


Integrated Learning of the Medical Pipeline in the PharmD Curriculum

Diana Brixner, Gary Oderda, and Emily Hunter
*Pharmacotherapy Outcomes Research Center (PORC), University of Utah, Salt Lake City, Utah, USA.



Presentation Overview

- Movement toward integrated learning
- Current status of drug development teaching in pharmacy education
- The medical pipeline in pharmacy education
- ARS (integrative learning) approach to consider the medical pipeline in PharmD curriculum
- Summary and next steps

Integrative Learning in the Pharmacy Curriculum

ACCP Curricular Change Summit Supplement

- Move from classroom for factual data to a venue for integrated learning
- Challenge critical thinking, provide lucid communication, and synthesize data to solve problems
- Philosophy of evidence-based education

*Blouin, RA., Riffe, WH., Robinson, ET., Beck, DE., & Green, C. (2009). Roles of innovation in education delivery. *American Journal of Pharmacy Education*, 73(8).

Innovative Teaching Approaches

- Technology-Enhanced Environment
 - Supplement traditional lecture with technology, e.g. YouTube demonstrations.
- Blended (Hybrid Learning) Environment
 - Reduces lecture time with more active learning and out of class projects.
- Online Learning Environment
 - Learn using preferred learning style at the time of day best for each individual.

*Blouin, RA., Riffe, WH., Robinson, ET., Beck, DE., & Green, C. (2009). Roles of innovation in education delivery. *American Journal of Pharmacy Education*, 73(8).

Seven Principles of Good Practice for Integrative Learning

Table 1. Chickering and Gamson's Seven Principles of Good Practice

Good practice:

- (1) encourages contact among students and faculty.
- (2) develops reciprocity and cooperation among students.
- (3) uses active learning techniques.
- (4) gives prompt feedback.
- (5) emphasizes time on task.
- (6) communicates high expectations.
- (7) respects diverse talents and ways of learning.

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Problem Based Learning Example

- University of Utah Pharmacy Management Course used a Problem Based Learning Model for instruction.
 - Didactic Lecture
 - Group Projects
 - Groups of 5-6 students developed plans for managing a hypothetical managed care organization culminating in an annual report.
 - Individual Reports on other systems

*Ho, M., Kirkness, C., & Brixner, D. (2006). Problem-based learning in pharmacy management. *Journal of Pharmacy Teaching*, 13(2), 39-56.

Value of Curricular Information on Drugs and Devices in Development

- Promotes learning
 - Regulatory and Drug Approval Process
 - New Mechanisms of Action and Drug Delivery
 - Comparison with Existing Agents and Future Role in the Market
 - Economic Impact of Newly Developed Expensive Products
 - Appreciation of Science and Impact on Practice

Current Status of Drug Pipeline Information in Pharmacy Education

- Currently drug development education is most often seen as post PharmD continuing education or workshops
- Field of genomics could provide a good venue for integrating drug development into the PharmD education.
 - Teach students about the newest medications and devices using genomic technology
 - Train to look for adverse drug events before they occur.

Vizirianakis, I. S. (2002). "Pharmaceutical education in the wake of genomic technologies for drug development and personalized medicine." *Eur. J. Pharm. Sci.* 15(3): 243-250.

Related Coursework at the University of Utah

- P1
 - Physiological Chemistry
 - Introduction to Pharmacotherapy
 - Dosage Forms/Drug Delivery Systems
- P2
 - Drug Literature Evaluation
 - Medicinal Chemistry
 - Pharmacy Management
 - Pharmacology and Disease & Drug Therapy

Related Coursework at the University of Utah

- P3
 - Disease & Drug Therapy
 - Pharmacokinetics
- P4
 - Clerkships: HIV Clinic, various research rotations, managed care, seminar

Sources of Information on Pipeline Drugs and Devices

- Drugs
 - FDA Center for Drug Evaluation
 - FDC *Pink Sheet*
 - Journals and Magazines
 - PBM Trend Reports
 - The Medical Pipeline
 - BioPharm Insight
 - Internet Sources
 - Syndicated Databases
- Devices
 - More limited
 - FDA Center for Drug Evaluation
 - BioPharm Devices
 - The Medical Pipeline

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Prostate Cancer: Leading-Edge Diagnostics in Detection and Prognosis

Prostate cancer affects more men than any other cancer. It is not the number 1 cause of death, however, for a number of reasons, including the widespread utilization of screening. The extensive use of prostate-specific antigen (PSA) screening is controversial because the test measures protein that is secreted by both healthy prostate cells and tumor cells, resulting in high false-positive rates and unnecessary biopsies.

Unfortunately, no other biologic marker that can detect prostate cancer has been identified. Therefore, the majority of diagnostics in development need to be used in conjunction with the PSA test, with the goal of improving the clinical value of PSA testing.

What is The Medical Pipeline®?

A monthly newsletter that evaluates technology in development by class

- Devices
 - Prosthetics, Pacemakers
- Diagnostics
 - Genetic Testing, Imaging Systems
- Drugs
 - Specialty and Traditional

Sample of Topics Covered in 2009 and 2010 Medical Pipeline

Devices	Diagnostics	Drugs
Blood	Blood dyscrasias	Hemopoetic factors
Ultrasound	Leukemia	Leukemia
Knee replacement	Lymphoma	NHL
Sleep apnea	Lupus	Schizophrenia
Migraine	HPV	Migraine
Pain management	Alzheimer's disease	Alzheimer's disease
Spinal	HIV/AIDS	HIV/AIDS
Heart valves	Hepatitis C	Hepatitis C
Cardiac stents	Cystic fibrosis	Hemophilia

**Who Uses Information
on Pipeline Drugs?**

- Employer assessment of value of new technology to employees
- Health Plans for formulary consideration
- Health Policy for reimbursement decisions
- Hospital for formulary consideration
- Pharmacy Benefit Management for benefit design decisions
- Physicians for patient care

***Curricular Placement in
Pharm.D. Programs***

Audience Response System

***Which Best Describes your College of
Pharmacy?***

1. Public Research Intensive
2. Public Teaching Intensive
3. Private Research Intensive
4. Private Teaching Intensive

Does your College of Pharmacy include information about the drug approval process in your curriculum?

- 1. Yes
- 2. No

If so, where is information on drug approval included? Answer all that apply

- 1. Didactic courses
- 2. IPPEs
- 3. APPEs
- 4. Seminar courses
- 5. Electives

Does your College of Pharmacy include information about pipeline drugs in your curriculum?

- 1. Yes
- 2. No

If so, where is information on pipeline drugs included? Answer all that apply

1. Didactic courses
2. IPPEs
3. APPEs
4. Seminar courses
5. Electives

In addition to text books, do you actively include tertiary resources in your curriculum?

1. Yes
2. No

If so, where do you use Tertiary Resources? Answer all that apply.

1. Didactic courses
2. IPPEs
3. APPEs
4. Seminar courses
5. Electives

If so, which tertiary resources do you use? Answer all that apply.

1. Medical Letter
2. Micromedex – eg DrugDex
3. Drug Facts and Comparisons
4. Up to Date
5. The Medical Pipeline
6. Other

Does your College of Pharmacy include information about Medical Devices in your curriculum?

1. Yes
2. No

If so, where is information on Medical Devices included? Answer all that apply

1. Didactic courses
2. IPPEs
3. APPEs
4. Seminar courses
5. Electives

Does your College of Pharmacy include information about the Drug Coverage Process in your curriculum?

- 1. Yes
- 2. No

If so, where is information on the drug coverage process included? Answer all that apply

- 1. Didactic courses
- 2. IPPEs
- 3. APPEs
- 4. Seminar courses
- 5. Electives

Rank the following in terms of the likelihood that you will increase content in your curriculum

- 1. Biotechnology drugs
- 2. Pharmacogenomics
- 3. Medical Devices
- 4. Medical Pipeline
- 5. Drug Coverage Process

The use of The Medical Pipeline would be a useful tool in interactive learning. What is your opinion?

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

Summary and Next Steps

- Integrated learning is an important component of pharmacy curricular revision
- The medical pipeline offers an unique approach to offer interactive teaching opportunities
- We plan to summarize the output from today's workshop in an upcoming issue of the TMP®!

References

- Blouin, RA., Riffée, WH., Robinson, ET., Beck, DE., & Green, C. (2009). Roles of innovation in education delivery. *American Journal of Pharmacy Education*, 73(8).
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- www.tmp-pipeline.com
- **The Medical Pipeline® Editor:** Marjorie P. Zimmerman, MS, BS Pharm; marj.zimmerman@tmp-pipeline.com
