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**Hong Kong Pharmacy Conference 2019**  
March 9 - 10, 2019

**THE TIME IS NOW**



*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,

Welcome to the Hong Kong Pharmacy Conference 2019!

You may still recall that last year's conference featured a showcase of how collaborative models of professional practice can improve patient's continuity of care and health outcomes. While one may wonder when these shall be integrated into our pharmacy practice, the Organising Committee joins hands with me and believe that **'The Time is Now'**.

Not long before this very occasion, we saw some strong appeals from other healthcare professions. The HKSAR Government's initiatives in developing primary care and re-allocating resources between public and private healthcare is part of an answer to the increasing burden on the healthcare system. "Pharmacists are ready" was the initial reaction that rang in my head. While there may still be some fine details that may require further discussions, the timing is none other but NOW.

The key opinion leaders on Day 1 shall set the tone and explain why the time is indeed now for pharmacists to step up our engagement in the healthcare sector, in particularly elderly and primary care services. Day 2 features an all-encompassing programme ranging from the long-standing streams of clinical and community practice, to acroamatic though increasingly popular streams of crisis management and opportunities in Mainland & the Greater Bay Area. A focused networking session provides an excellent opportunity for graduating pharmacists or pharmacists looking for new challenges to have exclusive exchanges with their counterparts, which may eventually help them to sort their minds out.

For the first time ever, a fourth concurrent session is available in the morning of Day 2 where pharmacists may obtain on-site certification of adult cardiopulmonary resuscitation (CPR) offered by the Hong Kong St. John Ambulance. Ward pharmacists who are now working in integrated medical teams, and pharmacists working in clinical areas who aspire to become healthcare providers should not miss the chance to get accredited and better equip yourself for future opportunities!

The Organising Committee would also like to invite all of you to join the plenary session, which touches the unprecedented yet hesitant topic of self-reflection. After all the years of 'TransPharmAction', it is time to hear what others think about us as a profession and to see where we should go from here. With the variety of guest representatives, a thoughtful and mind-provoking experience is guaranteed.

"If you want to make the world a better place, take a look at yourself and make a change" sang by the King of Pop, the legendary Michael Jackson. No message could have been any clearer. Fellow pharmacists, the Time is Now.

Yours Sincerely,



Phoebe Chan  
Chairlady, Organising Committee  
Hong Kong Pharmacy Conference 2019



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## Theme Speech 1

### Stepping Up for the Healthcare Game

**KAO, W John**

Chair of Translational Medical Engineering, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong

“The Valley of Death” describes the high risk – high return drug development process involving years of R&D, billions of US dollars, and incredible low probability for success. For example, the failure rate for novel cancer drugs in late-phase clinical trials is around 70% in phase II and 60% in phase III, a devastating prospect to the patients and their family, the health care community, the public, and the economy. How to provide a path to safely and efficiently translate new biomedical technologies into the market requires a new paradigm of collaboration not only across traditional academic disciplines, but across sectors including public agencies, academia, and industry. In this talk, we will examine a specific example of drug formulation from discovery to development as a case in point.

Polymers have been explored extensively for the delivery of bioactives including small molecules, biologics, and therapeutic cells for basic and applied research. A robust and versatile interpenetrating network platform consists of cysteine-conjugated gelatin and PEG-diacrylate has been developed as a research platform to better understand the fundamental biology and to address clinical needs. The discovery and development of this technology offers a case study on the processes, challenges, and opportunities in translating life sciences technologies from the university to the public.

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## Theme Speech 2

### Challenges and Opportunities at Times of Geopolitical Changes

**CRAIG, Duncan**

Director and Professor, UCL School of Pharmacy, United Kingdom

Abstract is not available

## Theme Speech 3

### Pharmacists en Route to Health Service Model Reorientation

**YEOH, Eng-kiong**

Director, The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong

Abstract is not available

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## Theme Speech 4

### Reinvigorating Pharmacists' Role to Rejuvenate our Elderly Population

**LAM, Ching-choi**

Chairman, Elderly Commission, Social Welfare Department, Government of the Hong Kong SAR, Hong Kong

The establishment of the first District Health Centre in Kwai Tsing will be a milestone in the development of primary healthcare in Hong Kong. Among other allied health professionals, pharmacists are expected to play a significant role to empower the community members to manage their own health. At District Health Centres, pharmacists could have one-on-one consultations with each patient, dealing with their concerns in a timely manner.

Technologies are being adopted with proven benefits, such as automated prescription system for the elderly homes, and mobile applications sending reminders and monitoring medication intake for elders in the community. These technologies can be applied to enhance the accuracy of prescription, and the compliance with medication. Automation may also prevent redundant prescription and save manpower.

The notion of community pharmacy should be explored, to break down traditional hospital walls and help to promote ageing-in-place and people-centred care. With better coordinated and person-centred medication plan at the community pharmacy, the problem of polypharmacy can be mitigated, especially for the elderly who may have multiple chronic diseases and limited mobility.

## Concurrent Session I: Sharpening Clinical Skills (1) Surviving Sepsis Update

### WONG, William

Clinical Pharmacist of Adult Critical Care Medicine, Washington Hospital, USA

The Surviving Sepsis guidelines produced by the Society of Critical Care Medicine and the European Society of Intensive Care Medicine have been established since the early 2000s. The first published guideline was in 2004. Then the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> edition were published in 2008, 2012 and 2016, respectively. In the 4<sup>th</sup> edition guideline, many of the guideline recommendations remain unchanged from previous versions but include in depth rationales from studies published since the 2012 guidelines were released. The 2016 guidelines cover the treatment of sepsis and septic shock in depth and recommendations including fluid resuscitation, vasopressor selection, antimicrobial therapy, mechanical ventilation, blood products, insulin administration, DVT and stress ulcer prophylaxis, and nutrition therapy. In 2018, there is a revision to the bundle based on the 2016 guidelines. A small summary of many of the guideline's recommendations pertinent to pharmacy will be summarized and discussed.

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## Concurrent Session I: Sharpening Clinical Skills (1) Setting up Ambulatory Care Clinics

### LEE, Joyce

Associate Professor, Division of Clinical Pharmacy and Pharmacy Practice, Department of Pharmacy, National University of Singapore, Singapore

The role of pharmacists has evolved from working behind the dispensary counter to serving patients at frontline as part of a collaborative care team. Pharmacists' practice autonomy has also expanded from providing recommendations to patients and healthcare professionals to furnishing and prescribing medications collaboratively as an independent pharmacist clinician. Pharmacists practicing in the ambulatory care setting are largely involved in the active role of direct patient care through face-to-face clinic visits and follow up care to ensure attainment of disease control. This talk will focus on setting up effective ambulatory care clinics that are sustainable and cost-effective. By the end of this talk, participants will be able to:

1. Describe the structure of pharmacist-involved collaborative care models
2. List the key features of effective ambulatory care clinics
3. Review data on pharmacist-involved collaborative interventions

## Concurrent Session I: Sharpening Clinical Skills (1) An Overview of JAK Inhibitors - Not Just Another Kinase

**CHEUNG, Tsang**

Clinical Assistant Professor, Department of Medicine, The University of Hong Kong, Hong Kong

Abstract is not available

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## Concurrent Session II: Exploring the Unexplored Immunotherapy & CAR-T Cells in Multiple Myeloma

**CHIM, Chor-sang**

S H Ho Professor of Haematology and Oncology, Department of Medicine, The University of Hong Kong, Hong Kong

Multiple myeloma (MM) is an incurable cancer of plasma cells. Enormous advances have resulted in a prolongation of survival from 2-3 years to more than 10 years. The advent of novel agents including proteasome inhibitors (PI) and immunomodulatory agents (IMiD) have rendered an unprecedented high rate of complete remission that translates into a superior survival. The mechanism of PI is based on the pivotal role of proteasome in the activation of NkκB, a survival signalling for myeloma plasma cells, and mitigation of the ER stress inherent with the high level of misfolded protein in myeloma cells. The mechanism of IMiD is based on the ability of IMiD to bind to cereblon of the E3 ubiquitin-pathway, thereby proteasome degradation of Ikaros zinc finger transcription factors, hence downregulation of IRF4 & MYC. Apart from the first generation PI such as bortezomib, new generation PI including carfilzomib and ixazomib have been recently approved. Of the IMiDs, since thalidomide, second & third generation IMiDs of lenalidomide & pomalidomide have been developed. Besides, monoclonal antibodies targeting CD38 (Daratumumab) & SLAMF7 (Elotuzumab) have been approved for relapsed MM. While the efficacy of these agents have been confirmed by randomized controlled clinical trials, there is a great deal of heterogeneity among the trials, making direct comparison of outcomes impossible. Moreover, venetoclax, a BCL2 mimetic, is an inhibitor of BCL2, possesses single agent activity in MM, especially in those carrying t(11;14). Besides, selinexor, an exportin-1 inhibitor, is effective in highly refractory MM. Finally, in the era of immunotherapy, while the role of anti-PD1 or PDL1 is uncertain, antibody-conjugates, Bispecific T-cell engager (BiTE), and chimeric antigen receptor (CAR-T) T cells are upcoming modalities for refractory MM. Nonetheless, the cost of treatment is daunting.

## Concurrent Session II: Exploring the Unexplored Global Orphan Drug Policy and Insights for Hong Kong

**LI, Shirley**

Postdoctoral Fellow, Centre for Safe Medication Practice and Research (CSMPR), Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong

### Background

Orphan drugs refer to drugs or biologic products developed to treat rare diseases or conditions upon request of a sponsor. Based on international nosology, rare diseases were prevalent in 1 in 67 of the Hong Kong population and contributed to 4.3% of total inpatient cost in 2015-2016.<sup>1</sup> Rare diseases have recently gained more public awareness in Hong Kong. However, there is no definition of rare diseases in Hong Kong, and the development of orphan drug policy lags decades behind our global counterparts.

### Objective

We systematically reviewed available evidence on orphan drug policies in 195 countries and regions to provide insights for local orphan drug policy.

### Methods

Electronic databases were searched from inception to November 2018 for publications that described any policies, legislation, or regulation on orphan drugs. A hand-search was further conducted on websites of medicines regulatory authorities. Extracted data were analysed through thematic synthesis.

### Results and Implications

Many countries and regions such as the United States, the European Union, Taiwan, Singapore, Korea, and Japan have laid down comprehensive policies and mechanisms to support rare disease patients, in particular, a legal framework for orphan drug development. Hong Kong has no dedicated legislation on rare diseases, nor existing mechanisms to facilitate the designation, reimbursement, and pricing of orphan drugs, and little support measures for the diagnosis and treatment of rare diseases. Hong Kong must strive to mitigate its delays in orphan drug policy development to address the unmet needs of the rare diseases in the city.

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## Concurrent Session II: Exploring the Unexplored Gene Therapy is just Around the Corner

**SOHN, Kyu-been**

Senior Manager, Asia Regional Regulatory Strategist for Rare Disease – Regulatory, Pfizer, Korea

Gene therapy is a promising treatment option for a number of rare diseases. It seeks to deliver functioning genes in the body, allowing a person to produce the necessary protein they were unable to make on their own. This process is a potentially one-time treatment that uses a vector—often, a modified virus with no viral DNA present—as a custom-made vehicle that delivers the functioning gene to a specific targeted tissue. Today's process of gene therapy differs from that in the 1990s, as it includes the development of safer vectors for DNA delivery, and improved study protocols and patient consent information.

Pfizer Rare Disease scientists have been investing time and resources into researching gene therapy for a number of years, including identifying the best approach toward manufacturing. We are committed to finding the right partners and forming collaborations with leveraging our facilities to support best-in-class manufacturing for potential gene therapies.

## Concurrent Session III: Mainland & Greater Bay Patients from Across Border – An Ethical Business

**KWOK, Ritchie**

Business Director, Hong Kong Integrated Oncology Centre, Hong Kong

With the rapid increase in the demand for health care services, patients from other countries, especially China, come to Hong Kong to look for medical services. The system setup, resources and culture are different in different countries and sometimes different regions of a country. The expectation from patients and their definition of ethical service can also be different. As a health care professional in Hong Kong, we have to uphold a standard that fulfil our code of ethics and code of conduct. Balancing the expectation from patients and our standard is never an easy task.....

(This session will be conducted in Cantonese)

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## Concurrent Session III: Mainland & Greater Bay Business Impact and Opportunities from Merging into the Greater Bay Area

**馮紹民**

常務副主任

廣東省粵港澳合作促進會

廣東省衛生健康委員會、香港特別行政區政府食物及衛生局、澳門特別行政區政府衛生局三方在廣東省聯合主辦了首屆粵港澳大灣區衛生與健康合作大會，三方簽署了《粵港澳大灣區衛生與健康合作框架協議》。政府為三地合作交流搭建了平臺，醫藥企業和業界以及機構如何跟進配合，為粵港澳大灣區健康共同體做出貢獻。報告在這個合作框架協議內，粵港澳大灣區醫藥和衛生健康合作全方位全面推進現狀，解讀CEPA醫藥合作有關政策和措施，介紹醫藥合作有關平臺，點出有關機遇，還有相關挑戰。

(This session will be conducted in Cantonese)

## Concurrent Session III: Mainland & Greater Bay Practical Aspects of Practising Pharmacy in Mainland China

### LAW, Kitty

Pharmacist, Shiu Tak Dispensary, Hong Kong

Recently, there have been more facilitation measures for working short-term or long-term in mainland China. Under the Closer Economic Partnership Arrangement (CEPA) in 2010, statutory healthcare professionals registered to practise in Hong Kong, including pharmacists, are allowed to provide short-term services in the mainland China. Regulations for Application of Residence Permit for Hong Kong, Macao and Taiwan Residents issued in 2018 enable those residing for at least 6 months to enjoy social and public services including employment, education, medical care, travel and financial services.

While policies make working in China easier, there are some practical issues to be considered when pharmacists seek new career opportunities. The pharmacy profession in China have undergone rapid and consistent development in the last decade, while the ongoing healthcare reform will further change the mode of pharmaceutical service. In this presentation, Ms Law will give an overview of her work experience in mainland China. She will highlight some differences between the healthcare system in mainland China and Hong Kong, along with several practical aspects of practising pharmacy in China, including the licensure, pharmacy profession and work environment.

Compared to their mainland counterparts, pharmacists from Hong Kong have their strengths and weaknesses. Like any other profession, practising in China has its positive and negative aspects. With careful planning and preparation, working in China is worth thinking for pharmacists who wish to experience a new way of practising and explore the future of pharmacy profession.

(This session will be conducted in Cantonese)

## Concurrent Session IV: Community Initiatives Pharmacy Service Development in the Community: The Implementation of Pharmacy Automation in the Rehabilitation Setting

### CHUI, Ka-sing

Pharmacist, Jockey Club Rehabilitation Complex, Tung Wah Group of Hospitals, Hong Kong

### LAM, May

Lecturer, Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong

Tung Wah Group of Hospitals Jockey Club Rehabilitation Complex (JCRC) is a rehabilitation complex that houses over 1000 residents. Each day, nurses spend over 100 man hours in preparing, checking and dispensing medications to residents. It is hoped that through centralized and computerized medication management system (CCMMS) and the use of pharmacy automation, this drug distribution process could be alleviated and more nursing time can be dedicated to taking care of the residents. Moreover, with pharmacist involvement in the process, quality pharmaceutical care can be ensured to the residents.

Pre-packing automation system was commenced in JCRC in September 2018. The in-house pharmacist of JCRC is responsible for overseeing the CCMMS and providing pharmaceutical care. The University of Hong Kong has been commissioned to carry out qualitative and quantitative evaluation of the system.

An overview on the current situation of medication management in local old-aged homes and rehabilitation units will be given during the session, followed by a discussion on the new medication management process at JCRC. Also, our roles at JCRC/community/rehabilitation setting and potential pharmacy developments in relevant areas will be reviewed. Lastly, preliminary results of the system evaluation will be presented.

## Concurrent Session IV: Community Initiatives

### Health in Action – A New Model Working Towards Affordable Medical Care

#### WONG, Janet

Lecturer, Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong

#### LIM, Duncan

Pharmacist, Health in Action, Hong Kong

Despite notable improvement in poverty rate after policy interventions<sup>1</sup>, the median monthly income among economically active households in Kwai Tsing District remained the fourth lowest in Hong Kong at HK\$28,500 in 2017.<sup>2</sup>

In a local study investigating the healthcare access by local grassroot working individuals and their families, Health In Action found multiple barriers that hindered the proper access to healthcare services by working poor, such as long and inflexible working hours, low health literacy and financial burden.<sup>3</sup> While private health service is seldom used due to high charges, only 20% of the working poor individuals were able to access to public outpatient services when needed. Studies have shown that self-medication without prescription or consultation by doctor or pharmacist was common among working poor.<sup>3,4</sup>

Aiming to enhance health among working poor and their family members, Health In Action has established an innovative community health model that is led by a multidisciplinary health team, comprised of nurses, nutritionist, pharmacist, physiotherapist, public health specialist and social worker.

Based at the Community Health Management Hub (葵家社康滙), the team fills the service gap by providing a holistic range of primary health services and by reaching out to the community through multiple outreach service points.

In setting up the community pharmacy at the Kwai Tsing Community Health Management Hub, Health In Action and Department of Pharmacology and Pharmacy, from the University of Hong Kong, collaborate to pilot new models of pharmacy practice to empower pharmacist in delivering affordable medical care to the community, and to fuel sustainable professional development through practice research and teaching of pharmacy students.

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## Concurrent Session IV: Community Initiatives

### CU Champion – A Primary Care Initiative in Sham Shui Po District

#### NGAI, Livia

Pharmacist, School of Pharmacy, The Chinese University of Hong Kong, Hong Kong

Why are there so many unresolved health problems when there are also unutilised healthcare resources? This issue is particularly evident in the pharmacy sector. Patients are not taking their medicines right, while pharmacists are struggling to practise with their expertise. Unfortunately, resources have not been appropriately allocated with respect to the health needs of the population. To expect improvement in such situations, actions are needed to drive for changes.

As an outreach team under Faculty of Medicine of CUHK, CU CHAMPION has identified various health and social problems in the community over the past years. With the health and social network that CU CHAMPION established, it could act as a platform to connect the health and social resources in a community to the people in need. With this mission, "Health in Community" was initiated.

"Health in Community" is a district-based primary care programme funded by the Community Investment and Inclusion Fund. It promotes health in Sham Shui Po by developing social capital in the district, i.e. to build a health and social care network in the community. The objectives are achieved by three intervention strategies: (1) to empower, (2) to identify, and (3) to manage. Firstly, we empower students and locals with healthcare knowledge and disease prevention awareness. Secondly, we identify health and social problems of the locals through outreach health screening and assessment. Thirdly, we manage those problems by referring cases to the respective disciplines in the district. This programme is ongoing and will run till the end of 2019.

## **Concurrent Session V: Big Data & Artificial Intelligence Past, Current and Future Development of Big Data in Healthcare Research**

**WONG, Ian**

Lo Shiu Kwan Kan Po Ling Professor, Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong

Abstract is not available

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## **Concurrent Session V: Big Data & Artificial Intelligence Unravelling the Power of AI for Pharmacy Profession**

**CHUN, Andy**

Regional Director, Technology Innovation, Prudential Corporation Asia, Hong Kong

Artificial intelligence (AI) and related technologies such as big data, open data, data analytics, machine learning, and deep-learning have the potential to radically transform or even disrupt an entire industry. Many believe that the pharmaceutical industry is also at the cusp of such a major change. Technology innovations will be changing the way drugs are discovered, made, tested, and dispensed. Innovations will also change how patients are diagnosed and treated. With increased usage of electronic health records and wearable devices, there is unprecedented amount of data to fuel AI machine learning. This combined with increasingly popular DNA testing and genomics, enables AI to provide highly precise and personalized recommendations and treatment. This talk provides an overview of current advancements in AI in a non-technical manner and explores its potential applications to healthcare and pharmacy.

## Concurrent Session V: Big Data & Artificial Intelligence Harnessing the Power of Pharmacy Data

### **RUSINOV, Vasil**

Chief Operating Officer, mClinica, Singapore

In many countries the pharmaceutical practice is very fragmented, dominated by mom-and-pop-style dispensing operations, which run on outdated technology and create a big data and access gap. This gap poses a challenge for institutions because there is no cost-effective, large scale, and up-to-date data available to guide the right policy decisions or even understand the true burden of disease in different geographies.

With the growing power and adoption of smartphones, a new generation of AI- powered technology platforms emerge for collecting and analyzing data in real time. mClinica currently is deploying technology in 6 markets in Southeast Asia to address precisely this data and access gap in the pharmacy practice.

The Philippines FDA was one of the first institutions in the region to embrace technology to solve some of the biggest health challenges facing the nation. Monitoring more than 15,000 pharmacies spread across 7,000 islands in the country is an impossible task without a robust data infrastructure.

After extensive research and development, mClinica developed the Electronic Drug Safety System (eDSS), a platform that digitizes prescription data using pharmacists' mobile phones. It was designed for any FDA to better understand dispensing and patient behavior. On June 27, 2018, the Philippines FDA Director General Nela Charade Puno signed the circular "Guidelines for the Use of the Electronic Drug Safety System (eDSS)" mandating the use of the eDSS every time a prescription is filled at every pharmacy in the country. As eDSS is gearing towards generating a data set of more than 250 Million prescriptions per year from 100 Million Filipino patients, important insights and opportunities emerge.

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## Concurrent Session VI: Career & Opportunities If Not Now, then When? Things you Better Know Sooner than Later

### **CHANG, Alison**

Managing Director, COREsearch Group Limited, Hong Kong

"Life is about choices. Some we regret, some we're proud of. Some will haunt us forever. The message: we are what we chose to be." —Graham Brown

"What lies behind us and what lies before us are small matters compared to what lies within us. And when we bring what is within us out into the world, miracles happen." Henry Stanley Haskins

"The measure of intelligence is the ability to change" Albert Einstein

"Change is the law of life, and those who look only to the past and present are certain to miss the future" -John F. Kennedy

"When things don't go right, go left" Lemony Snicket

## Concurrent Session VII: Sharpening Clinical Skills (2) Ethical Dilemmas in the Pharmaceutical Care of Older Adults

### LAURA, Meyer-Junco

Clinical Assistant Professor and Clinical Pharmacist, College of Pharmacy at Rockford, University of Illinois at Chicago (UIC), USA

The global population is aging with a projected doubling of the world's older adult population between 2025 and 2050. With an aging population, comes greater challenges for pharmacists involved in the care of older adults. In this session, we will discuss ethical dilemmas frequently encountered in geriatric care, including difficult pharmacotherapy decisions and emotionally charged issues at the end-of-life. The role of the pharmacist in shared decision making with older adults and caregivers will be highlighted as well as various challenges. This will also include a discussion of the pharmacist's ethical responsibility to respect patient choice, preserve patient dignity, and fully weigh the risks versus benefits of pharmacotherapy when making recommendations for medication initiation or discontinuation. This session will also address common pharmaceutical dilemmas encountered in end-of-life care including misconceptions about opioid therapy for pain and symptom management, withdrawal of life-sustaining treatments, and requests for aid in dying.

## Concurrent Session VII: Sharpening Clinical Skills (2) Pharmacogenomics – Current Application and Challenges

### LEE, Yee-ming

Assistant Professor, School of Pharmacy and Pharmaceutical Sciences, University of Colorado Skaggs, USA

Pharmacogenomics is a subset of Precision Medicine that studies how an individual's genetic makeup affects his/her drug response; with the goal to maximize drug efficacy and minimize toxicity. There are currently over 150 FDA-approved drugs with pharmacogenomic information in the drug label.

Pharmacists are uniquely qualified to lead and promote pharmacogenomics as another tool to help tailor drug therapies for patients. The role of pharmacists in the use of pharmacogenomics involves leading inter-professional efforts to develop processes for ordering pharmacogenomic tests; interpreting the results; and educating other health care professionals, patients and public about pharmacogenomics.

While pharmacists are familiar with using genetic testing to guide chemotherapeutic drug selection and dosing; as well as the Hong Kong Hospital Authority advisory to clinicians to perform HLA-B\*15:02 testing prior to prescribing carbamazepine, the adoption of pharmacogenomics in other therapeutic areas is lagging. This is in part due to pharmacists feeling inadequate in their training in pharmacogenomics, as well as the challenges in implementing pharmacogenomics. This presentation will cover the key considerations involved implementing pharmacogenomics; from ordering the test; to the translation of the results into prescribing decisions, and educating other health care professionals and patients. Given the life-time utility of pharmacogenomic results, it is also important to harness technology to facilitate their use in future drugs prescribed.

As the field of Precision Medicine advances, the time is now for pharmacists to take this opportunity to lead in the clinical implementation of pharmacogenomics; work collaboratively with other health care professionals to promote its use and benefit patient care.

## Concurrent Session VII: Sharpening Clinical Skills (2) Precision Oncology: Essentials for Pharmacists

### LAM, Tai-chung

Clinical Assistant Professor, Department of Clinical Oncology, The University of Hong Kong, Hong Kong

The rapidly advancing molecular technique and the availability of new treatment agents are changing the paradigm of oncology practice. While “orthodox” oncology treatment protocols are based on anatomical stage and histological diagnosis, precision oncology is revolutionary in the sense that personalized cancer treatments are based on detailed molecular profiling of tumors or on germline mutations of patients. A single treatment modality can be used across different primary cancer sites with same biomarkers.

In daily clinical practice, molecular profiling is commonly performed by next generation sequencing (NGS) based genomic tests. As the use of NGS based tests has already entered mainstream oncology practice, health care team members should acquire new knowledge for interpretation of such complicated tests and applied the results appropriately in suitable patients. Pharmacists have important role to guide and monitor the use of such personalized treatment approaches - especially when such usage is frequently “off-label”.

The presentation will review the basic principle of NGS based tests and commonly encountered, clinical relevant molecular biomarkers. Local experience of precision oncology practice at Queen Mary Hospital / HKU will also be reviewed. Finally, new service of “molecular tumor board” at HKU health system, which aims to facilitate territory-wide, multi-disciplinary discussion in precision oncology practice, will be introduced.

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## Concurrent Session VIII: Talk Crisis Away Staff Conflicts – An Endemic in the Workplace

### LING, Michael

Honorary Pharmacist, Pharmacy Department, Kwong Wah Hospital, Hong Kong

Today we are living in a world of conflicts – among nations, ethnic divisions within a country, political sectors, and commercial enterprises, etc. Being a miniature of the world, the pharmacy department we work in is not immune to this endemic. Conflict among staff is a problem very close at home. The pharmacist, being a professional, often plays the role of a manager, and needs to manage his/her subordinates. We should realize that conflict is often the most destructive force that hinders the progress of our work. When we join a department, there are already existing conflicts among individuals or fractions of our staff. It is important to acquire the skills to resolve conflicts and also to prevent further conflicts from developing. The speaker will discuss the types of conflicts at work, how they are formed and offer ways to handle workplace conflicts. Audience may not expect that everything will be fine after listening to the talk, as an endemic is not easy to be eradicated by snapping our fingers. But the speaker hopes to use some examples to inspire the audience to solve the problems *themselves*!

(This session will be conducted in Cantonese)

## Concurrent Session VIII: Talk Crisis Away Sentinel Events – A Public Relations Disaster

### **LUK, Che-chung**

Cluster of Chief Executive of Hong Kong East Cluster/Hospital Chief Executive, Pamela Youde Nethersole Eastern Hospital, Hong Kong

Abstract is not available

(This session will be conducted in Cantonese)

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## Concurrent Session VIII: Talk Crisis Away Partnering with Media

### **CHUI, William**

Clinical Stream Coordinator (Pharmacy), Hong Kong West Cluster / Department Manager, Queen Mary Hospital, Hong Kong

### **CHENG, Karen**

Consultant, PRPPL Consultancy Limited, Hong Kong

揭開報紙，扭開收音機和電視，每天都有形形色式的醫療健康相關的資訊或新聞報道，皆源於市民對健康的關注程度與日俱增。不過在網上資訊爆炸的年代，為公眾利益，傳媒會由醫生、藥劑師、護士等醫護人員的專業角度出發，為市民找尋及報道正確的醫療資訊。

不過傳媒到底對哪一類議題感興趣？記者的思維是怎樣？新聞一定是報憂不報喜？前新聞記者將被香港醫院藥劑師學會會長崔俊明「反訪問」，一一拆解，從而帶出藥劑師與傳媒維繫良好關係重要性，以及應對一般訪問、以至當出現事故及危機時的答問技巧。

(This session will be conducted in Cantonese)

## Concurrent Session IX: Skin-deep Skin Science Evidence-based Cosmetics & Personal Care Products in Pharmacy Practice

### **TONG, Henry**

Professor and Programme Coordinator, Division of Biomedical Sciences, School of Health Sciences, Macao Polytechnic Institute, Macau

It is not uncommon for pharmacy professionals in community settings to encounter questions related to cosmetics and personal care products. If high-quality evidence, i.e., randomized controlled trials, or even meta-analysis data, is available, it is usually with relative ease to address these enquiries in an evidence-based approach. Yet, in the area of cosmetics and personal care products, missing data is the norm. The real challenge is the apparent lack of relevant data available in open knowledge domain, leading to dissatisfaction and frustration of our clients. This presentation is, therefore, aiming to address the missing gap by:

- A. Providing some easy-to-follow rules for quick adoption of evidence-based cosmetics in community pharmacy practice.
- B. Sharing some of my research works in evidence-based cosmetics, which are learned from the painful lessons of failures during cosmetics development.
- C. Sharing some of my thoughts in the future development of cosmetic sciences on the basis of current technological trends.

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## Concurrent Session IX: Skin-deep Skin Science Capturing Consumer Trends in Today's Dermatology Market: More than Skin Deep

### **SIHOTA, Aaron**

Primary Care Pharmacist, UBC Faculty of Pharmacy, Canada

Pharmacist-led skincare services represent an unmet patient care and high-yield financial opportunity. With the pharmacist often the first healthcare professional to be consulted about a skin condition, together with a growing compilation of treatment options available, the knowledge of skin assessment, related treatments and monitoring is extremely important.

This session will explore key consumer trends in the aesthetic skincare category and novel ways that the healthcare space is responding to capture and address these needs. We will review examples of business models, both within and outside of the profession of pharmacy and how to build a collaborative, value-added service offering through establishing the pharmacy as the premium destination for patient skincare needs as well as a center where patients experience best possible care. This session will also provide insight into the role of innovative marketing techniques, as well as how to establish relationships with local prescribers for new collaborative care opportunities in dermatology.

### **Learning Objectives:**

By the end of the session, you will be able to:

- To gain insights into key consumer market trends in dermatology and appreciate how the needs of patients are currently being captured
- To gain insights as to how new innovative pharmacist-led dermatology services can be incorporated into pharmacy workflow
- Understand how to effectively market pharmacist-led skincare services and the role of strategic product-placement in the pharmacy
- Recognize how to establish relationships with local prescribers to enhance your pharmacy's service offerings

**Concurrent Session IX: Skin-deep Skin Science  
Cosmetic Dermatology: Beauty for Everyone?**

**CHAN, Kingsley**

Dermatologist and Venereologist, Private Practice, Hong Kong

Abstract is not available

## Ab03

### Role of Diet-Induced Obesity and Chronic Intermittent Hypoxia on Pulmonary Injury

**WONG, Serena SM; MAK, Judith CW**

Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong  
Department of Medicine, The University of Hong Kong, Hong Kong

**Objectives:** Obstructive sleep apnea (OSA) is a breathing disorder that causes injuries in multiple organs. Chronic intermittent hypoxia (CIH) is the major proposed pathological feature of OSA while obesity is a notable OSA-inducing risk factor. This study aimed to investigate the effects of CIH severity and diet-induced obesity on pulmonary inflammatory response in a murine OSA model.

**Methods:** 32 C57BL/6N mice were randomly divided into 4 groups (n=8 each): control group, intermittent hypoxia (IH) group, high-fat diet (HF) group, and intermittent hypoxia with high-fat diet (HF+IH) group. IH and HF+IH groups were exposed to 30 cycles/hour of CIH for 1 week. Additional 32 mice were divided into the 4 groups (n=8 each), with IH and HF+IH groups exposed to 60 cycles/hour of CIH for 4 weeks. After the collection of lung tissues, inflammatory markers interleukin-6 (IL-6) and cytokine-induced neutrophil chemoattractant-1 (CINC-1; resembling human IL-8) were measured by ELISA.

**Results:** CIH caused significant elevations of lung IL-6 and CINC-1 levels in lean mice under both severities and durations. The elevation of lung CINC-1 level in lean mice was more prominent under a higher severity and longer duration of CIH. A significant elevation of lung IL-6 level in obese mice were found after the exposure to 60 cycles/hour of CIH for 4 weeks.

**Conclusions:** Pulmonary inflammation occurred as a result of CIH and the extent differed with the severity and duration of exposure, more prominently in lean mice. Such local inflammation may be one of the mechanisms involved in the lung injury associated with CIH.

## Ab05

### Evaluation of Medication Reconciliation Service given by Clinical Pharmacists in Oncology Wards

**LING, YH**

Department of Pharmacy, Princess Margaret Hospital, Hong Kong

**Objectives:** To evaluate the medication reconciliation (MR) service given by clinical pharmacists in oncology wards at Princess Margaret Hospital (PMH) in Hong Kong.

**Methods:** The evaluation was based on a retrospective review of MR interventions made by oncology clinical pharmacists from 1 April 2016 to 31 March 2017 documented in an electronic database in the PMH Pharmacy Department website. The evaluation consisted of 1) investigating the total number of MR interventions done within the study period; 2) investigating the acceptance rate of MR interventions by the prescribers; 3) categorizing and analyzing MR interventions based on their nature and therapeutic class of medications involved.

**Results:** A total of 223 MR interventions over the 12-month study period from 1 April 2016 to 31 March 2017 were reviewed. The total number of patients admitted in the 2 oncology wards within the captioned period was 3218. The acceptance rate was 100%. The most common drug-related problem identified was omission error (78%), followed by unjustified change of medications (8%) and addition error (6%). The most frequently involved therapeutic groups were cardiovascular system (30%), followed by nervous system (20%) and gastrointestinal system (15%).

**Conclusions:** The value of MR interventions made by oncology pharmacists in reducing medication errors and enhancing patient safety were clearly demonstrated by the high acceptance rate. Further studies involving clinical outcomes can be considered to objectively demonstrate the benefits of MR to oncology patients.

**Ab07****Clinical Outcome Analysis of Cetuximab Test Dose in Predicting its Infusion-Related Reactions -- A Retrospective Study****KL, YT<sup>1,2</sup>; CHONG, CH<sup>1</sup>**<sup>1</sup> Department of Pharmacy, United Christian Hospital, Hong Kong<sup>2</sup> School of Pharmacy, Health and Well-being, University of Sunderland, UK

**Introduction:** Cetuximab is indicated for treatment of head and neck cancer and KRAS Wild-type, EGFR-expressing colorectal cancer. Infusion-related reactions (IRR) may occur during administration of the first dose of cetuximab. This study evaluated the use of cetuximab test dose in predicting its IRR.

**Methods:** This was a retrospective study. Patients with the first time of receiving cetuximab at United Christian Hospital from 2011 to 2018 were included and a test dose 20mg cetuximab was received. For Grade 1/2 IRR detected, the infusion rate of remaining cetuximab dose was reduced. Cetuximab was discontinued for Grade 3/4 IRR. By identifying those not truly safe but carrying a 'safe' label after receiving the test dose (X%) and those with IRR after introducing a test dose and still presented with IRR despite reduction of the infusion rate (Y%), (X+Y)% was compared with the general percentage of patients having IRR after receiving cetuximab (ie. 15-21%). The closer the (X+Y)% to or within 15-21%, the less effective the test dose was. The comparison was performed by using the normal approximation of binomial test approach and left tailed test, with the p value < 0.05 considered statistically significant.

**Results:** 44 patients were included in the study. X% and Y% were 6.82% and 2.27% respectively. No grade 3/4 IRR was resulted. The (X+Y)% was 9.09 ± 8.49% (95% CI 0.60% to 17.58%). There was not enough evidence to show that the (X+Y)% was different from 15% (p=0.2723), but it was significant to show that (X+Y)% was smaller than 21% (p= 0.0262).

**Conclusion:** The percentage of patients having IRR with the use of cetuximab test dose was comparable to the general percentage of patients having IRR without test dose. Hence, there was not enough evidence to support the use of test dose of cetuximab in predicting its IRR.

**Ab08****Evaluation of Machine Learning Techniques on Low Field NMR Spectroscopy for Pharmaceutical Tablet Identification****TSE, HK; WONG, KC**

Department of Pharmacology and Pharmacy, LKS Faculty of Medicine, The University of Hong Kong, Hong Kong

**Objectives:** Identifying the brand of a pharmaceutical tablet is difficult because of the subtle differences in chemical composition among tablets of different brands. Separating components in the tablet before chemical analysis is the traditional approach but it is both costly and time-consuming. Newer approaches use spectroscopy to analyse pharmaceutical tablets without any prior physical separation of components, but they require more advanced statistical approaches when analysing the spectrum. The objective of this study was to evaluate the use of machine learning techniques to differentiate tablets of different brands using their low-field NMR spectrum.

**Methods:** Low-field NMR spectra of pharmaceutical tablets from different brands were obtained. Classification models were trained using different machine learning techniques, including principal component analysis (PCA), partial least squares regression (PLSR), k-nearest neighbour (k-NN), logistic regression, support vector machine (SVM) and artificial neural network (ANN). Accuracies of each technique were evaluated using repeated cross-validation.

**Results:** Machine learning techniques had different accuracies when applied to brand differentiation of different drugs. Nonetheless there was a general trend that some techniques performed better than others. Dimensionality reduction techniques, such as PCA and PLSR, that were commonly used in chemical analysis were useful for visualisation and understanding of the spectra but did not improve classification rates. The convolutional network variant of ANN had the best performance, with more than 99% accuracy achieved.

**Conclusion:** Low field NMR combined with ANN is an accurate and readily accessible tool for identification of the brand of a pharmaceutical tablet.

## Ab09

### In Vitro Testing of a Selection of TCM Plant Extracts from 24-Flavour Herbal Tea against Cytochrome CYP3A4 Activity

**HAU, Wing Kei Melody; WORLSEY, J. Alan**

Department of Pharmacology and Pharmacy, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong

**Objective:** To investigate the inhibitory activity of *Chrysanthemum morifolium*, *Elephantopus scaber*, *Glycyrrhiza uralensis*, *Polygonum chinense* and *Taraxacum mongolicum* from 24-flavour herbal tea against cytochrome CYP3A4 enzyme.

**Methods:** Five selected plant species *Chrysanthemum morifolium*, *Elephantopus scaber*, *Glycyrrhiza uralensis*, *Polygonum Chinense*, *Taraxacum mongolicum*, were purchased from a traditional Chinese medicine store in Sheung Wan. Five plants were ground into powder and 250g of each was extracted with methanol. Fluorometric inhibition assay was adopted in this study to assess the inhibitory activity of individual plants against CYP3A4 enzyme *in vitro*. Sample solutions were reconstituted in serial dilution in accordance to the manufacturer's protocol on a sample 96-well plate to obtain dose-response inhibition curves and IC<sub>50</sub> values for each tested plant.

**Results:** All five herbs demonstrated notable CYP3A4 inhibitory activity. *Chrysanthemum morifolium* exhibited the strongest CYP3A4 inhibition, followed by *Elephantopus scaber*, *Glycyrrhiza uralensis* and *Taraxacum mongolicum*. *Polygonum chinense* was the least potent CYP3A4 inhibitor, which was found to be around 80 times less potent than *C. morifolium*. These positive results suggested that the potential herb-drug interactions should not be overlooked in real life practice. More quality studies and researches on the phytochemical composition of Chinese medicinal herbs are required to establish the mechanism of the underlying CYP inhibition to enhance medication safety.

## Ab10

### A Retrospective Study on the Clinical Impact of Gastric Acid Suppressants on the Use of Tyrosine Kinase Inhibitors in Non-Small Cell Lung Cancer

**CHU, MH<sup>1,2</sup>; CHONG, CH<sup>1</sup>; ZHOU, KR<sup>2</sup>**

<sup>1</sup> Department of Pharmacy, The United Christian Hospital, Hong Kong

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

**Introduction:** Tyrosine kinase inhibitors (TKIs) exhibit remarkable efficacy over chemotherapy in non-small cell lung cancer (NSCLC) patients with mutations in epidermal growth factor receptor (EGFR). However, concurrent therapy of gastric acid suppressants (AS) may reduce absorption of TKIs and hence affect the clinical outcome.

**Methods:** This study was a retrospective study. Adult patients taking erlotinib or gefitinib for non-small cell lung cancer with EGFR positive mutations were recruited. Patients concurrently taking TKI and proton pump inhibitor (PPI) or histamine-2 receptor antagonist (H2RA) were included as PPI and H2RA group respectively. Patients who did not take PPI or H2RA were classified as non-gastric acid suppressant (AS) users. The primary outcome was the progression-free survival (PFS).

**Results:** Among 249 patients, 59 and 63 patients were taking PPI and H2RA respectively while 127 patients were non-AS users. Median PFS was 11.7, 12.9 and 14.5 months respectively in non-AS, PPI and H2RA groups, which were not significantly different from each other ( $p = 0.231$ ). There was no significant difference in OS (17.1 vs 16.2 vs 20.4 months for non-AS, PPI and H2RA respectively,  $p = 0.062$ ). Adverse effects were not different from each group except more grade 2 skin rash in non-AS group (21.3% vs 8.6% in PPI vs 20.6% in H2RA,  $p = 0.042$ ).

**Conclusion:** Concomitant use of PPI and H2RA did not affect the clinical efficacy or toxicity of erlotinib or gefitinib in patients with NSCLC and EGFR mutations.

**Ab11****The Use of Intravenous Paracetamol Versus Intravenous Ibuprofen for Patent Ductus Arteriosus in Preterm Neonates: A Single Centre Retrospective Study****TSANG, FHR<sup>1</sup>; CHAN, EWY<sup>2</sup>; WONG, YF<sup>1</sup>**<sup>1</sup> Pharmacy Department, United Christian Hospital, Hong Kong<sup>2</sup> Department of Pharmacology and Pharmacy, The University of Hong Kong

**Objective:** Recent evidence suggested that paracetamol may be a viable medical agent for the closure of haemodynamically significant patent ductus arteriosus (hsPDA) in preterm neonates. This study aimed to evaluate the local experience on the efficacy of IV paracetamol compared to IV ibuprofen in the closure of hsPDA in preterm neonates, and to compare the safety profile of paracetamol to that of ibuprofen.

**Method:** This retrospective study was conducted in UCH where preterm neonates being medically treated for PDA in the NICU throughout a 52-month period from September 2013 to December 2017 were enrolled. The primary outcome was to compare the closure rates between two treatments. The secondary outcome was to explore other PDA closure related parameters and safety profiles of the two drugs. Baseline differences were observed in PDA sizes and frequency of antibiotic use, therefore analysis of such parameters were excluded.

**Results:** Forty-nine enrolled patients were grouped according to treatment received to ibuprofen group (n = 24) and paracetamol group (n = 25). PDA was closed in 12 (50%) of the patients in ibuprofen group and 12 (48%) in the paracetamol group. A significantly higher incidence of retinopathy of prematurity (ROP) ( $p = 0.0465$ ) was found in the ibuprofen group, and a significantly higher peak bilirubin level ( $p = 0.0199$ ) were found in the paracetamol group. No statistically significant differences were found with other safety parameters.

**Conclusions:** No significant difference was found between the closure rates of paracetamol and ibuprofen. The reported significant differences in ROP incidences and bilirubin levels were unexpected since such results were not shown in existing evidence. Future studies are warranted to verify these observations especially when this study has its risk of bias due to significant baseline differences and non-optimal quality of data. Clinical use of paracetamol should be accompanied with cautious monitoring, especially for the extreme preterm neonates who were at added risk of retinopathy of prematurity and hyperbilirubinaemia.

**Ab12****Pharmacist Clinical Interventions and Discharge Counseling in Medical Rehabilitation Wards: A Prospective Trial****IP, NS<sup>1</sup>; CHU, CK<sup>2</sup>; CHU, LM<sup>1</sup>; YOUNG, WM<sup>1</sup>; TENNEY, JW<sup>3</sup>**<sup>1</sup> Department of Pharmacy, Tuen Mun Hospital, Hong Kong<sup>2</sup> Department of Medicine and Geriatrics, Tuen Mun Hospital, Hong Kong<sup>3</sup> School of Pharmacy, The Chinese University of Hong Kong, Hong Kong

**Objectives:** Patients undergoing rehabilitation experience numerous changes in medication regimens during care transitions, exposing them to an increased risk of drug-related problems (DRPs). However, there have been no local studies evaluating the impact of pharmacist-led discharge service for rehabilitation patients. This study aimed to evaluate the impact of pharmacist-delivered medication reconciliation and discharge counseling on 1-month post-discharge unplanned healthcare utilization and medication adherence for selected high-risk patients.

**Methods:** A prospective, non-randomized study was conducted in medical rehabilitation wards in Tuen Mun Hospital. Patients aged  $\geq 65$  years old who were hospitalized for acute coronary syndrome/ heart failure/ stroke and discharged with  $\geq 5$  regular oral medications were included. Enrolled patients were divided into prospective intervention group and historical usual care group. Medication adherence was assessed using the 8-item Morisky Medication Adherence Scale. A pharmacist provided medication reconciliation and counseling before patient discharge. Phone follow-up was completed 30-days after discharge to assess for unplanned healthcare utilization rate and post-counseling medication adherence.

**Results:** A total of 85 patients (n=43 in the intervention group, n=42 in the usual care group) were included. Among the intervention group, 23 DRPs were identified in 14 patients (32.6%) and resulted in 51 interventions. The acceptance rate of pharmacist interventions was 94.1%. The intervention group had a significantly lower rate of all-cause unplanned healthcare utilization than the usual care group (25.6% vs. 47.6%,  $p=0.035$ ). The risk of unplanned healthcare utilization within 30 days was reduced by over 60% with pharmacist service (OR=0.378; 95% CI=0.15-0.94). Patients reporting medium to high medication adherence by having a Morisky score of  $\geq 6$  increased from 23.6% to 88.4% 30 days after counseling ( $p<0.05$ ).

**Conclusions:** Pharmacist medication reconciliation and discharge counseling significantly reduced all-cause unplanned healthcare utilization 30 days after discharge and improved patient medication adherence among geriatric rehabilitation patients.

## Ab13

### Febrile Neutropenia and its associated Hospitalization in Breast Cancer Patients on Docetaxel-containing Regimen: A Retrospective Analysis

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**Purpose:** To investigate the risk of febrile neutropenia (FN) and its associated hospitalization outcomes in breast cancer patients who had received a 4-day granulocyte colony-stimulating factor (GCSF) as primary prophylaxis for docetaxel-containing chemotherapy.

**Patients and Methods:** 409 breast cancer patients who had received docetaxel-containing chemotherapy from 1/1/2014 to 31/12/2016 had been retrieved from electronic patient records in Tuen Mun Hospital. TC (docetaxel, cyclophosphamide), AC-T (doxorubicin, cyclophosphamide then docetaxel), FEC-T (fluorouracil, epirubicin, cyclophosphamide then docetaxel) and TJH (docetaxel, carboplatin, trastuzumab) were evaluated. Patients failed to complete the regimens listed above were categorized as miscellaneous cases for further analysis. 4-day primary prophylactic GCSF was given within 5 days since docetaxel administration. Primary outcome was the risk of FN per each docetaxel-containing regimen. Secondary outcomes included duration of FN and its associated hospitalization rate, duration and time to first hospitalization.

**Results:** Ninety-nine patients received TC and 187 patients received FEC-T, with or without trastuzumab depending on HER2 status. A total of 27 and 46 patients were on TJH and AC-T, with or without trastuzumab, respectively. 20 patients (4.89%) had FN during treatment despite having primary GCSF prophylaxis. AC-T with or without trastuzumab had the highest risk (8.00%). Among the cases with FN, only 2 cases were classified as high risk patients. The average KPS of these patients was near 90. The mean age of patients with FN was similar to that in non-febrile-neutropenia cases. Average duration of FN was  $1.85 \pm 1.23$  days. Nineteen cases of FN (95.0%) were hospitalized. Mean time to first hospitalization was  $7.26 \pm 1.28$  days, and patients stayed in hospital for  $5.00 \pm 2.98$  days.

**Conclusion:** Administration of 4-day primary GCSF prophylaxis could reduce the risk of FN and its associated hospitalization outcomes. Further comparison on different primary prophylactic GCSF regimens of different durations is needed to maximize the benefits of routine prophylaxis.

## Ab14

### Population Pharmacokinetic Model-based Individual Dose Adjustments of High-Dose Methotrexate in the Treatment of Acute Lymphoblastic Leukemia and Osteosarcoma in the Pediatric Population using a shiny-based User Interface

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**Objectives:** High-dose methotrexate ( $>0.5 \text{ g/m}^2$ ) is among the first-line chemotherapeutic agents used in treating acute lymphoblastic leukemia (ALL) and osteosarcoma in children. Despite rapid hydration, leucovorin rescue and routine therapeutic drug monitoring, severe toxicity is not uncommon. Model-based dose individualization is a potential method to optimize treatment, but the execution is difficult in clinical settings. This study aimed to explore the possibility to develop an evidence-based, convenient and efficient tool to optimize individual doses. The objectives of the study are: (1) to develop population pharmacokinetic (popPK) models of high-dose methotrexate for ALL and osteosarcoma and (2) to demonstrate the accessibility, efficiency and clinician-friendliness of the popPK model-based individual dose optimizers developed using R and *shiny*.

**Methods:** The final dataset consisted of 36 ALL (354 observations) and 16 osteosarcoma (585 observations) patients. Covariate model building and parameter estimations were done using NONMEM<sup>®</sup>, the state-of-the-art software for popPK model estimation. The models' performance and stability were validated by diagnostic plots and bootstrapping. Based on the final models, the dose optimizers were developed using R and *shiny*.

**Results:** The final models' performance and stability were validated. The dose optimizers developed based on the validated models can obtain identical individual parameter estimates as NONMEM<sup>®</sup>. The time taken for dose optimization was under 4 seconds. For each subject, the dose optimizer could recommend (1) an individualized optimal dose, and (2) an individualized range of doses. For osteosarcoma, recommended optimal doses by the dose optimizer resembled the final doses at which the subjects were eventually stabilized.

**Conclusions:** The dose optimizers developed demonstrated the potential to inform dose adjustments using an evidence-based, convenient and efficient tool for high-dose methotrexate. While the dose optimizer is not meant to replace clinical judgment, it provides the clinician with the individual pharmacokinetics perspective by recommending the (range of) optimal dose.

**Ab15****Impact of Pharmacist Collaborative Heart Failure Programme on Heart Failure-related Hospitalizations: A Pilot Randomized Controlled Trial in Queen Mary Hospital****CHUI, CM<sup>1</sup>; HO, KW<sup>2</sup>; LEUNG, YP<sup>1</sup>; LI, HY<sup>2</sup>; LEE, WY<sup>2</sup>; TAM, YT<sup>3</sup>**<sup>1</sup> Department of Pharmacy, Queen Mary Hospital, Hong Kong<sup>2</sup> School of Pharmacy, The Chinese University of Hong Kong, Hong Kong<sup>3</sup> Department of Pharmacy and Pharmacology, The University of Hong Kong, Hong Kong

**Objectives:** Heart failure (HF) is associated with high hospitalization rate and significant healthcare burden. Involvement of clinical pharmacists in the management of HF has not been established in Hong Kong despite the positive outcomes demonstrated by overseas studies. This study is to evaluate the impact of a Clinical Pharmacist Collaborative Heart Failure Programme on HF patient care in Hong Kong.

**Methods:** This was a randomized controlled study in Queen Mary Hospital. 113 HF patients with at least two HF-related admissions during the past one year were randomized into intervention and control group. For the intervention group, clinical pharmacist consultation was arranged in outpatient clinic prior to physician consultation for reviewing medications, recommending therapeutic interventions to physicians and solving drug-related problems (DRPs) of patients. Other study interventions included regular tele-monitoring and post-discharge phone counselling. The primary outcome was the difference in HF-related hospitalizations while secondary outcome was the difference in all-cause hospitalizations. DRPs, pharmacist interventions and physician's acceptance to interventions were analyzed as sub-group analysis.

**Results:** At the time of this interim study, the target number of patients was not reached. After the mean follow-up period of 233 days, there was a trend towards less HF-related hospitalizations in the intervention group (OR 0.82,  $p=0.418$ ). Numbers of all-cause hospitalizations were similar (OR 0.98,  $p=0.914$ ). These differences did not reach statistical significance at this interim report. Total number of DRPs and interventions was 188 and 166 respectively. Pharmacists' interventions were well accepted by physicians (acceptance rate=77%).

**Conclusion:** This study showed a trend of reduction in HF-related hospitalizations by involving clinical pharmacists in the HF patient care. The high number of DRPs identified and high physician acceptance rate to pharmacist interventions highlighted the clinical pharmacist's roles in enhancing patient safety and improving quality of care in HF patients.

**Ab18****A Retrospective Study of the Impact of Pharmacist's Medication Review and Counseling in the Interdisciplinary Medication Adherence Clinic (IMAC) on Use of Non-highly Active Antiretroviral Therapy (HAART) Chronic Medications in Human Immunodeficiency Virus (HIV)-Infected Patients****LEE, SK<sup>1,2</sup>; LEE, MP<sup>3</sup>; LEUNG, WYS<sup>1</sup>; EWIG, CLY<sup>2</sup>; NG, TM<sup>1</sup>**<sup>1</sup> Pharmacy Department, Queen Elizabeth Hospital, Hong Kong<sup>2</sup> School of Pharmacy, The Chinese University of Hong Kong, Hong Kong<sup>3</sup> AIDS Clinical Service, Queen Elizabeth Hospital, Hong Kong

**Objectives:** To evaluate the impact of a pilot service for HIV-infected patients, IMAC, by the drug-related problems (DRP), pharmacist's interventions, the change in adherence to non-HAART chronic medications and the respective therapeutic markers, and patients' satisfaction.

**Methods:** Patient referred to IMAC from 29/6/2017 to 31/3/2018 were included in the study and their clinic notes were reviewed retrospectively. The primary outcomes were DRP identified and the significance of pharmacist's interventions, which were respectively classified by PCNE version 8.02 and rated by a consultant physician, two specialist nurses and an uninvolved pharmacist based on the Overhage's assessment scale. The secondary outcomes were the change in adherence to non-HAART chronic medications of non-adherent patients measured by the self-report rate of correct medication administration, therapeutic markers related to the comorbidities, and patient satisfaction to IMAC.

**Results:** 29 patients aged from 43 to 81 years old were included. 26 DRPs and 32 pharmacist interventions were recorded. The most prevalent DRPs were inappropriate timing or dosing intervals ( $N=12$ ) and taking less drug than prescribed ( $N=9$ ). The most frequent types of pharmacist interventions were patient (drug) counseling ( $N=23$ ) and patient referred to prescriber ( $N=3$ ). All DRPs were completely solved and all pharmacist interventions were rated as significant. The medication adherence to non-HAART chronic medications showed a statistically significant improvement from 65.4% to 100% ( $p=0.004$ ). Fasting glucose in patients with diabetes mellitus also showed statistically significant improvement from 9.3mmol/L to 7.6mmol/L ( $p=0.048$ ). However, there was no statistically significant change of therapeutic markers in patients without therapy modification. The patient satisfaction survey showed overall support for IMAC.

**Conclusion:** Pharmacists can help optimize the use of non-HAART chronic medications in HIV-infected patients through identification of DRP and improvement of medication adherence. IMAC should be further assessed and continued for better clinical outcomes in this patient group.

## Ab19

### Genetic Variability of *CYP2C9*, *CYP2C19* and *CYP2D6* in a Chronic Pain Population

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**Objectives:** Inadequate pain relief and serious side effects from chronic pain treatment can occur in approximately 50% of patients. To a great extent, variabilities in responses to chronic pain treatment could be explained by genetic differences. In a recent study, our group had shed some light on genetic variabilities of *CYP2C9*, *CYP2C19* and *CYP2D6* in the general population of Hong Kong. While these knowledges are valuable, understanding the impact of these genetic polymorphisms in a clinically significant population would be pivotal. This present study aimed to investigate and report on the allele, genotype and phenotype distribution of *CYP2C9*, *CYP2C19* and *CYP2D6* in a chronic pain population.

**Methods:** *CYP2C9*, *CYP2C19* and *CYP2D6* genotyping was performed over 140 individuals using iGenes Pharmacogenomics Test (PGx) with TaqMan assay, Real-Time Polymerase Chain Reaction (RT-PCR) and digital PCR technology at Prenetics' international standard accredited laboratory.

**Results:** The observed phenotypes were reported as follows: for *CYP2C9*, 131 (93.6%) were extensive metabolizers (EM) and 9 (6.4%) were intermediate metabolizers (IM); for *CYP2C19*, 55 (39.3%) were EM, 61 (43.6%) were IM and 24 (17.1%) were poor metabolizers (PM); for *CYP2D6*, 65 (47.8%) were EM and 71 (52.2%) were IM. Among the study cohort, majority (114 (81.4%)) were found to have at least one of the three *CYP450* genes with phenotypes being non-EM in which dosage adjustment might need to be considered.

**Conclusions:** Current guidelines and clinical evidence focus on the prediction of drug responses based on a single polymorphism on a single gene, while it is clear that a myriad of proteins is involved in the pharmacokinetics and pharmacodynamics. In order to bridge the translational gap, a pharmacogenomics-based combinatorial dosing algorithm, considering genetic polymorphisms of *CYP450*, is required to improve the safety and efficacy in the use of chronic pain medications.

## Ab20

### The Impact of Training Video on Patient's Inhaler Technique: A Prospective, Randomized, Controlled Study

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**Objectives:** Inhaled drugs are widely used for chronic obstructive pulmonary disease (COPD) and asthma. However, over 60% patients have inadequate inhaler technique, leading to therapy failure. With high demand of training, a more effective method is needed. This study aimed to examine the impact on patient's inhaler technique after watching training video, and to compare that against reading written instructions.

**Methods:** This prospective, randomized, assessor-blinded, controlled study was conducted in a local hospital from Feb-Jul 2018. Eligible patients of chest outpatient clinic with COPD or asthma, and using at least one inhaler were randomly assigned to receive training with video or written instructions (control) in 1:1 ratio. Inhaler technique was assessed with a 9-steps scoring checklist at baseline and post training by a blinded assessor. The same blinded assessor would provide subsequent counselling if patient's inhaler technique was inadequate after training. The outcomes were inhaler technique score pre- and post- training, and time required in re-assessment and subsequent counselling.

**Results:** Mean baseline technique score for metered-dose inhaler (MDI) was 6.22 (n=33); soft mist inhaler was 6.67 (n=27); and capsule-based inhaler was 6.71 (n=28). Inhaler technique scores were significantly improved in video group post training for all inhalers (MDI: +1.88, p<0.001, soft mist inhaler: +2.08, p<0.001, capsule-based inhaler: +1.86, p<0.001), but improvement was insignificant for all inhalers in control. Mean time required for re-assessment and subsequent counselling was 1.5 minutes/case in video group and 7.1 minutes/case in control, with significant difference of 5.8 minutes/case for MDI, 5.2 minutes/case for soft mist inhaler and 5.6 minutes/case for capsule-based inhaler (p<0.001).

**Conclusions:** Baseline inhaler technique was unsatisfactory, implying a need for a more effective training method. Patients' inhaler technique was significantly improved after video training, and less counselling time was required in video group. Incorporation of videos for patient education is effective and time-saving in improving patients' inhaler technique.

**Ab21****Interprofessional Practice (IPP) Applied to the New Pharmacist Training Program****HSIEH, Hui-hsia<sup>1</sup>; WU, Tien-Yuan<sup>2,3</sup>; CHEN, Chi-hua<sup>2</sup>**<sup>1</sup> Clinical Pharmacy Division, Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan<sup>2</sup> Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan<sup>3</sup> Department of Pharmacology, School of Medicine, Tzu Chi University, Hualien, Taiwan

**Objectives:** Inter-disciplinary team-based care aims to train a health-care profession with “cooperative and team care skills”. To achieve inter-professional practice (IPP) and ultimately improve the quality of medical care. To understand the role and ability in the multi-disciplinary team, the two-year new graduate pharmacist (PGY) practice to enhance coordination and communication between the professions. This study analyzed the training outcomes of the IPP course in the pharmacist PGY.

**Methods:** There were a total of 12 PGY pharmacists included in the training program from October 2017 to October 2018. Each PGY pharmacist had a preceptor to discuss the case and review the patient’s medication records. The trainee discussed the case with the team members from different fields through the multi-disciplinary care meeting. Preceptors observed the PGY performance and gave feedbacks. The evaluation of PGY pharmacist learning effectiveness projects includes: (1) Pre-test and self-assessment of the course (according to six major points, clinical problem-solving ability, prescription review, medication advice, cross-team cooperation ability, self-confidence and sense of achievement). (2) Pre- and post-test of clinical care ability (focusing on the core of the problem, improve the database search skills, data sorting ability, providing medication recommendations). Differences were measured before and after the paired sample t test. Comparison of these two groups was analyzed using Excel 2013.

**Results:** [The self-assessment of the course] increased from 77.6 points to 85.8 points, and the Pearson correlation coefficient was 0.72, which was highly correlated,  $p < 0.05$  was statistically significant. It showed that the post-training self-evaluation had improved in clinical problem-solving ability, prescription review, medication advice, and cross-team cooperation ability. At the same time, it improved self-confidence and sense of accomplishment. [Clinical Care Ability Questionnaire] increased from 75.7 points to 85.8 points, and the Pearson correlation coefficient was 0.73, which was highly correlated,  $p < 0.05$  was statistically significant. After training, trainees can focus on the core problem, improve database search skills, data sorting ability, and providing medication advice.

**Conclusion:** The outcomes of the study showed that the IPP training could really improve the PGY professional care ability and clinical problem-solving ability. By studying and discussing with PGY trainees in different professional fields, we could more confidently use multi-disciplinary teamwork to care the patients.

**Keyword:** Interprofessional practice, Pharmacist PGY preceptor, Clinical training

**Ab22****Drug Use Review of Meropenem****HUNG, Chi-hao<sup>1</sup>; WU, Tien-yuan<sup>2,3</sup>; CHEN, Chi-hua<sup>2</sup>**<sup>1</sup> Clinical Pharmacy Division, Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan<sup>2</sup> Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan<sup>3</sup> Department of Pharmacology, School of Medicine, Tzu Chi University, Hualien, Taiwan

**Objectives:** Inappropriate use of antibiotics not only induces the bacteria drug-resistant, but also increases hospital stays and medical costs, especially for broad-spectrum antibiotics. Meropenem is a broad-spectrum antibiotic with good bactericidal ability against gram-positive bacteria, gram-negative bacteria, anaerobic bacteria, and multi-drug resistant (MDR) bacteria. In order to improve antibiotic management, drug use review study was conducted to assess the appropriateness of the use of restrictive antibiotics in existing antibiotic order forms.

**Methods:** Patients from February 2015 to June 2018 using restrictive antibiotics (Meropenem) in the intensive care unit and general ward for more than 72 hours were enrolled into this study. The assessment criteria included Indication, dosage, bacterial culture results, down-grade or withdrawal Meropenem after treatment, the average length of hospital stay. Finally, the reasons for using Meropenem were analyzed.

**Results:** The total number of patients treated with Meropenem in the intensive care unit vs. general ward were 51 and 47 respectively. The days treated with Meropenem were  $11.80 \pm 7.43$  and  $9.66 \pm 6.11$  respectively. Meropenem treatment was subsequently down-graded or withdrawn in 47 (92.16%) and 41 (87.23%) cases respectively. Only one of the Meropenem-resistant strains produced by Meropenem was used, and dosage was not adjusted according to renal function in 4 (7.84%) and 2 (4.26%) cases respectively. Reason analysis of using Meropenem: (1) The history of epilepsy or epilepsy occurred during treatment were 16 cases (31.37%) vs 5 (10.64%), respectively. (2) The current antibiotic treatment and bacterial culture results did not match 8 cases (15.69%) vs 21 cases.

**Conclusions:** In this study, it was shown that most of the use was consistent with the indications, and only a few cases did not adjust the dose according to renal function. In the analysis of cause use, when Carbapenems were needed, meropenem treatment was preferred because of epilepsy.

## Ab23

### Assessment of Drug-Drug Interactions in Potential Adverse Drug Reaction of Aspirin-Escitalopram Use

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**Objectives:** Combination of drugs achieves better therapeutic effects. One of DDIs is concomitant use of aspirin and escitalopram, which may result in an increased risk of bleeding. In this retrospective study, we evaluated whether bleeding happened when concomitant use of aspirin with escitalopram or not. This drug utilizing evaluation (DUE) study will help to improve the drug safety for patient, especially in the high risk group, including elderly and those with a history of GI ulcers.

**Methods:** This study was a retrospective study in a regional hospital. Cases were collected from June 2017 to June 2018 for all outpatients who concomitantly used aspirin and escitalopram. The assessment included dose, duration, other prescription drugs, such as stomach medicine and hemostatic drug, used in the same period and bleeding follow-up monitoring. Descriptive statistical analysis was performed in the study.

**Results:** Total 90 cases were recruited in the study. The average day of patient taking these 2 drugs together was 223 days. In addition, 31 cases (34.44%) also took stomach medicine in the meantime, 6 cases of them had GI ulcers history but no relapse happened. Two cases (2.22%) without GI ulcers history required hospitalization because of hemorrhage of gastrointestinal. They all continued escitalopram treatment but switched aspirin to clopidogrel, although concomitant use of clopidogrel and escitalopram could also lead to DDI that may induce gastrointestinal or intracranial bleeding. One of them added stomach medicine to prevent gastrointestinal bleeding, and no bleeding happened again.

**Conclusion:** This study showed that the caution is recommended with the concomitant use of aspirin and escitalopram due to an increased risk of bleeding. We also use the build-in computerized physician order entry system to remind the physicians about DDI and clinical management, including monitoring the patient for signs of ADRs and other choices of drugs that can avoid DDI.

## Ab24

### Drug Use Evaluation of Tofacitinib in Patients with Rheumatoid Arthritis

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**Objectives:** Tofacitinib is an oral Janus kinase inhibitor for the treatment of rheumatoid arthritis (RA). We evaluated the efficacy and safety of tofacitinib in patients with moderate to severe RA.

**Methods:** This retrospective study enrolled adult RA patients treated with tofacitinib at a region hospital in central Taiwan from 10/01/2017 to 09/30/2018.

**Results:** A total of 85 patients were recruited. Twenty four patients were initiated on first use and others were switch from biologic disease-modifying antirheumatic drugs. Concomitant drugs were methotrexate (49.4%), hydroxychloroquine (16.5%), sulfasalazine (9.4%) and leflunomide (1.2%). Forty percent of patients were treated with tofacitinib as monotherapy. We analyzed the values of C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and rheumatoid factor (RF) before and after using tofacitinib. CRP response rates decreased significantly ( $P < 0.01$ ) and ESR changed from baseline significantly ( $P < 0.0001$ ). RF assessments were not statistically significant ( $P = 0.057$ ). Opportunistic infections (OIs) defined *a priori* included mycobacterial and fungal infections, multi-dermatomal herpes zoster and other viral infection. We identified 16 OIs (15 patients) among 85 patients enrolled in this studies. Urinary tract infection (UTI) was the most common OI (crude incidence rates (IR) 0.07, n=6), followed by LTBI (IR 0.035, n=3), HBV (IR 0.02, n=2), HZV (IR 0.02, n=2), vaginitis (IR 0.01, n=1) and sinusitis (IR 0.01, n=1). Neutropenia occurred in 24% of patients during the study period ( $ANC < 1000/mcL$ ).

**Conclusion:** Within the global tofacitinib RA development programme, TB was the most common OI reported. Since 2012, the Taiwan Rheumatology Association had implemented a Risk Management Plan (RMP) for bDMARDs users. This study showed a lower TB risk might be due to RMP in Taiwan. Based on this study, tofacitinib is efficacious and well tolerated in patients with RA.

**Ab25****Efficacy and Safety of Febuxostat in Patient with Hyperuricaemia and Gout****WU, Tien-yuan<sup>1,2</sup>; HSIEH, Hui-hsia<sup>3</sup>; CHEN, Chi-hua<sup>2</sup>**<sup>1</sup> Department of Pharmacology, School of Medicine, Tzu Chi University, Hualien, Taiwan<sup>2</sup> Clinical Pharmacy Division, Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan<sup>3</sup> Department of Pharmacy, Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taichung, Taiwan

**Objectives:** Febuxostat, a novel non-purine selective inhibitor of xanthine oxidase, has been approved by the US Food and Drug Administration for the treatment of hyperuricaemia in patients with gout. This study was to explore the efficacy and drug utilization evaluation (DUE) of febuxostat for the treatment of hyperuricemia and gout.

**Methods:** This is a retrospective study recruited patients taking febuxostat during May 2018 and Oct 2018. In this study, we assessed patients' dosage by renal function such as creatinine clearance (CrCl). The dose adjustment criteria including CrCl=15 to 29 mL/min: Limit dose to 40 mg once daily; dialysis: 10 to 20 mg/day. We also monitored patients' serum uric acid (SUA) changed and analysis by Microsoft Excel 2013.

**Results:** There were total 790 patients (574 males and 216 females) taking febuxostat recruited into this study. The average age was 66.91±13.96 years old. The high uric acid patients with concomitant kidney disease (395 patients, 50%) included 211 patients with CrCl<30 mL/min. Forty patients took febuxostat without adjusted dose. The difference of serum uric acid (SUA) between before and after taking febuxostat were 6.59±2.19 mg/dL and 5.48±1.81 mg/dL (p <0.001).

**Conclusion:** The prevalence of gout in the chronic kidney disease (CKD) patient is higher than other population. The hyperuricaemia is one of the death risks in cardiovascular disease in stage 3-5 CKD patients. To control the serum uric acid is the most important method to reduce gout attack. Taking xanthine oxidase inhibitors such as febuxostat is one of the effective way to control uric acid. Hence, the appropriate dose in CKD patients can reduce other complications.

**Ab26****Retrospective Evaluation on Patient Screening and Counseling Service on Direct-acting Antivirals against Hepatitis C****WONG, KH; CHONG, CH**

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**Objectives:** The recent introduction of direct-acting antivirals (DAA) has provided more effective yet costly alternatives for chronic hepatitis C treatment. However, drug-drug interactions and risk of hepatitis B reactivation potentially affect treatment outcomes. A comprehensive pharmacist screening and counseling service was implemented in United Christian Hospital, which aims to optimize the efficacy and safety of the therapy while minimize the risk of drug wastage due to unintended prescribing beyond the standard duration. This study retrospectively evaluated the service outcomes for patients prescribed with DAA against hepatitis C.

**Methods:** For cases initiated with DAA, pharmacists reviewed on the drug dosage, duration, hepatitis B status and medication profile. Patient counseling was provided with medication supplied as refills every 4-6 weeks. We retrospectively evaluated all cases under provision of care since service initiation from June 2017 to September 2018. Outcome measures included drug related problems (DRP) identified, treatment discontinuation and failure rate.

**Results:** There were 44 cases under provision of service. All cases completed DAA therapy, except 1 died from advanced cirrhosis. 3 cases have positive hepatitis B serology, with preemptive treatment and/or blood monitoring given. No cases of hepatitis B reactivation or treatment failure is reported. Twenty five DRPs were documented. Drug-drug interactions (84%) was commonly involved, in which acid-lowering agents are readily available over-the-counter. One case was noted with documented duration longer than standard regimen. Co-morbidities were common, and the associated admissions and follow-ups from other specialties posed a risk on unrecognized drug-drug interactions.

**Conclusions:** The safety concerns and high cost of DAA have created a new challenge to healthcare providers. Comprehensive screening and counseling are valuable to ensure safe and effective use of DAA in hepatitis C patients, hence reduce unnecessary drug wastage.

## Ab27

### The Role of Pharmacists in Assisting Women to make Informed Decisions about the Safe and Appropriate Use of Herbal Products during Lactation: A Systematic Literature Review

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**Objectives:** This study aimed to summarize the literature about the role of pharmacists in supporting breastfeeding women's use of herbal product (HP).

**Methods:** Pubmed, ScienceDirect, Web of Science, and CINAHL databases were searched for articles written in English since 2013 using the Keywords: "breastfeeding" or "lactation" and "herbal medicine\*", "botanical\*", "dietary supplement\*", "natural product\*", "traditional medicine\*" or "complementary medicine\*".

**Results:** Twenty papers were included for analysis: 15 focused on all healthcare providers (HCPs) including pharmacists and 5 specifically on pharmacists. Three main themes were identified: breastfeeding women's expectations, pharmacists' current practice, and enabling factors for improving pharmacists' care. Major expectations for pharmacists were to: be more proactive and open-minded; have basic knowledge about breastfeeding; be aware of the latest information regarding the safety and efficacy of HP commonly used during lactation; help make informed decision about HP use; evaluate and manage side effects; and initiate referrals. Significant gaps between expectations and pharmacists' current practice were reported especially in areas of pharmacists' attitude towards HP-related discussions; level of confidence and knowledge when providing HP-related advice; awareness about accessibility of evidence-based HP-related information; inappropriate recommendations; interprofessional communication; and inconsistency in their approach to HP. Education/training about HP at university level and continuing professional development, a clear description of practice scope and skill set, accessibility of standardized information, more stringent regulations of HP, quality research about HP, and public education about HP and pharmacists' role were deemed important to support pharmacists providing better care.

**Conclusions:** Pharmacists, among other HCPs, play an integral role in assisting breastfeeding women about making informed decision on the HP use during lactation. Collaborative efforts are needed to ensure pharmacists are well equipped and supported to address the needs of breastfeeding women who consider the use of HP during lactation.

## Ab28

### The Use of Herbal Preparations by Breastfeeding Mothers in Macau: A Cross-Sectional Survey

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**Objectives:** This study aimed to identify the prevalence and characteristics of herbal product (HP) use by women who are breastfeeding, the reasons for use, and women's perceptions about the advice they receive from a range of health care providers and lay sources.

**Methods:** A cross-sectional survey was conducted via an online survey platform in Macau in 2018.

**Results:** Of 780 invited participants, 500 completed the survey (completion rate 64%) of which 48.9% agreed that HPs were generally safe to take during breastfeeding and 61.6% reported HP use for less than 1 week to more than 6 months during breastfeeding. Factors associated with HPs use during breastfeeding included employment status, family monthly income and the presence of breastfeeding-related health problems (all  $p < 0.05$ ). The most common HPs included *tetrapanax papyriferus* (蓬草 77.3%), lecithin (71.2%), *Vaccaria segetalis* (王不留行 31.3%), DHA (31.3%) and fenugreek (30.4%). The most common reasons for use were "to unblock milk ducts", "to increase milk supply" and "to improve baby development". Among the users, 7.5%-25.6% found the HPs effective and 15.8% reported experiences of side effects. More than half (55.6%) of respondents did not think there was sufficient reliable information about HPs use. They would like to learn more about the safety to their breastfed children (96%), side effects (87.4%) and effectiveness (83.2%). Both healthcare providers (HCPs) and non-HCPs were considered important information sources with non-HCPs more preferable (25.9% vs 74.1%). Among HCPs, TCM doctors were most consulted (72.8%), followed by doctors (26.4%), nurses (21.6%) and pharmacists (19.2%).

**Conclusions:** The use of HP among breastfeeding mothers is prevalent. The uncoordinated approach to such use raises potential safety concerns for mothers and infants health. HCPs should be supported in developing a stronger professional role in assisting women make informed decisions about HP use while breastfeeding.

**Ab29****The Use of Traditional/Complementary Medicines by Breastfeeding Women in China: A Cross-Sectional Survey****HU, YQ<sup>1</sup>; YAO, DN<sup>1</sup>; XI, XY<sup>2</sup>; HARNETT, J<sup>3</sup>; UNG, COL<sup>1,3</sup>; HU, H<sup>1</sup>**<sup>1</sup> State Key Laboratory of Quality Research in Chinese Medicine, Institute of Chinese Medical Sciences, University of Macau, Macau<sup>2</sup> School of International Pharmaceutical Business, China Pharmaceutical University, Nanjing, China<sup>3</sup> School of Pharmacy, Faculty of Medicine and Health, The University of Sydney, Australia**Objective:** This study aimed to investigate breastfeeding mothers' perception and pattern of TCM use, and their information seeking behavior.**Methods:** This study employed a self-administered questionnaire administered to breastfeeding mothers from 190 cities in 30 provinces in China in 2018.**Results:** Of 624 invited participants, 574 questionnaires were completed (92.0% completion rate). Despite only 31.2% believing TCMs were safe to take during breastfeeding, 41.3% said they would still consider using TCMs if necessary. The prevalence of TCMs use during breastfeeding was 28.2%. The most common TCMs were *Taraxacum mongolicum* 蒲公英(24.8%), *Tetrapanax papyriferus* 通草(18.0%), malt 麥芽(14.9%), fish oil (13.0%), and *Vaccaria segetalis* 王不留行(10.6%). 36.6% of participants did not know what TCMs they took. The main reasons for use were to promote breast milk secretion, improve immunity, and prevent/treat colds. Side effects were reported by 42% of the users. Overall, breastfeeding mothers wanted to learn more about the safety of TCMs for their infants (87.3%), the side effects (81.5%) and effectiveness (67.2%) of TCMs. They would like to be able to consult both healthcare providers (HCPs) (76.7%) and non-HCPs (92.9%) about TCM use. Among HCPs, TCM doctors (68.3%), pharmacists (34.0%) and physicians (23.0%), were the most popular non-HCPs. Family members (71.1%), friends (53.8%) and lactating counselors (36.4%) were the most popular information sources.**Conclusion:** In China, breastfeeding mothers use TCMs to manage health conditions related and not related to breastfeeding despite the gaps in access to information. Both HCPs and non-HCPs play a significant role in providing information about TCMs. However, it remains uncertain if these medicines are being used appropriately or safely.**Ab30****Survey of Community Pharmacists' Perspectives about Integrating Traditional Chinese Medicines into their Practice in China****YAO, DN<sup>1</sup>; HU, YQ<sup>1</sup>; HU, H<sup>1</sup>; XI, XY<sup>2</sup>; HARNETT, J<sup>3</sup>; UNG, COL<sup>1,3</sup>**<sup>1</sup> State Key Laboratory of Quality Research in Chinese Medicine, Institute of Chinese Medical Sciences, University of Macau, Macau<sup>2</sup> School of International Pharmaceutical Business, China Pharmaceutical University, Nanjing, China<sup>3</sup> School of Pharmacy, Faculty of Medicine and Health, The University of Sydney, Australia**Objective:** The role Chinese pharmacists play in ensuring the appropriate and safe use of traditional Chinese medicines (TCM) is not well understood. This study aimed to investigate community pharmacists' perceptions and practice behaviors related to the provision of TCM-associated professional services.**Methods:** A cross-sectional survey of community pharmacists was conducted. Demographic information and responses to questions relating to perceptions, competence and attitude towards TCM and associated workload were collected. Following descriptive analysis, Wilcoxon rank sum test was used to determine the differences between perception and practice. Mann-Whitney U test (2 groups) or Kruskal-Wallis (>2 groups) were used to identify contributing factors.**Results:** Of 279 invited pharmacists, 190 from all but 2 administrative provinces in China completed the survey, with 32.1%, 36.3% and 31.6% being licensed-TCM pharmacists, licensed-pharmacists, and practicing-pharmacists, respectively. All but 2 respondents' daily practice involved TCM, with 35% of them had over 40% TCM-related workload. Being a licensed-TCM pharmacist, holding a TCM-related degree and having a positive attitude towards these products contributed to higher TCM-related workload (all  $p < 0.05$ ). In response to a list of 10 professional responsibilities, the level of agreement (mean scores 3.86) was higher than the extent of practice (mean scores 3.56) with significant statistical differences ( $p < 0.05$ ). Factors contributing to the extent of practice were mainly competence-related including having education/training in integrative medicine, TCM-related degree and type of pharmacist (all  $p < 0.05$ ). Respondents who learned about integrative medicine were more likely to assist consumers in making informed decisions about TCM, advise them about the risks, and communicate with other health care professionals regarding patients' use of TCM.**Conclusions:** In China, community pharmacists were positive about providing professional services to ensure the safe and appropriate use of TCM despite gaps in practice standards. The study results suggested education and training might play a role in closing this gap.

## Ab31

### Clinical and Economic Evaluation of Salvianolate Injection for Coronary Heart Disease: A Retrospective Study based on National Health Insurance Data in China

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**Objective:** The study aimed to conduct clinic and economic evaluation of salvianolate injection for patients with coronary heart disease (CHD) in comparison to danhong injection and alprostadil injection.

**Methods:** This was a retrospective study using data from National Health Insurance Data about inpatients diagnosed with CHD in China in 2015 who met the inclusion criteria. The recruited patients were divided into samples: surgery and non-surgery. The exposed group received salvianolate injection, while the control group received either alprostadil injection or danhong injection. The average cost and duration of hospitalization, and the re-hospitalization rate were used as outcome indicators. Heterogeneity was processed according to disease stratification. Propensity score matching (PSM) and multivariate analysis were used for statistical analysis to control potential confounding factors.

**Results:** Within the surgery sample, the average duration of hospitalization for patients treated with salvianolate injection was shorter than those treated with alprostadil injection ( $P = 0.023$ ). Within the non-surgery group, the average duration and cost of hospitalization for patients treated with salvianolate injection group were shorter and lower than those treated with alprostadil injection ( $P = 0.011$ ;  $P = 0.002$ , respectively). No statistical difference in re-hospitalization rate was detected between treatment with salvianolate injection and alprostadil injection. Also, no statistical difference was detected in the three outcome indicators between treatment with salvianolate injection and danhong injection in both surgery and non-surgery samples.

**Conclusions:** Compared with alprostadil injection, salvianolate injection can effectively reduce the hospitalization duration and cost in patients with CHD. The results of this real world study can provide certain reference value for the clinical prescription for managing CHD. Future studies which collect further data to process PSM and employ more economic and effectiveness indicators for evaluation are warranted.

## Ab33

### Retrospective Review of Anemia Management in Renal Out-patients on Peritoneal Dialysis

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**Objectives:** The primary outcomes of the study were to investigate the usage pattern of erythropoietin stimulating agents (ESAs) and iron supplements in patients on peritoneal dialysis (PD), and to compare hemoglobin (Hb) levels between the study subjects attended the pharmacist-led Medication Therapy Management Clinic (MTMC) and those not attended the clinic. The secondary outcomes were to evaluate physicians' acceptance rate of pharmacist interventions on anemia management and identify common drug-related problems.

**Methods:** This retrospective review recruited 80 PD patients aged 18 or above who used long-acting ESAs in 2016 and attended regular renal follow up appointments in the Specialist Outpatient Clinic of a local hospital. Subjects attended the MTMC were enrolled as the intervention group while those received usual care by renal physicians and not attended the MTMC were the control group. The evaluation period was from 1<sup>st</sup> January 2015 to 31<sup>st</sup> December 2016.

**Results:** The mean Hb level of subjects was  $9.7 \pm 1.2$  g/dl. The mean dose of darbepoetin alfa and methoxy polyethylene glycol/epoetin beta was  $90.4 \pm 23.0$  mcg and  $84.5 \pm 22.9$  mcg respectively. There were 41 patients (51.3%) on oral ferrous sulphate tablets, 3 patients (3.8%) on oral iron polymaltose complex drops and 2 patients (2.5%) on intravenous iron sucrose injections. The percentage of Hb levels within the target therapeutic range (Kidney Disease: Improving Global Outcomes 2012: 9-11.5 g/dl) over all Hb levels ordered during the evaluation period was 74.2% and 68.2% in the intervention group ( $n=44$ ) and control group ( $n=36$ ) respectively, although it did not reach statistical significance. There were 16 anemia-related pharmacist interventions made in the MTMC and 80.1% were accepted by physicians.

**Conclusions:** Hb variability was demonstrated in renal out-patients on PD. Pharmacist interventions can be effectively delivered to physicians through the MTMC for optimizing pharmacotherapies.

**Ab34****Pharmacy Clinical Service in ICU Ward in a Local Hospital****FUNG, PC**

Department of Pharmacy, Tuen Mun Hospital, Hong Kong

**Objectives:** Critically-ill patients are at higher risk of drug-related problems (DRPs). DRPs may result in undesirable clinical outcomes such as suboptimal treatment response and adverse drug events. Unlike the United States and other western countries, where clinical pharmacists are shown to improve patient outcomes in ICU, critical care pharmacist is not available in most public hospitals in Hong Kong. This study aimed to report DRPs identified and develop a pilot clinical pharmacy service in ICU wards in a local tertiary hospital.

**Methods:** A prospective, service-based study was conducted over one month in 2 ICU wards in Tuen Mun Hospital. Clinical pharmacy service was provided every weekday morning. A pharmacist reviewed medication orders of admitted cases and performed interventions to optimize therapeutic treatment. DRPs identified and interventions made were recorded and analyzed. Number of drug information enquiries was also reported.

**Results:** During the one-month period, 25 DRPs were identified for 73 included patients. The most common types of DRP were related to "treatment effectiveness" (56%) and "treatment safety" (36%). Most DRPs (80%) were caused by inappropriate dose selections. Antibiotics (52%) followed by antiviral drugs (20%) were the most common drugs associated with DRPs. Nine interventions were made to prescriber and 7 (78%) were accepted by ICU physicians. Two enquiries were answered during service period.

**Conclusions:** Pharmacist participation in the critical care can identify drug related problems and provide recommendations. Seventy-eight percent of pharmacist interventions were accepted and implemented by physicians. Clinical pharmacy service is welcomed by ward colleagues. Medication review can be prioritized to patients with more severe disease if there is limited recourse available. If a full-time clinical pharmacist is available, more clinical activities including medication reconciliation, therapeutic drug monitoring and drug education can be performed.

**Ab35****A Retrospective Evaluation of Use of Crisis Packs in Management of Acute Exacerbations of Chronic Obstructive Pulmonary Disease****HUI, KS<sup>1</sup>; LAM, TN<sup>2</sup>; LEE, CP<sup>2</sup>**<sup>1</sup> Department of Pharmacy, North District Hospital, New Territories, Hong Kong<sup>2</sup> School of Pharmacy, The Chinese University of Hong Kong, New Territories, Hong Kong

**Introduction:** Patients with chronic obstructive pulmonary disease (COPD) often experience acute exacerbations and are hospitalized. In patients at risk of frequent exacerbations, standby courses of oral antibiotics and corticosteroids, referred as crisis packs, are often prescribed for self-management of exacerbations to prevent hospitalizations. However, the effect of this strategy in clinical practice remains to be elucidated.

**Objective:** To evaluate the effect of the use of crisis packs on the number of unplanned hospitalization and accident & emergency department (AED) visits in COPD patients at North District Hospital.

**Methods:** Retrospective data of COPD patients in the 12-month periods before and after the initiation of crisis packs were collected. The difference in the number of unplanned hospitalization and AED visits, length of hospital stay, sputum culture and nasopharyngeal aspirate findings and inpatient utilization of antibiotics in the two 12-month periods were compared. The predictors of acute exacerbations were also assessed.

**Results:** Data were analysed for 150 patients. Amongst the patients analysed, 87 patients had at least one exacerbation leading to hospitalization or AED visit in 12 months after the initiation of crisis packs. No statistically significant differences in the number of unplanned hospitalization and AED visits, length of hospital stay and sputum culture and nasopharyngeal aspirate findings were identified. There were increases in inpatient utilization of intravenous amoxicillin/clavulanate (+8.6 DDDs/100 bed-days) and piperacillin/tazobactam (+5.2 DDDs/100 bed-days) in 12 months after the initiation. Multivariate analysis identified the history of exacerbations as a predictive factor of increased exacerbation risk.

**Conclusions:** The use of crisis packs may not be effective for preventing unplanned hospitalizations or emergent medical visits due to exacerbations in COPD patients. There is a possible increase in the inpatient utilization of antibiotics after the introduction of crisis packs. The history of exacerbations is the only predictor of future exacerbations in this group of patients.

## Ab36

### Impact of a Pharmacist-led Medication Therapy Management Service to Reduce the Use of Potentially Inappropriate Medications and Manage Drug Related Problems in Hospitalized Geriatric Patients with Psychiatric Disease: A Pilot Study

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**Objectives:** (1) To identify the prevalence of potentially inappropriate medications (PIMs) use in hospitalized geriatric patients with psychiatric disease, (2) to demonstrate physician's acceptance to pharmacists' interventions on (i) reducing the use of PIMs, (ii) medication reconciliation and (iii) management of drug-related problems.

**Method:** Elderly patients 65 years old or above admitted to two informal inpatient psychogeriatric wards in Kowloon Hospital between April 2017 and December 2017 were included. Patients with terminal illness or a palliative treatment plan were excluded. The pharmacist reviewed medications on a weekly basis to (i) review PIMs use, (ii) perform medication reconciliation, (iii) screen and manage actual or potential drug related problems. Written interventions were provided to psychiatrists and the acceptance of pharmacists' interventions were recorded.

**Results:** During the nine-month period, 137 patients were included in the study. Patients had a mean of 1.75 regular PIMs (Range 0-5) and 0.74 as needed PIMs (Range 0-3) according to 2015 American Geriatric Society Beers criteria. Non-benzodiazepine hypnotics, proton pump inhibitors, second generation antipsychotics and benzodiazepines were the common PIMs in these populations. Pharmacist proposed 44 interventions on reduction of PIMs (72.7% accepted), 60 interventions on reconciliation (71.7% accepted). Common drug related problems identified through regular screening included 'Effect of drug treatment not optimal' and 'Adverse drug event occurring' under PCNE classification. Among 78 proposed interventions with known result, 54 pharmacist interventions (69.2%) were accepted by psychiatrists. Interventions were rated as 'Very significant' (17.4%), 'Significant' (77.4%), 'Somewhat significant' (5.1%), respectively by an independent board certified pharmacist.

**Conclusion:** The presence of a pharmacist in a psychogeriatric setting could assist psychiatrists to provide a comprehensive pharmaceutical care plan to reduce the use of PIMs, reduce and manage drug related problems through regular medication review and reconciliation.

## Ab37

### Exploratory Study of Drug Utilization at Direct-to-Patient Pharmacies in China: Current Status and Perspectives

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**Objectives:** A shift in dispensing of prescription medicines from hospitals to external pharmacies derives a new direct-to-patient (DTP) pharmacy model in China. DTP pharmacies supply high profit-margin and specialist medicines mostly, and provide pharmaceutical care greatly driven by pharmaceutical companies (PC). This study aimed to investigate the drug utilization at DTP pharmacies and to explore perspective development pathways for DTP pharmacy.

**Methods:** Using the data of all DTP pharmacies from the China Health Industry Intelligence System database and China Association of Pharmaceutical Commerce dated between January 2017 and May 2018, pharmaceutical sales at each pharmacy were analyzed and compared using ANOVA analysis.

**Results:** Included in this study were 673 DTP pharmacies from 149 cities in China, 30% of which located in the top 10 cities. Antineoplastic accounted for 53.13% of the total sales revenue in DTP pharmacies, followed by anti-rheumatic and drugs for blood and blood forming organs. Of the top-selling 50 pharmaceuticals, 31 were antineoplastic agents and 28 were reimbursable under medical insurance. The market concentration of PC was high with the top 10 companies (6 foreign-invested PC including Roche, Novartis and AstraZeneca; 4 domestic PC including Betta, Simcere and Hengrui) accounting for 55.17% of the overall sales value in DTP pharmacies. On average, the sales value by a PC in DTP pharmacy was 2.32 million yuan per year (n = 3101). However, the average sales value per year of a foreign-invested PC in the DTP pharmacy (10.97 million yuan, n = 385) surpassed that of a domestic PC (1.09 million yuan, n = 2716) with significant difference (p < 0.001).

**Conclusions:** DTP pharmacies in China mainly provides antineoplastic agents and develops under great influence of foreign-invested PC. National drug policy on brand pharmaceuticals will have profound influence on the future development of DTP pharmacy in the long run.

**Ab38****Development of Model of A Physician-Pharmacist Co-Managed Chronic Myeloid Leukaemia Clinic in A Tertiary Hospital in Hong Kong****CHOW, LC; SO, KH; CHAN, MC**

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**Objectives:** Patients with chronic myeloid leukaemia (CML) on BCR-ABL tyrosine kinase inhibitors (TKIs) who have attained major molecular response (MMR) are considered stable. In order to optimize pharmaceutical care and resource utilization, a collaborative physician-pharmacist co-managed CML clinic for these patients was proposed at Prince of Wales Hospital Haematology Specialist Out-Patient Clinic (SOPC). A pilot study was planned to evaluate its feasibility.

**Methods:** The model was developed after consultation of other ambulatory care clinical pharmacy service models, CML clinical management pathway, and discussions with haematology consultant and oncology pharmacists. Two pilot study sessions were conducted in May and June 2018, in which pharmacist assessed patients before physician consultation using structured monitoring forms. The pharmacist documentations and physician's consultation notes were reviewed for assessment of physician's acceptance rate of pharmacist recommendations on CML monitoring plan in terms of TKI regimen and follow-up interval, number and type of potential drug-related problems (DRPs) identified and documented, and additional investigations arranged by physician.

**Results:** Fifty-two eligible patients attending the Haematology SOPC were identified. Clinic operation workflow, monitoring parameters, standardized case summary form and drug-specific monitoring forms, outcomes for service evaluation, and training and qualifications of pharmacist were developed. Nine patients were enrolled and evaluated in the pilot study. CML monitoring plan was recommended by pharmacist in eight cases and were all accepted by physician. One case required discussion with physician due to unstable clinical condition. Thirty-eight potential DRPs were identified with over half (n=22, 57.9%) related to possible adverse drug events and 8 (21.1%) related to potential drug interactions. Additional investigations were arranged by physician in 3 cases.

**Conclusion:** The roles of clinical pharmacists in management of CML patients in ambulatory setting were described. Our data supported the physician-pharmacist collaborative model can effectively manage the CML condition and DRPs in these patients.

**Ab39****Parents' Perception of Procedural Pain Management and Use of Analgesics in Children with Cancer: A Pilot Study****CHEUNG, Rita<sup>1</sup>; WONG, Cho-lee<sup>2</sup>; CHENG, Ho-yu<sup>2</sup>; PENG, Liwen<sup>1</sup>; EWIG, Celeste<sup>1</sup>; LI, Chi-Kong<sup>3</sup>; CHEUNG, Yin-ting<sup>1\*</sup>**<sup>1</sup> School of Pharmacy, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong<sup>2</sup> The Nethersole School of Nursing, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong<sup>3</sup> Department of Paediatrics, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong

**Objectives:** Children with cancer are repeatedly exposed to treatment-related pain and invasive procedures. This study examined parental stress and perceptions towards procedural pain and current pain control measures in children with cancer.

**Methods:** Parents were recruited from the pediatric oncology outpatient clinic or the ambulatory ward at the Prince of Wales Hospital from November–December 2018. Parents used a pain scale (0–10) to report their perceived effectiveness of existing procedural pain control measures which typically include midazolam, ketamine, opioids, as well as non-pharmacological interventions. The *Pain Flexibility Scale for Parents (PFS)* and *Parental Medication Attitude Questionnaire (Parental-MAQ)* were administered to evaluate parental stress in coping with the child's pain and their knowledge on analgesics, respectively.

**Results:** This pilot study included 37 parents (90% response rate; 76% mothers) of children with cancer (child's median age[IQR] 7.0[4.0–12.0] years; 62% male; 27% only child; 89% undergoing active treatment). A quarter (n=9; 24%) expressed significant stress and resistance in coping with the child's pain. Out of the 24 parents whose children had undergone a lumbar puncture, 7 (29%) perceived that their child experienced moderate-to-severe pain (pain score>5) with existing pain control measures. A quarter indicated suboptimal pain control with child's bone marrow biopsy (n=32). Responses on the Parental-MAQ revealed parents' concerns or misconceptions over the use of analgesics, including fear of adverse effects (n=22; 59%) and addiction (n=12; 32%), and reservation of analgesics only for severe pain (n=25; 68%). The most frequently reported non-pharmacological interventions were distraction (n=31; 83%), pre-procedural pain counseling (n=28; 76%) and heat and/or cold compresses (n=25; 67%). Over half of them perceived these non-pharmacological interventions to be effective.

**Conclusion:** Our preliminary results identified parental distress with child's pain and misconceptions over the use of analgesics in subgroups of parents in Hong Kong. Future work includes devising education interventions for these parents and children.

## Ab40

### The Impact of Introducing a New 'Chemotherapy Administration Record' to a Haematology Unit

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**Background and Objectives:** Standardised computer-generated chemotherapy order form is a preventive measure from chemotherapy associated medication error recommended by various international guidelines. Queen Elizabeth Hospital has been using Medication Administration Record (MAR) on no-carbon-required papers for prescribing chemotherapy and a chemotherapy regimen sheet was required for each cycle which increased prescribing time and could cause discrepancies in prescribing. For medication safety, the Department of Pharmacy collaborated with the Medical Haematology team to develop a new 'Chemotherapy Administration Record' (CAR). This study aimed to assess the impact of introducing a new prescription form followed by the acceptance of the new CAR by the haematology unit.

**Methods:** The study was divided into a one-month pre-implementation study and a three-month post-implementation study. Data was collected by respectively nurses and pharmacists on clarifications made with the prescribing physician and interventions made for each prescription. After the study, an impact survey was distributed to each haematologists and nurses in the haematology ward to collect their views on medication safety and workload to assess the acceptance of the new CAR.

**Results:** Before the implementation, 52.2% and 50% of the prescriptions reported by nurses and pharmacy respectively required further clarification with the prescribing physician before proceeding to drug preparation. They were reduced to 17.3% and 22.4% respectively after the use of CAR. The percentage of prescriptions with information missing reduced from 32% to 13.5% in prescriptions reported by nurses and reduced from 34.3% to 16.4% in prescriptions reported by pharmacy. Discrepancies between MAR and chemotherapy regimen sheet were eliminated. All reductions were statistically significant. Positive responses were received from the impact survey and the new ordering forms are well accepted by the haematology unit.

**Conclusions:** The new CAR can facilitate drug prescribing and it can also improve medication safety by promoting the completeness of prescriptions.

## Ab41

### Drug Use Evaluation of Sodium-glucose Cotransporter 2 in Patients with Type II Diabetes Mellitus

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**Objectives:** Sodium-glucose cotransporter 2 (SGLT2) inhibitors are a novel class of drugs for the treatment of type 2 diabetes mellitus (T2DM). Recently, cumulative evidence suggested that SGLT2 inhibitors may lead to diabetic ketoacidosis (DKA), urinary tract infection (UTI) and acute kidney injury (AKI). The U.S. Food and Drug Administration issued an updated drug safety communication warning about SGLT2 inhibitors potentially increasing the risk of DKA requiring hospitalization on the May of 2015.

**Methods:** This retrospective analysis focused on patients who used SGLT2 inhibitors, dapagliflozin, and empagliflozin, between 1 Jan 2017 to 30 Nov 2018 in a regional teaching hospital in Taichung, Taiwan. In this study, we conducted an analysis to examine the risk of UTIs, DKA, AKI and HHS (hyperglycemic hyperosmolar status).

**Results:** Our study recruited 483 patients (male 53% and female 47%), average age is 54.7 years old and average eGFR is 84.7 ml/min\*1.73m<sup>2</sup>. Only 462 patients took empagliflozin and others took dapagliflozin. The incidence rates of UTI are 10.47% (n=27) in male and 10.53% (n=24) in female. The incidence rate of DKA is 2.07% (n=10). One HHS event and no AKI events was found. Six patients were diagnosed as UTI and DKA simultaneously. The random blood glucose average value is 519 mg/dL and HbA1C average value is 11.47 in DKA patients.

**Conclusion:** According to package insert sheet of the drugs, the incidence rates of UTI are 7.6% of empagliflozin and 4.3% of dapagliflozin. Our result presents higher incidence rate of UTI and no difference between male and female. In this study, episodes of DKA with SGLT2 inhibitors used patients were suffered from higher blood glucose levels. Our findings can be provided to clinicians to consider the prescriptions for patients with SGLT2 inhibitors.

**Ab42****Continual Improvement of Antimicrobial Stewardship Programme in The University of Hong Kong-Shenzhen Hospital****LI, Ying**

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**Objectives:** Continue to improve the antimicrobial stewardship (AMS) programme in The University of Hong Kong-Shenzhen Hospital.**Methods:** The programme was governed by the Antimicrobial Management Committee (AMC) as well as the Drug and Therapeutics Committee. The AMS team contains clinical microbiologists and clinical pharmacists with experts in infection, and develops a series of methods: 1) to restrict the number of antimicrobial agents available in the hospital formulary; 2) the core multidisciplinary team conducts antimicrobial stewardship trainings with assessment. Only medical staffs passing the assessment are conferred antimicrobial prescribing authority; 3) use of restricted special antimicrobial agents must be endorsed by the specialist team; 4) guidance on choice of antimicrobials for treatment and prophylaxis has been made available for healthcare professionals to follow; 5) there are prompts to alert prescribers that the antimicrobial prescriptions are over 3 and 5 days, and the specialist team check antimicrobial orders, conduct audits, monitor, and provide timely feedback to the doctors; 6) data collected on antibiotic resistance, usage analysis and trend analysis using Defined Daily Dosage (DDDs) are used to provide structured feedback to prescribing teams at our regular AMC Meetings; 7) clinical pharmacists prepare monthly summary of interventions and usage analysis for discussion at their respective specialties' MDT meeting for continuous quality improvements.**Results:** From 2014 – 2018, significant improvement trend for respective years was observed on the antimicrobial usage rates, for outpatients they were 8.29%, 7.38%, 6.61%, 5.16% and 4.92%; for inpatients they were 45.42%, 41.87%, 39.48%, 36.24% and 38.12%; the DDDs for inpatients were 58.55, 54.21, 48.84, 32.97 and 36.75. The antimicrobial prophylactic usage rates for pre-operative surgery were 37.41%, 35.43%, 24.71%, 27.24% and 25.10%.**Conclusions:** The antibiotic indicators in 2018 all met the national requirements, and the data remained at a low level. AMS programme with multidisciplinary approach has demonstrated the effectiveness.**Ab43****The Evaluation of a Pharmacist-led Medication Reconciliation Service In Paediatric Patients****HO, Sze-wing C<sup>1</sup>; WONG, Sammy WC<sup>2</sup>; SO, Simon WY<sup>1</sup>**<sup>1</sup> Dept of Pharmacy, Alice Ho Miu Ling Nethersole Hospital, Hong Kong<sup>2</sup> Associate Consultant, Dept of Paediatrics and Adolescent Medicine, Alice Ho Miu Ling Nethersole Hospital, Hong Kong**Objectives:** Studies on medication reconciliation (MR) service in paediatric care were mainly quantitative researches, and focused on admission. Researches on pharmacist-led MR service at hospital admission, discharge and outpatient in paediatrics were scarce.

This project aimed to evaluate the effectiveness of a pharmacist-led MR service at three clinical settings. Medication discrepancies identified during MR were classified based on its nature, proportion and clinical significance; the results were used to compare the input of the MR service at each setting. Physician's acceptance rate of recommendations was measured. The multidisciplinary team's experience of the MR service was explored.

**Methods:** The retrospective study reviewed patient's MR records collected in 3 consecutive months; the unintentional medication discrepancies were categorised. The incidence of the discrepancies was calculated. A three-point scale was used to assess the clinical significance, and the interrater reliability between the assessors was measured.

Twelve multidisciplinary team (MDT) members were randomly selected for the semi-structured interviews prospectively. Thematic qualitative analysis was undertaken.

**Results:** The incidence of medication discrepancy was 31% at admission and 11% at discharge, none was found at outpatient. Most of the discrepancies (81%) were drug omissions. Eight out of 25 (32%) discrepancies had the potential to cause moderate discomfort. Ratings were different among the assessors (ICC=0.153). Ten (40%) recommendations were fully accepted, others were partially accepted.

Thematic analysis highlighted drug related problems occurred at all three settings; pharmacist's role was interlinked to patient safety. The other themes emerged were unclear documentation during transition of care; communication methods and children with chronic illness.

**Conclusions:** The overall incidence of discrepancy was low. The quantitative results showed clinical pharmacist may have a greater input on admission. MDT members felt positive regarding the MR service and were satisfied with the collaboration with clinical pharmacist; they wanted the service to continue and expand.

## Ab44

### Standardized Computerized Printing of Expiry Date and Auxiliary Label for Reconstituted Medications during Drug Dispensing Process in Pharmacy Setting

**CHAN, HC; NG, MK; LIM, WL**

Department of Pharmacy, Alice Ho Miu Ling Nethersole Hospital, Hong Kong

**Objectives:** This project aimed to:

1. Improve medication safety through replacing manual written labels by automatic printing
2. Ensure patients will not be using an expired product due to incorrect use before date
3. Optimize dispensing process and improve efficiency
4. Improve tidiness and neatness of dispensing labels for better readability by patients/carers and nursing staff when administering the drug.

This project targeted to achieve the following outcomes:

1. Elimination of wrong calculation or writing of use before date and wrong labelling of “refrigerate” after medication reconstitution
2. Elimination of poor readability of manual writing of use before date, so as to safeguard correct medication administration and patient safety
3. Reduction of pharmacy staff workload and optimization of dispensing process

**Methods:** To improve the current practice and quality of dispensing, a computerized program was designed to calculate and print expiry date and auxiliary label automatically from label printer after scanning barcodes which was originally printed on dispensing labels. Evaluation was performed by interviewing pharmacy staff and distributing questionnaires to patient/carers and nursing staff.

**Results:** Zero near miss of incorrect use-before date and refrigerate instruction recorded since implementation in AHNH main pharmacy and TPH main pharmacy. Improvement of dispensing efficiency was evaluated by interviewing dispensing staff (pharmacists and dispensers) after implementation. All staff interviewed agreed new measure could reduce workload for manual calculation, reduce frontline stress and increase dispensing accuracy and efficiency. Questionnaires were distributed to patient/carers and nursing staff. 100% of respondents are satisfied with the new measure. Most respondents agreed that new measure could improve tidiness of instruction, reduce mistakes and misunderstanding of information, and hence improve medication safety.

**Conclusions:** Standardized computerized printing of expiry date and auxiliary label could increase efficiency and quality of dispensing. The program is now under expansion to include other medications with short shelf-lives.

## Ab45

### Using Intelligent Equipment to Improve Work Efficiency and Shorten Waiting Time for Medicine Collection

**CHEN, Jun-wen; DENG, Jing-jun; WANG, Nan-song**

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**Objectives:** Shorten the prescription waiting time, improve the working efficiency. The outpatients increased and outpatient pharmacist understaffed contradictions increasingly prominent. So, regulating outpatient service process, improve the pharmacist with speed, reduce patient waiting time, avoid the happening of medicine of disputes become urgently needs to solve the problem of outpatient pharmacy.

**Methods:** Optimize workflow, application of intelligent equipment

1. Use fishbone diagram model, and find out the method to shorten the waiting time for drug collection in all kinds of factors.
2. Among many influencing factors, it is determined to improve the service quality by adding intelligent equipment and optimizing workflow on the basis of guaranteeing the existing service quality.

Add intelligent equipment: Automatic manipulator dispenser, Automatic check-in Machine with bar code scanner, Drug delivery belt, Intelligent medicine basket with RFID.

Optimize the workflow: Set up centralized drug consultation room, Medicine is packed in multiple boxes

**Results:** Improve work efficiency, pharmacists have more time for communication and drug counseling.

Take medicine waiting time within 15 minutes of the ratio of the number, from less than 50% of the total number of prescriptions (47.72% in May, 2017) to stable at more than 90%.

**Conclusions:** Intelligent equipment was used to optimize workflow, could greatly improve the work efficiency, shorten outpatients waiting time, improve the safety and quality of service.

That use the method of informatization, automation equipment, machine integration advantages, play a quick and efficient drug process, can greatly improve the work efficiency, shorten outpatients waiting time take medicine.

**Ab46****Impact of a Pharmacist-led Community Interventional Program to Prevent Cognitive Deterioration in Community-dwelling Hong Kong Elders with High Anticholinergic Cognitive Burden****WONG, MH; CHENG, FWT; NG, EEN; FONG, FYH; LAM, AYM; NGAI, LYS; LO, LLH; LEE, VWY**

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**Objectives:** With the emerging evidence of high anticholinergic exposure being associated with cognitive decline or dementia in older adults, this study evaluated whether a pharmacist-led interventional program could decrease the anticholinergic cognitive burden (ACB) in a group of community-dwelling elders in Hong Kong. This study also evaluated whether lifestyle habits could be improved after said intervention regarding cognitive-beneficial lifestyles.

**Methods:** 4462 elders referred from the CU CHAMPION outreach network during 2016 and 2017 were screened for clinical characteristics, including the ACB score and cognitive function (as measured by the Memory Impairment Screen (MIS)). Those who had a clinically relevant ACB score of 3 or above, not diagnosed with dementia, and were communicable were recruited for intervention. In the intervention, pharmacists aimed to decrease the ACB score of the elders by suggesting changes to their drug regimens through writing letters to the respective physicians or through other methods deemed appropriate. Habits towards cognitive beneficial lifestyles and diets were also assessed through a "lifestyle questionnaire", and an educational session was arranged afterwards. After an approximate two-month period, the ACB score and lifestyle habits of these elders were reassessed.

**Results:** Of the 45 elders who completed the study, chlorpheniramine and other cardiac medications were found to be major contributors to the anticholinergic burden. The ACB score did not decrease at a statistically significant level after intervention, however it was found that most interventions made targeted antihistamines - suggesting sub-optimal antihistamine use. The score achieved from the lifestyle questionnaire improved significantly ( $p < 0.05$ ), suggesting improvement in cognitive-beneficial lifestyle knowledge and habits. Of all the elders screened, only 6.31% have a clinically relevant ACB score of 3 or above

**Conclusions:** The pharmacist-led intervention improved lifestyles and antihistamine-use in community-dwelling elders. Antihistamine-use might be a potential area of focus for future pharmacist-physician collaboration opportunities in the community. Future research should evaluate whether ACB score adjustment is clinically relevant in the target population.

**Ab47****Evaluation of Adverse Drug Reactions Associated with the Use of High Alert Medications Among Critically Ill Pediatric Patients: A Retrospective Chart-based Study****TSO, WK; WONG, MK; YOU, HS; CHEUNG, YT; EWIG, CLY**

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

**Objectives:** A high alert medication list specific to the pediatric population based on clinical data is not available while extensive use of high alert medications in PICU patients may lead to high ADR incidence. The primary objective of this study is to evaluate ADR incidence associated with high alert medication use in PICU patients. The secondary objective is to describe risks factors associated with ADR occurrence in the study population.

**Methods:** A single-centre retrospective electronic- and paper-based chart review study was conducted in PWH PICU. Patients' demographic, clinical and drug use information was collected. Naranjo Adverse Drug Reaction Probability Scale and Hartwig's Severity Assessment Scale were used to classify causality and severity of ADRs respectively. Univariate and multivariate logistic regression was conducted to identify risk factors of ADR occurrence. Chi-square test was used to identify the association between high alert medications, ADRs and their potential effects.

**Results:** A total of 336 patient admissions were included (admission age: IQR 1-8 years). The overall ADR incidence was 34.8%, with 267 ADRs detected. In the 267 ADRs, 233 (87.3%) were associated with high alert medications. Anti-infectives were involved in the highest number of ADRs (56.2%) while chemotherapeutic agents had the highest ADR incidence (62.5%). The most common ADR was increased alanine aminotransferase (10.3%). Higher risk of experiencing ADRs was associated with more anti-infectives used ( $p < 0.001$ ), admission GCS lower than 8 ( $p = 0.027$ ) and/or serum urea at admission higher than 6.6 mmol/L ( $p < 0.001$ ). Use of all four high alert drug classes and ADR occurrence were significantly associated with longer hospital stay ( $p < 0.001$ ).

**Conclusions:** ADRs experienced by PICU patients were common and frequently associated with high alert medications especially anti-infectives and chemotherapeutic agents. More intensive monitoring, prevention measures and development of ADR management guidelines may be useful in limiting the effect of ADRs in patients using these medications.

## Ab48

### Evaluating the Impact of Pharmacist Intervention on Disease Knowledge, Illness Perceptions, and Belief Towards Medications in Acute Coronary Syndrome Patients in Hong Kong

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**Objective:** This study evaluated the impact of pharmacist intervention on ACS patients in the following aspects: knowledge, patient belief towards illness (BIPQ), patient belief towards medications (BMQ), adherence and clinical outcomes of readmissions.

**Method:** This was an interventional prospective study performed at the Cardiology Ward, Prince of Wales Hospital, Hong Kong. 30 patients were enrolled into the study, and questionnaires were performed at three time points: before the intervention, after the intervention, and 2 weeks after the intervention. Patient knowledge, belief towards illness (BIPQ), belief towards medications (BMQ), and adherence scores were collected. Hospitalization rates 30-day before and after the interventions were also collected. Correlations between the outcome measurements were analyzed.

**Results:** Pharmacist intervention was found to have a significant impact on patients' overall knowledge scores immediately after the intervention ( $p < 0.001$ ) and 2 weeks follow-up ( $p = 0.009$ ). Individual illness perceptions (BIPQ) scores were found to have a statistically significant change, specifically on Timeline ( $p = 0.025$ ), Treatment-control ( $p = 0.001$ ), Concern ( $p = 0.003$ ), and Understanding ( $p = 0.005$ ). There was an inverse correlation found between patient belief towards their illness and adherence ( $r_s = -0.449$ ,  $p = 0.013$ ). Education levels were found to have a statistically significant difference in relation with BMQ-Necessity ( $U = 43.5$ ,  $p = 0.019$ ).

**Conclusion:** Pharmacist intervention does have a significant impact on improving patient knowledge and certain patient beliefs, with a threatening view of the illness decreasing self-efficacy, negatively impacting medication adherence. New pharmacist intervention strategies should adopt methods that allow self-efficacy growth, such as engaging the patient in goal-setting to nurture patient autonomy, engaging family member support, and integrating socio-structural facilitators and visual assistance aids.

## Ab49

### The Relation between the Physicochemical Properties of PEG-b-PCL and PEG-b-PLA Nanoparticles and their *In Vitro* Cellular Uptake

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**Objectives:** The objective was two-fold: (1) to synthesize and characterize the properties of a library of PEG-b-PCL and PEG-b-PLA micelles prepared by flash nanoprecipitation with a multi-inlet vortex mixer; (2) to examine the relation between the physicochemical properties of the micelles and their *in vitro* cellular uptake.

**Methods:** Polymeric micelles were produced using six different block-length combinations of PEG and PCL/PLA. Then, the particle size, zeta potentials, critical micelle concentrations, release profile and stability were measured. Lastly, sulforhodamine B cytotoxicity assay and uptake assay were conducted to evaluate the *in vitro* performance of micelles.

**Results:** For PEG-b-PCL micelles with 2k PEG, the particle size decreased with decreasing PCL block-length. For PEG-b-PCL micelles with 5k PEG, the particle size decreased from 10k PCL to 5k PCL, yet increased again at 2k PCL. Particle size decreased with increasing hydrophobicity for PEG-b-PLA. Among all micelles, PEG-b-PCL 2k-10k, PEG-b-PCL 2k-5k and PEG-b-PLA 2k-5k had notable sustained-release phrases and released consistently high percentage of drugs. PEG-b-PCL 2k-10k was the most stable PEG-b-PCL micelle (in terms of drug content) in both simulated GI fluids and serum while PEG-b-PLA 5k-10k was the most stable PEG-b-PLA micelle in simulated GI fluids. No PEG-b-PLA micelles performed satisfactorily in serum.

None of the micelles investigated were cytotoxic. Choice of copolymer and block-length showed a significant direct impact on cellular uptake, unmediated by the micellar physicochemical properties.

**Conclusions:** Choice of manufacturing parameters not only determines the physicochemical properties of micelles, but also exerts a significant direct effect on cellular uptake. Unexpectedly, micellar physicochemical properties such as release profiles and stability only exerted mild influence on the cellular uptake, suggesting the need of further studies for the uptake mechanism.

**Ab50****The Use of Procalcitonin Surveillance to Guide Decision Making in Antibiotic Management for Suspected Early-onset Neonatal Sepsis: A Decision Model Analysis****YOU, JHS; CHEUNG, JYG**

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**Objectives:** Early-onset neonatal sepsis (EOS) has a high mortality rate and prevalence in the neonatal intensive care unit (NICU) setting. Timely discontinuation of antibiotics can improve the quality-adjusted life years (QALY) saved and cost outcomes. This study compared the cost-effectiveness of the procalcitonin-guided care versus standard care to guide decision-making in antibiotic management for suspected EOS patients in the NICU, from the perspective of a Hong Kong healthcare provider.

**Methods:** A decision tree model was designed to simulate the outcomes of procalcitonin surveillance on EOS in the NICU. The outcome measures were sepsis-associated costs, loss of quality-adjusted life year (QALY) and incremental cost per QALY saved by PCT-guided care. The model inputs were estimated from literature. One-way and probabilistic sensitivity analysis were performed to evaluate the major influential factors of cost-effectiveness.

**Results:** In the base-case analysis, the PCT-guided care intervention arm was more costly (HK\$223,842 vs HK\$215,052) with a lower QALY loss (0.02684 vs 0.02747) than the standard care control arm. The incremental cost-effectiveness ratio (ICER) of HK\$13,767,547 per QALY saved was higher than the willingness-to-pay threshold of 3\*GDP per capita in Hong Kong (HK\$1,018,593). One-way sensitivity analysis found that the variability of prevalence of sepsis, odds ratio of length of NICU stay with PCT and the odds ratio of CDI with PCT can allow the ICER of PCT-guided care to be acceptable and considered cost-effective. The probabilistic sensitivity analysis of 10,000 Monte-Carlo simulations showed that the surveillance arm was the preferred option 38.89% of the time.

**Conclusion:** The use of PCT surveillance to guide decision-making in antibiotic management of NICU neonates with suspected EOS is less likely a cost-effective option when compared to standard care. However, outcomes were highly dependent on multiple assumptions and variables.

**Ab51****Enhanced Immunocompatibility of Ligand-targeted Liposomes by Attenuating Natural IgM Absorption****GUAN, Juan<sup>1</sup>; LU, Weiyue<sup>2</sup>; ZHAN, Changyou<sup>1,2\*</sup>**<sup>1</sup> School of Basic Medical Sciences & State Key Laboratory of Molecular Engineering of Polymers, Fudan University, Shanghai, China<sup>2</sup> School of Pharmacy, Fudan University & Key Laboratory of Smart Drug Delivery (Fudan University), Ministry of Education, Shanghai, China.

**Objectives:** Targeting ligands are anticipated to facilitate precise delivery of therapeutic agents to diseased tissues by recognizing the overexpressed corresponding receptors; however, they may also severely affect the interaction of nanocarriers with plasma proteins, determining what is "seen" by living organisms.

**Methods:** We studied the effects of peptide ligands on immunocompatibility of liposome-based, brain-targeted drug delivery systems.

**Results:** Immunocompatibility of liposomes exhibited inverse correlation with absorbed natural IgM. Modification of long, stable positively charged peptide ligands on the surface of stealth liposomes was inclined to absorb natural IgM, leading to rapid clearance and enhanced immunogenicity. Rational design of brain-targeted ligand was conducted using computer-aided peptide design. The resulting small peptidomimetic D8 (<sup>0</sup>RTG<sup>0</sup>R<sup>0</sup>A<sup>0</sup>RE<sup>0</sup>W) exhibited improved immunocompatibility by attenuating natural IgM absorption *in vivo*.

**Conclusions:** The present study highlights the effects of peptide ligands on the composition of formed protein corona and on *in vivo* fate of liposomes. Stable positively charged peptide ligands may play double-edged roles in targeted delivery, preserving *in vivo* bioactivities for binding receptors and long-term unfavorable interactions with innate immune system. The development of D8 provides new insights into how to rationally design immunocompatible drug delivery systems by modulating the composition of protein corona.

## Ab52

### Characterization of PM20D1 as a Novel Anti-obese and Anti-diabetic Target

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**Objectives:** To develop and optimize an in-vitro assay with the LC-MS-based strategy to detect the enzymatic activity of recombinant mouse PM20D1.

**Methods:** The enzymatic activity was determined by accessing the concentration of C18:1-Phe (N-acyl amino acid). Seven standard solutions of C18:1-Phe were prepared to construct a standard curve. Testing parameters for incubation included temperature, time, and concentrations of oleate (fatty acid), phenylalanine (amino acid), C18:1-Phe and PM20D1. For LC-MS, reversed-phase chromatography was used to separate C18:1-Phe at RT=7.21 minutes with C18 column and negative ions at m/z=429.30 Da were detected by mass spectrometry.

**Results:** In the synthase reaction, the production of C18:1-Phe was increased when the concentrations of oleate, phenylalanine and PM20D1 increased. Oleate and phenylalanine were the essential substrates for the synthase activity. In the hydrolase reaction, the concentration of C18:1-Phe hydrolysed increased with increasing concentrations of C18:1-Phe and PM20D1. C18:1-Phe was the only substrate required for hydrolysis. Both synthase and hydrolase reactions were enhanced by incubating PM20D1 at 37°C with a longer incubation time.

**Conclusions:** Recombinant mouse PM20D1 possessed the bidirectional activity by catalysing the condensation of fatty acids and amino acids into N-acyl amino acids, and the reverse hydrolysis. Its hydrolase activity was stronger than its synthase activity. Optimization of PM20D1 activity in vitro was also established. The hydrolase reaction system can be used as an in vitro screening platform for PM20D1 inhibitors. Further research on PM20D1 inhibitor might suggest its potential as a clinical candidate to increase the level of N-acyl amino acids, which are endogenous mitochondrial uncouplers, in vivo for anti-obesity and anti-diabetic therapy.

## Ab53

### Functional Characteristics of the Novel Peptide Interleukin-33 with Anti-Obesity Effect

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**Objectives:** Interleukin-33 (IL-33), as a member of the IL-1 superfamily of cytokines, induces browning of white adipose tissue *in vivo*. Hence it has been suggested as one of the potential therapeutic targets in anti-obesity. The aims of the study are to (1) determine the biological activity of mouse IL-33 recombinant protein (rmIL-33), (2) evaluate the effectiveness of browning in subcutaneous fat pad via local injection and (3) discuss the potential of rmIL-33 as a therapeutic drug in obesity context.

**Materials and Methods:** Two *in-vitro* studies on the gene expression of IL-13 and polarisation of alternatively activated macrophages(AAMs) were assessed after the treatment of rmIL-33 using isolated bone marrow-derived macrophages(BMDM). An *in vivo* study to observe the browning induction in white adipose tissue after administration of rmIL-33 was performed using C57/BL6N male mice under cold-stressed condition.

**Results:** Both *in-vitro* studies showed positive results on the bioactivity of rmIL-33. Stimulated BMDM expressed IL-13 in a time-dependent manner, and Arginase 1, the biomarker of AAMs was also increased dramatically after the treatment of rmIL-33. In addition, local subcutaneous injection of rmIL-33 further enhanced cold-induced browning of white adipose tissue under a cold-stressed condition, supported by the stimulation of UCP-1 protein expression and histological analysis.

**Conclusions:** rmIL-33 produced by AIS is biologically active. Subcutaneous injection of rmIL-33 enhanced browning in the fat pad, while further studies should initiate regarding validity and efficacy of route of administrations.







