Advances in Education in Pharmaceutical GMPs in China

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Outline

1. GMP History and Current Status in China
2. Traditional GMP Training
3. New GMP Training and Education
4. Future Plans
1. GMP History and Current Status in China


(Article 9) Drug manufacturers shall conduct production according to the Good Manufacturing Practice (GMP) for pharmaceutical products formulated by the drug regulatory department under the State Council on the basis of this Law.

(Article 9) The drug regulatory department shall inspect a drug manufacturer as to its compliance with the GMP requirements and issue a certificate to the manufacturer passing the inspection.
1. GMP History and Current Status in China

Framework of the Chinese GMP

- General Requirements for Annex
- Non-sterile Products
- Sterile Products
- APIs
- Biological Products
- Chinese Medicine Preparations
- Prepared Slices of Chinese Crude Drugs
- Radiopharmaceuticals
- Medical Gases
1. GMP History and Current Status in China

For domestically registered pharmaceutical manufacturers

- **1982** GMP issued by *National Pharmaceutical Industry Corporation*
- **1984** Revised by *National Pharmaceutical Industry Corporation*
- **1988** GMP issued by *Ministry of Health*
- **1992** Revised by *Ministry of Health*
- **1998** GMP issued by "SFDA" (Compliance Deadline: June 2004)
- **2007** Evaluation Standard of GMP Inspection issued by *SFDA*
- Present New GMP under development by *SFDA/Ministry of Health*
  (modeled based on WHO and EU GMP)

For API and drug manufacturers exporting to international markets

- Follow GMP or cGMP regulations of destination countries or regions
## 2. Traditional GMP Training

<table>
<thead>
<tr>
<th></th>
<th>Domestic Pharmaceutical Manufacturers</th>
<th>Export-oriented API and Pharmaceutical Manufacturers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Providers</strong></td>
<td>State &amp; regional FDAs, industry associations, consultants</td>
<td>Consultants, international associations, overseas buyers</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>Regulations, guidance, compliance practices</td>
<td>Regulations, guidance, compliance practices</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>Workers, first-line managers of QA/QC, RA, production</td>
<td>Workers, first-line managers of QA/QC, RA, engineering</td>
</tr>
<tr>
<td><strong>Formats</strong></td>
<td>Workshop, seminars, on-site training</td>
<td>Workshop, on-site training, videolink, online,</td>
</tr>
<tr>
<td><strong>Accreditation</strong></td>
<td>Training certificates</td>
<td>Training certificates, without official recognition from regulatory authorities</td>
</tr>
<tr>
<td><strong>Length/Fee</strong></td>
<td>1-3 days, ~$50/day</td>
<td>1-3 days, ~$200/day</td>
</tr>
</tbody>
</table>
3. New GMP Training and Education

Two cGMP training workshops, co-sponsored by the US FDA, Peking University and ISPE, in 2005 and 2006 marked the start of a new era of GMP training and education in China: *broad audience, regional, and system approach to quality*. 
3. New GMP Training and Education

Attendee Profile of the 2005 FDA China cGMP Workshop

Over 300 attendees from mainline China, Hong Kong, Marco, Taiwan, Korea, Japan, Singapore, Cuba, India, Iran, Bangladeshi, Switzerland and the U.S.
3. New GMP Training and Education

Following the lead of the two FDA cGMP workshops, EU and Swissmedic co-sponsored, along with Peking University and ISPE, 2006 EU-Swiss GMP Training Workshop, with speakers from EMEA, BfArM, Swissmedic, Affssaps and ISPE
3. New GMP Training and Education

Experience Learned from the FDA and EU-Swiss GMP Trainings

Positives
- Participation from the regulatory officials of China
- Broad participation from the industry in China and the APEC region
- Strong Interest to hear directly from regulatory officials

Negatives
- English translation (realtime: non-technical, sequential: time consuming)
- Presentation (need for more specific and in-depth case studies)
- Topics (attention on inspection tactics, not quality systems)
- Participation (too many attendees, too diverse interests)
- Network reception (the locals seemed shy to chat with the English speakers)
- Lack of academic participation
3. New GMP Training and Education

- Short-term GMP training workshops are only good for training people to follow standard procedures of established quality systems.

- To train people with the ability to design quality systems, a long-term advanced degree university program is needed.

  Joseph Famulare, US FDA, Beijing, October 2004
3. New GMP Training and Education

Curriculum Designed by Mr. Nicholas Buhay, the US FDA

- Quality Management
  - Quality Management (6 Sigma, FTR, ...)
  - Project Management
  - Risk Management & Assessment

- Legal Perspective
  - Laws & Procedures
  - GxP (x= M, L, C)
  - Communication with FDA

- Product & Process Perspective
  - Drug Discovery & Development
  - Product & Process Engineering
  - New Technologies

- Technical

- Business
  - International Strategies
  - Supply Chain Management
  - Other Laws
    - IP
    - Labor
    - Safety
    - Environment
  - Market Surveillance & AER
  - Financing & Asset Management

- Record Keeping & Information Technology & Part 11
3. New GMP Training and Education

Train the Trainers / Leaders
A year ago, on March 30, 2007, Peking University started an all new master degree program of International Pharmaceutical Engineering Management to provide systematic education to middle and upper-middle management of pharmaceutical companies and government regulatory agencies to help to prepare them to become leaders of international standard.

In July 2006, Peking University announced a new master’s degree graduate program “International Pharmaceutical Engineering Management,” which is dedicated to quality management and regulatory science. This program is the result of close collaboration between Peking University and FDA. The long-term goal of this program is to accelerate the modernization of China’s pharmaceutical industry, as well as to provide the basis for a satisfying professional career with success and accomplishment for graduates.

Murray Lumpkin, M.D.,
Deputy Commissioner for International and Special Program, FDA

Congressional Testimony, July 18, 2007
3. New GMP Training and Education

- The inaugural class of 25 students started in March 2007
- Classes are offered once a month, usually from Thursday to Sunday
- The program is for two years, including a master degree thesis work
- Courses are taught in Chinese or English (often with realtime translation)
- PPT printouts in both English and Chinese, side by side
- Students come from 21 pharmaceutical companies and government
- Faculties are from FDA, SFDA, and major pharmas in US, EU & China
3. New GMP Training and Education

<table>
<thead>
<tr>
<th>Teaching Faculties and Guest Lecturers in Academic Year of 2007</th>
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<tbody>
<tr>
<td>Robert Temple, MD</td>
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<tr>
<td>Paul Seligman, MD</td>
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<tr>
<td>Moheb Nasr, PhD</td>
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<tr>
<td>Joseph Famulare</td>
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<tr>
<td>Lawrence Yu, PhD</td>
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<tr>
<td>Shaw Chen, MD</td>
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<tr>
<td>Nick Buhay</td>
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<tr>
<td>RY He, MD</td>
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<tr>
<td>Ning Li, MD</td>
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<td>ZQ Gu, PhD</td>
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<tr>
<td>Qingwu Guo (in Chinese)</td>
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<tr>
<td>Jean Wyvratt, PhD</td>
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<tr>
<td>Yongkui Sun, PhD</td>
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<tr>
<td>Lihu Yang, PhD</td>
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<td>Ron Branning</td>
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<td>James Liu</td>
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<td>Jason Zhang, PhD</td>
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<td>Joe Zhou, PhD</td>
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### 3. New GMP Training and Education

<table>
<thead>
<tr>
<th>Teaching Faculties and Guest Lecturers in Academic Year of 2007 (continued)</th>
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<tbody>
<tr>
<td><strong>Jack Zheng, PhD</strong></td>
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<tr>
<td><strong>Ludwig Huber, PhD</strong></td>
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<td><strong>Ming Guo, PhD</strong></td>
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<td><strong>John Hu, PhD</strong></td>
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<td><strong>Tom Sam, PhD</strong></td>
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<td><strong>DQ Wang, PhD</strong></td>
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<tr>
<td><strong>Qing Zhou, PhD</strong></td>
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<tr>
<td><strong>Jian Wang, PhD</strong></td>
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<tr>
<td><strong>B. van Liedekerke, PhD</strong></td>
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<tr>
<td><strong>Ling Ye, PhD</strong></td>
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<tr>
<td><strong>Chao Ye, PhD</strong></td>
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<td><strong>Greg Wei, PhD</strong></td>
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<tr>
<td><strong>Rebecca Wang, MD</strong></td>
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<td><strong>Wenni Li, PhD</strong></td>
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<tr>
<td><strong>Christian Ilsøe</strong></td>
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<td><strong>WK Tan (in Chinese)</strong></td>
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<td><strong>JL Tang (in Chinese)</strong></td>
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<td><strong>Chester Chai, MBA</strong></td>
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3. New GMP Training and Education

Photos of teaching faculties and guest lecturers of the academic year of 2007

A truly international team: all but three speakers can and prefer to lecture in English
3. New GMP Training and Education

Extended Activities of the Master Degree Program

To provide a broader audience with the invaluable opportunities to meet with world leading experts from the US FDA and the industry, we organized or co-organized nine workshops/lectures on topics of drug quality, safety and efficacy, throughout the year.

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<tr>
<th>Workshop/Lecture</th>
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<tr>
<td>Generic Drugs (March 30 – 31)</td>
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<tr>
<td>Dialog with FDA, (June 1, AM)</td>
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<td>FDA – Industry Dialog (June 1, PM)</td>
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<td><strong>Quality by Design (June 2 – 3) →</strong></td>
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<td>Clinical Trial (September 26-27)</td>
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<td>Clinical Development (September 28)</td>
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<td>Developing A QbD Platform (November 8)</td>
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<td>Pharmacovigilance (November 30)</td>
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<td>Qualification &amp; Validation (December 1 – 2)</td>
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3. New GMP Training and Education

An International Education and Communication Forum, and A Community

With help of the FDA, the Chinese authority and the multi-international pharmaceutical companies, the Peking University’s master degree program is developing into a unique community for regulatory, industry and academic people, domestic and abroad, to meet and to help one another, to exchange and develop ideas, all with the objective of understanding and meeting the international standard of drug quality and safety.

Accessible to Government Officials and Academic Researchers

All master degree program classes are offered to government officials and academic researchers for free, subject to seating availability, including regulatory agencies, government research funding agencies, intellectual property administration, leading research institutions and universities.
4. Future Plans

Issues to Consider

- Drug quality and safety problems are closely related
- Counterfeit drugs cause major quality and safety concerns
- Industry capacity (science & engineering) building -- key to improving quality
- Community (industry, government & academia) building facilitates collaboration
- Manufacturing supply chain becomes increasingly regional and global
- Education and research should go hand in hand, and are mutually beneficial
- Systematic education vs. short-term training
- Traditional education vs. service-oriented education
- Basic research vs. applied research
- Target audience: workers, low-level, middle-level or top-level management
4. Future Plans of Peking University

An academic institute dedicated to improving drug quality and safety by means of applied research, education, training and services

- Training
- Education
- Dialog

Institute for Pharmaceutical Excellence

Schools of Engineering, Business Law, Government and Medicine

Applied Research (QbD, Risk, Preambles)

Services (Databases, Informatics)

A Community of Industry and Government Leaders: China → Region

e.g. Baxter’s heparin incident
- Changzhou SPL’s QA director: student
- Baxter Tianjin QA manager: student
- FDA’s inspector and Mr. Buhay: faculties
- SFDA’s inspector: faculty
Thank You

Acknowledgements

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and
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Mettler Toledo AutoChem, CCPIE, RDPAC, ISPE

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