



Nanjing  
China

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Pharmacy &  
Pharmaceutical Sciences  
Education  
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## Reforming pharmaceutical education: The imperative for change

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## Pharmacy and the Pharmaceutical Sciences



- Drug discovery
- Manufacturing
- Distribution/supply chain
- Prescribing
- Transcribing
  - Medication administration records
  - Pharmacy records
- Compounding
- Dispensing/distribution
- Administration
- Monitoring/pharmacovigilance



## We need new medicines



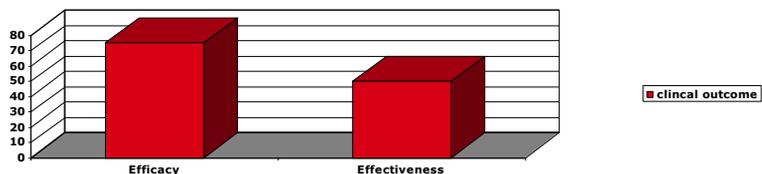
- Many fatal diseases cannot currently be cured
  - Cancer
- Many non-fatal diseases can only be treated symptomatically
  - Diabetes
  - Rheumatoid arthritis
- New medicines will be personalized for individual patients
  - Genomics



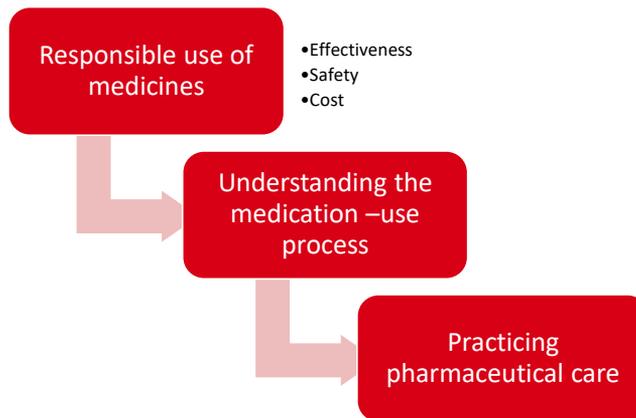
## We need better USE of medicines



- **Efficacy** – Treatment effect shown by randomized, controlled trials
- **Effectiveness** – Does treatment effect transfer to “real world” populations



## Responsibilities and obligations of pharmacists



## Pharmaceutical care



- **Responsibility** and **accountability** for the outcome of drug therapy
- Identifying, preventing, and resolving drug-related problems
  - Needing pharmacotherapy but not getting it
  - Needing pharmacotherapy but getting the wrong drug
  - **Not** needing pharmacotherapy but getting it
  - Needing and getting pharmacotherapy but:
    - Dose is too high
    - Dose is too low
    - Interacts with another drug or food
    - Results in a preventable adverse drug event



Reference: Helper, D.D. & Strand, L.M., Opportunities and Responsibilities in Pharmaceutical Care, *Am. J. Pharm. Educ.*, 53, 75-155(1989).

## Science informs practice



- Evidence-based medicine based on science
  - Case reports (“evidence in not the plural of anecdote”)
  - Randomised controlled trials
  - Meta analyses/systematic reviews
- Examples
  - Anticoagulant therapy following aortic valve replacement or atrial fibrillation
  - Cholesterol management to prevent cardiovascular disease
  - Managing high blood pressure to prevent complications (RF, Stroke, blindness)
  - Managing blood glucose in diabetes to prevent complications



## Practice informs science



- Can we find an anticoagulant that is easier to use than warfarin?
  - Wider therapeutic range?
  - Fewer complications/bleeding?
  - Fewer interactions (food/drugs)?
  - Requires less monitoring?
- How can we use genomic information to personalized the use of medicines?
  - Will it work at all?
  - Should the dose be adjusted?
  - Is a medicine with fewer side effects be used (if available)?



## Bridging the gap at FIP



## Science ↔ Practice



**Kamal Midha**  
FIP President  
2006 – 2010

“A molecule becomes a medicine when it passes through the hands of a pharmacist.”

“The pharmacist is the scientist in the community.” (Past BPS chairman Mitsuru Hashida)

### • FIP efforts

- Science and practice co-chairs, Congress Programme Committee
- BPP/BPS leadership meetings twice a year
- Integration of Pharmacy Practice Research into BPS
- Formal recognition of FIPeD in the new FIP bylaws



## Some challenges to address



- How to narrow the gap between pharmaceutical sciences and pharmacy practice?
  - Each should relate to and benefit from the other
  - Improving the USE of medicines is as important as drug discovery.
- How to integrate the increasing importance of the biological sciences into pharmaceutical education and the balance with the physical sciences?



## Some challenges to address



- What new curriculum content is needed and how to incorporate it?
  - Social determinants of health
  - Communication and teamwork
- How much can reasonably be taught in an entry level pharmacy program and the need for post-graduate education and/or training?

