# COMMENTARY

# Making Diagnostic Instruction Explicit in US Pharmacy Education

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The profession of pharmacy and standards directing the education of student pharmacists are constantly evolving. The profession continues to emphasize patient-centered practice as a model for the future. The US health care system is faced with an impending shortage of primary care providers, which will affect the ability of patients to access the health care system. The pharmacy profession should position itself to contribute to meeting this need. The explicit instruction of differential diagnosis within Doctor of Pharmacy degree programs is a critical consideration in advancing pharmacy practice and potential contributions to the primary care gap.

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The role of the pharmacist has significantly evolved over the past 100 years. In the early 20th century, pharmacists were often referred to as "on the corner doctors" responsible for prescribing, compounding, and dispensing medications,[1] and patients were at the center of practice. However, with the increase in mass production of pharmaceuticals, the profession shifted toward a product-focused orientation as a result of the Durham-Humphrey Amendment Act in 1951. A pivotal shift in terms of realigning patients at the center of practice occurred with the introduction of the pharmaceutical care concept in 1992.[2] Subsequently, pharmacy education evolved to reflect the changing professional landscape and shifted to a more direct patient care focus, evidenced by the universal adoption of the Doctor of Pharmacy (PharmD) degree and the incorporation of patient assessment into the Accreditation Council for Pharmacy Education (ACPE) Standards for the PharmD degree program. In 2007, patient assessment was expanded to include physical examination skills and increased student exposure to patients through introductory and advanced pharmacy practice experiences.[3] In 2013 the Center for the Advancement of Pharmacy Education (CAPE) updated their educational outcomes to reflect the importance of patient centeredness in practice.[4] Correspondingly, standards further evolved to reflect the CAPE outcomes. Currently, "Standards 2016" reinforce the necessity of patient assessment skills and experiential education in fostering patient care and continuity in acute, chronic, and wellness-promoting patient care services in both outpatient and inpatient settings.[5]

National professional practice organizations help shape the landscape and actualization of clinical practice and set the tone for clinical practice-related competencies, which in turn inform educational gaps and expectations. For example, the American Society of Health-System Pharmacists (ASHP) Research and Education Foundation's Center for Health-System Pharmacy Leadership and the American College of Clinical Pharmacy (ACCP) have both advocated for formal education in direct patient care activities.[6] The Council on Credentialing in Pharmacy has since provided a meaningful definition of direct patient care in pharmacy practice, which is defined as the "direct observation of the patient and [the pharmacist's] contributions to the selection, modification, and monitoring of patient-specific drug therapy,"[7] yet after nearly 70 years of educational and practice advancements related to direct patient care, has the profession fully realized and operationalized its clinical role in the US health care landscape? The demand for health care continues to rise, with the US population expected to increase by 2.3 million in the next 10 years.[8] The number of Americans over the age of 65 years is expected to double by 2050.[9] Additionally, there is a projected shortage of nearly 105,000 primary care physicians (PCPs) by the year 2030,[8,10] which is particularly

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concerning, as these professionals most often serve as the first point of entry for patients who need medical services. Primary care providers deliver acute patient care services, ensure care continuity for patients with chronic health conditions, and provide patient education and counseling with a focus on health promotion and maintenance, disease prevention, diagnosis, and management.[11] The impact of the PCP shortage is already being realized in the form of increased emergency department use for non-emergent reasons, use of medical specialists for primary care purposes, and subsequent increases in health care costs.[12,13]

Lack of primary care access provides significant challenges for the health care community and policymakers. Some have emphasized the ongoing contributions of midlevel providers, including nurse practitioners and physician assistants. Highlighting the quality and adequacy of care provided by mid-level practitioners, Dewan and Norcini recently suggested the notion of reconsidering the minimum educational standards for independent primary care practice pending the outcome of more rigorous comparative studies.[14] As these discussions evolve, the profession should position itself as a contributor and potential provider in this arena. Pharmacists are poised to increase their roles in areas where they already make significant impacts. For example, chronic disease management accounts for over 90% of all prescriptions filled[15] and costs the health care system $1.1 trillion annually.[16] Nearly 70% of all Americans take at least one medication and 50% are prescribed at least two, while two-thirds of elderly Americans take five to nine medications.[15] Given their training and vast accessibility, pharmacists are uniquely positioned to provide expanded services in primary care, both in the community pharmacy and ambulatory care clinical settings.[17] A 2016 Cochrane Review reported that pharmacist prescribing in a variety of settings is at least as effective as physician prescribing and was associated with positive outcomes for chronic disease states, including hypertension, diabetes, and hypercholesterolemia.[18] The 2011 Report to the US Surgeon General also provided rationale and compelling evidence to support pharmacist delivery of expanded patient care services.[19] In collaboration with other providers, this is an already existing and accepted model of health care delivery that meets growing health care demands within the United States,[19] which we propose should be a new norm for community and ambulatory care pharmacy settings.

Small strides have been made by the profession with regards to health care provider recognition, primarily at the state level through protocol-driven care and collaborative practice agreements.[20] While key stakeholders, including physicians, policymakers, and patients appear to hold largely favorable opinions, recognition is often met with contention that primarily relates to a perceived lack of pharmacist training in the areas of patient assessment, clinical decision-making, and diagnostic ability.[21–23] Such misconception may be partly explained by the lack of interprofessional education (IPE) and training for collaborative practice, as curricular standards for health professions educational programs have only recently implemented IPE-related competencies on a national scale. The majority of currently practicing health care providers were trained prior to interprofessional integrative curricular designs and/or may not provide care within a collaborative interprofessional team model. This may limit mutual understanding of roles and responsibilities, values and ethics, and scopes of practice. Additionally, pharmacy education has not formally or widely communicated pharmacists' importance to the diagnostic process nor articulated a need for pharmacist training specifically in diagnosis; however, this may be changing. Encouragingly, at the 2019 American Association of Colleges of Pharmacy (AACP) annual meeting, the House of Delegates moved to recognize the importance of diagnostic training for PharmD students by formally adopting a new policy "support[ing] education on the pharmacists' responsibility for contributing to the diagnostic process to help minimize errors, maximize patient safety, and optimize health outcomes."[24] This was largely in response to the call by the National Academy of Medicine regarding the need for diagnostic safety training for all health professions. Subsequently, the Society to Improve Diagnosis in Medicine in collaboration with an interprofessional consensus group, which included pharmacy educators, has identified a set of 12 key competencies related to diagnostic quality and safety.[25] In a pivotal paper, Graber and colleagues outline examples of how pharmacists already contribute to diagnosis at the individual, team, and system levels, such as when a patient presents with increasing fatigue and the pharmacist discovers a therapeutic duplication between two different prescribers is the likely cause,[25] or when a patient with heart failure presents with increasing shortness of breath and edema and the pharmacist uncovers medication nonadherence to diuretic therapy as the likely cause. Graber and colleagues provide several other examples of how pharmacists already contribute to diagnosis in everyday practice as part of the Pharmacy Quality Alliance's IESA framework (indication, effectiveness, safety, and adherence),[26] and how the 12 diagnostic competencies map to existing core entrustable professional activities, CAPE, and ACPE expectations.[25] Differential diagnosis is mentioned several times when

describing curricular gaps in pharmacy education and is placed within the 12 competencies at the individual level.[25]

Explicit instruction of differential diagnosis in PharmD degree programs is a critical consideration in advancing pharmacy practice. Differential diagnosis is the process of developing a list of potential causes for a patient's presenting symptoms and is a thought process for prioritizing and risk stratifying complaints in terms of severity, probability, and ability to treat.[26] Whether the profession realizes it or not, pharmacists already engage in the differential diagnosis process in many ways. For example, in community pharmacy settings when patients present with self-care related complaints, the pharmacist must take a focused history to determine the most likely problem and recommend appropriate self-care or medical referral. In collaborative chronic disease management, pharmacists engage in the differential process when they assess the appropriateness, safety, efficacy, and adherence of drug therapy for a previously diagnosed condition. For example, medication safety and efficacy determinants are assessed by evaluating the presence or absence of symptoms and, depending on the disease and drug therapy, certain laboratory or diagnostic tests. When a patient presents with a new symptomatic complaint, the pharmacist must determine whether the complaint is the result of medication nonadherence; an acute worsening or expected progression of a chronic condition; or a drug-related problem such as adverse effects, drug toxicity, or ineffectiveness; or caused by a new or unrelated problem entirely, in which case referral or collaborative discussion with the patient's primary provider would ensue. This is not unlike when a primary care provider refers a patient to a medical specialist in instances that are beyond their scope. These examples illustrate how the concept of differential diagnosis is already an integral component of the collect and assess phases of the Pharmacists' Patient Care Process (PPCP),[27]which Graber and colleagues make explicitly clear in their 12 key competencies related to diagnosis.[25] For example, in the collect phase, pharmacists first collect "necessary subjective and objective information about the patient in order to understand the relevant medical/medication history and clinical status of the patient."[27] Collecting appropriate information is a vital first step in formulating a differential diagnosis. Collected information is then analyzed "in order to identify and prioritize problems and achieve optimal care," which is the assess phase of the PPCP.[27] Thus, based on the definition of differential diagnosis provided earlier, we contend that differential diagnosis is a tangible process in the collect and assess phases of the PPCP. With recent incorporation of the PPCP process into both ACPE curricular standards and ASHP residency training standards, the importance of diagnostic instruction and its correlation to the PPCP is paramount.

Formalized training in differential diagnosis provides a means to practice and enhance critical thinking and problem-solving skills[28,29] and allows students to develop their clinical acumen early in their career by integrating didactic knowledge with practice experiences. Additionally, explicit differential diagnosis training may help to address the perceived lack of training pharmacists have in terms of their clinical decision-making abilities.[21-23,30] Including differential diagnosis instruction within national accreditation standards will provide guidance to pharmacy educators regarding content and assessment and will better prepare pharmacists to provide expanded services in the realm of primary care. Clearly stating the intended purpose of differential diagnosis training and its applicability to pharmacy practice, as well as defining the depth, breadth, and scope of training, is of critical importance.

Commensurate with the individual-level competencies related to differential diagnosis,[25] we propose the idea of the "pharmacist's diagnosis," a concept that national pharmacy organizations should help to shape and define, plainly stating how it is distinguished from that of diagnosticians and how it is specifically applied in the scope of pharmacy practice. The concept of the pharmacist's diagnosis should not be misconstrued to imply independent practice of direct patient care, but rather to facilitate patient care in partnership with our medical colleagues in terms of enabling mutual understanding of how diagnostic training is used and applied within the scope of pharmacy practice. Finally, the profession must communicate the purpose of the "pharmacist's diagnosis" and its inclusion within pharmacy curricula to other health care professions. Doing so encourages the use of a common language across professions that may better enable interprofessional communication and understanding of pharmacist education, current contributions to the diagnostic process, and clinical decision-making abilities. Robert Brandom's book, *Making It Explicit*, highlights the importance of language and meaning.[31] Brandom suggests that "having made [something] explicit, now you're in a position to be critical about it."[31] Given the looming primary care crisis in the United States, the profession must stop being afraid of saying "pharmacist" and "diagnosis" in the same sentence. In the words of Brandom, "If you can bring it out into the open as something we can discuss and give and ask for reasons for, the implicit inferences that are curled up in the [misperceptions about our profession] don't have power over us anymore. They've come into the light of day

where we have the power of reasoning about them."[31] Perhaps such reasoning will lead to the power to move us boldly forward in addressing a gap in health care that so desperately needs our attention.

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