Harmonization of Asia Pacific Pharmacy and Pharmaceutical Sciences Education

Kenji Sugibayashi, Ph.D.
Josai University
Josai International University

Mission of Pharmacists and Pharmaceutical Scientists against Communities/Patients

- To improve local and/or global health by advancing pharmacy practice and science as pharmacists and pharmaceutical scientists

- drug discovery
- drug development
- drug access
- responsible use of medicines
- drug safety and quality
- cost-effective adjustment
- chemical safety
- hygiene

Pharmaceutical Scientists
Hospital Pharmacists
Community Pharmacists

Curricula to Cultivate Students Who Will Be Pharmacists and Pharmaceutical Scientists

- Arts and Sciences
  Languages, Culture, Literatures, Social Sciences
  Mathematics, Physics, Chemistry, Biology

- Pre Pharm
  Chemistry, Biology, Anatomy, Physiology
  Organic Chemistry, Biochemistry, Physical Chemistry

- Pharm course
  Pharmacology, Hygiene Chemistry, Pharmaceutics,
  Pharmacokinetics, Pharmacotherapeutics, Practical Pharmacy
  Clerkship or Internship
  Final research project

- Others
  Pharmaceutical Law
  Business Management

Pharmacy Education in Asia Pacific Region

<table>
<thead>
<tr>
<th>Country/Course</th>
<th>Period of Pharmacy School</th>
<th>Compulsory Pharmacy Internship</th>
<th>Final Research Project</th>
<th>Time for National Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>4 years course, 4 years</td>
<td>6th year 8 weeks (hospital, community pharmacy)</td>
<td>4th year 1 year</td>
<td>just after graduation</td>
</tr>
<tr>
<td>Malaysia</td>
<td>4 years</td>
<td>5th year 8 weeks (hospital, community pharmacy)</td>
<td>4th year 3 months</td>
<td>at the end of 5th year</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5 years</td>
<td>5th year 8 weeks (hospital, community pharmacy, government)</td>
<td>4th year 1 year</td>
<td>just after graduation</td>
</tr>
<tr>
<td>Thailand</td>
<td>6 years</td>
<td>8th year 9 months (hospital, community pharmacy, industry)</td>
<td>5th year 1 year</td>
<td>just after graduation</td>
</tr>
<tr>
<td>China</td>
<td>4 years course, 5 years</td>
<td>4th or 5th year 0.5 or 1 year (depend on university)</td>
<td>4th year 3 years after graduation</td>
<td>after internship</td>
</tr>
<tr>
<td>Singapore</td>
<td>4 years</td>
<td>after graduation no compulsory practice</td>
<td>4th year 1 year</td>
<td>the end of pre-registration training</td>
</tr>
<tr>
<td>Philippines</td>
<td>4 years course, 5 years</td>
<td>3rd year 960 h (hospital, community pharmacy or hospital)</td>
<td>4th year 1 year</td>
<td>as soon as graduation</td>
</tr>
<tr>
<td>Australia</td>
<td>4 years</td>
<td>after graduation</td>
<td>Total 1 year (community pharmacy or hospital)</td>
<td>after internship</td>
</tr>
</tbody>
</table>
Miller’s Education Pyramid

Knowledge, Skill, Attitude and ...

- Knowledge: recall of facts → interpretation → problem solving
- Skill: imitation → control → automatism
- Attitude: reception → response → internalization

Wisdom or Brightness

The most important ability is to possess “wisdom” or “brightness”, which can be achieved through sufficient knowledge, skills and attitude.

Pharmacy Education in Asia Pacific Region

<table>
<thead>
<tr>
<th>Country, Courses</th>
<th>Period of Pharmacy School</th>
<th>Compulsory Pharmacy Internship</th>
<th>Final Research Project</th>
<th>Time for National Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>4 years course</td>
<td>4 years</td>
<td>6 years</td>
<td>5th year</td>
</tr>
<tr>
<td></td>
<td>5 years course</td>
<td>9th year</td>
<td>hospital, community pharmacy</td>
<td>6th year</td>
</tr>
<tr>
<td>Malaysia</td>
<td>4 years</td>
<td>4th year</td>
<td>4 months</td>
<td>6th year</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5 years</td>
<td>5th year</td>
<td>Total 28 weeks</td>
<td>4th year</td>
</tr>
<tr>
<td></td>
<td>8 weeks hospital, industry, 6 weeks community pharmacy, government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>6 years</td>
<td>6th year</td>
<td>Total 9 months</td>
<td>4th year</td>
</tr>
<tr>
<td></td>
<td>hospital, community pharmacy, industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>5 years</td>
<td>4th or 5th year</td>
<td>5 years</td>
<td>1 year</td>
</tr>
<tr>
<td>China</td>
<td>4 years course</td>
<td>4 years</td>
<td>4th or 5th year</td>
<td>5th year</td>
</tr>
<tr>
<td></td>
<td>5 years course</td>
<td>3 years</td>
<td>0.5 or 1 year depend on university</td>
<td>5th year</td>
</tr>
<tr>
<td>Singapore</td>
<td>4 years</td>
<td>after graduation</td>
<td>no compulsory practice</td>
<td>5th year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>4 years</td>
<td>after graduation</td>
<td>5 years</td>
<td>1 year?</td>
</tr>
</tbody>
</table>

Although we do accumulate much more knowledge than Hippocrates and da Vinci did due to availability of IT tools, however, we are still far away from reaching their wisdom. They created own “wisdom” and “brightness”, while our generation is getting the knowledge for free, often uncensored one.
Present Tasks to Harmonize the Pharmacy and Pharmacy Sciences Education in Asia Pacific Region 1

- Pre-Pharm Education
  - same school or another college?
- Final Research Project
  - Necessity? Contents/substance/matter?
  - When? Period? (How many years/months?)
- Internship or Clerkship
  - When? (before or after licensure exam?)
  - Duration? How many years/months?
  - Where? (hospital, community pharmacy, industry)

Present Tasks to Harmonize the Pharmacy and Pharmacy Sciences Education in Asia Pacific Region 2

- Licensure Exam for Pharmacist
  - When? (before or after internship?)
  - What kind of questions/problems?
- School year
  - 4, 5 or 6 years?
- Degree
  - B. Pharm., M. Pharm., Pharm D.?
- Existence of Pre-Pharm School?
  - Curriculum

A little difference in the pharmacy and pharmaceutical sciences curricula may be acceptable in this stage among Asia Pacific nations.

Barriers to Harmonize the Pharmacy and Pharmaceutical Sciences Education, especially for curricula in Asia Pacific region

We do not need to hurry up to harmonize curricula themselves due to

- Language variation
- Culture variation
- History variation
- Religion variation
- Education System variation
- Economic variation
- Population Pyramid
- Pharmacist density variation

Countries with and without Critical Shortage

- Countries with critical shortage
- Countries without critical shortage
Number of Health Workforce, 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Physicians Number</th>
<th>Physicians Density (per 10,000 population)</th>
<th>Nursing and Midwifery Personnel Number</th>
<th>Nursing and Midwifery Personnel Density (per 10,000 population)</th>
<th>Pharmaceutical Personnel Number</th>
<th>Pharmaceutical Personnel Density (per 10,000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>America</td>
<td>793,648</td>
<td>27</td>
<td>2,927,000</td>
<td>96</td>
<td>249,642</td>
<td>8</td>
</tr>
<tr>
<td>Australia</td>
<td>19,612</td>
<td>10</td>
<td>222,133</td>
<td>100</td>
<td>15,339</td>
<td>8</td>
</tr>
<tr>
<td>Canada</td>
<td>62,307</td>
<td>19</td>
<td>327,224</td>
<td>100</td>
<td>27,018</td>
<td>8</td>
</tr>
<tr>
<td>China</td>
<td>1,862,630</td>
<td>14</td>
<td>1,259,240</td>
<td>10</td>
<td>351,620</td>
<td>3</td>
</tr>
<tr>
<td>France</td>
<td>227,683</td>
<td>37</td>
<td>494,885</td>
<td>81</td>
<td>72,160</td>
<td>12</td>
</tr>
<tr>
<td>Germany</td>
<td>288,182</td>
<td>35</td>
<td>661,000</td>
<td>80</td>
<td>49,528</td>
<td>6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>29,499</td>
<td>1</td>
<td>179,959</td>
<td>8</td>
<td>7,580</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Japan</td>
<td>270,371</td>
<td>21</td>
<td>1,210,633</td>
<td>90</td>
<td>241,399</td>
<td>19</td>
</tr>
<tr>
<td>Korea</td>
<td>81,998</td>
<td>17</td>
<td>210,840</td>
<td>44</td>
<td>53,492</td>
<td>11</td>
</tr>
<tr>
<td>Malaysia</td>
<td>17,020</td>
<td>7</td>
<td>43,380</td>
<td>18</td>
<td>2,880</td>
<td>1</td>
</tr>
<tr>
<td>Philippines</td>
<td>90,370</td>
<td>12</td>
<td>489,910</td>
<td>61</td>
<td>46,360</td>
<td>6</td>
</tr>
<tr>
<td>Singapore</td>
<td>6,380</td>
<td>15</td>
<td>18,710</td>
<td>44</td>
<td>1,280</td>
<td>2</td>
</tr>
<tr>
<td>Thailand</td>
<td>18,887</td>
<td>3</td>
<td>84,683</td>
<td>14</td>
<td>7,350</td>
<td>1</td>
</tr>
</tbody>
</table>
Medicines Consumption by Pharmacist Density

![Graph showing the relationship between medicines consumption and pharmacist density per 10,000 population. The graph includes data points indicating a positive correlation.](image)

R Squared Linear = 0.281

Reasons for Variation in Roles of Health Workforces and Medicines

- Different population pyramids
- Types of chronic diseases
- Dependent on the population pyramid
- Increase in ambulatory market growth
- Increase in new available treatments
- Variation in clinical outcomes
- Development of primary care

**Young countries**
Anti-infective agents and Antibiotics are important.

**Aged countries**
Drugs for Lifestyle-related diseases are important.

Pharmacy Education in USA and ...

- After Elementary school, Junior High and High school, Students go to 2 years Pre Pharm, then go to 4 years Pharm D course.
- Korea started the same system.
- Pre Pharm
  - Chemistry, Biology, Anatomy, Physiology
  - Organic chemistry, Biochemistry, Physical Chemistry
- Pharm D course
  - Pharmacology, Pharmaceutics, Pharmacokinetics
  - Pharmaco therapeutics, Practical Pharmacy
  - Clerkship or Internship

Pharmacy Education in EU

- Erasmus Mundus 1987
  - Student and educator mobility
  - Joint curriculum development
  - Intensive program
- Bologna Declaration 1999
  - Undergraduate course/ graduate course
  - Harmonization of name of degree (B Pharm, M Pharm, Pharm D)
  - Credit exchange and adjustment
  - Educator exchange
- mainly 5 years-course
Pharmacy and Pharmaceutical Sciences Curriculum

- Patient-oriented Education
  - Patient-centered Education
- Community-based Education
- Outcome-based Education

These are just words. The important point is the method to fulfill well pharmacy education. However, we have markedly broad variations in our pharmacy and pharmaceutical sciences education. Therefore, we have to pay attention to competency.

Competence vs Competency

Something to Be Harmonized and not to Be Harmonized in Asia Pacific Region

Something to be harmonized
- Mission for Pharmacists
  (especially for hospital pharmacists)
- Curriculum on the human body and pharmaceutical Chemistry
- Individual pharmacy law and pharmacopeia
- Competency

Something not to be harmonized
- Mission for Pharmaceutical Scientists
  (especially for industrial scientists)
- Competence

For Better Education in Pharmacy and Pharmaceutical Sciences

Need to Discuss with Practitioners and Industrial Workers for Better Pharmacy and Pharmaceutical Sciences Education

- Practitioners (Pharmacists) at Hospitals
- Practitioners (Pharmacists) at Community Pharmacy
- Pharmaceutical Scientists at Pharmaceutical Companies

- drug discovery
- drug development
- drug access
- responsible use of medicines
- chemical safety
- hygiene

Education are for the next generation of practitioners and industrial workers.

Competency-Based Education

Competence vs Competency

What? vs How?

Performance

Harmonization of Pharmacy Education using Competency-Based Education.
Conclusion

1. The most important ability for education is to possess “wisdom” or “brightness”, which can be achieved through sufficient knowledge, skills and attitude. This cannot be obtained by recent IT tools.

2. Harmonization of Pharmacy Education is a big issue that has to discuss now. It can be designed by Competency-Based Education.

Thank you for your attention

We have the 9th Cluster Forum on the Dermatological Sciences at Tokyo on the 6th of September.

We have the 5th FG Symposium on the Topical/Transdermal Delivery Systems at Tokyo on the 10th of November.

We have the 3rd International Conference on Nutraceutical and Cosmetic Sciences at Tokyo on the 11-12th of November.

Global Model from WHO-UNESCO-FIP Education Initiative Development Team

Concept of Global Competency Framework

<table>
<thead>
<tr>
<th>Public Hygiene</th>
<th>Pharmaceutical Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Promotion</td>
<td>Medical Examination/Diagnostics</td>
</tr>
<tr>
<td>Medicament Information and Advice</td>
<td>Medicament Evaluation Dispensing,</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teams and Administration</th>
<th>Practitioner function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remuneration for medical treatment</td>
<td>Communication skill, Self-control</td>
</tr>
<tr>
<td>Pharmaceutical serves</td>
<td>Law and regulation, Ethics</td>
</tr>
<tr>
<td>Drug supply process</td>
<td>Quality guarantee and study</td>
</tr>
</tbody>
</table>

Knowledge to Management
<table>
<thead>
<tr>
<th>Work Domain</th>
<th>Education Development Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Academic &amp; Institutional Capacity</td>
<td></td>
</tr>
<tr>
<td>• Competency</td>
<td></td>
</tr>
<tr>
<td>• Continuing Professional Development/Continuing Education</td>
<td></td>
</tr>
<tr>
<td>• E-platforms and IT-based learning</td>
<td></td>
</tr>
<tr>
<td>• Global Observatory</td>
<td>Workforce</td>
</tr>
<tr>
<td>• Interprofessional Education</td>
<td></td>
</tr>
<tr>
<td>• Leadership</td>
<td></td>
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<tr>
<td>• Quality Assurance</td>
<td></td>
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<tr>
<td>• Pharmacy Support Workforce</td>
<td></td>
</tr>
<tr>
<td>• Social Accountability</td>
<td></td>
</tr>
<tr>
<td>• Support acquisition of complex skills through work-based learning models</td>
<td></td>
</tr>
<tr>
<td>• Put competency at the heart of experience</td>
<td></td>
</tr>
<tr>
<td>• Meet patient safety agenda</td>
<td></td>
</tr>
<tr>
<td>• Be accessible for all practitioners</td>
<td></td>
</tr>
<tr>
<td>• Recognize poor performance and provide a system for dealing with it</td>
<td></td>
</tr>
<tr>
<td>• Demonstrate appropriate and consistent quality: of the workplace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of the ‘educators’ – mentors, supervisors, seniors...</td>
</tr>
</tbody>
</table>