

# Front-Line Health Care Professionals Lack Critical Knowledge in Dietary Supplement and Nutraceutical Products: A Call to Action for Comprehensive Educational Opportunities

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 On behalf of the ACCP Public Policy Committee

The American College of Clinical Pharmacology seeks a call to action on improving front-line health care professional (HCP) knowledge on complementary and integrative medicine, supplement, and herbal products purported to improve health. This need can be accomplished through inclusion of additional formal academic-based curricula or as professional continuing medical or pharmacy education/development options. Because of the significant and highly varied use of these products, the American College of Clinical Pharmacology believes that the Accreditation Council for Pharmacy Education (and other relevant education accreditation bodies) must make this education a basic expectation for PharmD, RN, MD, DO, and other front-line HCPs.

Our concern on this issue stems from the reduction in professional education related to the basic pharmacology of these non-governmentally regulated products, with simultaneous increase in use by the general public. Wiernik<sup>1</sup> convincingly described a sustained decline in basic clinical pharmacology education in medical and nursing school curricula. In this publication, an informal poll of 50 medical school pharmacology departments was described; of the 50 solicitations, 39 responded, with 35 acknowledging that there have been reductions in the curriculum for basic pharmacology education at their institutions.

Meanwhile, the risk of serious adverse events from use of these products alone, or in combination with other products, including prescription or over-the-counter drugs, is significant.<sup>2,3</sup> The lack of comprehensive knowledge in the physiologic effects and toxicity of nutraceutical products, in the context of potential complex drug-drug, drug-disease, drug-supplement, and

drug-nutraceutical interactions for front-line health practitioners, poses significant health concerns.

As the population is seeking out greater access to alternative products that are promoted to improve health, the potential for significant harm due to interactions related to polypharmacy and patient demographics is increasing. Our population is aging, and ethnic and genotypic diversity is growing. This concern for safety is not new; it was initially raised by Miller et al<sup>4</sup> when the use of these products was becoming more widespread. It was further pointed out by the National Institutes of Health (Health United States Report 2016 [cdc.gov]) that 20% of the US population is taking at least 3 prescription and/or over-the-counter drugs and as many as 40% of older Americans (>65 years old) are often taking at least 5 drugs routinely. In a consumer poll conducted between 2011 and 2014, 70% of older Americans were identified as having used at least 1 dietary supplement or nutraceutical product in the prior 30 days and 29% using at least 4 such products within this time frame.<sup>5</sup>

The use of these diverse chemical products, manufactured under diverse practices and conditions, in the context of insufficient awareness and general pharmacology training raises valid concerns for public health and safety. An immediate need for improved awareness and knowledge of these products by front-line HCPs demands attention.

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**Educational Opportunities Available, Challenges Remain**  
Already, there is recognition by accredited pharmacy schools that pharmacists are relied upon to provide knowledgeable advice to patients and other health care providers alike on the use of dietary and herbal supplements.<sup>6</sup> However, the Accreditation Council for Pharmacy Education recommended formal coursework on herbal and complementary medicine, is not mandatory.<sup>7</sup> Currently,  $\approx 80\%$  of pharmacy schools in the United States offer some formal instruction in complementary and integrative medicine (CIM), which mostly focuses on self-care use with natural products. However, while professional interest within pharmacy is high and instruction is available, pharmacy students do not feel their training is sufficient for the active role they have in educating the consumer and practitioner.<sup>7,8</sup> Scaletta et al<sup>9</sup> published survey results in which 96 schools were interrogated on their core coursework related to CIM. The response to the survey was robust ( $\approx 71\%$  of requested respondents) and those respondents reported that only some CIM is incorporated into the curriculum. Survey topics covered teaching strategies; assessment methods varied among the 74 elective courses and the 116 required courses that were described. Respondents listed lack of evidence to support CIM use as the most common barrier to CIM education, and 50% of respondents reported plans for expansion of CIM education at their schools.

It is not evident that broad and comprehensive CIM training is provided in other health care disciplines. Knowledge gaps have been noted in medical school training and in other disciplines such as nursing and dietetics.<sup>10</sup> In the year 2000, the National Center for Complementary and Alternative Medicine began annual support of formal coursework on complementary and alternative medicine in a limited number of medical and nursing schools.<sup>11,12</sup> A review of the 2021 budget and priorities for the renamed National Center for Complementary and Integrative Medicine does not appear to include a placeholder for expanding this formal education within curricula. However, the center does provide a significant amount of practical information to the consumer who is aware of and is able to visit the website.

#### Barriers and Challenges

As the use of these often less regulated or nonregulated products grows and the diversity of patients and concomitant regulated drug use grows, there is need for continuing improvement in practical knowledge by HCPs that will ensure the safe use of supplements while preserving the safety and efficacy of more formally regulated products. Already, the content of coursework in HCP curricula is demanding and difficult to accomplish within current academic curricular time frames.<sup>6,13</sup>

Solutions to this challenge can include integration of additional coursework into already crowded curricula, establishment of a broader framework of continuing education opportunities, or blending these options into a coordinated system that ensures HCP CIM knowledge is both current and practical. Formal coursework has been successfully implemented in many academic institutions that can be emulated on a broader scale.<sup>14-17</sup> Formal postdoctoral training may also be instituted by pharmacy schools to train future HCPs in appropriate nutraceutical and dietary supplement use and to increase the number of care experts in the community.

In parallel, expanding the opportunities to maintain current knowledge through continuing medical or pharmacy education and professional development courses should be emphasized to provide current and future practitioners with the most recent and relevant information on CIM and supplements. Few continuing education opportunities are available to the larger health care community; these courses, whether online or in person, should be expanded. The National Center for Complementary and Integrative Health offers such education (Clinically Relevant Herb-Drug Interactions: Past, Present, and Future [nih.gov]) but few other credible opportunities are available. The US Pharmacopeia is actively involved in quality assurance of the products (Dietary Supplements & Herbal Medicines) and they might be equally positioned to provide continuing education in this area.<sup>18</sup> Alternatively, we should call upon our scientific/medical societies to offer this education to the larger HCP community. Importantly, recognition should be offered to those who maintain their professional continuing education currency on this important, but largely underappreciated, aspect of patient health and safety.

#### Conflicts of Interest

M.R. and O.G. are employees of the University of Florida. P.K. is an employee of Gilead Science, Inc.

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#### Disclaimer

The opinions expressed in this article are those of the authors on behalf of the American College of Clinical Pharmacology and should not be interpreted as the position of the entities or institutions at which the authors are employed.

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## References

1. Wiernik PH. A dangerous lack of pharmacology education in medical and nursing schools: a policy statement from the American College of Clinical Pharmacology. *J Clin Pharmacol*. 2015;55(9):953–954.
2. Awortwe C, Makiwane M, Reuter H, Muller C, Louw J, Rosenkranz B. Critical evaluation of causality assessment of herb-drug interactions in patients. *Br J Clin Pharmacol*. 2018;84(4):679–693.
3. Bunchorntavakul C, Reddy KR. Review article: herbal and dietary supplement hepatotoxicity. *Aliment Pharmacol Ther*. 2013;37(1):3–17.
4. Miller LG, Hume A, Harris IM, et al. White paper on herbal products. *American College of Clinical Pharmacy. Pharmacotherapy*. 2000;20(7):877–891.
5. Gahche JJ, Bailey RL, Potischman N, Dwyer JT. Dietary supplement use was very high among older adults in the United States in 2011-2014. *J Nutr*. 2017;147(10):1968-1976.
6. Ng JY, Tahir U, Dhaliwal S. Barriers, knowledge, and training related to pharmacists' counselling on dietary and herbal supplements: a systematic review of qualitative studies. *BMC health serv res*. 2021;21(1):1–21.
7. Geldenhuys WJ, Cudnik ML, Krinsky DL, Darvesh AS. Evolution of a natural products and nutraceuticals course in the pharmacy curriculum. *Am J Pharm Educ*. 2015;79(6):82.
8. Axon DR, Vanova J, Edell C, Slack M. Dietary supplement use, knowledge, and perceptions among student pharmacists. *Am J Pharm Educ*. 2017;81(5):92.
9. Scaletta A, Ghelani N, Sunny S. Complementary and alternative medicine education in U.S. schools and colleges of pharmacy. *Curr Pharm Teach Learn*. 2017;9(4):521–527.
10. Kemper KJ, Gardiner P, Gobble J, Woods C. Expertise about herbs and dietary supplements among diverse health professionals. *BMC Complement Altern Med*. 2006;6:15.
11. Lee MY, Benn R, Wimsatt L, et al. Integrating complementary and alternative medicine instruction into health professions education: organizational and instructional strategies. *Acad Med*. 2007;82(10):939–945.
12. Pearson NJ, Chesney MA. The CAM Education Program of the National Center for Complementary and Alternative Medicine: an overview. *Acad Med*. 2007;82(10):921-926.
13. Sierpina VS, Schneeweiss R, Frenkel MA, Bulik R, Maypole J. Barriers, strategies, and lessons learned from complementary and alternative medicine curricular initiatives. *Acad Med*. 2007;82(10):946–950.
14. Steinfeldt L, Hughes J. An evidence-based course in complementary medicines. *Am J Pharm Educ*. 2012;76(10):200.
15. Tiralongo E, Wallis M. Integrating complementary and alternative medicine education into the pharmacy curriculum. *Am J Pharm Educ*. 2008;72(4):74.
16. Dvorkin L, Gardiner P, Whelan JS. Herbal medicine course within pharmacy curriculum. *J Herb Pharmacother*. 2004;4(2):47–58.
17. Bonafede M, Caron W, Zeolla M. An evidence-based elective on dietary supplements. *Am J Pharm Educ*. 2009;73(5):80.
18. Grundmann O, Rogge M, Fossler MJ, et al. Regulation of dietary supplements and nutraceutical products in the United States: an argument for greater oversight and uniform standards. *J Clin Pharmacol*. 2021;accepted.