THE EUROPEAN SOCIETY OF MEDICINE
Medical Research Archives, Volume 12 Issue 12

RESEARCH ARTICLE

# Clinical Pharmacology Testing in Medical Education and Beyond

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OPEN ACCESS

PUBLISHED
30 December 2024

CITATION
Goldstein, FJ., 2024. Clinical Pharmacology Testing in Medical Education and Beyond. Medical Research Archives, [online] 12(12). https://doi.org/10.18103/mra.v12i12.6058

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DOI
https://doi.org/10.18103/mra.v12i12.6058

ISSN
2375-1924

## ABSTRACT

**Aim:**

To obtain opinions of high-level medical education administrators on allowing test-takers from undergraduate medical education to specialty certifications to have an electronic clinical pharmacology data base not connected to the internet as a reference during their respective exams.

**Scope:**

Deans in undergraduate and graduate medical education along with the top level administrators of the national osteopathic medical board were invited to give their opinions on the aim of this proposal.

## Introduction

FDA approval of new drugs has increased substantially over the past several years[1,2]. While healthcare professionals appreciate having more efficacious therapeutic agents, those faculty teaching and creating exams involving clinical pharmacology are concerned about the significant impact on test-takers at Undergraduate Medical Education (UME), Physician Licensure, Certification and Recertification levels, as well as better aligning assessments to real–world practice

I have proposed providing electronic storage devices – not connected to the internet – which will contain Food and Drug Administration labels of those drugs which would be considered when answering exam questions[2]. Utilization of such federal information is provided at no charge by the US government so there would be no cost for its procurement.

If accepted as a routine aspect of the examination process, a more rational approach will then be provided in medical education and assessment for this field. Advantages are:

a. memorization of facts would be reduced to a tolerable level
b. test-takers would then be able to access clinical material in greater depth
c. examiners will have the opportunity to develop more challenging questions
d. assessments would better align with real-world clinical practice

A pilot study needs to be conducted to evaluate this process which allows opportunities for development of an optimal system for assessments that are valid, reliable and fair.

To determine the opinion of upper level medical education administrators regarding my solution to this clinical pharmacology cascade, I have requested colleagues who serve at this level, *i.e.*, deans and board officers (Table) to participate.

Table. Participants Providing Administrative Opinions

| *Administrator* | *Position* | *Organization* |
|---|---|---|
| | | |
| Peter F Bidey, DO, MSEd, FACOFP | Dean and Chief Academic Officer | PCOM Philadelphia Campus |
| | | |
| Marla Golden, DO MS, FACEP | Dean | PCOM South Georgia Campus |
| | | |
| David Kuo, DO, FACOFP | Associate Dean for Graduate Medical Education | PCOM Philadelphia Campus |
| | | |
| John R. Gimpel, DO, MEd | President & CEO | National Board of Osteopathic Medical Examiners (NBOME) |
| | | |
| Gretta A. Gross, DO, MSEd | Executive Vice President for Assessment and Chief Assessment Officer | NBOME |

*Abbreviations*
DO: Doctor of Osteopathy
MS: Master of Science
MSed: Master of Science in Education
MSEd: Master of Education

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FACEP: Fellow of the American College of Emergency Physicians
FACOFP: Fellow of the American College of Osteopathic Family Physicians

An invitation was sent to all as follows:

*"Colleagues:*

*Thanks for participating in my focused academic research study addressing the issue of an extremely expansive number of drugs now available to practicing physicians. Your respective opinions are critical to this process.*

Q1: Do you approve of providing test-takers during *UME* exams with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?

___NO ___ YES
Please provide an explanation below for your selection.

Q2: Do you approve of providing test-takers during the NBOME licensing examination (COMLEX-USA) with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?

___NO ___ YES
Please provide an explanation below for your decision.

Q3: Do you approve of providing test-takers during *Certification* and *Recertification* exams with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?

___NO ___ YES
Please provide an explanation for your decision.

Q4: If you approve of providing such a device to test-takers for Undergraduate Medical Education, NBOME licensing examination (COMLEX-USA), and Graduate Medical Education: Recertification, when would be a reasonable time for implementation 'As soon as possible (ASAP)', 'Within 2 years', or 'Within 5 years'?

The following comments from participants were edited and condensed by the author.

Q1
***Do you approve of providing test-takers during Undergraduate Medical Education exams with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?***

*Dr. Bidey*:

Agrees. Could be an added benefit to test takers. Physicians currently use many elements which are verified sources in making medical decisions. Assurance is necessary that test-takers understand basic pharmacological principles, interactions, and downstream applications.

*Dr. Kuo*

Agrees. With incredible current amount of medical information now available, particularly drug information, that students need to know, a pharmacopeia-like tool would be helpful. Would reduce some stress for students during testing; also more realistic with current medical practice. Mechanisms of action, food/drug interactions, and biotransformation and elimination processes are the main aspects that physicians focus on when selecting medications. In clinical medicine, for most drugs it is not necessary to know subcellular actions. At the point of care, doctors use phone apps that provide such information. I use Epocrates, which has this material and much more, *e.g.*, adverse reactions, black box warnings, and product pictures which aid in identifying medications for patients.

*Dr. Golden*

Agrees. Believes an electronic reference database of pharmacological information can be provided

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within any examination as is currently done for terms, and abbreviations. It may be easy to manage. Concerns expressed were equipment and maintenance costs for an external device. Recommended providing limited reference data within the exam's electronic platform because use of FDA drug labels could possibly provide too much information to students and serve to confuse, overwhelm and distract them.

*Drs Gimpel and Gross (submitted join reply)*

Agrees- for initial pilot-testing. Recognizing the importance of assessing competency elements in the Practice-Based Learning and Improvement domain, the NBOME has been developing and pilot testing ways to assess the ability of students and residents to use information technology and resources to optimize learning and to access and utilize medical information online[3]. While we encountered obstacles that included test administration limitations of the vendor in our high-stakes examinations, and also challenges related to the pandemic, we are excited to continue to explore assessment across a broader competency subset, which we believe will also be more authentic to the practice of osteopathic medicine.

Q2.

**Do you approve of providing test-takers during the NBOME licensing examination (Comprehensive Osteopathic Medical Licensing Examination; COMLEX-USA:) with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?**

*Dr. Bidey*

Agrees. Opinion same as in Q1. However, an additional caveat to this would be that Q1 and Q2 are dependent on each other. i.e., if a 'board' or licensing exam did not have the same availability, then having test-takers prepare for these exams in a different manner would not be beneficial to the learner.

*Dr. Kuo*

Agrees. Opinion same as in Q1. Would be helpful to residents when taking their COMLEX-USA licensing exams in UME.

*Dr. Golden*

Agrees. Believes there is merit to identifying what information could be provided in an electronic database that could be a reference while taking the exam. However, should not reduce need for mastery of content, *e.g.*, with respect to pharmacologic agents, a basic knowledge of drug classes, indications, contraindications and drug-drug/food interactions should be required. Finer points of perhaps pharmacokinetics, half lives and/or extended profiles of medications and their interactions, might be considered in a reference. All of this relates to the fact that medical decisions are complex.

*Drs Gimpel and Gross (submitted join reply)*

Agree. As above, pilot-testing would enable the NBOME to gather the requisite evidence in validity, reliability, fairness and defensibility of this novel test item format, while at the same time to optimize any technical challenges in administration necessary for high-stakes testing.

Q3

**Do you approve of providing test-takers during *Certification and Recertification* exams with a storage device -- not connected to the internet – that contains FDA labels for drugs so that clinical pharmacological information can be accessed to assist in answering questions?**

*Dr. Bidey*

Agrees. Same response as in Q-2

Dr Kuo

Agrees. For the same reasons stated in Q-2; believes it would be helpful to attending physicians when taking board *certification and* recertification exams.

*Dr Golden*

Agrees partially. Extraneous devices would be cumbersome. Reference databases available during testing would be preferred.

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*Drs Gimpel and Gross (submitted join reply)*

Agree. Same reply as in Q-1 and 2.

Q4

**If you approve of providing such a device to test-takers for one or more of these levels, when do you think it should be available to them.**

*[Based on various ongoing considerations within NBOME, Drs Gimpel and Gross declined to provide their opinion on the following.]*

| | *ASAP* | *Within 2 Years* | *Within 5 years* |
|---|---|---|---|
| Undergraduate Medical Education (UME) | X | | XX |
| NBOME licensing examination (COMLEX-USA) | X | | XX |
| Graduate Medical Education (GME): Certification and Recertification | X | X | X |

Additional commentary on this concept was provided by Drs. Gimpel and Gross:

*"The NBOME is continuously investigating novel ways to provide assessment across the competency domains outlined in the blueprint for the COMLEX-USA examination series. Included in this exploration are ways to incorporate utilization of real-time resources for point-of-care access to evidence-based resources that enhance the authenticity to competencies utilized for the actual practice of osteopathic medicine.*

*Both osteopathic and allopathic specialty certifying board examinations have moved to longitudinal assessment as part of maintaining certification in specialty practice. Longitudinal assessment allows for candidates to answer questions in an untimed, non-proctored environment where they can access resources to assist with answering clinical questions and provides the candidate an understanding of the quality of their resources based on how they perform on the exam."*

All five high-level medical education administrators agreed that providing access to clinical pharmacology resources during examinations from UME to Recertification would be appropriate for further exploration in this era of substantially increasing availability of medicines. Most also concurred that doing this through an external storage process is acceptable; one slightly different opinion was that such information should be embedded into the electronic evaluation system employed for exams.

The next phase will be to develop a pilot testing project starting at the UME level.

## Acknowledgements:

The author acknowledges contributions from the following educators:

Peter F Bidey, DO, MSEd, FACOFP, Dean and Chief Academic Officer, PCOM, Philadelphia Campus

Marla Golden, DO, MS, FACEP, Dean, PCOM, South Georgia Campus

David Kuo, DO, FACOFP, Associate Dean for Graduate Medical Education, PCOM, Philadelphia Campus

John R. Gimpel, DO, MEd, President and CEO, NBOME

Gretta Gross, DO, MEd, Executive Vice President for Assessment and Chief Assessment Officer, NBOME

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