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AACP REPORT

Implementation Science to Advance Practice and Curricular Transformation: Report of the 2019-2020 AACP Research and Graduate Affairs Committee

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EXECUTIVE SUMMARY. The 2019-2020 AACP Research and Graduate Affairs Committee (RGAC) was charged with articulating the case for and evaluating the state of implementation science in academic pharmacy, given the potential for implementation science to act as a driver of practice and curricular transformation. Based on the current state of pharmacy research in this area, the RGAC was further charged with outlining a plan to raise the profile of implementation science with pharmacy leadership and defining strategies for AACP to facilitate schools in applying its methods to their practice and education missions. For this work, the RGAC considered implementation science to be the scientific study of methods and strategies to promote adoption of evidence-based practices and interventions into real world settings and routine practice, to improve the quality and effectiveness of services.

The RGAC identified three components of an effective strategy for AACP to assist schools in applying implementation science in practice and education: 1) raising awareness of implementation science as an opportunity for academic pharmacy, 2) connecting pharmacy researchers with the larger implementation science community, and 3) developing pharmacy researchers in the competencies and methods associated with implementation science. Specific recommendations for this strategy were informed by searches of the literature and funding landscape related to implementation science and pharmacy. The RGAC also identified stakeholder groups that AACP could target in a campaign to raise awareness of implementation science and connectivity to the existing research community in this space, including academic leadership, faculty with expertise in relevant research methodologies (eg, the Social and Administrative Science (SAS) section of AACP), and the academic pharmacy community as a whole.

Keywords: implementation science, practice transformation, curricular transformation, professional development

INTRODUCTION AND CHARGES

At the beginning of his presidential year, American Association of Colleges of Pharmacy (AACP) President Todd Sorensen identified a bold aim for the pharmacy profession – that by the year 2025, 50% of primary care practice sites in the United States will have a relationship with a pharmacist. President Sorensen's charges to each of AACP's standing committees centered around promoting practices and mindsets within academic pharmacy that would position the academy to be a driving force in attaining that bold aim and transforming pharmacy practice. Related to research and graduate education, President Sorensen identified implementation science as a potential driver of curricular and practice transformation within academic pharmacy. As the duties of the AACP Research and Graduate Affairs Committee (RGAC) include assistance with the development of the Association's research, graduate education and scholarship

agenda, President Sorensen's charges to the committee were:

1. Articulate the case for implementation science as a key strategy for practice and curricular advancement efforts led by academic institutions.

2. Evaluate the state of implementation science research across academic pharmacy and determine the need for research pipeline development and/or faculty development within this discipline.

3. Outline a plan to raise the profile of implementation science among CEO deans, associate deans for research, and pharmacy practice and social and administrative science department chairs.

4. Define strategies and draft an action plan for AACP's role in facilitating school leaders in the application of implementation science with their stakeholders.

The committee conducted its work through monthly virtual meetings between August 2019 and May 2020 and a two-day, in-person meeting in Arlington, VA in January 2020.

Background

Although there are many definitions of implementation science, it is generally understood as the scientific study of methods and strategies to promote adoption of evidence-based practices and interventions into real world settings and routine practice, to improve the quality and effectiveness of services.[1,2] For its work, this committee accepted that general definition, recognizing certain aspects of implementation science as especially relevant to the project of pharmacy practice transformation. These include the systematic study of how interventions actually take place, a focus on process more than outcomes, and consideration of how to make results scalable. The committee also determined that both the research and practice of implementation science were within its remit, together with consideration of how the two intersect.

Implementation science is an experiential field, dedicated both to the rigorous study of successful adoption of interventions and to the use of best practices in implementing new interventions. Hand-in-hand application of research and practice innovation, such as rigorously tracking and assessing the process and outcomes of adoption of new practices in education or healthcare, can successfully build the evidence base for successful dissemination and implementation of these new practices. This combination of research and practice is also essential to build the business case for reimbursement of new practices and practice models. As leaders in both research and practice, pharmacy schools are uniquely positioned to take the lead in developing the implementation science of pharmacy practice and transformation.

In considering the charges put to them by President Sorensen and drafting an action plan for AACP's role in facilitating school leaders in application of implementation science with their stakeholders, the committee identified three components of an effective strategy: 1) raising awareness of implementation science as an opportunity for academic pharmacy, 2) connecting pharmacy researchers with the larger implementation science community, and 3) developing pharmacy researchers in the competencies and methods associated with implementation science.

Raising Awareness of Implementation Science within Academic Pharmacy

To "evaluate the state of implementation science research across academic pharmacy and determine the need for research pipeline development and/or faculty development within this discipline" (Charge 2), the committee undertook a search of different databases (Google Scholar, PubMed, Web of Science) using different search terms (eg, "implementation science" and "pharmacy," "RE-AIM" and "pharmacy," "CFIR" and "pharmacy), along with a MESH term (medical subject headings used to index journal articles in PubMed) search on "implementation science." The committee also looked at the state of support for implementation science research by the federal government.

Literature and Funding Landscape Search Results. Although each committee member used different search terms and platforms, with more than 800 distinct publications returned, the general findings were similar across the searches. The large majority of studies were not primarily focused on pharmacy, and many, if not most, of the search results related to pharmacy were commentaries and reviews, with relatively little original research papers. Within the research space, a few groups dominated, and much of the work is being done outside the U.S. Most implementation science research in healthcare is being done in other disciplines, and very little research related to implementation of educational or curricular changes in pharmacy was found.

For research that is being conducted within pharmacy, three main types of studies seem to exist with focus on outcomes or processes at the clinical intervention or programmatic level: 1) studies of implementation of interventions within educational, community or clinical practice settings,[3,4] 2) studies that apply frameworks into practice,[5,6] and 3) program assessment studies.[7,8] Program assessment studies in particular have the potential to influence health and reimbursement policies in support of practice transformation. The committee was able to identify research studies in both community pharmacy and clinical pharmacy practice settings, with a larger subset of papers dedicated to studies in the community

setting. A substantial number of the clinical pharmacy studies performed in the U.S. were done in the VA (U.S. Department of Veterans Affairs) system. For community pharmacy studies, topics related to medication review, immunization and primary care were most common. Committee members created an "Implementation Science in Pharmacy" group on the Mendeley reference management platform.[9]

An NIH RePORTER search for funding to pharmacy schools in fiscal years 2010 to 2019 with the search terms "implementation science," "RE-AIM," "CFIR," and "workflow" returned very little funding in this space going directly to pharmacy schools. This is consistent with the findings of the literature search and may reflect that much of the work being done in this space in pharmacy is happening in collaboration with other health professions schools, eg, public health. It does suggest, though, that implementation science is an underappreciated opportunity in academic pharmacy.

Funding and collaboration opportunities for implementation science exist across the federal government. Consistent with the findings of the literature search for implementation science in pharmacy, the VA has been a leader in implementation science, including in pharmacy, most notably through QUERI, the Quality Enhancement Research Initiative.[10] QUERI provides funding opportunities and offers partnerships to study quality efforts at the VA, as well as an online seminar series.[11] The National Cancer Institute's program in implementation science, run out of the Division of Cancer Control and Population Sciences, is a major driver of the field in the United States. The program provides training in implementation science,[12] including its well-regarded Training Institute for Dissemination and Implementation Research in Cancer (TIDIRC) and offers funding support. The NCI effort reflects a larger interest by NIH in promoting dissemination and implementation of research findings into practice, which includes co-sponsorship of the Annual Conference on the Science of Dissemination and Implementation in Health (D&I meeting.)[13] A number of hubs within the National Center for Advancing Translational Sciences (NCATS) Clinical Translational Science Awards (CTSA) program support dissemination and implementation science cores, many offering training resources. Ongoing support for the field is also offered by the Agency for Healthcare Research and Quality (AHRQ).

Connecting Academic Pharmacy with the Implementation Science Community

The field of implementation science has experienced significant growth recently as an important public health priority, and as noted above, the availability of funding for implementation science research has expanded to match this priority. Although the field of implementation science may be somewhat newer to pharmacy, a number of colleges of pharmacy across the U.S. have emerged as leaders. Some of these programs evolved through specific development of individual researchers to expand their expertise into the field of implementation science. Other programs focused on recruiting and hiring new faculty with implementation science expertise or collaborating with programs that had implementation science expertise. This expansion into the field of implementation science has resulted in a network of researchers with both implementation science and pharmacy expertise that can be tapped into as a resource to connect academic pharmacy with the broader implementation science community.

Although a number of programs have emerged as implementation science leaders, from the literature and funding search results it was also clear that many schools or colleges may not have the same awareness of the field and its importance. With this in mind, the committee set an ambitious goal to increase awareness and appreciation of the value of implementation science to schools and colleges of pharmacy more broadly as a means to advance practice and curricular transformation and promote faculty research development. To achieve this goal, the committee outlined a campaign to raise awareness of the opportunities associated with this emerging field.

The committee identified specific stakeholder groups AACP could target with different activities, focusing on (1) academic leadership (eg, CEO Deans and Associate Deans of Research and Graduate Education), (2) faculty with expertise in research methodologies common in implementation science (eg, the Social and Administrative Science (SAS) section of AACP), and (3) the academic pharmacy community as a whole. Given overlapping areas of research, the SAS section of AACP is a key group to target for raising awareness of implementation science. The SAS section of AACP would be best positioned to apply for and conduct implementation science projects given the social science focus associated with much of the implementation science research agenda.

As a first step in raising awareness of this group, the committee has developed a continuing education session at the July 2020 AACP annual meeting. This session is designed to educate AACP membership about the role of implementation science in pharmacy and also to demonstrate successful implementation science programs. The session will feature faculty from three institutions, the University of Washington, Purdue University and the University of North Carolina, that have embraced

implementation science in different settings. The session will describe implementation science and opportunities within pharmacy, demonstration of funded research emphasizing the use of implementation frameworks and formative evaluation to ensure intervention fit and effectiveness in a given context, and demonstration of funded research emphasizing the development of pharmacy specific measurements for conducting implementation science research and evaluation of implementation outcomes. The second activity outlined by the committee to increase awareness of opportunities for implementation science research is the publication of a feature article in Academic Pharmacy Now, the news and media publication of AACP. This committee recommends that the feature emphasize the importance of implementation science for pharmacy, the opportunities for funding in this space, and some of the projects currently being conducted by faculty in different colleges of pharmacy across the U.S.

Recommendation 1: AACP should continue a campaign to increase awareness and appreciation of the value of implementation science among colleges and schools of pharmacy.

Future campaign activities could include direct outreach to and peer networking among CEO Deans and Associate Deans of Research and Graduate Education, with the goals of articulating the case and sharing strategies for increasing capacity for implementation science at their respective colleges and schools of pharmacy. Networking, poster, and podium sessions at future AACP Annual Meetings and/ or a research symposium at an upcoming Interim Meeting could be held to further highlight the impact of the field on pharmacy practice transformation and connect those doing implementation science and those looking to learn more about implementation science.

Developing Implementation Science Researchers and Community in Pharmacy

Some pharmacy schools have already identified implementation science as an area of focus and established research centers, such as the Center for Implementation Research, a joint entity between the Colleges of Pharmacy and Medicine at the University of Arkansas for Medical Science (UAMS)[14] or have integrated implementation science into existing centers, such as the Center for Medication Optimization at the UNC Eshelman School of Pharmacy,[15] which champions value-based payment models for pharmacy. In other places, pharmacy faculty are members of multidisciplinary centers, some established within CTSA hubs or by schools of public or global health, disciplines that have been early adopters of implementation science. A common element within these centers is a focus on nurturing implementation scientists through fellowships, training, and pilot projects.

As pharmacy schools come to appreciate the potential of implementation science to help transform pharmacy practice and education and seek to take advantage of the opportunities provided, it will be crucial for those schools to build capacity in this field, including appropriate research competencies among faculty and trainees. Recruiting specialists to bring their research programs to a school and mentor faculty in implementation science is an effective approach to nucleate a research program and begin to bring in funding, but on its own is insufficient to grow and maintain a successful program. Ongoing excellence in the field will require that schools develop their faculty as independent researchers and practitioners who can establish collaborations and partners in this highly interdisciplinary field.

AACP and schools should develop programs and tools to support faculty looking to advance their scholarship and practice through implementation science. As stated above, federal and private funding providers have recognized the importance of implementation science and created funding and training opportunities to support the field. Academic pharmacy should take advantage of and integrate with these existing efforts where possible and look for opportunities to adapt materials or add components specific to pharmacy when appropriate. School leaders should be open to providing release time and financial support for faculty to attend meetings and training sessions that would enhance their competency in implementation science research and practice.

Recommendation 2: AACP should collaborate with other organizations, including funders, to build or adapt programs that enable pharmacy faculty to develop as implementation science researchers.

Suggestion 1: Schools should support faculty and trainee development as implementation science researchers.

An excellent opportunity for AACP to engage the implementation science community is the annual D&I Meeting, co-hosted by AcademyHealth (https://www.academyhealth.org/) and the National Institutes of Health each year in the Washington, DC area.[13] The committee has outlined a plan for a networking session for pharmacy researchers that AACP could host in conjunction with or parallel to the meeting. The session would include an active learning component where more experienced researchers introduce key concepts and techniques to first-time attendees and offer advice on processing the large amount of information and new ideas encountered at the meeting. Pharmacy faculty would be encouraged to attend

the meeting, and school leadership encouraged to support their attendance, as part of the awareness campaign outlined above. Greater pharmacy involvement in the D&I meeting could help knit pharmacy into the implementation science community and provide further opportunities to build collaborations between pharmacy and other health fields to promote practice transformation and pharmacy researcher development.

Recommendation 3: AACP should require applications to its research awards, such as the New Investigator and Scholarship of Teaching and Learning Awards, to utilize implementation science tools when appropriate.

Although founded as a field to advance evidence-based practices in health and education, the principles of implementation science promote rigor and translation of research into application and practice more broadly. AACP has identified implementation science as a major opportunity for academic pharmacy and an important part of the pharmacy research agenda. AACP should promote implementation science in pharmacy by including and referencing implementation science tools and principles in existing AACP research awards, such as the New Investigator Award[16] and the Scholarship of Teaching and Learning (SOTL) Grant.[17]

Integration of implementation science could be easily promoted by modifying awards evaluation criteria to include use of implementation science principles as appropriate. In addition, AACP should consider encouraging applicants to allocate a dedicated percent of their budget to implementation science-related activities as part of their submissions. Both of these recommendations create opportunities to not only integrate implementation science within pharmacy, but also encourage applicants to educate themselves about the role that implementation science can play in pharmacy. Should the submissions benefit from a more in-depth integration of implementation science offerings, AACP could further incentivize applications that include purposeful collaborations between pharmacists and experts in implementation science. Interdisciplinary teams are critical to creating implementation science bench strength within the profession of pharmacy.

Finally, in addition to supporting integration of implementation science by applicants, AACP could include implementation science experts as part of their review committees for both awards. These experts would ensure integrity of implementation science content, while being provided with an opportunity to educate others about use of implementation science principles and tools. Integrating knowledge from one discipline into another requires careful and consistent tending to ensure accurate translation.

CONCLUSION

In addition to the implementation science charges provided to the RGAC committee, AACP President Sorensen set an ambitious goal for our profession when he challenged pharmacy to push for at least 50% of primary care practice sites in the United States to have a relationship with a pharmacist by the year 2025. This progressive goal will require novel and innovative changes in pharmacy practice to accommodate a sea shift in our professional working relationship with primary care practice. Given the likely changes to pharmacy practice accompanying this charge, the case for careful implementation and evaluation of new practice models becomes paramount to the success of this bold vision. The committee members have outlined a plan for academic pharmacy to increase its engagement in implementation science and develop the research and personnel capacity needed to build the evidence base for pharmacy practice transformation. The committee has identified three main components necessary for an action plan to advance implementation science in pharmacy to succeed: awareness, connection and faculty development. AACP and its member schools should pursue joint programs and activities to raise awareness of implementation science, connect pharmacy faculty with leaders in the field to elevate pharmacy practice and research, and develop competencies and skills in implementation and dissemination science among pharmacy faculty.

REFERENCES

1. Livet M, Haines ST, Curran GM, et al. Implementation science to advance care delivery: a primer for pharmacists and other health professionals. *Pharmacotherapy*. 2018;38(5):490-502. doi:10.1002/phar.2114

2. University of Washington. What Is Implementation Science? https://impsciuw.org/implementation-science/learn/implementation-science-overview/. Accessed May 6, 2020.

3. Stafford RA, Garrett LN, Bates KA, et al. Development and implementation of a collaboration between a patient-centered medical home and community pharmacy. In: *Journal of the American Pharmacists Association*. Vol 60. Elsevier B.V.; 2020:122-129. doi:10.1016/j.japh.2019.09.022

4. Livet M, Blanchard C, Sorensen TD, Roth McClurg M. An implementation system for medication optimization: operationalizing comprehensive medication management delivery in primary care. *J Am Coll Clin Pharm*. 2018;1(1):14-20. doi:10.1002/jac5.1037

5. Shoemaker SJ, Curran GM, Swan H, Teeter BS, Thomas J. Application of the consolidated framework for implementation research to community pharmacy: a framework for implementation research on pharmacy services. *Res Soc Adm Pharm*. 2017;13(5):905-913. doi:10.1016/j.sapharm.2017.06.001

6. Blanchard C, Livet M, Ward C, Sorge L, Sorensen TD, McClurg MR. The active implementation frameworks: a roadmap for advancing implementation of comprehensive medication management in primary care. *Res Soc Adm Pharm*. 2017;13(5):922-929. doi:10.1016/j.sapharm.2017.05.006

7. Moss JM, Bryan WE, Wilkerson LM, et al. Impact of clinical pharmacy specialists on the design and implementation of a quality improvement initiative to decrease inappropriate medications in a veterans affairs emergency department. *J Manag Care Spec Pharm*. 2016;22(1):74-80. doi:10.18553/jmcp.2016.22.1.74
8. Farley JF, Ferreri SP, Easter JC, McClurg MR. The North Carolina experiment: active research in the development and assessment of new practice models. *N C Med J*. 2017;78(3):186-190. doi:10.18043/ncm.78.3.186
9. Mendeley. Implementation Science in Pharmacy. https://www.mendeley.com/community/implementation-science-in-pharmacy/. Accessed May 6, 2020.
10. U.S Department of Veterans Affairs. QUERI - Quality Enhancement Research Initiative. https://www.queri.research.va.gov/default.cfm. Accessed May 6, 2020.
11. U.S. Department of Veterans Affairs. Health Services Research and Development. https://www.hsrd.research.va.gov/cyberseminars/series.cfm#qi. Accessed May 6, 2020.
12. National Cancer Institute Division of Cancer Control and Population Sciences. Training & Education. https://cancercontrol.cancer.gov/IS/training-education/index.html. Accessed May 6, 2020.
13. AcademyHealth. 2020 D&I About. https://www.academyhealth.org/page/2020-di-about. Accessed May 6, 2020.
14. UAMS Translational Research Institute. Center for Implementation Research. https://tri.uams.edu/tri-services/the-center-for-implementation-research/. Accessed May 6, 2020.
15. UNC Eshelman School of Pharmacy. Center for Medication Optimizations. https://pharmacy.unc.edu/research/centers/cmo/. Accessed May 6, 2020.
16. American Association of Colleges of Pharmacy. New Investigator Award. https://www.aacp.org/resource/new-investigator-award. Accessed May 6, 2020.
17. American Association of Colleges of Pharmacy. Scholarship of Teaching and Learning (SOTL) Grant. https://www.aacp.org/resource/scholarship-teaching-and-learning-sotl-grant-application-instructions. Accessed May 6, 2020.