

AACP REPORT

Aligning the AACP Strategic Engagement Agenda with Key Federal Priorities in Health: Report of the 2016-17 Argus Commission

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EXECUTIVE SUMMARY. The Argus Commission identified three major federal priorities related to health care, including the precision medicine initiative, the Cancer Moonshot and the opioid abuse epidemic. Current activities at the federal level were summarized and an analysis of activities within the profession, and academic pharmacy specifically, was prepared. The implications for pharmacy education, research and practice are compelling in all three areas. Recommendations, suggestions and two policy statements aim to optimize the attention to these priorities by the academy. Further, aligning the AACP Strategic Engagement agenda with the opportunities and threats acknowledged in the analysis is essential.

Keywords: Precision medicine, pharmacogenomics, cancer, research collaboration, substance abuse disorder, opioid abuse, opioid misuse epidemic, curriculum

INTRODUCTION AND COMMITTEE CHARGES

The Argus Commission is comprised of the five most recent AACP presidents and typically will be charged to study a “horizon topic” believed to be germane to the future of pharmacy education, research and/or practice. President Joseph DiPiro charged the Commission to examine federal initiatives (eg, precision medicine initiative) that are emerging as significant national priorities and to select several with respect to their current and future impact on pharmacy education, research and practice.

After reviewing numerous potential national health priorities, members of the Commission selected three: the precision medicine initiative (PMI), the Cancer Moonshot, and the opioid misuse epidemic. What became clear as members of the Commission studied each topic was that pharmacy educators are significantly involved in all of these priorities. Further, the implications emerged for enhancing PharmD and graduate education, furthering the advancement of patient care and population health activities, and deepening the academy’s research participation, including basic biomedical, translational, clinical, administrative and social science research.

In one of the final actions of the 114th US Congress, the House of Representatives and Senate each passed legislation named the 21st Century Cures Act which President

Obama signed into law on December 13, 2016.¹ The three priorities identified by the Argus Commission were included as areas of research that will receive additional funding over the next 10 years. That said, AACP and other organizations committed to securing adequate federal support for research and innovation must remain vigilant to see that annual appropriations meet the expectations of the law.

BACKGROUND

Precision Medicine Initiative (PMI)

Precision medicine is the discovery, identification, and application of new technologies and/or services to make the prevention, diagnosis, and/or treatment of disease more successful and cost effective at delivering improved health outcomes for patients. The range of elements that contribute to precision health is very broad, including genetics, genomics, epigenomics, informatics, environment, behavior, and cultures and spans the full range of molecular, clinical, outcomes and population-based research. The definition is intended to be broadly stated because this is a highly diverse and dynamic arena. However, central and core within its foundation is the application of molecular analyses of genes, proteins and metabolites to accomplish precise diagnosis, treatment and/or prevention of disease.²

The patient is at the focus of precision medicine, with researchers and clinicians alike providing the means to

direct the most appropriate prevention or therapy to a specific patient based on the unique characteristics of both the patient and pathology from which he or she suffers, and engaging him or her to optimize outcomes.

We stand at a pivotal time in biomedical research where the integration of biologic, patient, and outcomes data are within our reach. By combining diverse datasets, new opportunities are emerging in how healthcare is delivered. Several key advances enable these efforts and together create a “perfect storm.” Advances in DNA sequencing technologies have ushered in new capabilities to collect genomic information at unprecedented scales, including whole genomes. Recent successes in interlinking molecular data with clinical data have demonstrated utility in the diagnosis and treatment of disease. New developments in information technology, such as the advent of electronic medical records, have made collection of clinical data from large numbers of patients possible. Moreover, advances in data mining allow for the realization of unexpected correlations in large-scale datasets from disparate sources. Together these advances enable us to gather, integrate, analyze and disseminate health-related data that were unimaginable 20 years ago in the evolving science and practice of precision medicine.

Former President Obama recognized this most important dynamic in health care when on January 20, 2015, in his State of the Union address he announced the PMI.³ Through advances in research, technology and policies that empower patients, the PMI will enable a new era of medicine in which researchers; providers and patients work together to develop individualized care. As noted in the introduction, the 21st Century Cures Act includes new funding to advance research on PMI.

The National Academy of Medicine recently released 19 excellent papers in a series entitled “Vital Directions for Health and Health Care.” One, entitled “Realizing the Full Potential for Precision Medicine in Health and Health Care,”² included the following summary of PMI:

Precision medicine is “an emerging approach that integrates investigation of mechanisms of disease with prevention, treatment and cure, resolved at the level of the individual subject or patient.” The authors believe it has tremendous potential to contribute to the goal of providing high value health care while enhancing outcomes and lowering costs. Despite recent breakthroughs and the growing momentum behind precision medicine, as evidenced by the launch of the U.S. Precision Medicine Initiative, there remain substantial challenges and barriers to its broad implementation in medical practice, including generating the needed evidentiary support for precision medicine, addressing data-sharing and infrastructure needs, incorporating

genomic information into clinical care and research, reconciling the economics of precision medicine, and securing participant engagement and trust. Policy-makers will need to play a critical role to help move this forward.

The paper contained the following five recommendations:

- 1. Develop evidence of precision medicine’s effect.** Provider and patient adoption and regulatory approval of and reimbursement for precision medicine require a robust evidentiary framework for evaluation of its effect on outcomes.
- 2. Accelerate clinical data integration and assessment.** Advancing precision medicine and achieving a greater understanding of the complexities of human health and disease will require aligning and integrating diverse, often unstructured datasets into a comprehensive knowledge network.
- 3. Promote integration of molecular guidance into care.** Moving genomic and other information into routine health care delivery will be critical for integrating precision medicine into health systems. We need to adopt an approach to genetic and genomic information that considers a patient’s genome sequence as foundational information for health care.
- 4. Develop innovation-oriented reimbursement and regulatory frameworks.** The current reimbursement environment does not reward innovators for the value created by their diagnostic tests. Rather than being value-based, reimbursement for diagnostics is typically cost-based and discourages the translation of innovative tests and therapies. Incentives to develop the evidence base and the economic model that support precision medicine will be crucial.
- 5. Strengthen engagement and trust of the public.** Participant engagement is essential for discovery in precision medicine to be accelerated and for services based on precision medicine to be adopted. Effective engagement will necessitate relationships with individuals and their communities and attaining their trust to overcome existing barriers.

The Argus Commission believes that pharmacists, pharmaceutical scientists and the academy in general have much to contribute to each recommendation.

The cost of completing the first human genome in 2001 was over \$3 billion. Since that time it can be completed for less than \$1,000. It is estimated that within the next few years it will cost less than most blood tests. The routine use of genomics is at the beginning in application to the individual patient but we suggest this will change

quickly.⁴ It is estimated by researchers from Stanford⁵ that more knowledge will be advanced in health care in the next ten years than what we have learned in the last 100 years. A first step is to expand the number of individuals whose complete genome is in a database. That is what the U.S. PMI aims to accomplish; however there are several similar initiatives ongoing throughout the world.

Many companies are gearing up rapidly with very entrepreneurial approaches. NantKwest and NantHealth are two recent IPO companies that are focused on health care, and oncology specifically. Watson, IBM's cognitive computing system, is making serious headway in understanding genes and disease. Additionally, there are several commercial companies that provide basic genomic information directly to the consumer. 23-and-Me is one of the more popular genetic testing companies that provides direct-to-consumer service. There are many other companies, such as AltheaDX, which interprets data and uses 23-and-Me to provide a detailed analysis and treatment/drug response, including side effects. The 23-and-Me test gives very basic genetic information on 23 common chromosomes. However, there are many other genetic tests for diseases that are not included in this test (pancreatic cancer and other rare genetic disorders). The patient has to pay for any additional tests. This can range from hundreds to thousands of dollars. Initially, the 23-and-Me test cost consumers \$300 but the price has decreased to less than \$200, making it far more accessible.

Some companies offer other services related to genetics, such as family histories, ethnicity, etc. Since this is such a rapidly growing area with new information being generated frequently, companies update participants when new information is discovered on their genetic sequence, (eg, new drug interactions).

Current Activities in and Implications of PMI for Pharmacy Education and Practice

As noted, the science of genetics and pharmacogenomics, specifically, are advancing rapidly. Significant contributions to such research are credited to several pharmaceutical scientists among the leaders of groups such as the Pharmacogenomics Research Network (PGRN) and the Clinical Pharmacogenomics Implementation Consortium (CPIC). These individuals have also earned recognition as elected members of the National Academy of Medicine, formerly the Institute of Medicine.

An extremely timely and valuable contribution to the pharmacy literature on genomics education and practice comes from collaborators at several colleges and schools of pharmacy and the NIH who published a series of articles in a themed issue of the *American Journal of Hospital Pharmacy* in December 2016.⁶ The series included examples

of implementation of pharmacogenomics service models in institutional care, and specifically in oncology. One manuscript in the series described the educational implications of pharmacogenomics for the profession.⁷

This group of pharmacogenomics leaders also published a commentary in January 2017 in the *Journal of the American Pharmacists Association* which contained an updated set of pharmacogenomics competencies in pharmacy practice and recommendations related to the preparation of practicing pharmacists and student pharmacists.⁸ In their opening paragraph, the authors quote Crews et al in summarizing the logical role for pharmacists in pharmacogenomics: "As a profession, pharmacy has long assumed a valued role in the leadership of therapeutic drug monitoring (eg, pharmacokinetics) and pharmacotherapy services owing to pharmacy's specialized training and an established practice record in medication management. In the same way, pharmacists are uniquely qualified to be on the front line of efforts to translate pharmacogenomics data into clinical practice across multiple diverse practice settings."⁹

It is not possible to accurately describe how all colleges and schools of pharmacy have introduced PMI and pharmacogenomics education into the PharmD curriculum. However, members of the Pharmacogenomics Special Interest Group (SIG) accepted the challenge of interpreting the pharmacogenomics implications of the 2013 CAPE Competencies in a paper entitled "The DNA of Pharmacy Education: CAPE Outcomes and Pharmacogenomics."¹⁰ The authors provide a comprehensive road map to the integration of pharmacogenomics in the PharmD curriculum in the context of the rapidly advancing scientific and clinical realm of pharmacogenomics.

In addition to curricular coverage in the PharmD curriculum, graduate level degree and post-graduate certificate offerings in pharmacogenomics are now being offered by several colleges and schools of pharmacy.¹¹ National pharmacy associations are partnering with pharmacy faculty to equip current practitioners across both institutional and community settings to assume leadership roles in drug therapy management informed by patient-specific pharmacogenomics information.

The Cancer Moonshot

In his final State of the Union address¹² President Obama announced that Vice President Joe Biden had accepted responsibility to head up a new national mission referenced as "The Cancer Moonshot." The aim of this effort is to make 10 years' worth of progress in cancer prevention, diagnosis, treatment and care in just 5 years. While others may have also used this term to signal the need for aggressive work to prevent, diagnose and treat cancer, President Obama issued a clarion call for an

intense public/private effort as a strategic priority for the federal government.

The report of the Cancer Moonshot Blue Ribbon Panel was released on October 17, 2016.¹³ The panel was comprised of a selection of the nation's top cancer experts, including cancer researchers, oncologists, patient advocates, and private-sector leaders. The panel was asked to identify and prioritize the most effective efforts that would expedite progress against cancer. Their October report offered recommendations in ten specific areas:

1. Establish a network for direct patient involvement offering genetic profiles, pre-registration for clinical trials, etc.
2. Create a clinical trials network devoted exclusively to immunotherapy for pediatric and adult cancers.
3. Develop ways to overcome resistance to cancer therapy.
4. Build a national cancer data ecosystem to enable one-stop, free access for researchers, doctors, and patients to share data on cancer and fuel faster progress.
5. Intensify research on the major drivers of childhood cancers, with emphasis on protein function.
6. Minimize cancer treatment's debilitating side effects.
7. Expand use of proven prevention and early detection strategies (eg, tobacco control, HPV vaccination) and expand prevention research.
8. Mine past patient data to predict future patient outcomes using tumor tissues stored at biobanks around the country.
9. Develop a 3D cancer atlas (a web-based catalog of the genetic lesions and cellular interactions in tumor, immune, and other cells in the tumor micro-environment).
10. Develop new cancer technologies, including implantable microdosing devices and advanced imaging technologies to study cancers at extremely high resolution.

Upon completing his 8-year term as vice president in January 2017, Joe Biden and his family established the Biden Foundation to continue advancing top priorities, including a cancer initiative.¹⁴

The Argus Commission believes that the profession of pharmacy, its clinicians, researchers, and public health activists, can make meaningful contributions in several areas covered by the above recommendations. They highlight patient-centered teams as a priority for pharmacists' practice engagement and for addressing the debilitating side effects of cancer treatment. Pharmacy researchers do play important roles in federally-funded cancer research and thus are poised to contribute significantly across the

spectrum of original research. Pharmacists in all settings have key roles to play in terms of prevention and early detection to enhance treatment outcomes.

Current Activities of and Implications for Pharmacy Education and Practice Related to the Cancer Moonshot

The Board of Pharmacy Specialties recognized oncology pharmacy practice as a specialty in 1994 and as of 2015 just under 2,000 individuals held current status as Board Certified Oncology Pharmacists (BCOP). The Hematology and Oncology Pharmacist Association (HOPA) was established as a specialty pharmacy association in the late 1990's, offering the growing number of pharmacists interested in the specialty a dedicated home for networking and professional development. ASHP reported that in 2014 there were 113 filled PGY2 oncology residency positions in the U.S.

There clearly are implications of the evolution of precision medicine in the field of oncology. The papers in the December 1, 2016 issue of the *American Journal of Health-System Pharmacists* included several analyses of the roles pharmacists are playing in pharmacogenomics in general and in oncology practice specifically. Walko and colleagues¹⁵ published three practice models and roles for oncology pharmacists based on emerging practices in Tampa, Indianapolis and Lexington, Kentucky. One model is the implementation of oncology tumor boards. The model allows pharmacists to participate in providing clinical recommendations as well as serving as principal investigators in research studies associated with the tumor board.

Robert Ignoffo and colleagues¹⁶ used a Delphi panel methodology to examine the potential roles that growing numbers of oncology pharmacy specialists might play in addressing the documented shortage of medical oncologists. The panel agreed upon a number of specific services oncology pharmacists routinely provide, including participating in clinical studies, adjusting chemotherapy and assessing drug response and toxicity, managing adverse drug effects and other patient symptoms (eg, pain management), and several other activities. The authors estimate that several million patient visits could be managed annually by BCOPs in hospital and ambulatory settings.

Examining just a sample of current PharmD curricula affirms that hematology/oncology consistently appears in course series focused on pathophysiology and therapeutics, suggesting that virtually all PharmD graduates enter practice with baseline knowledge of cancer therapeutics. Oncology specialization requires additional post-graduate training and practice.

According to the 2015 AACP Faculty Research Grant Database, over \$45 million in National Cancer

Institute (NCI) grants had been awarded in current year funding to cancer researchers at colleges and schools of pharmacy. Their research spanned the array of Cancer Moonshot priorities, from prevention to new treatment modalities and managing adverse effects of cancer treatment. While other agencies make awards for cancer-related research, those funding sources pale in comparison to the \$5 billion dollar budget for extramural and intramural awards plus the administrative costs of running the NCI.

Given the inclusion of cancer in the 21st Century Cures legislation and related funding, this is the opportune time for those working in the field in numerous ways to increase the intensity of our efforts to adequately prepare graduates and alumni to assume expanded roles in the prevention and treatment of cancer in all settings. The Moonshot emphasizes collaborating and networking which is especially salient in the research arena. The opportunities for pharmacists to participate in expanding prevention efforts (e.g., smoking cessation, colon cancer screening) applies to virtually all patient care environments as well as community-based projects.

The most significant threat to pharmacy will be a failure to enrich our curricula and post-graduate education with the adequate intensity of attention to the expanding field of pharmacogenomics with appropriate emphasis on cancer treatment. The need for specialists will grow rapidly and new models of practice have already emerged and will continue to develop in the near future. Our faculty must be exposed to these and our learners must be encouraged to prepare for careers where they can bring expertise on the application of genomic science to patient care and research.

The Opioid Epidemic and Effective Pain Management

Substance abuse and especially opiate addiction have emerged as a public health emergency. The Surgeon General's Report on Alcohol, Drugs, and Health¹⁷ documents the grim statistics. Twenty-one million Americans have a substance use disorder, similar in prevalence to metabolic disease and higher than cancer. Nearly 80 Americans die every day from an opiate overdose, either prescription opiates or heroin, more than 28,000 deaths per year. Health and societal consequences are unimaginably high. Despite evidence that treatment is effective, fewer than one in five Americans with opiate addiction receive treatment. The Surgeon General's report provides a comprehensive roadmap that documents what we know about the issues and reviews prevention and treatment strategies, both behavioral and pharmacologic, and supporting evidence.

Pharmacists work at the interface between the health care system and affected individuals and their families in communities. Academic pharmacy has the educational,

research, clinical, and engagement expertise to be a part of the solution. That said, in the comprehensive report from the Office of the Surgeon General, it is not apparent that pharmacists were engaged as contributing authors or consultants in this seminal work.

Various initiatives with government have been launched over the past years. The Centers for Disease Control and Prevention issued "Guidelines for Prescribing Opioids for Chronic Pain."¹⁸ The Department of Health and Human Services published "A Comprehensive Population Health-Level Strategy for Pain."¹⁹ The 2011 White House document, "Responding to America's Prescription Drug Abuse Crisis," emphasizes key strategies which include healthcare provider education, patient and public education, research and development, prescription drug monitoring programs, proper medication disposal, and enforcement efforts to find and shut down pill mills.²⁰ Notably, this report calls for the Indian Health Service to increase collaborative practice agreements involving pharmacist prescribing and monitoring of pain medication.

The Substance Abuse and Mental Health Services Administration (SAMHSA) produced a helpful Opioid Overdose Prevention Toolkit,²¹ targeted broadly to community members, first responders, prescribers, patients and family members. A HHS proposed rule change would increase the limit for physicians who prescribe buprenorphine from 100 to 200 patients per practice.

The Comprehensive Addiction and Recovery Act of 2016 is the first federal legislation to address all major elements of response to the crisis but has not yet been fully funded by the U.S. Congress. President Donald Trump has tapped Gov. Chris Christie, R-NJ, to chair a special commission for further study of the opioid crisis in America.²²

Current Activities of and Implications of the Epidemic for Pharmacy

"As many as one in three patients receiving long-term opioid therapy in a primary care setting struggles with addiction. Pharmacists are on the front lines providing medication-related services and engaging in prevention and treatment efforts of opioid use disorder and overdose. Pharmacists are an important resource for patients and can provide vital information about proper use, side effects, medication fills, and safe storage and disposal," said Grant Baldwin, PhD, MPH, director of the division of unintentional injury prevention (DUIP) at the National Center for Injury Prevention and Control (NCIPC).²³

The pharmacy profession is responding to the epidemic through national pharmacy organizations, state and national advocacy, and front-line patient care. The

American Pharmacists Association (APhA) hosts the Opioid Use, Abuse, and Misuse Resource Center²⁴ on www.pharmacist.com which is supported by a grant from Purdue Pharma, L.P. Community-based pharmacists know all too well the need to balance access to opioids for those who need them to control pain with the legal requirements and nonpharmacologic strategies which may offer relief.

The College of Psychiatric and Neurologic Pharmacists (CPNP) offers pharmacists the guide “Opioid Use Disorders: Interventions for Community Pharmacists” which is supported by the American Academy of Addiction Psychiatry under a grant from the Substance Abuse and Mental Health Services Administration.²⁵ There are many other examples of worthwhile projects and initiatives, but largely missing are the coordinated efforts, front-page impact, and consistent leadership to leverage pharmacists’ expertise in patient health and safety, community health, legislative advocacy, and pharmaceutical supply chain logistics.

Dr. John Prescott of the Association of American Medical Colleges (AAMC) wrote about academic medicine’s response to the opioid crisis to align education, research, and clinical care with public health, law enforcement, and healthcare providers.²⁶ Dr. Prescott details a collaborative effort with departments of psychology, social work, counseling, public health, nursing, physical therapy, pharmacy, and medicine for Screening, Brief Interventions and Referral for Treatment (SBIRT) training “using evidence-based practices to identify, reduce, and prevent problematic use, abuse, and dependence on alcohol and illicit drugs.” Not only does this approach use whatever local partners can be secured, it works toward a culture of involvement and advocacy. These efforts were noticed by President Obama who invited both medical school deans in West Virginia to the White House Summit. Following the 2016 elections, pharmacy educators must re-build relationships with newly-elected leaders.

Pharmacy education has a vital role to play in addressing this emergency and evidence accumulates to validate that the academy is engaged in local, regional and broader efforts. Increasingly, colleges and schools of pharmacy are recognized as partners in the effort to prevent opioid misuse, addiction, and overdose as described in the cover story in *Academic Pharmacy Now* in late 2016.²⁷ Examples include the University of Pittsburgh project “Overdose-free PA” which was funded in part with Pennsylvania taxpayer dollars. Dr. Jeffrey Bratberg, University of Rhode Island College of Pharmacy, is passionate about active engagement to prevent opioid overdose. In an article published in 2015 Dr. Bratberg outlined

many valuable resources for opioid overdose prevention.²⁸ Topics from safe medication and syringe disposal, opioid prescribing, and overdose and naloxone epidemiology, to naloxone laws and regulations to naloxone administration videos and handouts are supported by tools and valuable websites for didactic and experiential courses, partnerships/continuing education with practitioner organizations, and regulatory boards of pharmacy.

Where does AACP as an association stand on the opioid crisis? AACP supports many general policies related to the current opioid crisis in areas of partnerships, research, and interprofessional teamwork. Specifically, the AACP House of Delegates has affirmed:

- AACP urges colleges and schools of pharmacy to commit to actions aimed at reducing the public health threat from opioid abuse and heroin use by utilizing teaching, research and patient-centered, team-based care that includes, but is not limited to:
 - preparing every student to provide, administer, and educate on appropriate use of life-saving interventions to patients, as well as to individuals who may encounter those at risk of opiate overdose;
 - engaging in education outreach with other healthcare providers; and
 - providing continuing professional development to prepare practicing pharmacists to respond to requests for interventions that can reverse opioid overdose. (Source: *AACP Board of Directors*, 2016)
- AACP advocates increased continuing education programs that address practitioner needs in the areas of addiction, substance abuse and recovery. (Source: *Special Committee on Substance Abuse*, 2010)
- Pharmaceutical education has the responsibility to prepare students to address the problems of substance abuse and chemical dependency in society. (Source: *Academic Affairs Committee*, 1991)

Seizing the Opportunities and Thwarting the Threats in Addressing the Opioid Misuse Epidemic

More than ever before, awareness and goals are aligned to address the public health problem of substance misuse and substance use disorders. The resources to inform local, regional and national action abound, though they may not be organized optimally to fully feature, unify and link them for most effective access by educators, researchers and practitioners. The 2016-17 AACP Advocacy Committee report outlines an action framework specifically addressing community engagement targeting the opioid misuse problems. Action items include:

- Disseminating the CDC brochure²⁹ Pharmacists: On the Front Lines—Addressing Prescription Opioid Abuse and Overdose.
- Using the Surgeon General’s report as a roadmap as schools/colleges assess their all-out commitment to making this epidemic central, as they would other core chronic diseases such as diabetes and osteoporosis.
- Supporting initiatives using up-to-date language.

Not everyone agrees about the most appropriate ways to combat opioid addiction. Among such threats to full action are:

- Enabling of naloxone and buprenorphine prescriptive authority for nurse practitioners and physician assistants but not pharmacists.
- Lack of co-prescribing of naloxone with high-dose opiates.
- Not including indication for use with each prescription for opiate medication.
- Need for enhanced prescription drug monitoring program-sharing among states.
- Need for improving access to standing order naloxone and increased limits of number of patients for prescription of buprenorphine.

Urgent Call to Action

What is academic pharmacy’s place in the “idealized future state?” Consistent with the AACP vision statement, we envision a healthy community through academic leadership. After all, every single pharmacist in practice is one of our graduates and the same holds true for all other health professions. We aspire to educate, learn, discover, serve, and inspire. We find ourselves faced with both an urgent need and an opportunity. We believe the idealized future state is a partnership with all stakeholders, both in health sciences and across advocacy, economic opportunity, access, and law, and that the partnership will offer solutions in our communities to treat and prevent this scourge.

We have the clinical, research, and educational know-how. There may be other public health threats such as tobacco use and alcoholism which take more lives gradually, however we cannot ignore the devastation to families when young children are faced with their parents’ addiction and sudden deaths. While our research efforts, particularly in practice models and social-administrative sciences, can provide part of the evidence basis for action and part of our call to action, existing research and experience already tell us that prevention strategies are effective and treatment interventions work.

What we can do now with immediate impact is to put those established interventions into action. Our education strategies can be tailored to our own students, interprofes-

sionally to health sciences students broadly, to practitioners, and the public. We can partner in advocacy to make lifesaving treatment available through pharmacists in every community. We can implement clinical practice changes immediately in teaching sites where our students and our faculty members are present. Just as important is the legitimate and lawful access to opioids which must be assured to patients in need.

Our call to action also includes enhanced engagement in the national policy arena. It is not clear how the opioid crisis will fit in the priorities of the Trump Administration and who the leaders of the Office of National Drug Control Policy will be. While some federal initiatives include mention of pharmacists, our level of presence and influence are not reflective of our ability or intent to contribute to the solution to this vexing problem. The Surgeon General’s report provides an extremely helpful roadmap for us, but pharmacists are largely absent from authorship, consulting, and editorial involvement.

Summary: Implications for pharmacy education and practice

While distinctly different areas of interest, the three priorities selected for this report have strikingly similar implications for pharmacy education and practice. This stems in part from threads that run through all three priorities: rapidly evolving areas of interest with respect to advances in research and discovery, clinically challenging patient care priorities, insufficient expertise both in and outside the profession, priorities where “big data” holds great opportunity, and topics warranting examination of the PharmD curriculum to assure adequacy of emphasis.

Research

As noted in each section, pharmacy faculty are actively engaged in research in pharmacogenomics, oncology, and substance abuse/mental health. Centers of excellence can be identified at colleges and schools of pharmacy and strong graduate education activity corresponds to these programs of research. Faculty at select programs with sustained funding are, in many cases, leaders in research networks, especially in the area of pharmacogenomics. That said, potential new funding associated with 21st Century Cures implementation in an environment where funding for research in general is threatened suggests that AACP and our members should critically examine strategies to assist members to effectively compete for additional funding for research and graduate education.

Patient Care

Improving access to clinical expertise to accelerate translation of precision medicine research to patient diagnosis and treatment, to advance cancer prevention and

treatment, and to stem the harm from the misuse of opioids and other substances of abuse are compelling priorities for the U.S. health care system. The reality is that there are pockets of expertise in both academic health centers and other integrated health systems that have invested, for instance, in learning health system strategies that allow for the application of genomics to diagnosis and treatment to enhance patient care. Specialized cancer centers are also hubs of innovation for evidence-based care planning and delivery. However, the combination of the rapid advancement of discovery and the slow translation into mainstream health care suggests there is a need for national organizations across the spectrum of research, education and clinical practice to strengthen collaborations aimed at broadening the dissemination of evidence, models of care delivery, and public and private financing to accelerate diffusion of cutting edge clinical services.

Insufficient Expertise

As noted by Ignoffo and colleagues, there is a shortage of medical oncologists that is anticipated to become more acute. As of 2015, the Board of Pharmacy Specialties (BPS) reported that just under 2,000 individuals had been certified as oncology specialty pharmacists. Weitzel et al noted that “for colleges and schools of pharmacy, identifying the optimal structure and content of pharmacogenomics education remains a challenge, insufficient numbers of faculty members with pharmacogenomics expertise and inadequate availability of practice settings for experiential education are other limiting factors” for assuring that PharmD graduates and current practitioners are prepared to assume leadership roles in integrating pharmacogenomics into patient care. And while individuals and organizations at the local, state and federal levels are directing an increasing amount of attention and resources to address the misuse of addictive substances, lack of access to affordable mental health services, and substance abuse treatment specifically, is a national crisis. BPS also reported that just over 900 individuals had been certified as Psychiatric Pharmacy Specialists by yearend 2015.

Promise of Big Data

According to the NIH, “the ability to harvest the wealth of information contained in biomedical Big Data will advance our understanding of human health and disease; however, lack of appropriate tools, poor data accessibility, and insufficient training, are major impediments to rapid translational impact. To meet this challenge, the National Institutes of Health (NIH) launched the Big Data to Knowledge (BD2K) initiative in 2012.” The 2015 Argus Commission report³⁰ was devoted to an analysis of the implications of the availability of significant data for research, pharmacy education and practice. Precision

medicine will only realize its potential with the translation of big data into more accurate diagnoses and treatment strategies. A significant emphasis on the effective development and use of large networked datasets is a high priority in the Cancer Moonshot. More advanced and networked data systems on opioid prescribing and utilization hold promise for more effective interventions to reduce drug abuse.

The PharmD Curriculum

The members of the Argus Commission are well aware of the competition for hours to achieve “adequate coverage” of many subject areas in the PharmD curriculum. The complexity of genomics, oncology and mental health as reflected in the previous summaries suggest that while these topics indisputably require basic coverage for all PharmD graduates, depth of education and practice experience sufficient to provide the needed numbers of pharmacy specialists requires education and post-graduate training beyond the professional doctorate. Given the limited numbers of faculty and practitioners with specialized knowledge in each area, collaborative approaches should be developed to assure that both basic and advanced course material, as well as experiential learning opportunities, remain current in the face of exploding and ever-changing evidence.

PROPOSED POLICIES, RECOMMENDATIONS AND SUGGESTIONS

Policy Statements

1. AACP encourages colleges and schools of pharmacy to advise students on areas of emerging high demand and provide pathways for specialization both within the Doctor of Pharmacy curriculum and via post-graduate pathways. [The Bylaws and Policy Development Committee referred this statement to the AACP staff to formulate as a suggestion versus a policy statement (Suggestion 3).]
2. AACP encourages colleges and schools of pharmacy to equip student pharmacists, faculty, preceptors and alumni with the knowledge, skills and commitment to assist patients and families with the challenges of effective acute and chronic pain management as well as with the prevention and treatment of addiction disorders.

The 2017 House of Delegates adopted the amended statement as follows: AACP encourages colleges and schools of pharmacy to equip student pharmacists, faculty, preceptors and other practitioners with the knowledge, skills and abilities to assist providers, patients, families, and caregivers with the challenges of effective pain management and the prevention and treatment of associated substance use disorders.

Recommendations

1. AACP should work with member institutions and other relevant organizations to identify quality educational resources (eg, certificate programs, graduate courses/degrees) in specialized areas of practice and research to increase their accessibility for students and faculty.
2. AACP should convene jointly with the Joint Commission of Pharmacy Practitioners (JCPP) and/or other appropriate entities a series of intraprofessional dialogues focused on the optimization of the profession's roles in precision medicine, cancer prevention and treatment, and substance abuse disorders to clarify priorities for education, practice and research.
3. AACP should actively participate in the development of additional opportunities, models and resources for interprofessional collaboration in education, practice and research on precision medicine, oncology, mental health and other priority topics.
4. AACP must increase our strategic engagement efforts to insure the adequacy of federal and private sector funding for research encompassing the priorities of the 21st Century Cures legislation.

Suggestion

1. AACP encourages colleges and schools of pharmacy to increase the accessibility of dual degree and post-graduate training opportunities to facilitate specialization of PharmD graduates in practice, research and education.
2. AACP encourages consideration by all pharmacy organizations that provide funding for research to prioritize funding for pharmacogenomics, oncology and mental health/substance abuse to stimulate and support additional work in these key areas.
3. AACP encourages colleges and schools of pharmacy to advise students on areas of emerging high demand and provide pathways for specialization both within the Doctor of Pharmacy curriculum and via post-graduate pathways.

CONCLUSION

More knowledge will be advanced in health care in the next ten years than what we have learned in the last 100 years.⁵ This statement resonates for all of health care. How will we respond? The Argus Commission identified significant levels of commitment among member institutions and their faculty to provide leadership in research, education and practice in the three areas selected for analysis. That said, the pace of change and the need for increased specialization in each area are compelling and deserve focused attention as the profession seeks to optimize

its contributions in genomics, oncology and mental health. Our colleagues, our citizens, and our future depend on us to respond, innovate and adapt.

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