

ASHP Statement on the Pharmacist's Role in Public Health

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Position

Pharmacists play a vital role in maintaining and promoting public health. All pharmacists have a responsibility to participate in global, national, state, regional, and institutional efforts to promote public health and to integrate the goals of those initiatives into their practices. Furthermore, pharmacists have a responsibility to work with public health planners to ensure their

involvement in public health policy decision-making and in the planning, development, and implementation of public health efforts.

The primary objectives of this statement are to (1) increase awareness of pharmacists' contributions to public health, (2) educate pharmacists about public health and their role in promoting public health, (3) describe the role of pharmacists in public health planning and promotion, and (4) identify new opportunities for pharmacists' involvement in future public health initiatives. This statement does not provide an exhaustive review of pharmacists' public health activities. Its intent is to stimulate dialogue about the role that pharmacists can play in improving public health in the United States. The statement is also meant to draw attention to and highlight the significance of enhanced and proactive communication between the public health sector and the pharmacy profession's leaders and stakeholders representing national and state affiliates, colleges of pharmacy, and health systems to advocate the pharmacist's role in public health.

Background

Public health is a science-based field designed to "protect and improve the health of people and their communities."¹ In contrast to clinical medicine, public health concentrates on whole populations and communities, working to improve the places where they "live, learn, work and play,"² through health-promoting policies, prevention, interventions, and education.

These goals are accomplished through an upstream approach, or what could be considered "upstream healthcare." Public health recognizes four levels of prevention: primordial, primary, secondary, and tertiary.³ Primordial prevention is prevention of risk factors for disease, illness, injury, or poor health outcomes from ever

developing; primary prevention is the prevention of disease, illness, injury, or poor health outcomes from occurring; secondary prevention focuses on reducing the impact of disease, illness, injury, or poor health outcomes; and tertiary prevention focuses on minimizing the long-term impact of disease, illness, injury, and poor health outcomes.³ While all four levels of prevention are recognized and used in public health, primordial and primary prevention are considered largely upstream, whereas secondary and tertiary prevention are considered more downstream. Public health focuses heavily on upstream efforts while also working closely with the medical community and others to positively impact downstream work. Examples of the different types of prevention can be found in [Table 1](#).

There are many factors that contribute to the overall health of a community or population. To understand how best to prevent the risk factors of disease, illness, injury, and poor health outcomes from ever developing, one must first understand the many factors that contribute to overall health, referred to as "determinants of health." While there are many determinants of health, most can be grouped into five primary categories: social factors, referred to as "social determinants of health"; policy; health services; individual behavioral choices; and biology and genetics⁴:

- **Social determinants of health** include but are not limited to socioeconomic status, employment status, educational attainment, cultural and physical environment, family influence, intimate partners, social groups, and religious groups.
- **Policy** includes but is not limited to economic policies, political policies, justice policies, educational policies, health policies, work policies, and neighborhood and zoning policies.

- **Health services** include but are not limited to access to services, quality of services, cost of services, insurance coverage, language access, health programs, and time and means of access.
- **Individual behavioral choices** include but are not limited to diet; physical activity; alcohol, drug, or tobacco use; handwashing; sexual activity; stress management; sleep; and therapy adherence issues.
- **Biology and genetics** include but are not limited to age; gender; sex; biological response to stimuli, stress, or medications; and genetic predispositions.

The combination of these factors heavily influences the overall health of individuals, communities, and populations, making healthy living either easier or more difficult.² These factors are closely intertwined, with no single determinant independent of the others. One study ranked the relative contributions of determinants of health to overall health as follows: behavior, 40%; genetics, 30%; social factors 15%; healthcare, 10%; and environmental factors, 5%.⁵ As Shermock⁶ points out, “[e]ven if we get the part that healthcare practitioners typically focus on *completely right*, that still leaves 90% of what determines health unaccounted for.”

Public health seeks to understand the determinants of health and their influence on risk factors, disease, illness, injury, and negative health outcomes through research. That knowledge is then used to improve the determinants of health and remove the barriers to healthy living, making the healthy choice the easier one.

Public health activities of pharmacists

In 2006, the American Public Health Association (APHA) outlined the public health role of the pharmacist in a statement⁷ building on two previous APHA publications.^{8,9} In 2013, the American Association of Colleges of Pharmacy recognized the

important role pharmacists can play in public health by including population-based care and reducing health disparities and inequalities in its Center for Advancement in Pharmaceutical Education (CAPE) Educational Outcomes.¹⁰ These outcomes also emphasized the pharmacist's role in the public health components of “design[ing] prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness.”¹⁰

The public health duties that an individual pharmacist performs will vary, based on the individual's experience, abilities, training, and work setting. All pharmacists, working alone or in collaboration with healthcare colleagues and administrators, can contribute to the promotion of public health. ASHP has described roles pharmacists have in specific public health-related activities, including antimicrobial stewardship and infection control¹¹; substance abuse prevention, education, and treatment¹²; prevention of controlled substances diversion¹³; managing drug product shortages¹⁴; immunization¹⁵; tobacco cessation¹⁶; and emergency preparedness and response.¹⁷

The following are examples of other activities that pharmacists can engage in to promote public health:

- Promoting population health.
- Developing disease prevention and control programs (including chronic disease or disease treatment programs).
- Promoting medication safety efforts in their institutions and communities.
- Engaging in opioid stewardship efforts, including prevention, intervention, and treatment.
- Developing health-education policies and programs within their institutions that address the needs of patients, other healthcare professionals, community leaders, and the public, individually and as members of committees with purview over public health-related activities; and



participating as members of public health organizations and chapters in pharmacy organizations.

- Advocating for sound legislation, regulations, and public policy regarding disease prevention and management.
- Engaging in public health-related research and education programs, initiating campaigns to disseminate new knowledge, and providing training programs that include basic population health tools such as statistical analysis, epidemiology, disease surveillance techniques, risk reduction strategies, and insights into methodology.¹⁸

Population health. Although pharmacists have a role in both, it is important to distinguish population health from community health. Community health “encompasses population groups and the locus (e.g., place, venue, or other unit) of programs, interventions, and other actions,”¹⁹ typically implying a geographic basis. In contrast, population health focuses on groups of individuals defined by specific characteristics other than geography, such as a health determinant or disease state. For example, Kindig and Stoddart²⁰ defined population health as “the health outcomes of a group of individuals, including the distribution of such outcomes within the group.” They proposed that the field of population health includes policies and interventions that link health outcomes and patterns of health determinants. Evans, Barer, and Marmor²¹ described factors in the social environment, external to the healthcare system, that exert a major and potentially modifiable influence on the health of populations.

Efforts to improve population health have been defined in different ways. The Institute for Healthcare Improvement Triple Aim Initiative uses the term “population health management” to describe “the work by healthcare organizations to improve outcomes for individual patients to maximize population health,” whereas the National Academy of Medicine prefers the term “population health improvement” to

Table 1. Examples of Prevention

Upstream		Downstream	
			
Primordial Prevention (prevent risk factors)	Primary Prevention (prevent illness/injury)	Secondary Prevention (reduce impact)	Tertiary Prevention (chronic impact)
Banning smoking in public areas, smoking education programs	Anti-smoking campaigns, taxes on cigarettes, smoking cessation programs, patches, gum	Treatment for smoking related illness, medical intervention, patient counseling	Disease management, respiratory treatment, therapies and screenings
Eliminating food deserts, nutrition education, healthy cooking classes, dietary guidelines	Increasing access to farmers’ markets, health screenings	Individual nutrition counseling, medical intervention for diet-related illness, vitamins	Disease management, health monitoring
Laws and regulations against human trafficking, education regarding human trafficking, establishment of safe internet practices	Establishment of human trafficking hotline, raising awareness among the public, establishment of sentinel reporting, education programs for healthcare providers as well as police officers and other public servants	Screening for trafficking as part of all healthcare provider interactions, treatment of injuries and illnesses	Establishment of resources and safe havens for victims, mental health counseling
Opioid education programs, safe practices to avoid illness and injury	Improved opioid prescribing policies, opioid disposal locations and policies etc., patient education	Monitoring opioid use (both systemically and individually), early intervention	Medication-assisted therapy, access to treatment centers, monitoring

describe “work to identify and improve aspects of or contributors to population health, expanding the focus beyond traditional healthcare delivery systems.”²² Homsted et al²³ provide a process-based definition of population health management:

The active process of strategically utilizing health determinant data for a defined cohort to design, coordinate, and deliver high-quality, cost-effective, patient-centered care across the continuum, through optimizing communication, collaboration, and utilization of available resources with the goal of creating and sustaining health.

Population health management, a subset of population health, focuses on the comprehensive care of a specific population to implement needed services and interventions to improve

the population’s health.²⁴ Pharmacists can participate in population health management by being able to identify the needs of a population and implement necessary changes by, for example, performing medication reviews (especially of risky or costly medications) and working with other healthcare providers to develop care paths and chronic disease state management programs.²⁵ Given the importance of behavior as a determinant of health, pharmacists can improve population health through concerted actions to improve adherence to medication, diet, and exercise regimens, and through efforts to discourage harmful behaviors such as tobacco use, substance abuse, and high-risk sexual activity. Pharmacists practicing in ambulatory care and primary care settings are particularly well positioned to help ensure patients have received appropriate preventive care, such as well care visits, immunizations, and screenings (e.g., mammograms, colonoscopies).

Those pharmacists also have a role in population health management by contributing to team-based monitoring and education of patients about healthy lifestyle choices and screening for social determinants of health.²⁶

Medication therapy management (MTM) programs provide one example of a role pharmacists can have in population health management. MTM broadly encompasses a range of healthcare services provided by pharmacists that optimize patient outcomes. Pharmacists can expand their roles by leveraging provider status to improve public health through MTM.²⁷ MTM can be used to identify and resolve drug therapy problems. Pharmacists can develop comprehensive individual care plans, identify and meet vaccination needs, and improve health outcomes through adherence and management of chronic diseases. MTM has the potential to go beyond the treatment and management of diseases and provide pharmacists an

opportunity to identify social determinants of health during patient care conversations (e.g., identifying social determinants of health such as food insecurities may shed light on why a patient skips meals and insulin, leading to uncontrolled diabetes) and help address them. Identifying social determinants of health that are impacting patient outcomes and advocating for these patients is an important aspect of MTM, and the future of pharmacy must incorporate social determinants of health principles if the profession is to treat the whole patient and meet the needs of an integrated and multi-professional healthcare system.

Some of the leading health initiatives of Healthy People 2030 include smoking cessation, fall risk assessment, vaccinations, and medical product safety,²⁸ which can all be addressed during MTM services provided by pharmacists. Motivational interviewing should be utilized for those who are actively smoking, and benefits of quitting discussed during MTM sessions. This activity, along with identifying needed vaccines and potential fall risks, could improve public health and patient outcomes.

The CAPE 2013 outcomes emphasize the importance of this ability for future pharmacists to be trained in identifying and critically analyzing information that may impact patient-centered and population-based care.¹⁰ As the volume of population and patient data grows, along with the ability to analyze that data using tools such as machine learning, human language processing, and harvesting of data from health apps and social media, well-trained pharmacists will be able to harness the power of big data to care for populations more efficiently and effectively.

Disease prevention and control. Pharmacists can be involved in disease prevention and control in many ways. For example, they can help develop institutional screening programs to check immunization status and identify undiagnosed medical conditions (e.g., hypertension, diabetes, hyperlipidemia,

depression, substance abuse, behavioral health issues). Pharmacists have gained authority in many parts of the United States to administer immunizations, sometimes with a prescription from a physician, but often just at the request of the patient, and are making it a routine part of offered services. The goals for disease prevention in Healthy People 2020 were focused on the diseases and conditions listed above.²⁹ Healthy People 2020 also introduced Leading Health Indicators,³⁰ which included social determinants of health.

In Healthy People 2030, more attention is focused on preventing disease through attention to upstream influences on health, such as social determinants.²⁸ Healthy People 2030 continues to emphasize helping people prevent conditions that have a high impact on costs and quality of life, such as chronic disease, behavioral health, and equity, or the equal opportunity to be the healthiest a person can be. Pharmacists can encourage and model behaviors to mitigate threats that are high risk to public health, such as anthrax, botulism, plague, and smallpox, as well as currently emerging diseases spread by viral and bacterial vectors, such as Zika, HIV, influenza (e.g., H1N1), and coronaviruses. These behaviors include handwashing, social distancing, mask wearing, immunization, and not working when symptomatic.³¹ Table 2 provides a list of ways to prepare for specific pharmacy public health roles in epidemic or pandemic response.

All healthcare professionals, including pharmacists, have become increasingly concerned about the effect of stress on the overall health of people and interested in promoting ways to reduce stress (e.g., regular exercise, yoga, increasing time in nature, comfort animals). As Healthy People stakeholders, pharmacists can use and make their patients aware of available resources and services by providing website links, data, interactive tools, and reports as passive offerings in clinic and community pharmacies. Pharmacists can more actively manage disease prevention

through collaborative care agreements, prescribing, therapeutic medication management, and counseling.

Medication safety. Medication safety is one of pharmacists' primary responsibilities.^{32,33} Adverse medication events are estimated to cost the United States more than \$30 billion a year and inflict incalculable loss and suffering on victims.³⁴ By providing focused and comprehensive medication instruction to individual patients and groups of patients, pharmacists can help reduce emergency room visits and hospital admissions by up to 30%.³⁴ The pharmacist's role in medication safety and preventable adverse events from medications align with the national public health goals outlined in Healthy People 2030,²⁸ which include reducing emergency department visits for overdoses from medications. Pharmacists are ideally suited to serve in leadership roles as an expert resource for medication safety by virtue of their education and training and their responsibility for ensuring medication safety through use of technologies such as barcoding, computerized provider order entry systems, infusion pumps, and clinical decision support. Pharmacists can improve medication-related processes and develop strong medication-safety practices utilizing Just Culture principles³⁵ to facilitate high-reliability organizations³⁶ through engagement in facility-wide committees (e.g., medication safety or pharmacy and therapeutics committees).^{37,38} Pharmacists can also promote adherence and effective medication use through initiatives in the community and local organizations. The 2013 CAPE outcomes include an increasing role for pharmacists in improving the safety of medications at each step in the medication-use system and in transitions of care.¹⁰ Pharmacists are responsible for monitoring the medication-use system and reporting of medication-related adverse events because of their unique expertise in this area. Pharmacists are often an inherent part of transitions of care (e.g., through community pharmacies, managed-care facilities, long-term care), so they can play a significant role

in ensuring medication safety by counseling patients, identifying potential medication-related adverse drug events, and putting in place strategies to prevent those events (e.g., notifying pharmacy colleagues in a setting that a patient is transferring to, or raising awareness of possible threats to medication safety for specific patients). Pharmacists' ability to problem-solve and decrease future medication-related adverse events is beneficial to public health at large.

Efforts to address the opioid epidemic. ASHP has described roles and responsibilities pharmacists have in substance abuse prevention, education, and assistance¹² and prevention of controlled substances diversion.¹³ The scope and nature of the opioid epidemic warrant particular focus. Healthcare professionals have come to embrace what is termed "pain management and opioid stewardship," recognizing that "opioid stewardship is an integral... part of an overall pain management and stewardship strategy" and that behavioral and socioeconomic aspects of care should be "recognized as an overarching component that needs to be addressed across the spectrum of patients."³⁹ Pharmacists are well positioned in the healthcare and local communities to collaborate with other providers in the treatment of acute and chronic pain working to apply opioid-alternative therapies when possible. In addition, pharmacists should be engaged to recommend appropriate opioid dosage regimens that decrease overprescribing and reduce the risks of abuse and addiction when necessary. Pharmacists, as part of the interprofessional team, have roles in prevention, intervention, and treatment of opioid abuse and addiction that include but are not limited to the following.

Prevention

- Collaborating with healthcare colleagues to take an interprofessional approach to pain management and opioid stewardship that incorporates evidence-based non-opioid therapies and reduces the risks of abuse, misuse, and addiction.

- Adopting communication and educational approaches to explain dosing instructions to patients in ways that avoid or reduce common problems that stem from opioid misuse or overuse.
- Leading efforts to prevent diversion of controlled substances.¹³
- Working with other healthcare professionals, governmental agencies, and civic organizations to destigmatize opioid use disorder and foster development of treatment programs.
- Using and advocating for the enhancement of state prescription drug monitoring programs.
- Participating in public substance abuse education and prevention programs.

Intervention

- Assisting in the identification of individuals, coworkers, and others who may be having problems related to opioid abuse.
- Dispensing and administering naloxone, and training caregivers to administer and at-risk patients to self-administer naloxone.
- Working with local school districts to provide programming and encourage peer interventions as well as opportunities for counseling with the pharmacist on options for treatment.

Treatment

- Seeking out education and training in the use of medications used in medication-assisted treatment of opioid use disorder (e.g., methadone, buprenorphine, buprenorphine/naloxone, naltrexone).
- Optimizing therapy outcomes by gathering vital clinical and health screening information about patients.

Laws regarding the prescribing, dispensing, and use of naloxone have changed dramatically in recent years. By 2019, every state in the United States had some form of immediate availability for naloxone in pharmacies.⁴⁰

Healthcare organizations have created training modules for pharmacists on how to use and administer the drug.

Health education. Another way pharmacists advance public health is by developing, promoting, and implementing education programs aimed across life's stages.⁴¹ Pharmacists have acted as health educators on a variety of topics (Table 3).⁴²⁻⁵³ In their role as health educators, pharmacists can assess and improve the health literacy of individuals and groups to improve adherence to medication, diet, and exercise regimens; reduce medication-related adverse events; enhance the individual's role in their care and health; and build trust with pharmacists and the healthcare system. Pharmacists who serve as faculty in health professions schools and colleges have a stake in promoting Healthy People 2030. There is a responsibility on their part to integrate strategies on prevention into curricula and interprofessional experiences for the learner. Employing interactive techniques and tools such as games, simulations, and personal fitness devices encourages engagement and commitment by individuals to activities such as exercise and maintaining healthy diets.

Public health policy. Pharmacists should participate in public health policy development, from local boards of health to national programs.⁵⁴ By linking disease prevalence, medication utilization, and the determinants of disease, pharmacists can place prevention within a larger context. Medication use plays a central role in health and health policy, especially policy directed at chronic disease, which must be formulated with a broad understanding of the relationship between medication therapy and the many other factors that affect disease outcomes. Since medication use increases as patients age, pharmacists' unique perspective on healthcare policy will become more important as the average age of the U.S. population rises.⁵⁵

As medication-use experts and experienced health-system administrators, pharmacists can and should contribute to the development of public

Table 2. Preparing for Specific Pharmacy Public Health Roles in Epidemic/Pandemic Response^a

Role in Communication and Information		
To prepare for	Cause	Issues
Counseling visitors and family members	Concerned and anxious due to fear of unknown	<ul style="list-style-type: none"> Prepare for increased phone calls and directing of family members that come to the facility to visit
Poor or confusing communication or information, misinformation	Health officials may update information frequently to adjust to evolving situation; different authorities may say conflicting or confusing things	<ul style="list-style-type: none"> Communicate and collaborate with institution, local, and/or state Incident Command Centers for coordinated and informed response Seek reliable information sources Seek local information for current quarantine or treatment recommendations Be an advocate for local citizens and be vigilant for emerging issues Keep staff well informed through frequent communication via various channels and provide a forum to address questions and concerns
Informing the pharmacy workforce	Information sharing to ensure a ready and engaged workforce	<ul style="list-style-type: none"> Stay up to date on the latest information about signs and symptoms, diagnostic testing, and case definitions for the epidemic/pandemic disease Share information with pharmacists at other institutions experiencing the same crisis Use network groups to keep colleagues at other institutions abreast of new information, guidelines, and issues Perform literature searches and communicate with drug manufacturers to obtain unpublished information on file for emerging and investigational regimens
Role in Supply Chain Management		
To prepare for	Cause	Issues
Challenges securing anticipated stocks of medications and supplies	Supply chain disruption	<ul style="list-style-type: none"> Report unusual sales volumes for medications or patient complaints Determine mechanisms for obtaining drugs not available on market (e.g., emerging investigational therapies) during regular and off-hours Report supply chain issues (e.g., drug shortages, PPE) to key facility staff and contact local/state health departments
Role in Pharmacy Operations		
To prepare for	Cause	Issues
Supplying rapid response kits	Timely access to treatment	<ul style="list-style-type: none"> For supportive care and as investigational therapies emerge, prepare rapid response kits containing information such as management algorithms, drug dosing and administration guidelines, and pharmacist contact numbers Make kits available in relevant patient care units such as emergency departments and intensive care units
Leadership in medication use and safety	Safe patient care	<ul style="list-style-type: none"> Ensure that appropriate education and drug administration and dosing guidelines are available to guide medical, nursing, and pharmacy staff
Role in Infection Prevention and Control		
To prepare for	Cause	Issues
Requests to dispose of potentially contaminated medications and supplies	Family members of potential disease cases may have unused medications they want to throw away	<ul style="list-style-type: none"> Determine local/state health department recommendations for disposing of unused medication products and supplies that have been dispensed to a patient

Updating policies and procedures	Integrity of drug supply	<ul style="list-style-type: none"> Develop or revise policies and procedures pertaining to drug delivery to meet infection control precautions
Protecting workforce from exposure	<ul style="list-style-type: none"> Healthcare workers are more likely to become infected if they work closely with patients with infectious diseases Limiting exposure time and closeness can help prevent infection 	<ul style="list-style-type: none"> Orient and educate workforce regarding infection control precautions Use standard respiratory precautions Handle items associated with potentially exposed patients while wearing gloves Frequent hand washing Use face masks if counseling symptomatic patients Ensure that appropriate pharmacy staff have been medically cleared, fit-tested, and trained for respirator use Use telephone for counseling Drop off prescriptions at home Bill via credit card to avoid handling checks or money
Monitoring pharmacy staff	Fever, cough, and shortness of breath are early signs and symptoms of some infectious diseases.	<ul style="list-style-type: none"> Be prepared to take temperature of workers once a shift If fever, cough, and shortness of breath are present, send worker to designated treatment site If a family member is sick, put employee on sick leave Notify occupational health services
Role in Patient Care		
To prepare for	Cause	Issues
Patient/visitor surge	Patients may seek other sources of care and information if local hospitals closed or under quarantine	<ul style="list-style-type: none"> Adjust staffing to handle increased traffic, phone calls, and other electronic communications (e.g., social media) Manage staff to accommodate revised or expanded responsibilities with appropriate sleep/rest cycles Prepare information for patients/visitors for education and awareness programs Report patient surges to key facility staff and public health officials
Treating sicker patients	Patients may be sicker than usual but barred from hospitals	<ul style="list-style-type: none"> Review latest CDC information for education and awareness programs Help triage patients in accordance with institution emergency preparedness plan Inform key facility staff and contact local/state health departments for latest guidance and instructions (e.g., home quarantine)
Caring for the worried well	Patients who have respiratory symptoms but no history of exposure	<ul style="list-style-type: none"> Provide information and reassurance through education and awareness programs Remind patients to get other appropriate vaccines
Requests for ineffective prevention and treatment options	Remedies for self-treating a disease may be requested by patients even though they are not effective	<ul style="list-style-type: none"> Provide patients with most current treatment and prevention information.
Team-based care	Interprofessional expertise needed	<ul style="list-style-type: none"> Collaborate with key players (e.g., microbiologist) and communicate on interprofessional issues needed to optimize patient care Be proactive and flexible in assuming new responsibilities within a pharmacist's scope of practice

Abbreviations: CDC, Centers for Disease Control and Prevention; PPE, personal protective equipment.

*Source: Adapted from Tables 3.5 and 3.6 in Carter J, Slack M. *Pharmacy in Public Health: Basics and Beyond*. American Society of Health-System Pharmacists; 2009.

health-related legislation and regulation and should be involved in public program oversight and administration. Legislators, regulators, and program managers at all levels of government should be educated to utilize this

expertise. Pharmacists, as individuals and through their professional associations, state and local boards of health, and state boards of pharmacy, are encouraged to participate in legislative, regulatory, and oversight processes.

Pharmacists will need knowledge of the policy and financial drivers of public health to engage in advocacy efforts to improve population outcomes.⁵⁶ To be most effective, pharmacists need to be trained to take leadership roles in

Table 3. Examples of Patient Education Programs, Goals, Methods, and Alignment with Healthy People 2030 goals

Patient Education Programs	Goals	Method	Aligns with Healthy People 2030 Goal
Birth Control ⁴²	Provide Womens Health services	Individual	Yes
Chronic Disease	Education Prevention Management	Individual Group Special Populations	Yes
Immunization ^{43,44}	Prevention Reduce epidemics Provide services Improve health of a nation	Individual Group Special Populations Community Awareness	Yes
Medication Safety ^{45,46}	Improve Patient Outcome Improve Health Literacy	Individual Health Literacy Assess Group Special Populations Community Awareness	Yes
Mental Health ^{47,48}	Reduce Stigma Direct individual to services Provide services Prevention	Individual Group Special Populations Community Awareness	Yes
Nutrition	Reduce disease Reduce cost to health system Better individual Health	Individual Group Community Awareness	Yes
Oral Chemotherapy ⁴⁹	Improve Patient Outcome	Individual	
Substance Abuse ^{50,51}	Prevention Direct individual to services Provide services Improve health of a nation	Individual Groups Special Populations Community Awareness Flyers or Brochures	Yes
Tobacco Cessation ⁵²	Reduce disease Reduce cost to health system Better individual Health	Individual Group Resources	Yes
Resources ⁵³	Improve Literacy and Guide to Resources and Support for: <ul style="list-style-type: none"> • Human Trafficking • Partner and Child Abuse • Community Wellness Services 	Individual Groups Brochures and Flyers	

public health policy. Postgraduate year 2 pharmacy residencies are now available in Population Health Management and Data Analytics Pharmacy, and dual PharmD/MPH degrees are available, as are executive programs in public health practice.

Research and training. Pharmacists should be encouraged to pursue more advanced training and gather credentials that will give them added credibility in addressing broad public health initiatives. Pharmacists should strive to be proficient in research methodology, pharmacoepidemiology, and biostatistics, and how these areas apply to public health decision-making. Pharmacists

should actively seek experience in the design, implementation, analysis, and interpretation of clinical studies (both observational and experimental), which can be achieved through both pharmacy curricula and professional education.

Pharmacy curricula should be developed in such a way to include public health, biostatistics, and research design.⁵⁷ Inclusion of the content can help assure that future pharmacists have a strong working knowledge of public health principles as well as population health. It is essential that both experiential and didactic training for students, residents, and research fellows include exposure to research in public

health policy, pharmacoepidemiology, pharmacoconomics, health-related quality of life, and evidence-based medicine, with potential opportunities for publication and/or presentation of their work.

Professional education of practicing pharmacists may include refreshers on biostatistics, research, and public health trends, with a focus on the application and analysis of research findings in the clinical setting. Mentoring and collaborative research projects across multiple disciplines is encouraged. Pharmacists can play an important role in data monitoring committees. There are certificate and graduate education

programs available for pharmacists to advance their knowledge and skills in the above-mentioned areas of practice.

Pharmacists should seek out opportunities to participate in collaborative research.⁵⁸ They are also well suited to serve on institutional review boards, medication safety committees, and pharmacy and therapeutics committees. It is recommended that pharmacists work directly with public health policymakers and other key stakeholders (e.g., leaders in professional organizations, medical centers, academic institutions, governmental agencies, and third-party payers) to learn about processes and to advance their knowledge in order to promote optimal pharmacotherapy.

Future roles

Some of the future roles of pharmacists in public health will look very similar to their current roles. Safe dispensing of drugs will remain a core responsibility of the profession, but changes in laws regarding dispensing will allow pharmacists to proactively dispense knowledge about medications and increase their primary care responsibilities. Pharmacists will continue to provide easy access to vaccinations and partner with other care providers in grassroots public health campaigns, particularly for underserved populations. Pharmacists will remain key healthcare providers in tobacco cessation. As advances in technology make disease screening more accessible, pharmacists will play an increasingly important role in education and screening for conditions such as obesity, hypertension, heart disease, substance abuse, sexually transmitted diseases, and others. With appropriate changes in law and regulation to confer provider status for pharmacists, interpretation of screening test results and referral to other healthcare providers will fall within the pharmacist's responsibilities. Recognition of pharmacists as healthcare providers and reimbursement for their services would also empower pharmacists to screen for food insecurity, physical or sexual abuse,

human trafficking, substance use disorders, and mental health issues.

Advances in informatics will permit aggregation and application of population and patient-specific data in ways that will encourage development of population-specific, evidence-based screening and disease management programs. Pharmacists should gain awareness of how artificial intelligence can illuminate the relationships between risk factors, prevention, treatment, and patient outcomes to better predict successful interventions. The burgeoning field of pharmacogenomics has already demonstrated its value in patient-focused pharmacotherapy, as genotyping has enabled prescribers and pharmacists to reduce treatment failures and prevent adverse drug reactions in large groups of people. As pharmacogenomics and the rapidly expanding field of population genetics become even more important, pharmacists, as medication-use experts, will apply these new tools not simply to improve patient-specific pharmacotherapy but to advance public health through population health management.

Conclusion

Pharmacists play a vital role in maintaining and promoting public health. Pharmacists can improve public health by promoting population health; developing and implementing disease prevention and control programs; advancing medication safety practices; engaging in opioid stewardship; developing health-education policies and programs; advocating for relevant and impactful legislation, regulations, and public policy regarding public health; engaging in public health-related research and education programs; initiating campaigns to disseminate new knowledge; and providing training that includes basic population health tools. All pharmacists have a responsibility to participate in global, national, state, regional, and institutional efforts to promote public health. Pharmacists should integrate the public health practices outlined in this statement

into their practices and be empowered by their employers and policymakers to contribute to and improve public health efforts. To more fully utilize their unique expertise, pharmacists should be involved in public health policy decision-making and in the planning, development, and implementation of public health efforts.

Disclosures

The authors have declared no potential conflicts of interest.

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Additional Information

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Other Resources

Pharmacists looking for further involvement in public health have many

options. First, training and competence in public health disciplines are invaluable for understanding the field of public health and its applications to pharmacy practice. Accredited schools of public health offer traditional didactic classes, and some have courses or continuing education available online that will give the beginner a clearer understanding of the four traditional areas of public health practice: health administration and policy, health education, biostatistics, and epidemiology. Pharmacists who wish to pursue a degree in public health can also do so online at a growing number of schools of public health.

Pharmacists with an interest in federal public health initiatives can start with one of three main points of access. The first is the Centers for Disease Control and Prevention (www.cdc.gov), the largest repository of documents, program descriptions, and contacts in the realm of prevention. Major efforts aimed at disease surveillance, infectious disease control, immunization, health education, chronic disease maintenance, and disease-related data management provide an ample and readily available source of information. The second major source of information is the Office of Disease Prevention and Health Promotion (<https://health.gov/>), which provides access to Healthy People and MyHealthfinder (a personalized screening tool) as well as information about food and nutrition, physical activity, health literacy, and healthcare quality. Finally, the Agency for Healthcare Research and Quality website (www.ahrq.gov) has a section on prevention (<https://www.ahrq.gov/prevention/index.html>) that provides information on a variety of topics as well as access to information from the U.S. Preventive Services Task Force and the Guide to Clinical Preventive Services.

State government websites provide public health information for their respective states. State entities serve as the main policymaking entity for public health priorities and strategies, provide a conduit for federal public health

dollars, and are the main repository of health information and data for the state. States often organize a range of advisory groups, task forces, and planning committees whose output shapes their public health agenda. These entities also provide input and direction for state legislative bodies to address, legislate, and fund.

On the local level, departments of health serve as the main government entities involved in public health. Aside from their usual routine of immunizations and restaurant inspections, these boards serve as the policymakers for disaster response and provision of primary care to underserved populations. They receive federal and state dollars that are used to fund public health efforts. They are closest to the general population both in their makeup and in their efforts at improving the public's health. Pharmacists interested in learning more about public

health and the types of activities that community public health agencies are involved in can register for a free interactive tutorial at www.nynj-phtc.org/orientation.

Below is a list of websites that provide information related to public health.

Public Health Organizations

- World Health Organization (www.who.int)
- Pan American Health Organization (www.paho.org)
- American Public Health Association (www.apha.org)
- Association of State and Territorial Health Officials (www.astho.org)
- National Association of County and City Health Officials (www.naccho.org)
- Public Health Foundation (www.phf.org)
- Association of Schools of Public Health (www.asph.org)

- Association for Prevention Teaching and Research (www.aptrweb.org/)

Federal Health Agencies

- U.S. Department of Health and Human Services (www.dhhs.gov)
- Office of the Surgeon General, Public Health Reports (<https://www.hhs.gov/surgeongeneral/reports-and-publications/publichealthreports/index.html>)
- Centers for Disease Control and Prevention (www.cdc.gov)
- Food and Drug Administration (www.fda.gov)
- Health Resources and Services Administration (www.hrsa.gov)
- National Institutes of Health (www.nih.gov)
- Agency for Healthcare Research and Quality (www.ahrq.gov)
- Environmental Protection Agency (www.epa.gov)