Improving the quality of health care requires innovative approaches to addressing the misuse, overuse, and underuse of medication in the United States. Strategies must be patient-centered, collaborative, and aligned with the move toward value-based care. We highlight research in North Carolina aimed at achieving these goals.

One of the greatest barriers to improving the quality of health care in the United States is the misuse, underuse, and overuse of medications. According to the most recent National Health Expenditure Data, prescription drug spending accounts for 10% of total health care expenditures, with medication spending comprising $325 billion of the $3.2 trillion spent on overall US health care in 2015 [1]. Most surprising is that health care costs attributed to the improper and unnecessary use of medicines approach nearly $300 billion, suggesting that for every dollar spent on drugs, nearly an additional dollar is spent addressing a medication misadventure [2, 3].

Given the burden of inappropriate medication use, there is no question that optimizing medication use is a critical component of care that must be addressed in order to improve national health care. The Center for Medication Optimization through Practice and Policy at the UNC Eshelman School of Pharmacy defines medication optimization as a patient-centered, collaborative approach to managing medication therapy that is applied consistently and holistically across care settings to improve patient care and reduce overall health care costs. Medication optimization may be addressed in different pharmacy settings. This includes the community pharmacy setting, where patients obtain their medications from pharmacies, as well as the ambulatory setting, where patients see providers who may dispense medications. Differences in the care settings in which medication optimization is addressed are important to consider when implementing programs to improve medication use in patients.

With specialized education and experiential training in the pharmaceutical sciences and in evidence-based pharmacotherapy, pharmacists are well-positioned to serve as integral members of the health care team, assuming responsibility for the optimal use of medications. Pharmacists have taken on greater responsibilities in both inpatient and outpatient settings, and the value of their contributions to the health care team has increasingly been recognized and documented [4-7]. The scope of services delivered by pharmacists and the settings in which this care is delivered are projected to increase as the health care system shifts toward the delivery of value-based models of health care. Given the importance of optimal medication use as an essential component of quality health care, the need to proactively access and manage medication use, especially for patients with multiple chronic conditions, becomes important. Increasingly, value-based contracts in both public (Medicare and Medicaid) and commercially-based health plans utilize measures of appropriate medication use in their toolbox of performance metrics tied to quality bonus payments for health plans [8, 9]. This positions pharmacists to provide a much needed and value-added role on the health care team in optimizing medication use as a means to improving health outcomes and managing costs.

The purpose of this paper is to highlight two innovative studies underway in North Carolina. Each is designed to identify and evaluate best practices in the delivery of services aimed at optimizing medication use, improving care, and controlling cost, while building the business case to enable effective programs to be scaled and sustained. Although the studies take place in different settings (community pharmacies and primary care practices), the overarching goal is the same: to optimize medication use. It is our hope that the lessons learned in North Carolina will be useful to other states seeking to advance medication optimization as a key component of value-based care delivery.

Optimizing Medication Use in the Community Pharmacy

Community pharmacists are among the most accessible, but often underutilized, health care professionals available to manage health care medication needs of patients. Using
North Carolina Medicaid claims data, we generated unpublished estimates suggesting that on average, Medicaid beneficiaries visit a community pharmacy more than 35 times each year. Given the frequency of contact with a community pharmacy, community pharmacists are in an ideal position to address patient care needs as they relate to medications [10, 11].

Beginning in March 2015, Community Care of North Carolina in collaboration with the UNC Eshelman School of Pharmacy, implemented a Community Pharmacy Enhanced Services Network (CPESN). This project is supported by a 3-year grant funded by the Center for Medicare & Medicaid Innovation (CMMI) entitled “Optimizing the Medical Neighborhood: Transforming Care Coordination through the North Carolina Community Pharmacy Enhanced Services Network.” The goal of the project is to improve the quality of care, optimize medication use, improve patient health outcomes, and reduce the total cost of care [10]. As of January 1, 2017, the NC CPESN included 277 pharmacies with more than 100,000 North Carolina residents with Medicaid or Medicare coverage attributed to a CPESN pharmacy in any given month [11] (see Figure 1).

A key focus of the CPESN project, with the support of CMMI, has been to support and evaluate the provision and payment of enhanced services by CPESN pharmacies. Conventional reimbursement in the community pharmacy setting has centered on dispensing medications with a small markup in reimbursement to the pharmacy for each medication dispensed. This reimbursement model does not incentivize pharmacists to provide services aimed at improving medication use, because doing so would distract from the dispensing process. Under the CMMI award, network pharmacies agree to provide enhanced services to patients with Medicaid and/or Medicare coverage in exchange for a modest per member per month reimbursement. These enhanced services include interventions such as synchronization of a patient’s chronic medications; adherence monitoring and coaching; compliance packaging; home delivery; medication reconciliation after hospital discharge; comprehensive medication reviews to identify and resolve drug therapy problems; patient education about medications; and prevention of medication wastage by verifying patient need prior to each fill. All network pharmacies offer these services in close communication and collaboration with the medical home care team. The pharmacies engage in continuous care plan development and reinforcement as part of a collaborative care model whereby community pharmacists are active and integrated members of the team. Clear and clinically relevant communication with the provider and care team is a core service of all CPESN pharmacies.

In addition to these enhanced services, a novel aspect of this program is the implementation of a pay-for-performance-based incentive program whereby higher performing pharmacies receive a more significant reimbursement to manage the care of patients with confirmed drug therapy problems. Pharmacy performance is measured using a number of quality metrics that assess health outcomes in the populations the pharmacies serve (eg, medication adherence, health spending, inpatient admission rates, and emergency department use). This aspect of the program holds pharmacies responsible for the quality of care provided and incentivizes them to adopt best practices in medication optimization. The study is ongoing with results forthcoming this year.

**Optimizing Medication Use in Primary Care**

In addition to ongoing research to optimize medication use in the community pharmacy setting, similar efforts are underway in the primary care setting. Through a $2.4 million award from the American College of Clinical Pharmacy entitled “Enhancing Performance in Primary Care Medical Practice through Implementation of Comprehensive...

**FIGURE 1.** Participating Community Pharmacy Enhanced Services Network (CPESN) Sites
Medication Management,” the UNC Eshelman School of Pharmacy, in collaboration with the University of Minnesota College of Pharmacy and the American Academy of Family Physicians National Research Network, created a multisite network of 40 primary care practices with embedded pharmacists providing medication optimization as integral members of the health care team. Additional partners include the National Implementation Research Network and the Alliance for Integrated Medication Management. The UNC Eshelman School of Pharmacy’s Center for Medication Optimization through Practice and Policy serves as the coordination and evaluation hub for the study. A grant steering committee and a payer and policy advisory board provide critical insight and support to the study team. The Eshelman Institute for Innovation provided an additional $500,000 to support the research and build the business case for incorporating medication optimization into emerging value-based models of care.

In the primary care setting, comprehensive medication management (CMM) is a service provided to patients to ensure the safe, effective, and affordable use of medications, and to optimize their medication use [12]. Peer-reviewed, published evidence demonstrates the potential clinical and economic benefits of medication optimization in primary care, but data are inconsistent and often fraught with limitations [4-7]. This is largely due to variations in study design, inconsistent definitions and delivery of the intervention, use of inconsistent outcome metrics, and lack of a sustainable
payment model. While the role of the pharmacist in optimizing medication use in the primary care setting holds promise as an effective, value-added strategy to improve the quality of health care, it is imperative that the service being delivered (in this case CMM) is explicitly defined, is consistently delivered with fidelity, is effective, is replicable, and is sustainable.

Through this ongoing research, knowledge must be generated regarding how CMM can best be delivered effectively and efficiently in real world practices. Importantly, the research must expand return on investment analyses to inform the role of medication optimization services in emerging value-based payment models and to build the business case for sustaining such services. Finally, it will be critical to demonstrate that the service being delivered is having an impact on patient outcomes and health care spending.

To accomplish these goals, the research team is applying implementation science methods and frameworks to generate insights into the service and to identify best practices in its delivery. Specifically, the study team is applying the Active Implementation Frameworks to elucidate key factors that facilitate successful implementation (see Table 1) [13]. Traditional formal evaluation methods are being used to evaluate the impact of the service on clinical outcomes and cost. Best practices, implementation learnings, and study outcomes are anticipated later this year.

**Anticipated Impact and Future Research**

The examples provided here illustrate our intent to accelerate the identification and replication of consistent and evidence-based best practices in medication optimization
across care settings, to better position pharmacists to practice at the top of their license, and to build the business case for scaling best practices throughout the country. The evaluation results forthcoming from each of these projects have the potential to shape health policy toward defining, building, and championing new value-based care delivery and payment models aimed at optimizing medication use and improving patient health in both the community and primary care practice settings. This work is important in promoting a consistent and sustainable approach to the delivery of services aimed at optimizing medication use as a means to improve national health care. Further, the results of these projects will be useful in informing the move toward value-based payment reform.

In addition to the projects outlined, it should also be noted that there are opportunities to optimize medication use in other settings. In particular, opportunities exist to improve medication-related outcomes at the point of care transitions, and in particular, in rural settings where medically complex patients have limited access to such services. The role of telemedicine and other innovative approaches to address the medication-related needs of populations warrant increased attention and are emerging areas for practice advancement and research. Moreover, future studies should seek to identify patients most at risk for adverse medication-related outcomes and target services for these patients in order to achieve the greatest return on investment on patient care and costs. While much work remains to be done, this new reality will have significant impact on improving patient care and addressing the $300 billion crisis in national health care attributed to medication use. NCMJ

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