U.S. Department of Health and Human Services

HRSA

Health Resources and Services Administration

Special Report to the Senate Appropriations Committee

On

Advancing Clinical Pharmacy Services in Programs Funded by the Health Resources and Services Administration and its Safety-Net Partners

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EXECUTIVE SUMMARY

The purpose of this report is to address the Senate Appropriations Committee's request for the Health Resources and Services Administration (HRSA) to advance the use of clinical pharmacy services in all HRSA programs in which medications play an integral role in patient care. In this report, HRSA provides details regarding numerous activities and projects the Agency has initiated in direct response to the Committee's requests, which are summarized in this section.

In its report on the fiscal year (FY) 2007 budget for the Department of Health and Human Services the Senate Appropriations Committee stated the following:

> *The Committee is pleased that the Mathematica evaluation of the HRSA clinical pharmacy demonstration projects proved valuable to patients, health centers, and colleges and schools of pharmacy. The Committee requests that HRSA submit a report to the Chairmen of the Senate Committee on Appropriations, Appropriations Subcommittee on Labor, Health and Human Services, Education and Related Agencies, and the Senate Committee on Health, Education, Labor, and Pensions making recommendations on similar improvements that might be made to all HRSA programs in which medications play an integral role in patient care, such as health centers and Ryan White programs. The Committee expects HRSA to collaborate with external organizations such as the American Association of Colleges of Pharmacy, the National Association of Community Health Centers, and members of the 340B Coalition to develop the recommendations that should include options for financing clinical pharmacy services in HRSA supported programs, cost of such financing, and opportunities for maintaining and building upon the relationships with colleges and schools of pharmacy.*

In response, HRSA contracted with Mathematica to conduct a study of safety-net providers to investigate approaches for including clinical pharmacy services in these health care settings. In its request, the Committee stipulated that HRSA collaborate with external organizations such as the American Association of Colleges of Pharmacy, the National Association of Community Health Centers, and members of the 340B Coalition to develop the recommendations. The recommendations were to include options for financing clinical pharmacy services in HRSA supported programs, cost of such financing, and opportunities for maintaining and building upon the relationships with colleges and schools of pharmacy. The Mathematica report includes those recommendations.[1]

Based on the variety of data sources and information presented in this report, the Agency concludes that the integration of clinical pharmacy services into primary health care improves patient health outcomes, reduces the incidence of adverse events, and reduces costs to the health care system overall. As a result, HRSA has moved forward with several significant activities as follows:

1. **Establishment of HRSA's Patient Safety and Clinical Pharmacy Services Collaborative** to improve patient safety and quality of care among HRSA-funded programs and their partners across the Nation by spreading the leading practices of high performing health care providers.

2. **Administration of the 340B Drug Pricing Program** to assist safety-net health care organizations to provide more services to more people and to expand the impact of federal dollars spent on prescription medications.
3. **Oversight of HRSA's Pharmacy Services Support Center** to provide information, education, and policy analysis to help eligible entities optimize the value of the 340B Drug Pricing Program and provide clinically, cost-effective pharmacy services that improve medication use and advance patient care.
4. **Award of 66 Service Expansion Grants in Comprehensive Pharmacy Services Under the Health Center Program** to further develop effective clinical pharmacy programs to improve patient outcomes through safe and effective medication use as an integral part of delivering high quality cost-effective primary health care.

Section C of this report provides greater details on each of the activities listed above. In addition, **Section D** of this report outlines possible opportunities for expanding pharmacy services in safety-net settings as well as the cost projections and potential barriers associated with these expansions:

- **Ryan White HIV/AIDS:** Research has shown that clinical pharmacists have a strong impact on promoting positive clinical outcomes for HIV-infected patients. Since drug treatment is an integral part of the management of HIV clients, the value and expertise of the clinical pharmacist in the management of a wide range of HIV-related drug interactions and co-morbid conditions is critical. HRSA is exploring options to expand pharmacy service and effectively manage high-risk and high-cost HIV patients.
- **Federally Qualified Health Centers:** HRSA views a comprehensive pharmacy service model that includes clinical pharmacy services as an important part of the community health center program. Through various funding opportunities and by highlighting health center best practices, HRSA strongly encourages health centers to utilize a comprehensive pharmacy service model in their pharmacy service delivery plan.
- **Rural Communities:** Pharmacy service delivery in rural communities is vastly different than those in urban areas due to the unique challenges faced by rural safety-net providers. Research shows that rural Americans have higher poverty rates; a larger percentage of elderly; tend to be in poorer health; have fewer doctors, hospitals and other health resources; and face more difficulty getting health services. For these reasons, HRSA is collaborating with national stakeholders to increase access to pharmacy services in rural communities.

A. BACKGROUND

For the purpose of this report, clinical pharmacy services are defined as *patient-centered services that promote the appropriate selection and utilization of medications to optimize individualized therapeutic outcomes*. Clinical pharmacy services can include medication access services for patients, patient counseling, preventive care programs, drug information services to patients, medication reconciliation services, provider education, retrospective drug utilization review, medication therapy management, disease state management, and prospective chart review and provider consultation.

Clinical pharmacy services are provided by an interdisciplinary health care team through individualized patient assessment and management.[2] The provision of education and counseling services results in increased patient involvement and understanding of disease condition(s), increased patient adherence, and promotion of the appropriate use of medications to reduce the risk of potential adverse events associated with medications.[2]

Medications play an integral role in the treatment of chronic conditions whose associated costs and human burden continue to grow, including diabetes, dyslipidemia, hypertension, asthma, and HIV/AIDS. HRSA-supported safety-net providers serve populations that tend to have a higher prevalence of these diseases compared with other populations of similar age and gender, making medication safety and effectiveness at least as salient for them as for other providers.

With the increased use of medications to treat chronic conditions and the problems associated with polypharmacy, (i.e., use of multiple medications), duplication of therapy, and incorrect drug or dosage, improving medication safety and reducing adverse events has emerged as an urgent task. The Institute of Medicine reports that 1.5 million people are injured each year as a result of medication errors, resulting in billions of dollars in avoidable cost.[4,3] One estimate found that for every dollar spent on ambulatory care medications, another is spent to treat new health problems caused by the medications.[4]

Uninsured, underinsured, and Medicaid patients comprise the majority of the patient populations for safety-net providers. These low-income and uninsured populations are often medically underserved and have chronic conditions where medications are a critical part of treatment.[5]Safety-net providers that have sustained clinical pharmacy services are strongly committed to services because providers find high value for patients and physicians.[8, 9]

HRSA is aware that some states have implemented payments for medication therapy management (MTM) on a statewide basis for low-income patients. Researchers at the University of Minnesota who studied Minnesota's statewide implementation of MTM services for low-income patients with complex medical needs "concluded that pharmacist-provided MTM services improved patients' clinical outcomes and offered the state the potential to save on health care expenditures in the future." (Appendix C)

MTM is an example of services through which pharmacists make improvements in patient health outcomes and safety. The evidence suggests that the role of the pharmacist and the

delivery of pharmacy-related services is broader and includes a range of elements such as medication access and dispensing services for patients, patient counseling, preventive care programs, drug information services to patients, medication reconciliation services. Other critical elements include provider education, retrospective drug utilization review, medication therapy management, disease state management, and prospective chart review and provider consultation. These elements together are referred to as clinical pharmacy services. Although a pharmacist is specifically trained to do this work, not all communities have access to pharmacists.[1] In this case, HRSA promotes the delivery of clinical pharmacy services by other health care providers and encourages these services be delivered by an inter-professional patient-centered health care team where appropriate.

Last, HRSA notes that the Medicare Modernization Act (MMA) of 2003 includes a provision for Medicare Prescription Drug Plans to provide for the delivery of MTM programs "that may be furnished by a pharmacist and that is designed to assure that covered Part D drugs under the prescription drug plan are appropriately used to optimize therapeutic outcomes through improved medication use, and to reduce the risk of adverse events, including adverse drug interactions."[1] The findings presented in this report support the promotion of programs similar to the specifications outlined in the MMA of 2003.

B. FINDINGS ON THE VALUE OF CLINCIAL PHARMACY SERVICES

This report includes data and information from three primary sources: 1) research conducted in 2007 by Mathematica Policy Research, Inc., and its partner, the University of Minnesota under contract with HRSA; 2) HRSA's direct knowledge from the field reported by grantees and other health care providers; and 3) peer-reviewed literature.

Through its contract with HRSA, Mathematica conducted a study and developed a summary report on the use of clinical pharmacy services by safety-net providers. Specifically, the study investigated factors that facilitated implementation of clinical pharmacy services and barriers to widespread implementation. In addition, considerations specific to rural safety-net providers, options and opportunities for the federal government and for foundations and professional and provider associations to make clinical pharmacy services more widely available were also discussed. The methodology that Mathematica used is outlined in Appendix B.

Based on the essential findings in Mathematica's report on the value of clinical pharmacy services, this section focuses on: (1) improved patient outcomes; and (2) evidence of cost savings.

1. Improved Patient Outcomes

a. Case Reports

Based on the available data, HRSA has found that clinical pharmacy services result in positive clinical effects across a range of chronic conditions and in a variety of health care settings. Studies show clinical pharmacy services add value by improving clinical

outcomes for a range of conditions where medications plays an integral role, including diabetes, dyslipidemia, asthma, hypertension, depression, and patients on anticoagulation therapy.[6] The literature to date is promising, and published reports are beginning to reflect current practice by those who already recognize the bencfits, as illustrated here:

- Westside Community Health Services, St. Paul, MN:
  - 82 percent of the HIV/AIDS patients who received adherence-focused services from a pharmacist showed viral suppression (HIV RNA ≤75 copies/ml using the Versant HIV-1 RNA v3.0 test), compared with only 57 percent of the patients who did not receive the services; and
  - In a separate effort, a clinical pharmacy resident documented and resolved 55 drug therapy problems in just 16 patients with arthritis.

- Tyler Health Care Center, Tyler, MN:, a critical access hospital, found that addition of a pharmacist in the organization resulted in significant improvements:
  - 20 percent increase in the number of patients being managed within anticoagulation treatment goals;
  - Improved physician satisfaction; and
  - Improved ability to recruit newly graduated pharmacists to the rural area in the last four years.

- Paynesville Area Health Care System, Paynesville, MN: a critical access hospital in rural MN, demonstrated the following improvements after the inclusion of clinical pharmacy services:
  - 92 percent of diabetic patients seen by a clinical pharmacist test blood sugars versus 10 percent of those diabetic patients who are not seen by a pharmacist;
  - Patients seen by pharmacists have improved blood sugar control (HbA1c decreased by 1.4 percent with an average of 6.6);
  - 89 percent of anticoagulation patients seen by pharmacists are within therapy goal range versus 50 percent of those not seen by a pharmacist;
  - 98 percent of patients feel health outcomes are improved with pharmacist involvement; and
  - Physician satisfaction is improved.

- The Asheville Project in North Carolina, consisted of patients meeting with pharmacists to receive diabetes education, training in the use of home glucose meters, and information about adherence.[11] While many disease-management interventions produce short-lived outcomes, the Asheville Project is the first to demonstrate longer-term (5-year) improvement in health outcomes. Five years after initiation of the Ashville Project:
  - HbA1C averages decreased from 8 to 6.7;
  - LDL averages decreased from 121 to 95;

- HDL averages increased from 40 to 45 for males and from 54 to 62 for females; and
- Diabetic employees' sick leave usage decreased from 12.6 days to 5.67 days.

- Kaiser Permanente, Colorado Region:

  - Out of 4,896 patients managed over an average of 3.6 years, the Clinical Pharmacy Cardiac Risk Service reduced all-cause mortality by 76 percent and cardiac-related mortality by 73 percent;
  - The Clinical Pharmacy Cardiac Risk Service has demonstrated consistent increases over time in the proportion of patients achieving an LDL-c < 100 mg/dl, with 83.4 percent of the 11,927 patients (as of July 2007) achieving this measure compared to 22 percent at baseline (September 1997);
  - Clinical Pharmacy Anticoagulation Services reduced the risk of anticoagulation related events by nearly 40 percent;
  - The Clinical Pharmacy Call Center resolves one to two drug related problems per intervention; and

- Researchers at the University of Minnesota in a study of Minnesota's recent statewide implementation of MTM services for low-income patients with complex medical needs, "concluded that pharmacist-provided MTM services improved patients' clinical outcomes and offered the state the potential to save on health care expenditures in the future" (Appendix C).

b. Published Findings

Similarly positive data are found in the published literature. Randomized, clinical control trials have been conducted in the areas of patient safety and clinical pharmacy services, and they show the value of these services on clinical outcomes and cost savings. Kaiser Permanente, Colorado Region, has published data from several trials which demonstrate those values.[7,8,9,10,11,12,13]

The results presented below represent a qualitative summary of the literature, focused on studies with patient populations of reasonable size, having comparison groups, and based on data from developed countries – characteristics that increase the likelihood that the study results could be replicated in the US and that the results are attributable to the intervention. The results illustrate improved health outcomes for the following conditions: diabetes, dyslipidemia, hypertension, hypercholesterolemia, conditions requiring anticoagulation therapy and depression.

- El Rio Community Health Center, Tucson, AZ provides clinical pharmacy services for its diabetic patients:

  - The percentage of patients with good HbA1c control increased almost seven-fold, from 6 percent to 41 percent; and
  - As a result of El Rio's clinical pharmacy services for its diabetic patient population, statistically significant improvements occurred (see Table 1 below) in

each of the major clinical indicators for diabetics: blood sugar, diastolic and systolic blood pressure, and hemoglobin A1C.[14]

Table 1: El Rio Community Health Center: Changes in Metabolic and BP Measures: Baseline to Follow-Up, 2001-2007

Parameter	# Pts	Baseline (Mean)	FU (Mean)	Diff.	P-value
TC (mg/dL)	600	198	170	28	<0.001
TG (mg/dL)	600	247	187	60	<0.001
HDLc (mg/dL)	597	45	43	2	<0.001
LDLc (mg/dL)	674	107	91	16	<0.001
SBP (mm/Hg)	594	124	117	7	<0.001
DBP (mm/Hg)	594	75	70	5	<0.001
A1C (%)	601	10	8	2%	<0.001
Gluc (mg/dL)	591	209	163	47	<0.001

  - El Rio was one of three case study federally qualified health centers (FQHCs) that compared their diabetic patients who received clinical pharmacy services to patients with diabetes in a comparison group. All three FQHCs found that their positive results held up to this more rigorous test.

- A study of more than a dozen networks of FQHCs and schools of pharmacy showed that patients who participated in diabetes-focused disease management efforts led by pharmacists tend to show significantly reduced HbA1c levels, with average blood pressure and LDL also significantly improved.[11,15]

- Two studies of community pharmacies in Australia and one in a university-affiliated clinic in North Carolina suggest that pharmacists play a significant role in reducing HbA1c levels and blood pressure control among patients with diabetes as well as several studies with positive results in community health centers.[16,17,18,19,20,21]

- A review of the literature in 2005 found that when pharmacists are involved in treating dyslipidemia, LDL and total cholesterol levels are reduced, HDL levels are increased, and more patients achieve the goals specified by the National Cholesterol

Education Program.[22] Pharmacist involvement usually consisted of ordering or performing lab tests, changing or recommending changes to drug therapy, providing education about the condition, and following up with patients over periods of several months or more.

- A study that focused on patients with mild to moderate essential hypertension found that the pharmacist-managed hypertension group experienced significant decreases in both systolic and diastolic blood pressure relative to the control group over the six-month study period.[23]

- A study of a pharmacist intervention to improve anticoagulation therapy to a high proportion of indigent patients found that patients who attended the pharmacist-run clinic experienced lower rates of significant bleeding, lower rates of major fatal bleeding, fewer thrombolytic events, lower annual rates of warfarin-related hospitalizations, and lower rates of warfarin-unrelated emergency department visits.[24]

- Existing evidence is demonstrating that clinical pharmacists play a positive role in facilitating medication adherence among individuals diagnosed with depression. In two studies at Kaiser Permanente medical centers, patients in the study groups exhibited significantly higher drug adherence rates than those of control group patients.[25,26]

- A pharmacist intervention for depressed patients served by nine primary care practices in Massachusetts, including a community health center, significantly increased antidepressant use rates among study group patients, and the antidepressant use rates of the intervention patients were higher than those of a control group.[27] In all cases the pharmacist's intervention included a relatively intensive intake interview, educating the patient about depression and anti-depressants, and repeated contacts to monitor and follow-up with the patient over a period of 24 weeks or six months.

2. Evidence of Cost Savings

Early published research on the economic benefits of clinical pharmacy services have been positive, with findings of cost savings or at least cost neutrality along with better outcomes from clinical pharmacy services.[40] During a stakeholders meeting convened by HRSA in October 2007 where input was sought from key national organizations, most participants expressed the belief that clinical pharmacy services are likely to result in overall cost reductions to the health care system with reduced hospitalizations and emergency room visits as the primary cost drivers. The literature reviewed shows a pattern consistent with this belief: savings from avoidable hospitalizations and emergency visits, with more mixed results regarding the effect on clinic visits (including visits to the pharmacist) and drug costs.

Some of the safety-net providers interviewed for the Mathematica study indicated that increases in physician productivity occurred as a result of the pharmacists' services; the

physicians have time to see more patients,[8,9] potentially enabling them to generate more revenue for the health center. However, this was not quantified by any of the sites or in any of the studies. HRSA has found from real-time data collected by safety-net providers that indicate the positive economic value of clinical pharmacy services based on site-specific evidence and presentations. Therefore, we share both site-specific reported evidence and a literature summary to show the value of clinical pharmacy services in terms of cost benefit and savings.

a. Case Reports

- Harris County Hospital District (HCHD), Houston, TX documented $1.5 million in cost savings in 2005 alone from emergency department and hospital visit reductions in the diabetes population who receive clinical pharmacy services, compared to patients receiving standard of care (those without a pharmacist intervention). HCHD's program includes eight pharmacists located in community health centers with patients referred by physicians for chronic disease management, such as HIV, anticoagulation and diabetes.

- Grady Health System Atlanta, GA reported that clinical pharmacy services in their heart failure clinic were estimated to save more than $200,000 over a 5-month period, and they identified approximately $660,000 per-year savings from reduced hospitalizations due to outpatient clinical pharmacy services for deep vein thrombosis (DVT). Grady's program includes clinical pharmacists and a medical resident, who work in primary care clinics to target a wide range of conditions including HIV, diabetes, DVT, hepatitis C, heart failure, and lipid problems.

- The results of the Asheville Project with the diabetic population in North Carolina serve as the hallmark example of the multiple and staggering benefits of a moderate investment in clinical pharmacy services:
  - Total mean direct medical costs decreased by $1,200 per patient per year to $1,872 compared with a baseline; and
  - Days of sick time decreased every year (1997-2001) for one employer group, with estimated increases in productivity estimated at $18,000 annually.

- Missouri's Pharmacy-Assisted Collaborative Disease Management Program focuses on asthma, diabetes, heart failure, depression, hyperlipidemia, chronic obstructive pulmonary disease, hypertension, and gastroesophageal reflux disease. The state enrolled physician/pharmacist teams to create care plans for eligible patients, and allows pharmacists to bill Medicaid for cognitive services.

  - Beneficiaries in the program in 2006 had 12 percent fewer hospitalizations relative to the prior year, a 25 percent reduction in emergency department visits, and fewer drug-related problems (21 percent decrease vs. 129 percent increase in control group).
  - The state reports this program achieved a 2.5-to-1 return on investment, with increasing savings per person served during state fiscal years 2004-2006. Per beneficiary per month savings were estimated at $428.76 in state fiscal year 2006.

- Fairview Healthcare Partners in Minnesota provide MTM services by clinical pharmacists to patients with multiple chronic conditions (average patient has 6.9 medical conditions), taking multiple medications (four or more) and for those experiencing drug therapy problems. Healthcare savings of $2,814,307 due to the delivery of MTM services by a pharmacist were reported for 7,347 patients from September 1998 through December 2006. Savings were calculated as emergency department visits avoided, hospital admissions avoided, urgent care visits avoided, laboratory services avoided, employee work days saved, specialty office visits avoided and outpatient visits avoided (See Table 2).

Table 2: Savings Accrued by Fairview Healthcare Partners in Minnesota

Impacted Services	# Events	Savings
Clinic outpatient visit avoided	6,417	$1,700,505
Specialty office visit avoided	1,108	$336,832
Employee work days saved	245	$58,065
Laboratory service avoided	187	$4,488
Urgent care visit avoided	113	$9,266
Long-term care stay avoidance	3	$168,000
Emergency department visit avoided	156	$70,512
Hospital admission avoided	29	$466,639
TOTAL	**8,258**	**$2,814,307**

- Kaiser Permanente, Colorado Region has accrued the following savings:
  - In 2007, the new member services provided by the Clinical Pharmacy Call Center resulted in $3,000,000 in drug cost avoidance and savings for the organization.

b. Published Findings

In the literature, positive findings have also been reported. The results presented here represent a qualitative summary of the literature, focused on studies with patient populations of reasonable size, having comparison groups, and based on data from developed countries – characteristics that increase the likelihood the study results could be replicated in the US and that the results are attributable to the intervention.

- Chiquette and colleagues report cost savings from an anticoagulation clinic run by a clinical pharmacist of $162,058 per 100 patients annually, due to reduced hospitalizations and emergency department visits.
- A study taking place at several Veterans Affairs Medical Centers found improved clinical outcomes at no additional cost among older patients with dyslipidemia treated by ambulatory care clinical pharmacists versus a comparison group.[41]

In a study comparing pharmacist-managed hypertension care to usual care over six

months, Okamoto and Nakahiro found that total costs were not different but that the pharmacist-managed clinic group was more cost-effective, that is, better outcomes were achieved for each dollar spent.[28] Specifically, the cost of decreasing diastolic blood pressure by 1 mm/Hg was $48 for the pharmacist-managed clinic group versus $151 for the physician-managed clinic. Although the number of emergency room visits was lower among the pharmacist-managed group, Okamoto and Nakahiro found that the number of clinic visits was higher among this group; there was no difference between the groups in hospitalizations or average number of drugs taken. .

C. HRSA'S ONGOING ACTIVITIES TO DEVELOP AND IMPLEMENT COST-EFFECTIVE CLINICAL PHARMACY SERVICES

HRSA is working on multiple fronts to increase cost-effective clinical pharmacy services in safety-net settings. In response to the Senate Committee's statement that "strongly encourages HRSA to continue to develop and implement cost-effective clinical pharmacy programs in all of the various safety-net provider settings," HRSA is actively leading the following four efforts:

1. Establishment of HRSA's Patient Safety and Clinical Pharmacy Services Collaborative;
2. Administration of the 340B Drug Pricing Program;
3. Oversight of HRSA's Pharmacy Services Support Center; and
4. Award of 66 Service Expansion Grants in Comprehensive Pharmacy Services under the Health Center Program.

1. Establishment of HRSA's Patient Safety and Clinical Pharmacy Services Collaborative

The Senate Appropriations Committee, in its 2008 report, "encouraged HRSA to establish a pharmacy collaborative to identify and implement best practices, which may improve patient care by establishing the pharmacist as an integral part of a patient-centered, inter-professional health care team." Based on this, HRSA implemented the Patient Safety and Clinical Pharmacy Services Collaborative (PSPC).

The aim of the PSPC is to save and enhance thousands of lives each year by: 1) achieving optimal health care outcomes; and 2) eliminating adverse drug events through increased clinical pharmacy services for the patients served. HRSA's PSPC team began its work by studying the leading practices in patient safety, clinical pharmacy services and health outcomes identified in organizations found to be "early adapters" across the nation. The leading practices were codified in the collaborative's *Change Package* – a menu of proven strategies and actions that teams are now using in their own organizations. The five major strategies found to be key components of high-performing organizations are as follows:

I. Leadership Commitment: Develop organizational relationships that promote safe medication-use systems and optimal health outcomes
II. Measurable Improvement: Achieve change using the value and power of data-

driven improvements

III. Integrated Care Delivery: Build an integrated health care system across providers and settings that produces safety and optimal health outcomes
IV. Safe Medication Use Systems: Develop and operate safe medication-use practices.
V. Patient-Centered Care: Build a patient-centered medication-use system

This collaborative approach is modeled on the Institute for Healthcare Improvement's (IHI) methodology as adapted by HRSA. Teams of health care providers, including HRSA grantees, from communities across the nation are learning, replicating, testing, and adopting these specific leading practices in patient safety and clinical pharmacy services to improve health outcomes and reduce adverse events.
Communities throughout the country are represented among the PSPC's participating teams. Each team self-selects its partners and can consist of community-based and state-level organizations working together to serve vulnerable patients in the safety net. Each team identifies a primary health care home and then determines its partners based on the patient population it will track over time. Organizations on teams include community health centers, poison control centers, hospitals, colleges and schools of pharmacy, Ryan White HIV/AIDS Program grantees, primary care associations, state health departments, and rural health clinics. Through their participation in the PSPC, teams work to: 1) establish an organized system of clinical pharmacy services; 2) develop health outcome and safety tracking capabilities; and 3) generate improvements in health outcomes and patient safety.

The most successful teams continually engage clinicians from multiple disciplines, together with their organizations' leaders, in the work of understanding, growing, and tracking the impacts of clinical pharmacy services. This integrated inter-professional approach is revising traditional health care team roles. It maximizes and leverages the expertise of the entire team so that the patient receives the best quality care. Most teams are still building partnerships and securing resources for increasing clinical pharmacy services. Many are continuing to put health and safety outcome tracking capabilities in place.

Challenges for teams include establishing systems to track improvement, collecting data, and reinventing and transforming the roles of the traditional health care team to provide truly integrated patient care.

The first PSPC cohort began in the fall of 2008 and included 68 teams representing 37 states. At the conclusion of the collaborative's first year in fall 2009, HRSA started a second wave of this breakthrough effort, which ran from the fall of 2009 through the fall of 2010. Participation grew to 110 teams representing 41 states. Combined, these teams served 2,436 high-risk patients, working to improve their health status and safety. During the PSPC's second year, HRSA hosted three national learning events, reaching a combined audience of more than 1,500 people from around the country.

Starting its third year in 2010 fall, the PSPC continued the rapid spread of leading practices found to most effectively improve patient safety and health outcomes in a health home model, and is building on lessons learned — and successes — while expanding the work to a greater national scale. There are 128 community-based, inter-professional teams comprised of more than 300 organizations in 43 states, with 3,874 patients served after five months. Schools and Colleges of Pharmacy have also adopted this model to increase their integration with safety-net partners to improve patient safety and patient health outcomes. HRSA has hosted two PSPC learning events thus far in the third year and have reached a total audience of more than 700 people.

PSPC's fourth year will begin in the fall of 2011 and will expand to include the Centers for Medicare and Medicaid Services' Quality Improvement Organizations across the country participating in PSPC as part of their 10th Scope of Work.

Table 3: Number of Organizations Participating in the Patient Safety and Clinical Pharmacy Services Collaborative

Organization Type	Year 1	Year 2	Year 3
Community Health Centers	57	79	92
Schools of Pharmacy	24	53	57
Hospitals	30	43	26
Community Pharmacies		20	21
Primary Care Associations	5	15	9
State Government / Health Departments	3	8	7
Ryan White Grantees / HIV Organizations	8	7	11
Rural Health Centers	1	6	3
Poison Control Centers	6	4	3
Schools of Medicine		3	3

The goal of PSPC is to reach 3,000 communities by 2015, continue to build on lessons learned, and expand the collaborative to a larger, national scale with even more communities engaged across the country to improve health outcomes and patient safety through the integration of clinical pharmacy services.

Strong Support for the Transformative Work of the PSPC Teams

The Leadership Coordinating Council (LCC) of the PSPC partners with HRSA and community-based teams to advance the goals of the collaborative. In addition to providing resources and support to teams, the more than 170 member organizations of the LCC actively serve as unofficial ambassadors, spreading news about the collaborative, encouraging additional organizations to become involved, and tapping into and amplifying the knowledge, practices, and methods generated as a result of the work. LCC members include national leaders from professional organizations spanning multiple disciplines, representatives from agencies across HHS, and other key stakeholders. These partners include the Centers for Medicare and Medicaid Services, Food and Drug Administration, Agency for Healthcare Research and Quality, Indian Health Service, Heinz Foundation, National Association of Chain Drug Stores, American

Pharmacists Association, American Society of Health-System Pharmacists, American Association of Colleges of Pharmacy, and others have provided non-financial support to the collaborative. Some of these organizations have also provided financial support directly to participating teams for their travel and capacity-building work. Teams have also acquired support for their travel and other activities in the PSPC on their own, through entities like foundations, drug companies, and associations.

A number of the national organizations in the LCC are working together to establish a new public/private alliance of organizations representing multiple disciplines to support and accelerate the work of the PSPC and its teams. Organizations forming the alliance want to model at the national level the inter-professional, cross-organizational work of collaborative teams and provide resources and support for their work.

2. Administration of the 340B Drug Pricing Program

HRSA's Office of Pharmacy Affairs (OPA) is responsible for:

1. Administration of the 340B Drug Pricing Program though which federally funded grantees and other safety-net health care providers may purchase outpatient prescription medication at significantly reduced prices;
2. Development of innovative pharmacy services models and technical assistance; and
3. Serving as a federal resource on pharmacy services to safety-net providers.

Through the 340B Drug Pricing Program, HRSA's grantees realize cost savings of approximately 20 – 50 percent on outpatient drug purchases. In addition to the cost savings available through the 340B Program, Apexus (the 340B Prime Vendor Program), provides additional savings. Apexus offers access to:

1. 340B ceiling or sub-ceiling prices for approximately 3,400 drug products;
2. Multiple wholesale distributors at favorable rates; and
3. Other related value added products.

The number of covered entities that currently benefit from the 340B Program has increased over the past 10 years and is currently over 16,000. The cost savings created by this program allow safety-net providers to provide more services to more people thereby expanding the impact of federal funds spent on prescription medications.

3. Oversight of HRSA's Pharmacy Services Support Center

The HRSA Pharmacy Services Support Center (PSSC) was established in 2002 to assist HRSA grantees and eligible health care sites optimize the value of the 340B Drug Pricing Program and provide more cost effective clinical pharmacy services that improve medication use and advance patient care. The PSSC operates under a contract between the American Pharmacists Association and the Office of Pharmacy Affairs. In 2010, the focus of the PSSC was to support the work of the Office of Pharmacy Affairs in

providing technical assistance to 340B eligible entities and providing assistance and expertise for the HRSA's Patient Safety and Clinical Pharmacy Services Collaborative.

4. **Award of 66 Service Expansion Grants in Comprehensive Pharmacy Services under the Health Center Program**

To further develop effective clinical pharmacy programs, HRSA awarded 42 service expansion grants for comprehensive pharmacy services totaling $6.2 million in 2008. An additional $2.9 million was awarded to 24 grantees in 2009 under the health center program. In total, $9.1 million has been awarded to support 66 grants to make these services available. HRSA recognizes that comprehensive pharmacy services, including patient access to affordable pharmaceuticals, application of best practices and efficient pharmacy management, and the application of systems that improve patient outcomes through safe and effective medication use, are integral parts of primary health care.[37] Grantees may either establish or expand comprehensive pharmacy services through a licensed in-house (on-site) pharmacy, a contractual relationship with a licensed pharmacy, or a combination of these as allowed in an Alternative Method Demonstration Project.

D. IMPLEMENTATION OF CLINICAL PHARMACY SERVICES IN HRSA-SUPPORTED SAFETY-NET SETTINGS

Safety-net providers that have incorporated clinical pharmacy services into their practices are finding that these services improve the quality of patient-centered care by preventing medication errors, which improves patient safety, increases cost effectiveness, and improves health outcomes. While HRSA's commitment to improving the overall health and wellness of the Nation's underserved communities through the integration of clinical pharmacy services and primary care is notable, there are opportunities to expand these services in HRSA-supported programs, as outlined below.

I. Ryan White HIV/AIDS Program

The Ryan White HIV/AIDS Program, administered by HRSA, works with cities, states, and local community-based organization to provide HIV-related services to more than half a million people each year. The Ryan White HIV/AIDS Program serves as a payer of last resort when all other forms of health coverage are exhausted. The majority of Ryan White funds support primary medical care and essential support services with a smaller portion of funds supporting equally critical technical assistance, clinical training, and research on innovative models of care.

Enacted in 1990, the Ryan White HIV/AIDS Program legislation created a number of programs, called Parts, to meet the needs of different communities and populations affected by HIV/AIDS. Since 2006, Parts A, B, and C Grantees are required to spend at least 75 percent of awarded funds on core medical services and no more than 25 percent on support services. Core services are limited to outpatient and ambulatory medical care; Aids Drug Assistance Program; AIDS pharmaceutical assistance; oral health; early intervention

services; health insurance premiums and cost sharing assistance for low-income individuals; medical nutrition therapy; hospice services; home and community-based health services; mental health services; substance abuse outpatient care; home health care; and medical case management, including treatment adherence services. Support services must be linked to medical outcomes and may include outreach, medical transportation, linguistic services, respite care for caregivers of people with HIV/AIDS, referrals for health care and other support services, case management, and substance abuse residential services.

Part A Grants

Part A grants provide funding assistance to 56 Eligible Metropolitan Areas (EMAs) and Transitional Grant Areas (TGAs) - locales that are most severely affected by the HIV/AIDS epidemic. These grants include formula and supplemental components as well as Minority AIDS Initiative (MAI) funds, which support services targeting minority populations. Part A Grantees are required to establish a community planning body that determine service priorities and allocation of funds on the basis of the size, demographics, existing resources and needs of the population living with or affected by HIV. Funds may be used to provide a continuum of care (i.e., medical and support services) for people living with HIV and include AIDS pharmaceutical assistance for low-income, uninsured, and underinsured individuals living with HIV/AIDS.

Part B Grants

Part B Grants provide funding to all 50 states, the District of Columbia, Puerto Rico, Guam, the U.S. Virgin Islands, and 5 U.S. Pacific Territories or associated jurisdictions. Part B grants are awarded on a formula and competitive supplemental basis to provide health care and support services for people living with HIV and provide medication for low-income, uninsured, and underinsured individuals living with HIV/AIDS. Similar to Part A, Part B grantees must utilize a community planning body that prioritizes services based on local needs assessments. The AIDS Drug Assistance Program (ADAP) is a federally-funded state administered program authorized under Part B that funds medications and pharmaceutical treatments for HIV patients. The program may also purchase health insurance coverage for the full range of HIV treatment and comprehensive primary care services, as well as supporting treatment adherence and monitoring progress under the flexibility policy.

Given that drug treatment is an integral part of the management of HIV clients, the value and expertise of the clinical pharmacist in the management of a wide range of HIV-related drug interactions and co-morbid conditions is critical. In cases where Ryan White HIV/AIDS Program grantees contract with community-based health care providers and health centers to provide comprehensive medical services and treatment to persons living with HIV/AIDS, clinical pharmacy services would form an essential component in the timely and appropriate management of these patients.

Parts C and D Grants

In addition to Part B grants awarded to states and territories, clinical pharmacy services are allowable for Ryan White HIV/AIDS Program Parts C and D grantees, as long as the grant is the payer of last resort. Part C grants provide funding directly to service providers such

as ambulatory medical clinics to support outpatient HIV early intervention services and ambulatory care. Part C also funds capacity development grants to enhance a grantee's capacity to develop, strengthen, or expand access to high quality HIV primary health care services for people living with HIV or who are at risk of infection in underserved or rural communities and communities of color. Ryan White HIV/AIDS Program Part D grantees provide family-centered primary medical care involving outpatient or ambulatory care for women, infants, children, and youth with HIV/AIDS.

Ryan White HIV/AIDS Program grantees that expend grant funds on medications are required to participate in the 340B program to reduce their costs if it is feasible to do so within the requirements of the 340B program. Anecdotally, some of the Part C and D grantees do offer full service pharmacies on site, and others provide limited medication dispensing and pharmacist support but they may or may not use Ryan White HIV/AIDS Program funding to support those services. Since Part B states differ in how they make ADAP medications available to clients (i.e., delivery through the provider, delivery through a commercial pharmacy, or mail order), the way grantees manage medication assistance services vary as well. Some grantees choose to contract with a pharmacist to provide adherence support to clients, even if medications are not available on site.

As noted previously, HRSA's PSPC has been shown to improve patient safety and quality of care among HRSA-funded programs and their partners across the Nation. Eleven teams of Ryan White HIV/AIDS Program Part C grantees are participating in the PSPC. The collaborative is using two of the HRSA HIV/AIDS indicators that measure use of antiretroviral medications and routine HIV screening in pregnancy, to measure a team's performance.

Expanding Clinical Pharmacy Services:
Improving patient safety and quality of services is critical to managing high-risk, high-cost HIV patients. HIV/AIDS programs that provide clinical pharmacy services could include a process to evaluate care delivery to HIV clients, beyond quality assurance evaluations, in order to establish a standard of care that creates an environment conducive to improving patient outcomes.

Although Ryan White HIV/AIDS Program grantees routinely assess health outcomes, clinical pharmacy services would play an integral role in the identification and implementation of methods to measure the impact of therapy on the HIV disease process. In addition, HRSA could explore opportunities for collaborative drug therapy management in patients with multiple co-morbid conditions.

Funding Considerations for Expanding Pharmacy Services in the Ryan White HIV/AIDS Program:
There is not enough information to make cost projections at the present time, however, HRSA could explore financing options beyond Ryan White HIV/AIDS Program funding (i.e. funding from state and/or local jurisdictions). Given the current environment of increasing demand for services and state budgetary cuts however, it is unlikely that any program funds would be readily available to finance expanded pharmacy services.

Since grantees are not required to offer on-site clinical pharmacy services and are expected not to duplicate existing services that are working well, expansion of clinical pharmacy services would appear to be difficult to achieve within the Ryan White HIV/AIDS Program. Nevertheless, one option would be for HRSA to encourage Part C grantees to allocate existing grant funds to expand pharmacy services. In addition, grantees could apply for capacity development or expansion funding when those opportunities are available.

Potential Barriers to Expanding Pharmacy Services in the Ryan White HIV/AIDS Program

Some Ryan White HIV/AIDS Program service providers with onsite pharmacy services have described a variety of barriers to clients receiving HIV medications through their pharmacies. This include; fear of loss of confidentiality, long wait times, unavailability of all medications , and some medications may be at higher costs than alternative sites. Some pharmacies do not keep expensive HIV medications in stock routinely. Other barriers include the inability of some state run ADAP programs to deliver medications through all on-site pharmacies, and while some service providers make generic medications available, most cannot compete with private pharmacies that offer very low prices.

Many of the Ryan White HIV/AIDS Program Part B grantees are currently experiencing severe state budget crises along with a rapid growth in the ADAP waiting lists which threaten the continuity of services. One of the major barriers to the implementation of clinical pharmacy services would be the limited availability of resources. Although it is clear that a comprehensive level of care that incorporates clinical pharmacy is needed for the delivery of quality HIV services, the implementation of this initiative will require additional financial and human resources, which are currently unavailable.

Provision of clinical pharmacy services at Ryan White HIV/AIDS Program Part C medical care sites is most feasible when grantees have a single site for care provision, and have the financial, personnel and physical resources to devote to these services. Part C grantees with different models of care including multiple care sites, large geographic areas, and/or contracted clinical providers usually find it more feasible to offer a wide range of client-driven options, such as primary care services, dental services, medical case management and psycho-social services, and may not have the capacity to provide pharmacy services.

II. Federally Qualified Health Centers (FQHC)

Section 330 of the Public Health Service Act directs federally qualified health centers (FQHCs) to provide "pharmaceutical services as may be appropriate for particular centers." FQHCs may provide pharmacy services by directly employing pharmacists and pharmacy assistants or technicians, through a paid contract for offsite services, or through formal written referral arrangements where the FQHC does not pay for services. In 2009, according to the Uniform Data System, 74 percent of FQHCs provided pharmacy services directly with either a medical provider or pharmacist dispensing medications on-site.

HRSA-supported FQHCs employed 2,478 pharmacy personnel in 2009, comprising two percent of the total health center workforce.

Currently, some health centers use a comprehensive pharmacy service model that includes clinical pharmacy services, while others provide more limited dispensary services. HRSA views a comprehensive pharmacy service model as an important part of the health center program's mission to provide quality patient- and community-centered medical homes to medically underserved and vulnerable populations. Through various funding opportunities as well as by highlighting health center best practices, HRSA strongly encourages FQHCs to utilize a comprehensive pharmacy service model in their pharmacy service delivery plan. Such a model seeks to increase access to affordable medications, utilizing best business practices to ensure financial and operational efficiencies. In addition to the traditional dispensing role, comprehensive pharmacy services utilize a pharmacist in the clinical management of chronic disease states such as diabetes, hypertension, asthma, and obesity.

FQHCs also use Health Information Technology to increase the effectiveness of their pharmacy services. According to a recent Commonwealth Fund survey, 38 percent of health centers use computerized systems to issue medication alerts or prompts, 35 percent prescribe medications electronically, and 39 percent list medications taken by a patient using computerized systems. These figures are similar to trends seen among non-FQHC practitioners.

Funding Considerations for Expanding Pharmacy Services in FQHCs:
Pharmacy services and pharmaceuticals, including overhead, comprise 7.1 percent of total health center costs ($439.8 million on pharmaceuticals and $363 million on other pharmacy costs). Pharmacy services at health centers are financed through third-party payer reimbursement, Section 330 grants and expansion grants from HRSA, additional grant opportunities through state and local governments and other entities such as insurers and pharmaceutical companies, and also through the section 340B Drug Pricing Program. The vast majority of FQHCs that provide pharmacy services are enrolled in the 340B program (94 percent, or 1,059 grantees operating 4,271 delivery sites).

Comprehensive pharmacy services are a focus area for community health center service expansion grants, along with oral health and behavioral health services. In 2008 and 2009, HRSA awarded 66 expansion grants for comprehensive pharmacy services totaling $9.1 million. In addition, through recent American Recovery and Reinvestment Act of 2009 investments in health center services, an additional 50 pharmacists have been hired by HCs in 2010.

Funds for service expansion projects focused on comprehensive pharmacy services are one way of supporting FQHCs to move toward this model. Outreach, technical assistance, and education about utilizing the 340B program as well as workforce recruitment, including pharmacist recruitment, are supported through cooperative agreements with the national and state associations.

programs that are associated with supporting effective medication use systems in safety-net organizations.

State Offices of Rural Health

Opportunities to create educational efforts and promote federal initiatives related to clinical pharmacy services can be explored through the State Offices of Rural Health (SORH) grant program. These offices, which provide an institutional framework that links small rural communities with state and federal resources, can serve as an important outlet for communicating the value of clinical pharmacy services and connecting rural health care organizations with information and expertise to successfully expand the delivery of these services.

Rural Hospital Grant Programs

HRSA is involved in quality improvement work with small rural and Critical Access Hospitals (CAH) through the Medicare Rural Hospital Flexibility (Flex) and Small Rural Hospital Improvement (SHIP) grant programs. The Flex program provides funding to state governments to spur quality and performance improvement activities in CAHs. States could increase use of funds for developing quality improvement-related networks and participation in national quality improvement and reporting efforts that include clinical pharmacy services. Likewise, the SHIP program is available to assist small rural hospitals that are essential access points for Medicare and Medicaid beneficiaries through awards to the SORHs. States could encourage hospitals to use SHIP funding for quality improvement projects that focus on clinical pharmacy services and medication safety such as the purchase of computer software and hardware to help reduce medication errors and support quality improvement; and/or educating and training hospital staff on HIT to help reduce medication errors and support quality improvement.

Rural Health Care Services Outreach Grant Program

There is also an opportunity to focus on improvements to rural clinical pharmacy services through the Rural Health Care Services Outreach (Outreach) grant program authorized in Section 330A of the Public Health Service Act. The Outreach program is non-categorical and therefore applicants could use the funds under this grant to expand clinical pharmacy services and improve patient outcomes through better management of clinical pharmacy services and integration within the ambulatory care setting. Many applicants focus on chronic disease management so the potential exists that this might be a possible strategy to expand clinical pharmacy services in these areas.

Potential Barriers to Implementation in Rural Communities

In its 2007 study, Mathematica identified six challenges, which confront rural communities in expanding clinical pharmacy services. The study found that there exists a *lack of awareness of potential benefits of clinical pharmacy services, particularly in the ambulatory care setting.*[42] There were very few examples of rural health care organizations that integrated pharmacists beyond inpatient services and into the full scope of services.

The study identified a *maldistribution of the pharmacy workforce across urban and rural communities*. The difficulties of recruitment and retention of pharmacists in rural areas

was found to be both related to geography and associated with pharmacy graduates' disinterest in the types of practice positions available in rural communities. The long hours and limited personal and professional leave that are related to pharmacy ownership or working in independently owned pharmacies, common in rural areas, were less appealing to pharmacy students. Students indicated that their interest in practicing in rural areas would increase if clinically focused, collaborative practice opportunities were available in rural health care organizations.

After surveying small hospitals, Mathematica found that there is a *limited adoption of medication safety practices in small rural hospitals*. They also found that the longer the hours of the pharmacist, the more likely the organization was to adopt or increase medication safety practices. These findings suggest that increasing staff time provided by pharmacists may address limitations in medication safety practices as well as delivery of clinical pharmacy services.

Although the use of telepharmacy services in remote rural areas is increasing, there is *limited adoption of technology for the purpose of providing clinical pharmacy services through this medium*. In many cases telepharmacy technology is used primarily to support core functions of medication dispensing services and not clinical pharmacy services delivery. A key reason indicated is that it is challenging to seek compensation from health care payers for clinical pharmacy services delivered by telepharmacy.

Furthermore, the study identified the *financial viability of rural pharmacies* as another challenge encountered in rural areas. Rural health centers and hospitals usually contract with local or independent pharmacies however, a number of these pharmacies have been forced out of business due to competition from chain, mass-merchandiser, and mail order pharmacies and the advent of prescription drug benefit managers, managed care, and third party reimbursement. There has been a disproportionate decrease in prescription medication sales revenue contributing to the closure of a number of rural pharmacies, which in turn can impact service delivery within local safety-net organizations due to the interdependent nature of health care services in rural communities.

Another barrier confronting rural health care settings is that *academic-practice partnerships are uncommon between schools of pharmacy and rural safety-net providers*. Research findings suggest health professionals are more likely to practice in rural communities if there are formal collaborations between academic institutions and rural health care organizations.

Most of the findings described in the Mathematica report could promote expansion of clinical pharmacy services in both urban and rural settings. However, different methods may be needed to make these efforts effective within these different geographic areas. Thus, when considering actions on any of the options outlined in the Mathematica report, the need for unique implementation strategies based on urban versus rural audiences or based on safety-net provider type (FQHC and Disproportionate Share Hospital versus Rural Health Clinics and CAHs) is emphasized.

HRSA affirms all of the barriers identified by Mathematica are present in rural areas served by HRSA's safety-net programs and that the challenges identified have a negative effect on the quality of care delivered to the targeted populations. HRSA's Patient Safety and Clinical Pharmacy Collaborative and the Flex Program Medicare Beneficiary Quality Improvement Project are two programs designed to address the specific challenges mentioned. HRSA's ORHP is collaborating with the national stakeholders cited to increase access to pharmacist services among safety net populations.

E. INCLUSION OF STAKEHOLDERS

Collaboration with External Stakeholders

HRSA sought input from over sixty organizations in the development of recommendations for this report and to develop HRSA's PSPC. A complete list of organizations that the Agency either met with individually or included in stakeholder meetings is found in Appendix D.

In April and November of 2007, HRSA convened two day-long meetings of grantees and a range of national stakeholders and experts in patient safety, health care quality, and pharmacy services. During these meetings, high-achieving frontline health care providers showcased practices and results in health outcomes, evidence-based practices, and patient safety. As a result of these collaborative meetings, HRSA's programs are better able to align with leading practices in order to improve patient outcomes.

As part of the Mathematica study, a meeting was convened to obtain input from key national organizations on the best strategies for advancing clinical pharmacy services in safety-net settings. Representatives from a total of twenty organizations attended including the National Association of Community Health Centers, the National Association of Chain Drug Stores, the American Society of Health-System Pharmacists, and the American Pharmacists Association. Representatives from academic associations included the American Association of Colleges of Pharmacy, and other members of the 340B coalition. Follow-up calls to other key organizations that could not attend, including the National Rural Health Association and the National Quality Forum, were also conducted. Stakeholders at the meeting indicated that clinical pharmacy services are likely to result in overall cost reductions to the health care system with reductions being driven by reduced hospitalizations and emergency visits.

Colleges and Schools of Pharmacy

In response to the Senate Committee's request to identify opportunities for maintaining and building upon relationships with colleges and schools of pharmacy, HRSA asked Mathematica to provide recommendations as to how these stakeholders could help advance the practice of clinical pharmacy. As demonstrated through the Clinical Pharmacy Demonstrations Grants, the role of the schools of pharmacy was absolutely critical to the success of implementing clinical pharmacy services.[43] In closely partnering with the American Association of Colleges of Pharmacy, HRSA recognizes the importance of working with the colleges and schools regarding exposure of students to clinical pharmacy services, the safety-net setting and ambulatory care opportunities. The recommendations

from Mathematica are outlined below.

a) Directly encourage safety-net provider/college and school of pharmacy linkages. As many of the case study discussions and the prior Evaluation of the Clinical Pharmacy Demonstration Program suggest, the establishment of strong partnerships with colleges and schools of pharmacy has been and remains a promising way to initiate or expand clinical pharmacy services in safety-net settings, both by providing financial stability for the programs and, in the longer term, by helping to provide a stable supply of pharmacists trained to provide clinical services in safety-net settings.

b) The HRSA-funded Area Health Education Centers (AHEC) program is designed to help address workforce supply issues in safety-net settings. Currently, only 8 of the 49 AHEC programs report training sites for pharmacy students in underserved areas. AHECs could serve as a rich source for pharmacy student placements, strengthening the pharmacy component of this program by increasing the placement of pharmacy students in underserved areas, including rural safety-net organizations. This approach is one available tool to increase the supply of pharmacists interested in working in rural communities. Some participants who attended the national stakeholders meeting also suggested that inter-professional development between physicians and pharmacists could be encouraged through the AHECs.

c) With sponsorship, the American Association of Colleges of Pharmacy (AACP) could extend its existing activities to create national networking opportunities between colleges and schools that have partnered with safety-net organizations and those that have not. Strong academic-safety net partnerships can be more formally highlighted to increase the awareness of colleges and schools about the value to schools and communities engaged in this work. Furthermore, there may be ways in which existing AACP programming could be leveraged to support further expansion of these academic-practice partnerships.

d) National pharmacy associations that currently provide awards to colleges and schools of pharmacy for program recognition or scholarships can include specific recognition or awards to schools with strong relationships with safety-net providers.

e) The State Boards of Pharmacy can increase their approval of telepharmacy networks in order to establish traditional and clinical pharmacy services for patients in remote locations.

In addition to colleges and schools of pharmacy, the audience for Mathematica's second set of recommendations was foundations, states, and professional associations. These key players, along with the federal government, must be involved to achieve a high level of integration of clinical pharmacy services in safety-net settings. The Mathematica recommendations include:

a) Foundations could partner with the federal government to sponsor studies to help fill the information gap regarding whether there are cost savings from these services. Foundations also provide start-up or ongoing financial assistance for clinical pharmacy

services for interested safety-net providers who have used a financial planning tool and optimized existing sources of revenue.

b) State Medicaid agencies can decide to amend their state plans to pay for clinical pharmacy services, or include clinical pharmacy services as part of a larger waiver application they may be planning. Similarly, Medicaid managed care plans set their own payment policies and could choose to begin paying for these services.

c) National organizations concerned with Medicaid, such as the National Academy for State Health Policy, National Association of State Medicaid Directors, National Governors' Association, and Center for Health Care Strategies Purchasing Institutes, can help share experiences from the states that currently pay for clinical pharmacy services with other states, particularly as second-generation efforts, such as those in Missouri and Florida, become fully implemented.

d) The National Association of Chain Drug Stores (NACDS) can work with its members to build on the contractual relationships established to date between FQHCs and other safety-net providers and chain drug stores. Almost 2,000 contractual relationships have been established between safety-net providers and independent and chain drug stores, with the assistance and encouragement of HRSA's Pharmacy Services Support Center (PSSC). With encouragement from the NACDS, many more of these contracts could be established with chain drug stores, and they could be used to provide clinical pharmacy services as well as traditional pharmacy services.

Other professional pharmacy organizations, such as the American Pharmacists Association, American Society of Health-System Pharmacists, and the National Community Pharmacist Association, can all play a coordinating role in this effort.

e) The National Association of Community Health Centers (NACHC), National Association of Public Hospitals (NAPH), and other safety-net provider organizations can educate their members about the value of these services.

F. SUMMARY AND CONCLUSION

The integration of clinical pharmacy services into primary care improves patient health outcomes, reduces the incidence of adverse events, and reduces costs to the health care system.[9] HRSA established the Patient Safety and Clinical Pharmacy Services Collaborative (PSPC) as a vehicle to improve patient safety and quality of care among HRSA funded programs and their partners by spreading the leading practices of high performing health care providers as described in this report. In addition, HRSA awarded 66 service expansion grants for comprehensive pharmacy services with $6.2 million under the health center program in FY 2008 and $2.9 million in 2009 totaling $9.1 million to improve access to these services.

Based on the study conducted for this report, HRSA concludes that the provision of efficient and effective clinical pharmacy services requires an interdisciplinary approach. Similarly,

system-wide improvements will best be established through cooperation across a broad array of stakeholders including the federal, state and local governments; third-party payers; individual safety-net providers, clinics and hospitals; researchers and schools of pharmacy. HRSA will continue to provide strong leadership and serve as a facilitator to continue building cooperative efforts to advance the use of clinical pharmacy services across the health care safety net.

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LIST OF APPENDICES