

ADVISORY COMMITTEE ON INTERDISCIPLINARY, COMMUNITY-BASED LINKAGES (ACICBL)

Preparing the Interprofessional Workforce to
Address Health Behavior Change:
Ensuring A High Quality and
Cost-Effective Healthcare System

Tenth Annual Report
to the
Secretary of the United States
Department of Health and Human Services
and the
Congress of the United States

September 2010



Advisory Committee on Interdisciplinary, Community-Based Linkages

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The views expressed in this report are solely those of the **Advisory Committee on Interdisciplinary, Community-Based Linkages** and do not represent the perspectives of the Health Resources and Services Administration nor the United States Government.

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The Committee

Mission

The Advisory Committee on Interdisciplinary Community-Based Linkages (the ACICBL) provides advice and recommendations to the Secretary of the Department of Health and Human Services (Secretary) concerning policy, program development and other matters of significance related to interdisciplinary, community-based training grant programs authorized under sections 750-759, Title VII, Part D of the PHS Act, as amended by the Affordable Care Act. As amended, Part D of Title VII of the PHS Act includes the following sections/programs:

750 – General Provisions

751 – Area Health Education Centers

752 – Continuing Education Support for Health Professionals Serving in Underserved Communities

753 – Education and Training Related to Geriatrics

754 – Quentin N. Burdick Program for Rural Interdisciplinary Training

755 – Allied Health and Other Disciplines

756 – Mental and Behavioral Health Education and Training Grants

757 – Advisory Committee on Interdisciplinary, Community-Based Linkages

759 – Program for Education and Training in Pain Care

The Committee prepares an annual report describing its activities conducted during the fiscal year, including findings and recommendations made to enhance these Title VII programs. This annual report is submitted to the Secretary of the United States Department of Health and Human Services and ranking members of the Senate Committee on Health, Education, Labor and Pensions, and the House of Representatives Committee on Energy and Commerce. In addition, the ACICBL: 1) develops, publishes, and implements performance measures for programs under this part; 2) develops and publishes guidelines for longitudinal evaluations (as described in section 761 (d)(2) of the PHS Act) for programs under this part; and 3) recommends appropriation levels for programs under this part.

Report Development Process

The Committee's annual report includes findings and recommendations focused on a selected topic regarding a particular aspect of interprofessional education and training for healthcare providers covered in sections 750-759, Title VII, Part D of the PHS Act. This annual report is prepared by the Committee after conducting an independent search of published literature on the selected annual topic, hearing testimony from experts in various areas relevant to that topic, and engaging in dialogue with each other utilizing individual expertise and experiences in this area.

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Chairperson's Acknowledgements

The Tenth Annual Report of the Advisory Committee on Interdisciplinary Community-Based Linkages (the ACICBL) is titled, "Preparing the Interprofessional Healthcare Workforce to Address Health Behavior Change: Ensuring A High Quality and Cost-Effective Healthcare System." The report and its recommendations are presented to the Secretary (Secretary) of the United States Department of Health and Human Services (HHS) and the Congress with the goal of helping to shape the ongoing education and training of all healthcare professionals. With the implementation of these recommendations, the healthcare workforce will be engaged in developing a truly integrated, patient-centered healthcare system, prepared to address health behavior change at the individual, community, population, and health policy levels.

Focusing on enhancing the education and training of the healthcare workforce to address the health behaviors of the American populace is particularly timely. The importance of this focus is reflected in the *Patient Protection and Affordable Care Act, Title XIII-Health Information Technology of the "American Recovery and Reinvestment Act of 2009."* It also mirrors one of four overarching goals in the upcoming national health agenda as outlined in *Healthy People 2020*, which is to attain, high-quality, longer lives free of preventable disease, disability, injury, and premature death.

The recommendations highlight patient-centered communication and shared decision making, interprofessional collaboration, community engagement, and healthcare policy leadership. Each recommendation discusses funding requirements, interprofessional education and training protocols designed to enhance clinical competencies for addressing health behaviors, programmatic evaluation, or broader policy-based approaches that can influence community and population health.

Testimony from nine experts and a review of the scientific literature helped to shape the supporting rationales for the recommendations. This testimony examined areas of individual health behavior change, patient adherence to healthcare regimes, prevention of illness and risky health behaviors, community and patient engagement, healthcare finance, and overall population health.

I extend my sincere appreciation to all of the members of the ACICBL, a group of truly dedicated professionals. They reflect the best in interprofessional cooperation focused on enhancing the education and training of all healthcare professionals with the ultimate goal of high quality patient care. I am grateful for the staff of the Bureau of Health Professions (BHPr): Joan Weiss, PhD, RN, CRNP; Louis Coccodrilli, MPH; and CAPT Norma Hatot. They provided skillful guidance and quality organizational support to the committee. Additionally, I must extend sincere appreciation to the nine experts, including Bonnie Spring, PhD who provided a comprehensive, supporting concept paper that is included in this final report. These experts provided high quality, in-depth reviews of various aspects of health behaviors from the educational, scientific, clinical, and health policy perspectives. Finally, I offer my sincerest gratitude to Jane Hamel-Lambert, PhD, Vice-chair of the ACICBL, for helping to bring this Tenth Annual Report to a focused and timely conclusion.

American essayist and philosopher, Henry David Thoreau, wrote, “Is not disease the rule of existence? ... Disease is not the accident of the individual, nor even of the generation, but of life itself.” While the ACICBL acknowledges the inevitability of illness, implantation of the funding and programmatic recommendations presented in this report will have a marked, positive impact on addressing health behaviors and, in turn, the prevention of disease and a speedy recovery from illness. Support for curriculum development and educational programs based on best-practices will assure that the interprofessional healthcare workforce develops the needed competencies to assure that the American populace receives comprehensive, high quality care and actively participates in an integrated system that minimizes health care costs while enhancing the quality of life.

A handwritten signature in black ink, reading "Ronald H. Rozensky". The signature is written in a cursive style with a large, stylized initial 'R'.

Ronald H. Rozensky, Ph.D., ABPP
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September 30, 2010

Executive Summary

This Tenth Annual Report of the Advisory Committee on Interdisciplinary, Community Based Linkages (ACICBL) focuses on the importance of providing interprofessional education and training for all healthcare providers to effectively address health behavior change at the individual, family, community, and policy levels. **Health Behavior Change**, the topic of this annual report, is timely and relevant given that individual health behaviors significantly affect the development and outcome of chronic diseases, which have far surpassed infectious diseases as leading causes of death and disability in the United States (U.S.).²

The importance of focusing on health behaviors can be found within the *Patient Protection and Affordable Care Act* and is reinforced further by testimony to the Committee by Carter Blakely, Acting Deputy Director of the Health and Human Services, Office of Disease Prevention and Health Promotion.³ Ms. Blakely noted in her testimony that improving health behaviors is one of four overarching goals in the recently completed *Healthy People 2020* national health agenda. Specifically, the topic relates to the goal of promoting the quality of life, healthy development, and healthy behaviors across all life stages. In addition, the 2009 *Health Information Technology for Economic and Clinical Health (HITECH) Act* includes provisions for financial incentives to providers who show evidence of outreach to patients for the provision of preventive services and chronic disease management, which are hallmarks of health behavior change.⁴ This attests to the timeliness of this year's topic and assures that these recommendations are and will continue to be aligned with the most important issues facing the health of individual citizens and healthcare organizations at the local, state, and national levels as these organizations strive to provide high quality, cost-effective care.

Both health and illness behaviors affect morbidity, mortality, and healthcare costs. Smoking cigarettes, leading a sedentary lifestyle, eating high caloric and high fat foods, and not following prescribed health regimes are examples of detrimental health behaviors that interfere with health maintenance, significantly increase the risk for many chronic diseases, and interfere with recovery from illness.¹ Health behaviors can be defined as the actions, habits, and decisions of individuals or communities that are related to health maintenance. Health behaviors are sustained by the particular beliefs, perceptions, and values of those individuals and communities. Illness behaviors can be defined as the actions, habits, and decisions of individuals or communities that are related to health restoration after illness is diagnosed. These behaviors are also sustained by the particular beliefs, perceptions, and values of those individuals and communities.² Not attending recommended healthcare visits and non-adherence with prescribed healthcare regimens and medications are also examples of detrimental illness behaviors. Managing one's own illness and illness-related behaviors are critical keys to assuring one's return to health and wellness.

This report presents **specific education and training recommendations** which, when implemented, will improve the readiness of the healthcare workforce to promote positive health behaviors and provide clinical interventions to enhance quality care and a more cost-effective health services system. Testimony to the Committee about health behavior change was provided by nine experts from a variety of perspectives including population health, health promotion, disease prevention, and health behavior change interventions at the individual, family, and

community levels. The experts concurred that healthcare providers can help patients improve their health by actively encouraging specific behaviors using patient-centered approaches and by taking leadership roles in fostering supportive health policies that affect not only health provider practices but also behaviors in the broader community. It is important that healthcare providers facilitate patient participation in building a responsive, quality-focused, and financially efficient healthcare system by addressing health and illness behaviors. There was strong consensus across these testimonies which led the Committee to organize the recommendations in this report. The recommendations to Congress, the Secretary of HHS (the Secretary), and the Health Resources and Services Administration (HRSA) are presented in this Executive Summary and are later expanded upon with supporting rationales. The overall importance of addressing health behaviors in the U.S. healthcare system are further detailed in an invited concept paper (see Appendix) which was prepared as part of this report by Bonnie Spring, PhD, Professor of Preventive Medicine, Psychology, and Psychiatry; Behavioral Medicine Director and Co-Program Leader for Cancer Prevention at Northwestern University.

RECOMMENDATIONS

1. The ACICBL recommends that the Secretary and HRSA support curricula development that will increase professional education and training in patient-centered communication and shared decision making. These curricula would encourage addressing healthy behaviors, monitoring patient responses to their acute and chronic illnesses, and assisting patients in managing their own health behaviors. These curricula should include information about health determinants (e.g., ethnicity, environment, economics, family, genetics, and health systems) and health risk behaviors (e.g., tobacco use, alcohol and other drug abuse, sedentary lifestyle, and unhealthy eating) in the context of individual and population level health assessments and health improvement. This includes the clinical treatment of health behaviors to assure a return to health, relapse prevention, and patient involvement in the future maintenance of healthy behaviors.
2. The ACICBL recommends that Congress appropriate and HRSA fund interprofessional education and training demonstration projects designed to prepare interprofessional healthcare faculty and providers to work in collaborative teams to address health behavior assessment, treatment, and the enhancement of patient health behavior self-management across the lifespan. Projects should address interventions that are strategic and effective in promoting healthy behavior, intervening against risky health behaviors within diverse populations or addressing ongoing clinical interventions focused on health behaviors which are designed to restore individuals to health. This funding should include support for program evaluation of interprofessional, competency-based educational outcomes that include practice improvement, clinical health outcomes, and patient satisfaction.
3. The ACICBL recommends that Congress appropriate and HRSA increase its funding of existing successful, interprofessional healthcare education and training programs such as the Geriatric Education Centers, Graduate Psychology Education, and Area Health Education Centers all centered on community engagement and preparation for interprofessional, team-based practices but with an expanded focus on health behavior assessment, treatment, and enhancement of patient self-management. This effort will enhance and increase opportunities for

college, university, and academic health science center faculty, staff, and students in all healthcare disciplines to participate in community-engaged scholarship (CES), including academic service learning programs and community-based participatory research designed to address health behaviors of individuals and populations. This expansion of funding should specifically focus on health behaviors including ongoing clinical interventions to help restore individuals to health, illness prevention, evaluation of health determinants (e.g., ethnicity, environment, economics, family, genetics, and health systems), and interventions for health risk behaviors (e.g., tobacco use, alcohol, and other drug abuse, sedentary lifestyle, unhealthy eating, and non-adherence to treatment regimens) in the context of both individual and population health. In addition, these expanded funding opportunities should require that institutions of higher education align faculty incentives and rewards for CES through a review and modification of policies, such as promotion and tenure policies.

4. The ACICBL recommends that Congress direct the Centers for Medicare and Medicaid Services (CMS) to work with the American Medical Association's (AMA) current procedural terminology (CPT) editorial panel to provide CPT codes for brief and ongoing intensive prevention counseling. Further, the ACICBL recommends that Congress appropriate and CMS fund the reimbursement for individual and interprofessional team assessment and counseling across all health professions for health promotion/disease prevention and ongoing intensive health behavior treatment interventions. This reimbursement will promote prevention practice through the alignment of a payment system that supports practice improvement. Prevention counseling CPT codes would increase the likelihood that all health professionals would address health behavior practices in disease prevention and health promotion activities and provide referrals as necessary.

The Committee recognizes that the four organizational categories (Patient-Centered Communication and Shared Decision-making, Interprofessional Collaboration, Community Engagement, and Policy Leadership) repeatedly emerged from an array of expert testimony because they reflect important, recurring themes in national discussions on healthcare. These categories provide a framework for reviewing healthcare's interprofessional education, training, and practice in order to better meet the evolving requirements of today's healthcare landscape.⁶⁸⁻⁷⁶ Finally, they serve to structure the Committee's recommendations in a way that assures the healthcare workforce's recognition of the importance of health behaviors. Additionally, the workforce will be prepared to address health behaviors with a range of health promotion activities and connect community wellness with clinical assessments and ongoing interventions.

Nongovernmental organizations with a mission to improve health professions education and healthcare delivery concur that essential changes in the current healthcare system framework are necessary to improve health outcomes. Both the Josiah Macy Jr. and Carnegie Foundations have recently emphasized the need for greater attention to community engagement and policy leadership in the education and training of all healthcare professions.^{69,70} A 2008 Josiah Macy Jr. Foundation report recommended that health professionals' training should, "place less emphasis on hospital venues and more on community settings as 'classrooms' and prepare students to work effectively as members of interprofessional teams in order to broaden their understanding of public health and the non-biologic determinants of illness."⁶⁹ A 2010 Carnegie Foundation report underscores the importance of strengthening connections between formal

knowledge and experiential learning and observes that this problem is compounded by lack of attention to the characteristics of the population being served.⁷⁰ These and other authors also find that learners entering the healthcare workforce do not have adequate opportunities to work with patients in all stages of illness and recovery and have a poor understanding of the roles and scopes of practice of others within the healthcare system.^{74, 76}

The Committee has integrated expert testimony and a review of published, evidence-based literature into this report and its recommendations. The Committee strongly believes that implementing the recommendations and respective strategies presented herein will effectively improve the collective ability of the U.S. healthcare workforce to assess, treat, and enhance patient self-management of health behaviors. This, in turn, will contribute to improving individual and population level health indicators throughout the healthcare system.

A supporting concept paper is contained in the Appendix to this report.

Background: The Importance of Health Behaviors

The testifying experts agreed and noted that a substantial evidence base supports them in asserting that policies at the community, county, state, and national levels which support healthcare providers in addressing their patients' health behaviors can facilitate improved health outcomes.^{3, 5, 8, 24, 48, 50, 53-57, 59-64, 66, 67, 79-86} Reimbursement for health behavior assessment, management, treatment and inclusion of these knowledge and skill areas as core competencies recognized by each health professions' accreditation bodies were frequently noted examples of policies that influence providers' perceptions. Providers perceived addressing health behaviors as valuable for improving both individual- and population-level health indicators, reducing chronic disease, and lowering healthcare costs. Policy matters discussed in the expert testimony before the Committee included a recommendation that would target professional behavior such as provider reimbursement and consumer behavior such as taxes on cigarettes.^{5, 80, 82, 83, 85, 86}

Some authors disagree that addressing health behaviors can have a positive cost-benefit impact and further suggest that some providers are reluctant to address health behaviors even when this is recommended by practice guidelines.⁷⁶⁻⁸⁰ In her testimony before the ACICBL, Kate Lorig, RN, DrPH, Director of the Stanford Patient Education Research Center, noted that many healthcare providers have historically not been willing to address health behavior change because they believe that patients should not be encouraged to 'self-manage' their health conditions and that it is more beneficial for patients to focus on following the medical advice of their healthcare providers.⁸⁴ Furthermore, Dr. Lorig testified that healthcare providers have been reluctant to address health behavior change for multiple reasons including concerns about costs in terms of the time and money required to address health behaviors; and beliefs that their efforts will not be effective due to their own lack of behavior change skills or their patients' lack of motivation to change.⁸⁴

In fact, data indicate that, in the short term, effective efforts to improve health behaviors actually reduce healthcare resource utilization and, in the long term, reduce the overall burden of disease.^{66, 87-97} Evidence further indicates that it is cost-effective for individual health care providers and interprofessional healthcare teams to participate in specific, evidence-based efforts to reduce detrimental health behaviors at the individual, family, community, and policy levels.^{8, 26, 29, 98-101} However, as many of the expert witnesses testified, education about and training in the use of these evidence-based methods warrants greater attention and enhancement in both education and training programs as well as in clinical practices.

In order to better align healthcare training and delivery systems with evidence-based 'best practices', it is important to educate both current students who have not yet entered the workforce as well as providers with established careers. Continuing professional education and lifelong learning for practicing healthcare providers addressing 'why' and 'how' they should address health behaviors will be particularly important because resistance to incorporating new processes of care is a well-documented barrier to transforming healthcare systems.¹⁰²⁻¹⁰⁶ In addition, it is crucial that students are exposed to faculty role-models and academic frameworks which encourage, support, and reward the use of evidence-based models of health behavior assessment and management.

It is well documented and undisputed that behavioral risk factors for disease are prevalent and significantly linked to leading causes of death and disability and that, by contrast, healthy behaviors are health protective.¹⁰⁷⁻¹²⁰ Over the past thirty years, public, private, and professional interest in behaviors that influence health outcomes has increased dramatically. This heightened attention has been largely stimulated by rapidly escalating healthcare costs and by the fact that chronic diseases have surpassed infectious diseases as leading causes of death and disability in the United States.²

Research generated by scientific inquiry into patterns of health and illness has produced a significant amount of data which irrefutably link specific behaviors to chronic diseases and associated morbidity and mortality. Cardiovascular disease, hypertension, diabetes, obesity, and some cancers are more prevalent among individuals who engage in specific detrimental health behaviors and less prevalent among those who engage in specific beneficial health behaviors. The increased morbidity and mortality associated with six detrimental behaviors have been especially well-studied including: consuming a high caloric, high-fat, low-nutrient diet;^{107, 117, 121-123} smoking cigarettes;¹²⁴⁻¹²⁸ being physically inactive;^{65, 129-135} abusing substances including alcohol and licit/illicit drugs;^{91, 136-148} engaging in risky sexual behaviors;¹⁴⁹⁻¹⁵¹ and being non-compliant with prescribed medication.^{92, 152-157} A preponderance of data show that leading health indicators such as rates of cardiovascular disease, hypertension, diabetes, obesity, and sexually transmitted diseases are correlated with these behaviors.^{11, 65, 91, 92, 107, 117, 118, 121-126, 128-142, 144, 147-159} In other words, individuals who manifest any of these six behaviors are at significantly higher risk for developing cardiovascular disease, hypertension, diabetes, obesity, and sexually transmitted diseases than individuals who do not engage in these behaviors. On a positive note, data also indicate that reducing detrimental behaviors can significantly lower the incidence of disease-related morbidity and mortality, even among individuals who already have manifestations of disease.

Evidence alone, however, is not sufficient to alter health practice or patient behavior change. It is necessary to develop and implement specific activities across multiple disciplines to create sufficient momentum to change practice. The recommendations presented in this report offer specific activities which will contribute to creating a workforce of health professionals who are better prepared to meet the challenge of addressing health behaviors among their patients and to provide leadership on policy initiatives which will foster healthy communities.

The Committee's specific education and training recommendations are purposefully organized under categories in order to reinforce four central elements which have been widely and repeatedly supported as 'necessary' to transform healthcare delivery and outcomes. These four categories focus on leveraging health professional education and training to strengthen health professionals' relationships with their surrounding communities, colleagues, and healthcare consumers through partnerships and policies directed toward addressing health behaviors.

Recommendations and Rationale for Education and Training to Address Health Behaviors

Introduction

Testimony from nine experts before the Committee in April and August of 2010 confirmed the effectiveness and importance of addressing detrimental health behaviors to reduce the burden of disease and increase productive life-years among individuals and across populations. After hearing this testimony and independently considering other scientific evidence, the Committee recommends that healthcare professionals receive increased education and training in the use of specific approaches that have been found effective across a broad range of settings and behaviors. Each recommendation is presented below with an accompanying rationale summarizing the evidence base supporting it.

Recommendation #1. The ACICBL recommends that the Secretary and HRSA support curricula development that will increase professional education and training in patient-centered communication and shared decision making. These curricula would encourage addressing healthy behaviors, monitoring patient responses to their acute and chronic illnesses, and assisting patients in managing their own health behaviors. Curricula should include information about health determinants (e.g., ethnicity, environment, economics, family, genetics, and health systems) and health risk behaviors (e.g., tobacco use, alcohol and other drug abuse, sedentary lifestyle, and unhealthy eating) in the context of individual- and population-level health assessment and health improvement. This includes the clinical treatment of health behaviors to assure a return to health, prevent relapse, and patient involvement in the future maintenance of healthy behaviors.

Funded training strategies must facilitate interprofessional learning across a range of healthcare disciplines within the context of a team-based approach to healthcare as applied to integrated healthcare that includes attention to the behavioral components of health. Additionally, the Secretary and HRSA should financially support training of faculty, students, direct service workers, and current health care providers across all disciplines in the content areas of health behavior assessment, treatment, and enhanced patient self-management as a strategy to increase the competencies of health professionals in these aforementioned areas.

Recommendation 1: Rationale

This recommendation focuses on bringing into practice the extensive evidence-base supporting patient-centered communication and shared decision-making as effective avenues for addressing health behavior change. For decades healthcare providers have relied upon verbal and written instructions to assess and help patients' manage their health behaviors related to reducing risk factors for disease, managing health conditions, and taking prescribed medication. Unfortunately, these communication techniques have been found largely ineffective for changing health behaviors in a majority of patients.¹⁶⁰

Health literacy levels among American adults is low and has not substantially changed during the past ten years, which means that the traditional reliance on providing only written or verbal

healthcare information is not effective.¹⁶⁰ Furthermore, lower health literacy is associated with poorer health, greater medication non-adherence, higher medical expenses, and increased rates of hospitalization.¹⁶⁰ There is a great deal of evidence that healthcare providers' communication skills are vitally important in helping their patients adopt positive health behaviors.¹⁶¹ In fact, many agencies that focus on healthcare quality improvement have recommended increased communication skills training for health professionals.^{58, 161} At the heart of most current recommendations for effective patient/provider interactions are a move toward more patient-centered communication styles. Moreover, studies find that training healthcare providers in patient-centered communication and shared decision-making techniques is successful.^{162, 163}

Experiential learning is crucial to embed new communication techniques into daily practice and to transform healthcare processes. Although patient-centered communication and shared decision-making are known to be highly effective and have been recommended for many years by multiple national and international organizations' practice guidelines, there are few interprofessional training and education opportunities for healthcare providers to explore, develop, and practice using these approaches. Regarding use of technologically mediated communication strategies, it is important to train and educate healthcare professionals how to identify and access persons with relevant expertise such as webmasters and information technology specialists who can assist in designing, implementing, and evaluating technologically mediated, patient-centered communications related to health behavior change.

Belinda Borrelli, PhD, Professor of Psychiatry at the Center for Behavioral and Preventive Medicine at Brown University's School of Medicine, testified before the Committee about the extensive evidence-based use of motivational interviewing (MI).⁵ This is a well-known, scientifically tested, patient-centered communication method that has been found to produce positive health behavior changes in both adult and pediatric populations.^{9, 13, 14} Dr. Borrelli pointed out that healthcare professionals who have not been trained in patient-centered communication and shared decision-making techniques commonly attempt to 'convince' patients to adopt a health behavior change by giving reasons that do not effectively motivate that individual.⁵

A patient-centered approach to health behavior assessment and treatment, and a focus on enhancing patient self-management engages the healthcare provider in a listening role to help them better assess the patient's stage of motivation to change. From that understanding, the provider can more effectively begin to move them forward in the behavior change process through shared decision-making. Among other things, the MI technique has proven effective for promoting fruit and vegetable consumption, reducing alcohol consumption, reducing illicit drug use, promoting weight loss, reducing risky sexual behavior, improving medication adherence, and increasing physical activity.^{6-8, 10-12, 15-18, 21, 22, 164}

As technologically mediated communications (i.e., voice mail, email, text messages, pod-casts, telemedicine, electronic health records [EHRs], and web pages) have become more wide-spread, interest in using these communication strategies to improve health behaviors has risen.^{23, 28} The extent of this interest is vividly highlighted by the *HITECH Act* which provides strong financial incentives to providers who adopt EHRs and utilize their multiple functionalities to improve health behaviors among their patients.⁴ Research shows that healthcare providers can reach

beyond the confines of traditional healthcare settings by using mobile technology to effectively deliver positive health behavior messages to individuals as they go about their daily lives.^{19, 25} Handheld computers and mobile phones have been effectively used to deliver supportive interventions for smoking cessation, weight loss, anxiety management, diabetes control, eating disorder management, alcohol use, medication adherence, healthy food choices, safe sex behaviors, and physical activity.^{19, 20, 23-27, 165} The emerging science of internet-based health behavior interventions provides a rationale for investing in more technologically mediated interventions that incorporate multiple health behavior change techniques and various modes of delivery.²⁵ Finally, studies indicate that technologically mediated communications are accepted by patients and may be cost-saving.^{19, 27, 29}

2. The ACICBL recommends that Congress appropriate and HRSA fund interprofessional education and training demonstration projects designed to prepare the interprofessional healthcare faculty and providers to work in collaborative teams to address health behavior assessment, treatment, and the enhancement of patient health behavior self-management across the lifespan. Projects should implement interventions that are strategic and effective in promoting healthy behavior, intervening against risky health behaviors within diverse populations or addressing ongoing clinical interventions focused on health behaviors which are designed to restore individuals to health. This funding should include support for program evaluation of interprofessional, competency-based educational outcomes that include practice improvement, clinical health outcomes, and patient satisfaction.

The Institute of Medicine has consistently called for greater use of interprofessional team approaches and patient-centered communication strategies across healthcare settings since the publication of its landmark report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, in 2001.⁷⁷ More recently, team-based approaches to care and patient-centered communications were specified as key quality indicators in the 2010 *Patient Protection and Affordable Care Act*.⁷⁸

3. The ACICBL recommends that Congress appropriate and HRSA increase its funding of existing successful, interprofessional healthcare education and training programs such as the Geriatric Education Centers, Graduate Psychology Education, and Area Health Education Centers centered on community engagement and preparation for interprofessional, team-based practices but with an expanded focus on health behavior assessment, treatment, and enhancing patient self-management. This effort will enhance and increase opportunities for college, university, and academic health science center faculty, staff, and students in all healthcare disciplines to participate in community-engaged scholarship (CES), including academic service learning programs and community-based participatory research designed to address health behaviors of individuals and populations. This expansion of funding should specifically focus on health behaviors including ongoing clinical interventions to help restore individuals to health, illness prevention, evaluation of health determinants (e.g., ethnicity, environment, economics, family, genetics, and health systems), and interventions for health risk behaviors (e.g., tobacco use, alcohol and other drug abuse, sedentary lifestyle, unhealthy eating, and non-adherence to treatment regimens) in the context of both individual and population health. In addition, these expanded funding opportunities should require that institutions of higher education align faculty

incentives and rewards for CES through review and modification of policies, such as promotion and tenure policies.

Recommendations 2 and 3: Rationale

Currently, most health professions education and training curricula do not produce healthcare providers who have a broad understanding of how health determinants and risk behaviors influence individual- and population-level health indicators. In order for health professionals to function effectively in interprofessional teams, all members should be educated about and trained to use comprehensive assessment and treatment approaches to address health behaviors. Coordination of care is required. Demonstration projects are needed to provide practical, hands-on experience to healthcare providers, staff, and students in how to transform existing processes of care to accommodate team approaches. It is well recognized that one of the greatest barriers to healthcare transformation is resistance to adopting new processes of care. Demonstration projects in which providers must build broad interprofessional collaborations will require health professions students as well as practicing providers to work within a transformed healthcare paradigm. Evaluations of these demonstration projects will provide important quantitative and qualitative data for feedback to participants and other stakeholders regarding how transforming existing practices into team-based models with specific characteristics can affect practice improvement, clinical health outcomes, and/or patient satisfaction.

It is increasingly being recognized that a team approach to healthcare delivery produces more optimal long-term outcomes across a wide range of chronic and acute conditions.^{18, 30-32, 34, 36, 40} More specifically, collaborative models of care are found to result in higher levels of consumer satisfaction, treatment adherence, team performance, and care coordination.⁴⁰ An interprofessional, team-based healthcare paradigm is also encouraged by the *HITECH Act* which facilitates and rewards sharing patients' goals and progress toward meeting these goals with other healthcare providers involved in their care.⁴

Testimony to the Committee by Bonnie Spring, PhD, Professor of Preventive Medicine, Psychology, and Psychiatry; Behavioral Medicine Director and Co-Program Leader for Cancer Prevention at Northwestern University, highlighted the benefits of increased interprofessional collaboration and task sharing which covers the full complement of healthcare disciplines including non-clinicians.⁸⁶ She pointed out that the World Health Organization specifically recommends using collaborative strategies to reorganize the healthcare workforce in order to make more efficient use of available human and physical resources. Dr. Spring gave an example of a diabetes management intervention which realized cost-savings of \$1,125-\$1,075 per participant per year when the program was adapted for group delivery at community Young Men's Christian Association sites compared to costs in the original clinical setting.⁴²

Other experts testifying before the Committee agreed, including Patrick Remington, MD, MPH, Associate Dean for Public Health at the University of Wisconsin-Madison, and Kenneth Jones, PhD, the National Program Director for Weight Management in the National Center for Health Promotion and Disease Prevention of the Veterans' Health Administration's (VHA) Office of Patient Care Services, who both pointed out that patient/provider interactions during office visits provide only a brief opportunity to address what are often deeply ingrained, habitual health

behaviors.^{83,85} Thus, they agreed, it is important that healthcare providers adopt a team-based approach so that patients experience multiple exposures to and reinforcements of positive health behavior messages. Furthermore, when multiple members of the healthcare team participate in health behavior change efforts, the burden on time and resources can be more manageable and responsibilities shared.

Current literature identifies several promising areas in which interprofessional collaborations can produce positive health behavior change. Evidence indicates that pharmacists, nurses, and social workers can be trained to effectively intervene with people of all ages to improve smoking cessation rates.^{33,38,39} Other studies find that collaborations between physicians, pharmacists, psychologists, and social workers can effectively improve medication adherence among people with chronic conditions such as cardiovascular disease and diabetes.^{30,31,34} Studies also find that dieticians and physical activity specialists working in conjunction with primary care providers (PCPs) can more effectively improve levels of physical activity and reduce coronary heart disease risk factors among overweight patients than when PCPs intervene alone.¹⁸ Collaborations between different types of physicians such as general practitioners and emergency department providers have been found useful in producing a more patient-centered care plan as a result of their different care-giving styles.³²

Notably, Dr. Jones testified about the VHA's recent decision to institutionalize a collaborative, team-based approach to obesity reduction throughout its facilities, which comprise the largest healthcare system in the U.S.⁸³ He described the evolution of the MOVE! Weight Loss Program in response to significant rates of obesity and related chronic diseases among the 5.7 million veterans who are served by the VHA healthcare system. In this population, 77% of patients are either overweight or obese and 24% have diabetes (compared to ~7% diabetes in the general population).⁸³ Dr. Jones testified that three-fourths of participants either lose weight or halt weight gain after completing six sessions of the MOVE! program. In addition, 22% of men and 24% of women achieve a 5% weight reduction within six months of beginning the program and which, program data show, is stable 18 months later.⁸³ He testified that one of the most important features of the MOVE! program is that it is modeled on a team-based, collaborative approach that incorporates multiple disciplines including dieticians, nurses, psychologists, physical therapists, and other physical activity specialists who are each trained to be an effective health behavior change coach for participants.

Community-engaged scholarship (CES) is gaining momentum as a core value and practice at colleges and universities across the U.S. and abroad. It involves faculty and students working collaboratively and equitably with community partners to understand health determinants and to research health behavior change interventions. Ultimately, CES uses the information gathered and the relationships established to bring about transformational change.

Academic service learning can be a credit-bearing, educational experience that integrates meaningful community service with academic instruction and reflection to enrich the learning experience and teach future healthcare professionals about civic responsibility. Students, faculty, and community partners collaborate to enable students to help communities address health behavior modification, initiate social change, build effective relationships, enhance academic skills, and develop civic literacy.

Federal funding from HRSA and institutional incentives and rewards, (e.g., promotion and tenure criteria) which support CES and academic service learning would increase faculty and student involvement. This funding could strengthen community efforts to mount health behavior interventions focused on physical activity, smoking cessation, safe sex, healthy eating, and substance abuse mitigation.

Few individuals can develop and maintain positive health behaviors while living in communities that promote detrimental health behaviors. It is widely accepted that communities must be engaged in health improvement efforts if we hope to produce significant improvements in population-based health indicators. Testimony to the Committee by Patrick Remington, MD, MPH, Associate Dean for Public Health at the University of Wisconsin-Madison, and Bernard Guyer, MD, MPH, the Zanvyl Kreiger Professor of Children's Health at Johns Hopkins Bloomberg School of Public Health, particularly emphasized the importance of building community capacity to address health behavior change by engaging the broader community (i.e., the context in which all individuals live, work, and play) in health behavior change activities.^{82, 85} According to one concept analysis, "Community health is achieved through participatory, community development processes based upon ecological models that address broad determinants of health."¹⁶⁶ Thus, the importance of community engagement in local health improvement efforts is clear and requires healthcare providers who can effectively communicate and collaborate with a broad array of partners.¹⁶⁶

There is substantial evidence that forming community partnerships to carry out health behavior change interventions can produce positive results among large groups within that community.^{41, 43-46, 49, 51, 52} Experts testifying before the Committee concurred that, in order for sustained health behavior improvement to occur, it is necessary to engage the broader culture in supporting positive behaviors. Community partnerships between healthcare professionals and local businesses, YM/WCAs, schools, and even scout groups are well documented to have carried out effective health behavior interventions in diverse areas including physical activity, smoking cessation, safe sex, healthy eating, and substance abuse mitigation.^{41, 43-46, 49, 51, 52, 167}

Some researchers in the field assert that schools, in particular, should be centrally involved in promoting healthy behaviors.^{46, 51} In addition, engaging employers in supporting positive health behavior changes through worksite health promotion programs was encouraged in the previous national health agenda (*Healthy People 2010*) and continues to be supported in the *Healthy People 2020* document.¹⁶⁸ The rationale for this inclusion was based on research indicating that worksite health promotion efforts can be highly effective and substantially reduce costs for both the healthcare system and the employer.¹⁶⁷⁻¹⁷²

Multiple strategies to promote health behavior change through community engagement have been proven effective. An analysis of published interventions to increase physical activity identifies several 'exemplary' approaches to community engagement including informational approaches (e.g., mass media campaigns or delivering short behavioral messages at key community sites), social interventions (e.g., organized walking clubs), and policy leadership (e.g., increasing access to exercise opportunities through community planning).⁴³ Researchers in the area of community engagement emphasize that the specific type of intervention that will be

most effective in a given population largely depends on the community partner(s) involved, the intervention setting, and participant preferences.²

4. The ACICBL recommends that Congress direct the Centers for Medicare and Medicaid Services (CMS) to work with the American Medical Association's (AMA) current procedural terminology (CPT) editorial panel to provide CPT codes for brief and ongoing intensive prevention counseling. Further, the ACICBL recommends that Congress appropriate and CMS fund reimbursement for individual and interprofessional team assessment and counseling across all health professions for health promotion/disease prevention and ongoing intensive health behavior treatment interventions. This reimbursement will promote prevention practice through the alignment of a payment system that supports practice improvement. Prevention counseling CPT codes would increase the likelihood that all health professionals would address health behavior practices in disease prevention and health promotion activities and provide referrals as necessary.

Recommendation 4: Rationale

The rising prevalence of chronic diseases poses important policy considerations at every level of the U.S. healthcare delivery system from the federal government to state health agencies, health insurance companies, employers, all healthcare professionals, and individual healthcare delivery systems.⁶⁶ Unfortunately, providers currently receive little training and few incentives to assess and manage health behaviors among patients although these activities have been proven to reduce chronic disease risks. The recommendation to provide CPT codes and reimbursement supports the *Patient Protection and Affordable Care Act* of 2010 in which prevention counseling and health promotion are named as key quality indicators.⁷⁸ The recommendation for CPT codes and reimbursement also supports the most recent revision of the national health agenda, *Healthy People 2020*, in which health behavior assessment, treatment, and patient self-management of health behaviors are central elements.³

Charging health professional organizations and accreditation bodies with developing interprofessional core competencies around health behavior assessment, treatment, and patient self-management is necessary to embed health behavior change in the culture of health professions education and training. These recommendations emphasize the idea that there is value in addressing health behaviors because these activities can improve both population- and individual-level health indicators and the overall burdens of chronic diseases and healthcare costs.

Inviting industry leaders to participate in discussions about their roles and responsibilities in reducing poor population-level health indicators will contribute to broadening the dialogue and developing novel approaches to health behavior change. In addition, there is a great deal that healthcare providers can learn about successfully 'marketing' healthy behaviors from industry partners who have long known how to capture the public imagination via targeted marketing campaigns for their products.

Public and private policies are highly effective tools for encouraging healthy behaviors and discouraging unhealthy ones. Similarly, public and private policies are powerful levers for

motivating health professionals' behavior in practice settings. For example, research indicates that the most effective intervention to reduce second-hand smoke exposure is to implement and enforce 'no smoking' policies.⁶⁰ Additionally, state laws regarding mandatory minimum cigarette prices effectively prevent trade discounts from eroding the positive public health impact of tobacco excise taxes.⁵⁶

David Abrams, PhD, Executive Director of the Schroeder Institute for Tobacco Research and Policy Studies, testified to the ACICBL that stronger policy leadership among healthcare professionals is needed to press for full reimbursement of tobacco cessation counseling and interventions.⁸⁰ He explained that this is especially important in light of other data showing that insurance companies' medication reimbursement policies significantly affect prescription adherence among patients with a wide range of chronic and acute conditions.⁶³ Kate Lorig, RN, DrPH, Director of the Stanford Patient Education Research Center, made this point very succinctly in her testimony saying, "payment for services drives whether services are offered in the U. S. healthcare system."⁸⁴

A wide range of policies beyond those which directly affect healthcare services can also affect health behaviors. Urban plans for designing the built environment in cities and suburbs can have a substantial impact on the physical activity levels and, thus, on other health indicators among residents.⁵⁷ Employer initiated drug-screening policies can effectively reduce illicit substance use among employees.⁶⁷ Policies at healthcare facilities and medical schools can also create programs and incentives that nurture positive health behaviors through interprofessional models of patient-centered care. One example of this is adoption of referral policies that steer patients with poorly controlled chronic conditions such as diabetes and cardiovascular disease to pharmacist-led health promotion teams which have been shown to improve medication adherence rates.^{30, 31, 34} Furthermore, several experts testifying before the Committee, including Dr. Belinda Borrelli, Dr. Bonnie Spring, and Dr. Bernard Guyer, discussed the importance of including participation in interprofessional models of patient-centered care in tenure and promotion guidelines in order to raise awareness of the value of these aspects of the healthcare paradigm.^{5, 82, 86}

As Patrick Remington, MD, MPH, Associate Dean for Public Health at the University of Wisconsin-Madison, pointed out in his testimony, in this technological age, health data assessment tools such as state- and county-level health rankings are widely available and can attract media and policy-maker attention as well as stimulate public discussion about health issues.^{48, 50, 54, 85} This heightened attention can then be used to catalyze existing community health improvement efforts and to develop new ones aimed at addressing the most critical local issues.^{50, 54}

In his testimony, Bernard Guyer, MD, MPH, the Zanyvl Kreiger Professor of Children's Health at Johns Hopkins Bloomberg School of Public Health, discussed the fact that although the current U.S. healthcare system is under-performing in areas such as child health compared to other industrialized nations, policy leadership for reforming and transforming these aspects of the U.S. healthcare system is lacking.^{61, 77, 82} It is important that healthcare providers are prepared to contribute to long-term policy formation which will capitalize on opportunities to address systemic short-comings and improve population-based health indicators.^{61, 62} The

testimonies of Kenneth Jones, PhD, who directs a system-wide weight loss initiative at the Veteran's Health Administration, Carter Blakey, who directs the Healthy People initiative at the Department of Health and Human Services, and Vincent Fusca, who directs Dartmouth's Institute for Health Policy and Clinical Practice, discussed the importance of developing strong leaders within healthcare agencies.^{3, 81, 83} They agreed that there is a pressing need for leaders who can assess risks, build consensus, and implement broad-reaching policies that support transformative healthcare delivery paradigms especially in areas related to health behaviors.

Impact of Implementing the Recommendations

Implementing the recommendations for interprofessional education and training in health behavior assessment, treatment, and enhancement of patient self-management including addressing the need for supportive policy changes will clearly communicate the value of focusing on health behaviors to reduce chronic diseases and improve individual- and population-level health indicators. Implementation of these recommendations will also contribute to increasing momentum to transform existing healthcare systems to better reflect the known evidence-base regarding effective healthcare delivery processes for addressing health behaviors among both individuals and the broader community.

The recommendations in this report support recent activity at the national level regarding healthcare delivery including but not limited to the goals of *Healthy People 2020*, the *Patient Protection and Affordable Care Act*, and the *HITECH Act*.^{3,4,78} However, barriers to transforming healthcare delivery remain. It is an ongoing challenge for faculty members across all healthcare disciplines to continue addressing the preparation of the healthcare workforce to value health behavior change among their patients via education and training programs without strong support for this as a clinical competency and funding to support development and implementation of new interprofessional curricula. In addition, the need remains for practicing health professionals to embrace new practice styles which reflect the changing knowledge-base on how to most effectively assist patients in making positive health behavior changes.

The Committee believes that implementing the recommendations in this report will make substantial progress toward accomplishing two goals. First, implementation will provide experiential learning opportunities for the next generation of healthcare providers. Second, implementation will help health professions students, practicing providers, and healthcare workforces shift away from the old paradigm based on ‘silo’d’ discipline-specific care to a new one based on patient-centered communication and shared decision-making, interprofessional collaboration, community engagement, and policy leadership to support addressing health behaviors. These recommendations approach healthcare from a perspective of developing the competencies needed by the healthcare workforce to restore health while promoting healthy behaviors through health behavior change.

Vision for the Future

The *Patient Protection and Affordable Care Act* focuses on “... improving health outcomes, efficiency, and patient-centeredness of healthcare for all populations...” including identifying areas in the healthcare delivery system for rapid quality improvement.⁷⁸ The Act specifically supports addressing “wellness and prevention” related to health behavior issues such as smoking cessation, weight management, stress management, and healthy lifestyle support by integrating these services into the patient-centered healthcare home (primary care) and community-based services in order to promote positive health behaviors and outcomes.⁷⁸

The Act also proposes the use of “innovative approaches to clinical teaching using models of primary care” that include a patient-centered medical / healthcare home.⁷⁸ This healthcare home concept will serve as the nexus of integrated, team-based, interprofessional healthcare where

patient-centered communication and shared decision-making will be used to empower patients and their families to increasingly manage their health behaviors. Further, *Title XIII-Health Information Technology of the “American Recovery and Reinvestment Act of 2009”* states that enhanced federal funding for information technology “improves the coordination of care (and)... promotes early detection, prevention, and management of chronic disease.”⁴ Once again it has been recognized that enhanced communication among all healthcare providers and their patients and patients' families is part and parcel of an evolving healthcare system that must focus on health behaviors to assure quality of care.

Supporting education and training of the healthcare workforce in health behavior areas including population health, health promotion, and behavior change interventions focused on individual and family behaviors and their many attendant challenges (e.g., adherence to healthcare regimes, tobacco and weight control, chronic illness management, and children’s healthy development) will facilitate broader adoption of healthy behaviors across the lifespan, increased disease prevention, and enhanced restoration of health. The recommendations in this report focus on patient-centered communications and shared decision-making, interprofessional collaboration, community engagement, and encouraging supportive policies at the local and national levels to assure a high quality, efficient healthcare system. The Committee looks forward to the implementation of these recommendations as key steps to enhancing the patient-centered, interprofessional healthcare system of the future.

The importance of the Committee’s focus on health behaviors in this Tenth Report to the Secretary of Health and Human Services and the U.S. Congress is reinforced by testimony to the Committee by Carter Blakely, Acting Deputy Director of the Department of Health and Human Services' Office of Disease Prevention and Health Promotion.³ Ms. Blakely noted that improving health behaviors is one of four key, overarching goals in the recently completed *Healthy People 2020* which is the central component of the U.S. national health agenda. Further, *Title XIII- Health Information Technology of the American Recovery and Reinvestment Act of 2009* states that enhanced federal funding for information technology “improves the coordination of care (and)... promotes early detection, prevention, and management of chronic disease.”⁴ This legislation recognizes once again that enhanced communication among all healthcare providers and their patients and patients' families is part of an evolving healthcare system that must focus on health behaviors to assure quality of care.

This report presents specific education and training recommendations which, when implemented, will improve the readiness of the healthcare workforce, across disciplines, to promote positive health behaviors and provide clinical intervention that will enhance quality care and assure a more cost-effective service system. Timely adoption of these recommendations will allow the healthcare workforce to meet the *Patient Protection and Affordable Care Act* mandate of rapidly addressing positive changes to the healthcare system.

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APPENDIX

"Concept Paper

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Bonnie Spring, PhD, ABPP

PREPARING THE INTERPROFESSIONAL HEALTHCARE WORKFORCE TO ADDRESS
HEALTH BEHAVIOR CHANGE: INSURING A HIGH QUALITY AND COST-EFFECTIVE
HEALTHCARE SYSTEM

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I. PURPOSE / OVERVIEW

Chronic diseases now account for a majority of deaths in the United States and globally [1-2]. It is well-established that susceptibility to the major chronic diseases (e.g., cardiovascular disease, cancers, stroke) is associated with health risk behaviors and can be modified substantially through behavioral changes [3-4]. Health behaviors are those actions, habits, and decisions of individuals and communities that relate to attaining, maintaining, or regaining good health, preventing illness, and assuring overall wellness. Smoking cigarettes, leading a sedentary lifestyle, eating high calorie, low nutrient dense foods, and not following prescribed healthcare regimes are examples of detrimental health behaviors. Those risk behaviors interfere with health maintenance, increase risk for disease, and impede recovery from illness. On a population level, 40% of premature mortality is due to health behaviors, with the remainder attributable to genetic predispositions (30%), social and environmental determinants (20%), and insufficient medical care (10%) [4-5].

In the United States (U.S.), 95% of dollars spent on health care are applied toward the immediate medical costs of treating sickness [5]. Addressing the immediate, urgent demands of sick care has distracted us from the need to preserve the public's health [6]. Investment in health promotion and disease prevention is vital to keep the U.S. population healthy and stave off epidemics of chronic disease. Later in this report, we review evidence demonstrating that health behaviors are modifiable cost-effectively and with positive impact on health outcomes. Although almost no health intervention provides immediate return on investment, payers have a right to expect good value for dollars spent on the public's health. Preventive strategies that keep the population healthy by fostering healthy behaviors are among the most cost-effective health investments available [7]-[8]. Preparing the interprofessional healthcare workforce effectively to promote and restore health by addressing health behavior change is necessary to ensure a high quality and cost-effective healthcare system. We begin this report by appraising the current status of the nation's health behaviors and their associated consequences. Next we envision the improved, patient-centered, community-engaged, value-oriented health care system of the future. In that better future, interprofessional health care teams collaborate with patients to promote health and prevent disease through health behavior change. We recommend specific, feasible actions needed to equip the health care workforce to attain this vision and improve public health.

II. RELATIONSHIP BETWEEN HEALTH BEHAVIORS AND HEALTH OUTCOMES

A majority of life-threatening diseases around the world are now chronic and linked to health behaviors [1]. In the United States specifically, chronic diseases comprise seven of the ten leading causes of death [2]. Specifically, heart disease is responsible for 28.5% of all U.S. deaths and cancer is responsible for 22.8% [9]. Other major causes of death are cerebrovascular diseases (5.6%), chronic lower respiratory disease (5.3%) and accidents (5.1) [9]. Susceptibility to each of these leading causes of death is linked to health risk behaviors. Indeed, it is estimated that half of all deaths in the United States can be attributed to a select few preventable behaviors. Smoking and physical inactivity coupled with poor quality diet account for nearly one-third of all deaths [7] and alcohol abuse is a major risk factor for accidents [7-8, 10].

Each decade since 1979, the U.S. Department of Health and Human Services (HHS) has created national public health objectives focused on disease prevention and health promotion. The aim is to achieve public health targets by encouraging collaboration across legislative, community, health care and consumer sectors. Current goals in *HP 2010* emphasize ways to increase years of healthy life and eliminate health disparities. As 2010 nears an end, HHS has drafted the next set of objectives. *Healthy People 2020* features an expanded set of overarching, national-level goals focused on social determinants of health as well as on health outcomes and risk factors. The four goals are to: 1) attain high quality, longer lives free of preventable disease, disability, injury, and premature death; 2) achieve health equity, eliminate disparities, and improve the health of all groups; 3) create social and physical environments that foster good health for all; and 4) promote quality of life, healthy development, and healthy behaviors across the lifespan[11].

Despite the objectives outlined in *HP 2010* and 2020, recent data suggest that the U.S. population continues to fall short of its targets. Achieving a more consistent population-wide practice of healthy behaviors is one of very few viable ways to stem a rapidly developing tide of chronic diseases [7, 10]. Of great cause for concern is the alarming rise in obesity, foreshadowing epidemics of diabetes, cardiovascular disease, and other illness. Tobacco use previously was the main behavioral target of efforts to reverse preventable deaths. Now, poor quality diet and physical inactivity leading to obesity have become equal, if not greater, contributors to the burden of disease [7, 12].

Health Risk and Health Protective Behaviors

Several health behaviors are especially well-established to be linked to the leading causes of death, either negatively or positively [13-26]. These behaviors can be grouped into two categories. *Health risk behaviors* are unhealthful, detrimental, risky actions that heighten the odds of illness or impede recovery (e.g., failure to practice sun protection or get sufficient sleep). Four health risk behaviors have been especially well studied and consistently found to correlate with increased morbidity and mortality: (1) consuming a poor quality diet high in calories and fat and low in nutrients[27-31]; (2) smoking cigarettes [32-36]; (3) abusing substances including alcohol and licit/illicit drugs [37-50];and (4) engaging in risky sexual behaviors [51-53]. Conversely, *health protective behaviors* are healthful actions that reduce disease susceptibility or facilitate restoration of health (e.g., eating fruits and vegetables or taking prescribed medications). Three health protective behaviors are well-established to be associated with better health and recovery from illness: (1) being physically active [54-61]; (2) eating fruits and vegetables, and (3) being adherent with prescribed medication [62-68].

Some health protective behaviors (e.g., vaccinations, mammography screening) only need to be performed infrequently, and these simple health behaviors tend to have good rates of completion [3]. Adherence has proved more challenging to achieve for more complex health protective regimens that require frequent and consistent execution. Being adherent with prescribed medication represents a middle ground of behavioral complexity, at least so long as the number of drugs remains small and the patient's cognitive resources remain intact. At the upper extreme of behavioral complexity are eating and physical activity behaviors because these involve choices among many alternative options that need to be made multiple times throughout the day.

People who manifest health risk behaviors have greater odds of developing cardiovascular disease, cancer, diabetes, and sexually transmitted diseases than those who do not engage in these behaviors [1-2, 4, 7]. Similarly, individuals who practice health protective behaviors exhibit less morbidity and more rapid recovery than those who do not. Thus, from a population perspective, an optimal strategy to improve public health is to decrease the proportion of people that engages in unhealthy behaviors and to increase the proportion that performs health protective actions. From an individual clinical perspective, best practice is to help patients improve their health by reducing the frequency with which they perform key unhealthy behaviors, while increasing how often they perform healthful behaviors.

Since 1986, the Centers for Disease Control and Prevention (CDC) have implemented the Behavioral Risk Factor Surveillance System (BRFSS) to track the prevalence of health behaviors and health conditions in the U.S. population. The BRFSS survey provides annually updated state- and nationwide data on a number of health behaviors and conditions.

Health Risk Behaviors

Tobacco Use

Cigarette smoking remains the leading cause of preventable morbidity and mortality [32, 34-36, 69], resulting in 443,000 premature deaths every year [4]. Currently 21% of adults, 20% of high school students, and 6% of middle school students smoke cigarettes [70, 72]. Approximately 12.7% of Americans smoke daily; 5.0% smoke occasionally; and 55.5% never smoked [70]. Between the years 2000 and 2004, the average expenditure for smoking related health care was \$96 million annually [70]. About half of all smokers die from smoking-related disease. In the U.S., adult smokers lose an average of more than 13 years of life from negative consequences of smoking. In developed countries, smoking contributes to 30% of all cancers and is responsible for more than 90% of all lung cancers [71]. Added to that burden, smoking exacts a toll of more than \$96 billion annually in productivity losses [72].

Almost all cigarette smoking and smokeless tobacco use is initiated during adolescence, leading many to become addicted by age 20. Although youth cigarette use declined sharply from 1997 to 2003, rates have remained largely stable since then [73]. Currently, 20.0% of high school students and 6.3% of middle school students smoke cigarettes. In turn, adolescent tobacco use is associated with other health damaging behaviors: high-risk sexual behavior and use of drugs and alcohol [74].

Abuse of Alcohol and Other Drugs

Excessive alcohol intake ranks third among unhealthy lifestyle behaviors in the toll it takes on U.S. mortality [7]. According to the BRFSS, 53.9% of U.S. adults consume some alcohol. Moreover, 5.1% drink heavily (consuming more than 1-2 drinks per day) and 15.5% report binge drinking (consuming at least 4-5 drinks on a single occasion). In combination, alcohol and illicit drug consumption account for approximately 100,000 deaths annually in the United States [7]. On its own, excessive alcohol intake is responsible for an annual 79,000 deaths, with alcohol-related motor vehicle accidents claiming the lives of approximately 17,000 individuals each year [8]. Additionally, for each death that it causes, excessive alcohol use is responsible for about 30

years of potential life lost. In the United States, more than 1.6 million hospitalizations and more than 4 million emergency room visits for alcohol-related conditions occur yearly [75].

Risky Sexual Behaviors

Unprotected sex with casual partners occurs not uncommonly among adolescents and among men who have sex with men (MSM). Risky sexual behavior occurs as well among heterosexual adults[76-78]. Adolescents in the U.S. use alcohol and other drugs at high rates, and they are more likely to engage in unprotected sex when under the influence of drugs or alcohol [76, 79]. In 2009, 22% of high school students who had sexual intercourse during the past three months drank alcohol or used drugs before their last sexual intercourse[76]. In that same year, 34% of currently sexually active high school students did not use a condom during last sexual intercourse[76]. Whereas youth between ages 13-24 account for about 14% of people newly diagnosed with HIV/AIDS [80] they account for about half of those with new STD infections[81]. In a different population sector, 36% of men who have sex with men (MSM) reported not using condoms with casual sex partners [77].

High Calorie Diet, Overweight, and Obesity

We turn now to the most prevalent health risk behavior (overeating) and its natural sequelae (overweight and obesity). Weight gain results when energy intake from food calories exceeds combined energy expenditure from metabolism, the energy cost of physical activity and the thermic effect of food. In most parts of the globe, body weight has been increasing steadily [82]. In the U.S., for example, from 1973 to 2000, males gained an average of 7.3 kg and females 10.6 kg. The amount of excess energy intake needed to produce that degree of weight gain is surprisingly small. If one considers that 7700 kcal of energy intake is required to increase body weight by 1 kg, then the excess calorie intake required to produce the observed weight gain is only 7.3 kcal/day for males and 5.7 kcal/day for females [82]. It is the rule rather than the exception that contemporary dietary and physical activity environments easily tip the scales toward positive energy balance [82-83].

Among the influences fostering excess energy intake is that more eating than previously now occurs away from home. Between 1970 and 1999, money spent on non-home eating increased from 25% of total food spending to 47.5% of total spending. Moreover, in 2010, the proportion of food expenditures allocated to eating away from home is expected to reach 53% [84]. Fast food, defined as convenience food purchased in sales places without wait service, has come under suspicion as a prominent culprit in the obesity epidemic. Due largely to its convenience and low cost, fast food has become one of the most rapidly expanding sectors of the U.S. food distribution economy [85]. In addition to being widely purchased, fast foods have a number of characteristics that make them suspect in the obesity epidemic. They tend to be energy dense (i.e., they supply a very high number of calories per unit weight of food), nutrient poor, and supplied in excessive portion size [86]. Because humans are very poor at detecting and regulating how much energy they consume, eating fast food makes them prone to exceed recommended calorie allowances. It comes as little surprise, therefore, that elevated fast food consumption is strongly associated with excess calorie intake and obesity [87]. Moreover, economically deprived neighborhoods tend to have increased access to fast food restaurants and decreased access to stores selling healthy foods, contributing to health disparities[88-89].

Two-thirds of adults in the United States now qualify as overweight (having a Body Mass Index [BMI] between 25-30) or obese (BMI>30). In fact, Colorado is the only state where fewer than 20% of the adult population is obese [90]. According to the BRFSS, 27.2% of American adults are obese; another 36.2% are overweight and only 35.9% of American adults are neither overweight nor obese [90].

The medical costs of treating obesity-related disease are almost \$100 billion [90], or about 9.1% of aggregate medical spending[91]. If current trends continue, the rate of diabetes undoubtedly will increase exponentially as the obese population ages, creating high treatment costs with an insufficient cohort of younger people to carry the rising price of health care. The medical costs of managing obesity in youth are very small; however, costs increase almost exponentially with age. Lifetime medical costs for cardiovascular disease and its associated co-morbidities rise by 20% with mild obesity, 50% with moderate obesity, and nearly 200% with severe obesity [92]. Even beyond the medical costs, employers confront substantial costs associated with obesity-related absenteeism. In 2003, U.S. employers paid \$2.95 billion in expenses due to obesity related absenteeism [91]. The annual added dollar cost to an employer of medical and absenteeism expenses for an obese woman are \$1,170 for class I obesity (BMI 30-35) and \$3,230 for class II-III (BMI >35) obesity. Comparable added employer costs for obese men are \$410 and \$3,020, respectively. Over a lifetime, the added medical costs, discounted at 3% for a white female, are \$41,970 for class I obesity and \$72,520 for class II/III obesity[91]. Approximately half of the United States' obesity-attributable costs are paid by Medicare and Medicaid. Yet, despite this burgeoning problem and associated risks, only 42% of obese Americans report that a primary care practitioner has advised them to lose weight [93].

Health Protective Behaviors

Physical Activity

Physical activity can be considered a health protective behavior. In addition to helping to prevent weight gain and maintain weight loss, being physically active is preventive against cardiovascular disease (CVD), cancer, diabetes, and all-cause mortality [71, 94-96]. Increased physical activity is associated in a dose-response manner with decreased all-cause mortality (Figure 3)[94-95]. As compared to those who are inactive, adults who are active have up to a 50% reduction in cardiovascular disease risk. A significant reduction in CVD risk has been shown to accompany even a small increase in physical activity [95]. Even among those with existing CVD, physical activity attenuates and improves disease symptoms. Energy expenditure of 1600 kcal/week has been shown to stop the progression of coronary artery disease. Moreover, expenditure of 2200 kcal/week is associated with coronary plaque reduction in those with heart disease [95].

Regular physical activity also has been shown to be linked to reduced risk of cancers, particularly of the colon and breast. As compared to sedentary men and women, physically active men have a 30-40% reduction in risk for colon cancer, and physically active women have a 20-30% reduction in risk for breast cancer. Additionally, among individuals with colon and breast cancer, physical activity correlates with decreased recurrence and risk of death from cancer [95].

Yet, despite impressive evidence that physical activity is health protective, only about half of the U.S. population (50.6%) achieves the physical activity targets outlined in *Healthy People 2010*. The HP 2010 guideline recommends either 30 minutes of moderate activity on 5 days per week, or 20 minutes of vigorous activity on 3 days per week [5, 97]. Alarming, 25% of adults report no physical activity.

A new question has been raised recently about whether excessive sitting or too few breaks from sitting constitutes a separate health risk behavior that warrants its own public health guideline[98]. Recent epidemiologic evidence suggests that sitting time has adverse cardiovascular and metabolic effects. Those negative effects occur independently of whether adults meet physical activity guidelines: i.e., they cannot be “undone” by exercising for 30 minutes per day. Physical inactivity related to sitting and lying down appears to exert its own unique effects on one set of molecular processes, whereas exercise exerts its effects through other pathways [98-99]. It has been suggested that the beneficial effects of achieving the guideline-recommended 30 minutes per day of exercise may be “undone” if the person spends the remaining 15.5 hours in sedentary time [98]. If results continue to bear out that excessive sedentary time is a risk factor, it may become necessary to amend public health guidelines to advise shortening or breaking up bouts of sitting in addition to introducing bouts of moderate to vigorous intensity physical activity.

Fruit and Vegetable Intake

Consumption of fruits and vegetables has far-reaching health benefits. A strong association exists between fruit and vegetable consumption and reduced risk of many types of cancer and heart disease[100]. The association between fruit and vegetable consumption and cancer risk reduction is strongest for cancers of the esophagus, lung, stomach, and colon/rectum. Vegetable, but not fruit, consumption is associated with decreased breast cancer risk, whereas fruit, but not vegetable consumption is associated with decreased risk of bladder cancer [101]. Also, developing evidence suggests that fruit and vegetable consumption protects against other ailments, including stroke, diverticulitis, chronic obstructive pulmonary disease (COPD), cataracts, and hypertension [100]. It has been estimated that a diet high in fruit and vegetables (5 or more per day) could prevent 20% of cancers[100].

Yet although dietary guidelines specify fruit and vegetable consumption as necessary for a healthy diet, only 23.5% of adults eat the recommended five fruits and vegetables per day [102]. More alarmingly, 35% of Americans eat no vegetables daily and 57% eat no fruit daily. Indeed, no state in the U.S.A. attained its daily target for fruit and vegetable consumption [6].

Adherence to Prescribed Treatments

Adherence to prescribed medications helps to promote recovery from acute illness and prevent progression of chronic diseases. However, despite solid evidence that prescription drugs are effective, medication adherence in actual practice is typically only about 50%, particularly after the first six months of treatment [103-105]. Specifically, non-adherence is approximately 49% for lipid lowering agents, 42% for oral anti-diabetic agents, and 36% for antihypertensives [106]. Non-adherence to prescribed treatment accounts for 33% to 69% of medication-related hospital

admissions. In turn, the medical costs of prescription non-adherence are estimated at \$100 billion dollars annually [107-109]. Omitted or mistimed medication self-administration (whether intentional or not) compromise treatment efficacy and are difficult to detect [110]. On the other hand, it has been shown that reinforcing adherence by incentivizing patients and providers can reduce non-adherence (Haynes et al., 2002). Likewise, behavioral interventions to address non-adherence have been shown to improve adherence to antiretroviral therapy in HIV [111], and hold promise for other medication classes.

III. IMPROVING POPULATION HEALTH THROUGH THE LIFESPAN BY SYSTEM-WIDE INTERVENTION

Lifespan Influences

A lifespan perspective on health is needed in part because early life adversity has disproportionately negative effects [112]. The negative influence of childhood disadvantage on health persists over the course of a lifetime and actually becomes stronger with age. The correlation between years of education and health is particularly robust [113]. At a population level, low education is associated with low income and poor health literacy [114]. In turn, 50% of the variance in an individual's years of schooling is explained by parental socioeconomic status [112]. Being born into a socio-economically disadvantaged family begins a gradual cascade of unfortunate occurrences whose consequences tend to snowball and become progressively more difficult to overcome [115].

With low income, comes restricted access to a high quality education. Then, in the later teens and twenties, economic disadvantage introduces a further constraint. Limited financial reserves constrain a person's ability to delay full-time employment in order to finish high school, college, or graduate training. That, in turn, places limitations on employment prospects, which in turn, constrains the ability to secure health insurance and access to medical care. In the event of illness, the individual may be unable to afford the cost of medical treatment needed to delimit the course of the illness and prevent further complications. Often, the cost of multiple medications is out of reach financially, undermining treatment adherence and increasing the risk of developing co-morbid problems. The cycle of disadvantage then becomes visited upon the next generation, as children born into the family must forego necessary immunizations, preventive care, and illness management that could stave off later disease.

Cost considerations also suggest the wisdom of a lifespan approach to health policy. From a lifespan perspective, most preventive interventions are considerably more cost-effective than are treatments initiated in response to emergent or established disease [116]. Some health behavior change interventions are extremely inexpensive, while others initially cost more than medical interventions. In the long-run, however, health behavior change interventions are among the most cost-effective health interventions known [116-118]. The challenge for U.S. health care financing is that the cost-effectiveness advantage of health behavior change interventions usually takes several years to be realized [117]. Few private health insurance companies are willing to make the investment needed to achieve health behavior changes because their business model requires recouping a return on investment within one to two years, i.e., before patients are expected to transition to a different insurance provider. Investment in prevention and health behavior change is, therefore, more financially logical and characteristic of health care systems

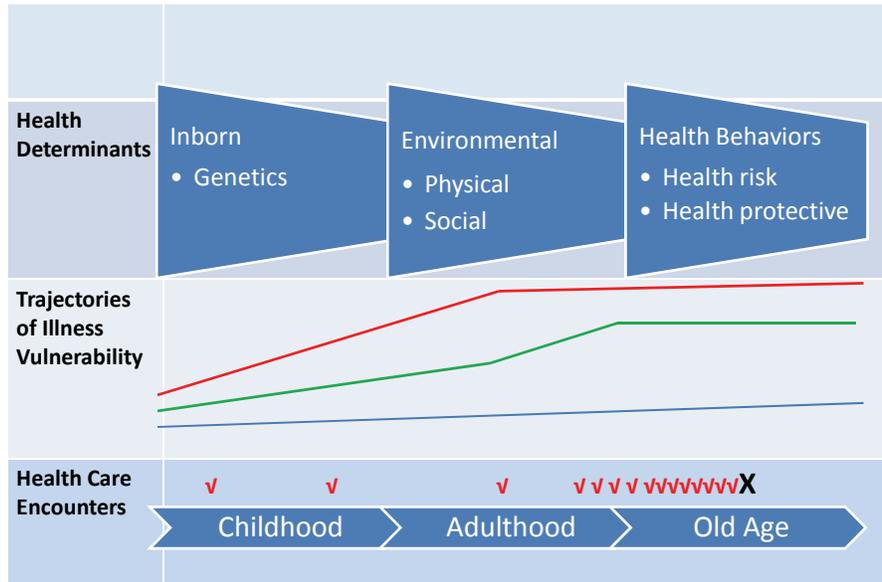
that expect to retain patient members over a long time span. Those health systems (e.g., the military, Veterans Administration, Kaiser Permanente, or Puget Sound Health Cooperative) that invest more extensively in prevention tend to perform better on quality indicators, cost-effectiveness, and patient satisfaction [119-122]. Stated differently, a lifespan perspective on health follows from health care policy that aligns incentives less exclusively with short-term profit and more broadly with doing what is right for the patient and for population health.

Conceptual Model: Development of Illness Susceptibility Over the Lifespan

The conceptual model shown in Figure 1 depicts how health determinants and health care access interact over the lifespan to engender different trajectories of illness vulnerability. The three main categories of health determinants are: 1) genetic influences; 2) environmental determinants; and 3) health behaviors. Individuals begin life with inborn genetic predispositions: for example, polymorphisms that heighten the risk of diabetes [123] and cardiovascular disease [124-125]. Whereas the genetic blueprint shapes the person's range of illness susceptibilities, environmental determinants and health behaviors determine the degree to which these vulnerabilities will be expressed phenotypically. Environmental determinants include both social and physical influences that affect health over the lifespan. For example, social determinants include the influences of family and community, education, race/ethnicity, discrimination, and access to health care. Physical determinants include exposure to pollutants, crime, and access to housing and space for physical activity.

Environmental determinants and health behaviors exert their influence throughout the lifespan by acting to shape the acquisition or epigenesis of vulnerabilities to illness [126-128]. Social and physical determinants act also as exposures or triggers that influence whether and when disease risk becomes transformed into disease expression. Consider, for example, a person who is born with a gene that predisposes to lung cancer. Under ordinary circumstances, the gene might remain quiescent throughout the person's life. However, this particular individual grew up in a gang-infested neighborhood in which his high status young peers believed that smoking conveys toughness. Having succumbed to peer pressure and acquired the habit of smoking, he became addicted to nicotine and continued smoking. Via his smoking behavior, he recurrently exposed himself to carcinogens that induced the gene toward carcinogenesis. As the example illustrates, environmental influences and behaviors interact with genetic predispositions across the lifespan to either elicit or constrain the vulnerability, emergence, progression, and course of illnesses. Often, the physical and social environments associated with economic disadvantage are inhospitable to maintaining healthy behaviors. In urban poverty areas, fresh fruits and vegetables are usually inaccessible or very expensive, rendering fast foods more affordable, convenient, and tasty than healthier dietary options. Gang warfare or other crimes can render neighborhoods unsafe, discouraging outdoor physical activity. Even in the face of motivation and a desire to change, these realities challenge an individual's ability to make and sustain healthy behavior choices.

Figure 1
Health Determinants, Health Care Encounters and Illness Susceptibility Over the Lifespan



The figure diagrams determinants of several possible courses of vulnerability to illness from childhood through adulthood and old age. The top row depicts the main sources of susceptibility to illness as either: inborn (i.e., arising from genetics), contextually derived (i.e., acquired as a result of experiences with the environment, family, or health system), or acquired as a consequence of health risk behaviors. The middle row depicts three different trajectories of how illness susceptibility can develop across the life course. The bottom line shows an ideal trajectory, whereby vulnerability to illness begins and remains low, rising only slightly and gradually throughout the lifespan. The top line shows an adverse trajectory in which early life disadvantage, health risk behaviors, and failure to recover from illness heighten illness susceptibility from childhood onward. The middle line depicts an intermediate trajectory in which illness susceptibility is somewhat heightened as a result of childhood disadvantage but remains contained until further compromised by the emergence of multiple co-morbid conditions in later adulthood. The bottom row shows health care encounters across the life course. The checkmarks signify that the depicted pattern of health care contacts represents that expected to accompany an adverse trajectory of illness susceptibility. Health care encounters are minimal during childhood when preventive care could help to build disease resistance and during adulthood when full recovery from illness might be possible. Care episodes are recurrent in late adulthood and old age to cope with entrenched disease

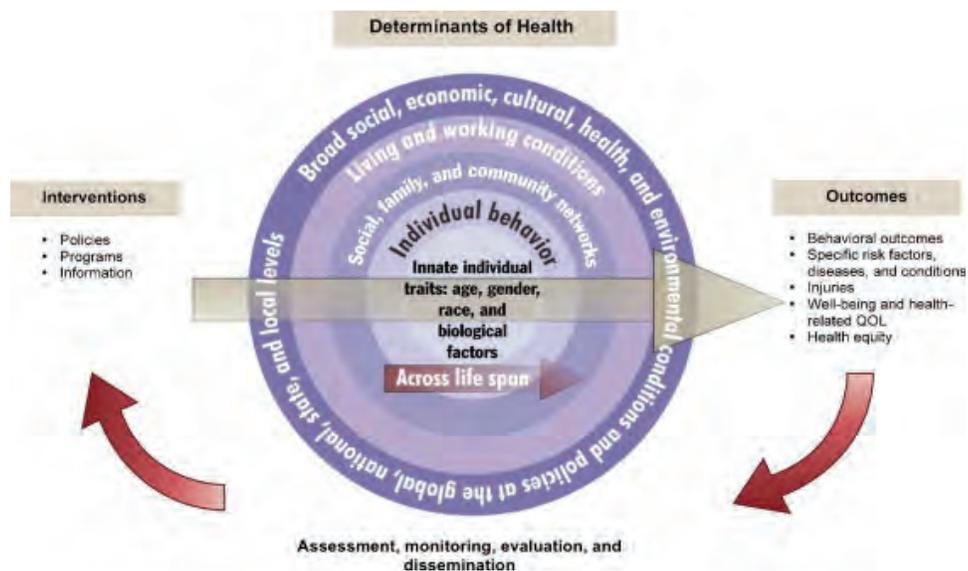
Figure 1 also illustrates how interactions with health professionals and the health care system can either contain or exacerbate the emergence of illness vulnerabilities. The check marks and trajectory depict life course data for a hypothetical individual born into an impoverished, uninsured family with a history of obesity and Type II diabetes. Note that the family’s lack of health insurance precludes childhood healthcare contacts for well-child visits, immunizations or other preventive care. Instead both childhood medical contacts occur via the hospital emergency room – one resulting in admission for meningitis, the other in repair of a gunshot wound. During adulthood, the person’s prediabetes, hyperlipidemia, and hypertension go undetected. With their progression left unchecked, diabetes and cardiovascular disease become overt but go untreated, and co-morbid depression develops. The individual’s obesity becomes severe and he develops leg pain associated with peripheral artery disease. The combination of pain and depression further undermine his motivation to engage in physical activity. He becomes more sedentary and socially isolated. His first health care contact in adulthood involves hospitalization for a myocardial infarction, after which he feels too depressed to keep follow-up appointments and or adhere to medications [129]. Later adulthood and the onset of old age bring frequent hospitalizations to manage complications arising from untreated diabetes, hypertension, and cardiovascular disease. The person’s premature death follows multiple, expensive episodes of

hospital-based care towards the end of his life. This downward spiraling life trajectory, all too common among U.S. citizens, extracts an enormous toll in quality of life and health care costs. To reverse it will require educating health professionals to lead a concerted, coordinated effort across the systems that influence population health.

Educating Health Professionals to Improve Health Behaviors: The HP2020 Systems Approach

Healthy People 2020 lays out an action agenda consistent with the conceptual model just outlined. The HP 2020 objectives are to reduce adverse health determinants and promote healthy development and healthy behaviors across the lifespan [11]. Figure 2 depicts the HP 2020 ecological model and action plan [113]. The strategy is to conjointly target determinants at multiple ecological levels in order improve health outcomes in ways that are more synergistic and sustainable than targeting a single level [130-131]. In particular, the HP 2020 action targets are environmental determinants – both social and physical – and health behaviors. Helping to move the US population toward healthy behavior change requires a coordinated effort across all levels of the system. To drive those changes, health professionals require an education that equips them for new roles.

Figure 2
Action Model for Achieving Healthy People 2020 Goals



This diagram is comprised of five circles that layer upon each other to create one large circle, with the title "Determinants of Health". In the center are "innate individual traits: age, gender, race, and biological factors". The following layers, from inside to the outer layer, are "individual behavior", "social, family and community networks", "living and working conditions", and "broad social, economic, cultural, health, and environmental conditions and policies at the global, national, state, and local levels". The first three circles are overlapped by an arrow that states "across the life span". Outside of the circle are arrows that flow around the circle in a clockwise direction, connecting the following: "Outcomes: behavioral outcomes; specific risk factors, diseases, and conditions; injuries; well-being and health-related QOL; health equity", "Assessment, monitoring evaluation, and dissemination", and "Interventions: policies; programs; information".

Policies

Policy interventions comprise the outermost layers of HP 2020’s action plan and are the strategies with greatest population reach. Public policies are a highly effective means of

reducing risky health behaviors. For example, policies were a key driver of the 50% reduction in smoking prevalence that has occurred since the mid-1960s [132-134]. Two policies in particular – increasing tobacco prices and smoke-free policies – proved highly effective. In a double-pronged attack, state laws regarding mandatory minimum cigarette prices effectively prevented trade discounts from eroding the positive public health impact of tobacco excise taxes [135]. Likewise, in a double victory, implementing smoke-free policies not only encouraged smokers to quit, but also reduced nonsmokers' exposure to second-hand smoke [136].

Competency in policy leadership has not traditionally been an objective in the education of health professionals. We suggest, however, that it should be. Because they share the core value of beneficence (promoting the wellbeing of others), healthcare professionals are ideally credentialed to drive policy changes that can positively impact population health. Moreover, guidance from health professionals is necessary to balance vested financial interests that might otherwise determine health policies. Beneficent leadership is especially needed, and sometimes lacking, to set policy in the arenas of care reimbursement and regulatory standards for foods and drugs.

One key policy obstacle has effectively disincentivized health professionals' involvement in health behavior change. That barrier is a lack of billing codes to reimburse providers for delivering the most effective health behavior change procedures. Many plans cover brief preventive counseling by a physician. However, the low level of remuneration for preventive counseling, as compared to covered medical procedures, greatly reduces the odds that physicians will attend to health behaviors during the typically short medical encounter. Brief patient-centered counseling by a physician can foster health behavior change, as compared to no intervention [169]. However, brief counseling is considerably less effective and less cost-effective than more intensive behavioral interventions, i.e., those that entail more frequent and longer treatment sessions [169, 173]. Not surprisingly, although brief, infrequent physician-patient interaction makes a contribution to behavior change, brief counseling alone is usually insufficient to change what are often deeply ingrained, habitual health behaviors [137-138]. Moreover, other non-physician members of the health care team (health psychologist, nurse, nutritionist, health educator) are often better equipped by training and availability to provide behavior change counseling.

To be maximally effective in encouraging behavioral preventive services, coverage policy will likely need to be redesigned to allow reimbursement of health care teams. That is because health behaviors can be addressed effectively via the use of task shifting: systematically delegating responsibility to the best qualified and most accessible member(s) of the health care team. Ideally, task shifting to address health behaviors can be performed via a warm hand-off from the physician to a co-located behavior change specialist. In the absence of on-site health behavior change expertise, referral to an established network of collaborating health behavioralists should become feasible through the electronic health record. Policy change that lets multiple members of the healthcare team participate in health behavior change efforts allows patients to experience multiple exposures to and reinforcements of positive health behavior messages. Further, the burden on the health care team's time and resources becomes more manageable because responsibilities are shared. A collaborative, team approach to healthcare delivery is increasingly recognized to improve long-term outcomes across a wide range of chronic and acute conditions

[139-145], while increasing consumer satisfaction, treatment adherence, and care coordination [144]. The policy engagement of health professionals now is needed to align reimbursement policies in a manner that cost-effectively fosters healthy behavior change.

Policy leadership skills would equip health professionals to recognize and drive the kinds of systems changes needed to enable our nation to meet HP2020 goals. As noted, one such policy need involves ensuring reimbursement across all health professions for interprofessional team-assessment, health promotion counseling and intensive health behavior change treatments. A second policy need involves influencing the major health professional organizations and accrediting bodies to include health behavior interventions and patient-self management skills as necessary professional competencies. A third involves bringing together stakeholders from industry, insurance, and the government to forge innovative policies that can help reverse the obesity epidemic by improving access to healthy foods and physical activity opportunities. Food taxes, subsidies, labeling, and advertising can all powerfully affect the likelihood of healthy eating by the population[146]. Similarly, policies that enhance green spaces, sidewalks, public safety, and school physical activity have a pervasive influence on the feasibility of exercise for much of the public [147].

Community and Social Networks

Few individuals can develop and maintain positive health behaviors while living in communities that promote detrimental health behaviors. The prospects for significant, sustained improvements in population health hinge upon communities becoming engaged in health improvement efforts. Community engagement extends health promotion efforts out of the medical clinic and into the surrounding environment to pervade and improve individuals' lives. Activating citizens to take personal responsibility and care for their health builds behavior change momentum. Motivated and empowered patients add consumer pull to the health professional's push towards healthy behaviors. Adherence to healthy behaviors is greater when behaviors are experienced as personally (autonomously) chosen rather than extrinsically demanded [148].

Earlier in the paper, we recommended addressing health behaviors via the use of task shifting among members of the health care team. The World Health Organization has extended the meaning of task shifting to include increasing community participation in health. They specifically propose building health care capacity by delegating tasks to less specialized cadres of the workforce [149]. The strategy of collaboratively shifting health care tasks among workforce members, including non-clinicians, originated to cope with scarcity of health professionals in under-resourced settings [150]. Task shifting offered a way to reorganize the healthcare workforce in order to make more efficient use of available human and physical resources [149]. Systematic evidence reviews show that delegating tasks to non-professional (i.e., lay) health workers can improve access and quality of health services at similar or lower cost than conventional professional care delivery models [151-154].

Task shifting to community members holds particular promise and has been widely adapted for use in rural and impoverished urban areas. Several successful examples involve the use of lay health workers, including promotoras [155], patient navigators [156], community advocates [155], and peer supporters [157]. A noteworthy recent success at task shifting involves training

YMCA workers to deliver the highly effective Diabetes Prevention Program [DPP] [158]. The DPP is an intensive lifestyle treatment that fosters weight loss through changes in diet and physical activity. In a multi-site randomized clinical trial involving more than 3000 people with impaired glucose tolerance, the DPP proved highly effective and more cost-effective than metformin in delaying or preventing the onset of Type II diabetes [117] [159]. Having health professionals deliver the DPP to patients on an individual basis costs approximately \$1400 per patient. However, the DPP can be implemented effectively and for \$275 to \$325 per participant by training YMCA staff to implement a group-based version of the program [158, 160].

The success of task shifting has highlighted the benefits of educating health professionals about their patients' communities and equipping them with the collaborative skills needed to organize and work in partnership. In Community-Engaged Scholarship (CES), faculty and students work together with community partners to understand environmental determinants and to test how to optimize healthy behavior change. Ultimately, CES uses the information gathered and the relationships established to bring about transformational change. Academic service learning can be a credit-bearing, educational experience that integrates meaningful community service with academic instruction and reflection. The experience teaches future healthcare professionals about civic responsibility by enabling them to help communities address health behavior modification, initiate social change, build effective relationships; and develop health literacy.

Comprehensive task shifting requires a reorganization of health teams that integrates workers at the primary care and community levels [150]. Just as lay health workers need to be recruited and trained, there is usually a need to modify the roles, skills, and workloads of the health professionals who will supervise them, and to reconfigure other team members' responsibilities accordingly. For example, if nurses take on supervision of the lay health workers, further task shifting will be needed as other members of the health care team take over some functions previously performed by nurses. Moving the introduction of community health workers beyond a fragmented, unsustainable "add-on" requires a health team approach [150]. One added benefit is a community that is increasingly activated and empowered to take personal responsibility for its health. Another value added is a cadre of clinical professionals whose ability to help patients is genuinely informed by an understanding of their surrounding environmental context.

Shared Decision-Making: The Provider - Patient - Family Relationship

Individual patients comprise the innermost layer of the HP2020 action targets. Through shared decision-making, there are opportunities to facilitate behavior change at the point where individuals, their families, and healthcare providers intersect. A frustrating reality for many providers is that patients make most of their health decisions weeks and miles away from any contact with a health professional [161]. Maintaining a high quality collaborative relationship with the patient and family is one way that providers can extend their reach and positively influence remote decisions about health behaviors. A good relationship between patient and healthcare provider is well-established to correlate with improved treatment adherence [162-163]. Therefore, cultivating a healthcare workforce that is patient-centered, and practitioners who work collaboratively with their patients affords a vehicle through which the health behavior goals of the nation can be achieved.

Enhanced communication and shared decision-making among all healthcare providers and their patients and patients' families are part and parcel of an evolving healthcare system that must focus on health behaviors to assure quality of care. The *Patient Protection and Affordable Care Act* (PPACA) of 2010 names prevention counseling and health promotion as key quality indicators [164]. The Act endorses addressing "wellness and prevention" by integrating healthy lifestyle support into the patient-centered healthcare home and community-based services. Core features of the healthcare home include: 1) a personal primary care provider who establishes and maintains a relationship with the patient, 2) a physician who leads a multi-disciplinary team of providers who are collectively responsible for ongoing patient care, 3) a patient-centered orientation in which providers and patients work collaboratively toward the primary, secondary, and tertiary prevention of disease, 4) coordinated and integrated care both within the primary care team and extending to include specialist and community referral, 5) a focus on quality improvement and overall safety with the use of performance measurement, decision-support technology, electronic health records (EHR), and evidence-based practices, and 6) enhanced access to the healthcare team through extended hours, group visits, telephone, email, and web-based communication. Recent reviews of the health care home approach demonstrate improved patient health outcomes, increased patient satisfaction, improved quality of care, and reduced medical errors [165]. The ongoing intent for the healthcare home is to serve as the nexus of integrated, team-based, interprofessional healthcare where patient-centered communication and shared decision-making will be used to empower patients and their families to increasingly manage their health behaviors.

As noted earlier, the patient's vulnerability to illness develops longitudinally over a lifespan. In that life trajectory, encounters with health care providers occur as brief, periodic, cross-sectional slices that give the patient-provider relationship an opportunity to emerge. The relationship is richer to the extent that the health care team has a good understanding of the patient and family, their community context, and their resources. A trusting and collaborative patient-provider relationship increases the likelihood that the encounter can be a mutually teachable moment during which decision-making is effectively shared. The outcomes of each health care encounter are decisions about behaviors that bear on the patient's health: whether to quit smoking, begin a new medication, undergo a surgery, etc. The patient's and provider's shared decision-making about health behaviors should result ideally in change strategies that are tailored to the patient, feasible, and likely to succeed.

The model of optimal shared decision-making shown in Figure 3 was put forward by the interprofessional Evidence-Based Behavioral Practice (EBBP) Council, sponsored by the National Institute of Health's Office of Behavioral and Social Sciences Research [166-167]. The model harmonizes the approaches taken to evidence-based practice by professionals in medicine, nursing, psychology, social work, and public health. By creating shared vocabulary and a conceptual framework, the model supports collaboration among diverse professionals on a health care team. The schematic depicts the three circles (i.e., data streams) that patient and provider need to integrate in order to arrive at a shared decision about health behavior change.

The data streams that the provider and patient need to integrate via shared decision making are: 1) best available research evidence about effective behavior change practices; 2) consideration of the patient's characteristics, values, and preferences, while taking into account, 3) the available

resources and surrounding context. The importance of the research evidence is that it conveys cumulative scientific knowledge about which interventions have proved effective for the average patient. In turn, the significance of the patient's unique attributes is that they sometimes suggest that the treatment that research shows to be a best practice for most people is not optimal for this particular patient. For example, the patient may have responded poorly to the treatment on prior occasions or may express unwillingness to adhere to it. Finally, available resources have a direct, pragmatic bearing on whether a treatment is feasible to implement. Relevant resources include insurance coverage to pay for the treatment, providers who are trained and available to deliver care, environmental features that support health behavior change, etc. A health care team that understands the patient's surrounding context, preferences and resources, and that enjoys a good collaborative relationship with the patient will be poised to help the patient make healthy choices that generalize beyond the clinic and into real life.

Figure 3
Shared Evidence-Based Decision Making During the Health Care Encounter



The EBBP Three Circles Model is comprised of three circles that are tied together, creating an overlapping middle section that represents shared, evidence-based decision-making. The three circles tied together by shared decision-making are: best available research evidence; client/population characteristics, state, needs, values, & preferences; and resources, including practitioner expertise. All three circles exist within the larger environmental and organizational context.

The Role of Informatics in Supporting Shared Decision Making about Health Behaviors

The complexity of shared decision making cries out for digital infrastructure to support the undertaking. The electronic health record (EHR) is quickly emerging to meet that need. The EHR's decisional algorithms already prompt providers to assess a few behavioral risk factors. The functionalities of future EHRs will need to be still more extensive: more proactive in engaging the patient, more informative about available resources, better able to connect patients to needed community-based care, and more successful in coordinating the efforts of multiple providers. In addition to including extensive information about a patient's medical history, an ideal EHR should prompt shared decision making about health behavior change by providing an efficient appraisal of behavioral risk factors and available resources. A patient portal with engaging features that motivate users to self-assess their behavioral risk factors would bring patients to the provider visit having already contemplated which behavior(s) to target for improvement. By reducing time burden during the office visit, such a system would enable the

primary care provider to reinforce the patient's motivation and refer, electronically, to resources that match the patient's needed level of behavior change assistance.

Following a stepped care model, some patients will require little more than the provider's advice and a follow-up appointment to monitor behavior change progress. Others will prefer technology-mediated self-help via intelligent referral to the growing armamentarium of computer-, web-, or smart phone-mediated behavior change products. Still others will require more intensive, extended intervention from a behavior change specialist to alter unhealthy habits that have become recalcitrant. Ideally, the EHR database will include information about the patient's health insurance, including covered benefits and any co-pays, as well as names of health behavior change specialists covered as "in-system" providers and those accepting new patients. The provider will then be able to refer electronically through the EHR to a resource that is tailored by location, insurance coverage and cost, and by the patient's preferred treatment modality. The care continuity of the "warm-handoff" that can be achieved by co-locating behavior change specialists in primary care also can be approximated by electronic referral to a community provider who follows up by proactive telephone outreach to the patient. As such, the connectivity afforded by a fully functional EHR will support shared decision-making by opening up efficient lines of communication between the patient and collaborating health professionals.

IV. EVIDENCE-BASED INTERVENTIONS FOR HEALTH BEHAVIOR CHANGE

Current Context

Addressing health behaviors is a core health promotion and disease prevention strategy needed to reverse the health care financial crisis and stave off future epidemics of disease. Primary care providers are ideally positioned to advocate proactively for healthy behavior change with their patients. Most adults with behavioral risk factors see a physician at least annually: for example, more than 70% of smokers do so [168]. Clinical practice guidelines recommend that, at every visit, physicians assess the major behavioral risk factors, provide brief intervention, and arrange follow-up [169-170]. However, physician guideline adherence is far from perfect. Only approximately 51% of smokers report having been asked about smoking by their provider; 45.5% say they were advised to quit; 14.9% were offered assistance with quitting, and 3% were scheduled for a follow-up appointment [171]. Similarly, even though 80% of obese primary care patients say they are trying to lose weight and believe that their doctor can help [172], only half report that their provider recommended weight loss [173]. Moreover, only a minority were offered the active problem-solving and follow-up needed to promote weight loss: 20% were offered assistance and 10% were scheduled for follow-up [174].

Substantial evidence indicates that reducing health risk behaviors decreases morbidity and mortality and does so cost-effectively[17, 116, 175-178]. It is remarkable how few insurers have reimbursed health behavior change interventions, creating little incentive for providers to offer these treatments. As noted, a foreshortened time perspective (the need to recoup a return on investment over an average of two years) has led many insurers to regard professionally delivered health behavior change interventions as too expensive to be financially viable. On the contrary, however, over a longer time span, behavioral interventions are at least as cost-effective as most medical interventions and their cost-effectiveness increases as intervention becomes more intensive [176].

Facilitators and Barriers to Addressing Health Behaviors

A major barrier to addressing health risk behaviors will be removed shortly. Effective beginning January 1, 2011, The Affordable Care Act requires that health insurance companies cover, without co-payments, all preventive services given an “A” or “B” rating by the United States Preventive Services Task Force (USPSTF) [179]-180]. The risk behavior treatments now mandated for coverage are shown in Table 1. An “A” rating indicates that the intervention provides a high certainty of substantial benefit, as shown by consistent results from randomized controlled trials conducted in primary care settings representative of the U.S. population. A “B” rating indicates that the intervention provides a high certainty of moderate benefit or a moderate certainty of substantial benefit to the general population. To qualify for a “B” rating, randomized controlled trials testing the intervention were well-designed and well-implemented, but were limited in number, size, or ability to generalize across settings [170].

Table 1
Preventive Services Recommended as Having A or B Level Evidence by USPSTF [170]

TOPIC	RECOMMENDATION	GRADE
Tobacco Use	The USPSTF recommends that clinicians ask all adults about tobacco use and provide tobacco cessation interventions for those who use tobacco products.	A
	The USPSTF recommends that clinicians ask all pregnant women about tobacco use and provide <u>augmented</u> , pregnancy-tailored counseling to those who smoke.	A
Overweight/Obesity	The USPSTF recommends that clinicians screen all adult patients for obesity and offer <u>intensive</u> counseling and behavioral interventions to promote weight loss for obese adults.	B
	The USPSTF recommends that clinicians screen children aged 6 years and older for obesity and offer them or refer them to comprehensive, <u>intensive</u> behavioral interventions to promote improvement in weight status.	B
Healthy Diet	The USPSTF recommends <u>intensive</u> behavioral dietary counseling for adult patients with hyperlipidemia and other known risk factors for cardiovascular disease. <u>Intensive</u> counseling can be delivered by primary care clinicians or by referral to other specialists, such as nutritionists or dieticians.	B
Alcohol Misuse	The USPSTF recommends screening and behavioral counseling interventions to reduce alcohol misuse by adults, including pregnant women, in primary care settings.	B
Sexually Transmitted Diseases	The USPSTF recommends <u>high-intensity</u> behavioral counseling to prevent sexually transmitted infections (STIs) for all sexually active adolescents and for adults at increased risk for STIs.	B

The Table outlines the services recommended for health risk behavior prevention and treatment by the United States Preventive Services Task Force (USPSTF). Recommended services concern screening and intervention for tobacco use, overweight/obesity, healthy diet, alcohol misuse, and sexually transmitted diseases. Services qualify as recommended if the evidence supporting them is given a grade of A (indicates that the intervention provides a high certainty of substantial benefit as a result of consistent results from randomized controlled trials in primary care settings representative of the United States population) or B (indicates that the intervention provides a high certainty of moderate benefit or a moderate certainty of substantial benefit to the general population). Current evidence is judged to be insufficient to recommend for or against the use of other preventive services not listed in the table.

Despite removal of a major financial barrier, physicians still perceive many obstacles to providing behavior change interventions [180]. The barriers they report include: (1) lack of training and expertise in behavior change counseling; (2) insufficient time during the primary care visit; (3) lack of knowledge about appropriate referral options; and (4) absence of personalized behavioral assessment data from the patient [181-182]. These barriers largely can be overcome by the proposed recommendations to, respectively: (1) educate all health professionals about behavioral risk factors, (2) share responsibility for addressing health behaviors across members of the interprofessional health care team, and (3) make effective use of health informatics that (4) include a patient portal.

Another barrier to addressing health behaviors is the belief among some physicians that it is futile to try. i.e., that bad habits can't be changed. One justification for pessimism cites the failure of several large community intervention trials [183-184] to produce sustained reduction in the prevalence of health risk behaviors in the population. It should be noted, however, that these trials used only minimally intensive interventions, largely involving brief informational and educational outreach. Brief educational outreach has a definite place in the multi-level intervention portfolio endorsed by HP2020, but is, on its own, usually insufficient to produce large magnitude or lasting change. As can be seen from the underlined wordings in Table 1, most interventions with well-established evidence of effectiveness for changing health risk behaviors are more intensive: i.e., they involve more or longer contact with a health professional. Indeed, trials that have improved population level health outcomes implemented a full range of behavior change intervention intensities, allowing effects to synergize [185-186].

Often, the physician's own clinical practice experience provides additional grounds for skepticism about the feasibility of health behavior change. Perhaps not surprisingly, physicians frequently fail at helping their patients to modify unhealthy behaviors for many of the same reasons that early clinical trials were unsuccessful. Reliance on verbal advice and written instructions have been the mainstays of physician behavior change intervention strategies but are, for the most part, insufficiently intensive or persuasive to change behavior [187]. Moreover, health literacy among American adults remains low, which means that reliance on providing only written or verbal health information is problematic [187]. Furthermore, lower health literacy is associated with poorer health, greater medication non-adherence, higher medical expenses, and increased rates of hospitalization, suggesting that it is precisely those patients in greatest need of intervention who are least effectively reached by solely educational outreach [187].

A great deal of evidence indicates that healthcare providers' communication skills are vitally important in helping their patients adopt positive health behaviors [188]. In fact, many agencies concerned with healthcare quality improvement have recommended increased communication skills training for health professionals [188-189]. At the heart of most current recommendations for effective patient/provider interactions is a movement toward more patient-centered communication styles. Patient-centered care prioritizes should orient the health care system to accommodate the preferences and needs of patients rather than the convenience of providers. Training healthcare providers in patient-centered communication and shared decision-making lays the groundwork for patients to experience and providers observe successful behavior change efforts [190-191].

Treatments That Work to Change Health Behaviors

Motivational Interviewing

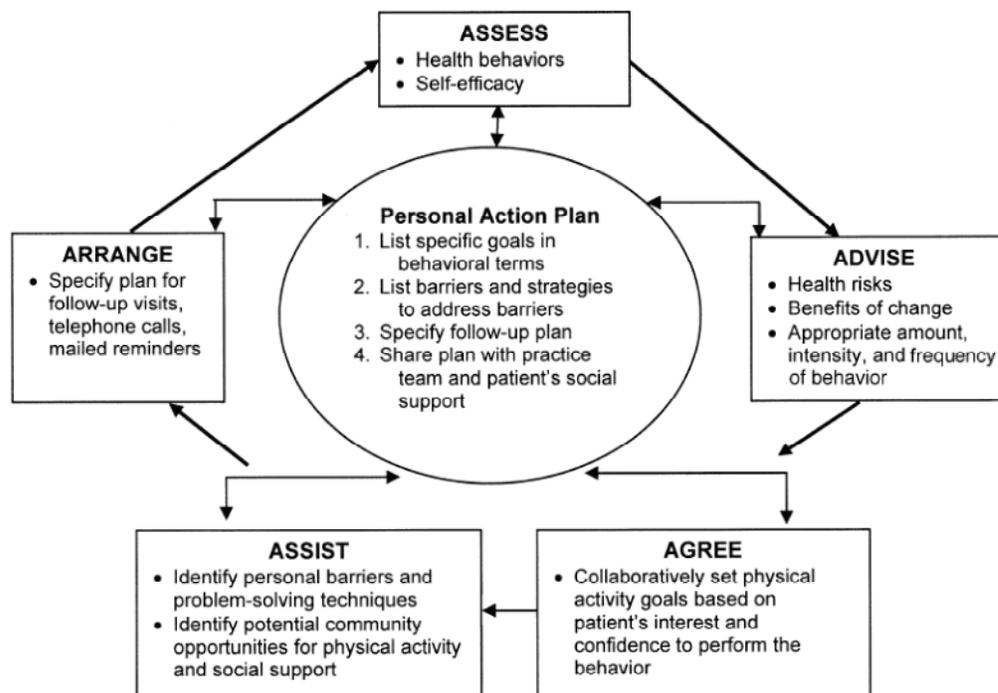
Moving the U.S. population toward healthy behavior change will require a coordinated effort. There are opportunities to facilitate behavior change at the point where individuals and healthcare providers intersect. A higher quality relationship between patients and healthcare providers fosters greater treatment adherence [162-163]. Therefore, cultivating a healthcare workforce that is patient-centered, and practitioners who work collaboratively with their patients will provide a vehicle through which the health behavior goals of the nation can be achieved. It may not be self-evident that effective patient-centered communication is a skill that can be taught but whose mastery requires practice. Inclusion of such training needs to become part of the required armamentarium of educational experiences for all health professionals.

Motivational interviewing (MI) is a patient-centered counseling approach that providers can apply to heighten their patients' intrinsic motivation to change. By equipping themselves with the communication strategies and techniques included in the MI "toolkit," providers become better able to help their patients explore and resolve their mixed feelings about making healthy changes. MI was first developed as a collection of intervention techniques for treating substance abuse [192]. The efficacy of motivational interviewing has since been demonstrated for fostering smoking cessation, reducing alcohol consumption and illicit drug use, improving dietary choice, increasing physical activity, reducing risky sexual behavior, and improving medication adherence [145, 193-204]. Healthcare professionals who have not been trained in patient-centered communication and shared decision-making commonly attempt to 'convince' patients to adopt a health behavior change. The traditional approach is to give information and try to educate patients about reasons to change. However, those reasons are usually too generic or impersonal to effectively motivate that individual. Too often that behavior change strategy sets the stage for an unproductive struggle. The provider may interpret the patient as willfully noncompliant when in fact the individual has tried but been unable to change an entrenched bad habit. In contrast, motivational interviewing bypasses struggles by casting healthcare providers in a listening and reflecting role. From that vantage point, the provider helps the patient to better understand his or her own (rather than the provider's) pros and cons of changing. As patients are helped to understand and work through their own mixed motivations for and against changing, they can become unstuck and start to move forward in the behavior change process.

The 5 A's Model

The efficacy of a brief intervention for health risk behavior is well-established. Brief counseling about risk behaviors at every visit with a health care provider is the current standard of care and the first rung on the stepped care ladder needed to achieve HP2020 goals. The 5 A's approach to behavior change intervention is an evidence-based, patient-centered collaborative approach [205]. It has been widely endorsed as an efficient, cost effective strategy intended to produce population level reduction in risk behaviors [206]. Originally developed for tobacco cessation, the 5 A's approach has since been adapted to address additional health risk behaviors and conditions, including obesity, poor quality diet, physical inactivity, risky drinking, and substance abuse [205].

The 5 A's process is highly adaptable. It can be delivered through a variety of modalities (e.g. electronic, print, in-person) and settings (e.g., primary care visits, community health clinics, internet-based modules). The five steps are: 1) Assess the patient's behavior(s) and identify modifiable conditions/risks; 2) Advice the patient to change one or more risk behaviors; 3) Agree, via shared decision-making between provider and patient, on a course of action after considering evidenced-based intervention options; 4) Assist by either directly delivering a behavior change intervention, arranging to have the intervention delivered by a member of the co-located healthcare team, or providing referral to a collaborating health behavior specialist; and 5) Arrange a follow-up visit with the patient to monitor progress [206]. Healthcare providers, particularly those in primary care, are positioned ideally to capture teachable moments during which they can implement the 5 A model iteratively and recurrently over the years and multiple intervention episodes that patients may need to modify their risk behaviors [206].



The 5A's Model consists of five steps that assist providers in helping to facilitate patients' behavior change. In the center of the model is a circle entitled "Personal Action Plan." The plan lists a sequence of four instructions for individuals attempting to change their behavior: (1) List specific goals in behavioral terms, (2) List barriers and strategies to address barriers, (3) Specify follow-up plan, and (4) Share plan with practice team and patient's social support. Surrounding the "Personal Action Plan" are five boxes that represent the 5As: "Assess: health behaviors; self-efficacy"; "Advise: health risks; benefits of change; appropriate amount, intensity, and frequency of behavior"; "Agree: collaboratively set physical activity goals based on patient's interest and confidence to perform the behavior"; "Assist: identify personal barriers and problem-solving techniques; identify potential community opportunities for physical activity and social support"; and "Arrange: specify plan for follow-up visits, telephone calls, mailed reminders". These boxes are connected by arrows that imply a cyclical process.

There has been improvement over the past decade in the rate at which providers perform the first two A's (Assess and Advise) for smoking and for weight control [174, 207]. That still leaves considerable room for improvement, however, as only a minority of providers perform the active problem solving (Assist) and follow-up (Arrange) needed to succeed at producing smoking cessation or weight loss [174, 208]. Moreover, provider 5A's performance for other behavioral risk factors remains poor [208].

The main barriers that providers cite as deterrents to administering the 5A's are lack of training, lack of referral resources, lack of patient-reported behavioral data and lack of time (Forman-Hoffman et al, 2006; Ruelaz et al, 2007). Those barriers can be overcome by training all health professionals in the 5A's approach and by creating informatics infrastructure to gather patient reports and search out referral options efficiently. Another concern voiced by some providers is fear that patients may dislike being asked about their health risk behaviors. The worry is that patients may perceive the provider's queries as "nagging" and become dissatisfied with treatment. To the contrary, however, more than 90% of primary care patients say that they expect healthcare providers to provide assistance regarding their health behaviors [209]. To be clear, having all professionals adopt the 5A's approach to health risk behaviors represents an outstanding first step but only a partial solution to curtailing health risk behaviors. In the case of smoking cessation, it has been shown that a 5A's approach can double the quit rate among primary care patients [169]. However, that outcome partly reflects the reality that spontaneous quit attempts (when individuals attempt to quit on their own without assistance) are very unlikely to succeed. When clinicians assist patients by arranging for more intensive behavioral interventions, the odds of successful health behavior change improve substantially.

Intensive Behavioral Interventions

To reach HP2020 goals, every patient should receive a brief risk behavior intervention at every health care encounter. Additionally, those patients who agree to make behavior change efforts will benefit substantially from receiving more intensive intervention. In tobacco cessation, for example, self-help approaches are largely ineffectual and the evidence points to structured intensive interventions [210-211]. Individual, group, and telephone counseling are all effective for smoking cessation, and their effectiveness increases with greater treatment intensity [169]. Although direct costs increase with treatment intensity, so do effectiveness and cost-effectiveness [212]. Social support and practical training in problem solving skills are two components of most successful tobacco treatments. A number of effective pharmacotherapies also can be used alone or in combination with behavioral intervention [169]. Moreover, intensive smoking cessation treatment can have far-reaching health benefits even for patients who are already ill. In one study, smokers hospitalized for acute coronary syndrome or decompensated heart failure were randomized to usual care or intensive smoking cessation counseling plus nicotine replacement therapy (NRT). The intensively treated group achieved 33% continuous abstinence at 24 months, compared to 9% for the usual care group. Additionally, CVD symptoms lessened in the intensively treated group, improving medical outcomes and decreasing total mortality [211].

For obesity treatment as well, intensive behavioral treatments have an excellent track record of success at engendering weight loss and weight loss maintenance [170]. An example is the Diabetes Prevention Program (DPP), an intensive lifestyle intervention administered by health professionals, and tested against metformin and placebo in a multi-site trial. Study aims were to produce weight loss and slow the conversion from pre-diabetes to diabetes among participants with BMI ≥ 24 and elevated fasting glucose. Participants in the lifestyle intervention received 16 sessions of in-person counseling aimed at helping them to lose 7% of their initial bodyweight by maintaining a low-fat, low-calorie diet, and engaging in at least 150 minutes of moderate physical activity per week. The DPP intensive lifestyle intervention proved to be remarkably effective. It produced an absolute risk reduction of 20.2% compared to placebo, whereas

metformin produced only a 7.9% reduction [177-178]. Intensive lifestyle intervention also improved several other cardiovascular outcomes. The prevalence of hypertension decreased in the group that received lifestyle treatment, whereas it increased significantly in the other intervention conditions. Although all three treatment groups showed significant reductions in systolic and diastolic blood pressure and triglycerides, the medication dosages needed to accomplish those biomarker changes were lower in the lifestyle intervention condition [213]. Not only did DPP intensive lifestyle intervention produce better diabetic and CVD outcomes, but it was also highly cost effective. The lifestyle group did have greater direct three-year intervention costs than the metformin and placebo groups: \$3,200, \$2,960, and \$497 respectively. However, the lifestyle group's direct medical costs were also greatly reduced: \$4,579 for the lifestyle group, \$4,739 for metformin, and \$5,011 for placebo. That translated into greater cost-effectiveness, such that over a lifetime. The cost for every quality-adjusted life year (QALY) gained via intensive lifestyle intervention was less than \$3,000, whereas the cost per QALY with metformin was \$33,000 per QALY gained [178].

V. SUCCESS STORIES – MODEL PROGRAMS

As model programs, we highlight two kinds of ventures. The first is educational programs that conjointly train diverse health professionals to address health behaviors. The second is programs that excel in fostering healthy behavior change by bridging the gap between provider and community.

One example of an interprofessional educational program is the project called “Resources for Training in Evidence-Based Behavioral Practice (EBBP)” [166, 214]. Commissioned in 2006 by the National Institute of Health’s Office of Behavioral and Social Science Research (OBSSR), EBBP’s goal is to bridge the gap between health behavior research and practice by harmonizing the approach to evidence-based practice across health professions. Led by Dr. Bonnie Spring, the EBBP Project team is comprised of a multidisciplinary Council, Scientific Advisory Board, and Advisory Councils of practitioners who work with individuals or communities. Each EBBP project entity includes representatives from medicine, nursing, psychology, public health, and social work. Using a team science approach, the EBBP Project identifies training gaps and creates on-line learning resources to fill them. On-line learning modules have been created about searching for evidence, randomized controlled trials, critical appraisal of research methods, systematic evidence reviews, the evidence-based practice process, and shared decision-making with individuals and with communities that facilitate research to practice translation. The modules are free and they attract approximately 3,000 users per month. Modules are accessed almost equally by users from each of the major health professions, who can earn continuing education credits for completing them.

A different interprofessional venture is the Medical Home Model (MHM) of primary care. Originally proposed in the late 1960s as an alternative to the solo physician practice model, the contemporary MHM has certain core features. These include: 1) a personal physician who establishes and maintains a relationship with the patient, 2) a physician who leads a multi-disciplinary team of providers that is collectively responsible for ongoing patient care, 3) a patient-centered orientation in which providers and patients work collaboratively toward the primary, secondary, and tertiary prevention of disease, 4) coordinated and integrated care both within the primary care team and extending to include specialist and community referral, 5) a

focus on quality improvement and overall safety with the use of performance measurement, decision-support technology, electronic health records (EHR), and evidence-based practices, and 6) enhanced access to the healthcare team through extended hours, group visits, telephone, email, and web-based communication [165].

During the past decade, several demonstration projects have been under way to implement and evaluate the impact of the MHM on a variety of patient outcomes. Demonstration projects are ongoing at Kaiser Permanente, CareOregon, and the United States Veterans Administration (USVA). In the case of the USVA, five sites across different regions have implemented the MHM with the goal of transforming 80% of USVA clinics by 2012. One modification of the MHM within the USVA relates to the composition of its medical leadership. To overcome the workforce shortage of primary care physicians, USVA primary care teams will include nurse practitioners. Recent reviews of the MHM of primary care demonstrate improved patient health outcomes, increased patient satisfaction, improved quality of care, and reduced medical errors [165]. If the data on the MHM continue to support improved health outcomes, the MHM may offer a viable option that improves the state of primary care in the US.

Programs that require health professionals to engage in service learning within the community set an example for community-engaged education. For example, as it recruits, trains, and supports young professionals working towards degrees in health, the National AHEC (Area Health Education Centers) Organization emphasizes connecting health and community development [215]. The AHEC Organization provides clinical placements in community health clinics that work with underserved populations. Placements promote student awareness of cultural and economic barriers through AHEC Service Learning projects [215]. Another program that fosters community-engaged learning is the Graduate Psychology Education (GPE) Program. GPE provides federally-funded grants to support training of psychology students who work in interprofessional teams. This program specifically promotes training in underserved communities where there is a shortage of mental and behavioral health providers [216]. Increasing the number of programs that couple interprofessional training with community engagement will demonstrate to more health professionals the feasibility of collaboration with communities, particularly in underserved and under-resourced areas.

Joint programming between academic centers and communities also can be a successful method to translate research to practice through discussion, education, and the sharing of resources. One exemplary program is the translation of the Diabetes Prevention Program (DPP) into the community through the YMCA. When compared to a control condition of brief counseling alone, the DPP lifestyle intervention created a significant increase in weight loss among participants in the YMCA [217]. This program trained staff of the YMCA to deliver the DPP intervention, thereby promoting involvement of the community within an existing infrastructure. Compared to costs in the original clinic setting, the collaboration resulted in a cost-savings of \$1,125-\$1,075 per participant per year [158], prompting United Healthcare to cover the DPP at the YMCA in six states [158, 217].

VI. CONCLUSIONS AND RECOMMENDATIONS

To bring health care costs under control and prevent future epidemics of disease, the health care workforce needs to become educated about how to address health risk behaviors. A health care

system that effectively addresses preventive care will evaluate and intervene on behavioral risk factors at every encounter. Patients will provide self-assessments of their health risk behaviors in advance of the health care encounter, preparing them to engage in shared decision-making and action planning with the health care team. All members of the interprofessional health care team will, in turn, be trained in patient-centered communication strategies, such as motivational interviewing and the 5A's. That will allow team members to engage in brief counseling and shared decision-making that effectively connect the patient (cost-effectively) to the maximum intensity of behavior change intervention that the patient feels able to endorse. Of course, billing codes will be available to cover health behavior change interventions that range from minimal to intensive. Reimbursement for health behavior change services will be available for interventions provided either by the primary health care team or by referral to behavior change experts. Informatics developments will support system-wide behavior change efforts. The EHR will track changes in behavioral risk factor status, supporting cross-talk among members of the health care team. Advancements in the functionalities of the EHR will provide decision support about which treatments are covered and which on-panel providers have openings. Integrating the spatial location capabilities now available will enable providers to help patients find health-promoting resources (e.g., recreational facilities, fresh produce, social supports) in their local communities.

In this ideal health care system of the future, clinicians will engage in patient-centered 5A counseling about health risk behaviors. By applying motivational interviewing, they will be able to engage in shared decision-making that helps patients decide to make changes in health behaviors. Providers will be equipped and empowered to help patients find supportive community or electronic resources to help them change (e.g., 1-800-QUIT-NOW, YMCA, local support groups, walking trails). When a more intensive intervention is acceptable, information contained in the EHR will facilitate warm hand-off or referral to a behavioral interventionist with needed treatment expertise (e.g., behavioral weight loss for obesity). Informatics infrastructure will facilitate communication among providers (both within and outside of the MHM) to ensure the quality and continuity of patient care. Development of advanced health technology communications and training of health care providers to create and utilize these resources is also necessary. Use of communication strategies such as voicemail, email, text messaging, pod-casts, and electronic health records has become ubiquitous. Patients are integrating handheld technologies and internet interventions into their daily lives to improve health behaviors [218-220]. These communication strategies are both accepted by patients and cost-saving, indicating a worthwhile investment [218, 221-222]. The next step is to connect these patient tools into the EHR to heighten the patient's sense of accountability, commitment, and support for healthy change.

It has become imperative for MHM's to understand the communities in which they serve. Appreciating unique community culture and history, enables providers to offer stepped, patient-centered, community-linked, resource sensitive, culturally competent healthcare. Ongoing assessment of outcomes is needed to ensure the performance of the health care system. In turn, mining of those collected data will make it feasible, ultimately, for the health care system to "learn" and test local algorithms that reveal what care and services are effective for which segments of the population being served.

Patient-centered communication strategies and shared decision-making need to be incorporated into education and training for faculty, students, direct service workers, and health care providers across all disciplines. Patient-centered communication improves shared decision-making, motivates patients to engage in healthy behaviors and seeks out health-promoting influences, gradually empowering communities toward health. Many health care providers are unable to communicate information in a way that patients understand. Health literacy among adults in the U.S. is low and has not significantly changed over the past 10 years [223]. Those with limited health literacy are unable to understand health information, impeding their ability to make optimal health decisions [224]. Until recently, health care providers have relied on verbal and/or written instructions and educational strategies as a primary method to activate patients to change behavior. Those with limited health literacy skills are unlikely to understand the provided information well enough to apply it to change their behavior [225]. Adopting a patient-centered communication style and shared decision-making techniques is more likely to engage the patient's intrinsic motivation to master what they need to adopt healthy behaviors [226-227].

The provider skilled in patient-centered communication skills is equipped to engage in shared-decision making that activates the patient. During shared problem-solving, the provider and patient work together to solve whatever problem is at hand. They collaborate to integrate the best available evidence about an effective intervention with consideration of needed resources, all targeted towards the patient's characteristics and preferences. Patients need to become empowered to become active agents in their own health care. They are, after all, the drivers of all behavioral choices made outside the provider's office. Patients need to own their own power, have the confidence and knowledge to take action, and be able to remove barriers to maintain positive change [228]. Recasting the provider in a listening and helping role reflects the reality that engaging the patient in self-management is the only true path toward healthy behavior change.

A necessary first step to population wide targeting of health risk behaviors is to provide a Current Procedural Terminology (CPT) code for prevention counseling. It is essential that Congress and the Department of Health and Human Services direct the Centers for Medicare and Medicaid Services (CMS) to provide CPT codes. Critically, codes are needed not only for brief counseling, but also for more impactful intensive behavioral counseling. Physicians are unlikely to have time available to offer intensive health risk behavior intervention. Most will prefer to have patients to receive intensive treatment from behaviorally trained ancillary health care providers who are co-located or virtual members of the health care team.

In addition to acquiring clinical skills, health professionals need to acquire training in policy leadership. Because they share the core value of beneficence, health professionals are the ideal constituency to champion public health. The well-being of the population will be best served by training health professionals to champion health-promoting policies at least as effectively as industries champion their financial interests. Several policy initiatives are needed to address health behaviors. To create a successful, ongoing system for managing health risk behaviors, the Joint Commission is well-advised to develop a core measure for obesity and health risk behaviors, linked to provider performance measurement. Such a step offers an important means to address health risk behaviors at a large-scale policy level. In addition, public health would be well-served if the Department of Health and Human Services Secretary convenes industry sector

leaders to develop partner strategies. Great population impact could be achieved by engaging the food industry to address obesity and convenience store retailers to address tobacco sales. Lastly, health professionals need to learn how to guide educational policy standards for their health professions. All health professions curricula need to include education about health risk behaviors and consequences. Health professional trainees all need to learn about assessment and effective interventions to improve health behaviors. They need to acquire skill in delivering some behavioral interventions, understand the full spectrum of treatment intensities available, and learn how to interact with professionals who deliver other treatments. These skills need to become interprofessional core competencies developed via required aspects of the curriculum.

Collaboration between health professional policy leaders, the Department of Health and Human Services, and professional organizations will be needed to realign curricula to accord needed attention to health risk behaviors. In addition, in order to be able to implement health behavior change treatments broadly enough to impact population health, all health profession students need to become educated about financing of the health care system. An understanding of financial realities will enable providers to work interprofessionally within institutions and within the patient-centered medical home. A cadre of health professionals trained via a common body of core competencies and overlapping curriculum will provide the capacity needed to improve population health by changing health risk behaviors.

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