

HONG KONG PHARMACEUTICAL *JOURNAL*

VOL 17 NO 3 Jul - Sep 2010 ISSN 1727-2874



News & Short Communications

**Medicines Management in the Old Aged Homes –
A New Leadership Role for Community Pharmacists**

Building Effective Teams in Pharmacy Practice Settings

**Community-Visiting Pharmacist Services for the Aged
People in Elderly Homes**

**Overview of Depression in Hong Kong and Its
Treatment**

**A 2D Barcode Electronic Monitoring Dosage System
(eMDS) for the prevention of Medication
Administration Errors in Nursing Homes**

**Macroscopic and Microscopic Identification of the
Two Species of Atractylodis**

Message from Chairlady – Ms Iris Chang

Against the Breaking Wave 同舟共濟 乘風破浪

Simponi®/ Prevenar 13®



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

Be Holistic Be Thoughtful Be Innovative and Be Forward to Reform the Healthcare System for Hong Kong



Medicines have not only conferred immense benefits but have also done harm to the health of mankind. Irrational use, illegal possession and distribution of contaminated drugs or incompetence to authenticate a drug

may put users' lives at risk or result in fatal consequences to patients. In the last several months, we have heard about these accidents. Some of these news items are reproduced in the Section of News & Communication (p85-89). One approach to minimize the casualties is to apply novel approaches for the quality control of drugs and herbal medicines. Lam et al's report, from pages p112 to p114, on the identification of two confusing species of *Atractylodis* sp. by various techniques is worthwhile for those who are interested to identify herbs.

Unlike daily food, drugs normally have a very narrow range of dosage and restricted conditions for their safe use as well as maximal effects. Because of these characteristics, it is why their possession, prescription and manufacture had to be executed by some specially trained personnel, i.e. medical doctors and pharmacists. Although more recently, Britain has taken a step forward to entrust nurses with rights to prescribe licensed medicine, including some controlled drugs, for any medical condition, provided that they are competent,⁽¹⁾ pharmacists are traditionally involved almost exclusively with the therapeutic use of drugs, and their expertise in this field is well recognized in all advance countries. This is because drugs prescribed for patient use, by itself, cannot deliver the desired level of therapeutic outcomes without the appropriate level of patient medication counseling, by qualified and trained pharmacists, to educate the patient in safe and effective use of pharmaceutical products. Hence, the pharmacists, as the expert on drugs, is the most qualified person to provide the update and accurate drug information to medical professionals, patients and the general public.⁽²⁾

Medication administration error (MAE) remains a patient safety concern in most nursing homes. Dr Yung's article indicated that there is a need in old aged homes to setup medication management, following a systematic study of medication complexity amongst aged people (p90). The implementation of health informatics technology is one of the solutions to medication management in old aged homes.

The 2D bar-coded weekly dispensing system designed by Yung and Leung (p109) will certainly help healthcare professionals to audit the five rights of medication administration including the right drug, right time, right patient, right dose and right route. Besides the application of electronic systems for medication monitoring which can cater to the complexity of drug medication, regular visits organized by community pharmacists for medication counseling (p102) and adequate trainings given to pharmacists to form an effective team in management (p94) are also important. Readers are, therefore, recommended to take a glimpse of these three articles written by Yung and Leung, by Chung and by Chong et al, respectively.

In Hong Kong, we have witnessed everything relevant to healthcare practices remains unchanged for over one hundred and fifty years; the system is basically a colonial style based totally on Western medicines. To implement a healthcare policy for a society whose 95% population are ethnically Chinese yet retain no elements of Chinese medicines incorporated into the system is unbelievable. During the first stage of healthcare reform consultation, many opinions had been raised and their view to implement a holistic instead of fragmented reform is explicit.⁽³⁻⁵⁾

Furthermore, pharmacists should also be given an active role to reduce patient safety risks and align pharmacy services with government initiatives to create a visible and sustainable safe medication management structure and system in the healthcare environment. In Australia, accredited pharmacists conduct medication reviews in targeted patient's homes to improve adherence and medical literacy. Similarly, community pharmacists in Hong Kong should also be given the right to perform clinical medication review and medical reconciliation of elderly residents in nursing homes.

There is an urgent need for safe medicine management especially in the private nursing home sector where shortage of nursing staff is prominent and the majority of elderly residents have complicated drug regimens. Polypharmacy increases the likelihood of medicine-related adverse events leading to preventable hospitalization. What makes the situation worse is that the population of Hong Kong is ageing and the percentage of the elderly sector is postulated to reach 25% of Hong Kong population by 2033. Therefore, now is the time to act!

Pharmacists should seize the opportunity to lead and work in collaboration with other allied health members to provide innovative services in the community, both for the elderly in the long-term care setting or

those at home. Experiences from the US, UK, Europe and Australia have demonstrated that tapping into the resources of pharmacists, nurses and empowering patients to self-care, will deliver a better model which is effective and efficient in comparison with the current healthcare system.⁽¹⁾

At the moment of distributing the latest issue of HK Pharm. J., everyone in Hong Kong would have known about the second stage consultation of healthcare reform, called "My Health, My Choice",⁽⁶⁾ which is the continuation of the first stage consultation called "Your Health, Your Life" launched two and a half years ago by the Government of the Hong Kong SAR. Whatever consultation the government is going to do, we sincerely wish that people's voices are heard and all healthcare professionals' views are considered to formulate a policy that has longer term benefit to the whole society and all kinds of professionals but not merely catered for a particular sector of people. If healthcare reform is merely a tactic to shift the financial burden to the middle class people without considering the fairness and social responsibility of a government, it won't work. Frankly speaking, many people do not have pleasant experiences when dealing with private insurers. If our healthcare reform means switching government responsibility to the insurance businessmen, this editorial does not regard the proposed changes to be a blessing for the Hong Kong people.

In conclusion, we hope that the reform of the healthcare system for Hong Kong people is holistic, is thoughtful, is innovative, is forward and not a fragmented approach. In other words, the deep level of conflict could be partially solved.

References

1. University of Southampton (2005). An evaluation of extended formulary independent nurse prescribing, United Kingdom: Department of Health. <http://www.dh.gov.uk/assetRoot/04/11/40/86/0411086.pdf> (last accessed: October 2010)
2. The Practising Pharmacists Association of Hong Kong (2008). Views on healthcare reform consultation document.
3. The Chinese University of Hong Kong (2008). Primary health care: a symphonic approach. March 14. Organized by School of Pharmacy, the Netherlands School of Nursing and School of Public Health.
4. The Pharmaceutical Society of Hong Kong (2008). Health care reform consultation document – your health your life. *Hong Kong Pharmaceutical Journal*, 15:72-73.
5. SCHSA's position paper on Healthcare Reform consultation (2008). <http://www.fgb.gov.hk/beStrong/files/organizations/0074.pdf> (last accessed: October 2010)
6. <http://english.people.com.cn/90001/90783/91300/7158308.pdf> (last accessed: October 2010)

Cheung Hon-Young
Editor-in-Chief
10th October, 2010

HONG KONG PHARMACEUTICAL JOURNAL

VOL 17 NO 3 Jul - Sep 2010 ISSN 1727-2874

EDITORIAL COMMITTEE

Editor-in-Chief CHEUNG, Hon-Yeung
Managing Editors CHEUNG, Mary
TSANG, Warren

Secretary WONG, Johnny
Treasurer LAM, Anson
Business Manager YUNG, Gloria

Section Editors
Pharmacy Education & Practice CHONG, Donald
CHAN, Timothy
Drug & Therapeutics LEUNG, Wilson
OTC & Health CHEUNG, Foster
Pharmaceutical Technique & Technology CHEUNG, HY
TONG, Henry

Herbal Medicines & Nutraceuticals CHEUNG, HY
Society Activities WONG, Helen
New Products CHAN, Ivy
PANG, Bobby
LEE, Ken

Representatives from SHP

EDITORIAL ADVISORY BOARD

Prof. CHAN, Hak-Kim Prof. CHANG, Pong
Prof. CHERN, Ji-Wang Prof. CHIANG, Chiao-Hsi
Dr. CHING, Wei-Mei Prof. CHO, Chi-Hin
Prof. CHOW, SS Moses Prof. HUI, SC Sarah
Prof. LI, CH Paul Prof. LI, Wan-Po Alain
Prof. LEE, An-Rong Dr. MORGAN, Rae M.
Dr. TIAN, Hui Prof. YANG, Chih-Hsin David
Prof. O'TOOLE, Desmond K Prof. LEE, Hon-leung Vincent

The Hong Kong Pharmaceutical Journal, the publisher, the editorial board and the respective member societies are not responsible for the completeness and accuracy of the articles and advertisements contained in the Hong Kong Pharmaceutical Journal. The Journal will not be liable to any damages to persons and properties. Readers are advised to approach the respective authors and advertisers for information in case of doubts.

Copyright © 2010 by Hong Kong Pharmaceutical Journal
All rights reserved. No part of this publication or its supplement may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the Publisher.

All communications and enquiries should be directed to:
The Secretary, Hong Kong Pharmaceutical Journal,
G.P.O. Box 3274, General Post Office, Hong Kong

For all enquiries regarding advertisement, please contact:
Ms Gloria Yung (Tel. 9552 2458) at the following email address:
ad@hkpj.org

INSTRUCTIONS FOR AUTHORS

The Hong Kong Pharmaceutical Journal is a journal of the pharmacists, for the pharmacists and by the pharmacists. Submissions are welcome for the following sections:

- Pharmacy Education & Practice
- Drug & Therapeutics
- OTC & Health
- Pharmaceutical Technique & Technology
- Medication Safety
- Herbal Medicines & Nutraceuticals
- Society Activities
- New Products

Comments on any aspects of the profession are also welcome as Letter to the Editor.

There is no restriction on the length of the articles to be submitted. They can be written in English or Chinese. The Editorial Committee may make editorial changes to the articles but major amendments will be communicated with the authors prior to publishing.

It is preferable to have original articles submitted as an electronic file, in Microsoft Word, typed in Arial 9pt. Files can be sent to the following address:

e-mail: editor@hkpj.org

address: G.P.O. Box No. 3274,
General Post Office,
Hong Kong

For detail instructions for authors, please refer to the first issue of each volume of HKPJ.

Editorial

CHEUNG, Hon-Yeung 82

News & Short Communications

Woman Arrested for Illegal Drug Possession 85

Caution on Severe Liver Injury with Rheumatoid Arthritis Drug 85

Public Reminded to Prevent *E. Coli* O157:H7 Infection 85

Chinese Herbal Medicine was Contaminated with Aconitum Alkaloids 86

Safe Use of Medicines Containing Lamivudine and Telbivudine 86

Topical Products Containing Ketoprofen Put Patients in Risk under the Sun 86

Recall of Chinese Herbal Medicine Containing Atropine 86

Recall of Registered Proprietary Chinese Medicines with Western Drug Ingredient 87

Recall of Chinese Medicine Product with Exceeding Microbial Limit 87

Recall of Panadol Children Tablets 87

Tigecycline Linked to Increased Mortality Risk 87

Woman Died after Given Wrong Dose of Warfarin by a Doctor in Prince of Wales Hospital 88

A 55-year Old Woman Poisoned by Aconitum Alkaloid 88

Inappropriate Dispensing of Anti-hypertension Drug in Disable Hostel 88

Results of Registration Examination for Pharmacists Announced 88

FDA Approves Pegloticase for Refractory Gout 88

US FDA Approves First Automated Molecular Test for Assessing Hepatitis B Treatment 89

Product Recall Because Failed the Dissolution Test 89

Stage 2 Public Consultation on Healthcare Reform Launched 89

Pharmacy Education & Practice

Medicines Management in the Old Aged Homes – A New Leadership Role for Community Pharmacists 90

YUNG, Anna Wai-Lan

Building Effective Teams in Pharmacy Practice Settings 94

CHONG, WK Donald; SHEUNG, GM William

Community-Visiting Pharmacist Services for the Aged People in Elderly Homes 102

CHUNG, Wing-Ming Billy

Drug & Therapeutics

Overview of Depression in Hong Kong and Its Treatment 105

LAW, Sin Yan Anne; LUK, Stella Pik-Kwan

Pharmaceutical Technique & Technology

A 2D Barcode Electronic Monitoring Dosage System (eMDS) for the prevention of Medication Administration Errors in Nursing Homes 109

YUNG, Anna Wai-Lan; LEUNG, Andrew Yee-Tak

Herbal Medicines & Nutraceuticals

Macroscopic and Microscopic Identification of the Two Species of *Atractylodes* 112

LAM Li-Wing; ZHANG Zhifeng; CHEUNG Hon-Yeung

Society Activities

Message from Chairlady – Ms Iris Chang 115

Against the Breaking Wave 同舟共濟 乘風破浪 115

New Products

Simponi® (Janssen-Cilag) 117

Prevenar 13® (Pfizer) 118

The world's first and only RA therapy to target the IL-6* receptor¹



- ✓ ACTEMRA delivers consistently high remission rates** across patient types¹
- ✓ ACTEMRA is the only product to show superiority over MTX^{1,2}
- ✓ ACTEMRA delivers a unique combination of rapid onset of action and efficacy that keeps improving over time¹
- ✓ ACTEMRA is well-characterized in its safety profile¹

Full prescribing information should be viewed prior to prescribing.
Detailed prescribing information is available upon request.

* IL-6 = Interleukin 6
** Defined as disease activity score (DAS28) <2.6

Reference:
1. ACTEMRA Product Information (HK), Current at April 2009. 2. G Jones, et al. Ann Rheum Dis 2009;0;1-9.

Roche Hong Kong Limited
32/F, Dah Sing Financial Centre,
108 Gloucester Road, Wanchai,
Hong Kong
Tel: 2723 2832 Fax: 2723 7820

ACT-AD-02-12-09

Copyright © (2009) by Roche Hong Kong Limited. All right reserved.

Woman Arrested for Illegal Drug Possession

Date: Jun 30, 2010

A 54-year-old woman was arrested for illegal possession of Part 1 poisons and an unregistered pharmaceutical product called "Beauty Fix Detox 修身美肌寶", which was found to contain undeclared western drug ingredients that may cause serious side effects.

The Department of Health received a report about a 25-year-old woman who felt unwell after taking the product for a week. The patient presented with palpitation, decreased appetite, hand tremor, chest tightness and shortness of breath and was admitted to Ruttonjee Hospital on June 10.

Hospital laboratory tests on the product obtained from the patient showed the presence of undeclared Western drugs -- phenolphthalein, sibutramine and thyroid hormone. Investigation revealed that the woman joined a weight reduction course organised by Fit Beauty in Fanling. She was advised to take two capsules of the product every day. The proprietor was arrested and a total of 28 bottles of the product were seized, after a search at the company.

In Hong Kong, phenolphthalein was once used for treating constipation but has been banned for its cancer-

causing effect. Sibutramine is used as an appetite suppressant. Its side effects include increased blood pressure and heart rate, psychosis and possibly convulsion. People with heart problems should not take it. Thyroid hormones are used for treatment of hypothyroidism. Side effects include tremors, palpitations, excessive sweating, insomnia, headache and arrhythmias. A product containing sibutramine or thyroid hormone must be registered before it can be sold in Hong Kong.

Source: <http://www.dh.gov.hk/english/press>

Caution on Severe Liver Injury with Rheumatoid Arthritis Drug

Date: July 14, 2010

The Department of Health (DH) highlighted the risk of severe liver injury with a drug called Arava (containing leflunomide), which is used to treat rheumatoid arthritis. It was noted through the department's drug surveillance scheme that the Food and Drug Administration (FDA) in the United States announced on July 13 that information on severe liver injury would be added to

the Boxed Warning of Arava (containing leflunomide) to draw attention to such a risk in patients using this drug. FDA's move was based on their review of adverse event reports which identified 49 cases of severe liver injury, including 14 cases of fatal liver failure, between August 2002 and May 2009. In the review, the greatest risk for liver injury was seen in patients taking other drugs

known to cause liver injury, and patients with pre-existing liver disease.

In Hong Kong, drugs containing leflunomide can only be sold in dispensaries on a doctor's prescription and under the supervision of a pharmacist.

Source: <http://www.dh.gov.hk/english/press>

Public Reminded to Prevent *E. Coli* O157:H7 Infection

Date: July 20, 2010

The Centre for Health Protection (CHP) of the DH reminded people to observe good personal, food and environmental hygiene to prevent intestinal infection caused by *E. Coli* O157:H7 bacteria. The appeal followed the confirmation by laboratory test of a local case involving a 13-month-old girl living in Yuen Long. This is the fourth case of *E. Coli* O157:H7 infection reported to the CHP this year.

The CHP's investigation revealed

that the girl presented with loose stool with blood and mucus on July 13. She was admitted to Tuen Mun Hospital the next day and developed low grade fever after admission. Her stool specimen grew toxin-producing *E. Coli* O157:H7.

A CHP spokesman said that in general, *E. coli* O157:H7 could be contracted through consumption of undercooked contaminated food (especially minced beef and hamburgers, etc.) or contaminated water,

or transmitted from person to person through the faecal-oral route. "However, the bacteria can be killed at a cooking temperature of around 75 degrees Celsius for two to three minutes," he said. "People are advised to cook meat thoroughly.

There were two cases of *E. coli* O157:H7 infection in 2008 and another two cases in 2009.

Source: <http://www.dh.gov.hk/english/press>

Chinese Herbal Medicine was Contaminated with Aconitum Alkaloids

Date: July 23, 2010

Toxicology Reference Laboratory of the Hospital Authority reported an incidental finding of impurities with aconitum alkaloids in a sample of *Atractylodes Rhizoma*

collected by hospital routine monitoring system. Although *Atractylodes Rhizoma* is a commonly used herb which in itself is not toxic, it should not be contaminated with

aconitum alkaloids which is toxic.

Source: <http://www.dh.gov.hk/english/press/2010/100723-3.html>

Safe Use of Medicines Containing Lamivudine and Telbivudine

Date: July 23, 2010

The DH drew public attention to the safety alert issued by the State Food and Drug Administration (SFDA) on July 22, 2010 regarding the risk of rhabdomyolysis associated with the use of preparations containing lamivudine and telbivudine. Rhabdomyolysis is the breakdown of muscle tissues resulting in the release of tissue contents into the bloodstream. The common symptoms

of rhabdomyolysis include muscle pain and muscle weakness. Although the side effects are well-documented, the quick diagnosis and treatment of the adverse effects will provide better outcome for the patient.

Lamivudine is used for the treatment of HIV infection and AIDS, and chronic hepatitis B infection, while telbivudine is used for treatment of chronic

hepatitis B. In Hong Kong, there are eleven registered products containing lamivudine and one registered product containing telbivudine. Preparations containing lamivudine and telbivudine can only be sold on a doctor's prescription in pharmacy under the supervision of a pharmacist.

Source: <http://www.psdh.gov.hk/eps/webpage.jsp>

Topical Products Containing Ketoprofen Put Patients in Risk under the Sun

Date: July 23, 2010

The DH drew public attention to the risk of serious skin sensitive and allergic reactions in patients using topical products containing ketoprofen, following advices given by The European Medicines Agency on July 22.

The European Medicines Agency's Committee for Medicinal Products for

Human Use (CHMP) recommended that strengthened warnings on sun exposure and the risk of sensitive skin reactions when topical ketoprofen is used together with octocrylene. Ketoprofen is a non-steroidal anti-inflammatory drug (NSAID). Topical formulations of ketoprofen are used to treat minor trauma, tendonitis, small-joint osteoarthritis, acute low-back

pain and phlebitis. Patients using topical ketoprofen should make sure that the treated areas are protected from sunlight during the whole period of ketoprofen treatment and the two weeks after discontinuation of the treatment.

Source: <http://www.psdh.gov.hk/eps/webpage.jsp>

Recall of Chinese Herbal Medicine Containing Atropine

Date: July 28, 2010

The DH instructed a licensed Chinese herbal medicine wholesaler Wong Chak Kee Limited to recall *Radix Strobilanthis Forrestii* (味牛膝) from retailers as it was found to contain atropine. The recall was made following DH's investigation into a case of poisoning involving a 79-year-old woman who had a history of taking Chinese

herbs bought from the wholesaler. Among the samples taken from Wing Woo Hing for chemical analysis, a sample of *Radix Strobilanthis Forrestii* showed presence of atropine. *Radix Strobilanthis Forrestii* is used to improve circulation, and remove heat and dampness. It does not contain atropine. The herb itself is not toxic.

Atropine is a kind of tropane alkaloids which can cause serious side effect in children and elderly, and patients with heart diseases, glaucoma or prostate enlargement.

Source: <http://www.dh.gov.hk/english/press>

Recall of Registered Proprietary Chinese Medicines with Western Drug Ingredient

Date: August 2, 2010

The DH urged members of the public not to buy or use two haircare products registered as proprietary Chinese medicines called [Zhang Guang] Gold 101 Super Effective Hair Growth Agent (Registration number: HKP-08408), and [101 Zhangguang] Zhangguang 101D Fabao (Registration number: HKP-07223) as they were found to contain a western medicine, minoxidil.

The appeal and recall order followed detection of minoxidil, a western medicine, in the products during DH's market surveillance. Both products are manufactured on the Mainland by "Beijing Zhangguang 101 Science & Technology Development Co. Ltd". Minoxidil is a western medicine used for the treatment of hair loss. Its side effects include skin irritation, rash

and itchiness. Products containing minoxidil are pharmaceutical products and must be registered with the Pharmacy and Poisons Board before it can be sold in registered pharmacies under the supervision of a registered pharmacist.

Source: <http://www.psdh.gov.hk/eps/webpage.jsp>

Recall of Chinese Medicine Product with Exceeding Microbial Limit

Date: August 5, 2010

The DH urged members of the public not to buy or use a Chinese medicine product named "Hai Keow Yu" as the total microbial count of the product was found to have exceeded the

maximum permitted limit by Macau Health Bureau during a recent market surveillance. The concerned product (batch no. SA20411) was manufactured by a local proprietary

Chinese medicines manufacturer called Singapore Medicine Co.

Source: <http://www.dh.gov.hk/english/press>

Recall of Panadol Children Tablets

Date: August 31, 2010

The DH endorsed a recall made by GlaxoSmithKline Ltd. (GSK), a licensed drug wholesaler, of one batch of Panadol for Children Tablet Chewable 120mg (Registration No.: HK-31209, Batch no.: XPH026) from the market due to a mismatch of dosage instructions between the products's package insert and the carton.

The recall was initiated after GSK

found that the package insert of the concerned batch carried currently registered dosage instructions based on a child's age while the carton provided new dosage instructions based on a child's weight. Although the new dosage instructions have received DH's approval-in-principle, it may only be used on the condition that the package insert be changed to the new dosage instruction format and its commencement date be

agreed by DH.

A DH spokesman explained that the old and new dosage instructions are considered appropriate but the new instructions are more refined, taking into account the child's actual body weight instead of just his / her age.

Source: <http://www.dh.gov.hk/english/press>

Tigecycline Linked to Increased Mortality Risk

Date: September 1, 2010

The US Food and Drug Administration (FDA) announced that Tigecycline (*Tygacil*; Wyeth Pharmaceuticals) is linked to an increased risk for death in patients with certain severe infections, and clinicians should consider alternative intravenous antibiotics.

The agency stated that the increased

mortality risk is most apparent in patients treated for hospital-acquired pneumonia, particularly ventilator-associated pneumonia. The agency also has discerned the increased risk in patients with complicated intra-abdominal infections, complicated skin and skin-structure infections, and diabetic foot infections. Tigecycline is not approved

for diabetic foot infections or hospital-acquired pneumonia. It is approved for complicated intra-abdominal infections and complicated skin and skin-structure infections, as well as for community-acquired pneumonia.

Source: <http://www.fda.gov/Drugs/DrugSafety/ucm224370.htm>

Woman Died after Given Wrong Dose of Warfarin by a Doctor in Prince of Wales Hospital

Date: September 8, 2010

A 84 year old woman, who had minor stroke, died after taken warfarin for about a month. The woman was prescribed with this anticoagulant by a doctor in the Prince of Wales Hospital but somehow was told to take the drug on alternative day by mistake.

Source: Apple Daily

A 55-year Old Woman Poisoned by Aconitum Alkaloid

Date: September 10, 2010

Hospital Authority (HA) reported a suspected poisoning case to the Department of Health that a 55-year old woman had developed symptoms and signs of aconitum alkaloid poisoning, including vomiting, dizziness, generalised numbness and shock after taking Chinese medicines for arthritis. Both "yunaconitine" and "crassicauline A" were found in the patient's urine samples and the herbal broth remnants by a laboratory of the HA. According to literature, these two components should not be present in the herbs that had been prescribed to the patient.

Source: <http://www.dh.gov.hk/english/press/2010/100910-3.html>

Inappropriate Dispensing of Anti-hypertension Drug in Disable Hostel

Date: September 11, 2010

A 41 year old cleaner in Hang Nga manufacturing & hostel for disable people was given by mistake an anti-hypertension drug by a social work. She became dizzy right after taken the drug and was delivered to hospital for immediate rescue. Figure from the Department of Social Welfare reveals that three elderly people died because of given wrong medications between 2007 to 2008.

Source: Apple Daily

Results of Registration Examination for Pharmacists Announced

Date: September 17, 2010

The Pharmacy and Poisons Board of Hong Kong announced results of the Pharmacists Registration Examination held in June 2010. There were 60, 57 and 67 candidates sitting for the examinations in Pharmacy Legislation in Hong Kong, Pharmacy Practice and Pharmacology respectively, with corresponding passing rates of 71.7%, 61.4% and 65.7%. Kong is required to pass the above three subjects. The Board conducts its registration examinations twice a year, normally in June and December.

Source: <http://www.dh.gov.hk/english/press>

FDA Approves Pegloticase for Refractory Gout

Date: September 20, 2010

The US Food and Drug Administration (FDA) has approved pegloticase, the glycolated uric acid-specific enzyme (Krystexxa; Savient Pharmaceuticals, Inc) as the first and only treatment for chronic gout in adults refractory to conventional therapy.

Source: CME/CE Released

US FDA Approves First Automated Molecular Test for Assessing Hepatitis B Treatment

Date: September 23, 2010

Abbott receives approval from US FDA to market the RealTime HBV assay for measuring viral load or the amount of hepatitis B virus (HBV) in a patient's blood. It is the first and only approved test capable of automating HBV viral load testing from sample extraction to final results. The RealTime HBV assay, based on

real-time PCR (polymerase chain reaction) technology, is now available for laboratories that use the Abbott m2000 automated instrument system for molecular diagnostic testing. The test offers sensitive measurement (quantitation) of HBV in human plasma or serum from individuals chronically infected with HBV.

The assay can detect and measure all known HBV genotypes (A-H) by targeting an essential, highly conserved segment of the HBV genome. The capability for detecting HBV genotypes is important for both monitoring the disease and guiding treatment decisions.

Source: PharmaAsia, 20100929

Product Recall Because Failed the Dissolution Test

Date: September 24, 2010

One batch of Cimedine Tablet 400mg (batch number S081121, registration number HK-40956), which was manufactured by Christo Pharmaceutical (Guangzhou) Company Ltd., was instructed a recall

by the Department of Health due to its failure of dissolution test. According to the specification of the product, at least 75% of the labeled active ingredient should be dissolved in 15 minutes. However, analysis

showed that less than 40% of the active ingredient was dissolved.

Source: <http://www.dh.gov.hk/english/press/2010/100924-3.html>

Stage 2 Public Consultation on Healthcare Reform Launched

Date: October 6, 2010

The Food and Health Bureau of the Government of Hong Kong SAR announced its second stage of public

consultation on Healthcare Reform "My Health My Choice" for Hong Kong people. The consultation will be lasted for

three months until January, 2011.

Source: <http://www.myhealthmychoice.gov.hk/en>

Medicines Management in the Old Aged Homes – A New Leadership Role for Community Pharmacists

YUNG, Anna Wai-Lan

Social Enterprise Limited, Hong Kong

ABSTRACT

Elderly people in the old aged homes are living much longer because of advanced technology and better healthcare. This trend is on the increase. Studies have shown that residents in care homes take more medicines than those in the community and are at higher risk of adverse drug reactions. Utilizing the clinical knowledge and expertise, community pharmacists can play a leading role to reduce medication risks, optimize safe medicines management systems and work collaboratively with other agencies in the community for better quality of pharmaceutical care in the old aged homes.

Keywords: polypharmacy; adverse drug reactions; medication review; medication reconciliation medicines use review; medicines management

INTRODUCTION

Hong Kong is an ageing society. People are now living longer than their predecessors because of new medicines, technologies and better health care. In 2006, Hong Kong had more than 850,000 people over 65, i.e. one eighth of its population. ⁽¹⁾ Among them, 72518 (8.5%) were in old aged homes (OAH) while 23,446 were on waiting list. ⁽²⁾ This elderly sector is expected to increase to 25 percent, i.e. one in four of the total Hong Kong population by 2033. ⁽³⁾ Old aged homes are essential support in the community for older people with complex health needs. Some common reasons for admission into care homes include a stroke, falls, fractures, dementia and confusion. Elderly residents are often frail and have progressive degenerative health conditions. Studies have shown that residents in care homes take more medicines than those in the community. ⁽⁴⁻⁸⁾ Evidence has shown that polypharmacy is a significant risk for adverse drug events which could lead to hospital admissions. ⁽⁹⁾ Furthermore, the cognitive impairment of the elderly

residents undermines their capacity to report symptoms. Consequently, medicines management is a major health concern in nursing homes and should be tackled with urgency.

The objective of this article is to delineate the actions that community pharmacists can take to create a visible and sustainable safe medicine management structure in the old aged homes care setting.

THE CHANGES IN AGEING THAT RELATE TO MEDICINE USE

First, I am going to outline pharmacokinetic and pharmacodynamic changes that are commonly seen in the elderly, and then explore how these factors may affect medicines use. The summary of these changes are listed in Table 1.

Pharmacokinetic changes seen in ageing

Changes affected by ageing	Phenomena associated with changes in ageing	Medicines to use with caution in elderly
Pharmacokinetic: absorption distribution	Slower absorption rate More adipose tissue and less body muscle affects drug distribution	Smaller doses of water-soluble drugs are needed eg digoxin. Lipid-soluble drugs such as diazepam are required in smaller doses and used at longer intervals.
metabolism	Decrease in circulating proteins due to hepatic impairment, malnutrition or following major acute episodes, such as surgery or infection Liver's ability to withstand stress decreases and healing time is longer after damage	Medicines that are highly plasma protein bound are displaced, resulting in higher concentration of free drug and thus toxicity e.g. phenytoin and warfarin. Dose adjustment is needed. Hepatotoxic drugs should be used with caution, eg paracetamol, amiodarone, statins, phenothiazines, ciprofloxacin, erythromycin, fluconazole, isoniazid, valproate, methyl dopa.
excretion	Reduced renal function	Drugs exclusively excreted by kidneys and have a narrow therapeutic index such as lithium, aminoglycosides and digoxin can lead to toxicity.
Pharmacodynamic: homeostasis Orthostatic circulatory response	A decline of homeostatic mechanism A blunted reflex tachycardia leads to dizziness due to postural hypotension	Experience a higher rate and intensity of adverse effect of drugs Cautious with drugs causing postural hypotension such as diuretics, beta-blockers, nitrates, antihypertensives, antidepressants, levodopa and sedatives.
Blunted static reflexes that impair balance	A reduction of dopamine receptors in the brain impairs the static reflexes and affect postural stability.	Drugs causing problems with balance include opiates, antipsychotics, antidepressants benzodiazepines, and sedating antihistamines for cough and colds.
Water Balance homeostasis is impaired	Lower thirst sensation and secretion of antidiuretic hormone (ADH) inappropriately: the syndrome of inappropriate antidiuretic hormone (SIADH).	Drugs that cause hyponatraemia such as SSRIs, TCAs, carbamazepine and indomethacin should be monitored closely to prevent severe hyponatraemia.

Pharmacokinetics tells us what the body does to medicines as they move into, through and out of the body. It relates to absorption, distribution, metabolism and excretion of the drug which in turn determines the onset, duration and intensity of the drug taken.

Absorption

Drug absorption is largely unaffected by ageing, only the rate of absorption may be slowed down.

Distribution

Owing to the increase in the adipose tissue in the expense of body muscle, drug distribution may be altered in ageing. Since water-soluble drugs have a much reduced volume of distribution, they attain higher blood concentrations for a given dose, so doses have to be reduced to minimize toxicity, such as digoxin. On the other hand, lipid-soluble drugs deposit in fatty tissue and the brain, and have a larger volume of distribution as adipose tissue increases as people age. The body stores of the drugs become larger. As clearance from adipose tissue is relatively slow, the half-life prolongs. For instance drugs such as diazepam can cause excessive sedation and potentiates the risk of falls in the elderly. Therefore, lipid-soluble drugs should be adjusted to smaller doses and used at longer intervals in the elderly. Furthermore, there is a reduction in serum albumin and protein, especially after major acute episodes such as surgery or infection. Under these circumstances, medicines that are highly plasma protein bound will be displaced, resulting in higher concentration of free drugs and thus toxicity. Examples include phenytoin with toxicity seen as ataxia, slurred speech, confusion and warfarin leading to bruising/bleeding in the elderly.

Metabolism

Many drugs are metabolized by the liver. With ageing, liver size shrinks and blood flow falls, reducing drug delivery and clearance. The ability of the liver to withstand stress also diminishes with age coupled with longer healing time after damage. Therefore hepatotoxic drugs may cause more adverse effects in the elderly; eg, paracetamol, amiodarone, statins, phenothiazines, ciprofloxacin,

erythromycin, fluconazole, isoniazid, valproate and methyldopa.

Excretion

There is a reduction in renal blood flow, renal tubular function and glomerular filtration rate (GFR) as people age. This decrease in renal function affects the pharmacological effects of many drugs, including those toxic or active metabolites that are renally excreted. Failure to excrete drugs and their metabolites leads to accumulation and toxicity. This is particularly so with drugs which have a narrow therapeutic index – such as aminoglycosides, lithium and digoxin. Before initiating such drugs, prescriber should determine baseline renal function and then adjust the dose to the individual and ensure the patient is regularly monitored. In addition, nephrotoxic drugs should be avoided in the elderly, such as non-steroidal anti-inflammatory drugs (NSAIDs) and angiotensin-converting enzyme inhibitors (ACEIs). But if prescribed, they should be used with caution, by starting at a low dose and titrating up to the desired therapeutic response, with the patient monitored regularly.

PHARMACODYNAMIC AND HOMEOSTATIC CHANGES IN AGEING

Pharmacodynamic refers to the effects of drugs in the body. The pharmacodynamic effect of a drug is brought about by mechanisms at specific receptor target sites, which include number of receptors, the drug's affinity for the receptors and post-receptors events. Owing to a decline of homeostatic mechanism in the elderly, they tend to experience a higher rate and intensity of adverse effect of drugs.

Orthostatic circulatory response

Reflex tachycardia refers to the recovery of blood pressure to its active level immediately when rising from a bed or chair after resting. This reflex is impaired in older people. The failure of blood pressure to return to its active level quickly enough causes dizziness, due to postural hypotension. This is actually the common cause of falls and poor mobility in the elderly. Nonetheless, if medicine causing postural hypotension is prescribed to the elderly, this will complicate a normally manageable symptom and lead to a fall. Examples

of drugs causing postural hypotension include diuretics, beta-blockers, nitrates, antihypertensives, antidepressants, levodopa and sedatives.

Impairment of static reflexes

With ageing, the static reflexes are blunted due to a decrease of dopamine receptors in the brain, meaning older people are less able to keep balance when tripped on an uneven floor. This is made worse by vision impairment. Elderly residents adapt to this aspect of life by taking extra care when come to stairs or uneven floors. However, unexpected falls can occur when medicines are prescribed which make a person drowsy than normal. Examples of drugs causing problems with balance include opiates, antipsychotics, antidepressants, benzodiazepines, and sedating antihistamines in cold and cough medicines.

Loss of thirst sensation and danger of dehydration

Water balance in the body is maintained by thirst and the secretion of antidiuretic hormone (ADH). ADH is secreted to prevent further water loss through the kidneys when serum sodium levels rise in the body, while thirst promotes drinking to replenish the water. However, the elderly have a blunted sensation of thirst and also tend to secrete ADH inappropriately when serum sodium levels are low, i.e. hyponatraemia. This is known as the syndrome of inappropriate antidiuretic hormone (SIADH) and may be found in elderly with chronic heart, hepatic or renal disease, leading to risk of severe hyponatraemia. Thus, drugs that cause hyponatraemia, such as selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs), carbamazepine and indomethacine should be monitored closely. Furthermore, older people may refuse to drink sufficient fluids because of worries over bladder problems. This may potentiate their risk of getting dehydration as they have lost their 'thirst prompt'. Carers should be educated of this feature of ageing and help to pick up signs of dehydration at an early stage.

THE CURRENT DRUG PROFILE IN THE OLD AGED HOMES

Polypharmacy and the risks it poses

to the elderly residents

The elderly residents with multiple illnesses will often be seen at a range of specialist clinics by various healthcare professionals, all of whom may prescribe medications to manage specific conditions, with little communication. This can lead to polypharmacy.

From a health system point of view, polypharmacy increases drug costs and wastage. However, from the patient's perspective, polypharmacy substantially increases the risk of adverse drug reactions and can lead to poor therapeutic outcomes.⁽¹⁰⁾ Furthermore, polypharmacy increases the likelihood of drug-drug interactions, especially in elderly and those with renal impairment.

Adverse drug reactions

Among the elderly residents, many adverse drug events remain undiagnosed, as the side-effect may not happen immediately but take days to develop, for instance, excessive sedation due to accumulation of a long-acting benzodiazepine. Table 2 lists the common side-effects experienced by the residents, and one can see that these side-effects can be caused by a number of drugs taken. Therefore, a careful and thorough medication history should be taken, especially when the elderly resident presents with new symptoms.

Beers criteria in 2003 have listed 46 drugs or classes of drugs to be avoided in people over 65 irrespective of their condition or diagnosis. This is because these drugs are either ineffective or they pose an unnecessarily high risk for the elderly.⁽¹¹⁾ Those in the 'Beers list' commonly prescribed for elderly residents in OAH are listed in Table 3 for our awareness.

MANAGING MEDICATION RISKS

As medicine experts, community pharmacists can take a lead role to improve medicines management in OAH and ensuring that the elderly residents get the best from their medicines. The impact of pharmacist-conducted clinical medication review with elderly care home residents has been proven by a significant reduction in the number of falls.⁽¹²⁾ With understanding the effects of ageing on pharmacotherapeutics, the pharmacists conduct medication reviews to apply these principles to drug selection, dosage adjustments and pharmaceutical care so as to improve clinical effectiveness.

Medication review

Studies have shown that medication reviews can reduce the risks of medicines-related problems and ensure maximum benefits.^(13,14) Thorough drug monitoring

is an essential component of a good medication review, and interpretation of any findings has to be done in the context of the patient as a whole. The purposes of regular monitoring include the following:

- To check that the desired therapeutic goal is achieved

This is done by measuring parameters such as blood pressure, HbA1c, frequency of epileptic seizures, bowel movement, peak flow readings, weight gain or loss and pain assessments. Also biochemical data like thyroid function tests, bone mineral density, U&Es, serum lipids, haemoglobin levels are often included.

- To pick up symptoms of adverse drug effects

Residents are observed or asked about signs and symptoms of adverse effects, for example cough with ACEIs, incidents of falls with drugs that cause postural hypotension and bleeding/bruising with warfarin. U&Es should be monitored for drugs that cause electrolyte imbalance and damage renal function, liver function tests for statins, thyroid function tests for amiodarone or full blood count tests for carbamazepine.

- To ensure appropriateness of dose, drug and formulation

Adjust medication to suit elderly residents' circumstances. For example, soluble or liquid formulation should be provided for swallowing difficulties. Also review co-prescription for a drug to deal with an adverse drug event of an essential drug which is continued after the essential drug has been stopped, eg, an NSAID and a PPI to treat acute episodes.

Medicine reconciliation

Adverse events are more likely to occur after hospital discharge, and as residents age, the rate of postdischarge adverse events is likely to increase. In this instance, the pharmacists can work together with hospital colleagues to ensure accurate and timely information about that resident's medicines is communicated to the OAH.

Medicines use review (MUR)

The pharmacists conduct a structured review with residents and/or carers receiving medication for long-term

Table 2. Drugs commonly used in elderly that may cause the following side-effects.

Side-effects	Drugs used in the elderly that may have the corresponding side-effects
Constipation	Opiates, antimuscarinics, antidepressants, dopaminergics, calcium channel blockers, bisphosphonates, ferrous sulphate, calcium
Nausea and vomiting	Opiates, cytotoxics, rivastigmine, dopaminergics, zopiclone, metformin
Postural hypotension, falls	Diuretics, benzodiazepines, ACEIs, antihypertensives, levodopa, alpha-blockers, TCAs, antipsychotics
Impaired cognition	Citalopram, fluoxetine, oxybutynin, opiates, cimetidine, antiepileptics
Blood disorders	Carbamazepine, H2- receptors antagonists, mirtazapine, trimethoprim, phenytoin, methotrexate
Gastrointestinal Bleeds	NSAIDs, SSRIs, aspirin, clopidogrel, dipyridamole
Confusion	Levodopa, anticholinergics, dopaminergics, spironolactone, codeine, tramadol
Blurred vision	Antimuscarinics, carbamazepine
Renal failure	NSAIDs, ACEIs, lithium, angiotensin-II blockers, aminoglycosides, diuretics
Hypertension	NSAIDs, sympathomimetics, sibutramine
Extrapyramidal effects	Metoclopramide, antipsychotics

Table 3. Commonly prescribed drugs that necessitate caution and monitoring in elderly, as they are listed in the Beers criteria 2003.

Indomethacin	Amiodarone	Oxybutynin
Digoxin	Lorazepam	Naproxen
Dipyridamole	Doxazosin	Diazepam
TCAs eg, amitriptyline	Methyldopa	Fluoxetine
Cimetidine	Chlorphenamine	Ferrous sulphate
	Hyoscine	Nitrofurantoin
Hydroxyzine	Bisacodyl	Promethazine

conditions, so as to establish a picture of their use of prescribed medicines. Elderly residents are likely to benefit from MURs as their long-term conditions such as chronic obstructive pulmonary disease, hypertension and osteoarthritis where symptoms respond well to drug therapy. MURs are ideal opportunity to deal with residents having problems understanding or using their medicines, and experiencing adherence problems.

Foster partnership in the community

Pharmacists need a basis understanding of the roles of the range of individuals, teams and agencies that are involved in care of elderly in OAHs and need to work collaboratively with them to improve medicines management. Joint working is essential, and pharmacists with their expertise can provide a range of support and advice services to other groups that may in turn improve the way medicines are used and ultimately benefit the residents. For instance, pharmacists may participate in care worker training to ensure medicines are administered as intended and that adverse events are picked up at an early stage. In addition, pharmacists can help to ensure that regulations are met regarding safe storage of medicines in OAHs.

CONCLUSION

Elderly residents in old aged homes are polypharmacy and are more likely to suffer from adverse effects of medicines which can lead to otherwise preventable hospital admissions. As medicine experts, community pharmacists have a big contribution to make in improving medicines management in OAHs. Medication reviews, medication reconciliation and medicines use reviews play an important role to reduce polypharmacy, adverse drug reactions and improving adherence, meaning to improve the quality of life for the elderly residents. To achieve effective medicines management, community pharmacists should have good clinical knowledge, but empathy and consideration are also very important. Last but not least, pharmacists should also work collaboratively with other agencies in the community to improve medicines management in OAHs.

Author's background

Dr. YUNG, Anna Wai-Lan is a clinical pharmacist of UK and HK since 1983. She was awarded a B.Pharm. (Hons) from the School of Pharmacy of London University in 1982, an MSc in Immunology and Immunogenetics from the Department of Biochemistry of Manchester University in 1999, a PhD in Rational Drug Design from the department of Molecular Biology of University of Leeds in 2004 and a PG. Diploma in End-of-Life Care from the Chinese University of Hong Kong in 2010. For more information about this article, please contact Anna YUNG through the following email address: awlyung@googlemail.com.

References

1. Census and Statistics Department, 2007, February 22.
2. Social Welfare Department, 2008, March 11.
3. Food and Health Bureau, 2008, March.
4. Walley T & Scott AK (1995). Prescribing in the elderly. *Postgraduate Medical Journal*, 71:466-471.
5. Furniss LBA, Craig SK, Scobie S, Cooke J, Faragher B (2000). Effects of a pharmacist's medication review in nursing homes. Randomised controlled trial. *British Journal of Psychiatry*, 176:563-567.
6. Petty DR, Scrivener G (1998). Prescribing patterns for patients in homes. *Prescriber*, 9:103-106.
7. Nygaard HA, Naik M, Ruths S, Straand J (2003). Nursing-home residents and their drug use: a comparison between mentally intact and mentally impaired residents. The Bergen District Nursing Home (BEDNURS) Study. *European Journal of Clinical Pharmacology*, 59:463-469.
8. Williams B, Nichol M, Lowe B, Yoon P, McCombs J, Margolis J (1999). Medication use in residential care facilities for the elderly. *Annual Pharmacotherapy*, 33:149-155.
9. Nguyen JK, Fouts MM, Kotabe SE, Lo E (2006). Polypharmacy as a Risk Factor for Adverse Drug Reactions in Geriatric Nursing Home Residents. *The American Journal of Geriatric Pharmacotherapy*, 4:264-272.
10. Davies EC, Green CF, Taylor S, Williamson PR, Mottram DR, et al. (2009). Adverse drug reactions in hospital in-patients: a prospective analysis of 2695 patient-episodes. *PLoS ONE* 4(2): e4439. doi:10.1371/journal.pone.0004439.
11. Fick DM, Cooper JW, Wade WE, Waller JL, Maclean JR, Beers MH (2003). Updating the Beers criteria for potentially inappropriate medication use in older adults. *Archives of Internal Medicines*, 163:2716-2724.
12. Zermansky AG, Alldred DP, Petty DR, Raynor DK, Freemantle N, Eastaugh J, Bowie P (2006). Clinical medication review by a pharmacist of elderly people living in care homes-randomised controlled trial. *Age and Ageing*, 35:586-591.
13. Krska J, Cromarty JA, Arris F, Jamieson D, Hansford D, Duffus PRS, Downie G, Gwyn Seymour D (2001). Pharmacist-led medication review in patients over 65: a randomized, controlled trial in primary care. *Age and Ageing*, 30:205-211.
14. Zermansky AG, Silcock J (2009). Is medication review by primary-care pharmacists for older people cost effective?: a narrative review of the literature, focusing on costs and benefits. *Pharmacoeconomics*, 27:11-24.

How Can I Receive A copy of the Hong Kong Pharmaceutical Journal Regularly?

If you are a member of any one of the following societies, you will be on the HKPJ mailing list:

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

Why not take the dual advantage of becoming a member of these societies, as well as getting the HKPJ free of charge?

Great News

Continuing Education Units (CEUs) for Authors of Articles in the HKPJ. At the most recent meeting of the Pharmacy Central Continuing-education Committee (PCCC), it was decided that CEU would be awarded to authors of articles published in the HKPJ. For each issue, the Editorial Committee will choose an article from all the published articles in that issue, for PCCC to use for CE purposes. The author(s) is(are) responsible for setting questions for the approved CE article. Primary authors are entitled to receive 6 CEUs and other co-authors of the same CE article are entitled for 4 CEUs granted by PCCC. For details on how to get CEU, please refer to the article named "PCCC Continuing Education Units (CEU) Accrediting System" [HKPJ 2002;11(2):79-80] or visit the PCCC Website at www.pccchk.com

Great news to boost the professional standard and recognition of the contributions to the HKPJ!

Building Effective Teams in Pharmacy Practice Settings

CHONG, WK Donald*; SHEUNG, GM William

Pfizer Corporation Hong Kong Limited (*Corresponding Author)

ABSTRACT

Healthcare system is complicate and relies on many sectors. Pharmacy task force, performing unique daily function, is part of the healthcare system. It is a special form of teamwork in its context. Hence, management of a pharmacy department is undoubtedly a crucial element for the success of the healthcare system. This article analyzes how a high performance organization and management model could be enforced and validated in various pharmacy settings to foster it as an effective team.

Keywords: high performance; pharmacy; effective; team; organization

INTRODUCTION

The imperative need for patient-centered care in the past decade had driven pharmacy practice to move toward a systematic and comprehensive philosophy of pharmaceutical care.⁽¹⁾ A team approach which transcends departmental or organizational boundaries is deemed to be an indispensable approach for optimal and effective delivery of integrated care, whether in hospital pharmacy,⁽²⁾ community pharmacy,⁽³⁾ and pharmaceutical industry.⁽⁴⁾

Why do we need a team in pharmacy practice?

TEAM (Together Everyone Achieves More)

A greater appreciation of the merits and effectiveness of teamwork had fostered a new paradigm of valuing collaborative achievements more than individual accomplishments.⁽⁵⁾ In health care sector, the effectiveness of teamwork was found to influence staff morale, satisfaction and turnover, and patient outcome.⁽⁶⁻⁹⁾ In particular,

collaborative pharmacy practice was associated with consistency of patient care, enrichment of provider/patient relationships, expansion of continuous learning opportunities, as well as cost-effectiveness of managed care.⁽¹⁰⁾

Effective teamwork has become more integral in pharmacy practice, as pressures grow to manage resources more effectively and complexity increases. Working in harmony benefits individuals and organizations, as well as customers or patients they serve. In general, four benefits are suggested for effective teamwork in health care (Fig.1):⁽¹¹⁾

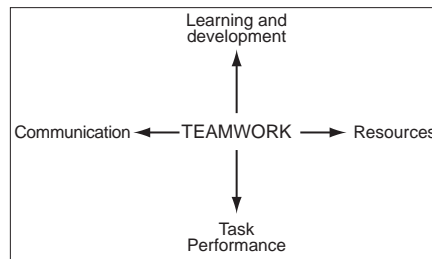


Figure 1. Four benefits of teamwork in health care context

- **Learning and development:** of people and organizations, enabling improvement and research.

- **Resource planning for the future:** ensuring resources are best utilized and unnecessary costs minimized through solving problems and implementing solutions together.
- **Task performance:** improving job performance and the quality of outputs in the presence of a systematic workflow, a common vision, and enthusiastic motivation.
- **Communication:** conflict resolution, reflective deliberation and fruitful relationship-building both internally and externally.

A team is more than just a group

A group is not just a collection of individuals, rather it is a social unit consisting of two or more interdependent, interactive individuals who are striving to attain common goals. Essentials of a group include the following (Fig. 2):⁽¹²⁾

A team could be perceived as an advanced level of group functioning which involves more than working towards a common goal by a collection of individuals. In essence, a team “is a small number of people

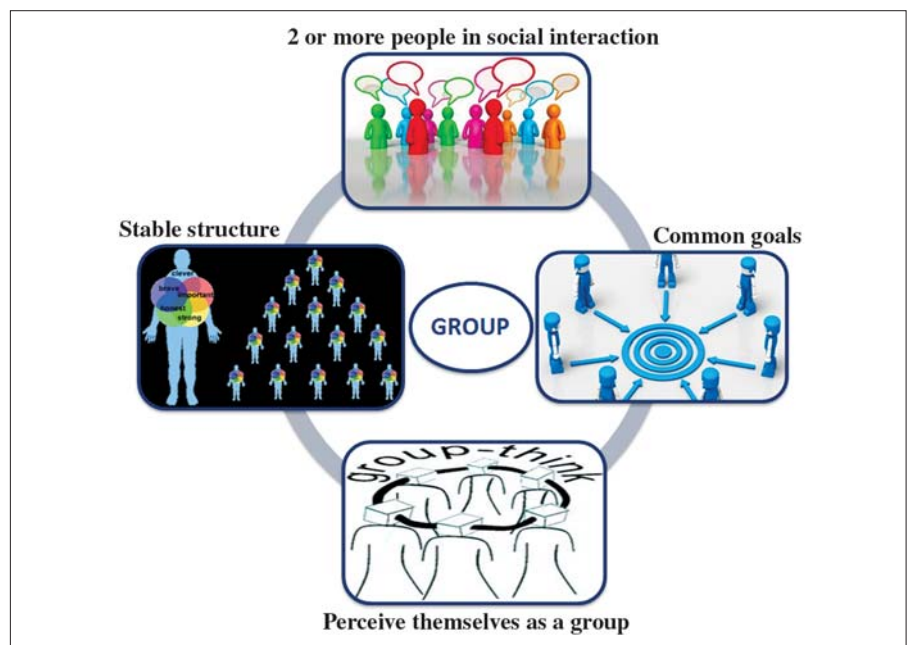


Figure 2. Essentials of a group

with complementary skills who are committed to a common purpose, performance goals and approach for which they hold themselves mutually accountable".⁽¹³⁾

In simpler terms, we could say a team is a group with the following additional characteristics:⁽¹⁴⁾

- It has a defined task or tasks
- Each person in a team is dependent on the efforts of others in the team.
- The members of a team are willing to work together
- The members are selected

Figure 3 below compares and contrasts the distinctive traits possessed by a group and a team respectively.⁽¹⁵⁾

Why do some teams fail?

A team is not necessarily functional. It is common to see members

of some teams fail to contribute towards achieving the common goal, mutually support each other, commit to teamwork, and develop interdependence.

Team failure is as a result of a dysfunctional team in which the team members fail to work effectively together. Robbins and Finley⁽¹⁶⁾ identified a number of factors which make teams fail (Fig. 4):

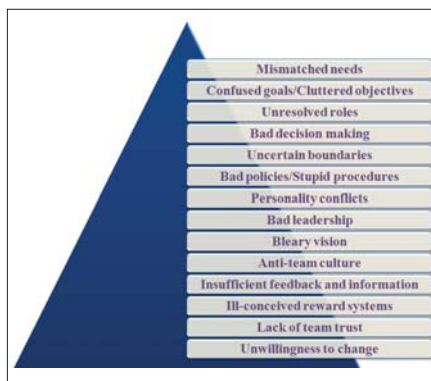


Figure 4. Factors leading to team failure

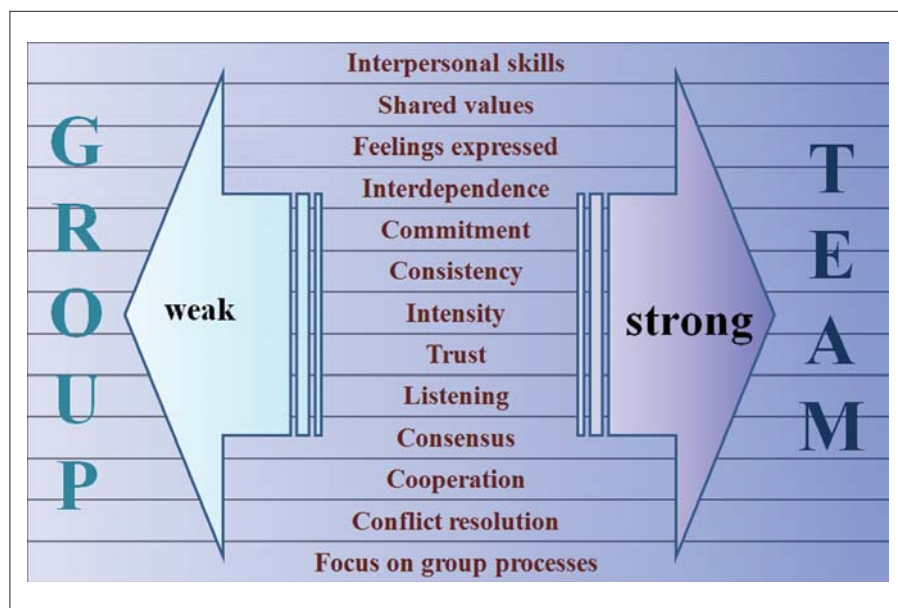


Figure 3. Traits that distinguish a team from a group

Without doubt, a dysfunction team is extremely costly to an organization. Not only would it lead to wasted time and resources, but the discouraging working atmosphere could also further demotivate other team members. Therefore, it is essential to make sure that a team truly performs.

Level of teamwork determines team performance

Jon Katzenbach and Douglas Smith⁽¹⁷⁾ viewed team development as a dynamic process. They postulated that any high performing teams are formed from a series of transformation stages, namely:

- **Loose working group:** members have no incentive to form a team.
- **Pseudo-team:** the team is just "nominal" in nature and there is no common purpose or goal.
- **Potential team:** a team with group output is evident, but which requires significant further improvements.
- **Real team:** team members could complement each other, be committed towards a common goal, and they uphold accountability.
- **High performance team:** a team that always outperforms others, members have deep commitments about each other's growth and development.

The following table (Table 1) summarizes and distinguishes between the five levels of teamwork by 3 criteria: team effectiveness, team trust, and team performance.⁽¹⁸⁾

The process of team development

Table 1. Team development process and changes therein			
	Team Effectiveness	Team Trust	Team Performance
Loose working group	<ul style="list-style-type: none"> • Very low • No collective outputs 	<ul style="list-style-type: none"> • Low to medium • Respect for individuals in the group 	<ul style="list-style-type: none"> • The group achieve its goals through achieving individual goals
Pseudo-team	<ul style="list-style-type: none"> • Low to medium • Collective outputs are generated and are generally acceptable 	<ul style="list-style-type: none"> • Very low • Team members are not prepared to take any risk 	<ul style="list-style-type: none"> • The individuals are a team in name only and performance is low
Potential team	<ul style="list-style-type: none"> • Low to medium • Collective outputs are generated and are acceptable 	<ul style="list-style-type: none"> • Low to medium • Respect for individuals in the team 	<ul style="list-style-type: none"> • Medium • The team achieves its goal
Real team	<ul style="list-style-type: none"> • Medium • There is commitment to team success 	<ul style="list-style-type: none"> • Medium • Team members are starting to trust each other 	<ul style="list-style-type: none"> • Medium • The team achieves its goal
High performance team	<ul style="list-style-type: none"> • High • There is a strong commitment to team success through supporting each other • The team work highly effectively as a unit to deliver outputs. 	<ul style="list-style-type: none"> • High • Team members have a high degree of trust in each other and can take risk (such as positive conflicts) 	<ul style="list-style-type: none"> • High • The team exceeds its goal through delivering requirements and other "intangibles".

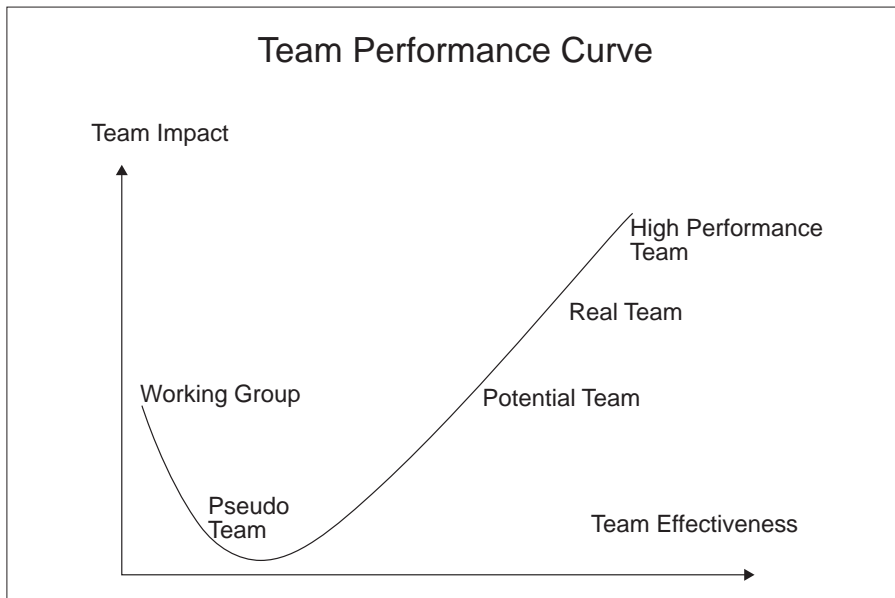


Figure 5. The team performance curve

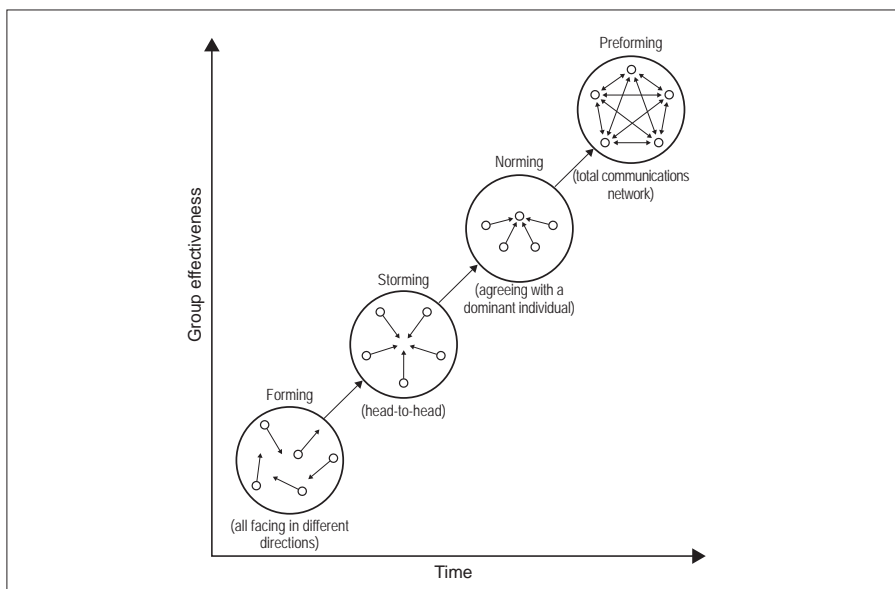


Figure 6. Four stages of team development

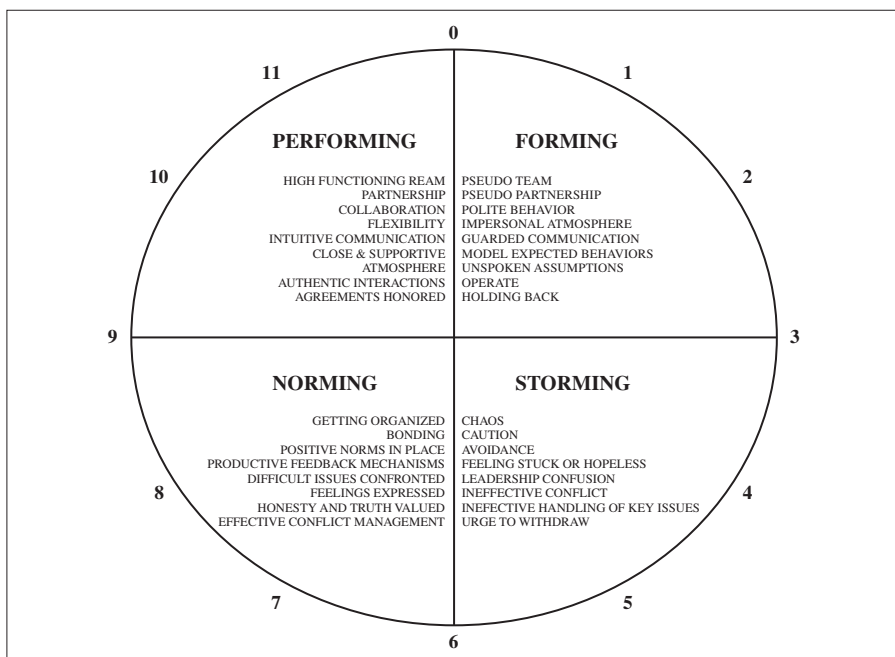


Figure 7. The team development wheel

Katzenbach and Smith⁽¹⁷⁾ further developed a framework for team development, called the “team performance curve”, (Fig. 5) which illustrates how different teams perform, use different approaches, and consequently generate what kind of performance impact (team impact) and team effectiveness.

A high-performance team, which is committed to achieving the objective and holds its member collectively responsible for success, is in fact evolved from a cycle of team development which consists of four stages (Fig. 6):⁽¹⁹⁾

- **Forming stage:** Team acquaints and establishes ground rules.
- **Storming stage:** Members resist control by group leaders and show hostility
- **Norming stage:** Members work together, developing close relationships and feelings of camaraderie.
- **Performing stage:** Team members work toward getting their jobs done.

A “team development wheel” best describes the behaviors likely to be found in team members at each stage of the team formation process. As shown by a study evaluating a model for multicultural and interdisciplinary health care team-building program for health professions students, it may be a useful tool for health care team members to track the process of their team development by circling one or more points (0-11) on the wheel periodically (Fig. 7).⁽²⁰⁾

The way to high performance pharmacy organizations --- HPO SCORES™ model.

In their extensive research seeking to identify the common characteristics possessed by high performance organizations (HPOs), Don Carew, Fay Kandarian, Eunice Parisi-Carew, and Jesse Stoner⁽²¹⁾ postulated 6 elements which make these organizations over time continue to produce outstanding results with the highest level of human satisfaction and commitment to success.

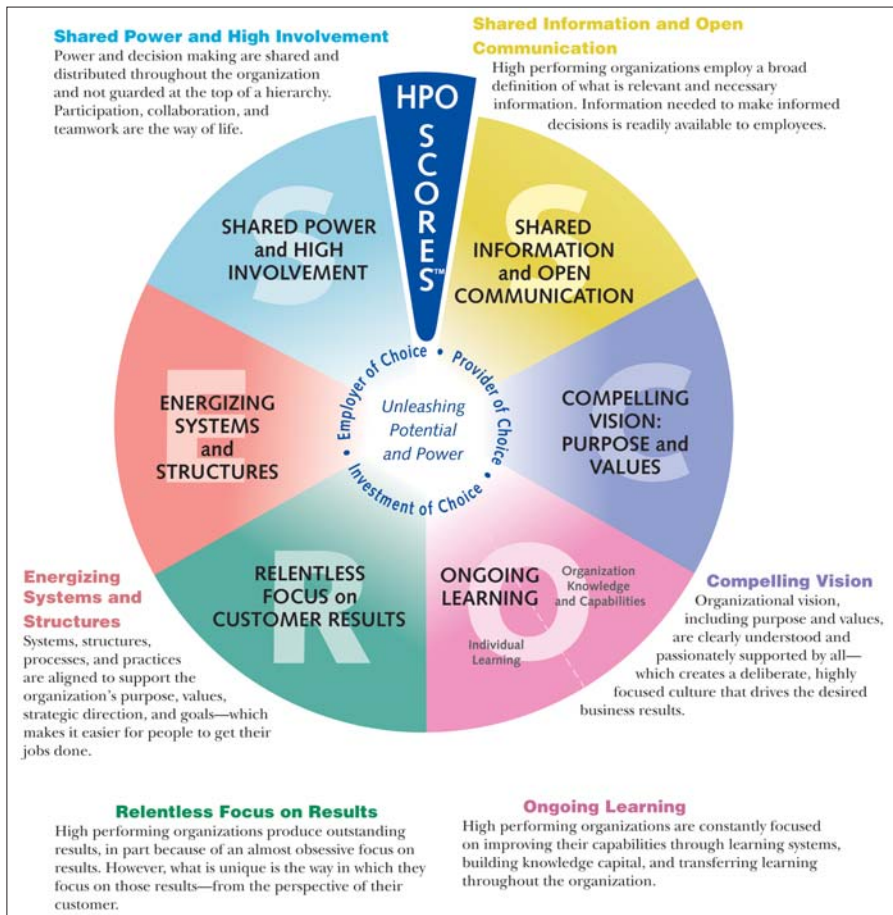


Figure 8. Six elements of the HPO SCORES™ model

The figure below (Fig. 8) depicts each of the six elements which together make up the acronym **SCORES**:

- **S**: Shared information and open communication
- **C**: Compelling vision: purpose and values
- **O**: Ongoing learning
- **R**: Relentless focus on customer results
- **E**: Energizing systems and structures
- **S**: Shared power and high involvement

Step 1: Shared information and open communication

A high performance team stresses on quality rather than quantity of communication, although both of them are actually interrelated. Instant information sharing across the divisions within an organization is crucial to facilitate open communication which makes every member inspired and motivated. In addition, whether an organization could act in time or fulfill its goal and values depends much on the availability of relevant and necessary

information to make an informed decision.

Shared information demands to have an atmosphere of open communication. Open communication could capitalize the benefits of different perspectives, and could cross-check the reliability and validity of data and information. It also reduces the chance

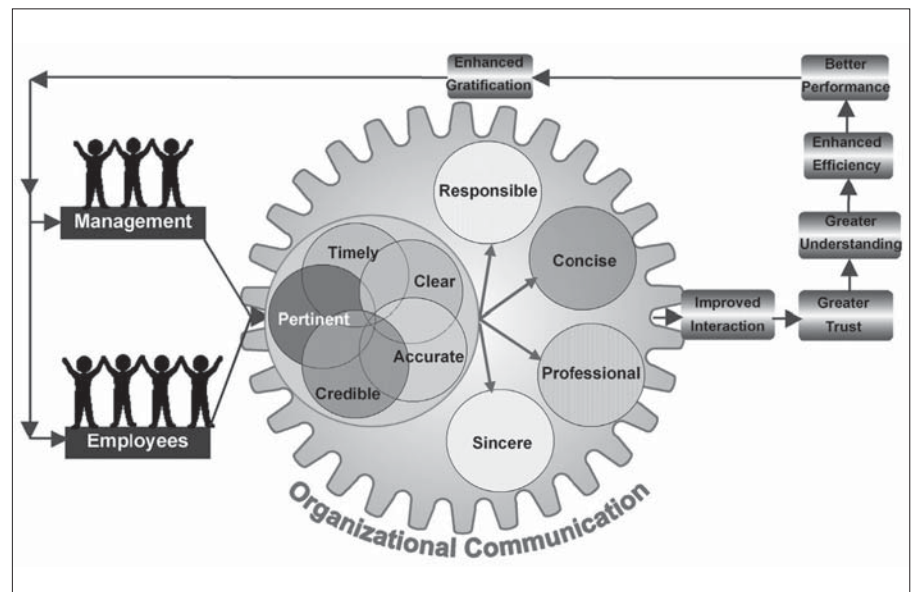


Figure 9. Elements for successful organizational communication

of fragmentation within an organization, and keeps the organization healthy and agile, because downstream impacts which are costly to handle are addressed early in time.

Several means of effective communication channels are identified; they include:⁽²²⁾

- One-to-one sessions with your managers
- Team briefings
- E-mails
- Web chats
- Shared folders
- Floor briefings
- Voice mails
- Presentations
- Newsletters
- Text messages
- Team events
- Conference calls
- Staff survey feedbacks

Communication is an important management competency in pharmacy practice, the modes of information delivery could take various forms, however, the following elements for high quality organizational communication generally apply in pharmacy practice (Fig. 9):⁽²³⁾

Good practice points:⁽²⁴⁾

- ☑ Before finalizing significant changes of any pharmacy policies and procedures, it is advisable to open the matter for staff discussion and feedback.
- ☑ True-hearted feedback should be protected against any invisible

influence; anonymous opinion collection box could be set up if necessary.

- ☑ Important routine operation standards or procedures should better be conveyed through written communications to ensure consistency and easy retrieval.
- ☑ Having an intranet may be beneficial to deliver general announcements in a timely manner. An intranet also provides a systematic documentation of unanimous agreements when they have accumulated to a significant volume.
- ☑ Verbal and non-verbal messages should not be confusing and contradicting. For example, a mixed message would be generated if one's facial expression does not match with his words.
- ☑ An open-door policy should be upheld to encourage staff actively seek for clarifications through emails, staff meetings, or personal encounters when there are ambiguities.
- ☑ Regular staff meetings or some kind of reflection meetings are recommended for upward and downward communications to get

everyone engaged as part of the team.

Step 2: Compelling vision: purpose and values

Creating a vision is seen as the foundation of all strategic planning processes and activities. A vision is forward-looking to lay out the goals an organization is striving for. Through defining the vision, an organization seeks continuous improvements by encouraging its members to be self-demanding and to pursue for excellence. In the vision-formulation process, a team would better understand its strength and weakness to better reposition itself for the future. ⁽²⁵⁾ A good vision defines an overall framework to guide decision making, but still maintain certain flexibilities in case of changing conditions. Ideally, a vision should be memorable, meaningful and inspirational to create a deliberate, highly focused culture that drives the team towards a greater good, be it a purpose or a value. ⁽²⁶⁾

Values and mission often go with

vision. All of them guide the actions of individuals, teams and organizations. Together they form an organization's identity, inform strategy and inspire commitment (Table 2).

The following diagram (Fig. 10) delineates some important considerations when a team needs to form a vision or mission statement.⁽²⁸⁾

Good practice points:⁽²⁹⁾

- ✓ Plan for the vision statements (i) ahead of drafting a major strategic plan, (ii) after the revision of the mission statements, or (iii) during the early stages of a planned organizational change effort.
- ✓ Involve frontline staff for vision statement brainstorming, not only top managers and other managers in the pharmacy team.
- ✓ Organize a one-and-a-half-day workshop off-site for planning, to distance the team from work pressures, phone calls or other interruptions.
- ✓ Proceed the workshop in the following sequence: (i) the mission review, (ii) core values identification, (iii) present state analysis, (iv) vision data generation, (v) the vision review.
- ✓ Assign one or two facilitators, who are familiar with the work but could remain strictly neutral, to serve as coordinators in the sharing and planning processes of the workshop.

Table 2. Definitions and examples of value, mission and vision.		
	Definitions	Examples (Hospital Authority, HK) ⁽²⁷⁾
Value	Beliefs or judgments about what is worthy, important or desirable that are reflected in individual and organizational behavior.	People-centered care, Professional service, Committed staff, Teamwork
Mission	A task, purpose, calling of an individual, team or organization.	Helping people stay healthy.
Vision	An image of the mission accomplished, the ideal future state.	Healthy people & happy staff trusted by the community

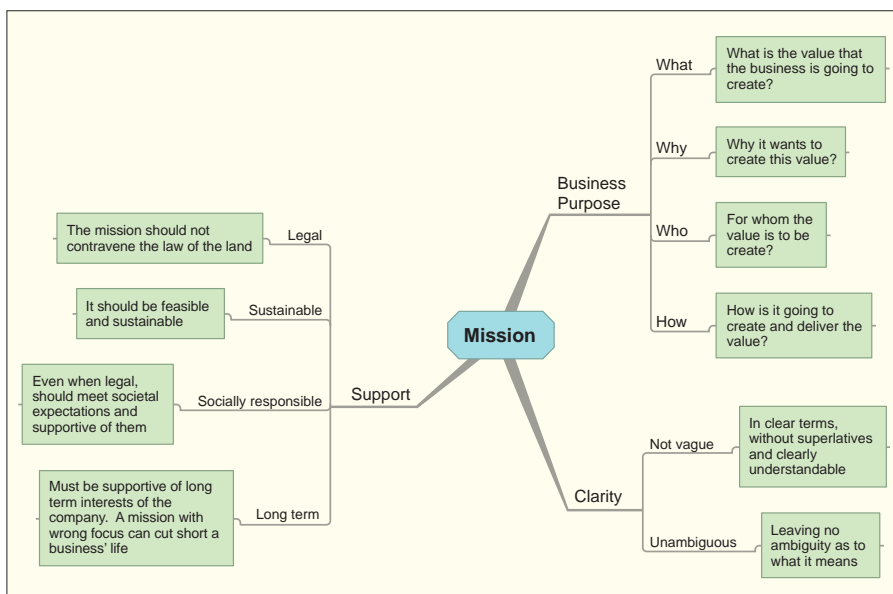


Figure 10. General criteria for a good vision statement

Some examples of setting good visions, missions and values in pharmacy practice (Table 4):

Step 3: Ongoing learning

Members in a high-performance team constantly seek learning opportunities to improve their capacities, both individually and as an organization. Individual learning and organizational learning have different emphases, advantages and disadvantages; therefore, an effective team should combine and encourage these two complementary learning approaches (Table 5):⁽³³⁾

The following diagram (Fig.11)

Table 4. Examples of values, mission and vision in pharmacy practice organizations.

Settings	Examples	Visions/Missions/Values
Hospital Pharmacy	Pharmacy Service, Hines VA Hospital ⁽³⁰⁾	Vision: To consistently provide the right drug to the right patient at the right time at an affordable cost. Mission: To provide pharmaceutical care to all patients through the responsible provision of drug therapy, for the purpose of achieving positive patient outcomes that improve the quality of life of our patients. Values: Safety, accuracy, efficiency, quality innovation, and cost-effectiveness.
Community Pharmacy	CVS Caremark, Canada ⁽³¹⁾	Vision: We strive to improve the quality of human life. Mission: To improve the lives of those we serve by making innovative and high-quality health and pharmacy services safe, affordable and easy to access. Values: Our customers, Our colleagues, Our contributions
Pharmaceutical Industry	American Association of Pharmaceutical Scientists ⁽³²⁾	Vision: To be the premier organization of all scientists dedicated to the discovery, development and manufacture of pharmaceutical products and therapies through advances in science and technology. Mission: To provide a dynamic international forum for the exchange of knowledge among scientists to enhance their contributions to health; To offer timely scientific programs, ongoing education, opportunities for networking, and professional development. Values: Communications, Inclusiveness, Innovation, Integrity, Member focus, Member involvement, Professional development, Quality.

summarizes the five learning cycles of the learning organization:⁽³⁴⁾

- New knowledge is created by individual.
- New knowledge developed by individuals are shared, tested, accepted or rejected as interactions between groups (or teams) and individuals begin.
- Group interactions select and determine which new knowledge arisen from a given group is to be accepted within an organization.
- New knowledge accepted at the organizational level is embedded in new processes, systems, and the culture of an organization.
- Such new processes, systems, and culture generate an improved pattern of organizational work.

Good practice points (Table 6):⁽³³⁾

Step 4: Relentless focus on customer results

In whatever situations or settings, a high performing organization is outcome-oriented. They highly focus on results and seek to understand their clients' need.

It is suggested that health of the citizens, rather than the budget itself, should be the driving force towards health systems managements and reforms. Similarly, the complexity of health care and the emergence of pharmaceutical care concept demand us to change the mindset from disease-focused or economic outcome-based approach towards patient-focused or health outcome-based approach. (Fig.12)⁽³⁵⁾

Table 5. Key differences between individual learning and organizational learning.

Individual learning	Organizational learning
• Knowledge is personal in nature and is hard to transfer among people.	• Knowledge can be articulated and codified into organizational assets.
• The only way to "transfer" knowledge is through grouping corresponding people having the desired knowledge.	• Knowledge can be disseminated using standard documents, procedures and practice models.
• Learning could only be made through gathering corresponding people.	• Learning could be made through structured, managed, scientific processes.

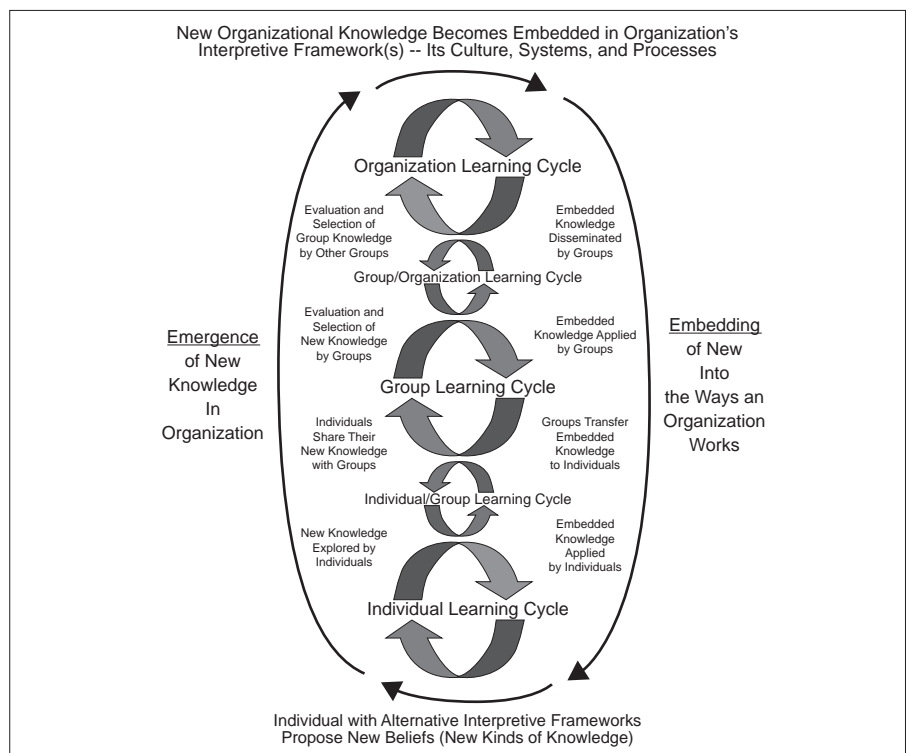


Figure 11. The five learning cycles of the learning organization

Table 6. Some suggestions to foster individual learning and organizational learning.

Foster individual learning by...	Foster organizational learning by...
✓ Stimulating metaphorical learning , e.g. expose a pharmacy staff periodically to different divisions or organizations to explore others' good practice.	✓ Forming several expert groups to help define facing difficulties and generate collaborative ideas of tackling them.
✓ Encouraging the emergence of divergent interpretive framework , e.g. encourage inspired individual to influence other members to compete against established orthodoxy of practice.	✓ Developing a coordination team to promote exchange of knowledge and information between the expert groups.
	✓ Arranging intensive interactions among top managers, coordination team, and expert groups to formulate an action plan.

Good practice points:⁽³⁶⁾

For example, pharmacy should be regarded as a complex system and behavior through which care is delivered, rather than being seen as a space for mere drug assembly. A properly designed pharmacy setting could use a user-centered approach to improve efficiency which ultimately benefits patients (Table 7):

Step 5: Energizing systems and structures

Operational systems and structures are supposed to help members in a pharmacy team to accomplish their jobs more easily rather than more difficult. It allows rapid response in face of upcoming obstacles or opportunities.

Good practice points:

- ✓ Procedures and protocols should maintain certain flexibilities in their implementations, e.g. timelines and steps could be slightly deviated in special situations or emergencies.
- ✓ Automated computer systems should be regularly maintained, checked and updated so as to ensure proper data backup, easy retrieval of information, and avoid system breakdown.
- ✓ Streamlining operations through data sharing across different pharmacy locations (e.g. satellite pharmacies) to allow timely distribution and retrieval of patient information.
- ✓ Ensure the transferability of healthcare information to and from different clinical systems, i.e. testing the interoperability of different clinical systems.

Step 6: Shared power and high involvement

High performance is often linked to collaborative leadership and team engagement. The right and power to make decision is shared and distributed

throughout the organization, not just guarded at the top of the hierarchy. Members would feel valued and respected when they participate, collaborate, and experience teamwork. In turn, they will function as valuable contributors to the purpose and vision

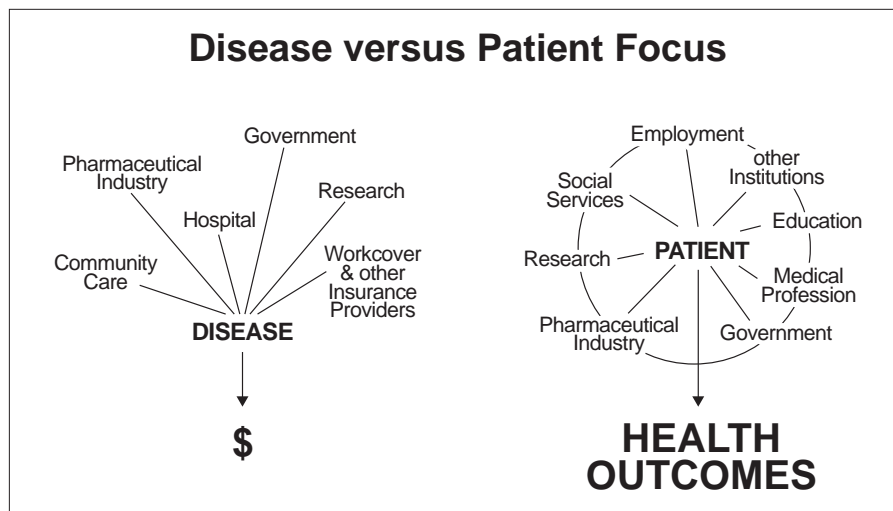


Figure 12. Disease-focused health care focuses on costs, patient-focused health care focuses on patient-relevant health outcomes



Figure 13. Four elements for successful leadership

Table 7. An illustration of using customer-focused approach for pharmacy workplace alignment	
Design principles	Examples
1. Apply lean principles throughout the pharmacy system	In outpatient pharmacy, robotic automation could be aligned in the fill area to allow auto fill, manual fill, and checking concentrating in the same place, thus smoothing the workflow.
2. Promote efficient handoffs	In inpatient pharmacy, technology combines the areas of order fill and check areas, minimizing gaps between steps.
3. Plan for short-term and long-term changes	Although automation drives the design of a pharmacy layout, minimizing the placement of surrounding furniture could allow space to be adapted to future technological changes.
4. Support decentralized and specialized pharmacy work	Dedicating a discrete consultation room supports expansion of services such as disease management, compliance consultation etc.
5. Plan for the impact of bar-coding on systems and spaces	The implementation of a bar-coding system could minimize the counter-checking work by pharmacists.
6. Incorporate regulatory criteria early in the design process	Employ adjustable-height counters at drop-off and pick-up allow a pharmacy to satisfy the needs of patients with different physical abilities.
7. Mitigate physical and emotional stressors	Regularly switching a pharmacist between order entry and order check could make daily routine less monotonous.
8. Support critical thinking	Shielding the place for order entry from surrounding noise and interruptions while not disturbing the sightline to other areas in the pharmacy.

of the organization.

Good Practice Points:

Participative leadership creates an environment in which leadership can naturally emerge within the organization. In general, 4 elements of successful leadership are identified (Fig. 13):⁽³⁷⁾

- **Modeling the way:** align actions with words
- **Inspiring shared vision:** get everyone involved to set a collective aim and work for it.
- **Encouraging others to act:** encourage collaboration and assist individuals within the organization and the organization itself to build capacity and tap into individual and collective wisdom.
- **Challenging the process:** dare to challenge the team to search for opportunities and to experience new processes.

CONCLUSION

High performance pharmacy practice demands the existence of a high performance team of pharmacy staff that functions at the highest levels of effectiveness and efficiency for the betterment of clinical outcomes of patients and financial position of its health systems. HPO SCORES™ model introduces 6 simple yet essential elements for pharmacy institutions to operate. It should be emphasized that successful team building and development ultimately relies on an “informal” leader who endeavors to build a visionary organization that endures beyond him. Through this way, it is hoped that high-performance pharmacy practice would lead to high-quality patient care, improved medication safety, and maximum productivity.

Author's background

CHONG WK Donald is the Medical Affairs Manager working in a multinational pharmaceutical company. For more information about this article, please contact him through the following email address: wing-kit.donald.chong@pfizer.com **SHEUNG GM William** is interning at the medical department at a multinational pharmaceutical company. He can be contacted at: william.sheung@pfizer.com

References

1. Berenguer B, La Casa C, de la Matta MJ, Martin-Calero MJ (2004). Pharmaceutical Care: Past, Present and Future. *Current Pharmaceutical Design*, 10(31):3931-3946.
2. Ford S, Jones K (1995). Integrating pharmacy fully into the primary care team. *British Medical Journal*, 310:1620-1621.
3. McDonough RP, Doucette WR (2001). Dynamics of pharmaceutical care: developing collaborative working relationships between pharmacists and physicians. *Journal of American Pharmaceutical Association*, 41(5):192-199.
4. Kristensen HG (1997). Teaching of Industrial Pharmacists: How to Teach? *American Journal of Pharmacy Education*, 61:197-199.
5. Riech RB (1987). Entrepreneurship reconsidered: The team as hero. *Harvard Business Review*, 65: 77-83.
6. Risser DT, Rice MM, Salisbury MM, et al (1999). The potential for improved teamwork to reduce medical errors in the emergency department. *Ann Emerg Med*, 34:373-383.
7. Miller C, Freeman M, Ross N (2001). *Interprofessional practice in health and social care: Challenging the shared learning agenda*. Arnold, London.
8. Tope R (1998). *The impact of interprofessional education in the South West region: a critical analysis. The literature review*. Department of Health, London.
9. Firth-Cozen J (2001). Cultures for improving patient safety through learning: the role of teamwork. *Qual Health Care*, 10(S2): 26-31.
10. Mitrany D, Elder R (1999). Collaborative pharmacy practice: an idea whose time has come. *J Manag Care Pharm*, 5(6): 487-491.
11. Ingram H, Desombre T (1999). Teamwork in health care: Lessons from the literature and from good practice around the world. *J Manag Med*, 13(1): 51-58.
12. Koontz H, Wehrich H (2007). Chapter 16: Committees, Teams and Group Decision Making. In: *Essentials of Management: An International Perspective*. (7th ed.). New Delhi: Tata McGraw-Hill Publishing Co. Ltd, 336-351.
13. Katzenbach JR, Smith DK (1993). *The Wisdom of Teams: Creating the High-Performance Organization*. Cambridge, MA: Harvard Business School Press.
14. Johnson J (2001). Chapter 1: Understanding teams. In: *Building a team that works*. (1st ed.). Hertfordshire: Select Knowledge Limited, 7-28.
15. Leigh A, Maynard M (2003). Chapter 1: Survival Kit. In: *Leading your team: how to involve and inspire teams*. (2nd ed.) London: Nicholas Brealey Publishing, 1-19.
16. Robbins H, Finley M (2000). Chapter 2: Team instinct. In: *The new why teams don't work: what goes wrong and how to make it right*. San Francisco: Berrett-Koehler Publishers, Inc, 16-20.
17. Katzenbach JR, Smith DK (1993). *The wisdom of teams: creating the high-performance organization*. Cambridge: Harvard School Press.
18. Melton T (2008). Chapter 3: Set up learning. In: *Real project planning: developing a project delivery strategy*. (1st ed.) Burlington: Elsevier Ltd, 73-144.
19. Needham D, Dransfield R, Coles M, Harris R, Rawlinson M (1999). Chapter 13: Groups and Group Dynamics. In: *Business for Higher Awards* (2nd ed.). Oxford: Heinemann Educational Publishers, 308-321.
20. Hope JM, Lugassy D, Meyer R, et al (2005). Bringing interdisciplinary and multicultural team building to health care education: the downstate team-building initiative. *Acad Med*, 80(1): 74-82.
21. Stoner J, Carew D, Parisi-Carew E, Kandarian F (2000). *High Performing Organizations: SCORES*. Escondido, CA: The Ken Blanchard Companies.
22. Holbeche L (2005). Section 4: High Performance Management Practices. In: *The high performance organization: creating dynamic stability and sustainable success*. (1st ed.). Burlington: Elsevier Butterworth-Heinemann, 213-194.
23. Marques JF (2010). Enhancing the quality of organizational communication: a presentation of reflection-based criteria. *J Comm Manag*, 14(1): 47-58.
24. Brown TR (2006). Chapter 3: The pharmacy staff. In: *Handbook of institutional pharmacy practice*. (4th ed.). Bethesda: ASHP, 33-58.
25. Bennett RW, Beis SJ (2006). Chapter 112: Re-engineering pharmacy practice. In: Troy DB (Ed.). *Remington: the science and practice of pharmacy*. (21st ed.). Philadelphia: Lippincott Williams & Wilkins, 2055-2069.
26. Cook S (2009). Chapter 4: creating a team vision and a set of values. In: *Building a high performance team*. (1st ed.). Cambridgeshire: IT Governance Publishing, 41-48.
27. Soloman S (2010). Keynote address by the Chief Executive of Hospital Authority at the Hospital Authority Convention 2010. Retrieved from: <http://www.imh.org.hk/upload/presentation/278.pdf>
28. Balajhi N (2010). Corporate Mission & Vision Statements. Retrieved from: <http://enablingbusiness.blogspot.com/>
29. Justice T, Jamieson DW (2006). Section IV-Special meetings. In: *The facilitator's fieldbook: step-by-step procedures, checklists and guidelines, samples and templates*. (2nd ed.). NY: HRD Press, 333-396.
30. Edward Hines, Jr. VA Hospital Pharmacy Service (2010). Mission, Vision and Values. Retrieved from: <http://www.hines.va.gov/news/rx/HinesVARxMission.pdf>
31. CVS Caremark Corporation (2007). 2007 Corporate Social Responsibility Report. Retrieved from: http://info.cvscaremark.com/files/CVS_Caremark_CSR.pdf
32. American Association of Pharmaceutical Scientists (AAPS) (2003). The vision, mission and values for AAPS. Retrieved from: <http://www.aaps.org/about/vision.asp>
33. Sanchez R (2005). Knowledge Management and Organizational Learning: Fundamental Concepts for Theory and Practice. Retrieved from: <http://www.lri.lu.se/pdf/wp/2005-3.pdf>
34. Sanchez R (2001). Managing knowledge into competence: The five learning cycles of the competent organization. In: *Knowledge Management and Organizational Competence*. Oxford: Oxford University Press, 3-37.
35. Sturmberg JP, Martin CM (2006). Rethinking general practice – Part 1: Far from equilibrium disease-centred and econometric-oriented health care and general practice/family medicine. *Asia Pacific Journal of Family Medicine*, 5(2). Retrieved from: http://www.apfmj-archive.com/afm5_3/afm48.htm
36. Kelly C, Redman M (2009 November). Rx for pharmacy spaces: A user-centered approach. Retrieved from: <http://www.nurture.com/Files/8864c449cf454ad6891a6b986031207c/Rxforpharmacyspa.pdf>
37. Integral Vision Consulting Inc. (2009). Integral Vision Consulting's approach to business. Retrieved from: <http://www.integralvisions.com/approach.html>

Community-Visiting Pharmacist Services for the Aged People in Elderly Homes

CHUNG, Wing-Ming, Billy*

Chief Operating Officer, Hong Kong Pharmaceutical Care Foundation, 13/F, Kingsfield Centre, 18 Shell St., North Point, Hong Kong

ABSTRACT

A project with different phases entitled Visiting Pharmacist (VP) Service is being conducted in the community for Residential Care Homes for the Elderly (RCHEs). The service is provided by the Hong Kong Pharmaceutical Care Foundation, and funded by the Labour and Welfare Bureau from June 2010 to May 2011. This article provides an overview of the background, scope of service, as well as the significance and impact of this local VP service.

Keywords: pharmacist; elderly; medication; safety; residential care

INTRODUCTION

The Hong Kong Pharmaceutical Care Foundation (the Foundation) was founded by a group of professional pharmacists serving various healthcare service sectors. It was incorporated on 14th June 2007 and is registered as a non-government, non-profit, charity organization fostering social welfare with the IR88 status.

AIMS AND OBJECTIVES OF THE FOUNDATION

The foundation endeavors to promote, foster and enhance medication safety for Residential Care Homes for the Elderly (RCHEs). In particular, it strives to improve the quality of medication management process at the RCHEs by providing the visiting pharmacist (VP) service which targets to optimize the residents' drug therapies by reviewing their drug profiles, reconciling their drugs obtained from various sources, hence reducing risks and medication errors that can potentially lead to unnecessary hospital admission

or undesirable hospital readmissions due to drug-related problems (DRPs).

CURRENT CHALLENGES FOR MEDICATION MANAGEMENT AT RCHEs

There are about 70,000 residential care places in RCHEs in the community dispersed in more than 500 private homes and more than 150 sub-vented homes. It was reported in 2005 by the Government that over 95.7% of the total number of residents in local RCHEs is under long-term medical care and over 88.2% received medications prescribed for chronic disease (67.8% taking 1-4 drugs and 32.2% taking 5 drugs or more). But in these homes, there is a total lack of any professional pharmaceutical service to address medication-related issues for these residents.

Because of the lack of the pharmaceutical support and supervision on medication-related matters in RCHEs, some residents suffered unnecessarily from medication incidents that take place at RCHEs and have to be readmitted into hospitals. As a result, substantial risks and overall healthcare costs are incurred. These can be prevented, at least partly, by the enforcement of VP service.

With the growing ageing population, it is projected that 1 in 4 citizens in Hong Kong would be elderly by year 2025, creating a huge demand of 180,000 healthcare services to justify the establishment of 5 specialty clinics per annum. The problems with medication management would become increasing acute if no action is taken now.

WHAT DOES EACH VP DO AT THE RCHEs?

Each VP will pay routine visits to his/her assigned RCHEs. The service includes, but may not be limited to, the following types:

I) Performing Medication Reconciliation Service

VPs will screen through medications of residents to ensure the medications provided to them are as intended and appropriate. They will also detect and rectify unnecessary drug duplications, as well as any unintended or inappropriate dosages.

II) Building and Updating Residents' Medication Profile

VPs will use the Foundation's web-based OAHxpress system to build up a full list of current and past medications for each resident. The list would be printed in the form of Resident's Drug Summary Report and Medication Administration Records (MAR) with clear drug names, dosage and frequency for use by the elderly home staff for documentation of drug administration.

III) Conducting Medication Review

VPs will routinely conduct complete medication review of the residents' drug profile. When there is a change in medications in a resident, the VPs will update the profile in the OAHxpress system and print out a new MAR. The VPs will contact the prescribing physician or the Visiting Medical Officer (VMO) in charge if any potential drug related problem is observed. All recommendations / suggestions made to physicians will be documented as "pharmacist interventions" and the result of the interventions will be recorded.

IV) Providing General Administrative supervision to Medication Related Issues

VPs can provide supervision to review the storage conditions and record keeping, and delivery of advices on medication disposal at the RCHes.

V) Providing Training to relevant parties

VPs can provide drug education to residents, nurses, health workers, home-helpers, and family members about common drug knowledge and medication management system at the RCHes.

VI) Running the Telephone Hotline

VPs can provide a routine telephone hotline from 9.00am to 9.00pm for RCHes enquiries on medication-related issues and an 24 hour-hotline for emergency calls.

IMPLEMENTATION APPROACH FOR THE VP SERVICE

The Foundation has proposed the following phase implementation approach for the VP service (Table 1).

THE PROVEN OUTCOMES OF THE VP SERVICE

Since late 2008, the Foundation has signed up over 30 service agreements to provide the VP service with various sub-vent and private homes. The outcomes of the VP service provided at the above homes are consistent with the vast amount of data shown by similar models of service in foreign countries. Since elderly residents often obtain medications from multiple sources, including outpatient clinics, VMOs, private clinics, Chinese medicine practitioners and community pharmacies, poly-pharmacy is one of the most common problems when residents take five or more prescribed medications. Through the service of the VPs provided at these homes, immediate positive impacts were noticed regarding the quality of medication management service, with numerous examples of successful interventions. The Foundation has collected relevant data and will continue to do so to generate the necessary statistics to report these DRPs encountered for future sharing and publication purposes.

NUMBER OF BENEFICIARIES COVERED BY THE SERVICE

Since the launch of the VP service by

the Foundation in 2008, a total of 1,400 residents in the Government-subservent homes and 600 residents in the private homes have benefited. Furthermore, some 1,700 carers including nurses, health workers, home-helpers, and family members have also benefited from the drug education and training program on drug safety provided by the Foundation at RCHes.

FUNDED PILOT VP SERVICE TO RCHes FROM JUNE 2010 TO MAY 2011

The followings details the particulars of the types of RCHes served under the VP service within the period.

The VP service serves local RCHes of different scale of business, varying in their respective number of residents in each home. (Table 2)

Upon investigation, the 26 homes to be served would consist of both Government-subservent homes and private homes, roughly in a 1:1 ratio. (Table 3)

The VP service is available over the whole territory of Hong Kong, and covers all the 7 clusters as delineated by the Hospital Authority. (Table 4)

Table 1. A description of the phased implementation approach for the VP service of the Foundation*.

Phases	Phase I (Preparatory Phase)	Phase II (Active Phase)	Phase III (Maintenance Phase)
Phase Duration	3 months	3 months	On going mode after completion of Phase II
Service types provided	I, II, IV, VI	I, II, III, IV, VI	I, II, III, IV, V and VI

* The service is conducted in 3 phases, each differing in the duration and the type of service provided.

Table 2. Expected number of homes and residents to be served by the VP project

Home size	No. of Homes served	No. of residents served
Large home with >120 residents	4	755
Middle home with 30-120 residents (90-120)	1	110
(60-90)	8	635
(30-60)	11	502
Small home with <30 residents	2	52
Total	26	2054

Table 3. A breakdown of the type of RCHes to be served according to their main source of operation fundings

Number of Government-subservent homes	Number of private homes
11	15

Table 4. A breakdown of the type of RCHes to be served according to their geographic locations.

HA Cluster	No. of Homes served	Home Location
NTEC	3	Sheung Shui & Tai Po
NTWC	4	Tsing Yi & Tuen Mun
KEC	5	Kwun Tong, Kowloon City & To Kwa Wan
K WC	8	Shamshuipo, Cheung Sha Wan & Tsuen Wan
KCC	2	Jordan & Boundary Street
HKEC	2	Causeway Bay & Shau Kei Wan
HKWC	2	Aberdeen & Wong Chuk Hang
Total	26	

EVALUATION OF THE VP SERVICE

The School of Pharmacy of the Chinese University of Hong Kong has agreed to perform the pilot project of outcome measurements to evaluate the VP service at RCHEs.

To evaluate the Visiting Pharmacist (VP) services, the following areas will be assessed with corresponding parameters collected:

1. General measures;
2. Medication reconciliation and Medication administration record;
3. Medication review;
4. Hotline service;
5. Medication Incident / Near Misses Reporting;
6. General Supervision / Drug management system (Home Safety Self Evaluation);
7. Education;
8. Satisfaction of the VP service by RCHE staffs.

PURPOSE AND POTENTIAL FOR IMPLEMENTATION OF EVALUATION RESULTS

The pilot project attempts to improve medication management in RCHEs in Hong Kong by providing medication reconciliation services through the VPs, testing a system that utilizes pharmacists for medication review and maintaining centralized patient medication profile.

The outcomes of the pilot project will provide significant guidance on whether the VP phased implementation approach may help to improve patient outcomes and prevent drug-related problems (DRPs). Should the results be found positive, similar projects may be extended for two years from June 2011 to May 2013 to cover more RCHEs to further improve patient outcomes for a wider population.

In addition, results of the proposed pilot project will also provide more information to heighten the need of establishing proper channels for adverse drug events reporting. Establishing an adverse drug event reporting system is essential to facilitate the formulation of solutions for preventing adverse drug events. Enhanced surveillance and reporting systems for ADEs in RCHEs should be emphasized; and educational programs about the optimal use of drug therapy in the frail elderly patients and among the population of home carers should be strongly encouraged.

The pharmacists providing the VP service have obtained the Certificate of Medication Management (Geriatric Care) provided by the School of Pharmacy, the Chinese University of Hong Kong in February 2009 ensuring that only suitably accredited and trained pharmacists are

involved in providing the service at the RCHEs.

The future potential developments of the service provided by the Foundation include:

I) Contributing to the electronic Health Record (eHR) system

The Foundation is aware of the eHR project initiated by the Hong Kong Government. The drug profiles built up by the Foundation through our web-based OAHxpress system will make significant contribution to providing an interface integrating the drug profiles of the residents to the eHR system.

II) Providing Unit-dose Packaging and Dispensing Service

The Foundation can provide unit-dose packaging and dispensing service to improve medication safety for residents at the RCHEs. This will significantly reduce the errors associated with the dispensing and drug administration processes at the RCHEs under the supervision of trained professionals.

Author's background

Mr. CHUNG Wing-ming Billy is the chief operating officer of the Hong Kong Pharmaceutical Care Foundation. His corresponding e-mail address is info@pcfhk.org

Overview of Depression in Hong Kong and Its Treatment

LAW, Sin Yan Anne¹; LUK, Stella Pik-Kwan²

¹ Queen Elizabeth Hospital, Hospital Authority, Hong Kong; ² Pfizer Corporation Hong Kong Limited, Hong Kong

ABSTRACT

Despite the availability of many effective antidepressants in the market, depression has remained a prevailing mental disorder and a heavy healthcare burden. The number of depressive patients is on the rise and if the trend continues, depression will have become the second major disease leading to global loss by the year 2020. Therefore, it is necessary to fully understand the treatment regimen of depression to ensure appropriate use of drugs and psychotherapy. It is also appropriate to learn more about other local support so that patients can receive better care. After all, we are hoping to improve depressive patients' quality of life through better understanding of the illness itself and its corresponding treatments.

Keywords: depression; suicide; antidepressants; local help support; psychotherapy

INTRODUCTION

Depression is a common mood disorder, the lifetime prevalence ranges among different countries. For instance, approximately 18.8 million American adults, or about 9.5 percent of the U.S. population aged 18 and older in a given year, have a depressive disorder.⁽¹⁾ According to the World Health Report 2001 by the WHO, one in every four persons would be affected by a mental disorder at some stage in life. Initial estimates have suggested that about 450 million people are suffering from mental or neurological disorders or from psychosocial problems today, of which 121 million are suffering from depression. It is also estimated that by the year 2020, depression will have become the second major disease leading to global loss.⁽²⁾

With reference to the Diagnostic and Statistical Manual of Mental Disorders, Forth Edition, Text Revision,

Major Depressive Disorder (recurrent) is defined as the presence of two or more major depressive episodes, which are not better accounted for by other psychotic illnesses. To fulfill the criteria for a major depressive episode, five or more of the following symptoms have to be present for most of the day, nearly every day during the same 2-week period and represent a change from previous functioning.

1. Persistent depressed mood
2. Pervasive anhedonia (loss of interest/pleasure)
3. Sleep disorder
4. Change in weight or appetite
5. Fatigue or loss of energy
6. Psychomotor retardation or agitation
7. Difficulty concentrating or indecisiveness
8. Guilt or low self esteem
9. Recurrent thoughts of death or suicide

Among the symptoms presented, at least one of them has to be either (1) depressed mood or (2) loss of interest or pleasure. Symptoms that are clearly due to a general medical condition, or mood-incongruent delusions or hallucinations are not included.⁽³⁾

ETIOLOGY

Genetics, environmental factors like work stress and broken relationships, underlying personality problems and neurotransmitter dysregulation are the main causes of depression.

DEPRESSION – A MAJOR SUICIDAL RISK FACTOR

Depression is a major risk factor of suicide. In Hong Kong, more than 900 deaths in the year 2007 were attributed to suicide, in which older adults (65 or above) account for the greatest percentage,⁽⁴⁾ owing to the fact that they are more prone to depression. A prevalence study of depression among older adults in Hong Kong was conducted in 2005, 11% and 14.5% of the Chinese men and women were identified with clinically significant depression respectively. Factors associated with an increased likelihood of depression among older adults included poor self-related health, long term pain, vision problem, higher level of impairment in activities of daily living, residing in Hong Kong less than 20 years, financial strain and having less social support.⁽⁵⁾

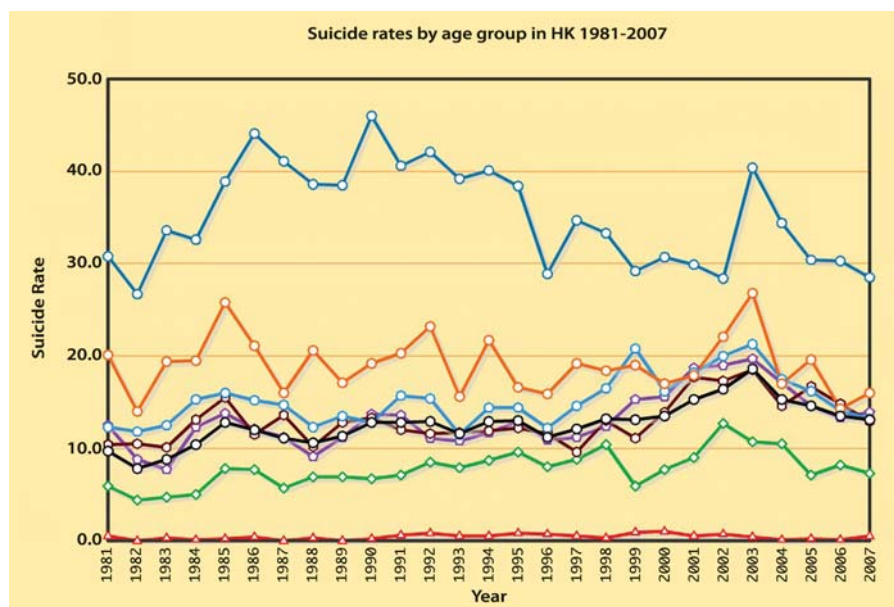


Figure 1. The suicidal rates of different age groups in HK between 1981 and 2007. (Adopted from Statistics. Centre for Suicide Research and Prevention. 2004).

Another group of patients worth paying much attention to is the adolescents. Among the adolescents who died from suicide, over 70% had suffered from at least one kind of mental disorders; including depression, behavioral problem, or drug abuse. Among form 4 to form 7 students with suicidal thoughts, those with depressive symptoms outnumbered those without by 1.85 times. Suicidal ideation and depressive symptoms among adolescents is much attributed to factors such as poor relationships with parents (lack of care and understanding), school pressure, and peer pressure.⁽⁶⁾

Seeing that depression causes such a heavy healthcare burden, it is necessary to manage it well with utmost seriousness. Depression is curable; 60-80% of the sufferers fell better after treatment. The earlier the treatment is started, the less likely the disease will recur.⁽⁷⁾

SEEKING HELP IS NEVER A STIGMA

Although it's very clear that depression is just like any other diseases and it requires medical intervention for a patient to recover, few patients are willing to seek help. Many depressive patients feel ashamed for their illness and are afraid of being misperceived as insane or 'crazy' when others find them consulting psychiatrists. Therefore, they would rather stay away from doctors and try to let the illness heal on its own. Other patients are worried about being discriminated, so they would not even tell their family members and intimate friends, making them even harder to be diagnosed and treated. There are also some patients unable to

bear the healthcare costs so that they do not seek medical advice. All these barriers to medical treatment render depression an underdiagnosed and undertreated illness in Hong Kong. The number of patients diagnosed with depressive illness and treated in public hospitals and clinics in year 2004-2005 is only 21240,⁽⁸⁾ which is less than the prevalence estimated by different statistics.

INTERVENTION FOR DEPRESSION

There are both pharmacological and non-pharmacological interventions in order to help a depressive patient recover. According to the NICE guideline, for mild depression, psychotherapy alone may be enough. Antidepressants are not necessarily recommended for initial treatment. On the other hand, for moderate to severe depression, combination of psychotherapy and antidepressants may be needed.⁽⁹⁾

Pharmacological intervention

Most antidepressants are of equivalent efficacy in groups of patients when given in comparable doses. Factors that influence the choice of medication include past history of response, depression subtype, risk of suicide, concurrent medication and diseases, adverse events profile, cost and so on. After 1-2 weeks of antidepressant treatment, physical responses could be observed. Patients will have improved appetite and sleep. In week 3-4, improvement in energy and cognition could be found as well. However, emotional responses usually become apparent only after 4 weeks or more. The NICE guideline suggests medication should be continued for at

least 6 months after remission of an episode of depression as this greatly reduces the risk of relapse. The need for continued medication beyond 6 months after remission depends on the number of previous episodes of depression, presence of residual symptoms and concurrent physical health problems and psychosocial difficulties

Abrupt discontinuation of antidepressants may lead to withdrawal symptoms, therefore the dose of should be gradually reduced, normally over a 4-week period, although some people may require longer periods, particularly with drugs with a shorter half-life (such as paroxetine and venlafaxine). Gradual withdrawal is not required for fluoxetine because of its long half-life.

1. Selective serotonin reuptake inhibitors

Selective serotonin reuptake inhibitors (SSRIs) are the first line medications for depression management as they are equally effective as other antidepressants and have a favourable risk-benefit ratio. As named, SSRIs can selectively block the reuptake of serotonin (5HT) into the pre-synaptic terminal, thus increasing its concentration in the synaptic cleft and potentiating its effect.

It is important to note that SSRIs are associated with an increased risk of bleeding, especially in older people or in people taking other drugs that have the potential to damage the gastrointestinal mucosa or interfere with clotting. A gastro-protective drug in older people who are also taking non-steroidal anti-inflammatory drugs (NSAIDs) or aspirin should be considered.

As suggested by the NICE guideline, when prescribing drugs other than SSRIs, take the following into account:

- The increased likelihood of the person stopping treatment because of side effects (and the consequent need to increase the dose gradually) with venlafaxine, duloxetine and tricyclic antidepressants (TCAs).
- The specific cautions, contraindications and monitoring requirements for some drugs. For example:
 - the potential for higher doses of venlafaxine to exacerbate cardiac arrhythmias and the need to monitor the person's blood pressure
 - the possible exacerbation of hypertension with venlafaxine and duloxetine

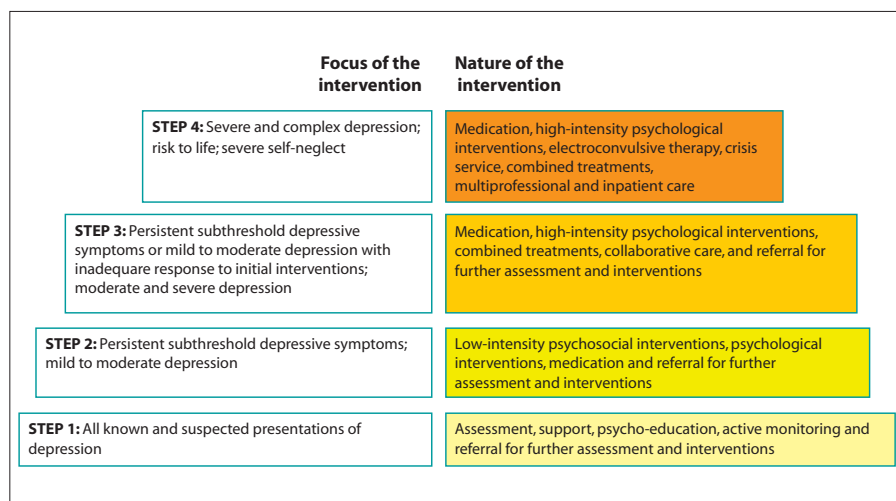


Figure 2. The NICE-stepped care model for depression. (Adapted from the National Clinical Practice Guideline 90. 2009).

- the potential for postural hypotension and arrhythmias with TCAs
 - the need for haematological monitoring with mianserin in elderly people.
- Non-reversible monoamine oxidase inhibitors (MAOIs), such as phenelzine, should normally be prescribed only by specialist mental health professionals.
 - Dosulepin should not be prescribed.

2. Atypical antidepressants

Venlafaxine and duloxetine are two commonly used atypical antidepressants, which can inhibit both 5-HT and norepinephrine (NE) reuptake. Duloxetine is more potent than venlafaxine. They have similar side effect profiles as SSRIs but the intensity is usually higher as NE reuptake is also inhibited. The GI side effects are especially prominent. It should be noted that significant elevation in diastolic blood pressure is observed when the dose of venlafaxine is higher than 300mg per day. Current guidelines suggest extended release venlafaxine as the second line treatment after the failure of one or more SSRIs.

Other examples of atypical antidepressants include trazodone, bupropion and mirtazepine. They have different mechanisms of action, all of them can increase the activity at 5HT receptors.

3. Tricyclic antidepressants

Tricyclic antidepressants (TCAs) are relatively old antidepressants which were first discovered in early 1950s.⁽¹⁰⁾ They are being replaced by SSRIs because they have more side effects and greater risk in overdose, with the exception of lofepramine only. People who start on low-dose TCAs and who have a clear clinical response can be maintained on that dose but must be carefully monitored. Commonly seen side effects include dry mouth, constipation, sedation, orthostatic hypotension and so on.

4. Monoamine oxidase inhibitors

Monoamine oxidase inhibitors (MAOIs) are seldom used in depression treatment nowadays due to its extensive side effects and drug-drug and drug-food interaction. Patients on MAOIs must be reminded not to take any fermented or tyramine rich foods and beverages such as cheeses, smoked fish and alcohol. They must

also tell the physician that they are taking MAOIs whenever they consult a new physician.

Non pharmacological intervention

1. Cognitive behavioral therapy

The most-studied form of psychotherapy for depression is cognitive behavioral therapy (CBT), which is thought to work by teaching clients to challenge self-defeating, but enduring, ways of thinking. Research beginning in the mid-1990s suggested that CBT could perform as well or better than antidepressants in patients with moderate to severe depression.^(11,12)

Combining fluoxetine with CBT appeared to bring no additional benefit,^(13,14) or, at the most, only marginal benefit.⁽¹⁵⁾ Several variables predict success for CBT in adolescents: higher levels of rational thoughts, less hopelessness, fewer negative thoughts, and fewer cognitive distortions.⁽¹⁶⁾ CBT is particularly beneficial in preventing relapse.⁽¹⁷⁾

2. Electroconvulsive therapy

Electroconvulsive therapy (ECT) is considered for major depressive episode with severe symptoms and functional impairment, psychotic symptoms or catatonia, or there is an urgent need for response such as significant suicidal ideation.

LOCAL HELP SUPPORT

1. Department of Health

Public education on mental health plays an important part in the prevention of depression. Therefore, Department of Health has tried to help the general public recognize the causes and symptoms of mental illness, educate them about the importance of early treatment to prevent the onset of residual disability, and to inform them of the available treatment and rehabilitation services. Current publicity and educational programs on mental health and depression include:⁽⁸⁾

- The Mental Health Month, which is an annual territory-wide publicity campaign comprising seminars, workshops, exhibitions and road shows on mental health.
- The Elderly Suicide Prevention Program, which is aimed at raising

public awareness of the problems of depression and suicide among the elderly and encouraging early treatment.

- Mental health education for the elderly provided through the Elderly Health Centres and Visiting Health Teams.
- Outreach Adolescent Health Program for promoting, among other things, psychosocial health among secondary school students.
- Educational activities in Maternal and Child Health Centers for the prevention of postnatal depression.
- Provision of mental health education material through various publications (e.g. leaflets, resource handbooks and video CDs); multi-media channels (e.g. newspaper columns, special segments on television and radio programs and Announcements in the Public Interest); talks and seminars; web pages; telephone hotlines; exhibitions and road shows.

2. The Hong Kong Jockey Club - Centre for Suicide Research and Prevention

Centre for Suicide Research and Prevention, receiving support from the University of Hong Kong, the Health, Welfare and Food Bureau, the Samaritan Befrienders Hong Kong as well as many other local and international collaborators, generates and advances knowledge in suicide studies through vigorous scientific research, it will also develop effective suicide preventive measures by public health approach and build evidence-based indigenous working models for suicide ideators, attempters, as well as survivors through practitioners-researchers collaboration.⁽¹⁸⁾

3. United Centre of Emotional Health and Positive Living

United Centre of Emotional Health and Positive Living is a division of the United Christian Medical Centre. It was set up in November, 2003, with the objective to provide mental health education and encourage positive living.⁽¹⁹⁾ It also provides a lot of information about different mental illnesses, which is available online for the general public as a self learning tool.

4. Hong Kong Mood Disorders Centre

Hong Kong Mood Disorders Centre is set up by the Chinese University of

Hong Kong. With the support of a group of healthcare professionals, it provides education, treatment and research about mental health problems. In its website, again, it provides information about different mental illnesses. It would also host different activities and provide psychotherapy at its centre.⁽²⁰⁾

CONCLUSION

Depression is an under-diagnosed and undertreated mental illness in Hong Kong. Better utilization of antidepressants and psychotherapy is needed in order to remedy the current situation. Besides, there are many local organizations that offer help for the depressed patients as well as their family. It is hoped that with collaborative support from healthcare professionals and society, patients' quality of life can be improved.

Author's background

LAW, Sin Yan Anne was graduated from the school of Pharmacy of The Chinese University of Hong Kong. She is currently a pharmacy intern working in Queen Elizabeth Hospital. Her corresponding e-mail address is annelaw0517@hotmail.com.

References

1. Facts and statistics 2009. Satellite Corporation. Available at: http://www.depressionperception.com/depression/depression_facts_and_statistics.asp#depressive. Accessed May 14, 2010.
2. Mental Health: New Understanding, New Hope. World Health Report 2001. Available at: http://www.who.int/whr/2001/en/whr01_en.pdf. Accessed May 14, 2010.
3. Diagnostic and Statistical Manual of Mental Disorders, 4th ed, TR. Psychiatryonline. Available at: <http://www.psychiatryonline.com/content.aspx?aID=2016>. Accessed May 14, 2010.
4. Statistics. Centre for Suicide Research and Prevention. Available at: <http://csrcp.hku.hk/WEB/eng/statistics.asp?id=205>. Accessed May 14, 2010.
5. Chi I, Yip PSF, Chiu HFK, et al. (2005). Prevalence of depression and its correlates in Hong Kong's Chinese older adults. *Am J Geriatr Psychiatry*;13(5):409-416.
6. Relationship with Suicide. Little Prince is depressed. Available at: http://www.depression.edu.hk/en/content/p2_6.php. Accessed May 14, 2010.
7. Schulberg H, Block MR, Madonia MJ, et al. (1996). Treating major depression in primary care practice: Eight month outcome. *Archives of General Psychiatry*, 53:913-920.
8. LCQ17: Prevention of depression. Press Release. 2005. Available at: <http://www.info.gov.hk/gia/general/200506/01/06010159.htm>. Accessed May 14, 2010.
9. Anderson I, Pilling S, Barnes A, et al. Depression in Adults (update). *National Clinical Practice Guideline 90*. 2009. Available at: <http://www.nice.org.uk/nicemedia/live/12329/45896/45896.pdf>. Accessed May 14, 2010.
10. Owens DGC. A Guide to the Extrapyramidal Side-Effects of Antipsychotic Drugs. Cambridge University Press. Available at: http://assets.cambridge.org/97805216/33536/excerpt/9780521633536_excerpt.pdf. Accessed May 23, 2010.
11. Dobson KS (1989). A meta-analysis of the efficacy of cognitive therapy for depression. *J Consult Clin Psychol*, 57(3):414-419.
12. Anonymous. (2005). What Works for Whom? Second Edition: A Critical Review of Psychotherapy Research. *Guilford Press*.
13. Goodyer I, Dubicka B, Wilkinson P (2007). Selective serotonin reuptake inhibitors (SSRIs) and routine specialist care with and without cognitive behaviour therapy in adolescents with major depression: Randomised controlled trial. *BMJ*, 335(7611):142.
14. Goodyer IM, Dubicka B, Wilkinson P (2008). A randomised controlled trial of cognitive behaviour therapy in adolescents with major depression treated by selective serotonin reuptake inhibitors. The ADAPT trial. *Health Technology Assessment*, 12(14):1-80.
15. Domino ME, Burns BJ, Silva SG (2008). Cost-effectiveness of treatments for adolescent depression: Results from TADS. *American Journal of Psychiatry*, 165(5):588-596.
16. Anonymous (2008). Cognitive-Behavioral Therapy for Adolescent Depression: Processes of Cognitive Change. *Psychiatric Times*, 25(14).
17. Paykel ES (2007). Cognitive therapy in relapse prevention in depression. *The international journal of neuropsychopharmacology*, 10(1): 131-136.
18. About Us. Centre for Suicide Research and Prevention. 2004. Available at: <http://csrcp.hku.hk/WEB/eng/pageHandler.asp?id=1>. Accessed May 30, 2010.
19. Background [背景]. United Centre of Emotional Health and Positive Living. 2004. Available at: http://www.ucep.org.hk/We_are/We_are.asp. Accessed May 30, 2010.
20. We are... [我們是...]. Hong Kong Mood Disorders Centre. Available at: <http://www.hmdc.med.cuhk.edu.hk/main.html>. Accessed May 30, 2010.

Answer to Question of An Article Entitled (Vol.17 No.2 - 2 CE Units)

Probiotics and Necrotizing Enterocolitis

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
b	d	b	te	d	e	e	c	d	c

A 2D Barcode Electronic Monitoring Dosage System (eMDS) for the prevention of Medication Administration Errors in Nursing Homes

YUNG, Anna Wai-Lan^{1*}; LEUNG, Andrew Yee-Tak²

¹ Social Enterprise Limited (Charity IR88), Hong Kong

² Department of Building & Construction, City University of Hong Kong, 83 Tat Chee Ave., Hong Kong.

ABSTRACT

A 2D barcode Electronic Monitoring Dosage System (eMDS) to identify and match residents with respective medicines during administration in nursing homes has been developed. It could be operated via an iPhone which transmits data to server in batch or real time through secured intranet. The system can monitor whether “the right drugs are delivered to the right person at the right time in the right amount.” The eMDS includes a 7-day pre-packed drug tray with 7x4 =28 pockets, a daily-log and an inventory system with three levels of security in the order of administrators, professionals and health workers to provide audit trails, clinical checks and medicine use review. Both the installation cost and consumable cost are low. Furthermore, this medicine management tool can be easily implemented to wider community long-term care facilities with the aim to reduce medicine wastage, prevent unnecessary hospital admissions and save lives.

Keywords: barcode; electronic monitoring dosage system; drug safety; mobile phone; real time drug monitoring

INTRODUCTION

In 2006, Hong Kong had more than 850,000 people over 65 years old, i.e. approximately one eighth of its population.⁽¹⁾ Among them, 72,518 (8.5%) were in nursing homes while 23,446 were on waiting list.⁽²⁾ Furthermore, as people are expected to be living longer, the projected ratio of the elderly will increase to 1 in 4 of the Hong Kong population by 2033.⁽³⁾ As a consequence, there is a continuous huge demand for community-based nursing

home services. Medication use is high in the nursing home setting. The average nursing home resident uses 6 different medications and more than 20% use 10 or more different drugs. The number of medicine that a resident receives greatly increases the opportunities for a medication error. The medication administration process is complex and it includes the nurse reviewing the medication administration record (MAR), verifying resident identity, followed by the medication, administering the drug, and documenting the event. The 5 rights of medication verification include right drug, right time, right patient, right dose, and right route. These are all potential areas of medication administration errors. Medication administration error remains a safety concern for health care professionals in nursing homes. The pressing need is to design an error proof medication delivery system to cope with checking the 5 rights. This communication is to report on a “2D barcode electronic monitoring dosage system (eMDS)” as a solution to the medication safety issue in nursing homes. It is a secured one-stop timely medication delivery system to provide for audit-trail, accurate inventory and real-time update of changes in a paperless fashion.

AIM AND OBJECTIVES

The goal of this design is to deliver the right drugs to the right person at the right time with the provision of audit trails, clinical checks and medicine use review to reduce medicine cost, prevent avoidable hospitalization and save lives.

The objectives of this design include: (1) Promote the use of good practices for medication delivery by health workers; (2) Promote a culture of professionalism across all levels of health workers,

and arouse organizational awareness of medication safety gaps; (3) Provide safety nets and quality assurance to medication delivery processes; (4) Improve work efficiency and reduce medical errors; (5) Provide peace of mind and therefore better mental health-being and quality of life for nursing home residents and their families.

MATERIALS AND METHODS

The facilities being used are listed below:

a. **An eMDS IT system includes the following components:**

- A 7-day pre-packed drug box (please refer to Figure 1 and 2) in two parts: an external reusable case and an internal 7x4 pocket transparent PET tray. Each pocket is 2D-barcode tagged with information for drug generic name/description/batch/expiry/patient name/dosage form/delivery time, as explained in Figure 3;
- An unobtrusive mobile-phone based device with internal clock as illustrated in Figure 4;
- Human identification: 2D barcode/Identity card/time checked;
- Drugs assured: dosage/imaging to confirm the right pills;
- Drug interaction and allergy alert;
- Strong data encryption for ensuring privacy;
- Interface program with existing systems (no re-keying of data is necessary);
- Alarms and alerts to avoid mistakes;
- Voice and visual feedback to assure good practice;
- Batch synchronization database updates and/or real-time updates for audit-trails;
- 3-level security with identification/passwords: administrators, supervisors and front-line health workers;
- An electronic scale as an additional quantity check before and after drug administration.

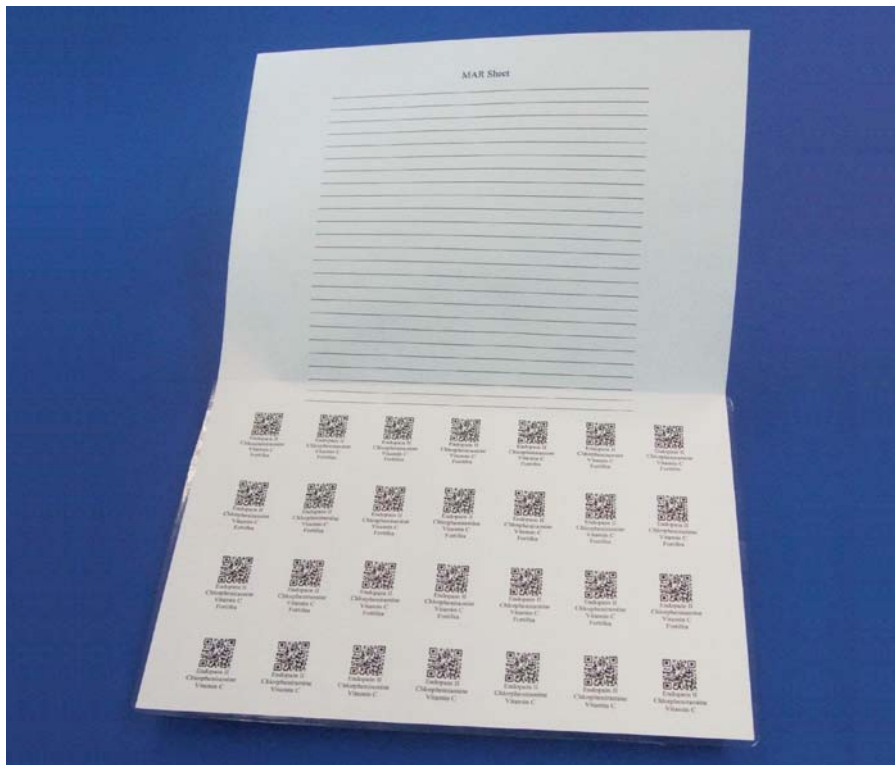


Figure 1. 2D barcode printed on sealing sheet.



Figure 2. The transparent back view of the drug tray is for easy visual identification of drugs.

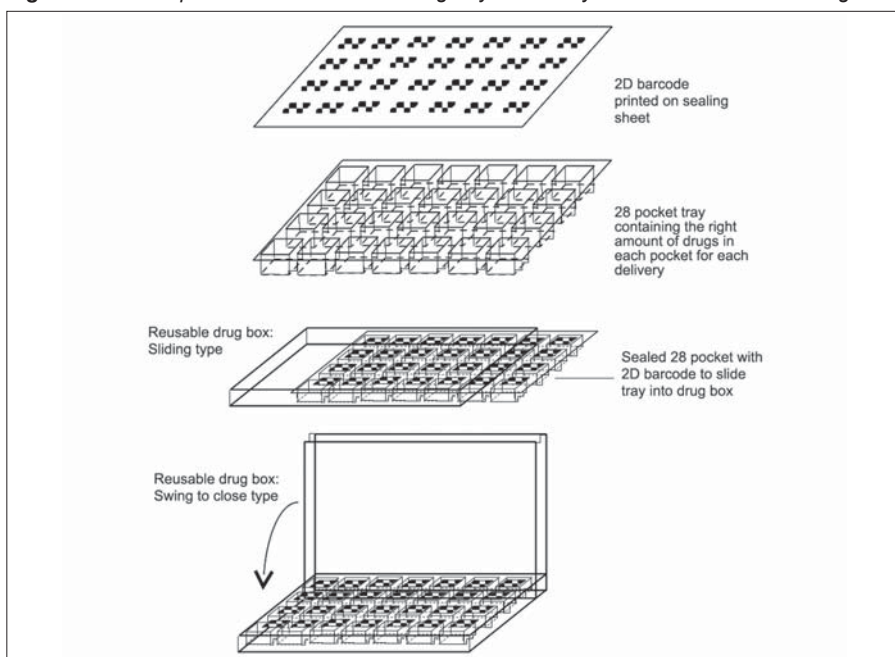


Figure 3. Drug tray and box designs.

- b. A training package for front-line health professionals and workers.
 - c. An inventory system and its data exchange programs for compatibility with different existing databases.
 - d. Clinical checking tool for pharmacists to:
 - Reconcile drugs from various clinics and ensure the appropriateness of the drug regimen before generation of medication administration record (MAR) for the residents;
 - Specify individualized pharmaceutical care plans with monitoring targets;
 - Conduct annual medication use review (MUR) for each resident.
- The system architecture of the whole 2D eMDS is summarized in Figure 5.



Figure 4. WiFi Mobile scanning device.

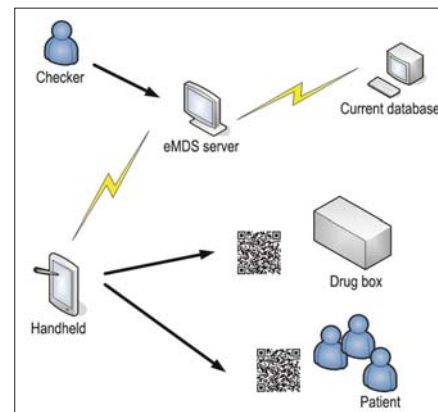


Figure 5. System architecture of the 2D eMDS.

THE STAGES OF IMPLEMENTATION

A step-wise four-phase approach of implementation is designed for each new nursing home participant:

1. Learning and development stage;
2. Drug delivery by health workers stage;
3. Pre-packing of medication by health professionals stage; and
4. Enhancement of 2D-eMDS to suit each nursing home setting.

The implementation is aimed at minimum disturbance of the pre-existing IT system of nursing homes.

1. Learning and development phase

Required educational reviews of the medication administration process are conducted before and after the implementation of 2D eMDS for each new participating nursing home to reinforce the importance of adherence to the system.

The current practices and procedures of drug administration of a participant nursing home is recognized and discussed with all the stakeholders in this initial phase. It is important to diagnose the limitations of the eMDS system and to manage the problem and expectation well on the drawing board before initiation of the eMDS in any nursing home. Tablets and capsules are to be packed into eMDS in the first phase, leaving powder and liquid to be unit-dose managed in a later stage. The system is designed to accurately confirm the 5 rights of medication management including patient identification, medication, dose, time and route of administration. The appropriate 2D barcode is printed on each of the 28 pockets of the PET tray, carrying the generic drug name, dosage form, description of the drug, lot and batch number, expiry date, patient identification and drug delivery time etc. In addition, potential drug interactions and allergy history of each resident are incorporated to alert health workers during drug administration. A handheld device is developed on the Android/iPhone Operating System. This system can be run online or offline to suit the particular nursing home setting. The applications are designed with a simple user interface to avoid time-consuming data entry. The operation processes are user-friendly, which are single button clicks on touch screens. During the drug administration round, the health worker will first log onto the 2D eMDS system. The Android mobile phone is programmed to scan the 2D barcode for verification. Once scanned, the device will alert the health worker with one of the three modes as desired: audio response (such as native speech voice or machine beep tones), visual response (such as green or red lights, photos or images), or the vibratory response. On completion, the data is transmitted to the server as batch or real time data.

2. The training packages are

simultaneously provided to the staff on the features of the eMDS system. The staff will learn about the flow chart of authentication using the Android Mobile Phone, to ensure the delivery of the right drugs to the right persons at the right time. The administration time will be matched by the internal clock of the Mobile Phone automatically. The drug tray will be weighed before and after drug administration as an additional check and the readings will be recorded automatically in daily log. If discrepancy arises, rectification is required from the health team; otherwise the supervisors will be alerted if no action is taken within an agreed time frame. Audits of 2D eMDS log data would identify human and procedural factors contributing to medication administration error.

3. Pre-packing of the eMDS drug trays are done on site once the health workers are trained and become competent with the system. This is the preferred delivery system of medicine management compared to the current practice of loose daily dispensing with the following advantages:
 - Ensure correct dosage frequency;
 - Monitor timely medication administration and compliance;
 - Avoid mixing of medication out of carelessness or accident; and
 - Identify human behavior involved in the incidence of medication errors.

POTENTIAL BENEFITS

Human nature is afraid of change. However, when professional knowledge applies successfully and combines smoothly with technologies, huge benefits are realized which include the following:

1. Save time in signature signing (7x4x3=84 signatures per resident per week replaced by clicks on touch screen of Android mobile phone);
2. Save time on re-keying data by using interface software;
3. Match resident to medicine using 2D barcode verification before administration. This prevents medication administration errors;
4. Provide three level security and warning for safeguarding;
5. Identify medication management risks to reduce preventable patient harm;
6. Reconcile drugs by real time logging;
7. Provide automatic audit trails;

8. Pre-packed drug trays pave the way for future robot dispensing;
9. Clinical checks in place to reduce medicine wastage and prevent unnecessary hospital admissions;
10. Provide peace of mind for all stakeholders
11. Avoid resources taken away from nursing professionals and easy management for clerical regulatory compliance procedures such as record-keeping and reporting.

CONCLUSION

In conclusion, the 2D eMDS draws on up-to-date human engineering, logistics and IT technologies to enhance current operation practice in medicine management for the nursing homes. From the audits of log data, human and procedural factors contributing to noncompliance are identified. Additional categories of medication administration error are captured through analysis. Examples are dose omitted, wrong rate, and expired dose given. This revelation provides new insight to widen the scope of medication administration error beyond the 5 rights since it incorporates human factors which represent root causes for medication administration error. Furthermore, the system provides the focus necessary for in-depth investigations, discussions, problem identification and solution development. It also brings up opportunity to inspire more cooperation.

Author's background

YUNG Anna is a clinical pharmacist of UK and HK since 1983. She was awarded a B.Pharm. (Hons) from the School of Pharmacy of London University in 1982, an MSc Immunology and Immunogenetics from the Department of Biochemistry of Manchester University in 1999, a PhD in Rational Drug Design from the department of Molecular Biology of University of Leeds in 2004 and a PG. Diploma in End-of-Life Care from the Chinese University of Hong Kong in 2010. **LEUNG Andrew** is Chair Professor of Building and Construction at City University of Hong Kong. He is the President of the Asian Institute of Intelligent Buildings, Vice-Chairman of the China Green Building (HK) Council and Honorary President of Kowloon Federation of Associations. For more information about this article, please contact Anna Yung through the following email address: awlyung@googlemail.com.

References

1. Census and Statistics Department, 22/02/2007.
2. Social Welfare Department, 11/03/2008.
3. Food and Health Bureau, 03/2008.

Macroscopic and Microscopic Identification of the Two Species of *Atractylodes*

LAM Li-Wing¹; ZHANG Zhifeng^{1,2}; CHEUNG Hon-Yeung¹

¹ Research Group for Bioactive Products, Department of Chemistry and Biology, City University of Hong Kong, 83 Tat Chee Ave., Hong Kong SAR, China.

² Ethnic Pharmaceutical Institute of Southwest University for Nationalities, Chengdu 610041, Sichuan, China.

ABSTRACT

Atractylodes Rhizoma, also known as Cangzhu (蒼朮), is a traditional Chinese medicinal herb. It has been used for the treatment of abdominal distention, diarrhea and edema. This herb, however, has two species; namely *Atractylodes lancea* (Thunb) DC (茅蒼朮) and *Atractylodes chinensis* Koidz (北蒼朮). Both species look alike and are not easily distinguishable by most people based on their appearance. To distinguish the two species and ensure their safety and efficacy, microscopic characteristics of rhizomes, including transverse sections, as well as the crude drug powder, were examined. The fixed, sectioned, and stained plant materials, as well as the crude powder, were studied using a light microscope according to the usual microscopic techniques. The results of the microscopic features were systematically and comparatively described and illustrated. The two species have distinct microscopic characteristic differences, thus allowing us to distinguish between the species. Also, semi-quantitative and quantitative micrographic parameter tables were simultaneously presented. Further, a key to the two species and a comparative chart of the key authentication parameters based on these macroscopic and anatomic characteristics was drawn up and is presented for the *Atractylodes* species studied. The study indicated that light microscopy and related techniques provide a method that is convenient, feasible, and can be unambiguously applied to the authentication of species of *Atractylodes*.

Keywords: macroscopic features; microscopic identification; *Atractylodes Rhizoma*; *Atractylodes lancea* (Thunb) DC; *Atractylodes chinensis* Koidz

INTRODUCTION

Atractylodes Rhizoma, also well known as Cangzhu (蒼朮) in traditional

Chinese medicine (TCM), is widely distributed in eastern Asia. Cangzhu was firstly documented as Zhu in "Shen Long Ben Cao Jing" in about 1 A.D. and was classified in the upper class. It indicated Cangzhu is harmless, effective and able to be used long-term.^(1,2) It is used to treat many diseases including oedema and stomach ulcers, and to prevent degeneration of vision. Besides the general therapeutic effects, Cangzhu can be used as a natural air-purifier. The volatile oil extracted from Cangzhu is usually used as anti-bacterial agent. In the Chinese Pharmacopoeia (The State Pharmacopoeia Committee of China 2010, two species are recorded, namely *Atractylodes lancea* (Thunb.) DC and *Atractylodes chinensis* Koidz.⁽³⁾ *Atractylodes lancea* was known as Maocangzhu or Nancangzhu in traditional Chinese medicine, and was mainly grown or cultivated in JiangNan areas, such as province of Jiangsu and Zhejiang. On the other hand, *Atractylodes chinensis*, also known as Beicangzhu in traditional Chinese medicine, was distributed in Northern and North-eastern China, in Provinces such as Hebei, Liaoning and Neimeng. Although their growing areas are different, their morphological characters are similar. Therefore, it is difficult to distinguish them by their appearance.

In recent years, many studies of the chemical and pharmacological activities of Maocangzhu and Beicangzhu have been reported, however, the two species have distinctly different chemical composition and pharmacological activities. It was reported that the content of volatile oil of Maocangzhu was more than five times that of Beicangzhu and anti-tumor angiogenesis, against cox-1, was reported in Maocangzhu.^(4,5) However, no activities are reported for Beicangzhu.⁽⁶⁻⁸⁾

Recently as the Chinese Materia Medica (CMM) and Chinese patent medicine (CPM) has become more widely used all over the world, some problems have emerged, for example, how to certify that a crude drug was correctly labeled. At the same time, an issue connected to the

growing concern about the authenticity of TTM and CMM so as to ensure their safety and efficacy. To be sure, the identification of these two species is often difficult due to their generally similar morphology. Fortunately, microscopic authentication, frequently reported in the literature,⁽⁹⁻¹¹⁾ offers an easy, economical, and objective method for solving this problem.

For the sake of safety, efficacy, and quality control, it is necessary to develop an efficient way to identify the two species of *Atractylodes*. In this study, a systematic and detailed microscopic method is presented for the authentication of the two species.

MATERIALS AND METHODS

Materials

Maocangzhu and Beicangzhu samples have been collected from mainland of China. The locality and date of collection of the two species are summarized in Table 1. The two species collected were dried under the sun and identified by Prof. Wang Wenquan (School of Pharmacy, Beijing University of Chinese University, Beijing, People's Republic of China). Voucher specimens were deposited in the City University of Hong Kong.

Apparatus

Transverse sections of the samples were prepared with a Leica RM 2125 RT Rotary Microtome (Nussloch, Germany). The optical imaging equipments used included a Carl Zeiss Axioplan 2 imaging optical microscope (Carl Zeiss, Oberkochen, Germany) and a Panasonic DMC-FX580 digital camera (Panasonic, Osaka, Japan).

Reagents

Flavone acetic acid (FAA70), an ethanol series (from 50 to 100%), a xylene series (25% to 100%), dehydration and hyalinization, respectively, and safranin and fast green solutions

Table 1. The location and collection date of the *Atractylodes* samples.

Batch No.	Source	Collection date	Batch No.	Source	Collection date
BCZ-001	Kana, Neimenggu	2009.10	MCZ-001	Yingshan Hubei	2009.9
BCZ-002	Yiping, Hebei	2009.9	MCZ-002	Zhuxi, Hubei	2009.9
BCZ-003	Meixian, Shanxi	2009.10	MCZ-003	Taibai, Shanxi	2009.10
BCZ-004	Longhua, Hebei	2009.9	MCZ-004	Zhenjiang, Jiangsu	2009.9
BCZ-005	Zhenan, Shanxi	2009.11	MCZ-005	Huangshan, Anhui	2009.10
BCZ-006	Longhua, Hebei	2009.10	MCZ-006	Enshi, Hubei	2009.10
BCZ-007	Hehuachi, Chengdu	2009.10	MCZ-007	Tongbai, Henan	2009.9
BCZ-008	Bozhou, Anhui	2009.11	MCZ-008	Meixian, Shanxi	2009.11
BCZ-009	Anguo, Hebei	2009.9	MCZ-009	Emei, Sichuan	2009.11
BCZ-010	Suixian, Liaoning	2009.10	MCZ-010	Panan, Zhejiang	2009.11

were applied for specimen staining as described by Li et al.⁽¹²⁾ Chlorate hydrate and glycerol-acetic acid were prepared according to the procedures described in the Pharmacopoeia of the People's Republic of China (The State Pharmacopoeia Committee of China, 2010). Dimethylbenzene, paraffin wax, and mounting medium used in this study were all Analytical graded.

Method

The ten batches of samples for the two species were studied to reveal their morphological feature.

The dried materials were cut into appropriate sizes and the most mature region of the rhizome available was taken and fixed in FAA. Rhizome samples of the two *Atractylodes* species were passed through the gradual ethanol series to dehydrate and the gradual xylene to render the samples transparent, buried in paraffin, and sectioned on a microtome in slices 10 µm thick. Tissues were stained with the safranin and the fast green solutions, and finally mounted in Canada balsam for observation. At the same time, some sections were not stained so that idioblasts and other deposits would not be destroyed or otherwise altered during processing.

The samples of crude drug were ground to powder and passed through a 250 µm sieve. Five different slides from the same powder were observed in order to get more data. Microchemical reactions were applied with phloroglucin-hydrochloric acid to reveal lignified elements such as wood fibers and with the 25% sulphuric acid for examining calcium oxalate crystals. The ten batches of samples for the two species were studied to reveal the key authentication parameters. The values of various cells and tissues were obtained by taking at least 20 measurements (five measurements per sample) for each species. All representative microscopic features were recorded by digital color imaging system.

RESULTS

Macroscopic feature of *Atractylodes Rhizoma*

Atractylodes lancea (Thunb.) DC. (Maocangzhu) is shown in Figure 1(A), it is irregularly moniliform or nodular-cylindrical, slightly curved, occasionally branched, 2~9 cm long, 0.5~4 cm in diameter. Outer surface dark brown, marked with wrinkles, remains of rootlets and stem scars. Texture compact, fracture fibrous-like, pale yellow or off-white, scattered with numerous reddish-brown oil spots, and crystallized out as

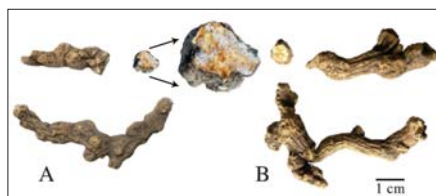


Figure 1. A photo of *Atractylodes lancea* (Thunb.) DC. (A) and *Atractylodebs chinensis* (DC.) Koidz (B)

white fine needle crystals after exposure for a time. Odour, aromatic; taste, slightly sweetish, pungent and bitter. At the same time, *Atractylodes chinensis* (DC.) Koidz. (Beicangzhu) is shown in Figure 1 (B), it is knotty-lumpy or nodular-cylindrical, slightly curved, occasionally branched. 3~12 cm long, 0.6~3 cm in diameter. Its outer surface is dark brown. Texture relatively lax, fracture fibrous-like, pale yellow or off-white, and scattered with yellowish-brown oil spots. Odour weakly aromatic; taste, pungent and bitter.

Microscopic identification of transverse sections

The microscopic identification of transverse sections of *Atractylodes* are shown in Figure 2. *Atractylodes lancea* (Thunb.) DC. (Maocangzhu) normally possesses a cork layer consisting of 10 or more rows of cork cells, containing 1-3 rows of stone cell bands. Each band is composed of a 1-3 layer of stone cells. Its cortex is relatively broad, with a few oil cavities. Phloem is narrow and the cambium is in a ring. The fibre bundles are mainly in the xylem, mostly large and usually occur as an alternate arrangement with vessels. Vessels are single or in groups, arranged radially. Oil cavities are scattered in parenchyma tissue of cortex, phloem, ray and pith, and are ellipsoid or subrounded. Parenchyma cells contain inulin and small raphides of calcium oxalate. On the other hand, *Atractylodes chinensis* (DC.)

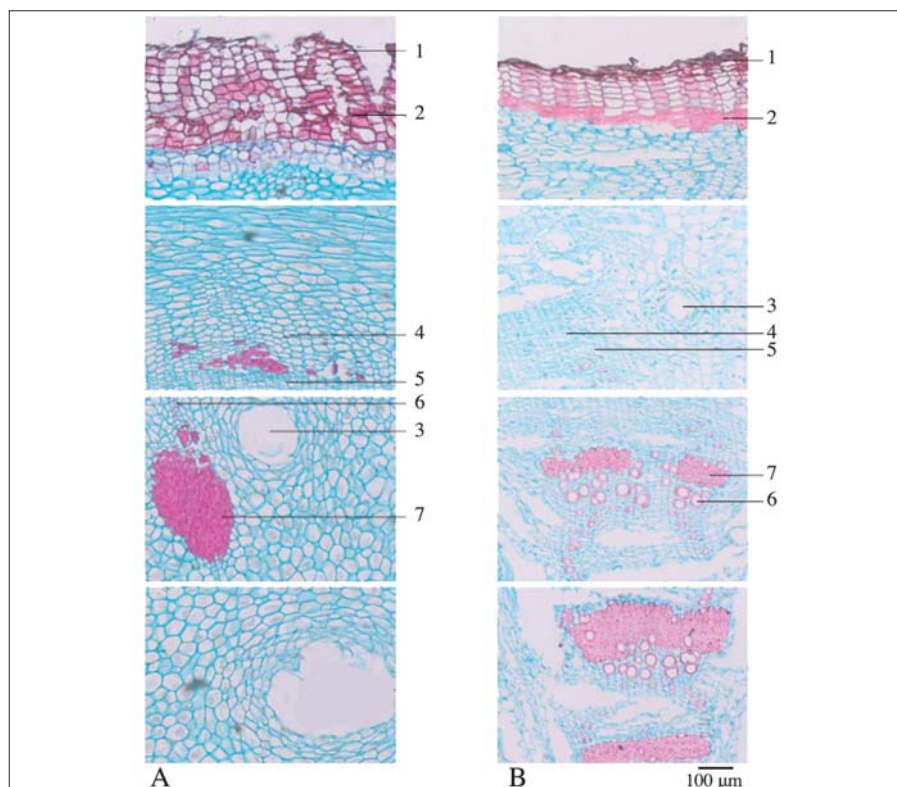


Figure 2. Microscopic features of transverse section of (A) *Atractylodebs Chinensis* (DC.) Koidz and (B) *Atractylodes lancea* (Thunb.) DC.

1. Cork
2. Stone cells band
3. Oil capacity
4. Phloem
5. Cambium
6. Vessel
7. Fibres

Koidz (Beicangzhu) is possessed of a broad cortex. Fibre bundles occur in the inner xylem, are relatively few but large, are alternately arranged with vessels, and fibres are occasionally scattered in phloem. Oil cavities are relatively few, scattered in parenchyma cells, and the oil cavities of pith are large in size.

Microscopic feature of powder

The microscopic features of powders from Maocangzhu and from Beicangzhu are extremely similar. The results are shown in Figure 3. The colour of powder from Maocangzhu and from Beicangzhu is yellow or yellowish brown. Cork cells can be observed; they are polygonal or subpolygonal in shape. Fairly abundant, singly scattered or several grouped, sometimes linking up with cork cell, lignified, polygonal subrounded or subrectangular, 17-90 μm in diameter, with heavily thickened walls. Raphides of calcium oxalate extremely abundant, minute, 4-25 μm long, irregularly filled in parenchymatous cells, often leaning to one side of a cell or scattered throughout but visible under a polarizing microscope. Fibres may be scattered

or grouped, and they are polychromatic when observed under polarized light microscope. Reticulate vessels are 17-50 μm in diameter.

DISCUSSION

The comparative macroscopic feature of the two species indicate that they are very similar in appearance, but they are different when exposed in air for some time. It can be shown clearly that in Maocangzhu some white fine needle crystals crystallize out (enlarge photo in Fig. 1A), However no such crystals can be seen in Beicangzhu.

The comparative microscopic observations of rhizoma and the crude drug powder of the two species of *Atractylodes Rhizoma* demonstrated that many of their anatomical characteristics are homologous. Accordingly, we drew up a generalized description to account for these similarities: cork consisting 10 or more cork cells, and 1-3 stone cell bands can be seen. Fibres are large and alternated with vessels, parenchyma tissue cells consist of inulin and are

filled with raphides of calcium oxalate. However, different species possess the unique microstructural characteristics. The anatomy and micromorphology of *Atractylodes Rhizoma* also reflects the high degree of diversity, which can be taken as the identifying standard of *Atractylodes* plants. Table 2 summarizes some distinguish features that can be used for distinguishing the two species. In brief, Maocangzhu possess a lot more fibers than Beicangzhu, and a distinct alternate arrangement of the vessels. Further, Maocangzhu possesses more oil ducts but the oil ducts of pith in Beicangzhu are larger in size.

Through the comparative study of the macroscopic feature and micromorphology of the two species, we hope to have furthered the study of the relationship between anatomical structure and physiological function and as well to have laid the foundation for an accurate evaluation of different sources of *Atractylodes Rhizoma* so as to ensure their safety and efficacy.

Author's background

Both **Dr. ZHANG Zhi-feng** and **Mr. LAM Li-Wing** are currently working as research supporting staffs in City University of Hong Kong. They have solid trainings in biological sciences. **Dr. CHEUNG Hon-Yeung** is the corresponding author. He is an Associate Professor of Pharmaceutical Microbiology & Biotechnology in CityU. His email address: bhonyun@cityu.edu.hk

References

1. The State Pharmacopoeia Commission of the P. R. China (2010). *Pharmacopoeia of People's Republic of China*, Vol. 1, China Medical Science and Technology Press, Beijing, p150.
2. Xiao Peigen (2002). *Modern China Material Medica*, Vol. 1, Chemical Industry Press, Beijing, pp501-502.
3. Jiangsu New Medical College (2001). *Encyclopedia of Chinese Materia Medica*, Vol 1, Shanghai Scientific and Technical Press, pp1066-1067.
4. 潘雪英 (PAN Xue-ying) (2008). 野生茅苍朮挥发油成分分析. *中国药房*, 19(30): 2380-2381.
5. 汪六英, 段金殿, 钱士辉, 宿树兰 (2007). 茅苍朮化学成分的研究. *中草药*, 38(4):499-500
6. 肖耀军 (2006). 茅苍朮与北苍朮的鉴别. *首都医药*, 13(16):50.
7. 段国峰, 欧阳臻, 樊一桥等 (2008). 茅苍朮多糖防治小鼠高血糖的实验研究. *中华中医药学刊*, 26(6):1211-1212.
8. 邵敬伟, 吴志香, 白锴凯, 董海燕, 郭养浩 (2006). 茅苍朮提取物诱导HepG2细胞凋亡的研究. *辽宁中医药大学学报*, 8(6):153-155.
9. Zhao ZZ, Kazami T, Suzuki R, Shimomura H (1998). Identification of traditional Chinese patent medicines by polariscope. III. Polariscopic characteristics of Zhibao Sanbian Wan. *Nature Medicine*, 6:485-489.
10. Zhao ZZ, Hu YN, Wong YW, Wong WCG, Wu K, Jiang ZH, Kang TG (2005). Application of microscopy in authentication of Chinese patent medicine-Bo Ying compound. *Microscopic Research Techniques*, 67:305-311.
11. Zhao ZZ, Hu YN, Liang ZT, Yuen JPS, Jiang ZH, Leung KSY (2006). Authentication is fundamental for standardization of Chinese Medicines. *Planta Medica*, 72:865-874.
12. Li J, Yi T, Lai HS, Xue D, Jiang H, Peng HC, Zhang H (2008). Application of microscopy in authentication of traditional Tibetan medicinal plant *Halenia elliptica*. *Microscopy Research and Techniques*, 71:11-19.

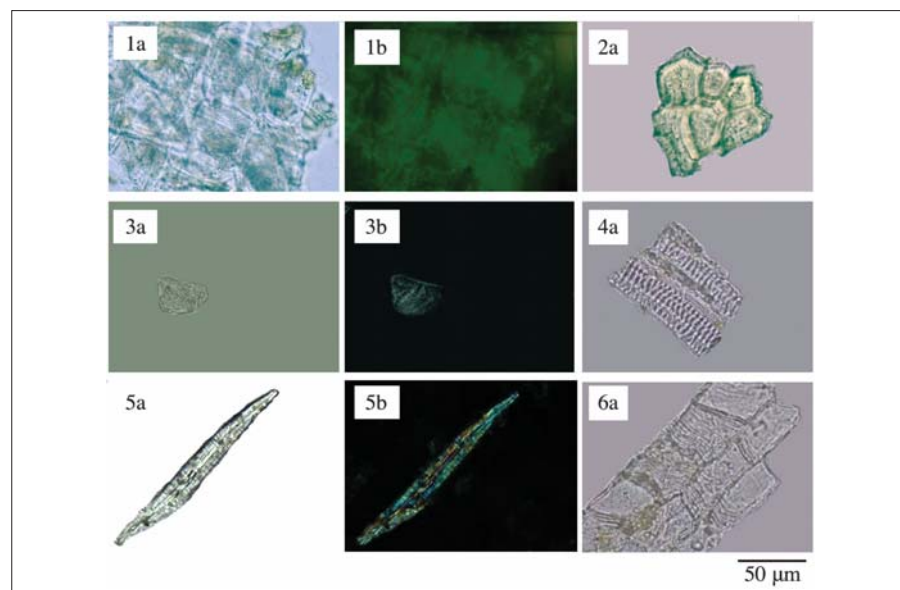


Figure 3. Microscopic features of powder of *Atractylodes Rhizoma*

1. Raphides of calcium oxalate 2. Stone cells 3. Inulin 4. Vessels 5. Fibres 6. Cork cells
a = Features under a light microscope b = Features under a polarizing microscope

Key Parameters		Maocangzhu	Beicangzhu
Macroscopic Identification	shape	irregularly moniliform or nodular-cylindrical	knotty-lumpy or nodular-cylindrical
	crystallized out	white fine needle crystals	no
	fracture	compact	relatively lax
	odour	aromatic	weakly aromatic
	taste	slightly sweetish, pungent and bitter	pungent and bitter
Microscopic Identification	Cortex	Relatively broad.	Broad, oil cavities relatively few, mostly subrounded.
	Oil cavities	Scattered in parenchyma tissue of cortex, phloem, ray and pith, ellipsoid or subrounded.	Relatively few, scattered in parenchyma cells
	Fibres bundles	Existing in xylem, large and mostly, alternate arrangement with vessels.	Relatively less, existing in the inner of xylem, showing alternate arrangement with vessels.
	Pith	parenchyma	Oil cavities large in size, scattered.

Message from Chairlady – Ms Iris Chang

On behalf of the Hong Kong Pharmacy Conference Organizing Committee, it is my pleasure to welcome you to join the Hong Kong Pharmacy Conference 2011 to be held on 26-27 Feb 2011. This event is jointly organized by The Pharmaceutical Society of Hong Kong, The Practising Pharmacists Association of Hong Kong, The Society of Hospital Pharmacists of Hong Kong, School of Pharmacy of the Chinese University of Hong Kong, Department of Health and Hospital Authority.

The year 2011 marks the beginning of the next Ten Golden Years for Pharmacy. As the world will be facing some of the greatest challenges of all time with an aging population, rising health care costs, and greater expectations from the public to ensure for higher levels of drug and patient safety, the new age pharmacist will need to be equipped with new knowledge and skills to meet the changing needs of our modern society. The next ten years will be filled with challenging but exciting opportunities for pharmacists to take on

new and important roles to better serve the people of Hong Kong.

Don't miss the opportunity to be part of our conference event to keep abreast of the latest developments in the changing world of pharmacy and join us in the celebrations of this year's conference theme "Against the Breaking Wave".

Yours faithfully,
Iris Chang
Chairperson

Against the Breaking Wave 同舟共濟 乘風破浪

2011 Hong Kong Pharmacy Conference

Date: 26th – 27th February, 2010

Venue: Hong Kong Convention and Exhibition Center

Programme:

Day 1 (26th February, 2010)

Time	Topics
1:30pm	Registration
2:30pm - 2:40pm	Opening ceremony
2:40pm - 2:50pm	Welcome speech by the Chairlady
2:50pm - 3:00pm	Opening Remarks
3:00pm - 3:40pm	Theme 1: To be confirmed
3:40pm - 4:10pm	Break, poster and exhibition
4:10pm - 4:50pm	Theme 2: In Search of the Next Ketamine - Emerging Drug of Abuse by Dr. Man Li TSE, Consultant, Hong Kong Poison Information Centre
4:50pm - 5:30pm	Theme 3: Poison Treatment Centre - Roles and Perspectives by delegate from Poison Treatment Center
6:00pm - 6:45pm	Pre-Conference Dinner Symposium
7:00pm - 10:00pm	Conference Dinner

Day 2 (27th February, 2010)

Concurrent Session I	II	III	
Topics	Information Technology	Education	Clinical
8:30am - 9:10am	e-Health Records: What Pharmacists are Doing to Make this Happen? by Ms. SC CHIANG	360 Degree Communication with Patients by Mr. YW SO & Mr. Donald CHONG	Clinical Research Ethics Application & Informed Patient Consent Approval by Prof. Benny ZEE, CUHK-NTEC CREC Chairman
9:10am - 9:50am	Pharmacy Informatics & Clinical Intelligence - the Development in China	Law Update	Provision of Visiting Pharmacist Service for Residential Care Home for the Elderly by Mr. Billy CHUNG
9:50am - 10:10am	Coffee Break - Poster & Exhibition		
10:10am - 10:50am	Medication Error Reduction – The New Era with the Smart Pump (speaker to-be-confirmed)	Update on the Chinese Medicine Ordinance by Mr. Frank CHAN, Senior Pharmacist (TCM), Chinese Medicine Division, Department of Health.	Role of Clinical Pharmacist in Cardiology and Nephrology Teams by Yang Min & Lao Hai Yan, Guangdong General Hospital
10:50am - 11:30am	Drug Intelligence at your Fingertips – Which finger and What Tips? by Mr. Man Keung NG, Mr. Johnny WONG and Mr. Kenneth CHUNG	Pharmacy curriculum: China Vs HK by Ms. Xiaoli DU & Dr. Susan HO	TCM toxicology (speaker to-be-confirmed)
11:30am - 12:30pm	Lunch Symposium		
12:30pm - 2:00pm	Lunch - Poster & Exhibition		
2:00pm - 2:40pm	Hospital Accreditation - Inside-out by Mr. Kim Wah NG	To be confirmed	Paediatric Nutrition (speaker to-be-confirmed)
2:40pm - 3:20pm	Hospital Accreditation - Outside-in by Mr. Michael LING	a. 大型社会活动中药学服务的筹备 b. 自然灾害与急救药学的發展 (speaker to-be-confirmed)	The Role of Clinical Pharmacist in Paediatric ICU by Ms. Amanda LI
3:20pm - 4:00pm	LEAN management (speaker to-be-confirmed)	Student Debate	Clinical Pharmacy Service in Outpatient Oncology by Dr. Keary ZHOU
4:00pm - 4:40pm	Drug information: What do Hong Kong People want to know? by Dr. Celeste EWIG		Clinical Update on Chronic Myeloid Leukemia by Dr. Raymond WONG

HONG KONG PHARMACY CONFERENCE 2011

Registration Form (Please complete in BLOCK LETTERS and tick \sqrt as appropriate.)

Personal Particulars

Title: Prof. Dr Mr Ms Mrs # Surname: _____ # Given Name: _____

Correspondence Address: _____

Contact Tel. No.: _____ Fax No.: _____ # E-mail Address: _____

Working Sector: Community Education Government Hospital Industry Student Others

Company Name: _____

Office Address: _____

Membership:

The Pharmaceutical Society of Hong Kong (PSHK) Membership No.: _____

The Society of Hospital Pharmacists of Hong Kong (SHPHK) Membership No.: _____

The Practising Pharmacists Association of Hong Kong (PPA) Membership No.: _____

compulsory

Registration Fee

		Standard Fee	Early-Bird* (before 1 st January 2011)
Full Registration	Member (PSHK / SHPHK / PPA)	<input type="checkbox"/> HK\$ 1,100	<input type="checkbox"/> HK\$ 900
	Non-member	<input type="checkbox"/> HK\$ 1,300	<input type="checkbox"/> HK\$ 1,100
Partial Registration	Day 1 lectures only	<input type="checkbox"/> HK\$ 400	
	Day 2 lectures only (includes Day 2 lunch symposium)	<input type="checkbox"/> HK\$ 550	
	Day 1 and Day 2 lectures only (includes Day 2 lunch symposium)	<input type="checkbox"/> HK\$ 800	<input type="checkbox"/> HK\$ 600
	Conference dinner only	<input type="checkbox"/> HK\$ 800	
Special Offer †	Day 1 and Day 2 lectures only (includes Day 2 lunch symposium)	<input type="checkbox"/> HK\$ 300	
		Affiliation (please indicate): _____	
ASP Sponsored Candidates ‡	Full registration	<input type="checkbox"/> Free	

* To receive the early-bird discount, the registration form received must be postmarked before **1st January 2011**.

† Only for *LOCAL* registrants who are undergraduates majoring in Pharmacy, Medicine, Nursing or Chinese Medicine; students of Higher Diploma in Pharmaceutical Technology (IVE); pharmacy interns; members of the Pharmaceutical Staff Association (PSA); members of the Hong Kong Pharmacy Technicians Association (HKPTA) or members of the Hong Kong Society of Pharmaceutical Technology and Health Care Professionals (PTHcP). **Relevant affiliations must be stated above to be eligible to apply for the special offer.**

‡ Only for *LOCAL* community pharmacists who are sponsored by their corresponding Authorized Sellers of Poisons (ASPs) through the ASP Sponsorship Programme.

In case of any disputes, the decision of the Conference Organizing Committee shall be final.

Payment

I have enclosed a Bank Draft / Cheque No. _____ of HK\$ _____ made payable to 'The Pharmaceutical Society of Hong Kong Ltd.'

Please send the completed registration form and the payment to
"Hong Kong Pharmacy Conference 2011, P.O. Box 90155, Tsim Sha Tsui, Kowloon, Hong Kong".

NEW PRODUCTS

Simponi®
(Janssen-Cilag)

Active Ingredient:

Golimumab

Presentation:

Prefilled Syringe - each single dose prefilled glass syringe (27 gauge ½ inch) contains 50 mg of Golimumab per 0.5mL of solution.

Pharmacological Properties:

Golimumab is a human monoclonal antibody that binds to both the soluble and transmembrane bioactive forms of human TNF α . This interaction prevents the binding of TNF α to its receptors, thereby inhibiting the biological activity of TNF α (a cytokine protein). Elevated TNF α levels in the blood, synovium, and joints have been implicated in the pathophysiology of several chronic inflammatory diseases such as rheumatoid arthritis, psoriatic arthritis, and ankylosing spondylitis. TNF α is an important mediator of the articular inflammation that is characteristic of these diseases.

Indications:

Rheumatoid Arthritis - in combination with methotrexate, is indicated for the treatment of adult patients with moderately to severely active rheumatoid arthritis.

Psoriatic Arthritis - alone or in combination with methotrexate, is indicated for the treatment of adult patients with active psoriatic arthritis.

Ankylosing Spondylitis - is indicated for the treatment of adult patients with active ankylosing spondylitis

Dosage and Administration:

The dose regimen is 50 mg administered by subcutaneous (SC) injection once a month. For patients with rheumatoid arthritis (RA), Simponi should

be given in combination with methotrexate and for patients with psoriatic arthritis (PsA) or ankylosing spondylitis (AS), Simponi may be given with or without methotrexate or other non-biologic DMARDs. For patients with RA, PsA, or AS, corticosteroids, non-biologic DMARDs, and/or NSAIDs may be continued during treatment with SIMPONI.

Contraindications:

None

Precautions:

Serious Infections - serious and sometimes fatal infections due to bacterial, mycobacterial, invasive fungal, viral, protozoal, or other opportunistic pathogens have been reported in patients receiving TNF-blockers including Simponi. Among opportunistic infections, tuberculosis, histoplasmosis, aspergillosis, candidiasis, cocci dioidomycosis, listeriosis, and pneumocystosis were the most common.

Tuberculosis - Cases of reactivation of tuberculosis or new tuberculosis infections have been observed in patients receiving TNF-blockers. Patients should be evaluated for tuberculosis risk factors and tested for latent infection prior to initiating Simponi and periodically during therapy.

Invasive Fungal Infections - Treated patients who reside or travel in regions where mycoses are endemic, invasive fungal infection should be suspected if they develop a serious systemic illness.

Hepatitis B Virus Reactivation - The use of TNF-blockers has been associated with reactivation of hepatitis B virus (HBV) in patients who are chronic hepatitis B carriers (i.e., surface antigen positive). In some instances, HBV reactivation occurring in conjunction with TNF-blocker therapy has been fatal.

Malignancies - Some fatal

malignancies, have been reported among children, adolescents, and young adults who received treatment with TNF-blocking agents (initiation of therapy \leq 18 years of age), of which Simponi is a member. Approximately half the cases were lymphomas, including Hodgkin's and non-Hodgkin's lymphoma.

Congestive Heart Failure -

Cases of worsening congestive heart failure (CHF) and new onset CHF have been reported with TNF-blockers.

Demyelinating Disorders -

Use of TNF-blockers has been associated with cases of new onset or exacerbation of central nervous system (CNS) demyelinating disorders, including multiple sclerosis (MS). While no trials have been performed evaluating Simponi in the treatment of patients with MS, another TNF-blocker was associated with increased disease activity in patients with MS.

Use with Abatacept -

In controlled trials, the concurrent administration of another TNF-blocker and abatacept was associated with a greater proportion of serious infections than alone; and the combination therapy, compared to the use of a TNF-blocker alone, has not demonstrated improved clinical benefit in the treatment of RA. Therefore, the combination of TNF-blockers including Simponi and abatacept is not recommended

Use with Anakinra -

Concurrent administration of anakinra (an interleukin-1 antagonist) and another TNF-blocker, was associated with a greater proportion of serious infections and neutropenia and no additional benefits compared with the TNF-blocker alone. Therefore, the combination of anakinra is not recommended.

Hematologic Cytopenias -

There have been post-

marketing reports of pancytopenia, leukopenia, neutropenia, aplastic anemia, and thrombocytopenia in patients receiving TNFblockers.

Vaccinations - Patients treated with Simponi may receive vaccinations, except for live vaccines.

PREGNANCY

Pregnancy Category B -

There are no adequate and well-controlled studies of Simponi in pregnant women. It is not known whether Simponi can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Simponi should be used during pregnancy only if clearly needed.

DRUG INTERACTIONS

Biologic Products for RA, PsA,

and/or AS - An increased risk of serious infections has been seen in clinical RA studies of other TNF-blockers used in combination with anakinra or abatacept, with no added benefit

Cytochrome P450 Substrates

- The formation of CYP450 enzymes may be suppressed by increased levels of cytokines (e.g., TNF α) during chronic inflammation. Therefore, it is expected that for a molecule that antagonizes cytokine activity, such as golimumab, the formation of CYP450 enzymes could be normalized. Upon initiation or discontinuation of Simponi in patients being treated with CYP450 substrates with a narrow therapeutic index, monitoring of the effect (e.g., warfarin) or drug concentration (e.g., cyclosporine or theophylline) is recommended and the individual dose of the drug product may be adjusted as needed.

Forensic Classification:

P1S1S3

Prevenar 13® (Pfizer)

Active Ingredients:

1 dose (0.5 ml) contains:

Pneumococcal polysaccharide serotype 1	2.2 µg
Pneumococcal polysaccharide serotype 3	2.2 µg
Pneumococcal polysaccharide serotype 4	2.2 µg
Pneumococcal polysaccharide serotype 5	2.2 µg
Pneumococcal polysaccharide serotype 6A	2.2 µg
Pneumococcal polysaccharide serotype 6B	4.4 µg
Pneumococcal polysaccharide serotype 7F	2.2 µg
Pneumococcal polysaccharide serotype 9V	2.2 µg
Pneumococcal polysaccharide serotype 14	2.2 µg
Pneumococcal polysaccharide serotype 18C	2.2 µg
Pneumococcal polysaccharide serotype 19A	2.2 µg
Pneumococcal polysaccharide serotype 19F	2.2 µg
Pneumococcal polysaccharide serotype 23F	2.2 µg

Presentation:

0.5 ml suspension for injection in pre-filled syringe

Pharmacological Properties:

Prevenar 13 contains the 7 pneumococcal capsular polysaccharides that are in Prevenar (4, 6B, 9V, 14, 18C, 19F, 23F) plus 6 additional polysaccharides (1, 3, 5, 6A, 7F, 19A) all conjugated to CRM197 carrier protein. Based on serotype surveillance in Europe performed before the introduction of Prevenar, Prevenar 13 is estimated to cover 73-100 % (depending on the country) of serotypes causing invasive pneumococcal disease (IPD) in children less than 5 years of age. In this age group, serotypes 1, 3, 5, 6A, 7F, and 19A account for 15.6 % to 59.7 % of invasive disease, depending on the country, the time period studied, and the use of Prevenar.

Indications:

Active immunisation for the prevention of invasive disease, pneumonia and acute otitis media caused by *Streptococcus pneumoniae* in infants and children from 6 weeks to 5 years of age.

Dosage & Administration:

The vaccine should be given by intramuscular injection.

The immunisation schedules for Prevenar 13 should be based on official recommendations.

It is recommended that infants who receive a first dose of Prevenar 13 complete the vaccination course with Prevenar 13.

Infants aged 6 weeks-6 months

Three-dose primary series

The recommended immunisation series consists of four doses, each of 0.5 ml. The primary infant series consists of three doses, with the first dose usually given at 2 months of age and with an interval of at least 1 month between doses. The first dose may be given as early as six weeks of age. The fourth (booster) dose is recommended between 11 and 15 months of age.

Two-dose primary series

Alternatively, when Prevenar 13 is given as part of a routine infant immunisation programme, a series consisting of three doses, each of 0.5 ml, may be given. The first dose may be administered from the age of 2 months, with a second dose 2 months later. The third (booster) dose is recommended between 11 and 15 months of age.

Unvaccinated infants and children ≥ 7 months of age

Infants aged 7-11 months

Two doses, each of 0.5 ml, with an interval of at least 1 month between doses. A third dose is recommended in the second year of life.

Children aged 12-23 months

Two doses, each of 0.5 ml, with an interval of at least 2 months between doses.

Children aged 2-5 years

One single dose of 0.5 ml.

Prevenar 13 vaccine schedule for infants and children previously vaccinated with Prevenar (7-valent)

(*Streptococcus pneumoniae* serotypes 4, 6B, 9V, 14, 18C, 19F, and 23F)

Prevenar 13 contains the same 7 serotypes included in Prevenar, using the same carrier protein CRM197.

Infants and children who have begun immunisation with Prevenar may switch to Prevenar 13 at any point in the schedule.

Children aged 12 - 23 months

Children who have not received two doses of Prevenar 13 during the infant series should receive two doses of the vaccine (with an interval of at least 2 months between doses) to complete the immunisation series for the six additional serotypes. Alternatively, complete the immunisation series according to official recommendations.

Children aged 2 - 5 years

One single dose.

Contraindications:

Hypersensitivity to the active substances, to any of the excipients or to diphtheria toxoid. As with other vaccines, the administration should be postponed in subjects suffering from acute, severe febrile illness. However, the presence of a minor infection, such as a cold, should not result in the deferral of vaccination.

Precautions:

Not for intravascular administration; should not be given to infants or children with thrombocytopenia or any coagulation disorder that would contraindicate intramuscular injection, unless the potential benefit clearly outweighs the risk of administration; only protect against *S. pneumoniae* serotypes included in the vaccine, and not for protecting against other microorganisms that cause invasive disease, pneumonia, or otitis media; may not protect all individuals receiving the vaccine from pneumococcal disease. Children with impaired immune responsiveness may have reduced antibody response to active immunisation. Limited data have demonstrated that Prevenar 7 valent (three-dose primary series) induces an acceptable immune response in infants with sickle cell disease with a safety profile similar to that observed in non high-risk groups. Safety and immunogenicity data are not yet available for children in other specific high-risk groups

for invasive pneumococcal disease (e.g., children with another congenital or acquired splenic dysfunction, HIV infected, malignancy, nephrotic syndrome). Vaccination in high-risk groups should be considered on an individual basis. Specific data are not yet available for Prevenar 13. Children younger than 2 years old should receive the appropriate-for-age Prevenar 13 vaccination series. The potential risk of apnoea and the need for respiratory monitoring for 48-72h should be considered when administering the primary immunisation series to very premature infants (born ≤ 28 weeks of gestation), and particularly for those with a previous history of respiratory immaturity. For vaccine serotypes, protection against otitis media is expected to be lower than protection against invasive disease. Antipyretic treatment should be initiated according to local treatment guidelines for children with seizure disorders or with a prior history of febrile seizures and for all children receiving Prevenar 13 simultaneously with vaccines containing whole cell pertussis.

Drug Interactions:

Can be given with any of the following vaccine antigens, either as monovalent or combination vaccines: diphtheria, tetanus, acellular or whole cell pertussis, Haemophilus influenzae type b, inactivated poliomyelitis, hepatitis B, meningococcal serogroup C, measles, mumps, rubella and varicella; Different injectable vaccines should always be given at different injection sites.

Side Effects:

Decreased appetite; pyrexia; irritability; any injection-site erythema, induration/swelling or pain/tenderness; somnolence; poor quality sleep; injection-site movement impairment (due to pain); apnoea in very premature infants (≤ 28 weeks of gestation).

Forensic Classification:

P1S1S3

Transform dis-oriented, loose lipids into a well-structured, integrated and cohesive bilamellary lipid barrier

LIQUID CLEANSER

Supportive Cleansing in Skin Disorders



Revolutionary Concept in Skin Care

- **seba med** pH5.5 activates the **skin surface hydrolases** (pH-dependent enzymes) to repair & build up own bilamellary lipid barrier and hence restore the healthy acid mantle.
- **Soap free**
- **Alkali free**
- **Drug free**
- **Non-comedogenic**



With risk coming from multiple directions, add on a multidimensional lipid therapy.

New TREDAPTIVE^{®†} sends lipids in the right direction.

Significant improvements with 2 g/40 mg when added to a statin ($P < 0.001$)^{1,a,b}

LDL-C: -19%^c

HDL-C: 20%^c

TG: -25%^d

n = 469
Placebo-adjusted values

TREDAPTIVE[®] (ER Niacin/laropirant, MSD) tablets is indicated for patients with combined dyslipidemia (type IIa and IIb according to Frederickson) and primary hypercholesterolemia (heterozygous familial and non-familial), to reduce total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), apolipoprotein B (Apo B) and triglycerides (TG) and increase high-density lipoprotein cholesterol (HDL-C) when not controlled by diet and exercise alone. TREDAPTIVE can be used in combination with HMG-CoA reductase inhibitors (statins) or as monotherapy.

Select Safety Information

TREDAPTIVE is contraindicated for use in patients with hypersensitivity to the active substances or to any of the excipients, in patients with significant or unexplained hepatic dysfunction, and in patients with active peptic ulcer disease or arterial bleeding.²

TREDAPTIVE was generally well tolerated in clinical studies. The most common side effect of TREDAPTIVE is flushing.²

Please consult the full Prescribing Information before initiating therapy.

Data from a study of TREDAPTIVE 2 g/40 mg relative to placebo. The primary end point was safety and LDL-C percent change from baseline across weeks 12 to 24. Patients (N = 1,613; mean age: 58 years) were randomized to TREDAPTIVE 1 g/20 mg (n = 800), nicotinic acid 1 g (prolonged-release formulation) (n = 543), or placebo (n = 270) for 4 weeks; patients then advanced directly to TREDAPTIVE 2 g/40 mg, nicotinic acid 2 g, and placebo, respectively, for a total treatment duration of 24 weeks.³

^a Each tablet of TREDAPTIVE contains 1 g of extended-release niacin and 20 mg of laropirant, a novel flushing pathway inhibitor.²

^b Patients received the following statins: atorvastatin (29%), simvastatin (54%), other statins (pravastatin, fluvastatin, rosuvastatin, lovastatin, 17%). Nine percent of statin patients were taking ezetimibe. Baseline values for the entire cohort were: LDL-C, 113.5 mg/dL (2.9 mmol/L) (mean), HDL-C, 50.8 mg/dL (1.3 mmol/L) (mean), and TG, 127.0 mg/dL (1.4 mmol/L) (median).¹

^c Mean percent change from statin-treated baseline.

^d Median percent change from statin-treated baseline.

References: 1. Maccubbin D, Bays HE, Olsson AC, et al. Lipid-modifying efficacy and tolerability of extended-release niacin/laropirant in patients with primary hypercholesterolaemia or mixed dyslipidaemia. *Int J Clin Pract.* 2008;62:1959-1970. 2. Hong Kong Product Circular (TREDAPTIVE, MSD)

The following are excerpts from the Prescribing Information. Please refer to the full Prescribing Information before initiating therapy.

Indication:

Therapy in patients with combined dyslipidemia (type IIa and IIb according to Frederickson) and primary hypercholesterolemia (heterozygous familial and non-familial), to reduce total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), apolipoprotein B (Apo B) and triglycerides (TG) and increase high-density lipoprotein cholesterol (HDL-C) when not controlled by diet and exercise alone. TREDAPTIVE can be used in combination with HMG-CoA reductase inhibitors (statins) or as monotherapy.

Dosage and Administration:

Dosage

The starting dose is one extended-release tablet (1 g niacin/20 mg laropirant) once a day. After four weeks, it is recommended that patients be advanced to the maintenance dose of 2 g/40 mg taken as two extended-release tablets (1 g/20 mg each) once daily. Daily doses greater than 2 g/40 mg have not been studied and therefore are not recommended.

If TREDAPTIVE is missed for less than 7 consecutive days, patients can resume therapy at the last administered dose. If TREDAPTIVE is missed for 7 or more consecutive days, therapy should be resumed at the 1 g/20 mg dose for 1 week, before advancing to the maintenance dose of 2 g/40 mg.

Those patients switching from 2 g or more of prolonged-release niacin can initiate TREDAPTIVE at the 2 g/40 mg dose. Patients switching from less than 2 g of prolonged-release niacin should initiate therapy at the starting dose of 1 g/20 mg and advance to the 2 g/40 mg maintenance dose after four weeks. For patients switching from immediate-release niacin to TREDAPTIVE, therapy should be initiated at the 1 g/20 mg dose and advanced to the 2 g/40 mg maintenance dose after four weeks.

Method of administration

The tablets should be taken whole, with food, in the evening or at bedtime. To preserve the extended-release properties, the tablets must not be split, broken, crushed, or chewed before swallowing. To reduce the possibility of flushing, alcohol or hot drinks should be avoided at the time of ingestion of the medicinal product.

Use in the elderly

No dose adjustment is required for elderly patients.

Use in paediatric patients

Safety and effectiveness of TREDAPTIVE in paediatric patients have not been established. Therefore, treatment is not recommended in this age group.

Use in patients with hepatic or renal insufficiency

Use of TREDAPTIVE in patients with hepatic or renal insufficiency has not been studied. Like other niacin medicinal products, TREDAPTIVE is contraindicated in patients with significant or unexplained hepatic dysfunction. It should be used with caution in patients with renal insufficiency, because niacin and its metabolites are primarily excreted by the kidneys (see CONTRAINDICATIONS; PRECAUTIONS).

Concomitant therapy

Aspirin provides no additional reduction of flushing beyond that achieved by TREDAPTIVE. Therefore, treatment with aspirin to alleviate flushing symptoms is not necessary.

Because co-administration of bile acid sequestrants may reduce the bioavailability of acidic medicinal products such as niacin, it is recommended that TREDAPTIVE be administered > 1 hour before or > 4 hours after administration of a bile acid sequestrant.

Contraindications:

- Hypersensitivity to the active substances or to any of the excipients.
- Significant or unexplained hepatic dysfunction.
- Active peptic ulcer disease.
- Arterial bleeding.

Precautions:

Hepatic Effects:

Liver function tests are recommended before initiation, every 6 to 12 weeks for the first year, and periodically (e.g., semiannually) thereafter. Patients who develop increased transaminase levels should be monitored until the abnormalities have resolved. Should an increase in ALT or AST of > 3x ULN persist, reduction of dose or withdrawal of TREDAPTIVE is recommended.

Effect on Skeletal Muscle:

Because the incidence of myopathy is higher than expected in Chinese patients, caution should be used when treating Chinese patients with TREDAPTIVE coadministered with simvastatin or ezetimibe/simvastatin (particularly simvastatin doses of 40 mg or higher). Because the risk of myopathy with statins is dose-related, the use of TREDAPTIVE with simvastatin 80 mg or ezetimibe/simvastatin 10/80 mg is not recommended in Chinese patients. It is unknown whether there is an increased risk of myopathy in other Asian patients treated with TREDAPTIVE coadministered with simvastatin or ezetimibe/simvastatin.

Effect on Glucose:

Diabetic or potentially diabetic patients should be observed closely. Adjustment of diet and/or hypoglycemic therapy may be necessary.

Side Effects:

TREDAPTIVE is generally well tolerated. Adverse reactions have usually been mild and transient. Flushing is the most common adverse reaction of TREDAPTIVE. Flushing is most prominent in the head, neck, and upper torso. In a pool of four active- or placebo-controlled clinical trials (N=2548), flushing was reported by the investigator as a possibly, probably, or definitely treatment-related adverse reaction in 12.3% of patients taking TREDAPTIVE. In these studies, the percentage of patients taking TREDAPTIVE, niacin (pooled prolonged-release formulations) or pooled placebo/simvastatin who discontinued due to any flushing-related symptom (redness, warmth, itching and tingling) was 7.2%, 16.6%, and 0.4%, respectively. Discontinuations due to other specific adverse reactions among patients taking TREDAPTIVE were infrequent (< 1%).

Reference: Hong Kong Product Circular (TREDAPTIVE, MSD).



Merck Sharp & Dohme (Asia) Ltd.
27/F, Caroline Centre, Lee Gardens Two, 28 Yun Ping Road, Causeway Bay, Hong Kong.
Tel: (852) 2574 4241 Fax: (852) 2834 0756

TREDAPTIVE is a registered trademark of Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Whitehouse Station, N.J., U.S.A.
Copyright © 2009 Merck & Co., Inc. All rights reserved.
05-2011-CV1-10-HK-1010-1 (3-10 CV1-2008-W-1268801-1)

NEW
Tredaptive[®]
(ER niacin/laropirant, MSD) tablets
Multidimensional Lipid Therapy