

Innovators in Education

Sparking Transformations
in UNMC Curricula

—

Spring 2019 | Volume 06





H. Dele Davies, MD, MS, MHCM

Senior Vice Chancellor for Academic Affairs

UNMC's latest cohort of e-learning innovators continues to transform our curricula. One of the key factors of their success is due to the collaborative partnership between the faculty and student participants. Faculty led the projects with the commitment to incorporate the e-modules into their courses and consult with students to generate creative ideas. In turn, students offered engagement options and development skills. Further, this cohort includes faculty and student representation from all colleges and multiple campuses.

While the projects continue to span a wide array of topics, there was an extended focus this year on pharmacology. This was due in part to support the new curriculum redesign in the College of Medicine, and to also ensure the projects reached a broad number of students from varying colleges. This cohort is also part of a larger effort to evaluate the impact of e-learning and to increase UNMC's educational research and scholarship in the e-learning field.

I want to express my gratitude and appreciation for all the hard work that went into the creation of these e-learning projects and previous ones. We now have over 30,000 annual downloads of the over 200 modules that are on our e-gallery. I hope you enjoy learning about how our faculty and students are sparking curricula innovation at UNMC.



Access the Modules on the E-Gallery

UNMC faculty, students, and staff can access e-learning modules on the E-Gallery at unmc.edu/gallery



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Guided Exploration of the Medical Record for Therapists: Cardiovascular & Pulmonary Systems

A medical record review is important to perform before a physical examination or treatment session of an individual with a cardiovascular or pulmonary condition. The information gathered from a medical record review is used in clinical decision making. However, the electronic medical record (EMR) has a wealth of information that can often be overwhelming to sift through for a therapy student or novice clinician.

This module provides a guided tour of the important components of the EMR to be reviewed prior to treating an individual with a cardiovascular or pulmonary condition.

The essential information found in the Medical History component of the EMR is highlighted first. The tour continues by identifying and defining common lab and diagnostic tests and measures important for the therapist to consider before treatment.

Clickable interactions in a virtual medical record along with animated video keep the learner engaged with the material. In addition, knowledge checks with feedback are integrated throughout the module for effective learning.

While **intended to be viewed before class discussion**, the module will be a readily available resource for students to **revisit when preparing for exams or treating patients** in the clinic.

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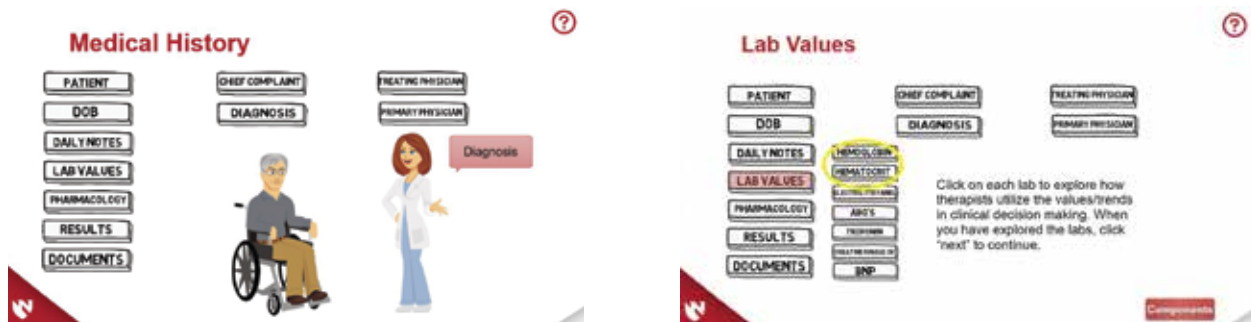
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Anemia in Older Adults

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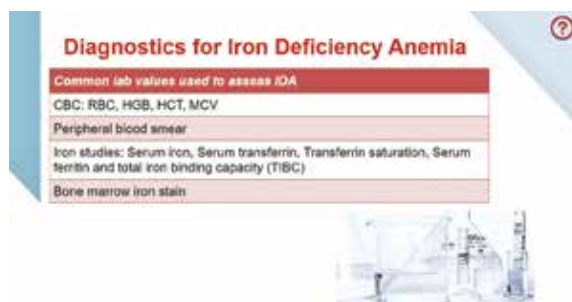
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Anemia is a common co-morbid problem facing clinicians and healthcare professionals in a variety of specialties. It is a known geriatric clinical problem that contributes to an increased rate of morbidity and mortality, and its prevalence increases with age. Studies show correlations between anemia and limited performance, daily activity impairment, weakness, cognitive impairment, and the frequency and duration of hospital stays.

This interactive e-learning module will help providers and clinicians assess, identify, diagnose, and treat anemia syndromes as seen in the geriatric population. With early recognition of these syndromes, providers can proactively avoid adverse events and improve health outcomes.

The module includes interactive case studies that allow the learner to assess one to two geriatric patients who are at risk for various types of anemia. The case study takes the learner through patient presentation, assesses and evaluates differential diagnoses, and selects various laboratory testing and diagnostics. Learners then interpret the results and choose a treatment plan that highlights the needs specific to the geriatric population. After completing the module, learners gain experience in treating anemia in vulnerable populations like the elderly, while also taking into consideration medication reconciliation, nutrition deficiencies, management of co-morbidities, and psychosocial concerns. This e-learning module will be **used in addition to lectures, in a hybrid classroom, and as a supplemental material or study aid** to promote better retention and application of course material.



More than Counting Pills: The Pharmacist Patient Care Process

The Pharmacist Patient Care Process (PPCP) describes how pharmacists deliver patient care across healthcare settings. It was developed to help standardize pharmacists' approach to care. The PPCP also helps communicate the role of the pharmacist to others on a healthcare team. The five key elements in the process are: collect, assess, plan, implement, and follow-up.

This e-module was developed to help educate pharmacy students about the PPCP and to help them envision how their learning in the classroom relates to practice at an early stage.

The first e-module helps students learn the basics of the process and the second e-module aims to show how the PPCP is practiced in multiple healthcare settings.

The e-module will serve as a tool to **introduce the process to first-year pharmacy students**, but also as **supplemental material** for the other two years in the didactic curriculum to help them match their own activities to the PPCP. Additionally, this e-module can be used to **show other healthcare professions the role of the pharmacist** on an interprofessional team. We plan to assess the ability of pharmacy students to match different activities in the curriculum correctly to the PPCP to determine the e-module's impact.

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Clinical Reasoning Using the International Classification of Functioning

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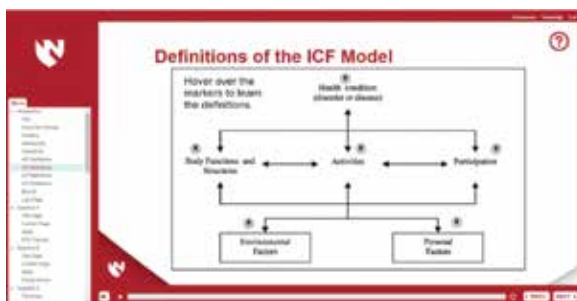
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Clinical reasoning is one of the more challenging aspects of healthcare that professionals need to master. The International Classification of Functioning, Disability and Health (ICF) of the World Health Organization, the basis of healthcare diagnostic coding (i.e., ICD-10), can also be used as a clinical reasoning method for deciding what aspects of an individual's health condition need to be examined and treated.

Using the ICF concepts of Participation Restriction, Activity Limitation, Impairment of Structures and Functions, Environmental Factors, and Personal Factors, this module helps learners understand terminology, how the different factors interact, and how they can be used to prioritize clinical decisions. The learner makes actual decisions about the patient case and sees the consequences of them.

The healthcare profession student can use this module as a **stand-alone learning activity**, but students will also use it to promote understanding of the ICF prior to an **in-class small-group discussion activity** that will apply the concepts from the module.

Outcomes will be assessed through student surveys and statistical comparisons of individual and group decisions with those made by a panel of expert clinicians. By using a clinical case, video clips, and interactive decisions, the module should appeal to those who appreciate active learning and help them improve their clinical reasoning skills. Articulate Storyline 3 was the technology used to create the module and its interactions.



Listening with Your Eyes: Observation for Excellent Patient Care

Assessing the environment and a patient quickly and accurately is crucial to providing excellent care. This requires relying on visually scanning a patient and the environment continuously during patient interactions, rather than only listening to what the patient is saying. Literature indicates nurses were able to become better observers by studying visual arts.

This module is designed to improve observational skills for physical therapy (PT) students. Students will be challenged to describe art pieces in as much detail as possible. This will help improve their visual literacy skills as they attempt to make meaning of the objects in the pictures. These same skills can subsequently be utilized to describe a hospital environment and a patient.

Students will assess an image of the hospital environment and clinically reason what needs to be prioritized before they would hypothetically mobilize a patient out of bed.

This module targets first-year PT students, who learn the psychomotor skills of transferring a patient subsequent to viewing this module. Completing this module beforehand allows continued practice of visual literacy and survey skills in lab with intentional repeated exposure to enhance learning. Many students are eager to perform hands-on skills with patients, but often forget to critically analyze the environment and think through their plan, which may compromise safety. By performing a general survey, critical steps can be taken to improve patient and provider safety and quality of care.

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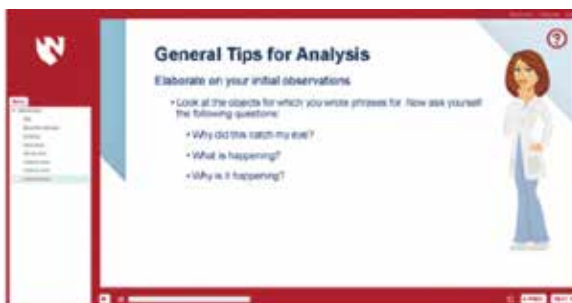
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An Introduction to Cohort Studies and Measures of Association Using Relative Risk

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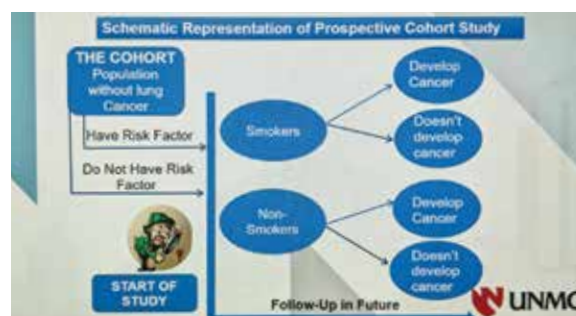
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Cohort studies are used to examine the causes of a disease and to establish links between risk factors and health outcomes of a large group of individuals with common characteristics. It features analysis of a cohort study that uses the risk of developing a disease in the exposed cohort compared with the risk of developing a disease in the unexposed cohort.

This module is designed for students to apply what they have learned about cohort studies, to identify and calculate the appropriate measures like relative risk and attributable risk, and to apply those measures in public health.

This is an online, interactive module embedded with quizzes to engage learners. These self-assessment quizzes promote analytical thinking and problem-solving abilities and help the students in applying the concepts with ease to complete their assignments. This module utilizes simple language and engages visually. It **helps learners participate actively in classroom discussions**, thereby enabling them to retain the subject. The e-learning module is great in **facilitating interactive learning for distance learning students**.

Learners from the professions of **medicine, nursing, pharmacy, and public health will find the courses applicable** because cohort studies represent one of fundamental designs of epidemiology used in research. Additionally, because it is easy to understand, this module assists learners acquire basic understanding of the subject matter.



Obesity Bias

This project focuses on the identification and mitigation of clinical-based obesity bias. This topic was chosen due to the adverse effects of internalized stigmatization that can arise from negative healthcare experiences.

The e-learning module utilizes a series of first-person encounters to put the user in the patient's position and take on a patient's perspective, ideally stimulating a more empathetic learning experience. Interspersed throughout the first-person encounters are reflection prompts and interactive questions used to engage the user in differentiating the subtle differences between the types of bias. The unique interactive format of the e-module allows learners to constantly apply the abstract definitions of bias into real-world clinical scenarios, which they then may apply to their own learning environments and eventual healthcare careers.

The module would be used ideally as a **supplemental introduction to obesity bias**, specifically with differentiating between explicit and implicit biases in clinical practice.

We aim to examine the overall understanding of obesity bias among students and medical practitioners before and after use of the e-module. Our extensive summative assessment applies our bias definitions in many different contexts and allows users to find more appropriate behaviors to mitigate their implicit biases and improve overall patient care.

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Why should you care about Obesity Bias? ?

Stigmatizing Healthcare Experiences → Food-related Coping Mechanisms → Poor Health Outcomes

79% reported eating; turning to food as coping mechanism!

1. Puhl, R. M. and Heuer, A. D. (2010). Correlates and Consequences of Weight Stigma: An Investigation of Overweight and Obese Adults. *Obesity*, 14, 1022-1031. doi:10.1038/sj.ob.2101208

Summary of Biases:

1. Assuming that a patient isn't trying to lose weight due to laziness: "Are you really trying to lose weight?"
2. Assuming that patient's lack the willpower to lose weight: "...but given to your current size I don't want you to be too ambitious."
3. Insinuating bingeing behavior and junk food/soda consumption: "Would you say that you eat any foods in excess, like junk food, for instance?"

Drug Dosing Calculations: An Interactive Approach to Maintenance and Loading Dose Calculations

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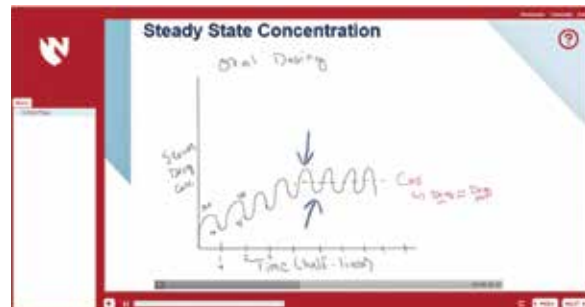
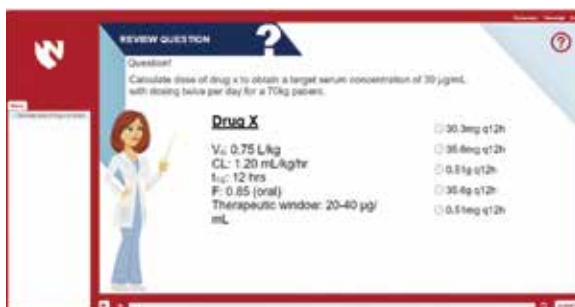
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Loading and maintenance dosing are difficult concepts to understand and even more challenging to apply to a mathematically based question, but determining these values is vital skill for **medical, nursing, and pharmacy students**. This concept is important to understand for standardized tests as well as clinical rotations, as students are faced with implementing treatment regimens and dealing with the complexities of patient care.

We utilized Articulate 360 to combine audio lectures with tablet drawings to develop a module that breaks down each individual component of dose calculations.

We start by defining the fundamental terms and concepts that are necessary to complete dose calculations, so the learner has a foundation to build upon. The module then progresses to a guided walk-through of example calculations before finally challenging the learner to complete a problem on their own. The examples are narrated and illustrated, and the written script is provided, which allows the learner to choose their preferred modality of learning as well as the speed at which they progress.

To assess for competency, the module provides feedback throughout and detailed explanations for each question. This allows learners to repeat specific sections they may not feel confident in before moving to a formative final question. This module will benefit students as a **supplemental resource** to their classroom work as it provides the ability to focus on and master the individual components of the process before moving forward.



You Got the Sugars

Diabetes mellitus presents a major health crisis in terms of prevalence, morbidity, and costs to the healthcare system. In the United States alone, every 24 hours, there are an estimated 4,100 new cases, 810 deaths, 230 amputations, 120 cases of kidney failure, and 55 people going blind.

The best strategy for decreasing the burden of diabetes is focused on preventative measures and lifestyle modifications, such as eating healthy and exercising. However, this may not always be feasible. Therefore, many medications have been developed in the treatment and management of diabetes. If it could not be prevented, then controlling its progression can help stifle the complications that come with it, such as cardiovascular disease, nerve damage, kidney damage, eye damage, foot damage, skin conditions, hearing impairment, and depression.

This project aims to portray clinically relevant information about diabetes mellitus and its treatments.

It will be best **used in conjunction with formal lecture** to help reinforce some of the more pertinent information or to provide a brief background of the information. To better enhance understanding and retention, the information will be presented in a short module with dynamic drawings to coincide with the information. Additionally, knowledge will be assessed intermittently throughout and at the end to provide a more interactive and enjoyable experience for the viewer.

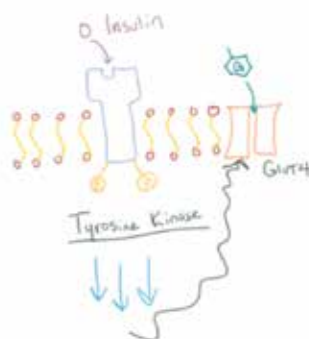


Image: Basic mechanism of insulin's effects on peripheral tissue and glucose uptake from the blood.

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Thyroid Pharmacology

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Learning the thyroid pharmaceuticals not only requires an understanding of the drugs themselves, it necessitates a comprehension of the interplay between pharmacology, physiology, and pathology. Therefore, an e-module is the perfect platform for combining what would be multiple lectures into one succinct learning tool.

This e-module on thyroid pharmacology includes thyroid physiology, drugs used to treat both hypothyroidism and hyperthyroidism, and various assessment tools. We created this module as a combination of our favorite study materials used in preparing for the USMLE Step 1 Exam.

The most notable themes are “Pathoma” style lectures and “Khan Academy” style illustrations. We also incorporated the application 3D Anatomy as an innovative tool for outlining thyroid physiology. The combination of these patented learning techniques along with interactive assessment tools will promote better retention of course material. One of our goals was to achieve consistency in the images used in order to avoid supersaturating students with pictures, graphs, or charts. In order to accomplish this, we used the same drawing from the Khan-style physiology lesson to illustrate where the mechanism of action for each thyroid drug takes place.

The project concludes with a summative assessment, which may be used to track the effectiveness of the module in future studies. By seamlessly connecting lessons in pharmacology, physiology, and pathology, the “Thyroid Pharmacology” e-module offers students a unique and efficient method to simplify a complex lesson in pharmaceuticals.



The Eyes Have It: Autonomic Control of the Eye

The autonomic nervous system can be a challenging topic for medical students, and autonomic innervation is particularly important to normal eye function.

This module enhances student learning by incorporating different aspects of eye autonomic innervation into a single cohesive and engaging storyline. The module follows the Autonomics Control Team (ACT) as they journey to the Twin Kingdoms of the Eye.

Within the eye, learners are introduced to the primary autonomic structures: the pupil, which constricts and dilates in response to light levels, and the lens, which accommodates to see near objects clearly. Learners then follow the ACT agents as they traverse the roads (nerves) and villages (nuclei) that convert sensory information into the aforementioned motor reflexes.

Additionally, students are challenged to apply this knowledge to predict the effect of autonomic ophthalmic drugs and to explain the physiology behind common pathologies such as rapid afferent pupillary defect. The module includes embedded questions to reinforce key concepts, as well as a final assessment to assess overall comprehension.

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Caring for the Patient Using Medical Marijuana

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This two-part project provides basic information for healthcare providers caring for patients who may be using medical marijuana. The modules provide introductory, unbiased information on medical marijuana, including:

- **Part 1:** legal issues and basic pharmacology
- **Part 2:** indications, side effects, and safety considerations

This topic was chosen because of the increasing use of medical marijuana in the general population. Healthcare educational oversight bodies, such as the National Council of State Boards of Nursing, have released recommendations to add education on medical marijuana to educational programs preparing healthcare providers for clinical practice.

The project allows students to gain a basic understanding of medical marijuana through independent, technology-based, active learning e-modules, which suits the learning styles of many contemporary learners. Utilizing new and interactive learning strategies will better prepare healthcare professionals on this topic.

This project promotes retention of content through active learning and case study application. Students interact with the module and complete the in-module quizzes prior to lecture. Using Articulate Storyline and PowerPoint, traditional quizzing and hotspot quizzing activities are incorporated throughout. The modules will be uploaded to Canvas, and data analytics will be used to determine student mastery of content.



Dental Management of the Cardiac Patient

Media depictions of cardiovascular disease (CVD) almost exclusively feature men, thereby clouding public awareness of its significance in women. Even more alarming is the fact that women are less likely than men to have their cardiovascular risk factors evaluated by physicians.

This module was developed to raise awareness of CVD's significance in women, and to provide healthcare professionals with the necessary knowledge regarding the pathophysiology of CVD and intervening pharmacological treatments.

Learning content is presented in a series of coherent, well-illustrated videos each designed with specific learning outcomes. The video animations are kept brief (two minutes or less) to retain viewer attention with concise focus in the following topics: physiology of the adrenergic system, tissue distribution of adrenoceptors, structure-activity relationship (SAR) of cardiogenic drugs, and pathophysiology of IHD in women. The learner is then challenged with applying the video concepts through interactive activities. Featured activities include "engineering" a human body with adrenoceptors, classifying drugs based solely on structure within receptor binding sites, and predicting and testing the biological activity of a molecule using real-time simulations.

Learners then integrate broad, evolutionary ideas with precise, molecular level concepts in a case-based, cumulative assessment. Activities and assessments are specifically designed to develop effective mental-representations for the student to adapt the knowledge in diverse clinical application.

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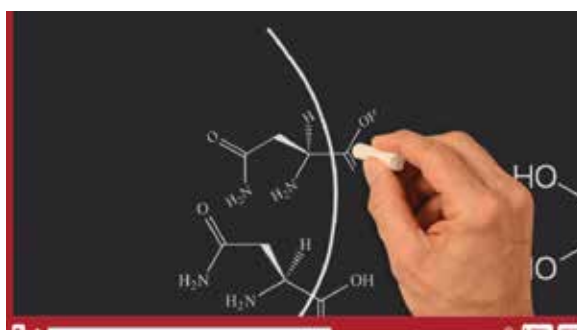
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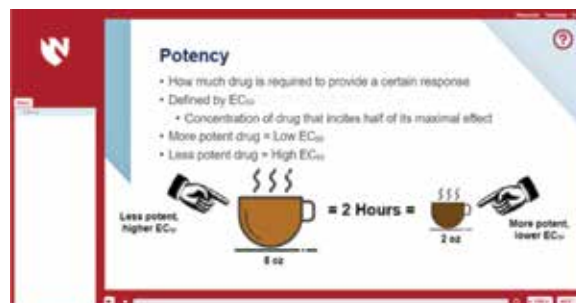
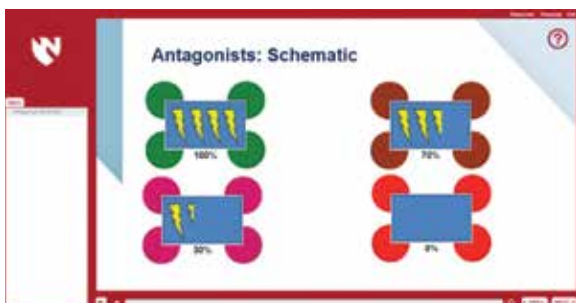
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This module was created as an extension of an existing module, Receptor Binding, to further explore the relationship between drugs/ligands and receptors. Specifically, this e-module covers drug properties (such as affinity, potency, and efficacy) and discusses how drugs act on receptors, with a focus on agonist and antagonist action.

The intricate nature of affinity, potency, and efficacy tend to confound individuals, especially since mainstream media (such as television or radio) frequently misuse these terms. Specific details as to how drugs act on receptors can also be confusing, particularly when applied to a drug's physiological role in the body. By providing relatable examples, interactive slides, and frequent review questions, this e-module is meant as a **supplement to a traditional lecture** to clarify these fundamental concepts. In addition, a summative review at the end of the module requires critical thinking and synthesis of concepts to answer higher-order application questions.

Almost everyone can benefit from this e-module including, but not limited to, **medical students, physical therapists, physician's assistants, nurses, allied health professionals, and graduate students**. The concepts covered within this e-module are critical for a basic understanding of pharmacology, an area of study applicable to many disciplines, and will contribute to a better-prepared healthcare professional and scientific researcher.



Spotlight Project

U.S. Healthcare System & Healthcare Reform for the Health Professions Student

The U.S. healthcare system is not really one system, so much as a network of subsystems, policies, providers, and payers. It is complicated and ever changing. Health professions education generally focuses on providing students with the knowledge and competencies to assume roles as providers of healthcare, but far less content about the system in which the care is provided.

This e-learning project presents a simple conceptual model – the “Healthcare Landscape” – for understanding of the complexities of the U.S. healthcare system, its various components, and the relationship between these components.

It is a five-part series that provides requisite knowledge for any health profession student about the U.S. healthcare system in an informative, interactive, one-hour course.

The first module introduces a simple, conceptual, model for understanding the complex U.S. healthcare system, and the subsequent modules reinforce the model by examining patterns in U.S. healthcare reform over the past 100 years. There is a focus on exploring how health policy reforms have intentionally or unintentionally affected the components, and how one reform often leads to the next. An organized and logical methodology for understanding and evaluating future healthcare reform efforts emerges as the incremental nature of healthcare policy reform is surveyed across the decades. The series can be used as a stand-alone mini-course or as supplemental information for a more extensive health system course.

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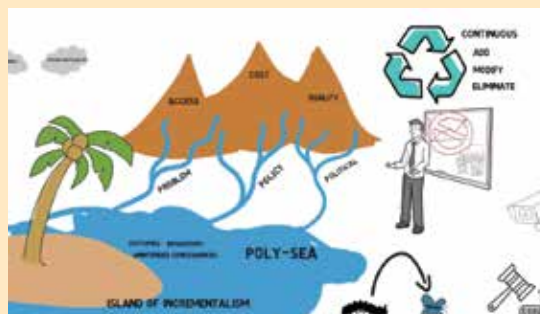
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