# Developing a Successful Clinical Pharmacology Curriculum

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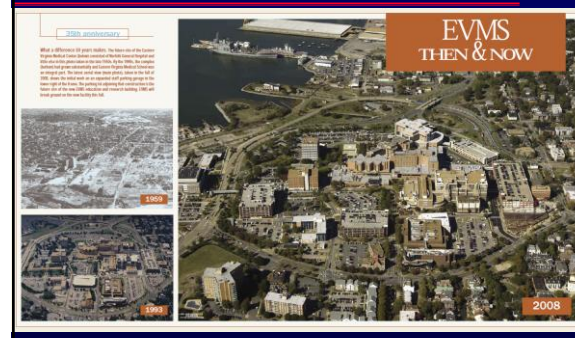
## Eastern Virginia Medical School




## EVMS Physician Assistant Program

- School of Health Professions
- 27 month program, including 15 month preclinical year
- New class starts each January
- Shares medical school resources and faculty
- On same campus:
  - Sentara Norfolk General Hospital (Level 1 Trauma)
  - Sentara Heart Hospital
  - Children's Hospital of the King's Daughters

## Traditional Pharmacology Curriculum

- Similar in structure for many PA and MD programs
- Focus on pharmacology (structure, mechanism of action, and pharmacokinetics)
- Brief mention of clinical use
- Use of generic drug names
- Taught by pharmacologists with little clinical training
- Material often out-of-date especially if obtained from pharmacology texts
- Medical school pharmacology curriculum usually starts in 2nd year of 4 year curriculum with ability to expand curriculum through 3rd and 4th years

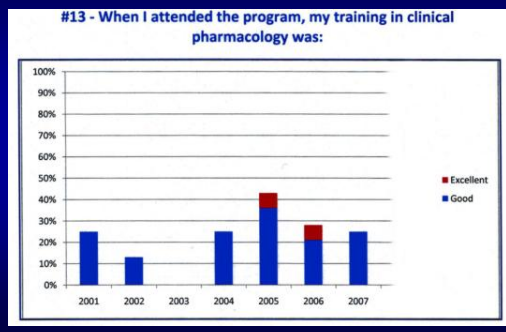
## Traditional Pharmacology Curriculum Subjects - Textbook

- Drug development
- Pharmacokinetics
- Pharmacodynamics
- Autonomic system
- Cardiovascular
- Hematological
- Neurological
- Analgesic
- Psychiatric
- Respiratory
- Gastrointestinal
- Pain and inflammation
- Thyroid
- Adrenal steroids
- Diabetes
- Calcium and bone
- Fertility and reproduction
- Antimicrobial
- Chemotherapy
- Immunotherapy

## Previous EVMS PA Pharmacology Curriculum

- Taught up to 2006
- Two semester course starting in May of the students' first year.
- Reliance on basic pharmacology text for resource
  - Out of date
  - Little clinical application
- Faculty from Department of Physiological Sciences (PhD)
  - No clinical training or experience
- Focus on drug structure, mechanism of action, and pharmacokinetics
- Use of generic drug names
- No integration with general medicine curriculum
- Traditional didactic class presentation

## Evaluations of Previous EVMS PA Pharmacology Program




## Challenges for PA Pharmacology Curriculum

- Physician assistants wrote or recommended 286 million prescriptions in 2006
- Must assume student has zero drug knowledge at start of PA school
- Student must be able to independently prescribe hundreds of medications safely and effectively after only 27 months of education and training
- Limited time during pre-clinical training to focus on pharmacology
- Limited access to pharmacology faculty for independent programs

## Competencies for the Physician Assistant Profession

- Medical Knowledge
- Patient Care
- Interpersonal & Communication Skills
- Professionalism
- Practice-Based Learning & Improvement
- Systems-Based Practice

**Concern:** Medical students are not receiving sufficient education and training in rational prescribing

**Panel:** Academic and industry experts in drug therapy, pharmacology education, and pharmaceutical research and development

**Objectives:** Based on six core competencies recommended by ACGME – same as PA core competencies


## Objective One: Medical Knowledge

Students need to understand:

- Factors that make patients unique
- Pharmacokinetic principles
- Drugs used to treat common diseases
- Management of medical emergencies (overdose, etc)
- Rules and regulations that govern prescribing
- Drug discovery process
- Dx and management of substance abuse
- How to find up-to-date information
- Medication errors
- Adverse Drug Reactions
- Drug-drug interactions

## Objective Two: Core Skills for Patient Care

Students are expected to be able to:

- Communicate well with patients and families
- Obtain accurate drug history
- Develop a sound drug therapy plan
- Use information technology
- Prescribe thoughtfully and clearly
- Find evidence-based information
- Understand package inserts
- Use therapeutic drug monitoring when needed
- Interpret antibiograms
- Maintain accurate and useful medical records

## Objective Three: Interpersonal and Communication Skills

Students are expected to be able to:

- Communicate basic information to patients
- Use effective listening skills
- Work with health care team
- Critically evaluate medical information
- Recognize errors and communicate w/ patient
- Explain DTC drug advertising to patients
- Understand the effect of culture on patient views
- Communicate special issues regarding human research trials
- Avoid collusion of anonymity

## Objective Four: Professionalism

Students are expected to:

- Demonstrate respect & show compassion
- Commit to lifelong learning
- Understand accountability
- Commit to ethical principles
- Demonstrate sensitivity to patient's culture, age, etc
- Practice good health behaviors
- Admit error and apologize when appropriate
- Know personal limitations
- Balance commitment with societal concerns

## Objective Five: Practice-Based Learning and Improvement

Students are expected to:

- Perform practice-based improvement activities
- Assimilate evidence related to patient's health
- Use community-based information and data
- Apply statistical methods to appraisal of clinical studies
- Access online medical information and support own education
- Understand use of critical pathways and guidelines
- Know role of hospital pharmacy and P&T committees

## Objective Six: Systems-Based Practice

Students are expected to:

- Explain how their patient care affects the larger society
- Understand how elements of the system affect practice
- Know how delivery systems differ in controlling costs
- Practice cost-effective health care
- Help patients deal with system complexities
- Understand roles of different professionals in medication use process
- Describe how prescribing practices can affect the health care system (drug costs = $250 billion/yr)
- Understand how the system supports or hinders prescribing
- Describe the role of regulatory authorities

## Current EVMS PA Curriculum

- New leadership starting 2005
  - Systematic review of curriculum
  - Per evaluations, students wished for more practical approach to pharmacology
- Starting in January, 2006
  - Integrated curriculum changes begin for medicine, pharmacology, and clinical assessment for class of 2008
  - New faculty additions
- Attempts to modify pharmacology curriculum school-wide were met with resistance
- Clinical pharmacist, already on site in Department of Family Medicine, was asked to join EVMS and develop new curriculum specifically for PA students

## Current PA Clinical Pharmacology Curriculum

- Bridge between traditional pharmacology and pharmacotherapeutics = clinical pharmacology
- Still cover basic pharmacology
- However, use information to determine potential benefits and risks of a drug – the key to selecting drugs of choice for individual patients
- Teach course as if it is a new language
  - Start with basic structure and terminology
  - Over time, introduce clinical reasoning skills both in cases and test questions
- Go beyond basic drug categories to address new competency expectations

## Structure of Current PA Clinical Pharmacology Curriculum

- Two semester course starting the second semester of the first school year
- Subjects linked as much as possible with general medicine course (3 semesters)
- Two question quiz before most classes based on assigned material from pharmacology text
  - Ensures familiarity with basic terminology and concepts
  - Ensures attendance
- Four modules each semester with MC exam after each
- Three case reviews and presentations on last class day before exam – applying the knowledge
- Extra topics presented periodically during fourth semester as part of medicine curriculum
- Review sessions every six weeks during the clinical year

## Current PA Clinical Pharmacology Curriculum

- Most of didactic material not taken from textbook
  - Focus on current clinical use of drugs
  - Resources: Medical Letter Therapeutic Guidelines, Prescribers Letter, DynaMed
  - Incorporate current guidelines from professional organizations
  - Utilize current reviews from peer-reviewed journals
- Use both generic and brand names – realities of practice
- Incorporate results of key outcome trials to highlight potential drug benefits as well as teach evidence-based medicine principles

## Current PA Clinical Pharmacology Curriculum

- Incorporate costs, potential drug interactions, pregnancy risk category in addition to common adverse effects to highlight potential risks
- Incorporate print and TV advertisements of common drugs to highlight marketing methods
  - Exaggerating the positive and minimizing the negative
- Encourage personal experiences of students
  - They are all on something or have had past usage
- Supplemental readings posted on Blackboard after each class – key reviews, clinical trials, guidelines, etc

## Non-Traditional Pharmacology Subjects Also Included

- Drug information resources
- Drug interactions
- Clinical trial evaluation
- Men's health
- Woman's health
- Prescription writing
- Medication assistance programs
- Medicare Part D, formularies, preferred drugs, etc
- Conflict of interest and the pharmaceutical industry
- Social psychology principles used to market drugs

MASTER of PHYSICIAN ASSISTANT PROGRAM at EVMS

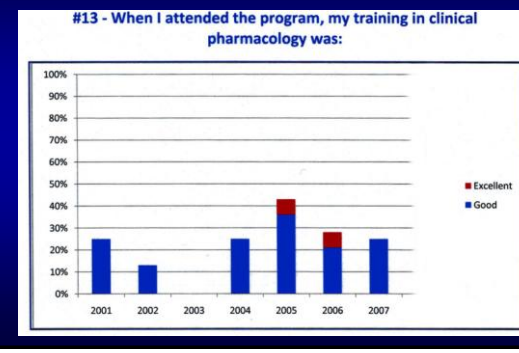
511-01 **CLINICAL PHARMACOLOGY I** SEMESTER TWO 2009

Lecture: Tuesday and Friday, 10:00 am-12:00 pm

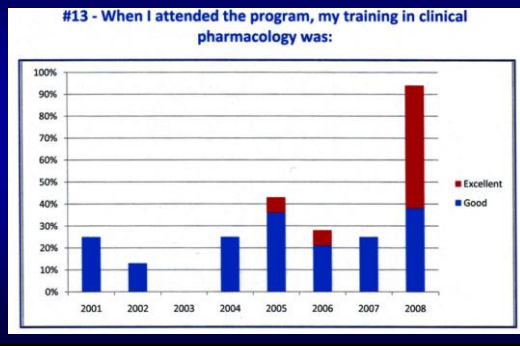
MODULE 4

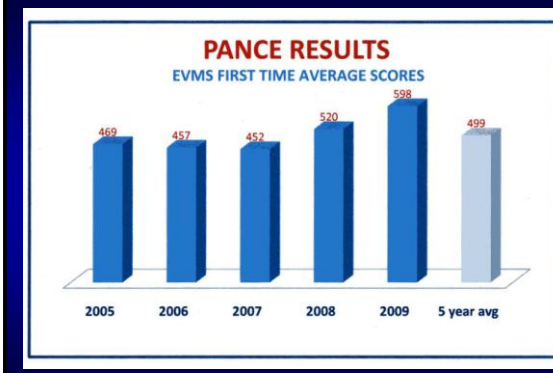
| DATE | LECTURER | TOPIC | REFERENCE | ASSIGNMENT |
|---|---|---|---|---|
| Tuesday July 28 | T. Lynch, Pharm.D. | Weight Loss Drugs | | Blackboard |
| Friday July 31 | T. Lynch, Pharm.D. | Drugs for Hypertension | Brenner & Stevens | Pgs. 96-109 |
| Tuesday August 4 | T. Lynch, Pharm.D. | Drugs for Coagulation Disorders | Brenner & Stevens | Pgs.169-178 |
| Friday August 7 | T. Lynch, Pharm.D. | Drugs for Heart Failure | | Pgs. 118-129 |
| Tuesday August 11 | T. Lynch, Pharm.D. | Critical Care Drugs | Brenner & Stevens | Blackboard |
| Friday August 14 | H.E. Davidson, Pharm.D. | Hypertension, Heart Failure, and Anticoagulation Case Studies | | |
| Final Exam Week | | EXAM #4 | | |

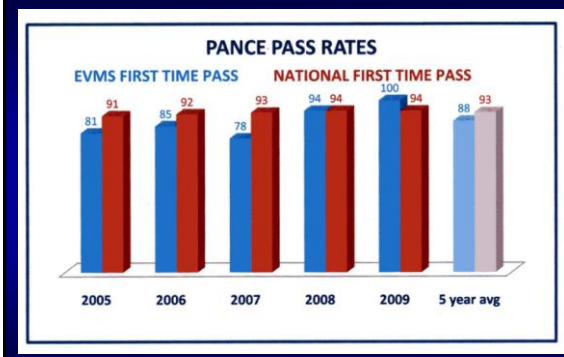
## PA Pharmacology Evaluations by Graduating Class



## PA Pharmacology Evaluations by Graduating Class - 2008




## Lessons Learned

- Redundancy, redundancy, redundancy
- Use anecdotes from clinical practice
- Keep current and incorporate new material into each prepared presentation
- Utilize latest guidelines (texts don't include these or they are out of date)
- Concentrate on most commonly prescribed drugs (P drugs – preferred, personal, or priority)
- Do not rely on industry-sponsored material
- Give equal weight to Benefit and Risk

## Possible Strategies

- Involve clinically trained Pharm.D.
- Look for opportunities outside standard curriculum time to meet objectives
- Get on email list of top journals, FDA, CDC, etc to keep current
- Health blogs for daily updates
  - Wall Street Journal Health Blog to start
- Add new developments to completed lectures as bullets and expand on later

## Possible Strategies

- Use unbiased resources to update curriculum and make more clinically relevant:
  - Medical Letter Therapeutic Guidelines
  - Prescribers Letter
  - Dynamed