall competence of pharmaceutical staff has been strengthened to meet the evolving service needs and deliver holistic care for our patients. HA will keep on exploring further collaborative opportunities in order to bring public hospital pharmaceutical services to a new horizon.

### Theme Speech 3

## Evolution of Medication Management under the Healthcare Reform in Mainland China

### 中國醫改下的藥物管理發展與改革

顏冰

處長  
北京市醫管局藥事處

醫院藥事管理工作作為現代醫院管理的重要組成部分，具有很強的政策性、學術性、技術性、實踐性。在過去一段時期裡，因為以藥補醫的不合理激勵機制，中國醫院藥學工作一直圍繞藥品的供應保障，與臨床藥學結合不夠，藥師沒能很好的發揮合理用藥管理作用。在北京市2012年開始的醫藥分開綜合改革中，北京市醫院管理局將醫院藥學與合理用藥、臨床服務緊密結合，帶領北京市屬醫院在藥學部門的建設、合理用藥管理、績效管理，藥品採購，總藥師制度、用藥諮詢、MTM藥物治療管理門診、精準用藥等方面進行了探索，發揮藥師保障患者安全合理用藥的專業優勢，實現從“賣藥”向“賣服務”的積極轉變。

(This session will be conducted in Putonghua)

### Theme Speech 4

## Separation of Prescribing and Dispensing in Taiwan

WANG, Tsung-hsi

Secretary General, Ministry of Health and Welfare, Taiwan

The presentation includes four topics regarding the separation of prescribing and dispensing in Taiwan. The history of separation and dispensing, current pharmaceutical manpower, the outcome and future of the separation of prescribing and dispensing in Taiwan. The trend of pharmaceutical administration and management was product-oriented. With the increasing complexity of medical products, the focus is shifted to patient-oriented. In Taiwan, the Pharmaceutical Affairs Act passed in 1993 was to replace the first regulation, the Drug Administration Law, amended in 1970. With the implementation of separation of prescribing and dispensing, people in Taiwan become more reliant on Pharmacist.

The separation of prescribing and dispensing has been implemented for 20 years since 1997. The concept is to have the drugs prescribed by physicians and dispensed by pharmacists. By doing so, the functions of physicians and pharmacists can be balanced. Physicians make diagnosis and prescription, while pharmacists check the potential drug-drug interactions or duplicated prescriptions to ensure the safety for medication. There were two steps for implementing the separation of prescribing and dispensing. First step was the implementation in two municipalities, Taipei and Kaohsiung, without any exception. The second step was to carry out the announcement of “the indicators and methods to implement the separation of prescribing and dispensing”.

One of the major indicators to evaluate the outcomes of the separation of prescribing and dispensing is the prescription release rate. The average prescription rate from 2008 to 2016 was 22.7%, higher than 18.3% from 1997 to 2007. Another benefit is establishing the professional images for pharmacist in the society. In 2016, a survey showed that the pharmacists rank second the most trusted professionals. We believe there are still rooms to be improved for the policy of separation of prescribing and dispensing. We hope that the next 20<sup>th</sup> anniversary will be more successful.



### Theme Speech 5

## Journey to Establish and Expand Clinical Pharmacy Service to Provide Pharmaceutical Care to Paediatric Patients at Hospital for Sick Children

**SETO, Winnie**

Therapeutic Drug Monitoring Coordinator and Critical Care Unit Pharmacist, Department of Pharmacy, The Hospital for Sick Children, Canada

Clinical Pharmacy Service focusing on provision of pharmaceutical care to patient along with medication safety are key considerations in the design and implementation of medication-related processes throughout the hospital. Successful implementation requires collaboration and teamwork with patients, families and hospital colleagues with core values of integrity, quality and professionalism to fulfill pharmacists' responsibilities. Clinical Pharmacists are proactive patient advocates in all aspects of the management of drug therapy, direct providers of family - centered patient care, and accountable to the patient and family. Pharmacists are expected to provide exemplary pharmaceutical services that meet the highest professional standards, participate fully in the academic mandate of the hospital by advancing new knowledge about drug therapy and paediatric pharmacy practice through research; and inspiring excellence in paediatric pharmacy practice through teaching, education and knowledge-sharing. In addition, pharmacists aim to improve the quality of life for our patients by ensuring the responsible provision of drug therapy while encouraging innovation, knowledge-sharing and the adoption of evidence-based care. Ultimate goal is to improve patient health outcomes through optimal medication therapy.

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### Concurrent Session I: Planning

## Interactive Panel Discussion – Experience Sharing on Hospital Pharmacy Commissioning

**CHAN, Victoria**

Senior Pharmacy Manager, Gleneagles Hong Kong Hospital, Hong Kong

**PANG, Janet**

Senior Pharmacist, Planning Office, CUHK Medical Centre, Hong Kong

**POON, Freddie**

Senior Pharmacist, Pharmacy Department, Hong Kong Children's Hospital, Hong Kong

Abstract is not available

### **Concurrent Session II: Clinical Practice – Oncology** **Impact of Clinical Pharmacists in Oncology Care at National Cancer Centre in Singapore**

**LEW, Kaung-yuan**

Principal Clinical Pharmacist, Department of Oncology Pharmacy, National Cancer Centre Singapore, Singapore

Globally, the role of a clinical pharmacist has grown over the years. In the last two decades, we have made the shift from dispensing medications behind the counters to becoming more involved in direct patient care.

In oncology for example, therapy is becoming more complex. Patients are being treated with more drugs and consequently develop more toxicity. Managing toxicities often require more time and resources. Hence, oncologists may refer patients to pharmacists to be managed. In this collaborative practice, clinical pharmacists and oncologists can work together to develop algorithms that can be used to help make clinical decisions and guide patient care.

In addition, oncology patients may be taking multiple medications for other comorbid conditions, leading to polypharmacy. As oncologists are primarily focused on cancer treatment, they have limited time and resources to manage their patients' comorbidities. This presents an opportunity for clinical pharmacists to support oncologists by helping to review and manage patients' medications.

In this presentation, the speaker will share his team's journey in establishing the role of clinical pharmacists in patient care at National Cancer Centre Singapore. He will focus on the impact of Medication Therapy Management Service and Pharmacy Review Service to patient care.

### **Concurrent Session II: Clinical Practice – Oncology** **A Step Forward in Cancer Patient Care – The Experience of an Oncology Pharmacist-managed Trastuzumab Clinic in Queen Mary Hospital**

**YUEN, Amy**

Queen Mary Hospital, Hong Kong

With the growing cancer patient population and healthcare demand, multi-disciplinary management approach has been advocated to optimize care for cancer patients and to enhance service quality. The setting up of Pharmacist Clinics in Hospital Authority is one of such initiatives.

As we know, breast cancer incidence has been increasing in the past decades. Among them, HER2 positive breast cancer accounts for about 20% of cases. With the promising clinical outcomes and tolerable side effect profile, HER2 targeted agents such as Trastuzumab has been widely in use. For patients on adjuvant Trastuzumab, a total course of one year is needed and given such a long treatment period and also a more stable patient characteristic for this population, Clinical Pharmacists' input are seemingly beneficial.

Thus, the Oncology Pharmacist-Managed Trastuzumab Clinic, which is run by an Oncology Pharmacist and targets patients on adjuvant maintenance Trastuzumab therapy, has been established in Queen Mary Hospital in January 2016. The implementation of this service aims to optimize the safety and efficacy of adjuvant Trastuzumab therapy for patients with early breast cancer through the integrated care of Oncologists and Oncology Pharmacist, and also shortens the waiting time for patients and reduces the workload of Oncologists.

### **Concurrent Session II: Clinical Practice – Oncology** **Development of a Haematology Pharmacist Clinic: An Experience Sharing**

**SO, Renwick**

Pharmacist, Department of Pharmacy, Prince of Wales Hospital, Hong Kong

Clinical pharmacy is rapidly developing in recent years. Oncology is one of the fields which provide opportunities for pharmacists. In this presentation, the speaker will share his experience on how to identify gap to develop new oncology clinical pharmacy service in his hospital. The considerations and challenges in service development will be discussed.

### **Concurrent Session III: Research/Training** **Interactive Workshop on Practice Research – The Problematique:** **Solving the Equation with a Series of Collaboration**

**CHEUNG, Yin-ting**

Assistant Professor, School of Pharmacy, The Chinese University of Hong Kong, Hong Kong

**CHOW, Twinny**

Resident Pharmacist, Department of Pharmacy, Hong Kong Children Hospital, Hong Kong

**EWIG, Celeste**

Lecturer, The Chinese University of Hong Kong, Hong Kong

**LAM, Teddy**

Assistant Professor, School of Pharmacy, The Chinese University of Hong Kong, Hong Kong

**LI, Janice**

Resident Pharmacist, Department of Pharmacy, Hong Kong Children Hospital, Hong Kong

**WONG, Jasper**

Clinical Pharmacist, Department of Pharmacy, Hong Kong Children's Hospital, Hong Kong

While vast amount of resources have been invested on developing evidence-based medicine or the drug product itself, the importance of adopting a high quality health-service delivery is also increasingly recognized. Over recent decades, the discipline of Health Services Research (HSR) has contributed significantly to the investigation of intricate relationships between various socioeconomic factors and healthcare outcomes. Pharmacy practice research, as a subspecialty within HSR, focuses on pharmacy services. With pragmatic considerations, pharmacy practice research embraces carefully thought-out research designs with an ambitious aim to systematically explore how and why people access pharmacy services, the implication of such services and the patient outcomes.

To further exploit the expertise of pharmacists and advance clinical pharmacy service development, strong support and promotion of practice research is needed. Successful pharmacy practice research is quintessential for promoting a paradigm change of pharmacy practice from a technical supply function to a cognitive-based profession. However, besides a mere enthusiasm to demonstrate the contribution pharmacists can make, pharmacists need to be adequately prepared with training and practice on the sophisticated methodological approaches involved in practice research.

This session aims to integrate research theory with practical applications. Participants will be involved to brain-storm and walk through the key processes of an example pharmacy practice research project. The speakers will showcase / share the steps taken in the project, specifically on:

1. Conceiving the project idea
2. Background info / literature search strategy
3. Development of the objective & outcomes
4. Ethics approval practical considerations
5. Pilot data to showcase analysis
6. Obstacles and refinement

### **Concurrent Session IV: Partnership Practice of Pharmacy in Private Sector in China**

**ZHANG, Helen**

Director, Department of Pharmacy, United Family Healthcare, Mainland China

In 2012 the Chinese government announced ambitious plans to develop the private healthcare sector, in order to relieve the strains on the public healthcare system resulting from the rapid ageing of the population. It set in motion a series of reforms that raise the number of private hospitals from 5,000 in 2008 to close to 18,000 in 2017.

At present, China has three main types of private hospitals: high-end, service-oriented ones, which target expatriates and wealthy Chinese patients; specialty facilities, which typically focus on elective services, such as medical cosmetics; and large general hospitals that are included in public health insurance networks. Private hospitals are further divided into for profit and non-profit.

Pharmacy services provided by the private hospitals also vary in scope, scale and quality. In 2013, with support of Chinese Society of Hospital Pharmacists, the sub-committee of private hospital pharmacists was founded. Its mission is to enhance cooperation between private-public sectors; improve pharmaceutical services provided; ensure rational use of medications through standardized management; personnel training program and career development.

With Chinese healthcare reform moving forward in full capacity and policies such as “zero drug markup” and the “Healthy China 2030 initiatives”, role of pharmacists is actively evolving. Private healthcare, as one of the integral part of the reform, is definitely facing opportunities as well as challenges.

(This session will be conducted in Cantonese)

### **Concurrent Session IV: Partnership Electronic Health Record Sharing System (eHRSS) for the Pharmacy Profession**

**LEE, Ida**

Commissioner for the Electronic Health Record and Head (eHR), Food and Health Bureau, Hong Kong

In today's clinical setting where team-based care is commonplace, the sharing of electronic health records (eHRs) has a key and catalytic role to play in the provision of integrated and coordinated care by healthcare professionals. The Electronic Health Record Sharing System (eHRSS), launched by the Government of the Hong Kong Special Administrative Region in March 2016, provides an essential infrastructure that enables two-way sharing of participating patients' eHRs between authorised healthcare providers in the public and private sectors.

The roll-out of the territory-wide eHRSS marks a major milestone of healthcare service delivery in Hong Kong. Since its launch in 2016, access to eHRSS has been gradually enabled for different healthcare professional disciplines, including more recently the pharmacy profession in institutional settings. In practical terms, how can the pharmacy profession participate in eHRSS and benefit from eHR sharing? In what capacities can pharmacists leverage on the wealth of eHRs available in the system to support pharmaceutical care? What opportunities are there for the pharmacy profession to collaborate with other healthcare disciplines to enhance healthcare services through the use of eHRSS? In this session, Ms. Ida Lee, Commissioner for the Electronic Health Record, will give an overview of eHRSS, and share with participants how the pharmacy profession can take part in and benefit from eHR sharing, as well as the potential opportunities and future developments of eHRSS relevant to the profession.



### **Concurrent Session IV: Partnership**

## **The Partnership Approach of Implementing Pharmaceutical Service Models in the Residential Care Homes for the Elderly (RCHE)**

**CHIANG, Sau-chu**

Director, The Hong Kong Pharmaceutical Care Foundation Ltd., Hong Kong

The majority of the RCHEs do not have a reliable and user friendly IT system which is the essential component to streamline the workflow processes relating to the complicated yet important medication management processes that are running daily at these institutions. They also do not have the ability to deploy automation to support their dispensing and drug packaging operations. The HKPCF is determined to address the fundamental issues and concerns encountered by the RCHEs by developing and implementing an integrated service model which includes the following components:

- (I) Provide and support the use of Safe Medication Management System (SMMS)
- (II) Provide Multi Dose Medication (MDM) packaging service
- (III) Provide the Drug Administration Record system with IoT (Internet of Things) and
- (IV) Providing the Visiting Pharmacists Service.

Hence, the entire integrated service has provided a technically feasible, financially affordable and operationally desirable solution to manage the medication management related processes at the RCHEs.

It demonstrates the smart combination of several ideas and concepts including appropriate use of the pharmacists' expertise in the health and medication related service, purposefully built system design with user friendly functions and features, the introduction of dispensing and packaging automation machines which relieve the burden of manual repetitive tasks, the use of smart IoT gadgets such as scanning of barcodes to trace and track the various actions performed.

The current means of workflow in most of the RCHEs by relying mainly on manual processes which are obviously tedious, error prone and unprofessional, only reflects the society's chronic negligence in this important area of service. But it is encouraging to hear in the 2018 Policy Address that the HKSAR is providing new financial support in promoting the use of Gerontechnology to make the lives of elderly better and smarter for the elderly Homes and Day Care Centres as part of the solutions to prepare for the ageing tsunami. Our Foundation is ready to play an active role to provide the new, professionally led service model using technologically supported solutions to deal with the aforementioned problems in order to make a difference.

The partnership approach of implementing the integrated solution with the challenges faced will be described in this presentation.

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### **Concurrent Session V: Clinical Practice – Paediatric**

## **Consolidating Overseas Experiences to Enhance Services to Patients under Paediatric Oncology**

**LAM, Sharon**

Pharmacist, Department of Pharmacy, Hong Kong Children Hospital, Hong Kong

**WONG, Jasper**

Clinical Pharmacist, Department of Pharmacy, Hong Kong Children's Hospital, Hong Kong

Can you imagine what will happen when lethally toxic drugs are given to a group of small vulnerable patients? This is exactly the situation when high dose chemotherapy is given to treat haematology/oncology diseases in children. Definitely you would like a clinical pharmacist be there to make sure everything is safe and that's our role of Paediatric Oncology clinical pharmacists.

With service commencement of Hong Kong Children's Hospital in 2018, five paediatric oncology centres will be merged into one tertiary centre. In order to cope with the service needs, we had attached to two world renowned paediatric hospitals, namely The Hospital for Sick Children in Toronto, and Great Ormond Street Hospital for Children in London, aiming to find out good clinical pharmacy practices and service models that can be incorporated into paediatric oncology patients in Hong Kong.

The presentation illustrates through a patient journey from diagnosis to discharge, to see how pharmacists provide patient-centered pharmaceutical care in different dimensions, and to appreciate how pharmacists evolved from traditional gatekeeper to proactive therapeutic advisor in paediatric oncology area. Inspired by oversea pharmacists' works, our future service model will be discussed.

### **Concurrent Session V: Clinical Practice – Paediatric Use of Therapeutic Drug Monitoring (TDM) to Improve Paediatric Clinical Pharmacy Service at the Hospital for Sick Children – Sharing 35 Years of Experience**

**SETO, Winnie**

Therapeutic Drug Monitoring Coordinator and Critical Care Unit Pharmacist, Department of Pharmacy, The Hospital for Sick Children, Canada

Therapeutic drug monitoring (TDM) of certain medications is essential in the maintenance of serum drug concentrations within the desired therapeutic range, above which toxicity occurs and below which ineffective therapy occurs. As paediatric patients undergo physiological changes that lead to different pharmacokinetic parameters compared to adults, a TDM service was initiated at the Hospital for Sick Children (SickKids) in 1983. TDM service need to include the following strategic directions to optimize paediatric clinical pharmacy services:

- Create a culture of service of excellence
- Optimize patient safety
- Foster clinical research excellence

### **Concurrent Session V: Clinical Practice – Paediatric How Clinical Pharmacists Contribute as an Integral Part of a Paediatric Nephrology Service? – A Physician’s Perspective**

**CHAN, Eugene**

Specialist in Paediatrics, Paediatric Nephrology Centre, Department of Paediatrics and Adolescent, Princess Margaret Hospital, Hong Kong

Patients with kidney diseases require long term medical care. It is not uncommon that these children are on multiple complex medications, especially when they receive dialysis treatment or renal transplantation.

Since our partnership in June 2012, Paediatric Nephrology clinical pharmacists have played a central role in enhancing medication safety and improving quality of patient care in children with kidney diseases. Pharmacists participate in both in-patient and out-patient settings to optimize individual drug therapies. Of note, therapeutic drug monitoring in transplant medicine has gained an increasing importance in this area. Pharmacists also enrich patients and/or their caregivers with appropriate drug knowledge, in the hope to reduce drug non-adherence. Over the years, our pharmacists have also involved in application of orphan drugs for rare renal diseases in Hong Kong, such as Eculizimab in the treatment of atypical hemolytic uremic syndrome.

We are excited for the further expansion of clinical pharmacist service in the upcoming Hong Kong Children’s Hospital. Multi-disciplinary approach, involving pharmacists’ support, is definitely beneficial to our renal patients. We are also hopeful for future service-enhancing projects, including a well-structured transition care program, as well as research studies to tailor-made drug treatment for the local population.

### **Concurrent Session VI: Primary Care Expanding Roles of Pharmacists in the Primary Health Care Setting**

**LEE, Evonne**

Senior Clinical Pharmacist, National Healthcare Group (NHG) Pharmacy (Woodlands), Singapore

The role of pharmacists has evolved today and has moved beyond just compounding and dispensing medicines to patients at the pharmacy counters. Clinical pharmacists, especially, are more involved in direct patient care during ambulatory care clinic sessions. At the National Healthcare Group (NHG) Pharmacy, clinical pharmacists manage and care for patient on Warfarin in the Anticoagulation Clinic (ACC) as well as complex patients with diabetes mellitus (DM), hypertension and/or dyslipidaemia in the Hypertension-Diabetes-Lipids (HDL) clinic. Besides our ACC and HDL clinics, our pharmacists are also actively involved in smoking cessation counselling and medication review for our patients. This session aims to give a brief overview of the clinic's protocols and processes, followed by case studies to illustrate patient management through continuity of care and close monitoring for better clinical outcomes, and suggestions for future improvements to these services.

### **Concurrent Session VI: Primary Care Enhancing Primary Healthcare Services with Use of New Technologies**

**POLOMOFF, Christina**

Assistant Clinical Professor, Department of Pharmacy Practice, University of Connecticut, USA

As technology within our society becomes more prevalent, accessible, and sophisticated, the pharmacy profession must keep up with medical advances and technological developments. Pharmacists must embrace the use of technology to expand their services beyond the traditional roles. Technology can facilitate the screening of chronic care disease states, such as diabetes, hypertension, and osteoporosis. It can also provide tools for monitoring efficacy and safety of medications. For example, portable instruments using smart technology ensure fast, accurate results for the management of anticoagulated patients. Telecare facilitates remote consultations for chronic care disease states and improves access to healthcare. Sophisticated apps on mobile devices help monitor disease parameters, process drug interactions, and perform medication identification. New interventions to improve adherence use emerging technology, such as automatic pill dispensers which help patients manage even the most complex medication regimens in the comfort of their own homes. Technology also enables the storage and analysis of patient records, which allows pharmacists to surface high-modifiable risk patients. Utilizing technology appropriately can improve patient safety and enable pharmacists to provide high quality care. Ultimately, utilizing technology in pharmacy practice will enhance clinical services and help patients achieve medication-related outcomes.

### **Concurrent Session VI: Primary Care NGO Community Pharmaceutical Care Services in Partnership**

**LEUNG, Pui-hong**

Pharmacist, St. James' Settlement Philanthropic Pharmacy, Hong Kong

'No Money No Talk' is an old slang of Hong Kong. Deprived people in Hong Kong are facing enormous problems, including medical need.

No money No drug? : Incomplete insurance coverage, expensive pricing of Self Finance Item (SFI) lead to the dead end of those patients with NONE affordability.

No money No time? : Medicine, a complicated substance needs adequate time for explanation. Could it be enough time for patient to be familiar with all their medications within 1 minute dispensing time?

We believed that there should be equitable access to essential medications and pharmaceutical care for the grassroots. St. James' Settlement, with the partnership of public hospital and charity donor, sets up the Philanthropic Community Pharmacy to alleviate the patient's issues.

We provide pharmaceutical counseling clinic for over one hundred patients per day, and reduce their financial burdens. Long-term alleviation of patients Issues is our service goal.

### **Concurrent Session VII: Policy Develop a Home Pharmaceutical Care Program in Taiwan**

**CHEN, Yu-chieh**

Division Director, Division of Clinical Pharmacy, Department of Pharmacy, China Medical University Hospital, Taiwan

Since 2010, Taiwan Pharmacist Association (TPA) applied and implemented several home pharmaceutical care programs sponsored by the Bureau of National Health Insurance (BNHI) to promote and protect patient medication safety. Until 2017, with the growth of the budget and patient number on home pharmaceutical care, the safety issues for pharmacists' home care is getting important. BNHI provided lists of patients with poly-pharmacy issues so that pharmacists could arrange home visits. Pharmacists were required to be trained and certified as long-term care pharmacists in order to provide the home care service. Each patient was followed at least once a month for 12 months with the aim of achieving the following goals:

(1) To decrease the number of visits so that yearly medical care expenditure falls by 10 per cent; (2) To cut annual drug expenditure by 10 per cent; (3) To reduce problems arising from drug treatment, and (4) To achieve appropriate drug therapy goals.

The BNHI agreed to the proposal and offered US\$300,000 for a pilot. Further details such as the certification processes, service process, reimbursement process, fees and data management were contracted with the BNHI. This is the first time the BNHI has been willing to pay for pharmaceutical care.



### **Concurrent Session VII: Policy**

# **Expansion of Pharmacist Service in California: The Implementation of SB 493 Legislation and its Impact on Improving Patient Care**

**CHAN, Pauline**

Senior Pharmaceutical Consultant, California Department of Health Care Services, USA

California Senate Bill (SB) 493, the landmark legislation that was signed into law by Governor Jerry Brown on October 1, 2013, was authored by State Senator Dr. Ed Hernandez with overwhelming support by pharmacists, other health care professional groups and the public.

The bill officially declares that pharmacists are health care providers who have the authority to provide health care services, allowing pharmacists to participate in multidisciplinary review of patient progress, including appropriate access to medical records, and strengthens the role of the pharmacist to provide consultation, training and education to patients about drug therapy, disease management and disease prevention.

The bill creates a new category of pharmacists in California – the Advanced Practice Pharmacist (APP). The California State Board of Pharmacy is responsible for creating a process to recognize the Advanced Practice Pharmacist, coterminous with the certificate holder's license to practice pharmacy.

This presentation will discuss new authorities granted to California pharmacists, the new rules and requirements, including high level of collaboration and communication between the pharmacist and other members of the health care team; the creation of uniform, state-wide protocols by the State Board of Pharmacy; training requirement through certification programs, and payment for pharmacist professional service in the California Medicaid (Medi-Cal) program.

By mobilizing pharmacists to work collaboratively with authorities and other health care professionals, California continues to advance and accelerate the practice of pharmacy to improve quality, efficiency and access to healthcare services, and to promote public health through safe medication practice for all.

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### **Concurrent Session VII: Policy**

# **Development and Certification of Competencies of Clinical Pharmacists**

**LAU, Alan**

Director, International Clinical Pharmacy Education, Pharmacy Practice, College of Pharmacy, University of Illinois Chicago, USA

Abstract is not available

### **Concurrent Session VIII: Clinical Practice – Expedition for New Frontiers Pharmacist-managed Clinical Services for Patients on Dialysis in Ambulatory Care Setting**

**DRAMBAREAN, Beatrice**

Clinical Pharmacist, Ambulatory Pharmacy Services, University of Illinois, USA

Dialysis is a unique setting where a pharmacist can play a helpful role. Incorporation into the interdisciplinary team is important as the pharmacist will work with many providers in all settings of dialysis. The pharmacist in such a setting is responsible for maintaining the medication profile for each patient in the electronic medication record as well as ensuring medications are appropriately renally adjusted and taken. Dialysis patients on average have between 10-12 medications that must be taken daily which increases the risk of non-adherence. This chronic disease state induces further comorbid conditions which require additional treatment and subsequent medications. Anemia and mineral and bone disease are complications which require careful monitoring and dosing. Pharmacists are in a good position to dose medications required for dialysis as we hold a strong understanding of drug knowledge as well as the ability to trend laboratory parameters when making dosing recommendations. Assessing a dialysis center's needs, reviewing examples of lab trending, and reviewing methods of increasing adherence to medications for patients will be discussed.

### **Concurrent Session VIII: Clinical Practice – Expedition for New Frontiers Beyond "Warfarin" "Clinic": Pharmacist-managed Comprehensive Anticoagulation Care Services**

**SHAPIRO, Nancy**

Clinical Associate Professor, Department of Pharmacy Practice, University of Illinois Chicago, USA

For many years, it has been recognized that higher quality anticoagulation management could be achieved by the creation of pharmacist-managed anticoagulation clinics that focus on appropriate monitoring of warfarin therapy. With the evolution of the direct oral anticoagulants (DOACs), clinical providers are not as clear as to how much intensity and monitoring these products require, since they are touted as "not requiring any monitoring". With this evolution comes the opportunity for pharmacists to take on a more comprehensive role with anticoagulation management at the population level. This presentation will discuss strategies that have been implemented in the United States to implement antithrombotic stewardship methods that provide quality anticoagulation management in the setting of the traditional anticoagulants, as well as the DOACs. These strategies include creating clinical care guidelines on anticoagulants (such as warfarin, low molecular weight heparins, direct oral anticoagulants, and unfractionated heparin). Additionally, using electronic prescribing alerts, prescribing reports, and electronic rules in your electronic health record can aid appropriate prescribing and optimize clinical management of anticoagulants. Technology has helped providers do a better job with anticoagulation management by ensuring consistent processes, making it easier to perform quality reporting, and allowing for better outcomes to be achieved. Now more than ever before, there is a need for highly skilled clinical pharmacists to implement these changes to provide comprehensive anticoagulation care services across all patient care settings.

### **Concurrent Session VIII: Clinical Practice – Expedition for New Frontiers Pharmacists as Physician Extenders: Provision of Chronic Disease Management in Ambulatory Care Clinics**

**O'YOUNG, Theresa**

Clinical Assistant Professor, School of Pharmacy, University of Washington, USA

Pharmacists as Physician Extenders: Provision of Chronic Disease Management in Ambulatory Care Clinics

There are many approaches that pharmacists have taken to expand the traditional pharmacist role of dispensing medications. Providing access to care while addressing cost and quality continues to be a challenge in the US. In primary care settings, pharmacists are participating in a variety of settings within integrated health care systems to extend the care of patients with chronic illnesses, improve health and wellness, and positively impact quality metrics. The pharmacist has the unique expertise to optimize health outcomes by optimizing and preventing the use of medications.

The objectives for this presentation are:

1. Illustrate examples of how pharmacists have participated in chronic disease management in a large internal medicine clinic in a county hospital in Seattle, WA.
  - a. Direct patient care with scheduled pharmacist appointments
  - b. Patient counseling and education
  - c. Medication monitoring
  - d. Population based identification of prescribing patterns
  - e. Medication refill and adherence evaluations.
  - f. Drug consultation and education to the clinical staff and interdisciplinary teams.
2. Identify challenges that pharmacists face in expanding the pharmacist' role

Expanding roles into unknown territory can be unfamiliar for both medical providers and pharmacists. Contributing to high-quality, coordinated and continuous medication management for patients is the responsibility of the pharmacist.

### **Concurrent Session IX: IT/Technological Advances & Med Safety Electronic Medication Management (eMM) for Paediatrics – Challenges and Innovations**

**CAMPBELL, Jillian**

eMR Application Manager (Pharmacy), eMR Unit, Sydney Children's Hospitals Network, Australia

In April 2016, The Children's Hospital at Westmead (CHW) became the first paediatric hospital in Australia to successfully implement an electronic medication management (eMM) system. The scope of this project included inpatient and outpatient prescribing, dispensing, administration, oncology protocols, continuous infusions and other complex medication regimens. The challenge was to adapt the US designed program, with input from Australian adult hospitals, to meet the needs of an Australian paediatric workflow.

The variability in dosing schedules and weight based dosing has been our biggest challenge. For example, data sets for routes and frequency that were developed by other Australian hospitals were used, but there was no paediatric content available for default medication orders. Local references were collated by the project team and used to inform development of a tailored database. There were also significant differences between the NSW Health Paediatric Fluid Guidelines and the US model of prescribing continuous infusions. We adapted the system with custom developments to meet clinical workflow and safety requirements. Some challenges were unanticipated, such as the logistical difficulties associated with recording accurate weights for dose calculations or the need for rules to cap infusion rates. As a result of these and other issues observed after going live, we have developed vigilant monitoring and continuous quality improvement programs. All eMM related incidents and workflow or system modifications to address the issues are discussed and approved by Clinical Governance groups.

Implementation of a system is a starting point, where the system has been built safely; this responsive process of review and Governance allows continual enhancement and safe use of the system.

### Concurrent Session IX: IT/Technological Advances & Med Safety A First-of-its-Kind Comprehensively Automated Pharmacy

#### 包健安

主任藥師

蘇州大學附屬第一醫院藥學部

蘇州大學附屬第一醫院藥學部，自2009年起推行全程信息化管理、自動化調配的現代化藥學服務與保障體系，現已成功構建門急診自動化智慧藥房；住院藥房推行自動化藥品智能存取系統和全自動單劑量錠劑分包系統；靜脈藥物調配中心優化調配流程、實行擺藥、分揀自動化和配置操作全程條碼掃描監管。藥品實行物流條碼信息化管理，並通過基數管理及批號跟蹤，保證藥品從一級庫、二級庫直至患者手中，整個流通過程全程可控，責任溯源。自動化藥房的建設大大提高藥品調劑效率，節約人力成本，使藥師能夠將更多的精力轉向為患者提供藥學服務，提高患者就醫的滿意度。

### Concurrent Session IX: IT/Technological Advances & Med Safety IT Application to Facilitate Medication Management at Old Age Homes

#### SUEN, Peter

Director, ActiveCarePharmacy Medication Management Centre, Hong Kong

Medication safety beyond the supply chain has been a worsening concern in Hong Kong due to its rapidly aging population, diminishing in numbers of competent healthcare workers for various reasons, and uncoordinated systems leading to chaos in polypharmacy related issues!

Pharmacists have important roles to play along the chain from manufacturing to supply and beyond. Ideally the problem is tackled at the top for effectiveness and cost-effectiveness. As a small bunch of community pharmacists with passion in elder care, we could only goal keep the final stage.

Many issues need to be dealt with seriously beyond the supply chain at the Long Term Care Homes (LTCH) level, and at the time of drug administration to avoid medication incidences. To do these effectively, we engaged in massive development of IT system, catching the train of innovative advances in technologies.

We have successfully completed a close loop IT and technology system that will handle the whole process from drug supply, handle medication reconciliation, record all medical-legal documents and communications, carry patient health record and full traceable medication records, robotic packaging of appropriate medications into a 7X4 drug pack, robotic vision checking of the correct medications, iOS device with Near-FieldCommunication (NFC) to identify patient together with the medicines, alongside with many fool-proof features. Data security is ensured to industrial standard with sufficient firewall and encryption protection, with real-time synchronization and off-site backup allowing minimal downtime.



## Ab01

### Impact and Evaluation of Visiting Pharmacist Service in Residential Care Homes for the Elderly (RCHEs) – A Hong Kong Perspective

CHAN, HC<sup>1</sup>; CHIANG, SC<sup>1</sup>; CHAN, PWL<sup>2</sup>

<sup>1</sup> Hong Kong Pharmaceutical Care Foundation, Hong Kong

<sup>2</sup> Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong

**Objectives:** To evaluate pharmacist involvement and impact on medication management and identification of drug related problems in RCHE service; to reveal the difficulties encountered in drug management and the acceptance of pharmacist service by RCHE staff.

**Setting:** A total of 5 residential care homes for the elderly (RCHEs) in Hong Kong, serving 725 residents and 53 RCHE staff.

**Methods:** The study comprised of (1) A retrospective quantitative study of reviewing documents generated by visiting pharmacists inside the service;(2) A questionnaire of RCHE staff view on medication handling difficulties and pharmacist service.

**Results:** Polypharmacy is prevalent among elders living in RCHEs. Among 725 residents, 83.32% were prescribed with 5 or more medications. Mean number of prescribed medications was 9.21. In period of Apr 2016 – March 2017, visiting pharmacists made 651 general interventions on medication management, particularly in medication record and storage issue (with 100% acceptance from RCHE staff). 1279 clinical interventions were also recorded (with 92.49% acceptance from physicians, RCHE and patients). On average, 1.76 clinical interventions were made per resident over one year data collection period. Pharmacist service was rated favorably across a spectrum of questions by Likert scale and carrying out medication review was being rated the most useful component of pharmacist service.

**Conclusions:** Pharmacist service can have an important role of improving pharmaceutical care in RCHE setting, in providing pharmaceutical and clinical advices and interventions. More resources should be allocated for development of pharmacist service in RCHE setting.

## Ab02

### A Genotype-guided Low-dose Approach to Administer Efavirenz in Chinese HIV Patients

HUI, Ka-ho Matthew; TSANG, Tak-yin Owen; CHAN, Pui-chung Denise; LAM, Tai-ning Teddy; LEUNG, Wai-shing; HO, King-man; LEE, Shui-shan

The Chinese University of Hong Kong, Hong Kong

**Background:** Efavirenz is a non-nucleoside reverse transcriptase inhibitor commonly incorporated in the highly active antiretroviral therapy (HAART) for HIV-1-positive patients. As efavirenz is largely metabolized by the polymorphic CYP2B6 isoenzyme, patients with the less functional GT genotype at locus 516 of the enzyme-encoding gene are likely to have supra-therapeutic plasma levels at the standard regimen of 600mg orally daily and therefore at increased risk of neurological toxicity. We proposed that patients receiving efavirenz should administer genotype-based doses such that toxicity is minimized without compromising efficacy (therapeutic target: 1-4mg/L) and hypothesized that the 400mg daily oral dose is non-inferior to 600mg in the GT population of Chinese HIV patients.

**Methods:** Chinese HIV patients who are stable on efavirenz-based HAART are prospectively recruited from Princess Margaret Hospital, Hong Kong, in this block-randomized, open-label, cross-over study. Recruited subjects are genotyped, following which GT patients are randomized to either 600mg or 400mg orally daily for 4 months, and then the other regimen for another 4 months. The primary outcomes are (1) steady-state plasma efavirenz level (Cp) and (2) sleep quality at baseline, 4 months and 8 months.

**Results:** The study is ongoing and the most recent results are described. 9 subjects had completed the study. The mean±SD(range) of Cp at 400mg and 600mg are 2.02±0.72(1.05-3.53)mg/L and 3.26±1.03(1.69-5.06)mg/L, respectively. The differences in Pittsburg Sleep Quality Indices (PSQI) at 400mg compared to 600mg are (0,-1,-1,+3,+1,-2,-1,+2,-1), respectively.

**Conclusions:** Our preliminary results show a more desirable Cp profile and more improved than worsened PSQI in GT patients receiving efavirenz at 400mg orally daily when compared to the standard dose of 600mg. It tends to support the use of a lower dose of efavirenz in the GT population. More samples are expected to substantiate the results.

## Ab03

### Genetic Variability of CYP2C9, CYP2C19 and CYP2D6 Genes across the Hong Kong Asians

CHAN, Wing<sup>1</sup>; KAM, Wing-sum Mandy<sup>2</sup>

<sup>1</sup> Prenetics Limited, Hong Kong

<sup>2</sup> School of Pharmacy, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong

**Objectives:** Within the Cytochrome P450s (CYP) family, CYP2C9, CYP2C19 and CYP2D6 are among the most clinically relevant enzymes, contributing to the metabolism of over 40% of drugs, and are subjected to functional genetic polymorphism. Variability of genes encoding the enzymes could significantly alter the pharmacokinetic properties of susceptible drugs, which potentially hampers clinical outcomes. While ethnicity-specific prevalence of genetic polymorphisms is generally available, local data across these CYP450 genes has yet to be established. This study examined the largest by far cohort to provide an overview of the allele, genotype and phenotype distribution of CYP2C9, CYP2C19 and CYP2D6 in the Hong Kong Asian population.

**Methods:** CYP2C9, CYP2C19 and CYP2D6 genotyping was performed over 3247 individuals using iGenes Pharmacogenomics Test (PGx) with TaqMan assay, Real-Time Polymerase Chain Reaction (RT-PCR) and digital PCR technology at Prenetics' ISO15189:2012 accredited laboratory.

**Results:** The observed phenotypes are reported as followed: for CYP2C9, 2972 (91.5%) are Extensive Metabolizers (EM), 263 (8.1%) are Intermediate Metabolizers (IM) and 12 (0.4%) are Poor Metabolizers (PM); for CYP2C19, 1295 (39.9%) are EM, 1437 (44.3%) are IM, 436 (13.4%) are PM, 69 (2.1%) are Rapid Metabolizer (RM), 10 (0.3%) are Ultra-rapid Metabolizers (UM); for CYP2D6, 1708 (52.6%) are EM, 1453 (44.7%) are IM, 16 (0.5%) are PM and 70 (2.2%) are UM. Among the study cohort, majority (2671 (82.3%)) were found to have at least one of three CYP450 genes with phenotypes being non-EM in which dosage adjustment might need to be considered.

**Conclusions:** The traditional concept of 'one size fits all' may no longer be appropriate in view of the prevalence of non-EM across the CYP genes, specifically in Hong Kong Asians. Genotype-directed guidance is readily available for clinical application. Novelty of our data promotes awareness towards the topic of pharmacogenomics and the necessity of personalizing therapy in the medical society.

## Ab04

### A Study of Impact on the Implementation of Unit Pack Dispensing System at Tseung Kwan O Hospital

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<sup>2</sup> Department of Pharmacy, Tseung Kwan O Hospital, Hong Kong

**Introduction:** Hospital Authority is facing challenge on verifying methods of cost effectiveness while maintaining safety and quality of healthcare services concurrently. Therefore, pharmacy departments have considered automation to expand their distribution capabilities and to improve work efficiency. Automated drug dispensing, with the technique of unit pack dispensing in this project, is an example for these purposes.

**Objectives:** To study an impact on various aspects related to patient safety, workload efficiency and cost-effectiveness with the implementation of Unit Pack Dispensing System at Tseung Kwan O Hospital.

**Methodology:** It was prospective, direct observational study two weeks before-and after the implementation of the Unit Pack System (UPS), with coordination of nurses in a general medicine ward. Primary endpoints included time of transferring medications from a delivery bag to a medication trolley (per 100 Unit Pack oral items) and time spent on medication administration at individual 8am and 8pm ward rounds. Secondary endpoints were based on internal data extraction. They were percentages (%) of oral solid unit pack items returned from the ward and incidences of medication errors one month before- and after- UPS implementation.

**Results:** The averaged unpacking time per 100 oral items were 7 minutes 30 seconds before- and 4 minutes 30 seconds after the application of UPS related practice ( $P=0.005, <0.05$ ). The average time used in both medication rounds during the pre- UPS period was 32 minutes 4 seconds and the post- UPS period was 29 minutes 7seconds. The P-values were 0.041 ( $<0.05$ ) for the 8 a.m. and 0.052 ( $>0.05$ ) for the 8 p.m. ward round individually. The pre- and post- calculated % of oral solid unit pack items returned were 35% and 10% respectively. Furthermore, 1 in 1315 incidence of oral medication error (proposed unit-pack related) was seen before- and 1 in 3814 incidence of UPS-related medication error was identified after the utilization of the UPS technology.

**Conclusion:** Overall, the results of this study have revealed that, the use of the UPS technology has provided a satisfactory performance on workload efficiency when administrating drug in ward, drug expenditure as well as medication safety.

## Ab05

### Drug Utilization Evaluation on Hyperphosphatemia and Vitamin D Usage in Secondary Hyperparathyroidism in Patients with Peritoneal Dialysis

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**Background:** Hyperphosphatemia is a common complication in patients on continuous ambulatory peritoneal dialysis (CAPD). Elevated serum phosphate level increases the risk of vascular calcification and death. The mainstays of therapy are stringent diet control and use of phosphate binders. Local data regarding management of hyperphosphatemia or drug usage pattern is limited. In addition, parathyroid hormone plays an important role in the regulation of phosphate homeostasis. In this Drug Utilization Evaluation (DUE), we aim at exploring the control of hyperphosphatemia and usage pattern of phosphate binders in the local hospital. We also review the use of vitamin D in management of SHPT.

**Methods:** We retrospectively reviewed 46 cases using phosphate binders for management of hypercalcemia who attended the outpatient Medical Renal Clinic in Yan Chai Hospital (YCH) between January 1, 2016 and December 31, 2016. We analyzed the control of serum phosphate, drug usage pattern and physician interventions.

**Results:** We observed a high prevalence (37.0%) of patients receiving aluminum hydroxide therapy with a mean prescribing duration of  $42.3 \pm 27.7$  weeks. The initiation was appropriate in 88.2% of patients, but up to 58.8% of them may have a potential need for reviewing and discontinuing aluminum hydroxide. Three patients would need temporal withhold of the calcitriol therapy to optimize serum phosphate control.

**Conclusion:** We observe several potential medication-related problems in our analysis. The comprehensive management of hyperphosphatemia and SHPT requires collaborative multidisciplinary efforts. The involvement of pharmacist could provide assessment of pharmacotherapy, early screening of medication-related problems, and detail counseling on medication and disease management.

## Ab06

### Use of Google Classroom to Enhance Pharmacy Practice Education Online

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**Objectives:** The current online pharmacy educational platform in our hospital has several disadvantages and limitations, including lack of real-time feedback function, inefficient management, and lack of self-learning and flipped classroom systems. To address these issues, we introduced Google Classroom as an alternative platform to enhance pharmacy educators' work. The platform helped teachers implement flipped classrooms, keep classes organized, and improve communication with students.

**Methods:** The Taichung Tzu Chi Hospital started to use Google classroom as a new online tool for pharmacy education from September 2017. More than 14 users consisting of pharmacy teachers and trainees participated in the trial of the new online tool. We evaluated the costs and benefits of the trial and analyzed user satisfactions through questionnaires.

**Results:** The cost of Google Classroom system, including Google Drive annual fee and wages for a partial workload administrator, was NT\$53,300/year. However, the online educational platform reduces the time required for system development and the associated costs. Moreover, the online tools enhanced the trainees' learning interest and teachers' instructional effectiveness. Therefore, the total reduced costs were six million Taiwan dollars. The user satisfaction score was 91% in total. Overall, the use of Google Classroom App increased real-time feedback and evaluation. As an environmental friendly system, it also reduced the waste of paper. The trainers uploaded the updated pharmacy and medical information and resources immediately. The integrative online medical resources appeared to have maximized the benefits of medical and pharmacy education.

**Conclusion:** Teaching in the 21st century means teaching 21st generation students. It means helping and providing new knowledge and skills for students to learn by themselves. Therefore, teachers must be very open-minded to the new technology to ensure the best teaching and learning outcomes in the virtual classroom. Online educational platform provides a vital chance to promote blended learning and professional development.

**Keyword:** Pharmacy education, Google Classroom APP, Cost-effectiveness

## Ab07

### Evaluation of the Pharmacist Conducted Health Education Service for Outpatients on NOACs

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**Objectives:** The clinical impact of pharmacist managed oral anticoagulation clinic has been well documented in the United States, but much less has been reported in Asia. Patients need more intensive education when they are undergoing new oral anticoagulants (NOACs) therapy with traditional Chinese herbal medicine (TCM). Therefore, the purpose of this study is to assess and improve patients' understanding of NOACs and increase safety of use by providing patient education on NOACs therapy.

**Methods:** This study recruited patients who were prescribed NOACs between June 2017 and October 2017 with written informed consent in the Taichung Tzu Chi Hospital. A 100-point questionnaire was used to evaluate the medication knowledge before and after completion of the program. The patient satisfaction questionnaires were distributed to investigate patients' perception of the medication instruction they received. Data were analyzed using SPSS® 18.0. McNemar's test was also applied to compare pre- and post-intervention differences.

**Results:** This study recruited 40 patients (18 male, 22 female), whose average age was  $73.6 \pm 14.4$ . The indications were atrial fibrillation (AF, 73%) and deep vein thrombosis (DVT, 27%). Analysis on drug safety awareness showed that patients' understanding enhanced significantly after patient education (pre-intervention scores  $51.5 \pm 28.9$  vs. post-intervention scores  $99 \pm 4.36$ ,  $p < 0.01$ ). The overall patient satisfaction score is  $95.3 \pm 6.9$  out of 100 points.

**Conclusion:** Pharmacists' knowledge of clinical pharmacology, pharmacokinetics and pharmacodynamics can work with patients in maintaining safe and effective use of NOACs. These results revealed that the clinical pharmacists improved the patients' therapeutic outcomes of NOACs and demonstrated the benefits of anticoagulation clinic performed by clinical pharmacists in Taiwan.

**Keyword:** NOACs, anticoagulation, Pharmaceutical care service

## Ab08

### Health Information System Management and Evaluation of Dabigatran Safety

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**Objective:** New oral anticoagulants (NOACs), which was developed to overcome the disadvantages of the old drug, Warfarin, are particularly effective in clotting factors, preventing embolic disease, reducing frequent monitoring of blood values, and lowering the risk of bleeding. However, NOACs may not be used in the patients with renal function insufficiency. Therefore, the study was performed to evaluate the utilization appropriateness of dabigatran in a regional teaching hospital in Taiwan.

**Methods:** The patients who took dabigatran from January 1 to April 17, 2017 were recruited for this study. The rationality and appropriateness of dabigatran utilization was evaluated by diagnoses and creatinine clearance (CrCl).

**Results:** The number of the recruited patients was 319. Indications included prophylaxis of non-valvular atrial fibrillation with stroke and systemic embolism. Four patients (4/319, 1.3%) took dabigatran without renal function assessment and dose adjustment. Among the twenty-seven renal function insufficient patients (CrCl  $< 30$  ml/min), only two took adjusted dose and nineteen were given normal dose. Six patients with renal insufficient withdrew dabigatran and transferred to other drugs.

**Conclusion:** In order to protect patient safety, the management of NOACs may need to be applied to health information systems. First, patients must receive renal function assessment within 6 months otherwise the system would block the prescription. Second, patients with renal insufficient (CrCl  $< 30$  ml/min) will not receive dabigatran to ensure their pharmacotherapy safety and reduce the risk of bleeding.



## Ab09

### Evaluation of Apixaban Utilization Rationality on Outpatients

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**Objectives:** Apixaban belongs to new oral anticoagulants (NOACs). It is not only the treatment of deep vein thrombosis, but also can reduce the risk of stroke and systemic embolism in patients with non-valvular atrial fibrillation. In this retrospective study, we evaluated the reasonable using ratio of apixaban on outpatients This drug utilizing evaluation (DUE) study will help to elevate the drug safety for patient, especially in high risk group.

**Methods:** This study is a retrospective study in a regional hospital. Cases were collected from February 2017 to May 2017 for all outpatients using apixaban. The reasonableness assessment of apixaban prescribing included indications and dose adjustment for renal dysfunction. The recommendation doses for renal dysfunction followed by the guidelines of American Heart Association (AHA) and Heart Rhythm Society (HRS). Patient's creatinine clearance (Clcr) was monitoring for adjusting the therapeutic dose accordingly. Descriptive statistical analysis was performed in the study.

**Results:** Total 49 cases were recruited in the study. The indications of all were non-valvular atrial fibrillation. In addition, 46 cases (93.88%) were monitored Clcr, 45 cases (93.88%) had performed dose adjustments in accordance with appropriate therapeutic doses by renal function. One patient was given normal dose initially, and then decreased dose according to renal dysfunction. However, we followed up the patient recently, the dose has been adjusted to normal dose according to the condition of the patient.

**Conclusion:** This study showed that the reasonableness of the use of apixaban was counted as 49 cases (100%). Recently, we also use the build-in computerized physician order entry system to remind the physicians about monitoring the renal function every 6 months to improve the efficacy and safety of apixaban. The results will also provide physicians to review.

**Keyword:** NOACs, anticoagulation, drug utilizing evaluation (DUE)

## Ab10

### Prevalence and Nature of Prescribing-related Problems of Queen Elizabeth Hospital in 2016

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**Background:** Prescribing errors are one of the common and preventable causes of medication errors. A study in UK had found an error rate of 8.9 errors per 100 prescriptions. However, relatively little is known about the prevalence and type of prescribing errors in Hong Kong. At Queen Elizabeth Hospital, the Clinical Intervention Reporting System (CIRS) was developed in April 2013 to document and analyze prescribing near-misses. Regular audit of pharmacy interventions provides feedback and recommendations for improvements and enhances medication safety.

**Purpose:** This project aims to analyze the incidence, type and severity of prescribing near-misses at Queen Elizabeth Hospital, highlight the problems with high occurrence rate, with the objectives to provide feedbacks to both prescribers and pharmacy staff on the potential risk factors of prescribing errors and enhance prescription safety.

**Methods:** This study was a retrospective, frequency based analysis of pharmacy interventions made during routine dispensing in the pharmacy department in Queen Elizabeth Hospital. Intervention records in CIRS were reviewed for a one-year period between 1<sup>st</sup> January and 31<sup>st</sup> December in 2016. Pharmacy interventions were categorized by the type of prescribing error and medication involved.

**Results:** An overall intervention rate of 4.368 per 10000 issues was recorded in the study period. The most frequent intervention was for inappropriate dosage (30.66%), followed by incorrect frequency (16.90%), inappropriate treatment option (14.49%) and wrong duration (12.67%). The top most medication group involved was Respiratory system (23.52%), followed by Infections (18.79%), Gastro-intestinal system (9.61%) and Cardiovascular system (8.74%).

**Conclusion:** The most frequent intervention was related to inappropriate dosage, which is in accordance with other literature. This audit result should be shared with prescribers and pharmacy staff as an education tool to increase their precautions of potential risk factors of prescribing near-misses and make a positive change in medication safety and patient care.



## Ab11

### The Medication Safety of Vinorelbine in Cancer Chemotherapy

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**Objectives:** Vinorelbine (Navelbine®) is a cancer chemotherapy medication used for non-small cell lung cancer, breast cancer, ovarian cancer, or Hodgkin's disease. The side effects of vinorelbine are nausea, vomiting, bleeding, constipation, peripheral neuropathy, and tiredness and weakness. The higher initial dose and regimen of vinorelbine cause the higher risk of side effects and higher mortality rate. Therefore, we reviewed the medical records of vinorelbine to evaluate the utilization appropriateness in the hospital.

**Methods:** This is a retrospective study. Patients taking vinorelbine orally from January 2009 to May 2017 enrolled into this study. This study followed the Guideline on medication use evaluation (MUE) by American Society of Health System Pharmacists (ASHP). The initial dose in the first three weeks higher than 60 mg/m<sup>2</sup>/week considered as inappropriate dose regimen.

**Results:** In this retrospective study, 301 patients recruited and evaluated their oral vinorelbine regimen. There were five patients diagnosed as breast cancer taking the higher initial dose. The initial regimen was 25% to 33 % higher than recommended dose. Although there were only five patients taking higher dose than recommended initial dose, a patient taking 33% higher than recommended dose suffered from a critical physical condition and enrolled into ICU. Therefore, the initial regimen was controlled by the health information system to prevent the sever physical crisis.

**Conclusion:** The severity of overdose of cancer chemotherapy causes higher mortality rate. Monitoring the chemotherapy regimen and blood cells as well as physical condition are important extremely. Oral vinorelbine is more convenient for patients receiving chemotherapy. Therefore, a clinical pharmacist may need to pay more attention into dose regimen assessment and patient education.

## Ab12

### Impact of a Pharmacist-led Asthma / Chronic Obstructive Pulmonary Disease Clinic: A Prospective Observational Study

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**Acknowledgement:** We would like to thank colleagues from Department of Pharmacy, Department of Medicine and Patient Resource Centre in Queen Mary Hospital for their kind support of the study.

**Background and Objective:** Inhalation therapy is crucial for asthma and Chronic Obstructive Pulmonary Disease (COPD). Poor drug adherence and inhaler techniques may compromise disease control and increase healthcare cost. The objective of this observational prospective study is to investigate the impact of a pilot Pharmacist-led Asthma/COPD Clinic (PACC) on patients' inhaler techniques, drug adherence, drug cost saving and disease control.

**Method:** Data from PACC during July to December 2016 were evaluated. In PACC, clinical pharmacists assessed patients' inhaler techniques, educated drug regimens and identified drug related problems (DRPs). Patients were invited for second visit for reassessment. The primary outcomes include change in inhaler technique, adherence and cost saved due to reuse of inhalers. Secondary outcomes include change in disease control, DRPs and patient's satisfaction.

**Results:** Ninety-three patients were recruited. Among all baseline inhaler technique assessments, 90% missed one or more key steps affecting drug delivery. Thirty-eight percent of patients were nonadherent based on the Morisky Medication Adherence Score-4. Eighty-five DRPs were identified, such as drug misuse (n=26) and use of expired/empty inhalers (n=10). For those attended second visit (n=71), improvement in key inhaler technique score was demonstrated in 72% of assessments; the improvement is statistically significant when key score is expressed in percentage (p<0.05). Statistically significant improvement in disease control was shown in asthma and COPD patients (p<0.05). Thirty-five patients (38%) brought back reusable inhalers, with cost saved of \$27,286.

**Conclusions:** Nonadherence and suboptimal inhaler techniques are common in asthma/COPD patients. Clinical pharmacist counseling improves inhaler techniques, adherence and rectifies DRPs. Disease control of patients was improved after pharmacist counseling.

**Keywords:** Pharmacists, Asthma, COPD, Inhaler techniques, Drug adherence

## Ab13

### Evaluation of Pharmacist's Impact on Hematology Oncology Chemotherapy Orders

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**Background:** A hematology pharmacist clinic was launched in Princess Margaret Hospital in October 2015. Clinical pharmacists at this clinic will provide counselling to Hematology patients and clinical interventions would be made on their prescriptions if necessary.

**Objective:** The aim of this study is to evaluate interventions made by pharmacists from hematology pharmacist clinic on hematology chemotherapy orders using the Hatoum scale. It also aims to report a patient experience survey for patients attended the hematology pharmacist clinic.

**Methods:** Pharmacist interventions from hematology pharmacist clinic were collected over a 17-months period. Interventions were analyzed for intervention type, cause of drug-related problems, and acceptance rate. Each intervention was evaluated for its clinical significance by an independent hematologist and a board certified oncology pharmacist using Hatoum scale. A patient experience survey on the hematology pharmacist clinic was conducted from September 2016–February 2017 and reported in this study.

**Results:** A total of 241 interventions were recorded. The most commonly identified drug-related problems were no drug prescribed but clear indication (23%), necessary information missing on prescription (21%), inappropriate dilution concentration of chemotherapy drugs (11%), and inappropriate dosage (10%). Acceptance rate of interventions was 99%. 88% and 100% of the interventions were rated as significant using Hatoum scale by hematologist and board-certified oncology pharmacist respectively. A total 28 returns of patient experience survey were obtained. 96% of the patients were satisfied with the hematology pharmacist clinic and reported improved knowledge on chemotherapy, improved competency in handling side effect and better understanding on goal of therapy.

**Conclusion:** The implementation of hematology pharmacist clinic enhanced medication safety by performing clinical screening and making recommendation to doctors through interventions.

## Ab14

### Impact of Pharmacist Intervention on Drug Adherence and Therapeutic Outcome of Chronic Disease Patients with Change of Regimen in the Specialist Out-Patient Setting

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**Objectives:** The Medicine Change Counseling by Pharmacy (MCCP) service, which aimed to improve the patient's adherence to their changed regimen, was recently launched at the Queen Elizabeth Hospital Specialist Out-Patient Pharmacy. The aim of this study was to evaluate its effectiveness.

**Methods:** A 14-week, retrospective service review was conducted. Part 1 described data such as the patient's drug adherence to regimen changes measured by the compliance score and Eight-Item Morisky Medication Adherence Scale (MMAS-8), types of pharmacist intervention provided and patient satisfaction. Part 2 evaluated the therapeutic outcomes of the service. The intervention group was the patients with changes in antidiabetic regimen and received the MCCP service. The control group was the patients with antidiabetic regimen changes one year ago when the service was not implemented. The change from baseline in patients' Haemoglobin A1c (HbA1c) and fasting blood glucose (FBG), and proportion of patients who achieved the HbA1c target of <7% were determined.

**Results:** After receiving the MCCP service, 96.1% of the drug regimen changes were taken as prescribed by patients with an average compliance score of 95.7±19.6%. Their average MMAS-8 score was 7.67±0.66 and 75.4% of the patients were determined to have high adherence to their new regimens. The intervention group had an insignificantly greater reduction in HbA1c than the control group (-0.29%±0.88% vs -0.28%±0.90%, p >0.1), whereas the control group showed a greater reduction in FBG (-0.81±2.47 mmol/L vs -0.59±2.30 mmol/L, p >0.1). The control group had an insignificant increase in the proportion of patients with HbA1c <7% compared with the intervention group (+12.3% vs +10%, p >0.1). 71.0% of the patients were most satisfied with the service.

**Conclusions:** The MCCP service had resulted in a high level of patient's adherence to regimen changes and contributed to improvement in their diabetic outcomes. Patients were satisfied with the service.

## Ab15

### Drug Utilization Evaluation on the Appropriate Use of Ezetimibe in addition to Statin at Princess Margaret Hospital

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**Background:** In 2014, cardiovascular disease (CVD) was the third leading cause of death in Hong Kong and elevated low-density lipoprotein (LDL) cholesterol has been found to be the main cause of arterial plaque blockage. Despite the use of statin as first line lipid lowering agent to lower LDL-cholesterol, patients with high risk of CVD may still fail to reach their target lipid levels. Ezetimibe has been used in combination with statin to achieve further reduction in LDL-cholesterol levels.

**Objective:** To examine the compliance of prescribing ezetimibe in addition to statin according to the Hospital Authority Drug Formulary (HADF) (version 12.2) indications at Princess Margaret Hospital in Hong Kong and also to evaluate the difference in efficacy and safety after the addition of ezetimibe to statin.

**Methodology:** This was a retrospective, observational study. 350 patients with dispensing record of ezetimibe and statin (atorvastatin, fluvastatin, rosuvastatin or simvastatin) at Princess Margaret Hospital in Hong Kong has been identified between 31 May 2014 to 1 June 2015 using the Clinical Data Analysis Reporting System (CDARS) and the Clinical Management System (CMS). The primary outcome was the compliance rate of prescribing ezetimibe according to the HADF indications. Secondary outcomes were the percentage of patients achieving an LDL-C level of 2.6mmol/L or lower at least 4 weeks after addition of ezetimibe, the difference in LDL-C levels after addition of ezetimibe to existing statin and the incidence of reported adverse events after the addition of ezetimibe to statin.

**Results:** Three hundred and fifty patients were identified in this study. The compliance rate of prescribing ezetimibe showed that 88% (n=350) cases complied with the HADF indications. Of those 309 patients who complied with the HADF indications, there were 163 patients (High risk dyslipidaemic: 50% (n=156) / Familial hyperlipidaemic: 3% (n=7)) reaching the LDL-cholesterol levels of 2.6mmol/L or lower after the addition of ezetimibe to statin compared to 37 patients (High risk dyslipidaemic: 11% (n=34) / Familial hyperlipidaemic: 1% (n=3)) before addition of ezetimibe to statin. Addition of ezetimibe to statin demonstrated further reduction in LDL-cholesterol level (ranged from -0.8mmol/L to -1.3mmol/L, p<0.001). Adverse events were reported in 10% (n = 32) patients during the 52 weeks follow-up period.

**Conclusion:** The study showed that the majority of ezetimibe prescribing complied with the HADF indications. Addition of ezetimibe to statin produced better attainment of LDL-cholesterol goals compared to statin monotherapy.

## Ab16

### A Study on Impact of Time with the Use of Automatic Tablet Dispensing and Packaging System in In-patient Setting at a Local Hospital

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**Introduction:** Since the implementation of IPMOE in TKOH, inpatient dispensing workflow had been smoothen out by reducing unnecessary paperwork. In order to further automise workflow, an automatic tablet dispensing and packaging system (ATDPS) machine was installed in TKOH.

**Objectives:** To investigate the impact on time with the use of ATDPS machine for dispensing in inpatient setting.

**Methods:** Time and motion study was carried out to assess time spent on various dispensing procedure during daily drug refill. Time taken to complete drug refill with and without the use of ATDPS was measured and compared.

**Results:** Time spent to complete drug refill of a surgical ward was measured for five days, before and after applying ATDPS. The total time spent for refill was similar (31min25sec/31min37sec). However, there was an increase in number of refill items from 28.4 to 74.8 (163% increase), leading to an overall time saving effect. The averaged time to process one item during refill was reduced from 49.6seconds to 25.2seconds, resulting 51% reduction. Pharmacy staff can process more than doubled amount of work with the same amount of time. The increase in dispensing items was due to revision on ward stock items and drug refill duration reduced from three-day to one-day. It ensured that medicines supplied to wards were most updated. Besides, changes in work duties of pharmacy staff were observed during the study. Supporting staff was shifted from non-inpatient duty to prepacking medication before delivery, while dispensers were shifted from dispensing medication to operating ATDPS.

**Conclusion:** ATDPS enhanced dispensing efficiency for increasing pharmacy service demand. It also provided additional benefits in service quality, as only up to date medicines were supplied. Also the ease of handling medicines for nurses is improved. However, reassigning working activities in pharmacy staff is required for smooth operation.

## Ab17

### Impact of Changing Printing Sequences of Unit Dose Packs on Pharmacy and Nursing Practice – A Before and After Time and Motion Study

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**Objective:** Unit dose pack packing and inspection machines are recently employed in local public hospitals. While medication errors were reduced, full utilization might further improve working efficiency. The proposed way is to change the printing sequence of the rolls of unit dose packs according to the administration sequence in ward.

The objectives are to increase efficiency in medication dispensing and administration; to promote safety in medication dispensing and administration and to investigate satisfaction of nursing staffs during the administration process.

**Method:** A before and after time and motion study was conducted. The medication refill process in pharmacy was broken down into different motions and medication administration time by nurse were timed on Sep 2016 and Mar 2017. Wilcoxon Signed Rank test were used. A satisfaction survey of nursing staffs was conducted. Number of medications incidents and ward return were also counted in different time frame.

**Results:** P-value>0.05 in the change in total time used by dispenser (19:30 vs 17:30) and pharmacist (14:24 vs 15:05), while p-value<0.05 in drug administration time in ward (1:49:19 vs 1:13:43). 16 satisfaction surveys were returned. No medications incident was reported on Apr 2016-Apr 2017 but nurses subjectively agree that they are more likely to find the correct medications for correct patients. Number of ward return has been increased.

**Conclusion:** The change in printing sequence did not improve dispensing efficiency but improved administration efficiency in ward. Machine upgrade and workflow redesign might improve dispensing efficiency. Medication safety might be improved subjectively from satisfaction survey. Repeating the study in a larger medical ward is warranted.

## Ab18

### A Prospective, Observational, Questionnaire Survey Study to Evaluate the Outcomes of a Pharmacist - Initiated Medication Counselling Service on Pressurized Metered - Dose Inhalers, Dry Powder Inhalers and Soft Mist Inhalers in North Lantau Hospital

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**Objective:** The aim of the study was to evaluate the outcomes of a pharmacist-initiated medication counseling service on pressurized Metered-Dose Inhalers (pMDIs), new generation Dry Powder Inhalers (DPIs) and Soft Mist Inhalers (SMIs) in North Lantau Hospital. The primary objective of the study was to compare the differences in patients' mean inhaler technique scores before and after the intervention. The secondary objective of the study was to compare the difference in patients' mean Health-Related Quality of Life (HRQoL) scores before and after the intervention.

**Methods:** Patients' HRQoL were assessed during the initial visits using Airway Questionnaire 20 (AQ20) The patients' inhaler techniques were assessed and recorded with the "Inhaler Technique Checklist" composed with reference to patient information leaflets published from Chief Pharmacist's Office (CPO) and electronic Medicines Compendium (eMC) from the United Kingdom. The HRQoL of the recruited patients were reassessed 4 weeks after the Initial visits.

**Results:** This study showed that there was a 14.1% ( $p \leq 0.05$ ) increase in patients' mean inhaler technique. There was also a 4.8% ( $p \leq 0.05$ ) increase in patients' mean HRQoL after the counselling service, with a 16.7% ( $p \leq 0.05$ ) improvement of feeling breathless when trying to sleep, a 13.3% ( $p \leq 0.05$ ) improvement of having cough during the day, as well as a 13.3% ( $p \leq 0.05$ ) improvement of having difficulty of getting around the house because of the chest trouble.

**Conclusion:** This local study showed that pharmacists-initiated medication counselling service on inhalers improved patients' mean inhaler technique as well as patients' HRQoL.



## Ab19

### A Review to Assess the Nature and Effectiveness of Pharmacy Interventions Carried Out in Oncology Outpatient Clinics

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**Objectives:** This study aimed to assess and evaluate the nature and impact of pharmacist interventions made in oncology outpatient setting.

**Methods:** Prescription verification service in oncology outpatient clinics by on-site clinical pharmacists has been implemented in the Department of Clinical Oncology, Queen Elizabeth Hospital. A retrospective study was performed. Interventions recorded by clinical pharmacists during the period of 1<sup>st</sup> of Jan, 2015 to 31<sup>st</sup> of Dec, 2016 were extracted. Interventions were classified according to the Pharmaceutical Care Network Europe (PCNE) Classification for Drug related problem v6.2 and level of severity was rated as defined by Overhage et al.

**Results:** During the study period, a total of 2636 interventions were made with 18468 prescription orders screened by clinical pharmacist. The incidence of drug-related problems was 2.7%. Among the 504 drug-related problems, Major problems included "effect of drug treatment not optimal" (38.7%), "untreated indication" (30.0%) and "non-allergic adverse reactions" (20.8%).

There were 98.4% of interventions made at prescriber level and 98.0% of interventions made at drug level, with an acceptance rate of 99.2%. It was found that 86.7% of interventions were considered significant or above, and 71.0% of drug-related problems can only be identified by on-site clinical pharmacist screening. Supportive therapies and pre-medications, including filgrastim (9.7%), dexamethasone (8.5%) and famotidine (8.3%), were most commonly associated with drug-related problems, contributing to 63.1% of interventions made.

**Conclusions:** It is demonstrated in this study that clinical pharmacists' interventions have a positive impact on enhancing medication safety and therapeutic outcome of oncology patients. On-site clinical pharmacists provide drug information and recommendation on drug-related problems by direct communication with nurses and physicians, facilitating the acceptance of interventions. Further studies are required to identify risk factors associated with drug-related problems.

## Ab20

### A Study on the Impact of Pharmacists' Interventions through Inpatient Medication Order Entry (IPMOE): Experience of a Local Hospital in Hong Kong

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**Objectives:** In-Patient Medication Order Entry (IPMOE) is a newly launched electronic system that interfaces prescribing, order verification and drug administration. The study is aimed to demonstrate the trend of prescribing errors and provide insight into the prevention of drug-related incidents by evaluating the drug-related problems (DRPs) found in daily routine of medication order validation through IPMOE. Also, by addressing the acceptance rate of prescribers, the compliance of pharmacists' interventions and inter-disciplinary collaboration would be shown.

**Methods:** Over a 2-month period (from 1<sup>st</sup> August 2016 to 30<sup>th</sup> September 2016), pharmacists' interventions in pending and suspending orders at Tseung Kwan O Hospital were analysed. From the data collected, pharmacists' interventions regarding to DRPs were classified and the prescribers' acceptance to the interventions made was assessed.

**Results:** A total of 905 interventions were documented in the 2-month period. The most common DRPs identified by the pharmacists were related to dose selections (38.2%) and drug selections (30.8%). As for the interventions made by pharmacists, dosage adjustment (40.7%) was the most common interventions made, followed by drug discontinuation (25.7%). Drugs frequently involved in interventions were mainly used for infections (37.6%), cardiovascular system (11.3%) and central nervous system (10.9%). For clinical significance, 56.2% of the interventions were ranked as 'significant' or above. The finding showed that prescribers' acceptance rate of pharmacists' proposed action was 86.5%.

**Conclusions:** The study revealed the positive impact of pharmacists in identifying DRPs and preventing potential medication errors and harm to patients. The high prescribers' acceptance rate of the pharmacists' interventions highlighted the value of pharmacists and acceptance by the medical staff. Areas of improvement for IPMOE are indicated. Education and system enhancement by adding more clinical decision support features would be keys for preventing DRPs.



## Ab22

### Impact of Pharmacist-led Pediatric Asthma Management on Improving Drug Compliance, Inhaler Technique, Asthma Control and Quality of Life for Pediatric Patients: A Pilot Cohort Study

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**Objectives:** Enormous amount of workload to the health care professional in Hong Kong may lead to sub-optimal health care on patient's asthma management. This study is to investigate whether pharmacist-led asthma management on children would cause a positive impact on patient's asthma control and ultimately better quality of life.

**Method:** A 4-month randomized, control, parallel group pilot cohort study was conducted in a single center (Pediatric Asthma Clinic in the Caritas Medical Centre) in Hong Kong from September 2016 to February 2017. Participants were randomly allocated to control group (n=12) which patient received normal care or intervention group (n=10) which patient received more intensive pharmacist-led interventions. Interventions include establishment of asthma action plan, counselling on medication, reinforcement of inhaler technique and education on asthma knowledge. Follow up was done 4 and 8 weeks after enrollment through telephone call. The primary outcomes are asthma control, inhaler technique and quality of life. And the secondary outcomes are asthma knowledge and drug compliance.

**Results:** This study showed a significant increase in mean ACT% in intervention group (7.67%,  $p<0.05$ ), in comparison with control group (1.48%). However, compare with the control group, this study did not observe a statistically significant improvement on the inhaler technique ( $p=0.87$ ) and PAQLQ ( $p=0.14$ ) in intervention group. In terms of secondary outcomes, an improvement in asthma knowledge has been demonstrated ( $p<0.05$ ), 23.4% and 3.8% increment in intervention and control group respectively. And our study failed to show compliance improvement ( $p=0.24$ ) of the participants to their asthma medication regimen.

**Conclusion:** In conclusion, pharmacist's intervention in pediatric asthma management could significantly improves patient's asthma control and their parent(s) asthma basic knowledge which in turns may improve the ability of asthma self-management.

## Ab23

### Pharmacokinetic Profiles and Factors Affecting Clearance of Carbamazepine for Epileptic Patients in Hospital Tengku Ampuan Rahimah (HTAR) Malaysia

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Carbamazepine (CBZ) is an anticonvulsant with narrow therapeutic range. Previous studies have shown various findings related to the influence of CBZ clearance with demographic profile. Individualizing dosage regimens is more appropriate if it is based on pharmacokinetics data derived from local population. However, specific data related to Hospital Tengku Ampuan Rahimah (HTAR) population was lacking. Therefore, a retrospective study was carried out to determine the population pharmacokinetic profiles including clearance values and factor(s) affecting clearance of CBZ in HTAR. Data was extracted from Therapeutic Drug Monitoring (TDM) request forms year 2015. 21 samples were included in the analysis. The overall average CBZ clearance in adult patients in this study was found to be 0.037L/kg/h, which is not consistent with the standard population clearance of 0.064L/kg/h and previous studies reported by others. Moreover, CBZ clearance in HTAR population is showed statistically significant associated with dose ( $P=0.021$ ). Lower mean (SD) dose 5.42 (2.68) mg/kg/day is required to achieved desired therapeutic outcome as our clearance is slower than standard population and other previous data. However, clearance is found to be no statistically significant with age, gender and body weight. These preliminary findings could serve as a guide for our local population in initiating CBZ treatment and considering factors influencing CBZ clearance. More related studies are encouraged as to look at other factors affecting such as hepatic and renal function, co-administration with other drug and patient's clinical status with clearance of CBZ for better dosing optimization and better pharmaceutical care of the patient.

## Ab24

### Design, Development and Characterization of Pioglitazone Transdermal Drug Delivery System

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The main aim of this research work was to design and development characterization of Pioglitazone transdermal drug delivery system by using various polymers such as Olibanum with different concentration by solvent evaporation technique. The prepared formulations were evaluated for different physicochemical characteristics like thickness, folding endurance, drug content, percentage moisture absorption, percentage moisture loss, percentage elongation break test and weight uniformity. The diffusion studies were performed by using modified Franz diffusion cells. The result of dissolution studies shows that formulation, F3 (Olibanum with 50 mg) showed maximum release of 99.95 % in 12hrs, whereas F1 (Olibanum and EC backing membrane) showed minimum release of 93.65% in 12 hr. Based on the drug release and physicochemical values obtained the formulation F3 is considered as an optimized formulation which shows higher percentage of drug release of 99.95 % in 12 hr. The developed transdermal patches increase the therapeutic efficacy and reduced toxic effect of pioglitazone.

## Ab25

### Development and Evaluation Chlorpheniramine Maleate Containing Nanoparticles Loaded Thermo Sensitive *In Situ Gel* for Treatment of Allergic Rhinitis

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**Objectives:** The objective of the present study was to fabricate a thermo sensitive gel containing Chlorpheniramine maleate (CPM) loaded nanoparticles following intranasal administration for effective treatment of allergic rhinitis.

**Methods:** Chitosan based nanoparticles were prepared by precipitation method followed by the addition of developed NPs within the Poloxamer 407 and carbopol 934P based mucoadhesive thermo-reversible gel. Developed formulations were evaluated for Particle size, PDI, % entrapment efficiency and % cumulative drug permeation.

**Result and discussion:** NP3 formulation was found to be optimized on the basis of minimum particle size (143.9 nm), maximum entrapment efficiency (80.10±0.414 %) and highest drug permeation (90.92±0.531 %). The optimized formulation NP3 was then formulated into thermo reversible *in situ gel*. This intensifies the contact between nasal mucosa and the drug, increases and facilitates the drug absorption which results in increased bioavailability. G4 formulation was selected as the optimize on the basis of gelation ability and mucoadhesive strength. Histology was carried out to examine the damage caused by the optimized G4 formulation. Results revealed no visual signs of tissue damage thus indicated safe nasal delivery of nanoparticulate *in situ gel* formulation G4.

**Conclusion:** Intranasal CPM NP-loaded *in situ gel* was found to be a promising formulation for the treatment of allergic rhinitis.

**Keywords:** Chitosan, Nanoparticles, *in situ gel*, Chlorpheniramine maleate, Poloxamer 407

## Ab26

### Drug Use Evaluation of Sodium–glucose Cotransporter 2 (SGLT2) Inhibitors in United Christian Hospital

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**Objectives:** This study aimed to evaluate the utilization pattern of SGLT2 inhibitors, and their efficacy and safety profile in our study population.

**Methods:** The study was conducted in United Christian Hospital, Hong Kong. We retrospectively analyzed data of patients initiating SGLT2 inhibitors from 1 January 2016 to 1 June 2017. Baseline demographics, concomitant diseases or conditions, concurrent drug therapy, documented adverse drug reaction after initiation of SGLT2 inhibitors, laboratory data including glycosylated hemoglobin (HbA1c), estimated glomerular filtration rate, lipid profile and blood pressure were retrieved from the electronic patient record of Hospital Authority. Data were expressed either as mean±standard deviation, or number and percentage where appropriate. Change in laboratory parameters at baseline and subsequent two medical follow ups were compared using two-sided paired t-test, with significance level set at 0.05.

**Results:** 55 patients taking empagliflozin and 43 patients taking dapagliflozin were analyzed. The overall compliance rate of prescribing to Hospital Authority Drug Formulary was 68.4%. The numbers of hypoglycemic agents taken by our patients were 3.9±1.0 and 3.8±0.8 respectively. The most commonly prescribed hypoglycemic agents were metformin, followed by insulin and thiazolidinedione, in addition to SGLT2 inhibitors. SGLT2 inhibitors significantly reduced body weight (empagliflozin: baseline 82.7±21.1kg, first follow up 82.3±21.3kg, second follow-up 76.2±19.1kg; dapagliflozin: baseline 87.2±18.0kg, first follow up 82.1±21.6kg, second follow-up 81.2±17.8kg) and HbA1c (empagliflozin: baseline 8.8±1.5%, first follow up 8.0±1.5%, second follow-up 7.4±1.2%; dapagliflozin: baseline 8.8±1.3%, first follow up 7.8±1.2%, second follow-up 7.8±1.2%), but there was no difference in blood pressure and lipid profile. Hypoglycemic episodes occurred in 10.3% of patients taking empagliflozin and 23.3% of patients taking dapagliflozin. Genital and urinary tract infections also occurred.

**Conclusions:** In our study population, SGLT2 inhibitors improved glycemic control and induced weight loss, but also cause genital and urinary tract infections, as well as hypoglycemia.

## Ab27

### Teaching STARZ-DRP as an Extended Pharmacy Services Model to Community Pharmacists: Malaysia Scenario

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**Objectives:** Aim of the research is to determine the community pharmacists' (CPs) self-rating confidence after three months attending the STARZ-DRP training programme. STARZ-DRP Model which emerges from the concept of pharmaceutical care is a structured and systematic approach to help out CPs to make an accurate triage action plan as well as identify, prevent and resolve the drug-related problem (DRP) among self-care customers in community pharmacy settings.

**Methods:** CPs who had involved in an earlier training programme were contacted via e-mail once more in order to evaluate their self-rating confidence to execute self-care counselling via STARZ-DRP Model. An earlier self-rating questionnaire (21 domains) was used to assess the up-to-date CPs' self-confidence. Mean scores obtained in the research were analysed in order to observe any significant improvement compared with an earlier study via a pair-sample T-test.

**Results:** All twenty (n=20) CPs who turned up at the earlier training programme were successfully contacted. They had immediately responded to the enquiry via e-mail. It was noted that significant differences (p<0.05) were notified throughout the domains except for domain # 8, 10, 12 and 15 when weighed up the mean scores with an earlier post-training study. Interestingly, significant differences were noted in every part of the domains in the self-rating questionnaire when comparing the mean scores with an earlier pre-training study.

**Conclusions:** It is noted that the STARZ-DRP training programme might have potential to help out CPs to possess self-confidence to make an accurate triage action plan as well as identify, prevent and resolve DRP. Subsequently, STARZ-DRP is potential to be the principal model for CPs to execute a wide range of extended pharmacy services in community pharmacy settings. Additionally, the model might have potential to help out CPs to initiate their supreme role as a medication protector in the healthcare system.

## Ab28

### Formulation Development and Evaluation of Colon Targeted Beads of Mesalamine

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**Objective:** The objective of this study is to develop a locally effective colon targeted therapeutic system in the form of a multiparticulate oral formulation that might provide an improved efficacy with a significant reduction in dose and systemic toxicity and improved quality of life for the treatment of inflammatory bowel disease (IBD).

**Methods:** The formulation of beads develops by ionotropic gelation. The effect of various formulation parameters such as ratio of gellan gum and locust bean gum were studied for drug loading and entrapment efficiency.

**Results:** To retard the drug release in the stomach and achieve a pH dependent release at colonic pH of 7.4, a polymethacrylate base coating carried out by dip coating method. The surface analysis was carried out by scanning electron microscopy (SEM). In vitro analysis of coated formulation shows much retarded release in comparison of uncoated formulation. The in vivo release performance of the developed colon specific formulation was carried out by gammascintigraphy. In this study, it was found that the gellan gum is a suitable biodegradable and biocompatible natural gum for preparing colon targeted beads of mesalamine and the ionotropic gelation was an appropriate technique to prepare the beads of mesalamine.

**Conclusion:** The results of in vitro release studies revealed that the coated CF-3 formulation shows the better and prolonged release of the mesalamine in the colon.

**Keywords:** IBD, pH Dependent, Gellan gum, locust bean gum, gellanase enzyme.

## Ab29

### Evaluation of Pharmacists' Impact on Medication Management in Patients with Type 2 Diabetes Mellitus on Empagliflozin

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**Objectives:** Empagliflozin lowers blood glucose level by reducing renal glucose reabsorption, presenting a different adverse drug event profile from conventional antidiabetic agents. A new medicine service was implemented to optimize the use of newer anti-diabetic agents in a Hong Kong public hospital. Our study examined the local utilization pattern and tolerability of empagliflozin, and evaluated the role of pharmacists in type 2 diabetes management from the service.

**Methods:** The service consisted of a baseline consultation and two telephone follow-ups at week 4 and 8. Our study retrospectively retrieved data of all cases under care of the new medicines service from December 2016 to June 2017. Outcomes measured included frequency and types of drug related problems identified, interventions performed by pharmacists and changes in medication adherence.

**Results:** 34 patients were referred to the service and a total of 67 pharmacist consultations were performed. 59 drug-related problems were identified. Most frequent drug-related problems included adverse drug reactions (46%), medication non-adherence (27%) and inadequate knowledge on hypoglycemia management (13%). Most commonly reported adverse drug reaction was increased urination. 7 cases experienced signs and symptoms of hypoglycemia. 33 interventions were performed by pharmacists, including 5 cases of physician referral, and the rest of advice to patients. Medication adherence showed trend of improvement, but the change was not statistical significant.

**Conclusions:** Pharmacists played a role in identifying drug-related problems with prompt management in patients with type 2 diabetes. Detailed education and follow-ups are important to reinforce medication adherence and to ensure efficacious and safe use of drugs.

## Ab30

### Using Mobile Health (m-Health) to Enhance Patients' Medication Adherence: An Empirical Investigation

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**Objectives:** Mobile health (m-Health) has been researched and examined as a method to improve patients' medication adherence in many countries. However, factors ranging from patients' preference to the nature of medication regimes were identified to affect the efficacy in using mobile phone messaging or smart phone apps to enhance medication adherence. While HA and the Society of Hospital Pharmacists HK are investing into the development of m-Health, this empirical study aims to investigate the preference of hospital patients in Hong Kong for using mobile apps as a medication adherence tool.

**Methods:** A self-administrated questionnaire was distributed at the pharmacy of United Christian Hospital to patients that have smartphones and experience in digital health by hospital volunteers. The 263 completed and usable responses were analysed to examine patients' preference for drug related apps functionality in relation to the usage intention of hospital-provided mobile apps.

**Results:** Findings indicated that hospital patients have high intention to use hospital-provided mobile apps. Among patients who are intended to use hospital mobile health apps, they prefer functionalities related to drug dispensing status and drug information. However, patients who have high intent to adopt m-Health shown no preference for apps that remind them to take their medicine. Multi-group analysis among patients with high m-Health intent revealed that medicine reminder apps is least preferable to patients who visit hospital pharmacy 1-2 times in 6 months but is desirable to patients using pharmacy for at least 3 times in 6 months.

**Conclusions:** While m-Health is posited as a tool to enhance medicine adherence, this study found that hospital patients having different pharmacy usage frequency differ in the preference for medicine reminder apps. Further studies are recommended to understand the influence of hospital pharmacy usage frequency on the potential of using m-Health to enhance medicine adherence.

## Ab31

### Assessment of Factors Influencing Communication in Clinical Pharmacy

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**Objectives:** This study aimed to identify and assess the factors that influence the communication quality between clinical pharmacists and patients.

**Methods:** a structural equation model structured based on PRECEDE-PROCEED model was applied to identify the most effective path to increase their communication quality. A survey was conducted at 253 class-A tertiary hospitals in China from March to December 2016. By on-site observations, verbal communications between clinical pharmacists (n=752) and patients were audio-recorded, communication quality of which were rated by an expert panel with an 8-item Quality of Communication rating scale. Clinical pharmacists completed questionnaires that examined the predisposing, enabling, and reinforcing factors that influenced the communication quality. Finally, AMOS was employed to examine relationships between the three factors and communication quality.

**Results:** all three factors positively affected the communication quality, with correlation coefficients of 0.26, 0.13, and 0.17, respectively. The most influential predisposing factor was attitude (0.77), the most influential enabling factors were self-efficacy (0.71) and confidence (0.72), and the most influential reinforcing factor was rewards (0.74).

**Conclusion:** the pharmacists' attitudes toward, perceived knowledge and skill of and confidence in communication, and the rewards offered by pharmacy management were the most influential factors that influence communication quality.



## Ab32

### Development of a Computerized Resuscitation Kit Management System in a Local Hospital in Hong Kong

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**Objectives:** 1. To enable electronic recording, easy retrieval and monitoring of Resuscitation Kits (R-Kits) transactions. 2. Facilitate stocktaking, batch traceability and product recall of R-Kits.

**Method:** A computerized R-Kit management programme was designed using Microsoft Access 2007. Pre-implementation study was conducted for two weeks (6<sup>th</sup>-17<sup>th</sup> February, 2017) to collect baseline performance data on R-kit exchange, preparation, batch recall and expiry date checking. After the development of the programme, training were provided to pharmacy staff, and existing R-Kits log data were converted to the new R-Kit program and counterchecked before implementation. The system was put into live run on 13<sup>th</sup> July, 2017, with prior notice to medical and nursing staffs. Post implementation study was subsequently conducted for two weeks (18<sup>th</sup>-29<sup>th</sup> September, 2017) to assess performance the new programme. Comparison of pre- versus post-implementation data was done using Student's T-test, with statistical significance set at  $p < 0.05$  level.

**Results:** With the implementation of the electronic R-Kit management programme, average time required for exchanging one R-Kit was improved from 4.85 minutes to 2.5 minutes (48% reduction;  $p < 0.001$ ). Time for assembling and checking one R-Kit remained comparable (10.7 minutes versus 11.1 minutes;  $p = 0.602$ ). Errors during assembling were eliminated (5 errors versus none). Efficiency for lot tracing and expiry date checking also improved markedly, with instant result provided by the new system versus 21.6 minutes and 32.8 minutes required for staff searching through one specific lot and recall all kits with expiry on or before a specified date respectively.

**Conclusion:** Development of the computerized R-Kit Management System significantly improved efficacy in exchange of resuscitation kits, as well as efficacy in expiry date monitoring and batch recall of R-kit components in case of need. Accuracy of the procedures involved was also improved with errors minimized.

## Ab33

### Risk of Major Bleeding Using Dabigatran and Concurrent Medications in Non-valvular Atrial Fibrillation Patients

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**Objective:** Dabigatran etexilate (Pradaxa<sup>®</sup>) is an oral anticoagulant (direct inhibitor of factor IIa, thrombin) approved by the FDA in 2010. Dabigatran are prescribed in combination of other medications which share the same metabolism enzymes may increase major bleeding risks. In this study, we assessed the association between dabigatran combined with or without concurrent medications and risk of major bleeding in patients with non-valvular atrial fibrillation.

**Method:** This is a retrospective cohort study collecting data between Nov 1, 2016 and Oct 31, 2017 in a regional hospital, central Taiwan. In 473 non-valvular atrial fibrillation patients who received dabigatran with or without concurrent use of amiodarone, fluconazole, itraconazole, voriconazole were recruited. Major bleeding included intracranial hemorrhage or gastrointestinal, urogenital, or other bleeding.

**Results:** The average age of these 473 non-valvular atrial fibrillation patients received dabigatran was  $74.2 \pm 9.0$ . The concurrent medications prescribed with dabigatran were amiodarone (77/473, 16.3%), fluconazole (8/473, 1.7%), itraconazole (0/473) and voriconazole (0/473). The incidence rate of bleeding in use of dabigatran alone is 2.56% (10/390). The risk of major bleeding of dabigatran in combination of amiodarone is 1.30% (1/77) and fluconazole is 12.5% (1/8). A patient took dabigatran and amiodarone together led to intracranial hemorrhage. A patient administered dabigatran with fluconazole occurred PT time prolonger over 100 seconds.

**Conclusions:** Among patients taking dabigatran for non-valvular atrial fibrillation, concurrent use of amiodarone compared with the use of NOACs alone, was associated with increasing risk of major bleeding. Thus, concomitant administration of dabigatran etexilate (a P-gp substrate) along with amiodarone (a P-gp inhibitor) will increase bioavailability of dabigatran etexilate and higher the plasma concentration of dabigatran. Physicians prescribing NOAC medications should consider the potential risks associated with concomitant use of other drugs. In order to protect patient safety, the management of NOACs may need to apply to health information systems.

**Keyword:** major bleeding, novel oral anticoagulants (NOACs), antifungal agents

## Ab34

### Comparison of Efficacy and Level of Adherence for Morning versus Evening versus before Bedtime Administration of Simvastatin in Hypercholesterolemic Patients

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**Background:** Simvastatin is usually taken in the evening, due to the circadian rhythm of hepatic cholesterol biosynthesis. Evening administration of simvastatin may lead to complex medication regime, affecting the simvastatin adherence and maximal societal benefits may forgone.

**Objective:** To investigate the effect of simvastatin on percentage reduction of low-density lipoprotein cholesterol (LDL-C) and its level of adherence when simvastatin were being instructed to be taken at different timing.

**Setting:** Nine primary care health clinics across Malaysia were participated.

**Methods:** 147 statin-naïve subjects were randomized into one of three arms (after breakfast, after dinner or before bedtime) after diagnosed with hypercholesterolemia. Differences on percentage reduction of LDL-C from baseline and level of adherence among three groups on week 16 were compared. Two-tailed analyses were done using intention to treat population and p-value > 0.05 was considered as statistical significant.

**Main Outcome Measure:** Percentage reduction of lipid parameters and Percentage of High-Adherence (MMAS = 8).

**Results:** With regards to LDL-C, all arms demonstrated a significant decline of TC level from their baseline values, reported a median reduction of 21.9% (after breakfast), 26.79% (after dinner) and 29.33% (before bedtime) after 16 weeks of statin therapy, the differences were significantly different (p < 0.001). LDL-C reduction was greatest when simvastatin was taken before bedtime. This study found out that when simvastatin administered in the morning, HDL-C increased steadily throughout the study and recorded an increase of 17.32% at week 16. High adherence rate was recorded in arm where patients were instructed to take simvastatin before bedtime.

**Conclusion:** Simvastatin show more superior LDL-reduction and higher level of adherence when being instructed to be taken just before bedtime. However, those who experience a low HDL-C and high TG level while aggressive LDL-C reduction is not necessary may potentially benefited from morning administration of simvastatin.

**Keywords:** Simvastatin, Chronotherapy, Administration Time, Adherence, Malaysia

## Ab35

### The Impact of a Centralized Automatic Tablet Dispensing and Packaging System in a Local Hospital Inpatient Pharmacy

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**Introduction:** The World Health Organization (WHO) has launched the third Global Patient Safety Challenge on Medication Safety in 2017. The goal of this challenge is to reduce medication-related harm by 50% in the next five years. Developing technologies and tools for reducing medication errors is one of the five key objectives within this challenge. A medication distribution system that comprised of an automated dispensing device and a unit dose system have been shown to provide a variety of advantages including a reduction of medication errors over alternative distribution systems in other health care systems.

**Objective:** To determine percentage of medication dispensing errors, dispensing efficiency, and percentage of ward return before and after implementation of a centralized automatic tablet dispensing and packaging system (ATDPS) in a local hospital inpatient pharmacy.

**Methods:** This was a prospective observational study with before-after design conducted at the United Christian Hospital. Medication distribution methods were observed in two periods of two months. Pre-intervention phase concerned manual dispensing, was taken place from Nov 2016 to Jan 2017. Post-intervention phase with ATDPS dispensing was taken place from May 2017 to July 2017. The data were collected from a renal ward.

**Results:** A total of 5647 and 17804 pouches of medications were dispensed in pre and post intervention group respectively. The percentage of medication dispensing errors reduced statistical significantly from 0.0885% to 0.0169% (p-value 0.011). Implementation of ATDPS led to 81% reduction in the risk of dispensing errors. The dispensing efficiency increased statistical significantly from 6.2 to 24.3 no. of unit dose per min (p-value 0.000). Although there was a reduction in total dispensed quantity, percentage of ward return increased slightly from 24.51% to 26.77% (p-value 0.000).

**Conclusion:** Implementation of ATDPS led to a reduction of medication dispensing errors, an increase in medication dispensing efficiency, and a slight increase in percentage of ward return.

## Ab36

### Review on the Use of Ciprofloxacin in the Empirical Treatment of Acute Gastroenteritis

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**Objectives:** Ciprofloxacin is commonly prescribed empirically to treat acute gastroenteritis. However, inappropriate use of ciprofloxacin may lead to prolonged intestinal *Salmonella* carriage, increased risk for *Clostridium difficile* infection, a potential risk of hemolytic uremic syndrome, and promotion of antimicrobial resistance. This study evaluated the appropriateness of prescribing ciprofloxacin in the empirical treatment of acute gastroenteritis in terms of indication, dosage and treatment duration.

**Methods:** A retrospective chart review was conducted at St. Paul's Hospital, Hong Kong. Out-patient cases prescribed with ciprofloxacin in the period of 1<sup>st</sup> to 30<sup>th</sup> September 2017 were identified. The appropriateness of ciprofloxacin prescribing was analyzed in accordance to evidence-based guidelines. Conditions considered appropriate include febrile and bloody diarrhea, severe and inflammatory diarrhea, immunocompromised status, and symptoms lasting for longer than a week despite conservative measures. Inappropriate conditions encompass mild to moderate diarrhea, or suspected enterohemorrhagic *Escherichia coli* (EHEC) infection.

**Results:** Thirty-seven cases of acute gastroenteritis treated empirically with ciprofloxacin were identified. Patients were aged  $37.7 \pm 14.9$  years, and presented with a mean body temperature of  $37.1^\circ\text{C} \pm 0.9^\circ\text{C}$ . Ciprofloxacin was prescribed for the inappropriate indication in 24 (64.9%) cases, where 23 (62.2%) had mild to moderate diarrhea, and 1 (2.7%) had suspected EHEC infection. The dosage was appropriate for all cases. Treatment duration was inappropriate in 3 (8.1%) cases, in which a seven-day course was prescribed, exceeding the recommended three- to five-day duration. Ciprofloxacin was prescribed for the appropriate indication and duration in 12 (32.4%) cases only.

**Conclusions:** The prescription of ciprofloxacin for acute gastroenteritis was deemed inappropriate based on the established criteria in the majority of cases. Physicians should be more prudent with the use of empirical antibiotics for gastroenteritis. Benefits and risks should be carefully balanced prior to initiating antibiotics.

## Ab38

### Design, Develop and Evaluate Dispensary Software in RP-KTPH Teaching Dispensary

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**Objective:** Recent pedagogical approaches within the field of applied sciences incorporate problem-based learning and hand-on training. Republic Polytechnic's School of Applied Sciences (SAS), in collaboration with the School of Engineering (SEG) and the School of Infocomm (SOI), has developed RPMED, a user-friendly and efficient dispensing software as a learning platform to hone student's clinical and dispensing skills. By embracing new technologies and automation, students will be inculcated with the values and principles of pharmaceutical care such as medication safety, patient care continuum, dispensing process efficiencies and documentation procedures.

**Methods:** Developing RPMED requires a system of information technology (IT) improvements. First, SAS students review current dispensing software issues raised by previous development teams. Next, SOI students address these issues with the teams. Followed by, enhancing and implementing new features in RPMED. Lastly, end users feedback surveys are prepared, conducted and reviewed by the SAS Sciences students to determine RPMED software usability and future enhancements.

**Results:** Three improvement processes within RPMED has been identified and implemented: a barcode system, a drug interaction matrix and drug imaging. Implementing barcode systems on pharmaceutical products reduces medication selection errors, thereby improving dispensing accuracy and efficiency. A drug interaction matrix improves medication safety by allowing concurrent checks for drug interactions when new medications are added to patients' drug chart. A pop-up alert will appear when drug interactions are found. Drug imaging incorporates images within the software for quick and accurate identification and selection of medicines. End users feedback surveys showed widespread acceptance and usability among students.

**Conclusion:** Developing and using RPMED allows students to appreciate the verisimilitudes with commercially available dispensing software. The system of checks and balances within RPMED allow students to gain insight into the complexities involved in IT use within pharmaceutical care.

## Ab40

### Characteristics of Long Term Survivors and Responders of EGFR-mutated Non-small-cell Lung Cancer Patients Treated with EGFR-TKIs

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**Objectives:** To identify clinical factors associated with long-term survival and long-term response of gefitinib and erlotinib in the treatment of EGFR-mutated non-small-cell lung cancer (NSCLC) patients.

**Methods:** 319 NSCLC patients with known EGFR mutation treated with gefitinib or erlotinib at a Macau government hospital between 2005 Jan and 2015 Dec were retrospectively reviewed. Demographic and clinical data, treatment response and survival time data were collected. Patients who had switched to other EGFR-TKIs or having concurrent chemotherapy were excluded. Patients who remained alive for more than 60 months were defined as long-term survivors and patients who were stable or response to gefitinib or erlotinib for more than 24 months were considered as long-term responders.

**Results:** 15 long-term survivors (11 in gefitinib group and 4 in erlotinib group) and 48 long-term responders (25 in gefitinib group and 23 in erlotinib group) were identified. Long-term survivors consisted of more female patients (80.0% vs 60.7%), less smokers (6.7% vs 26.6%), more patients with a better performance status (PS 0 to 1: 93.3% vs 75.8%) and less patients with bone (13.3% vs 28.7%) or brain (0% vs 13.5%) metastasis at diagnosis. A significantly larger proportion of long-term survivors had no pleural effusion at diagnosis (6.7% vs 36.5%,  $p=0.0225$ ) and presented skin side-effect during EGFR-TKI treatment (80.0% vs 42.6%,  $p=0.0063$ ). As for long-term responders, a significantly larger proportion of them underwent surgery (50.0% vs 21.6%,  $p<0.0001$ ) and reported skin side-effect during EGFR-TKI treatment (77.1% vs 42.0%,  $p<0.0001$ ). There were significantly less patients bearing exon 21 mutation (31.2% vs 47.0%,  $p=0.0442$ ) or present with bone metastasis (16.7% vs 31.8%,  $p=0.0345$ ) or pleural effusion (12.5% vs 36.0%,  $p=0.0014$ ).

**Conclusions:** The 5-year survival rate was 5.79%. Absence of pleural effusion at diagnosis and presence of skin side-effect during EGFR-TKI treatment can be predictors of prolonged survival and continuous response.

## Ab41

### Community Pharmacists' Beliefs in the Provision of Pharmacist Care for Herbal and Dietary Supplement Users: A Qualitative Study from Thailand

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**Objective:** Herbal and dietary supplements (HDS) are normally perceived as safe despite some adverse effects. Community pharmacists can ensure the safe use of HDS, but they are not proactive in providing pharmacist care (PC) for the HDS users. This study thus aimed to explore the community pharmacists' behavioral, normative and control beliefs in providing PC for the HDS users in Bangkok, Thailand.

**Methods:** A qualitative study with in-depth interviews was conducted in purposively sampled pharmacists from December 2016 to June 2017. A set of open-ended and probing questions for the interviews was constructed based on the Theory of Planned Behavior and COREQ guidance. A sample size was determined by the saturation of pharmacists' answers. All interviewed were audio-recorded, transcribed, and analyzed using the qualitative content analysis. Various measures were taken to ensure the credibility, dependability, and confirmability of the study findings.

**Results:** A total of 22 informants was interviewed. They were mostly female (13/22, 59%) with the mean age of 32 years. For behavioral beliefs, they could identify many benefits of PC for the HDS users, such as ensuring the safety of HDS use, making pharmacists more trustworthy, and attracting customers. They opined, as part of normative beliefs, that they were responsible for providing PC and the HDS users needed such a service. Regarding control beliefs, the motivating factors of offering PC were inquiries initiated by the HDS users, professional training, and the availability of HDS references. Some barriers included the reluctance of HDS users to accept pharmacists' advice and limited sources of information.

**Conclusion:** Community pharmacists reported various behavioral, normative and control beliefs in providing PC for the HDS users. Some facilitators should be enhanced and barriers resolved. Further studies are required to examine their attitudes toward optimum delivery of PC for the HDS users.



## Ab42

### The Use of Standardised Parenteral Nutrition in Neonates

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**Introduction:** Standardised parenteral nutrition (SPN) was shown to be a safe and effective parenteral nutrition (PN) to neonates, leading to cost-savings and reduction in medication errors. This practice has not been established in Hong Kong.

**Objective:** To examine the feasibility, safety and effectiveness of SPN in neonates.

**Method:** Six different SPN formulations of amino acid /dextrose (AA/DEX) solution (starter, standard preterm, restricted fluid preterm, peripheral preterm, 7.5% dextrose preterm and term PN) were designed. The selection of SPN or IPN (individualized parenteral nutrition) was by prescriber's choice. Fat emulsion was tailor-made with addition of vitamins according to guidelines.

**Results:** From Nov 2016 to June 2017, 69 cases (93%) used SPN and 5 (7%) used IPN. Sixty-two cases (50 premature) successfully used SPN for the whole duration of PN (90%). Seven cases (10%, all premature) switched to IPN due to hypernatraemia (>150mmol/L, n=1), hyponatremia (129-134mmol/L, n=4), intention for higher calories (n=1) and alkalosis (n=1). Birth weight was regained on day 3 of life for premature neonates who started SPN on the 1<sup>st</sup> two days of life. Target energy and protein were achieved on day 5 for preterm SPN and day 4 for term SPN group. Energy and protein target were comparable to international study. Ordering and processing time for SPN was shorter than IPN. No medication errors arose from the 499 SPN prescriptions made.

**Conclusion:** SPN was successfully used in majority (90%) of neonates. It is safe in administration and can deliver adequate nutrition to neonates. The nutritional intake is comparable to international study. It saves staff time and cost. Future enhancement programs can be done to improve the formulations (e.g. addition of high sodium preparation, adjustment of acetate, monitoring nutritional parameters and improve logistics in ordering and preparation). SPN is the future direction of PN in neonates.

## Ab44

### Community Pharmacists in Malaysia: Are They Ready for the Change? Perspectives from Community Pharmacists and General Practitioners

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**Objectives:** To explore the perceptions of community pharmacists (CPs) and general practitioners (GPs) in Malaysia towards the community pharmacist roles in the health care system.

**Method:** A triangulation of qualitative and quantitative methods was used.

**Results:** Analysis of the interviews (13 CPs and 12 GPs) suggested that most CPs were eager to provide extended healthcare services but have refrained to do so due to non-existence of separate roles in dispensing activities between CPs and GPs. Most GPs supported the CPs' involvements in providing healthcare services and advices but they were concerned by CPs' ethics and professionalism. The challenges encountered are multi-factorial and, are related to the existing healthcare system.

Three major themes were identified: barriers to professional development, trends of community pharmacy practice in Malaysia and perspectives towards the implementation of dispensing separation. The common barriers were lack of recognition, product-oriented practices and lack of communication between healthcare practitioners.

Two postal surveys were conducted to explore the preparedness of CPs (n=395) and perception of GPs (n=205) towards community pharmacy practice change in Malaysia. All respondents indicated that there is a need of change for the profession. In general, GPs were supportive yet they were uncertain about CPs' knowledge and skills.

The implementation of dispensing separation has been one of the hot debatable issues in Malaysia for many years. A mixture of responses were received from the GPs. Most of them were supportive if proper planning and execution can be introduced by the policy makers.

**Conclusion:** This study has identified the current barriers towards the transformation of community pharmacy practice in Malaysia. Community pharmacists believed they have important roles in the healthcare system and, are willing to work collaboratively in delivering optimal healthcare to the public, yet, they need to earn respect and trust from the public and other healthcare practitioners.



## Ab46

### To Study the Drug Utilization Pattern of Anti-Tuberculosis Therapy (ATT) in Tertiary Care Hospital

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**Objectives:** To study the Drug Utilization Pattern of Anti-Tuberculosis Therapy (ATT) in tertiary care hospital.

**Methodology:** The study was conducted in Kasturba Hospital, Manipal for a period of 7 months. It is a descriptive cross sectional retrospective study. Patients diagnosed with PTB between the age group 18–65 years were included. Ethical Clearance was obtained from Institutional Ethical Committee of Kasturba Hospital.

**Results:** In this study, a total of 459 patients were studied out of which 158 patients were referred to local DOTS centre and 297 patients were prescribed with ATT in Kasturba Hospital, Manipal. The prescribing pattern was examined to find that isoniazid (H), rifampicin (R), pyrazinamide (Z), ethambutol (E) in intensive phase (IP) and H and R in continuation phase (CP), HRZE(IP).HRE(CP) and HRE(IP).HR(CP) were the most commonly used regimens. The ATT prescribed were also checked for compliance to WHO/RNTCP treatment guidelines. It revealed 86.54% compliance to guidelines which includes 12.8% of Modified ATT regimen which was changed due to adverse drug reaction (ADR) or patients' co-morbid conditions. The ADR could only be assessed in 145 patients. In 314 patients the ADR could not be assessed as they were either referred to Directly Observed Therapy Short-course (DOTS) or they defaulted. 11 different ADR's were recorded. The incidence of ADR was 37.24%. Most common ADR's included Hepatotoxicity (31.03%), Nausea and vomiting (9.7%), Hyperuricaemia (6.2%) and Gastritis (4.8%).

**Conclusion:** The major ATT regimen used in a tertiary care hospital were identified and compliance to treatment guidelines was good. The incidence of ADR was high which entails the need for better monitoring and preventive strategies. Cure rate was found to be low and there were a very large number of defaulters. This necessitates immediate control measures to prevent defaulters and reasons for this must be established.

## Ab49

### In Vitro Investigation into Interactions of 24-Flavour Herbal Tea with Cytochrome 2D6 Enzymes

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**Objectives:** Herb–drug interactions are gaining increasing concern from the public due to the emerging trend of concomitant use of western medicines with traditional Chinese medicine, which requires further investigation. This study aims to investigate the inhibitory properties of 24-flavour herbal tea and its constituent plants to CYP2D6 as a possible mechanism of such an interaction.

**Methods:** A method employing *in vitro* fluorometry was adopted to test the CYP2D6 inhibitory properties of methanol extracts of three 24-flavour herbal teas and ten constituent plants.

**Results:** Among three commercially available brands of 24-flavour herbal tea, two of them showed inhibition to CYP2D6 at IC<sub>50</sub> of 1772.6 and 2885.7 µg/mL respectively. Of the ten plant constituents analyzed, *Houttuynia cordata* exhibited the most prominent inhibitory effect with an IC<sub>50</sub> of 438.5 µg/mL. *Abrus cantoniensis*, *Lonicera japonica*, *Chrysanthemum morifolium*, *Glycyrrhiza uralensis*, *Ilex asprella*, *Ilex rotunda*, and *Taraxacum mongolicum* had weaker inhibition with IC<sub>50</sub> of 1357.0, 1426.7, 1522.8, 1663.7, 1676.2, 1779.6, and 2247.9 µg/mL respectively. *Mentha haplocalyx* and *Morus alba* did not show any inhibitory effect on CYP2D6.

**Conclusions:** The study suggests that certain 24-flavour herbal teas and their components could inhibit CYP2D6-mediated metabolism *in vitro* to a small extent.

## Ab50

### Isolation and Characterization of Strophanthin-K and other Cardiac Glycosides from *Strophanthus Divaricatus*

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*Strophanthus divaricatus* is a shrub species characterized by its traditional use in the regulation of heart rate. Cardenolide, a subgroup of cardiac glycoside, is responsible for this cardiac action. Strophanthin-K is a type of cardenolide which attracts particular interest due to its short-acting nature and diuretic properties. It is esteemed of value in patients complicated with edema. Existing literature have demonstrated several methods for isolating the molecular content of *S. divaricatus* and twenty-four distinct cardenolides have been to date characterized. Yet, Strophanthin-K has not been successfully isolated from the species despite its prevalence among the same shrub genus. Present study focused on the development of an HPLC-UV methodology to qualify and quantify Strophanthin-K and other potential cardiac glycosides content from the seed and exocarp region of *S. divaricatus*. Single-step methanol extraction approach was incorporated in an attempt to simplify complex procedures and minimize quantitative error. The result of this study shows that Strophanthin-K was of insignificance amount in the seed and exocarp samples. Detection signal was beyond limit of quantification, rendering quantitative data unreliable. Nonetheless, several distinctive peaks have been observed, and their structural characteristics have been deduced. Despite negative outcome, false negative could not be excluded. Modifications and optimizations on HPLC conditions were required to attain better resolution and sensitivity, allowing more precise data to be collected. Involvement of other instrumentation methods should also be considered to elucidate the exact molecular structure of identified peaks.

## Ab51

### Effect of Flavonols on Nitrate Tolerance: Role of Aldehyde Dehydrogenase

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**Background:** A novel theory recently suggested that aldehyde dehydrogenase isozyme 2 plays a key role in exerting pharmacological effects of glyceryl trinitrate, and that inhibition of its activity by oxidative stress would lead to nitrate tolerance. Flavonols, as dietary antioxidants, show great potential in combating oxidative stress, and hence possibility in preventing nitrate tolerance.

**Objective:** In the present study, we examined the role of aldehyde dehydrogenase isozyme 2 in developing nitrate tolerance and whether flavonols can prevent such phenomenon by affecting oxidative stress and/ or aldehyde dehydrogenase activity.

**Methods:** Human vascular smooth muscle cells were pre-incubated with glyceryl trinitrate and an investigational flavonol (quercetin or kaempferol) for 24 hours, followed by 5-minute exposure of glyceryl trinitrate. Vascular response was then assessed by phosphorylated myosin light chain expression using Western Immunoblotting analysis. Enzyme activity was detected by catalyzed reduction of nicotinamide adenine dinucleotide. Oxidative stress was measured by oxidation of 2',7'-dichlorofluorescein diacetate. A known antioxidant, apocynin was used as the positive control.

**Key Results:** Aldehyde dehydrogenase activity was unaffected under chronic exposure of glyceryl trinitrate. Apocynin, an antioxidant, was able to mitigate nitrate tolerance, possibly due to its anti-oxidative property and/ or increased enzymatic activity. Similar effects could be observed in quercetin but not kaempferol. However, a higher concentration may be required to effectively prevent nitrate tolerance development.

**Conclusions:** Mismatch in findings suggested inconclusive relationships among nitrate tolerance, aldehyde dehydrogenase activity and oxidative stress. Nonetheless, apocynin and quercetin, demonstrating notable abilities in reducing nitrate tolerance, worth future studies to consolidate the postulation.

## Ab52

### Formulation of Spray Dried Inhalable Powder with Human Serum Albumin as an Aerosol Performance Enhancer for the Pulmonary Delivery of DNA

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**Objectives:** Dry powder inhalation has been investigated as an innovative approach of delivering nucleic acid therapeutics for the treatment of respiratory diseases. Particle size and dispersibility of the dry powder formulation can largely affect the aerodynamic properties and deposition in the respiratory tract. This study aims to investigate the feasibility of using human serum albumin (HSA) as an aerosol performance enhancer to delivery DNA through a dry powder inhaler device.

**Methods:** Various formulations of dry powders were produced by spray drying and the *in vitro* aerodynamic performance of the powders was assessed by using a next-generation impactor. The particle size and morphology of the powders were evaluated by laser diffraction and scanning electron microscopy.

**Results:** Corrugated particles were produced with the addition of HSA and improved dispersibility of powder was observed. Although HSA marginally enhanced aerosolising performance of the dry powder formulation, the combination of HSA and DNA reduced the fine particle fraction. An interaction between HSA and DNA may be present which alters the surface properties of the spray solution in spray drying, hence adversely affecting the aerosol performance enhancing effect of HSA.

**Conclusions:** HSA may not be a suitable additive in improving delivery of DNA through dry powder inhalation.

## Ab53

### The Effect of Ammonium Bicarbonate on the Aerosol Performance of Spray Dried Mannitol Particles

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**Aim / Objectives:** Spray dried mannitol particles, an increasingly popular carrier in formulations for pulmonary drug delivery, often has poor aerosol performance due to the presence of strong inter-particulate interactions. This study aims to improve the aerosol performance of spray dried mannitol particles by incorporating ammonium bicarbonate as porogen.

**Methods:** Solutions with different proportions of mannitol and ammonium bicarbonate were spray dried and the spray drying conditions were adjusted to produce particles with similar physical size. Scanning electron microscopy was adopted to examine the shape, porosity and surface morphology of the spray dried mannitol particles, and the *in vitro* aerosol performance of the particles were evaluated using a next generation impactor. Results of different samples were compared to study the effect of ammonium bicarbonate on particle porosity and its subsequent impact on the aerosol performance and pressure drop dependency of the particles.

**Results:** Ammonium bicarbonate enhanced the particle porosity and aerosol performance of the mannitol particles when it was used at a high proportion, but it did not decrease the pressure drop dependency of the particles. Fragmentation of particles was observed when ammonium bicarbonate was used in high proportion.

**Conclusions:** The aerosol performance of the mannitol particles formed by this technique was successfully improved, the particles may be used as carriers in inhalable formulations for aiding the pulmonary delivery of nano-sized drugs.

## Ab54

### The Impact of Beliefs towards Illness and Medications on Adherence and Clinical Outcomes in Acute Coronary Syndrome Patients in Hong Kong

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**Objectives:** To assess the impact of beliefs towards illness and medications on adherence and readmission in acute coronary syndrome (ACS) patients.

**Methods:** A phone interview that evaluated beliefs towards illness using the Brief Illness Perception Questionnaire (BIPQ), beliefs towards medications using the Beliefs about Medicines Questionnaire (BMQ) and adherence using a self-reported scale was done. Patients discharged for 1, 6, and 12 months were recruited and surveyed. 1-month, 6-month and 12-month readmission data was collected. Spearman's rank correlation was used to show correlation between belief scores, adherence and readmission, while ordinal regression was used to adjust for covariates.

**Results:** Seventy-nine patients were surveyed; 30, 22, and 27 were discharged from the index ACS admission for 1, 6 and 12 months respectively. Significant positive correlations were found between adherence score with BMQ-Specific Necessity score ( $r_s=0.287$ ,  $p=0.010$ ), necessity-concerns differential ( $r_s=0.539$ ,  $p<0.001$ ), and an inverse correlation between adherence and BMQ-Specific Concerns score ( $r_s=-0.443$ ,  $p<0.001$ ). Higher BMQ Specific-Necessity scores (aOR=1.404, 95% CI: 1.147-1.719) and a monthly income less than HKD\$10,000 compared to \$10,000 or greater (aOR=4.540, 95% CI: 1.761-14.311) was associated with higher adherence, while higher BMQ Specific-Concerns scores were related to lower adherence (aOR=0.774, 95% CI: 0.672-0.892). Total BIPQ score (OR=1.134, 95% CI: 1.005-1.278) and number of previous ACS episodes (OR=19.000, 95% CI: 2.029-177.932) predicted 6-month all-cause readmissions and 12-month cardiac readmissions respectively.

**Conclusions:** Patients' perceived necessity and concerns towards medications and an income less than \$10,000 were significantly associated with adherence. Illness perceptions and history of ACS predicted readmissions. These findings are useful for developing interventions to improve adherence in ACS patients.

## Ab55

### Antimicrobial Stewardship Program-Led Carbapenem Restriction in Hong Kong: A Cost-Effectiveness Analysis

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**Objectives:** This study evaluated the short-term and long-term cost-effectiveness of a carbapenem preapproval program by ASP from the perspective of a Hong Kong healthcare provider.

**Methods:** Short-term outcomes of patients with nosocomial pneumonia and long-term outcomes of patients with pseudomonal nosocomial pneumonia resulted from the program were simulated by two decision trees. They were compared to the control group where no carbapenem preapproval was implemented. Short-term outcome measures included mortality rate, CDI rate, quality-adjusted life-years (QALYs) loss and direct medical cost; long-term outcome measures included mortality rate, QALYs loss and direct medical cost. One-way and probabilistic sensitivity analyses were conducted to assess the robustness of results.

**Results:** In short-term, the program saved more lives (mortality: 21.00% versus 24.27%) with a lower cost (\$8,921 USD versus \$8,965 USD) and caused fewer CDIs (3.85% versus 7.69%) and less QALYs loss (4.195 versus 4.448) compared with control. In long-term, the program saved more lives (mortality: 33.30% versus 34.93%) with a lower cost (\$7,925 USD versus \$8,809 USD) and caused less QALYs loss (4.725 versus 4.960) compared with control. The most influential factor on the results was the relative risk of mortality with ASP. In the 10,000 Monte Carlo simulations, 90.3% showed the program was cost-effective in short-term; while 97.8% of 10,000 Monte Carlo simulations indicated the program was cost-effective in long-term.

**Conclusion:** In both short-term and long-term, carbapenem preapproval program appeared to be a cost-effective ASP intervention in patients with nosocomial pneumonia in Hong Kong.



## Ab56

### Identification of Low Risk Stable Cardiovascular Disease Patients for the More Cost-Effective Fast Track Medication Refill (FTMR) Service

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**Objectives:** This study identified clinical characteristics of cardiovascular disease patients not requiring any medication change from a follow-up visit for a newly proposed Fast Track Medication Refill (FTMR) service. This study also compared the cost-effectiveness such service with the current model in Special Out-Patient Clinics of Hospital Authority in Hong Kong.

**Methods:** Clinical characteristics of 472 patients were retrospectively reviewed from Hypertension Clinic, Prince of Wales Hospital from 1 Apr 2016 to 31 Mar 2017. As the primary outcome, logistic regression models were constructed to predict whether any medication change would be needed in the next follow-up appointment. As a secondary outcome, the ten-year costs per person, including hospitalization and running costs, and the quality-adjusted life-years (QALY) associated with the FTMR models with a follow-up duration of either 3 or 6 months and the current model as the base case were estimated by a Markov model. Model inputs were derived from characteristics of patients attending the clinic and from the literature. The outcome measure was incremental cost per QALY gained (ICER).

**Results:** Three formulae for blood pressure-, glycated haemoglobin- and low-density lipoprotein-lowering medication changes were developed (c-statistic: 0.831, 0.918 and 0.778). 53.9% of patients could be theoretically offloaded to FTMR and agreed with this suggestion. Using Gross Domestic Product (GDP) per capita of Hong Kong (USD 43,496.54) as the willingness-to-pay per QALY, an every-3-month FTMR was more cost-effective than the current model, (ICER = USD 28,300;  $\Delta$ QALY = +0.07 year) while an every-6-month FTMR dominated over the current model ( $\Delta$ cost = -USD 289;  $\Delta$ QALY = +0.009 year). An every-3-month FTMR was more cost-effective than an every-6-month FTMR (ICER = USD 37,200;  $\Delta$ QALY = +0.06 year).

**Conclusions:** A more frequent FTMR is a clinically viable and cost-effective refill model. The data projected would require a prospective trial for validation.

## Ab57

### Ribotype-guided Fecal Microbiota Transplantation for Patients with First Episode of *Clostridium Difficile* Infection

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**Objective:** Recurrence CDI (RCDI) occurs commonly in the clinical setting despite the initiation of standard first line antimicrobial therapy, particularly in patients infected with hyper-virulent ribotype strains. Previous studies demonstrated that fecal microbiota therapy (FMT) is effective in reducing recurrence and 30-day mortality rate in RCDI patients. The aim of the present study is to examine the cost-effectiveness of ribotype-guided FMT in comparison to standard treatment for patients with initial episode of CDI from the perspective of the public healthcare provider.

**Methods:** A decision analysis model was constructed to simulate outcomes of two interventions: ribotype-guided FMT versus standard treatment within a hypothetical adult patient cohort. The outcomes examined by the present model included direct medical cost, 30-day mortality rate, recurrence rate and quality-adjusted life year (QALY) loss for initial CDI. Model parameters were retrieved from literatures. Influence of uncertainty on model inputs was evaluated by sensitivity analysis.

**Results:** Base-case analysis showed that ribotype-guided FMT treatment was less costly (HK\$69,845 vs HK\$74,941) and more effective in reducing mortality rate (0.039 vs 0.153), RCDI rate (0.3447 vs 0.3718) and loss in QALYs (0.34 vs 1.32) when compared to standard treatment group. Two potential influential factors were identified in the model. One way sensitivity analysis revealed that ribotype-guided FMT reduced RCDI rate if primary cure rate of standard treatment was <70.6%. FMT saved cost if length of hospitalization in ribotype-guided FMT group was <11.1 days. Probability sensitivity analysis illustrated that ribotype-guided treatment was a dominant option in 91.78% of 10,000 Monte Carlo simulations.

**Conclusion:** Present study suggests that ribotype-guided FMT appears to be a effective and cost-saving strategy in initial CDI treatment. Implementation of ribotype-guided FMT in initial CDI patients may alleviate the economic and disease burden on our public healthcare system.

## Ab58

### The Physical Properties of Fatty Acid-conjugated Poly (Ethylene Oxide)-Block-Poly ( $\epsilon$ -Caprolactone) Micelles

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**Aims:** The objective of this study was to optimize a preparation method for the fabrication of fatty acid-conjugated poly (ethylene oxide)-block-poly ( $\epsilon$ -caprolactone) (PEG-b-PCL) micelles and characterize their physical properties.

**Methods:** Fatty acid-conjugated PEG-b-PCL micelles possess a great potential to deliver drugs to the brain. Therefore, 9 fatty acids were conjugated to PEG-b-PCL, including lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, erucic acid,  $\alpha$ -linolenic acid, linoleic acid and docosahexaenoic acid. These polymers and M PEG-b-PCL were used to prepare micelles. The CMC, particle size and curcumin content were determined by a pyrene method, dynamic light scattering (DLS) and UPLC-UV, respectively. The physical stability was assessed by DLS and UPLC-UV, whereas the stability of micelles in serum was examined by a Forster resonance energy transfer (FRET) method. The hemolytic effects and *in-vitro* release profiles of micelles were also examined.

**Results:** The fatty acid-conjugated PEG-b-PCL micelles were successfully prepared by an anti-solvent method with acetone. The CMCs of PEG-b-PCL conjugated with fatty acids except stearic acid were approximately 1 mg/mL, around 500 times higher than that of MPEG-b-PCL. Except lauric acid and stearic acid, fatty acid-conjugated PEG-b-PCL micelles exhibited a nano-size less than 100 nm with a narrow distribution and a drug loading around 16%. The curcumin concentrations of all the curcumin-loaded micelles decreased by more than a half after 48 hours in water at 37°C and their half-life in FBS was about 2 hours. All the micelles had no hemolytic effect and a release profile following first-order kinetics.

**Conclusions:** There was significant difference in the physical properties among different PEG-b-PCL micelles. Among all the fatty acid-conjugated PEG-b-PCL polymers, stearic acid conjugated PEG-b-PCL was not suitable for micelle preparation. In addition, these micelles were not stable enough for long-term storage. Therefore, future investigation on the technique to prolong their shelf-life is required.

## Ab59

### The Impact of Medication Optimization Service Provided by Pharmacist on Medication Appropriateness in Hospitalized Elderly Patients with Polypharmacy

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**Objectives:** To evaluate the impact of medication optimization service provided by pharmacists on the medication appropriateness in hospitalized elderly patients with polypharmacy in Our Lady of Maryknoll Hospital (OLMH).

**Methods:** This is a prospective, randomized controlled study. Elderly polypharmacy patients admitted to a medical ward in OLMH were randomized to receive either medication optimization service provided by pharmacist on ward, or existing pharmaceutical care. The service included (i) admission medication reconciliation; (ii) patient chart and medication review on alternate day basis. Any unintentional discrepancies or drug-related problems identified were brought to the attention of physicians with recommendation made. To assess the medication appropriateness, a validated tool called Medication Appropriateness Index (MAI) which consisted of 10 different criteria with different weighing was used. Higher MAI scores were related to increased hospitalization or emergency room visit. Main outcome was the change in summated MAI scores per patient at admission and on discharge.

**Results:** Seventy eligible patients were recruited from Dec 2016 to Sep 2017 for this in-progress study. There was no significant difference in the average summated MAI scores between the intervention group and the control group at admission ( $P=0.327$ ). The scores significantly improved from admission to discharge in the intervention group ( $n=35$ , 2.85 to 1.77,  $P=0.003$ ) but not in the control group ( $n=35$ , 3.03 to 2.63,  $P=0.066$ ). No significant difference was detected in the change of the scores between two groups ( $P=0.235$ ). Further, the intervention group had significantly lower scores on discharge when compared with the control group ( $P=0.032$ ).

**Conclusions:** Interim results revealed a significant improvement in the average summated MAI scores from admission to discharge in the intervention group but not in the control group. The pilot medication optimization service was shown to help physicians identify inappropriate medication use and improve inappropriate prescribing for patients from admission to discharge.

## Ab60

### A Prospective Study to Evaluate Pharmacist Interventions on Inappropriate Medication Use and Polypharmacy in Elderly Patients

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**Objective:** Inappropriate medication use and polypharmacy are linked to various drug-related problems. The objectives were to evaluate the impact of pharmacists' intervention on medication appropriateness and polypharmacy in geriatric patients.

**Method:** This was a prospective study conducted in the Medicine & Geriatrics (M&G) Department of Tai Po Hospital, an 800-bed rehabilitation hospital of the Hospital Authority. Patients in intervention group received medication review by pharmacists during ward round twice weekly; while patients in control group received standard care. Medication Appropriateness Index (MAI) was used to assess medication appropriateness. The primary outcomes were the difference in MAI on admission and discharge between intervention group and control group and the difference in the average number of drugs upon admission and at discharge.

**Results:** Over a period of 5 months, 308 patients were included in the study. MAI changed from  $4.18 \pm 3.14$  to  $2.23 \pm 2.27$  ( $p < 0.001$ ) and  $4.01 \pm 3.48$  to  $4.04 \pm 3.64$  ( $p = 0.992$ ) in intervention and control group respectively. The difference in change in MAI between the two groups was statistically significant ( $p < 0.001$ ). There was no difference in the change in number of medication between the two groups.

**Conclusion:** This study demonstrated that pharmacist intervention on ward level was effective in reducing inappropriate medication in geriatric patients as defined by the MAI.

