Accelerating Progress in Prescription Medicine Adherence: The Adherence Action Agenda

A National Action Plan to Address America's "Other Drug Problem"

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BeMedicine Smart

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Preface

Lack of prescription medicine adherence can be considered America's "other drug problem," leading to unnecessary disease progression, disease complications, reduced functional abilities, a lower quality of life, and even possibly premature death. Such downstream effects also increasingly contribute to our overall national health expenditures. That is why in 2007, the National Council on Patient Information and Education (NCPIE) issued ***Enhancing Prescription Medicine Adherence: A National Action Plan***. Calling for a national mobilization to reduce the adverse health and economic consequences associated with this pervasive public health threat, the report documented the numerous behavioral, social, economic, medical, and policy-related factors that contribute to patients not taking their medicines as prescribed and released a ten-step blueprint for action across the continuum of care—from diagnosis through treatment, and follow-up patient care and monitoring.

Since NCPIE's national action plan was released six years ago, there has been significant progress in meeting many of the priorities called for in the report, especially in the areas of public education, new resources for health providers, and public policy initiatives. Such progress represents good news, even as we anticipate that America's "other drug problem" will take on new dimensions due to a dramatic rise in the number of older Americans and a dramatic increase of costly age-related chronic illnesses. Already the number of adults aged 65 and over increased from 35 million in 2000 to 40 million in 2010 (a 15% increase) and it is estimated that as many as 55 million Americans will be over the age of 65 by 2020.[1]

Because aging is directly correlated with the increased prevalence of chronic disease, the United States is witnessing an epidemic of persons with multiple chronic conditions. As a result, a growing number of Americans are now taking numerous prescription medicines on a daily basis, often see more than one prescriber, and thus are at significantly higher risk for drug-drug interactions, adverse events and medication errors. Looking specifically at the nation's health care bill, researchers and public health experts put the avoidable costs associated with mismanaged medication use among patients with multiple chronic conditions at $1.3 billion a year,[2] an amount that will only increase unless the quality of medication prescribing and medication use—including medicine adherence—is substantially improved.

Recognizing the high costs of caring for Americans with multiple chronic conditions, the Department of Health and Human Services (HHS) convened a working group to address this challenge, especially in light of related Patient Protection and Affordable Care Act (ACA) initiatives, and in 2010, published a strategic framework for federal efforts to improve the health of individuals living with concurrent chronic diseases. But while HHS has elevated multiple chronic conditions as a priority concern, what remains lacking is a clearer understanding of the inter-relationship between multiple chronic conditions and poor adherence, a linkage that may represent a major public health threat.

To document what is at stake, NCPIE convened representatives of 22 professional societies and voluntary health organizations, government agencies and industry leaders to review the state of adherence today and identify the major challenges for the future. Their comprehensive assessment led to a consensus that confronting the combined threat of poor prescription medicine adherence and higher rates of multiple chronic conditions requires priority attention and action—before the predicted increase of multiple chronic conditions overwhelms the health care system.

This report presents the findings of NCPIE's new comprehensive review, providing up-to-date information on the state of prescription medicine adherence in the U.S., the extent and impact of multiple chronic medical conditions on appropriate medicine use, and what may materialize in terms of excess morbidity, mortality and

rising health care costs if steps are not taken quickly to improve patient adherence among Americans coping with two or more chronic illnesses. And because the stakes are so high, the report lays out a new *Adherence Action Agenda* to coalesce stakeholders around the common goal of improving patient adherence to reduce the burden of chronic disease. Ultimately involving the support and active participation of many constituencies—the federal government, state and local government agencies, professional societies, healthcare practitioners, health educators, health systems, insurers and patient advocates—it is hoped that this report will serve as a catalyst for action and provide a blueprint for accelerating progress.

Executive Summary

At the same time that medical science has transformed HIV and many cancers into treatable conditions and significantly reduced the burden of chronic diseases like diabetes, many Americans are not benefiting from these treatment advances due to the persistent problem of poor prescription medicine adherence—a pervasive problem the leads to unnecessary disease progression, disease complications, a lower quality of life, preventable deaths, avoidable medical spending and lost work productivity.

To address this complex and multifaceted public health problem, in 2007, the National Council on Patient Information and Education (NCPIE) issued *Enhancing Prescription Medicine Adherence: A National Action Plan*, which defined poor medication adherence as the nation's "other drug problem" and identified ten-action steps to reduce its adverse health and economic consequences. Intended as a catalyst for action, the 2007 report was the genesis for important progress in areas such as public education programs, new resources and tools for health professionals, extensive research and a number of policy initiatives. Adding to these developments, there is now a growing body of evidence on the cost effectiveness of medicine adherence, including a recent report from the Congressional Budget Office (CBO) that credits greater usage of medications by persons enrolled in Medicare Part D drug plans with reduced health care costs.

Yet, even as these important efforts are having an impact, nonadherence in the U.S. continues to be at unacceptable levels and will only be compounded in the days ahead by an aging society and a looming epidemic of age-related chronic diseases. This is especially true of multiple chronic conditions where older adults tend to take multiple drugs on a daily basis, have more than one prescriber, and are at increased risk of drug interactions, adverse events and errors in taking their medicines as prescribed. Thus, it is a necessary time to re-examine the state of medicine adherence, identify the major gaps in current adherence efforts, and create consensus on those action steps that will have the greatest impact in improving medicine adherence over the next decade.

Towards this end, in the fall of 2012, NCPIE commenced a new initiative called the ***Adherence Action Agenda*** or the "A^3 Project," bringing together 22 professional societies and voluntary health organizations, government agencies and industry leaders to review the state of adherence today and identify the major challenges for the future. The comprehensive assessment led to a consensus that confronting the combined threat of poor prescription medicine adherence and higher rates of multiple chronic conditions requires immediate attention and action—before the predicted increase of multiple chronic conditions overwhelms the health care system. The findings of this comprehensive review include the following:

THE U.S. PAYS A HIGH PRICE FOR POOR ADHERENCE

Based on the latest estimates, half of the estimated 187 million Americans who take one or more prescription medicines—or up to 93.5 million patients—do not take these drugs as prescribed. In fact, studies show that 20% to 30% of prescriptions are never filled by patients, while 50%–60% of medications to treat chronic disease are not taken as prescribed. In terms of the toll in morbidity and mortality, lack of medication adherence is associated with poorer health outcomes, resulting in approximately 125,000 preventable deaths a year and many as 40% of nursing home admissions in people with type 2 diabetes. From the standpoint of the cost to the economy, new research estimates that $105 billion is wasted annually on medication therapy nonadherence of which 69%—or $72.5 billion—is spent on hospitalizations. Other findings project that poor medicine adherence, along with suboptimal prescribing, drug administration, and diagnosis, costs the health care system an estimated $290 billion per year in avoidable medical spending and lost work productivity, translating into 13 percent of total health care expenditures.

MULTIPLE CHRONIC CONDITIONS AND POOR MEDICINE ADHERENCE REPRESENT THE PERFECT STORM

Driven by the aging of the U.S. population and such risk factors as increased obesity, the prevalence of multiple chronic conditions is on the rise along with polypharmacy, defined as the use of multiple medications. Today, 27% of Americans are living with multiple chronic conditions (MCC), including one in 15 children. However, the heaviest burden is among Americans aged 65 and older where recent data show that 68% of Medicare beneficiaries are being treated for at least two concurrent chronic illnesses—or 21.4 million individuals. Among these individuals, the concurrent use of multiple medications to manage coexisting chronic conditions (polypharmacy) is a common occurrence. It is now estimated that 76% of Americans aged 60 and over use two or more prescription drugs and 37% take five or more. Further, studies document a rise in the incidence of drug reactions from 6% in patients taking two medications a day to as high as 50% in patients taking five drugs a day.

Due to the health problems these individuals face, MCC accounts for 66% of the nation's health expenditures and is a major source of Medicare spending. Of the $300 billion Medicare spent in 2010 on health care, the price tag for treating the 14% of beneficiaries with six or more MCC was over $140 billion. Almost two-thirds (60%) of these patients required hospitalization, accounting for 55% of Medicare's total spending on hospitalizations, 70% went to the emergency room, and 92% saw a physician with almost half (46%) having 13 or more visits. In all these situations, poor medication adherence is commonplace and puts patients at higher risk for medication-related problems and the costly emergency room visits and hospitalizations that can result.

NUMEROUS FACTORS CONTRIBUTE TO POOR MEDICINE ADHERENCE

Numerous behavioral, social, economic, medical and policy-related factors contribute to the problem and must be addressed if adherence rates are to improve. Some critical concerns raised in the report are the complexity of the drug regimen, cost-control measures implemented by payers and health systems, the need for patients to visit multiple pharmacies to fill different prescriptions, poor communication between patients and clinicians, and the breakdown in provider communications during the transition of care from the hospital to the outpatient setting.

IMPORTANT CHANGES IN THE DELIVERY OF HEALTH CARE HAVE THE POTENTIAL TO IMPROVE MEDICATION ADHERENCE

The future state of medication adherence will be affected by the move towards a patient-centered health care system through implementation of the Patient Protection and Affordable Care Act (ACA), including efforts to reduce avoidable hospital readmissions, which is driving innovative approaches to medication management. Other important developments include lowering the cost of prescription drugs for participants enrolled in the Medicare Part D prescription drug program; increasing access to Medication Therapy Management (MTM) services, especially for patients with multiple chronic conditions; accelerating the adoption of the care coordination model and patient-centered medical homes; the Medicare Advantage "Star Rating" system and other Medicare quality incentives, which build in a number of adherence measures; and expanded use of health technology, from electronic reminder devices and pharmacy-based adherence messaging programs to electronic pillboxes, smartphone apps, health-monitoring devices and e-prescribing. Also of significance, the report cites the move towards an outcomes-based accreditation system for medical residency programs as an important opportunity to integrate medication management and e-prescribing into the curriculum of these programs and to establish medicine adherence skills as core competencies within the curricula of schools of pharmacy, nursing, and other allied health professions.

A NEW *ADHERENCE ACTION AGENDA*

Based on these findings, NCPIE's new *Adherence Action Agenda* advocates for an increased focus on the overlooked challenge of multiple chronic conditions, where the need for patient adherence is most acute, and lays out these ten policy and programmatic solutions to improve medication adherence:

1. **Establish medicine adherence as a priority goal of all federal and state efforts designed to reduce the burden of multiple chronic conditions.**
   Because patient adherence is not viewed as an essential element of government initiatives to reduce the burden of multiple chronic conditions, the report calls for adherence to be integrated throughout the range of efforts now underway through a new HHS Multiple Conditions Strategic Framework to improve health systems change and facilitate new research efforts.

2. **Establish the role of the patient navigator within the care team to help patients with multiple chronic conditions navigate the health care system and take their prescription medicines as prescribed.**
   Building on the patient navigator model now used in hospitals and cancer clinics nationwide, the action plan advocates for pairing patients treated for multiple chronic conditions with specially trained adherence navigators who will, in collaboration with patients and caregivers, obtain the patient's medical records, create an accurate medication list, set up medication counseling as needed, schedule timely follow-up physician visits, and facilitate communication between the patient and his or her different physicians.

3. **Promote clinical management approaches that are tailored to the specific needs and circumstances of individuals with multiple chronic conditions.**
   Since patients with multiple chronic conditions differ in the severity of their illnesses, prognosis, and functional status, the report encourages health professionals to adopt the American Geriatric Society's guiding principles for treating older adults with three or more diseases, which calls for eliciting and incorporating patient preferences and choosing therapies that optimize benefits and minimize the harm for older patients.

4. **Incentivize the entire health care system to incorporate adherence education and medication support as part of routine care for MCC patients.**
   With research showing that the interactions between patients and their healthcare providers affect how well patients manage their chronic conditions, the report advocates for an expanded investment in patient/provider education and engagement tools to help clinicians implement best practices for medication adherence and counsel their patients on the importance of following treatment plans.

5. **Eliminate the barriers that impede the ability of patients with multiple chronic conditions to refill their prescription medicines.**
   One of the reasons patients fail to refill their prescriptions is the need to pick up prescriptions at different times and sometimes at different pharmacies, requiring numerous trips. T o reduce these obstacles, stakeholders support implementing the "pharmacy home" model, which gives patients a single pharmacy point of contact for filling prescriptions, and adopting refill synchronization, which allows patients to fill different prescriptions at one time and therefore, reduce the number of visits they must make to the pharmacy.

6. **Reduce the cost-sharing barriers for patients by lowering or eliminating patient copayments for prescription medicines used to treat the most common chronic diseases.**
   The report makes clear that the cost of medications for some patients is a barrier to filling their prescriptions and taking their medicines as prescribed and advocates adopting

policies that will reduce the out-of-pocket costs for medications, especially for patients on multiple prescriptions for chronic conditions.

7. **Accelerate the adoption of new health information technologies that promote medication adherence.**
   Because significant innovations in health technology have the potential to improve the flow of timely and complete information on medicine use between patients and providers, the report calls for the swift adoption of new standards for using electronic health records, incentivizing providers to use health information technology to identify patients at risk for medication misuse, and the expanded use of electronic reminders and personal health records to improve medication adherence.

8. **Establish medication adherence as a measure for the accreditation of healthcare professional educational programs.**
   Currently, the nation's medical residency programs are moving towards an outcomes-based accreditation system, where medical residents will be evaluated on the basis of required core competencies, including interpersonal skills and communication. From the standpoint of medication adherence, this represents an opportunity to integrate medication management and e-prescribing into the curriculum of medical residency programs and paves the way for establishing medicine adherence skills as core competencies within the curricula of schools of pharmacy, nursing, and other allied health professions and as an accreditation measure.

9. **Address multiple chronic conditions and optimal medication management approaches in treatment guidelines.**
   Clinical practice guidelines typically focus on managing a specific chronic condition and do not take into account the presence of multiple chronic conditions. The report advocates the accelerated development of updated treatment guidelines where information is included on the most common comorbidities clustering with the incident chronic condition, this can start with the most common combinations of multiple chronic conditions, called dyads and triads, which have already been identified by the Centers for Medicare and Medicaid Services (CMS).

10. **Stimulate rigorous research on treating people with multiple chronic conditions, including focused research on medication adherence to promote the safe and appropriate use of different medicines in this patient population.**
    There is a paucity of evidence-based data on how to treat patients with two or more concurrent diseases who are taking drugs developed and tested in people who have a single condition. Accordingly, the report supports incorporating medicine adherence throughout the research agenda for multiple chronic conditions and advocates for increasing the budget for HHS research efforts examining the best ways to treat the most prevalent clusters of concurrent diseases.

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Introduction

Since scientists released the first draft of the human genome to the public in 2000, the impact of science and technology on medicine has produced new diagnostic tests and treatments that are transforming HIV and many cancers into treatable conditions and significantly reducing the burden of chronic diseases like diabetes and cardiovascular disease. As a result, life expectancy in the U.S. has increased by 1.9 years for men and 1.6 years for women since 2000[3] and rates of disability have declined.

But despite these medical breakthroughs, many Americans are not benefiting from these treatment advances due to the persistent problem of poor prescription medicine adherence—defined as the extent to which patients take medications as prescribed by their healthcare providers.[4] Today, it is estimated that half of the 3.2 billion prescription medicines dispensed each year in the U.S. are not taken as prescribed[5] and the impact in morbidity and mortality is extensive. Affecting Americans of all ages, various socioeconomic levels and both genders, nonadherence may lead to disease progression, disease complications and reduced functional abilities and is associated with approximately 125,000 deaths a year.[6] As a consequence, nonadherence—along with suboptimal prescribing, drug administration and diagnosis—costs the health care system an estimated $290 billion per year in avoidable medical spending and lost work productivity, translating into 13 percent of total health care expenditures.[7]

As early as 1995, the National Council on Patient Information and Education (NCPIE) recognized the need to address this looming public health threat and published ***Prescription Medicine Compliance: A Review of the Baseline Knowledge***, a review that defined the key factors contributing to poor medication adherence. This was followed in 2003 with a major report from the World Health Organization (WHO), which documented the magnitude of poor adherence on a global level, including the finding that adherence to long-term therapy for chronic illnesses averaged only 50% in developed countries and is even lower in developing nations.[8] Then, in 2005, the research team of Lars Osterberg, M.D. and Terrence Blaschke, M.D. published a review article in the ***New England Journal of Medicine***, still widely cited today because it identified 12 major predictors associated with poor adherence and documented the scope and cost of nonadherence in the U.S. Responding to this growing body of evidence, the National Institutes of Health (NIH) and a number of chronic disease organizations weighed in with new findings on the importance of adherence for successful treatment.

But while there was growing consensus on the need for action, there was no blueprint for collective action, leading NCPIE to convene a panel of experts to assess the nature and extent of poor medicine adherence in the U.S. and develop and identify action steps that can significantly improve medication adherence and be readily implemented. This led to the NCPIE's landmark 2007 report—***Enhancing Prescription Medicine Adherence: A National Action Plan***—which laid out 10 priorities for action:

1. Elevate patient adherence as a critical health care issue
2. Agree on a common adherence terminology that will unite all stakeholders
3. Create a public/private partnership to mount a unified national education campaign on adherence
4. Establish a multidisciplinary approach to adherence education and management
5. Implement professional training and increase funding for professional education on patient medicine adherence
6. Address the barriers to patient adherence among low health literacy patients
7. Create the means to share information about best practices in adherence education and management

8. Develop a curriculum on medication adherence for use in medical schools and allied health care institutions
9. Seek regulatory changes to remove roadblocks for adherence assistance programs
10. Increase the federal budget and stimulate rigorous research on medication adherence

Since the release of NCPIE's national action plan six years ago, there has been significant progress in meeting many of the goals laid out in NCPIE's landmark report. Some highlights include:

+ The launch in 2011 of the National Consumers League's multi-year ***Script Your Future*** public education campaign, an initiative to raise awareness among patients of the consequences of not taking medications as directed;

+ The 2011 release of the NEHI (formerly New England Healthcare Institute) ***Patient Medication Adherence Roadmap***, which led to the formulation of six priorities for action by policymakers to improve the way patients take their prescription medicines;

+ A series of research and policy initiatives on prescription medication adherence led by such broad-based coalitions as the Patient-Centered Primary Care Collaborative, the Pharmacy Quality Alliance and the Council for Affordable Health Coverage;

+ The availability of new resources and tools for promoting medication adherence that have been developed through the Agency for Health Care Research and Quality, Centers for Medicare and Medicaid Services, the Veterans Administration, and companies that developed innovative adherence estimators; and

+ The increased availability of information on best practices and model programs that are having an impact at the state and community levels.

At the same time, there is a growing body of evidence demonstrating the cost effectiveness of medicine adherence in reducing health care spending. Along with a number of observational studies, a 2011 study published in ***Health Affairs*** quantified the savings of adherence to medications, finding that every dollar spent on adhering to medications reduced the costs for patients with congestive heart failure by $7,823 and saved $3,756 for each adherent diabetes patient. The study also found a savings of $3,908 for those properly taking their medicines for hypertension, and $1,258 for each adherent patient with dyslipidemia.[9] Building on this new evidence, a 2012 Congressional Budget Office (CBO) report for the first time credited greater usage of medications by persons enrolled in Medicare Part D drug plans with reduced health care costs generally and included medication adherence as part of its guidance. Applying its legislative scoring methodology to estimate the medical offsets related to improved medication use, CBO reported a one-fifth of a percent reduction in Medicare's medical service spending for every one percent increase in the number of prescriptions filled through Medicare Part D. filled.[10]

Yet, even as these important efforts are having an impact, this is no time to rest on our collective laurels. The reality is that despite this combined effort, the state of nonadherence in the U.S. continues to be at unacceptable levels. The following findings underscore this assessment:

+ Today, up to half of the estimated 187 million Americans who take one or more prescription medicines—or up to 93.5 million patients—do not take these drugs as prescribed.[11, 12]

+ In fact, numerous studies have shown that 20% to 30% of prescriptions are never filled by patients and that 50%–60% of medications to treat chronic disease are not taken as prescribed.[13,14]

+ Moreover, a 2012 research review by the Agency for Healthcare Research and Quality (AHRQ), ***Closing the Quality Gap Series: Medication Adherence Interventions: Comparative Effectiveness***, reports that nonadherence tends to occur with greater frequency when

the prescribed medications are used to treat asymptomatic, chronic conditions such as hypertension and hypercholesterolemia.[15] Here, the literature suggests that 20% to 75% of patients prescribed these medications are not adhering to the regimen at their one-year follow-up.[16]

+ Because lack of medication adherence may lead to unnecessary disease progression and disease complications, nonadherence translates into increased use of expensive components of health care, such as costly hospitalizations. A June 2013 study by the IMS Institute for Healthcare Informatics estimated that $105 billion is wasted annually on medication therapy nonadherence of which 69%—or $72.5 billion—is spent on hospitalizations.[17] Further, nonadherence has been associated with as many as 40% of nursing home admissions in people with type 2 diabetes.[18]

+ Examining the impact of poor medicine adherence on patients with specific chronic conditions, a recent a meta-analysis found that compared to patients with high levels of adherence, the risk of poor clinical outcomes—including hospitalization, re-hospitalization, and premature death—among non-adherent patients is 5.4 times as high among those with hypertension, 2.8 times as high among those with dyslipidemia, and 1.5 times as high among those with heart disease.[19] Another study found that patients who do not adhere to their high cholesterol medications have a 26% greater likelihood of a cardiovascular-related hospitalization, as compared to patients who adhere to their drug regimens.[20]

However disturbing, these statistics are actually the tip of the iceberg in terms of what is in store in the years ahead. Today, a so-called "silver tsunami" is underway, ushering in one of the most dramatic demographic shifts in the nation's history. Starting in 2011—the year the first Baby Boomers began to turn age 65—10,000 adult Americans will become 65 every day through 2030.[21] And by 2060, the U.S. Census Bureau projects the number of older Americans will top 90 million—up from 43.1 million today—and for the first time, will outnumber children under age 18.[22]

Because aging is directly correlated with the increased prevalence of chronic disease, the "silver tsunami" portends a significant increase of debilitating and costly age-related chronic illnesses—from cardiovascular disease, diabetes and cancer to osteoarthritis and Alzheimer's disease—along with a growing number of older adults who are prescribed multiple medications to treat these conditions. Already, it is estimated that in 2012, 42% of Americans aged 65 and older took five or more prescription drugs with the average number of drugs prescribed increasing from five at age 65 to seven at age 85.[23] And because these individuals tend to take multiple drugs on a daily basis and have more than one prescriber, they are at increased risk of drug interactions, adverse events and errors in taking the medicines as prescribed. Accordingly, the IMS Institute for Healthcare Informatics put the avoidable health care costs associated with mismanaged multiple drug use by American seniors at $1.3 billion in 2012 of which the vast majority—or $1.1 billion—was spent on inpatient treatment and the remainder on emergency room and outpatient visits.[24]

Combined with the looming epidemic of age-related chronic diseases, the future state of medication adherence will be affected by the move towards a patient-centered health care system through implementation of the Patient Protection and Affordable Care Act (ACA), including efforts to reduce avoidable hospital readmissions, which are driving innovative approaches to medication management. Thus, now is the time to take stock of the dramatic changes that will be taking place in the delivery of health care to identify the areas of greatest unmet need, while building on the many developments now underway to understand and improve medication adherence.

Towards this end, in the fall of 2012, NCPIE commenced a new initiative called the ***Adherence Action Agenda*** or the "A^3 Project," bringing together 22 professional societies and voluntary health organizations, government agencies and industry leaders to identify the major gaps in current

adherence efforts and create a new *Adherence Action Agenda* for the nation. Intended to accelerate progress in appropriate medicine taking, this new agenda calls for an increased focus on the overlooked challenge of multiple chronic conditions where the need for patient adherence is most acute. It also offers realistic solutions for improving medication adherence through improved care coordination, harnessing new technology and supportive government policies.

Multiple Chronic Conditions and Medication Adherence: The Perfect Storm

Despite the time and resources now devoted to improving prescription medicine adherence in the U.S., a critical and pervasive public health issue threatens to undo the progress that has been achieved to date: how to enhance adherence among the growing number of Americans with multiple chronic conditions who take more prescription and OTC medicines than any other group, are seen by different prescribers, and often grapple with taking complex cocktails of different medicines correctly. The following is a look at the extent and impact of multiple chronic medical conditions today and what is in store in excess morbidity, mortality and rising health care costs if action is not taken quickly to improve patient adherence among Americans coping with two or more chronic illnesses and disorders.

DEFINING THE PROBLEM

In simple terms, multiple chronic medical conditions (MCC) are defined as two or more concurrent chronic conditions,[25] where the symptoms may be continual or intermittent and the patient has these conditions for extended periods and often for life. This includes chronic diseases, such as arthritis, asthma, cancer, cardiovascular disease, diabetes and hypertension, as well as mental illnesses, dementia and cognitive impairment disorders and substance abuse and addiction disorders.[26] Driven by the aging of the U.S. population and such risk factors as increased obesity, the number of people with multiple chronic conditions is increasing at a rapid pace.[27] What these multiple conditions have in common is that they all require ongoing medical attention, extensive medicine use, and a multidisciplinary approach to chronic disease management.

How extensive is the problem? An increasing body of evidence finds that the prevalence of multiple chronic conditions is on the rise along with polypharmacy, defined as the use of multiple medications.[28] According to the latest research findings:

+ The prevalence of MCC is increasingly steadily—from 21.8% of the adult population in 2001 to 26.0% in 2010 [29]
+ Today, an estimated one in four Americans has MCC, including one in 15 children [30]
+ In fact, due to the aging of the U.S. population, it is projected that 81 million seniors will have MCC by 2020, up from 57 million in 2000 [31]
+ The heaviest burden of MCC is among Americans aged 65 and older, where 2012 data from the Centers for Medicare and Medicaid Services (CMS) finds that 68% of Medicare beneficiaries are being treated for at least two concurrent chronic illnesses—or 21.4 million individuals. This translates into 32% who have two to three conditions, 23% who have four to five conditions, and 14% who have six conditions or more.[32]
+ As a result, the concurrent use of multiple medications to manage coexisting chronic conditions (polypharmacy) is a common occurrence. According to data from the Centers for Disease Control and Prevention (CDC), 76% of Americans aged 60 and over use two or more prescription drugs and 37% take five or more.[33] Other data find that 42% of patients aged 65 and older took five or more prescription drugs in 2012 with the average number of prescription medicines increasing from five to seven at age 85.[34]
+ Further, there is a direct link between the number of medications taken by a patient and the risk of adverse drug reactions. Studies document a rise in the incidence of drug reactions from 6% in patients taking two

medications a day to as high as 50% in patients taking five drugs a day.[35]

Adding to the impact of these statistics, patients with multiple chronic medical conditions are particularly vulnerable to suboptimal care.[36] According to CMS estimates, the average Medicare patient diagnosed with one chronic disease sees up to four different doctors while patients with five or more concurrent diseases see an average of 14 different physicians.[37] Compounding the problem, as the number of different providers increase, patients are likely to have substantially poorer outcomes and higher costs for care. Documenting this situation, a 2008 paper published in *Health Affairs* found that Americans with chronic illnesses are more likely than residents of seven other industrialized countries to report not having test results at the time of scheduled appointments, saw specialists who were not aware of their medical history, had primary doctors who did not seem to be informed about care the patient had received recently from a specialist, and were not counseled about their medications when they were hospitalized.[38]

What these findings make clear is that multiple chronic conditions are a serious and growing public health challenge, both in terms of the number of Americans living with concurrent diseases and disorders and the poor outcomes associated with MCC. As the number of chronic conditions in an individual increases, the potential risks may multiply for disease complications, adverse drug events (ADEs), reduced functional abilities, a lower quality of life, and even death.[39,40]

POPULATIONS AT GREATEST RISK

When it comes to multiple chronic conditions, prevalence varies significantly by age, sex and ethnicity. Minorities, particularly non-Hispanic black adults, are disproportionately affected with 27.9% of adults age 45 to 64 and more than half (51.6%) of adults 65 and over suffering from two or more chronic conditions.[41] CDC also finds a higher prevalence of MCC among women[42] and studies show an association between income level and multiple chronic conditions. According to one study, an adult living in poverty is twice as likely to have multiple chronic conditions as an adult with income at 400% the poverty level,[43] which translates into $45,960 a year.[44]

But the major burden of multiple chromic conditions is borne by Americans aged 65 and over, where the prevalence and costs of have far-reaching implications for the health care system. Almost two-thirds of Medicare beneficiaries with six or more chronic conditions required hospitalization compared to only 4% of beneficiaries with no or one chronic condition.[45] These individuals are also at high risk for medication-related problems resulting from the many drugs and complex regimens prescribed to manage their multiple diseases. As a consequence, poor adherence is a critical concern because of the increased potential for inappropriate drug use, under-use of effective treatments, medication errors, drug-drug and drug-disease interactions and adverse drug reactions. Studies show that between 25% and 75% of older adults do not take their medications as prescribed[46] and nonadherence becomes more marked as these individuals age, are diagnosed with more chronic diseases, and have increased physical and cognitive challenges that may impact medicine use.

THE MOST COMMON CHRONIC MEDICAL CONDITIONS

Although there is extensive data on the prevalence of individual chronic diseases in the U.S. population, less is known about the extent of multiple chronic conditions and the most common combinations of these diseases. To address this knowledge gap, researchers at the Centers for Disease Control and Prevention (CDC) utilized data from the National Health Interview Survey (NHIS) to determine the extent to which adults have combinations of the most prevalent chronic diseases (hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, weak or failing kidneys, chronic obstructive pulmonary disease, or current asthma) and to identify the most common combinations of these diseases, known as dyads (combinations of two chronic conditions) and triads (combinations of three conditions).

Published in 2010, CDC cited the combination of hypertension and arthritis as the most prevalent MCC dyad for both men and women.[47] For men and women in most age groups the most prevalent triad was having arthritis, diabetes and hypertension.[48] With the CDC data as the benchmark, in 2011, CMS categorized the extent of multiple chronic conditions among Medicare beneficiaries diagnosed with 15 common chronic diseases and disorders with plans to update these estimates on a yearly basis. Important findings from this analysis include:[49]

+ The most common chronic conditions among Medicare beneficiaries are high blood pressure (58%), high cholesterol (45%), heart disease (31%), arthritis (29%) and diabetes (28%)

+ In the case of stroke and heart failure, 55% of beneficiaries with these conditions had five or more additional chronic conditions

+ Most chronic conditions are more prevalent among dual eligible beneficiaries who qualify for both Medicare and Medicaid benefits. Compared to Medicare beneficiaries, those who are dual-eligible are 1.7 times more likely to have six or more chronic conditions

CMS also identified the most common combinations of chronic medical conditions and their prevalence among the Medicare population.[50] In 2012, more than half of beneficiaries with MCC were being treated concurrently for high cholesterol and hypertension (52.9% prevalence). Other common dyads were high cholesterol and ischemic heart disease (36.2% prevalence); high cholesterol and diabetes (32.3% prevalence); high cholesterol and arthritis (31.1% prevalence); and ischemic heart disease and hypertension (29.6% prevalence).

Among the most common triads, CMS found the combination of high cholesterol, hypertension and ischemic heart disease is the triad affecting most seniors (33.7%) followed by high cholesterol, hypertension and diabetes (29.9%); high cholesterol, hypertension and arthritis (25.7%); high cholesterol, diabetes and ischemic heart disease (21.5%); and high cholesterol, ischemic heart disease and arthritis (19.3%).

While these findings identify those combinations of diseases where patients are most likely to be taking a variety of different drugs, only recently has there been an attempt to improve medical decision-making and the coordination of care for Americans living with MCC. Specifically, in 2012, the American Geriatrics Society published ***Patient-Centered Care for Older Adults with Multiple Chronic Conditions: A Stepwise Approach from the American Geriatrics Society***, new guidance for treating older adults with three or more diseases. This guidance calls for a "stepwise approach" to making complex clinical management decisions, starting by eliciting and incorporating patient preferences and choosing therapies that optimize benefits and minimize the harm for older adults with MCC.[51] Building on these principles, treating physicians will benefit from the development of updated treatment guidelines where information is included on the most common comorbidities clustering with the incident chronic condition. They will also benefit from new communications tools that will help guide the discussion with patients and family caregivers about different treatment regimens and prioritizing among treatment goals.

PAYING THE PRICE FOR MULTIPLE CHRONIC CONDITIONS

It is now estimated that caring for approximately 27% of Americans with MCC accounts for 66% of the nation's health expenditures[52] and is a major source of Medicare spending. Of the $300 billion Medicare spent in 2010 on health care, the average cost per beneficiary was $9,738. However, beneficiaries with four to five chronic conditions cost an average of $12,174 while those with six or more chronic conditions—roughly 14% of the Medicare population—cost $32,658 or three times the national average.[53] As a result, the price tag for treating those patients with six or more MCC was over $140 billion compared to $20 billion for those without MCC.[54]

What is behind these staggering costs is a steady rise in the utilization of health care services as the number of chronic medical conditions increases. Of the $140 billion spent in 2010 on the care

of the 14% of Medicare beneficiaries with six or more chronic diseases, CMS calculated that almost two-thirds (60%) of these patients required hospitalization, accounting for 55% of Medicare's total spending on hospitalizations. These same individuals were responsible for 63% of Medicare's post-acute care costs. Further, patients with six or more chronic conditions had hospital admission rates that were approximately 30% higher than other Medicare beneficiaries.[55]

Adding to these findings, CMS reported that 70% of Medicare beneficiaries with six or more chronic conditions went to the emergency room in 2010 and over one-quarter had three or more ER visits. In addition, 92% of this population saw a physician in 2010 and almost half (46%) had 13 or more visits.[56] In all these situations, poor medication adherence is commonplace and puts patients at higher risk for medication-related problems and the costly emergency room visits and hospitalizations that can result.

Recognizing the impact of multiple chronic conditions on rising health care costs, in 2009, the Department of Health and Human Services (HHS) convened a departmental working group to coalesce the HHS agencies around programs and initiatives focused on improving the health status of individuals living with multiple chronic conditions. This led to the development of the ***HHS Multiple Chronic Conditions Strategic Framework***, published in the Federal Register on May 19, 2010, which lays out four national goals for reducing the burden of MCC: 1) foster health care and public health system changes to improve the care of people with MCC; 2) maximize the use of proven self-care management and other services among patients with multiple conditions; 3) provide better tools and information to health care, public health, and social services workers who deliver care to patients with MCC; and 4) facilitate research to fill knowledge gaps about, and interventions and systems to benefit, individuals with multiple chronic conditions.

To achieve these goals, the HHS strategic framework outlines a range of strategies, including the need to develop payment reforms and incentives for healthcare professionals, utilize health information technology more effectively and promote training for healthcare professionals. The framework further advances the adoption of Medication Therapy Management (MTM) programs and new care coordination models that will actively manage drug therapy and identify, prevent and resolve medication-related problems. Of great importance is also issuing updated clinical practice guidelines that address the treatment of common comorbid conditions and equipping patients and health professionals with the decision-making tools that will guide evidence-based decision-making on medication regimens.

With this national framework as the foundation, now is the time for a focused effort that will elevate the significance of medication adherence as a national strategy for reducing the burden of multiple chronic conditions and ensure that adherence priorities are integrated throughout the health care system.

Key Factors Behind Poor Adherence:
What's New?

A decade after the World Health Organization (WHO) identified poor medicine adherence as the leading cause of preventable morbidity and mortality, it is clear that numerous behavioral, social, economic, medical and policy-related issues are contributing to this pervasive and costly problem. In fact, a recent review associated medication nonadherence with more than 100 factors,[57] underscoring the need to address adherence across the continuum of care.

To better understand the interplay of the factors affecting medication adherence, NCPIE's 2007 national action plan classified the key elements underlying nonadherence into four broad groups: medication-related, patient-related, prescriber-related and pharmacy-related. Six years later, these categories remain the major barriers to optimal medication adherence. However, with the increasing problem of a fragmented health care system, especially as it applies to the growing number of older adults being treated for multiple chronic conditions, NCPIE has identified the transition of care from the hospital to the outpatient setting as a significant factor limiting medicine adherence. The following assesses the roles these factors play in adherence and the challenges they represent.

MEDICATION-RELATED FACTORS

For an increased number of Americans, one of the most significant challenges in taking their medicines as prescribed is the complexity of the drug regimen. Research during the past several decades indicates that, depending upon their conditions and the complexity of the regimens required, as many as 40% of patients fail to adhere to treatment recommendations and this number can be as high as 70% when the treatment regimen is very complex or requires significant lifestyle changes.[58]

Behind these statistics are several medication-related factors, such as the number of daily doses, where studies show that patients on once-daily regimens are much more likely to be adherent. This includes the findings of a comprehensive review of data published in 2009, which reported that studies comparing adherence rates among patients on once-daily and twice-daily regimens found 1% to 44% more adherent days among those taking one pill a day.[59] Adherence also decreases if the administration of a medication requires the mastery of specific techniques, as with injections and inhalers, or if the drug must be taken at a separate time than other medications or with or without food.

At the same time, poor adherence is directly related to the number of medications a patient is prescribed. A special concern is multi-drug use (polypharmacy) among older adults, where poor adherence rises in proportion to the number of drugs and daily doses prescribed. The consequence is progression of disease and more hospital admissions. One study showed that 11% of hospital admissions involving people aged 65 years or older were the result of nonadherence and this reached 26% in those aged 75 years or more.[60] Moreover, taking multiple medications for different conditions is associated with serious drug interactions and the so-called "prescribing cascade,"[61] in which a prescriber fails to recognize the medical event as an adverse drug reaction, and prescribes an additional drug to treat the problem, adding further to the risk of drug-related problems.

Compounding these challenges, many patients, and especially those with multiple chronic medical illnesses, are seen by more than one physician or other prescriber, each of whom may be prescribing one or more medications for a specific disease. Unless there is a primary care provider, pharmacist, or trained caregiver who coordinates these medication regimens, many patients find it difficult to understand, remember, and reconcile the instructions from their different physicians. This not only increases the potential for poor medicine adherence, but also increases the risk of adverse

drug events (ADEs), including ADEs that result from drug-drug interactions.[62]

Taken together, these findings underscore why intensified action is needed to address the medication-related barriers to improved medicine adherence. Among the critical challenges are more resources to improve effective communication between health professionals and patients, physician education and training on reducing the complexity of treatment regimens, and the accelerated adoption of innovative models of medication management, such as Medication Therapy Management (MTM), which has been shown to have a positive impact on patient outcomes. At the same time, the rising prevalence of multiple chronic conditions and the challenges for patients taking five or more prescription medicines a day demands top-to-bottom improvements so care is coordinated across specialties and an multidisciplinary healthcare team guides and supports optimizing therapeutic outcomes.

PATIENT-RELATED FACTORS

What causes patients not to fill up to 20% of new prescriptions and over 50% of the patients who fill a new prescription to discontinue their medication within the first year of treatment? The reality is that patients' decisions to take their medicines are driven by their experiences, perceptions and understanding of their disease(s). Moreover, the resolve to be adherent is unique for each medication and shaped by such factors as the patient's socioeconomic status, whether he or she lives alone, the patient's concerns about medication affordability, whether the individual has prescription drug coverage, the patient's relationship with his or her healthcare provider(s), and the potential impact of depression and cognitive impairment.[63]

In response to the growing need to improve medication adherence, researchers have classified nonadherence into two overlapping categories: intentional and unintentional. Intentional nonadherence, as the term implies, involves the conscious choice of a patient not to fill a prescription, take one or more medicines as prescribed or to discontinue therapy. Intentional nonadherence is a growing concern to clinicians, health care systems, and other stakeholders because of its prevalence, especially among patients with chronic conditions requiring long-term therapy, such as diabetes, cardiovascular disease and hypertension. According to recent estimates, approximately 15% of patients do not fill a new prescription and of those who do fill a new prescription, roughly 50% discontinue therapy in the first six months. [64,65]

To understand what is behind deliberate nonadherence, research over the past 20 years has consistently shown that intentional nonadherence is driven by patient beliefs about the severity of the medical condition and the perceived need for treatment. [66] Nonadherence rates have been found to be more than 1.5 times higher among patients who did not perceive their disease as severe or a threat. [67] In addition, a growing body of evidence associates patients' attitudes about their treatment, disease, and prognosis as well as their experiences with medications with the conscious choice not to take medicines as prescribed.[68] These include:

+ Uncertainty or disbelief about the effectiveness of treatment
+ The belief that once the symptoms improve and the patient "feels better" there is no need to continue treatment
+ Reluctance to take medications for symptomless conditions (e.g. statins to lower blood cholesterol levels)
+ Fear of side effects
+ Fear of needles and becoming drug dependent
+ Lack of confidence in the ability to follow the medication regimen
+ Lack of positive motivations and incentives to make necessary changes in behavior
+ Concerns about the safety and risks associated with a particular medicine

Also contributing to the intentional nonadherence are the costs of some medications, which negatively influence patient beliefs about the need for the

medication and potential side effects. Since NCPIE's 2007 report addressed these patient perceptions, several studies have examined this issue. This includes a 2011 research paper where researchers used data from a survey of 27,302 patients participating in the Harris Interactive Chronic Illness Panel to determine how patients' beliefs about the necessity of treatment and treatment side effects influence cost-related nonadherence (CRN). According to the findings, substantially more low-income than high-income patients worried about the side effects of their prescriptions (20% versus 10%) and more than three times as many low-income patients agreed they are likely to experience negative side effects from their medications (17% versus 5%).[69]

Reinforcing the problem, cost-control measures implemented by payers and health systems, such as high out-of-pocket costs in the form of copayments or coinsurance for medications, can have the unintended effect of deterring adherence. Among the evidence is a 2010 study of retired public employees in California identified as having multiple chronic conditions where estimated hospital spending increased by almost $2.00 for every dollar in estimated savings realized on prescription drugs and office visits as a result of higher prescription copayments.[70] In addition, a 2011 study of cancer patients taking oral oncology therapy found that abandonment of treatment rose more than four-fold when out-of-pocket costs exceeded $500, compared to out-of-pocket costs of $100 or less.[71] Conversely, reducing cost-sharing barriers for patients increases medication use and improves adherence. Studies suggest that medication usage increases up to 20% and adherence improves when patients get drug insurance coverage.[72]

In the case of unintentional nonadherence, which is associated with between 20% and 50% of nonadherence prevalence,[73] patients fail to take their medicines as prescribed due to such factors as forgetfulness, carelessness, lack of reminders and transportation challenges.[74] However, new research now finds that unintentional nonadherence is also predicted by medication beliefs, chronic disease, and socio-demographics. This includes a large study of adults with asthma, hypertension, diabetes, hyperlipidemia, osteoporosis, and depression where researchers attributed high rates of poor adherence (62% of patients forgot to take a drug, 37% ran out of their medicine and 23% were careless in how they took their medication) with such predictive factors as a lower perceived need for medications, medication affordability problems, low self-rated health, and younger age.[75] These findings are significant because they suggest that unintentional nonadherence may be an early warning sign of later intentional nonadherence, providing health professionals with the cues needed to address patients' underlying medication beliefs.

Also linked to unintentional nonadherence is the serious challenge of low health literacy and limited English language proficient, which greatly affect the ability of patients to understand and follow medical recommendations. According to the Institute of Medicine (IOM), more than 90 million adult Americans lack the literacy skills to understand, question and make informed decisions in today's health care environment.[76] Examining the impact on medication adherence, one large study of over 2,500 patients found nearly one third had marginal or inadequate health literacy. Of these, 42% misunderstood directions for taking medications on an empty stomach, 25% misunderstood the scheduling of their next appointment, and nearly 60% were unable to read and understand a typical informed consent document.[77]

PHYSICIAN AND CARE TEAM CHALLENGES

Prescriber-Related Factors

Physicians and other prescribers (physician assistants and nurse practitioners) who treat patients with chronic diseases can play a key role in addressing medication adherence: not only do they initiate the prescription process, but they can do so within the bond of a trusting clinician-patient relationship.[78] Looking specifically at physicians, adherence rates are nearly three times higher when patients trust their doctor and believe there is open communication about their treatment regimen.[79] Conversely, the risk for nonadherence increases by 19% among patients whose physicians communicate

poorly.[80] Yet, despite this evidence, the reality is that few physicians are actively involved in promoting medication adherence.

Why is this the case? One major reason is the time constraints placed on physicians, many of whom see a large volume of patients each day and have limited time to discuss medication adherence. Research shows the average patient, if allowed to speak freely, would initially discuss disease management with his or her physician for less than two minutes. [81] Yet, most physicians allocate between 7.6 and 17.6 minutes for a primary medical consultation with a patient[82] and spend only 49 seconds discussing all aspects of a newly prescribed medication.[83] The result is that physicians convey full medication dosing directions for less than 60% of all medications they prescribe and inform patients about the duration of intake and adverse effects only about a third of the time.[84] Moreover, patient surveys suggest that physicians provide no verbal instructions for 19% to 39% of prescriptions and medication dosing directions for only 50% to 62% of prescriptions.[85]

Physician attitudes and even their own adherence behaviors are also major stumbling blocks to counseling patients on medication adherence. In 2007, NCPIE identified as a causal factor for nonadherence the tendency of physicians to overestimate the extent to which their patients adhere to a medication regimen. Six years later, these incorrect assumptions persist. A study of 2,000 physicians prescribing osteoporosis medications to postmenopausal women revealed that while doctors estimated 69.2% of their patients were adherent 80% of the time, pharmacy claims data indicated only 48.7% of these patients took their medicines as prescribed after 12 months.[86] Another barometer of physician attitudes is the extent to which clinicians are adherent themselves. In a self-administered survey of 435 physicians and nurses prescribed medications for acute and chronic illnesses, only about 80% of clinicians reported properly taking their prescription medicines.[87]

Equally significant is the problem of poor communication between the clinician and the patient, which compromises the patient's understanding of his or her disease, its potential complications, and the importance of medication adherence. Problems cited in the literature are physicians using medical jargon, relying on verbal instructions and not providing supplementary educational materials that could aid patient comprehension, and attempting to cover a wealth of information in a limited amount of time.[88] Studies also show that many physicians under-recognize low health literacy among their patients and therefore, impart health information and basic medical instructions these patients can't understand.

Finally, there is the challenge of appropriate pharmacological management in patients with multiple chronic conditions where the need for care coordination is essential. In fact, as early as 2001, a report by the Institute of Medicine (IOM)—*Crossing the Quality Chasm: A New Health System for the 21st Century*—called for the adoption of the Chronic Care Model to manage multiple chronic conditions and advocated for physicians to play a greater role in motivating patients to adhere to necessary therapies.[89] With this goal in mind, researchers have studied the range of adherence interventions where physicians can have the greatest impact, leading to the development of the mnemonic *SIMPLE*,[90] which advances six categories of physician-led adherence interventions. Specifically, the *SIMPLE* model calls on physicians to:

+ **S**implify the regimen;
+ **I**mpart knowledge (through clear instructions and shared decision-making);
+ **M**odify patient beliefs and human behavior (by addressing patient concerns about specific medications);
+ **P**rovide communication and trust (through active listening, clear, direct and thorough information, and involving patients in treatment decisions);
+ **L**eave the bias (by taking time to overcome cultural and language barriers); and
+ **E**valuate adherence (by asking patients simply and directly if they are following their drug regimen).

Although it is clearly necessary for physicians, other prescribers and pharmacists to be proactive in educating and counseling patients about taking medicines as prescribed, there is a strong case to be made for surrounding the physician with a care team comprised of pharmacists, nurses and other skilled practitioners who can oversee, guide and support medication communication and adherence. Today, three out of five U.S. physicians practice in groups of fewer than six doctors, employing few staff.[91] Thus, the medication adherence services provided by care teams can be an important part of the solution to the adherence problem. As traditional medical practices are reconstituted to serve as accountable care organizations (ACOs) and other emerging care models, this could provide more opportunities for in-house (or even virtual) team-based care to promote medication management.

Pharmacy-Related Factors

Pharmacists play a key role in advancing patients' understanding of their medications, and of the need for adherence. Not only do they have specialized training in pharmacology, pharmacokinetics, and drug-drug and drug-disease state interactions, but pharmacists have ongoing contact with prescribers and are the last health professional a patient typically sees before beginning medication therapy.

Accordingly, a growing body of research demonstrates an expanded role for pharmacists as the "medication experts" in counseling patients on appropriate medicine use. For example, in a 2012 study where more than 5,000 patients with diabetes had face-to-face meetings or telephone counseling with their pharmacists, adherence rates improved and generated a return on investment of approximately $3 for every $1 spent on pharmacist-driven interventions.[92]

Pharmacists are also the health professionals who specialize in Medication Therapy Management (MTM), programs where they conduct a comprehensive medication review (CMR) of all medicines taken by the patient, including over-the-counter drugs and dietary supplements, and formulate a medication treatment plan for the patient. Demonstrating the ability of MTM programs to yield improved patient outcomes, one study reported that pharmacist-initiated MTM services delivered through community pharmacies over a seven-year period saved $7.1 million and improved the health outcomes of nearly 24,000 patients.[93]

The use of MTM in improving adherence is especially noteworthy because a number of Medicare beneficiaries enrolled in the Medicare Part D prescription drug program are eligible for free MTM services delivered through their drug plan. In fact, since Part D was first implemented in 2006, CMS expanded the eligibility and range of MTM services available to eligible enrollees. But despite these efforts, the number of Part D participants benefiting from MTM remains low. Out of 28 million Americans who were enrolled in Medicare in 2010, CMS reported that only 2.8 million—or about 10% of Medicare population—participated in MTM, significantly less than the 25% of the Part D population that CMS predicted a few years ago.[94]

However, major changes now underway through the Patient Protection and Affordable Care Act (ACA) are setting the stage for the increased adoption of MTM programs, including improvements to the Medicare MTM benefit. At the same time, the retail pharmacy industry is responding by providing more patient services while both government and private payers have indicated their commitment to pay for medication management and adherence interventions—all of which have the potential to accelerate the use of medication management programs.

But even with these opportunities, a number of pharmacy-related barriers continue to impede greater use of pharmacist-led MTM and adherence interventions. Among these most common obstacles are compensation, lack of additional staffing, and poor access to patients' medical information.[95] In addition, a recent examination of the nature and extent of medication adherence education in U.S. colleges and schools of pharmacy finds that advanced concepts in medication adherence, such as adherence intervention strategies, are still not adequately covered in pharmacy curriculums.[96] Changing this situation calls for designating medication adherence as a core competency within the pharmacy curriculum and including skills-

based competency in adherence as a measure for accrediting schools of pharmacy.

Besides addressing these barriers, stakeholders support changes in how prescriptions are dispensed to patients where the pharmacist will play a greater role in improving medication adherence. One recommendation from NEHI is to move towards a "pharmacy home," a strategy developed by North Carolina's Medicaid program that gives patients a single pharmacy point of contact for filling prescriptions so they don't have to visit multiple pharmacies to fill different prescriptions. Another and related recommendation is for pharmacies to adopt refill synchronization, which allows patients to fill their different prescriptions at one time and therefore, reduce the number of visits they must make to the pharmacy.[97] According to NEHI, these kinds of actions will improve the "medication ecosystem," increasing care coordination between prescribers and dispensing pharmacies and ensuring patients with multiple medications receive coordinated and consistent care.

Factors Affecting Transitions of Care From the Hospital to the Out-Patient Setting

For all patients except those being transferred to a continuing care facility, discharge is a period of transition from hospital to home that involves a transfer in responsibility from the inpatient provider or hospitalist to the patient, his or her caregivers and the primary care physician.[98] During this transition, prescription medications are commonly altered as patients are instructed to discontinue some medicines, switch to a new dosage schedule for certain drugs, or begin taking new medications.[99] As such, this period can be a vulnerable time for patients and caregivers, especially when trying to comply with complex discharge instructions that fail to provide important details about changes in their medication regimen.

Particularly now, when hospitals are treating and admitting a growing number of sicker patients who require more complex treatment regimens, ineffective care coordination and inadequate communication about medication adherence, can have serious consequences, including medication errors and more frequent hospital readmissions.[100] In fact, studies estimate that about half of adults who have been hospitalized experience a medical error after discharge,[101] and 19%–23% suffer an adverse event, most commonly an adverse drug event ADE.[102,103] Moreover, half of these ADEs are considered preventable and are the direct result of a breakdown in communication between the hospital team and the patient or the primary care physician.[104]

A major factor behind this growing challenge is poor communication between the hospital team and the outpatient healthcare providers about changes in the patient's medication regimen at the time of discharge, which increases the risk of post-discharge adverse drug events. Studies show that one in five hospitalizations is complicated by post-discharge adverse events and 66% of these adverse events are related to medications.[105] However, the situation is especially acute among older patients with multiple chronic conditions where unmanaged polypharmacy is directly associated with hospital readmissions. Demonstrating the scope of the problem, a review of the records of 142 older patients discharged from a hospital between November 2008 and October 2009 found these patients on average were prescribed 13.5 drugs at discharge while almost a fourth (23.2%) were prescribed more than 16 medications. Of these individuals, 46 were readmitted to the hospital within 30 days.[106]

Also contributing to the problem is the quality of the discharge instructions patients receive when leaving the hospital, which may not include complete information about the names, dose and frequency of the medication regimen or clear instructions about discontinuing some medications previously prescribed. Moreover, because hospital personnel often over-estimate patients' knowledge of medication management,[107] inpatient providers often use medical jargon when speaking to patients, rely on verbal instructions that are often unclear, and don't allot sufficient time for patients to ask questions. The consequences of inadequate and confusing discharge instructions are especially damaging for patients with low health literacy skills who know less about their chronic illnesses and how to manage their diseases. Accordingly, low

health literacy has been linked to increased use of emergency department services, a higher risk of re-hospitalization and higher health care costs.[108]

To address some of these problems, in February 2013 the American Medical Association (AMA) issued a report outlining five responsibilities that physicians in outpatient setting should consider when caring for patients who recently completed a hospital stay. The report, entitled ***There And Home Again, Safely*** calls on physicians to assess the patient's health, set goals to determine desired outcomes, support self-management to ensure the patient has access to resources, oversee the management of needed prescriptions, and utilize care coordination to bring together all members of the healthcare team.[109]

While AMA's recommendations are a positive step forward, improving patient care during the transition from the hospital to the outpatient setting is the joint responsibility of the hospital team and the patients' physicians and requires new approaches. Among the approaches to consider are ensuring patient discharge summaries contain complete information and are sent to the patient's primary physician quickly, as well as to the patient and family; reconciling the prescribed medication regimens before the patient leaves the hospital; improved communication between inpatient and outpatient physicians; and effective communication with patients, and their family members, or caregivers about medication adherence and follow-up care. Only by adopting these strategies will patient care improve during the critical transition from hospital to home, and there will be fewer medical errors and re-hospitalizations in the post-discharge period.

The Triggers for Action

Today, a number of developments are changing the delivery of health care with the potential to enhance appropriate medicine taking among patients. Towards this end, NEHI categorized seven broad mega-trends that provide significant opportunities to improve patient medicine adherence: 1) improved care coordination between primary care physicians, hospitals and pharmacists; 2) payment innovations that will incentivize healthcare providers to counsel patients on appropriate medication use; 3) health care information technology, including electronic medical records and e-prescribing; 4) quality standards and measures that are necessary for creating performance goals that can be rewarded with payments; 5) patient engagement tools that inform and motivate patients to take their medicines as prescribed; 6) product innovations, such as user-friendly packaging, that make adherence easier; and 7) research to identify best practices and ways to integrate adherence into clinical practice.

With these mega-trends as the foundation, the following is an assessment of the important changes in health care delivery and new policy initiatives that offer significant opportunities to improve medication adherence.

1. State of the Art Medication Management Programs

A range of state-of-the-medication management programs now exist, providing valuable insights about approaches that manage costs, improve medication adherence and close gaps in care for people with chronic diseases. One of the best known is the Asheville Project®, begun in 1996 as an effort by the City of Asheville, North Carolina, a self-insured employer, to provide education and personal oversight for employees with chronic health problems such as diabetes, asthma, hypertension, and high cholesterol. Through this model, employees with these conditions are given intensive education through the Mission-St. Joseph's Diabetes and Health Education Center and teamed with community pharmacists who serve as coaches to help patients set treatment goals and provide information on medication adherence.

Based on the measurable improvements achieved for the City of Asheville—including improved A1C levels in employees with diabetes, fewer sick days, and lower total health care costs—today, many other employers and communities across the country are using this model. Moreover, the Asheville Project® was the genesis for the American Pharmacists Association (APhA) Foundation to launch the Diabetes Ten City Challenge (DTCC), which operated between 2005 and 2009 and involved 30 employers in 10 cities who provided employees, dependents and retirees a voluntary health benefit, waived co-pays for medications and supplies and helped these individuals manage their diabetes on a day-to-day basis with the help of specially-trained pharmacist "coaches." According to a 2009 report, employers realized an average annual savings of almost $1,100 in total health care costs per patient through the program, while participants had improved clinical outcomes and saved an average of almost $600 per year.[110]

Building on these models, a number of newer approaches that harness technology are reaching more people with chronic diseases in innovative ways. One such approach is a nationwide medication therapy management program provided by Mirixa Corporation, which utilizes a unique technology platform and a pharmacy-based patient care network of more than 40,000 pharmacies to identify at-risk patients and encourage standardized care. Another model is the CVS/Caremark Pharmacy Advisory Program, which launched a Pharmacy Advisor program for diabetes in 2011 and recently started a program for cardiovascular care, initially focusing on four conditions: hypertension, high cholesterol, coronary artery disease and congestive heart failure. Using pharmacy claims data to identify gaps in care or medication issues, the program utilizes local pharmacists in the company's retail stores to contact the patients and follow up with either face-to-face counseling or a phone consultant based on the person's preference. According to recent

research published in Health Affairs, the Pharmacy Advisor program for diabetes increased both patient adherence rates and physician initiation of prescriptions.[111]

2. Expanding Medication Therapy Management Through Medicare Part D

Based on the successes of the Asheville Project® and other community-based medication management programs, several new policy developments have the potential to accelerate this progress. This includes two initiatives intended to lower costs of prescription drugs for participants enrolled in the Medicare Part D prescription drug program and to increase access to free Medication Therapy Management (MTM) services for those who qualify.

One important provision of the Patient Protection and Affordable Care Act (ACA) is to close the gap in drug coverage known as the "donut hole," which occurs when non-subsidized enrollees and their drug plans spend a certain amount of money for covered drugs. Before 2011, when this provision took effect, an individual in the "donut hole" had to pay the full costs of his or her prescription drugs, which was a substantial problem for many Part D participants. In 2012, more than 3.5 million Part D enrollees (who did not receive a low-income subsidy) experienced this coverage gap.[112] To address this situation, the ACA phases in a gradual reduction in beneficiary spending during the donut hole period by providing Part D participants with discounts on their medications until 2020 when the coverage gap will be closed. In 2013 and 2014, this means that beneficiaries who hit the donut hole will pay 47.5% of their plan's cost for covered brand-name prescription drugs. The amount seniors pay for generic drugs during the coverage gap will also decrease each year until 2020 when beneficiaries will pay 25% of the costs.[113]

Through the ACA, CMS will also make improvements to the Medicare Medication Therapy Management benefit, including funding new projects through the recently established Center for Medicare & Medicaid Innovation (CMMI) to expand innovative care models that incorporate MTM services. Targeted at high-risk, high-cost Medicare beneficiaries with a variety of chronic medical conditions, these services are designed to optimize therapeutic outcomes and reduce the risk of adverse drug events by improving medication use. According to a recently released CMS report using 2010 data on Medicare beneficiaries with congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD), MTM programs improved adherence to drug therapy, reduced hospitalizations and emergency room visits, accrued $490 less in all-cause hospitalization costs in beneficiaries enrolled in MTM programs versus those not enrolled in MTM programs, and netted approximately $4–$5 less per month in total prescription drug costs.[114] Starting in 2013, CMS will also require that when providing MTM services to Part D participants, drug plans must use a standardized format to prepare summaries of patients' comprehensive medication reviews and medication action plans. It is hoped that such simplicity will benefit MTM patients in terms of overall communication and documentation.

Beyond these policy changes, more than 75% of states have enacted legislation or modified state pharmacy practice regulations confirming the role of pharmacists in providing medication therapy management services.[115] Another development is the introduction in the U.S. Senate and House of Representatives of the Medication Therapy Management Empowerment Act of 2013, which seeks to provide MTM services to additional Medicare Part D beneficiaries with chronic medical conditions.

3. Advancing Medication Adherence Through the Patient-Centered Medical Home Model

The medical home model, also known as the patient-centered medical home (PCMH), is a health delivery model that relies on a team of providers—such as physicians, nurses, nutritionists, pharmacists, and social workers—to provide comprehensive and continuous medical care to patients. Introduced as a concept in the 1960s by pediatricians caring for children with chronic illnesses, the medical home model picked up steam in 2004 when the American Academy of Pediatrics (AAP) called for the

establishment of "a personal medical home for each patient, ensuring access to comprehensive, integrated care through an ongoing relationship."[116] Today, the model has been endorsed by the largest primary care physician organizations in the U.S.—the American Academy of Family Physicians, American College of Physicians, the American Osteopathic Association, as well as AAP—and shown to integrate all aspects of a patient's health care with the potential to improve physical health, behavioral health, access to community-based social services and management of chronic conditions.[117]

A distinguishing feature of the patient-centered medical home is the use of health information technology, such as electronic health records (EHRs), disease registries, personal health record systems and clinical decision support, which facilitate communication among providers, healthcare teams and patients and improve counseling on medication adherence. To expand the use of these innovations, the ACA includes provisions, such as the State Medicaid health (medical) home option, which support state-based medical home programs to manage chronic disease among the Medicaid population. This provision offers federal support for improving the integration and coordination of comprehensive health care services for Medicaid beneficiaries with conditions such as asthma, diabetes, heart disease, mental health issues and substance use disorders.

States have also created pilot projects, reformed payment structures, invested in health information technology, restructured Medicaid provider systems, and included the medical home model in service delivery. According to the National Conference of State Legislators, as of April 2013, 43 states had policies promoting the medical home model for certain Medicaid or Children Health Insurance Program (CHIP) beneficiaries.[118] Intended to accelerate the integration of comprehensive medication management within the medical home model, the Patient-Centered Primary Care Collaborative developed a resource guide for individual and group practices that reinforces the need for payment reform to support comprehensive medication management as an essential professional activity for effective integrated care.[119]

4. The Role of Innovative Care Coordination Models

Complementing the expanded adoption of the patient-centered medical home, there is great interest in new approaches that focus on improving the coordination of care for chronically ill patients. This includes two new models have been implemented in a variety of settings that manage a patient's care from one care setting to another, typically from the hospital to home, and are netting significant results.

In the first model, called the Transitional Care Model, eligible patients being admitted to the hospital are assigned a Transitional Care Nurse who conducts a comprehensive assessment of patient and family caregiver needs, coordinates the patient's discharge plan with the family and hospital provider team, implements the plan in the patient's home, assists the patient with management of their care needs, and facilitates communication and the transition to community providers and services. Both a randomized clinical trial and a randomized controlled trial of this particular approach have reported reduced health expenditures and rehospitalizations.[120]

The other model is the Care Transition Intervention program, which utilizes nurse practitioners, nurses and social workers as Transitions Coaches who train the patient and family caregivers on how to manage the patient's medication regimen, understand and utilize the patient's personal health records, respond to any red flags in care and schedule timely follow-up appointments. Under the program, the Transitions Coach makes one home visit and three phone calls to the assigned patient over 30 days, and provides a variety of other services, ranging from role-playing the next medical visit to creating an accurate medication list to support medication reconciliation and adherence. In one randomized controlled trial conducted in a large integrated delivery system in Colorado, the program was found to reduce hospital readmission rates as well as lower hospitalization costs for patients.[121] Moreover, because the Care Transitions Intervention program is adaptable to different care settings and provides support over a 30-day period, more than 750 health care organizations nationally are currently implementing this model.

Separate from initiatives focusing on care transitions, a number of innovative models are addressing medication management specifically. This includes the Veterans Health Administration (VHA) and state Medicaid programs, which have designed programs that use existing health professionals, and especially pharmacists, to counsel patients on appropriate medicine use and act as a bridge between the prescribing physician and the patient. In the case of VHA, the agency has granted prescriptive privileges to more than 2,200 pharmacists through Scope of Practice (SOP) arrangements, giving them authority to prescribe medications or suggest medication changes for patients.[122] Another health system model pioneered by the Fairview Health System in Minnesota involves setting up practice agreements with clinical pharmacists to manage patients' medications. Since the health system was created in 1997, this program has resolved nearly 80,000 drug therapy problems.[123]

Based on the success of these kinds of models, the Center for Medicare & Medicaid Innovation (CMMI) is currently conducting tests of various transitional care approaches with the aim of providing the agency with additional evidence for the effectiveness of care coordination interventions as part of the Medicare program.[124] At the same time, CMS created the Community-based Care Transitions Program (CCTP) in 2011 to award grants to health systems and community organizations that provide at least one transitional care intervention to high-cost Medicare beneficiaries with multiple chronic conditions. Operating through 2015, the CCTP will give preference to community-based organizations that provide care transition interventions to medically underserved populations, small communities and rural areas.[125]

5. Driving Change Through Quality Measures and Payment Innovations

Both the Medicare program and a number of private health insurance plans are experimenting with new payment models where improving medication adherence is a key factor in slowing health care spending and achieving better quality care. Of key importance are new Medicare quality incentives to Accountable Care Organizations (ACOs), many of which are related to the safe and effective use of medications. An ACO is a coordinated group of providers and suppliers of services (e.g., hospitals, physicians, and others involved in patient care) working to provide coordinated high-quality care to the Medicare patients they serve. Because these ACOs will be measured for their ability to slow the growth in spending in the hospital setting (Medicare Part A) and in the delivery of outpatient care (Medicare Part B), these quality measures are viewed as incentives for ACOs to promote medication adherence, since improved medicine use reduces health care costs.

Of equal significance is the Medicare Advantage "Star Rating" system where CMS gives financial bonuses to participating health plans based on 49 measures of quality and performance (in 2013). Through this program, Medicare Advantage plans that get five out of five available "Stars" earn five percent in premium bonuses while 4-Star plans earn four percent and 3-Star plans earn three percent and each of these stars translates into the amount paid for each Medicare beneficiary per month. Moreover, adherence measures are weighted heavily because they are considered "intermediate outcome" measures. As a result, the "Star Rating" program is spurring new attention and investments in medication adherence programs among Medicare Advantage plans.

6. The Promise of Health IT

In its 2007 report, NCPIE documented the many developments in health technology that are making it possible to engage patients more effectively about medication adherence. Among these technologies are electronic reminder devices (automatically sent reminders without personal contact between the healthcare provider and patient) and pharmacy-based adherence messaging programs that encourage patients to refill a prescription and emphasize the importance of following their healthcare provider's instructions.

Since the 2007 NCPIE report, however, there have been significant innovations in health technology, such as electronic pillboxes that can be scanned every time the lid is closed, confirming that the right medications are being taken at appropriate times,

and a number of apps aimed at aiding patients in organizing their medicine are now available on most smartphone platforms. Among the currently marketed features are reminders that can be set for consumption and refills, doses that can be logged and easily accessible information about specific drugs, such as dosages and adverse effects. Some apps also include calendar-based alarm reminders with specific dosage or functionality that integrates medication lists with specific drug information or combines pharmacy and primary care contact information or includes prescription drug discount cards.

Moreover, efforts are under way to integrate smartphones with health-monitoring devices that transmit the output data directly to patients or physicians[126] and to increase "e-prescribing," which replaces prescriptions delivered by paper, phone, or fax and has the potential to reduce the incidence of medications being prescribed but never filled by patients. A recent study reported that a significantly higher proportion of prescriptions are filled when physicians use e-prescribing technology compared to traditional prescribing methods.[127]

To realize the potential of health IT to enhance medication management, a key feature of the Patient Protection and Affordable Care Act (ACA) is to invest in e-prescribing, greater use of electronic health records and clinical decision support systems that can, for example, provide real time feedback of adherence information from refill and other data to primary care providers. At the same time, CMS plans to invest in a series of Independence at Home Demonstration Projects, where physicians, nurses and other health professionals make house calls and use health IT to ensure that patient data is available to all providers and evaluate payment reforms and health delivery solutions that will use health IT infrastructure to better coordinate care for vulnerable patients. While these investments in health IT are only beginning to happen, there is consensus that the widespread adoption of health technology will improve medication management and patient medicine adherence, leading to fewer medical errors and improved quality care.

7. Changes in Graduate Medical and Pharmacy Education

In light of the rapid changes in health delivery, in 2012, the organization that accredits the nation's medical residency programs, the Accreditation Council for Graduate Medical Education (ACGME), announced plans to transform how medical residency programs train future physicians to deliver quality patient care. When ACGME's next accreditation system goes into effect in 2014, each accredited medical residency program must demonstrate that its residents and fellows are skilled in evidence-based medicine, team-based care, care coordination and shared decision-making, all critical to practicing medicine in an increasingly complex health care system. In addition, these physicians-in-training will be evaluated on their competencies in six core areas: patient care, medical knowledge, practice-based learning and improvement, systems-based practice, professionalism, and interpersonal skills and communication.

This move to a new system of outcomes-based graduate medical education represents an important opportunity to integrate medication management and e-prescribing into the curriculum, especially to develop the clinical skills needed for team-based care and care coordination. At the same time, the ACGME approach can form the basis for designating medication adherence as a core competency within the pharmacy curriculum and including skills-based competency in adherence as a measure for accrediting schools of pharmacy. Further, a parallel commitment to improving pharmacotherapy training for prescribers—especially as this relates to counseling geriatric patients—would be a valued addition to this redesign of the curriculum.

Advancing Medicine Adherence With a Focus on Multiple Chronic Conditions:
The New Adherence Action Agenda

Although there has been significant progress in the nation's collective actions to address the pervasive and costly problem of poor medicine adherence, this is not a time for congratulations. Despite a national investment in public education and model programs, new resources for health professionals, important research efforts and a range of policy initiatives, the reality is:

+ Between 20% and 30% of prescriptions are never filled by patients;
+ Up to half of the estimated 187 million Americans who take one or more prescription medicines—or up to 93.5 million patients—do not take these drugs as prescribed;
+ Nonadherence, along with suboptimal prescribing, drug administration, and diagnosis, is associated with an estimated $290 billion per year in avoidable medical spending or 13 percent of what the nation spends annually on health care; and
+ The immediate future portends escalating rates of multiple chronic conditions where patients tend to have more than one prescriber, are prescribed multiple mediations, and are at increased risk for drug interactions, adverse events and medication errors.

What these facts make clear is that poor adherence and higher rates of multiple chronic conditions are inextricably linked and together, represent a potentially major public health threat. Contributing to this problem is the increasing challenge of a fragmented health care system, especially as it applies to the growing number of older adults being treated for multiple chronic conditions. Also contributing to this complex problem is the interplay of a number of adherence barriers, from the complexity of the drug regimen and the cost-control measures implemented by payers and health systems to the need for patients to visit multiple pharmacies to fill different prescriptions, poor communication between patients and clinicians, and the breakdown in provider communications during the transition to care from the hospital to the outpatient setting. All of these problems contribute to more medication errors, poor health outcomes and higher health care costs and all must be addressed.

Because the stakes are so high, NCPIE commenced a new initiative called the *Adherence Action Agenda* or the "A^3 Project," bringing together 22 professional societies and voluntary health organizations, government agencies and industry leaders to identify the major gaps in current adherence efforts and create a new *Adherence Action Agenda* for the nation. Intended to accelerate progress in appropriate medicine taking, this new roadmap calls for an increased focus on the growing challenge of multiple chronic conditions where the need for patient adherence is particularly pressing and offers realistic solutions for improving medication adherence through better care coordination, harnessing new technology and supportive government policies.

Ultimately involving the support and active participation of many constituencies—the federal government, state and local government agencies, professional societies and healthcare practitioners, health educators and patient advocates—this platform calls for action in the following areas:

1. **Establish medicine adherence as a priority goal of all federal and state efforts designed to reduce the burden of multiple chronic conditions.**
   It is well documented that Americans with multiple chronic conditions take more prescription and OTC medicines than any other group, often see multiple physicians to treat

their diseases, and grapple with taking complex cocktails of different medicines correctly. Yet, patient adherence is not viewed as an essential element of government initiatives to reduce the burden and impact of multiple chronic conditions. For example, the new HHS Multiple Conditions Strategic Framework identifies four strategic areas as policy priorities, all of which should be areas where medication adherence plays a critical role: 1) fostering health care and public health system changes to improve the care of people with MCC; 2) maximizing the use of proven self-care management and other services among patients with multiple conditions; 3) providing better tools and information to health care, public health, and social services workers who deliver care to patients with MCC; and 4) facilitating research to fill knowledge gaps about, and interventions and systems to benefit, individuals with multiple chronic conditions.

However, currently, the HHS Multiple Conditions Strategic Framework mentions adherence within the context of self-care management and better tools and information for health professionals, but does not integrate adherence in plans to improve health systems change and facilitate new research efforts. Therefore, changing the mindset of policymakers so they recognize the interconnectedness of medicine adherence and managing multiple chronic conditions is essential if the resources committed to reducing the burden of multiple chronic conditions are to be successful.

2. **Establish the role of the patient navigator within the care team to help patients with multiple chronic conditions navigate the health care system and take their prescription medicines as prescribed.**
Beginning in 1990 when Harlem Hospital first started using patient navigators to guide patients through the maze of the health care system, these health professionals have been utilized at hospitals and cancer clinics nationwide to help patients coordinate their treatment. Because this model has been successful in improving cancer outcomes, the same concept can be applied more broadly to pairing high-risk patients who have multiple chronic conditions with a patient navigator, who will be responsible for obtaining the patient's medical records, creating an accurate medication list, understanding the patient's medication regimen, setting up medication counseling, as needed, scheduling timely follow-up physician visits, and facilitating communication between the patient and his or her different physicians. In the case of patient navigators now working with cancer patients, many are specially trained nurses, nurse practitioners and social workers, which is in line with the Transitions Coaches now working in hospitals across the country to assist patients when leaving the hospital setting. However, clinical pharmacists, who are unencumbered from dispensing functions, and may already have unique training and credentials, would be well suited to play this role as would geriatric pharmacists. Extensive information about the role of the patient navigator now exists that can be utilized to establish this new and important role for patients with MCC.

3. **Promote clinical management approaches that are tailored to the specific needs and circumstances of individuals with multiple chronic conditions.**
Today, the heaviest burden of MCC is borne by Americans aged 65 and older, where as many as three in four seniors are being treated for multiple concurrent illnesses. Not only do these individuals differ in the severity of their illnesses but they differ in their prognosis, functional status, and treatment preferences, meaning their treatment options will differ and require more flexible approaches to care. Accordingly, NCPIE encourages health professionals to adopt the American Geriatric Society's guiding principles for treating older adults with three or more diseases, *Patient-Centered Care for Older Adults with Multiple Chronic Conditions: A Stepwise Approach from the American Geriatrics Society*, which calls for a "stepwise approach" to

making complex clinical management decisions, starting by eliciting and incorporating patient preferences and choosing therapies that optimize benefits and minimize the harm for older adults with MCC.

4. **Incentivize the entire health care system to incorporate adherence education and medication support as part of their routine care for MCC patients.**
Although most research on appropriate medication use focused on the characteristics that predict poor prescription medicine adherence, there is general consensus that improved patient adherence results from interventions that: increase patient understanding of their conditions and the importance of taking medicines as prescribed; teach the skills so patients can manage their treatment regimens; and create the environment that supports and maintains medication adherence. Here, a number of important initiatives are underway to arm patients with adherence information and personalized tools, such as refill reminders and pharmacy messaging programs.

   But to fully engage patients in the importance of medication adherence, a growing body of research suggests that the quality of the interactions between patients and their healthcare providers is important for how well patients manage their chronic conditions. Accordingly, a critical need is to expand the role that physicians/other prescribers and other members of the care team play in promoting shared decision-making about the treatment plan and encouraging patients to take their drugs as prescribed. Towards this end, stakeholders are calling for a significant investment in developing the patient/provider education and engagement tools so clinicians will be able to implement best practices for medication adherence; effectively communicate to their patients the importance of following treatment plans; and provide medication support services to patients and family caregivers.

5. **Eliminate the barriers that impede the ability of patients with multiple chronic conditions to refill their prescription medicines.**
Some of the reasons patients fail to take their medicines as prescribed are time constraints and transportation challenges, problems that are magnified for those with multiple chronic conditions who are prescribed different drugs for their disorders by different physicians. This can mean refilling drugs at different times, sometimes at different pharmacies, having to keep track of the refill schedules, and making a number of trips to the pharmacy to pick up their medicines. To reduce these obstacles, stakeholders support simple policy changes that will streamline how prescriptions are dispensed to patients in the pharmacy. One change is to adopt the "pharmacy home" model now in use for North Carolina Medicaid beneficiaries, which gives patients a single pharmacy point of contact for filling prescriptions so they don't have to visit multiple pharmacies to fill different prescriptions. Another and related change is for pharmacies to adopt refill synchronization, which allows patients to fill their different prescriptions at one time and therefore, reduce the number of visits they must make to the pharmacy. Refill synchronization also facilitates the adoption of an appointment-based model for improving comprehensive medication management services, if needed. According to NEHI, these kinds of actions will improve the "medication ecosystem," increasing care coordination between prescribers and dispensing pharmacies and ensuring patients with multiple medications receive coordinated and consistent care.

6. **Reduce the cost-sharing barriers for patients by lowering or eliminating patient copayments for prescription medicines used to treat the most common chronic diseases.**
Research makes clear that the cost of medications is a significant barrier to patients filling their prescriptions and taking their medicines as prescribed. Moreover, studies confirm that reducing cost-sharing barriers

for patients, such as cost-control measures implemented by payers and health systems, increases medication use and improves adherence. Accordingly, stakeholders advocate adopting policies that will reduce the out-of-pocket costs for medications, especially for patients on multiple prescriptions for chronic conditions.

7. **Accelerate the adoption of new health information technologies that promote medication adherence.**
Significant innovations in health technology, from electronic reminder devices and pharmacy-based adherence messaging programs to electronic pillboxes, smartphone apps, health-monitoring devices that transmit data directly to patients' smartphones to physicians and "e-prescribing," now arm patients with the tools to take their medicines as prescribed and improve the flow of timely and complete information on medicine use between patients and providers. To achieve the promise of these technological developments, stakeholders have outlined a number of immediate steps that are supported by NCPIE and the members of the "A^3 Project". These actions are to:

+ Adopt new standards for the use of electronic health records standards that provide for consistent data collection, ease of use and provider access to the comprehensive electronic medication information for a given patient;

+ Create incentives for providers to use health information technology to identify patients at risk for poor medication adherence;

+ Promote patient–provider and provider–provider sharing of electronic health records while ensuring patient privacy; and

+ Expand the use of electronic reminders and personal health records to improve medication adherence and optimal use by consumers.

8. **Establish medication adherence as a measure for the accreditation of healthcare professional educational programs.**
Currently, the nation's medical residency programs are moving towards a "next accreditation system," where all medical residents will be evaluated based on their competencies in six core areas, including patient care, systems-based practice and their interpersonal skills and communication. From the standpoint of medication adherence, the move to a new system of outcomes-based graduate medical education represents an important opportunity to integrate evidence-based prescribing, especially for geriatric patients, and collaborative medication management strategies to support adherence into the curriculum, especially to develop the clinical skills needed for team-based care and care coordination.

   At the same time, this approach can form the basis for integrating behavioral counseling and communications skills with patients—including cultural competencies, identifying patients at high risk for nonadherence, motivational interviewing, and how to work in a multidisciplinary environment with clarity in roles—as core competencies within the curriculum of schools of pharmacy, nursing, and other allied health professions and including skills-based competency in adherence as a measure for accreditation.

9. **Address multiple chronic conditions and optimal medication management approaches in treatment guidelines.**
Today, most clinical practice guidelines focus on managing a specific chronic condition and do not take into account the presence of MCC. The result is that physicians following different clinical practice guidance for each diagnosis lack the evidence-based information to account for the cumulative effect of multiple diseases occurring simultaneously and the interaction among recommended therapies that may prove harmful. To address this situation, NCPIE

encourages medical societies to accelerate the development of evidence-based treatment guidelines where information is included on the most common comorbidities clustering with the incident chronic condition—a major goal identified in the HHS Multiple Conditions Strategic Framework. An immediate priority is to include information on the clinical management of the most prevalent dyads and triads identified by the Centers for Medicare and Medicaid Services (CMS) where patients are likely to be taking a variety of different drugs and may be receiving conflicting advice from prescribers and other healthcare providers.

10. **Stimulate rigorous research on treating people with multiple chronic conditions, including focused research on medication adherence to promote the safe and appropriate use of different medicines in this patient population.**
Today, patients with multiple chronic conditions are being treated with drugs that are usually developed and tested in people who have a single condition. Thus, there is a paucity of evidence-based data on how to treat those with two or more concurrent diseases, especially to safeguard against prescribing drugs for one condition that may have negative effects on coexisting conditions and may interact with other treatments. To address this serious challenge, the HHS Multiple Conditions Strategic Framework calls for a range of new research efforts to expand information on the most prevalent clusters of MCC, identify those care models that are most successful in improving the health outcomes of patients with MCC, and define the most appropriate health outcomes for these individuals in light of the cumulative effect of having a constellation of different diseases. Moreover, the recently established Patient-Centered Outcomes Research Institute (PCORI) has identified research on multiple chronic conditions as part of its *National Research Agenda and Research Priorities*.

Clearly, these are important steps in the right direction, but questions remain about the level of funding to implement the HHS Multiple Conditions Strategic Framework and the timing and resources that PCORI will invest in MCC through its research agenda. Of added concern is to what extent the government's research efforts will address medication adherence as an essential element of caring for Americans with multiple chronic conditions. Therefore, as the research agenda is being shaped, NCPIE and the members of the "A^3 Project" call for incorporating medicine adherence throughout the MCC research agenda with the goal of determining:

+ What is known about adherence to multiple medications within the context of treating patients with MCC;
+ What existing evidence-based approaches to improving medication adherence are applicable to patients with multiple concurrent diseases; and
+ What are the gaps in the scientific literature on enhancing medication adherence that must be addressed if the health outcomes of individuals treated simultaneously for two or more conditions are to significantly improve.

For the growing number of Americans now grappling with multiple chronic conditions, these research efforts cannot start soon enough.

THIS IS THE TIME FOR RENEWED ACTION

Even as the issue of taking medicines as prescribed has become a priority concern for the public health community, nonadherence in the U.S. is compounded by escalating rates of multiple chronic conditions, especially among the growing number of patients who are prescribed numerous drugs on a daily basis, often see more than one prescribing physician, and are at significantly higher risk for drug interactions, adverse events and medication errors. Thus, now is the time for collective action to confront the combined threat of poor prescription medicine adherence and higher rates of multiple chronic conditions—before the predicted

increase and impact of multiple chronic conditions overwhelms our health care system.

While no single strategy will solve this difficult challenge, it is hoped that the priorities identified in this new *Adherence Action Agenda* will serve as a catalyst for action and offer realistic recommendations for improving patient adherence to reduce the burden of chronic disease.

Adherence Action Agenda Members

The National Council on Patient Information and Education (NCPIE) is pleased to recognize the following organizations for their input in conceptualizing and formulating the *Adherence Action Agenda* or the "A^3 project."

AARP

Academy of Managed Care Pharmacy

Agency for Health Care Research and Quality, Center for Outcomes and Evidence

American Academy of Nurse Practitioners

American Academy of Physician Assistants

American Diabetes Association

American Heart Association

American Medical Association

Cardinal Health

Council for Affordable Health Coverage

Kaiser Permanente

McKesson Patient Relationship Solutions

Merck*

National Association of Chain Drug Stores

National Community Pharmacists Association

NEHI

National Consumers League

National Council on Aging

National Council on Patient Information and Education

National eHealth Collaborative

National Pharmaceutical Council

NIH Adherence Network

Pharmacy Quality Alliance

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