Undergraduate (BSN) Nursing Pharmacology at the University of Michigan: Pharmacology 210

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“Even though your profs may tell you otherwise, pharmacology is ‘pure memorization.’” [It] is the “ultimate challenge in medical memorization,” and “one for which some remedy to dull the pain of the subject is needed.”

From a student-authored study guide for USMLE Step 1… but it applies to nursing students too!

You teach “pharm?” My condolences.

From me.
A Confusing Plethora of Nursing Programs, Degrees, Licenses, Certifications

- Associate degree (usually 3 year) and “diploma programs” -- limited knowledge, scope of practice, job opportunities (e.g., licensed practical nurse)
- BSN programs… standard (4 yr), “2nd degree” and others most common, enable licensure as RN, provide minimum prereqs for more advanced degrees, certifications, career opportunities
- Advanced degrees, certifications, such as nurse practitioner (NP; general or specialty), certified registered nurse anesthetist (CRNA)
- Masters or doctoral degree usually needed for faculty, dwindling faculty numbers because of poor compensation and mass retirements of current faculty
Educational Background of Today’s New Nurses*

- Hospital-sponsored diploma programs, ≈ 3%
- Bachelor’s degree program, ≈ 36%
- Associate’s degree program, ≈ 60%

*Aiken, LH: Nurses for the future. NEJM 364:3, 2011
Nature, Scope, Frequency of Contact By Nurses with Current or Future Patients

- In both in-patient and out-patient settings, nurses usually are the “first point of contact” and responsible for assessment, triage.

- In (mainly) institutional settings, nurses usually are the ones to administer drugs, provide initial assessment of responses good and bad.

- Are responsible for the bulk of patient teaching about drugs and overall care plan.

- Probably “most approachable” for advice requested by lay public.
From Day 1: “To Err Is Human”

- Seminal report from Institute of Medicine sets stage for the importance of pharm knowledge
- Show stats on medical errors, focus on drug-related issues (health- and other-wise)
- Explain nature and scope of professional interactions re: number, consequences of med errors, essential role of nurses in team responsibilities for checks and balances approach
- Foster need for knowledge, critical thinking, don’t scare students from administering drugs, but don’t inhibit students from questioning med orders
- Identify general “standards of care,” alternative approaches, common “goofs.”
- Stress common sources of errors, how to minimize them.
Course Enrollment, Teaching, Testing

- Most students in 1st term, 2nd year, BSN program (i.e., college undergrads)
  - Prereqs include prior or current anatomy & physiology and pathophysiology
  - Growing number of students from other areas accepted, most seeking entry to School of Nursing 2nd Degree program
  - Over last 20 years, enrollment has gone from about 80 to current + 170
  - Is taught by med school pharm, not School of Nursing

- Lectures
  - 50 hours total, 2 hours twice a week (4 credit course), 1 semester
  - Some self-study topics in addition to lectured topics

- Teachers
  - One jr faculty member (4 hours for antibiotics, 2 hr for cancer chemotherapy)
  - Two grad student TAs (assigned by department) give 1 hr lecture each, assist students with study, give reviews, proctor exams
  - Course director gives remaining lectures, writes exams
Exams (4 per term)

• 50 or so multiple choice questions, one best answer
• Most scenario-based
• Include questions on drugs NOT discussed in class, in text, etc.*
• Focus on synthesis, application, of knowledge taught in class
• Integrate recall of core knowledge tested on prior pharm exams and in pathophysiology
• Include topics/issues recently “in the ‘news’”

*This approach initially caused uproar and indignation among medical students until I told them why it’s appropriate and necessary, and followed-through on exam questions.
The “Nursing Process” Somewhat Directs Orientation of Teaching

- **Assess, diagnose** (what is the current situation?)
- **Plan** (how to improve/stabilize the situation)
- **Implement** (how to put plan into action)
- **Evaluate** (did the plan work?)
You teach yourselves pharmacology. I train your minds.

You come in here with a skull full of mush, and if you survive you’ll leave thinking (more) like a nurse.”

My standards for you, and for me, are high. Your professional role is important!
Main Areas Of Pharm 210

• General principles (pharmacokinetics, pharmacodynamics, drug interaction mechanisms, age-related effects, genetics, etc.)
• Peripheral (autonomic, somatic) nervous systems
• Respiratory (mainly seasonal allergies, asthma, COPD)
• CNS
• Cancer chemotherapy
• Antimicrobials
• Endocrine (diabetes, thyroid, parathyroid, various uses of corticosteroids, etc.)
• Antiinflammatory/antipyretic/non-narcotic analgesics
• Cardiovascular and renal
Learning Resources

Lectures (coming to class!)
Text book
Slides } all on the
Last year’s exams} course
Other web sites } web site
Your TAs
Study groups
Me
Generic Names (GN), Trade Names (TN)

- Differences between GN, TN, discussed early-on
- Generic names are “taught,” trade name(s) shown only for possible recognition
- Assiduously avoid unintentional/haphazard mixing of GN, TN: be consistent
- No “match TN with GN” questions
- Use TN only in exam question? Only when a brand name drug is described in such a way that student should be able to recognize relevant drug class or generic that was taught.
Focus on Prototype Drugs

• Generic names
• Classifications (chemical, system, and/or main use[s])
• Main mechanism(s) of action
• Main (FDA-approved) uses/indications; off-label uses noted only when relevant
• Main contraindications
• Most common and/or important side effects
• Main drug interactions and outcomes (including with common OTCs)
• Signs, symptoms, recognition, management, of toxicity
Atropine as Prototype Antimuscarinic

Basic pharmacology of cholinergic receptors — Muscarinic blockers — Atropine
Sites of action and system-specific effects

- Mydriatic/cycloplegic agent
- Adjunctive management of muscarinic agonist or AChE inhibitor toxicity
- Reversal adjunct for “curare-induced” skeletal muscle paralysis (glycopyrrolate)
- Management of sinus bradycardia

1st Generation antihistamines (diphenhydramine)
- Tricyclic antidepressants (imipramine)

Adjunctive Tx. of COPD (ipratropium); nebulized atropine as adjunct in severe, acute asthma
- Centrally-acting antimuscarinic antiparkinson drugs (benztropine)

Management of certain bladder or gut hypermotility conditions (tolterodine)

“Traditional” (“low potency”) antipsychotics (chlorpromazine)
07/10/2008

**Dx:** persistent adnexal mass

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<th>Procedure(s):</th>
<th>OPERATIVE LAPAROSCOPY, RSC</th>
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<td>TENSION-FREE VAGINAL TAPE</td>
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**BIRTHDATE**

**Name**

**MRN**

**SEX:** F

**Admit Date:** 

**VISIT No.:** 

**OP**

**ASA:** ASA 2

**Case Default:** 

**Surgeon:** 

Orally intubated using Macintosh #3 blade after first attempt. Patient extubated.

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<th>Anesthesia Start</th>
<th>Patient In Room</th>
<th>Anesthesia Induction End</th>
<th>Surgical Incision</th>
<th>Surgical Dressing Complete</th>
<th>Patient transported to PACU</th>
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**Anesthesia End**

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**Monitors**
Deviating from Focus on Prototypes…

Examples:

- **Albuterol** as largely selective β-2 agonist (compared with isoproterenol)
- **Atenolol** (or metoprolol), **labetalol** (vs. propranolol)
- **Physostigmine** (vs. neostigmine)
- **Cimetidine** (vs. the 3 other alternatives)
No Gratuitous Structures or Metabolic Pathways

• A “picture is worth a thousand words” approach here is counterproductive
• Tend to be off-putting, intimidating, largely needless
• Selected exceptions, eg, what a big difference the presence or absence of a little methyl group makes (EPI vs. NE)
Side Effects, Adverse Responses, Drug Interactions

• All are largely limited to those that are of most clinical significance:
  – Typical time of onset
  – Typical presentation
  – What to do about them

• Drug interactions limited to “#1 or #2” in *Handbook of Drug Interactions*, ie well documented in humans, serious/severe, whether common or not
What About Drugs That Have Been Discontinued, Those Coming “Down the Pike”?

• Discontinued/withdrawn drugs: Include only if there’s a teachable lesson
• Drugs in development: Include only if they’re likely to be FDA-approved and offer a unique or otherwise notable advantage over currently approved drugs
Keys To Success. 1.

- Know your pharmacology inside and out
- Understand what students/future professionals know (or should know), need to know, and how they use the information in the “real world”
- Strike good balance and connection between basic pharm (and biochem, A&P and pathophys) and application of knowledge by nurses
- Show students clinical applicability/connections of basic pharm knowledge in every lecture
- Personalize, when possible, to “your patient, your family member or friend, …you!”
- Emphasize, guide, and test on application of knowledge moreso than on “rat facts”
Keys To Success. 2.

- Limit discussions, as best as possible, to prototype drugs (and a few “selected others”)
- Show important connections/overlap between ostensibly disparate areas of pharm and drug therapy
- Know what students (should have) learned before to avoid needless redundancy
- Anecdotes (including from case reports), humor, help immensely
- Connect course content to “what’s in the news”
- Keep up to date otherwise: FDA’s MedWatch, Medical Letter, Prescriber’s Letter, ISMP Nurse AdvisERR, etc.
Keys To Success. 3.
“Dr. A discussed this, right?”

• As few teachers as possible helps

• Advantages:
  – Better understanding of what was or will be presented, tested
  – Better review or “heads-up”
  – Better integration of content throughout course
  – Consistency of question formats

• Disadvantage:
  – TIME!
Typical Grade Distribution
You teach “pharm?”

My admiration.