PERSPECTIVE

A Model for Advancing Scale-Up of Complex Interventions for Vulnerable Populations: the ALACRITY Center for Health and Longevity in Mental Illness

Emma E. McGinty, PhD, MS[1], *Karly A. Murphy, MD, MHS*[2], *Arlene T. Dalcin, MS, RD*[2], *Elizabeth A. Stuart, PhD*[3], *Nae-Yuh Wang, PhD*[2], *Faith Dickerson, PhD, MPH*[4], *Kim Gudzune, MD, MPH*[2], *Gerald Jerome, PhD*[5], *David Thompson, DNSc, MS*[6], *Bernadette A. Cullen, MB, BCh, MRCPsych*[7], *Joseph Gennusa, PhD, RD, LDN*[2], *Amy M. Kilbourne, PhD, MPH*[8], and *Gail L. Daumit, MD, MHS*[2]

[1]Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA; [2]Division of General Internal Medicine, Johns Hopkins School of Medicine, Baltimore, MD, USA; [3]Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA; [4]Sheppard Pratt Health System, Baltimore, MD, USA; [5]Department of Kinesiology, Towson University, Towson, MD, USA; [6]Department of Anesthesiology and Critical Care and Armstrong Institute for Patient Safety and Quality, Johns Hopkins School of Medicine, Baltimore, MD, USA; [7]Department of Psychiatry & Behavioral Sciences, Johns Hopkins School of Medicine, Baltimore, MD, USA; [8]Health Services Research and Development Service, Veterans Health Administration, US Department of Veterans Affairs and Department of Psychiatry, University of Michigan Medical School, Ann Arbor, MD, USA.

Many of the most pressing health issues in the USA and worldwide require complex, multi-faceted solutions. Delivery of such solutions is often complicated by the need to reach and engage vulnerable populations facing multiple barriers to care. While the fields of quality improvement and implementation science have made valuable gains in the development and spread of individual strategies to improve evidence-based practice delivery, models for coordinated deployment of numerous strategies to simultaneously implement multiple evidence-based interventions in vulnerable populations are lacking. In this Perspective, we describe a model for this type of comprehensive research-practice translation effort: the Johns Hopkins ALACRITY Center for Health and Longevity in Mental Illness, which is focused on reducing premature mortality in the population with serious mental illness. We describe the Center's conceptual framework, which is built upon an integrated set of quality improvement and implementation science frameworks, provide an overview of the Center's organizational structure and core research-practice translation activities, and discuss our vision for how the Center may evolve over time. Lessons learned from this Center's efforts could inform models to address other critical health issues in vulnerable populations that require multi-component solutions at the policy, system, provider, and patient levels.

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INTRODUCTION

Many of today's pressing health issues are what Charles West Churchman termed "wicked problems."[1] Wicked problems have interacting causes, involve multiple decision-makers and clients with conflicting priorities and values, and require coordinated solutions across various systems and actors.[1, 2] While the interrelated fields of quality improvement and implementation science have made important gains in the development and spread of individual strategies to improve evidence-based practice delivery, for example, the quality improvement approaches *LEAN* and *Six Sigma*[3] and facilitation implementation science strategies,[4–7] wicked problems cannot be addressed by a single strategy. Rather, they require the coordinated use of multiple strategies to implement multiple evidence-based interventions.[1, 2] Concrete models for this type of multi-faceted effort are lacking. In this Perspective, we describe one such model: the ALACRITY Center for Health and Longevity in Mental Illness, a research-practice translation center designed to address the wicked problem of premature mortality among people with serious mental illness (SMI). People with SMI die 10–20 years earlier than the overall population, primarily due to cardiovascular disease.[8–13]

This cardiovascular-related premature mortality is driven by multiple factors, including metabolic side effects of antipsychotic medications.[14–17] Cognitive and communication impairments, lack of social support, and socioeconomic risks among people with SMI can impede the adoption of healthy behaviors and productive engagement with the healthcare system.[18–27] Over 70% of primary care physicians (PCPs) believe that they should share responsibility with specialty mental health providers for treating physical health conditions and addressing tobacco smoking, diet, and exercise among people with SMI.[28] But poor integration of general medical and specialty mental healthcare in the USA hinders such joint responsibility. Siloed medical training and delivery systems mean that PCPs may lack experience and comfort treating people with SMI, and physical healthcare is outside the

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purview of most mental health specialists.[29, 30] Health IT barriers and inadequate care coordination financing mechanisms limit the degree to which PCPs can collaborate with mental health providers to address cardiovascular risk in SMI.

Effective interventions to address cardiovascular disease and its risk factors and behaviors in people with SMI exist, but there are significant implementation gaps.[31, 32] While such gaps also exist in the general population,[33–37] they are exacerbated among the population with SMI. Those with SMI—particularly the nearly 70% of people with SMI covered by Medicaid in the U.S.[38]—often receive sub-optimal cardiovascular care.[30] Tailored behavioral interventions have been shown in clinical trials to facilitate weight loss and tobacco smoking cessation among people with SMI, but are rarely implemented in real-world settings.[32, 39] These interventions are complex and can be challenging to implement with high fidelity and the required level of intensity.[39, 40]

The ALACRITY Center aims to develop scalable strategies to support widespread, high-fidelity implementation of effective interventions to reduce cardiovascular risk in SMI. In this Perspective, we provide a high-level overview of the Center. Protocols detailing the methodology of Center research projects will be published separately.

ALACRITY CENTER FOR HEALTH AND LONGEVITY IN MENTAL ILLNESS

Mission

In August 2018, the ALACRITY Center for Health and Longevity in Mental Illness at Johns Hopkins University was funded by the National Institute of Mental Health (NIMH) Advanced Laboratories for ACcelerating the Reach and Impact of Treatments for Youth and Adults with Mental Illness (ALACRITY) initiative. The Center's goals are to develop and test multi-component strategies to support the scale-up of evidence-based interventions to reduce cardiovascular risk in SMI. The strategies being tested by the Center integrate quality improvement and implementation science approaches. For this Center, we define quality improvement strategies as systematic processes leading to more effective organizational functioning, while implementation strategies are methods used to promote the uptake of specific evidence-based interventions.[41, 42] Both are crucial for sustaining new interventions in routine practice settings serving vulnerable populations like those with SMI.[42]

Conceptual Framework

The Center's work is guided by Proctor's conceptual model of implementation research. Figure 1 maps the Center's three core pilot projects onto the components of Proctor's model: evidence-based practices, implementation strategies, implementation outcomes, service/intervention outcomes, and health outcomes. The core projects (Fig. 1, box 1) focus on scaling up a tailored behavioral weight loss intervention[43] (project 1); evidence-based tobacco smoking cessation treatment[44–46] (project 2); and a care coordination intervention for hypertension, dyslipidemia, and diabetes mellitus (project 3)[47–51] These pilot studies will be conducted in a range of community mental health settings in Maryland (Fig. 1, box 1). The interventions will be implemented by mental health program staff, not research staff. Pilot project 1 uses a randomized controlled trial design and projects 2 and 3 use observational pre-post designs (as noted above, detailed study protocols will be published separately).

The goal of these projects is to identify promising multi-component implementation strategies (Fig. 1, box 2) through pilot testing which will then be further refined and tested in large-scale hybrid implementation-effectiveness trials.[52, 53] All three projects include both quality improvement-oriented strategies designed to improve organizational functioning and implementation science-oriented strategies designed to support implementation of the specific evidence-based intervention of interest. For example, all three projects include quality improvement-oriented organizational strategy meetings (OSMs). These meetings, led by a trained facilitator, bring together organizational leaders and front-line implementers to address barriers related to organizational functioning.[54] All three projects include multi-modality provider training, an implementation science-oriented strategy. (See Fig. 1, box 2, for the complete list of strategies tested in each project.)

For all three pilot projects, primary outcomes include the eight implementation research outcomes[55] in Figure 1, box 3, as well as intervention outcomes, operationalized as measures of the degree to which each evidence-based practice was implemented, with fidelity, in real-world community mental health settings (Fig. 1, box 4). We will calculate costs for delivery of both the multi-component implementation strategy and the evidence-based intervention in each pilot study; this information will be critical to informing the development of financing mechanisms to support scale-up. Secondary outcomes include measures of consumers' cardiovascular health (Fig. 1, box 5).

Center Organization

Center researchers represent fields including primary care; specialty mental health; implementation science; quality improvement; human factors and systems engineering; organizational behavior; systems science; health services research, economics, and policy; epidemiology and biostatistics; behavioral science; and clinical trials. To facilitate effective collaboration, researchers are organized within cores, including administrative, training, community engagement, and methods cores (Fig. 2). Within the method core, researchers are organized into seven sub-cores with distinct responsibilities in support of the Center's research projects, e.g., implementation strategy development, data collection, and measurement.

Cross-cutting Center Work

The Center includes three cross-cutting components: innovative research methods to support scale-up of complex

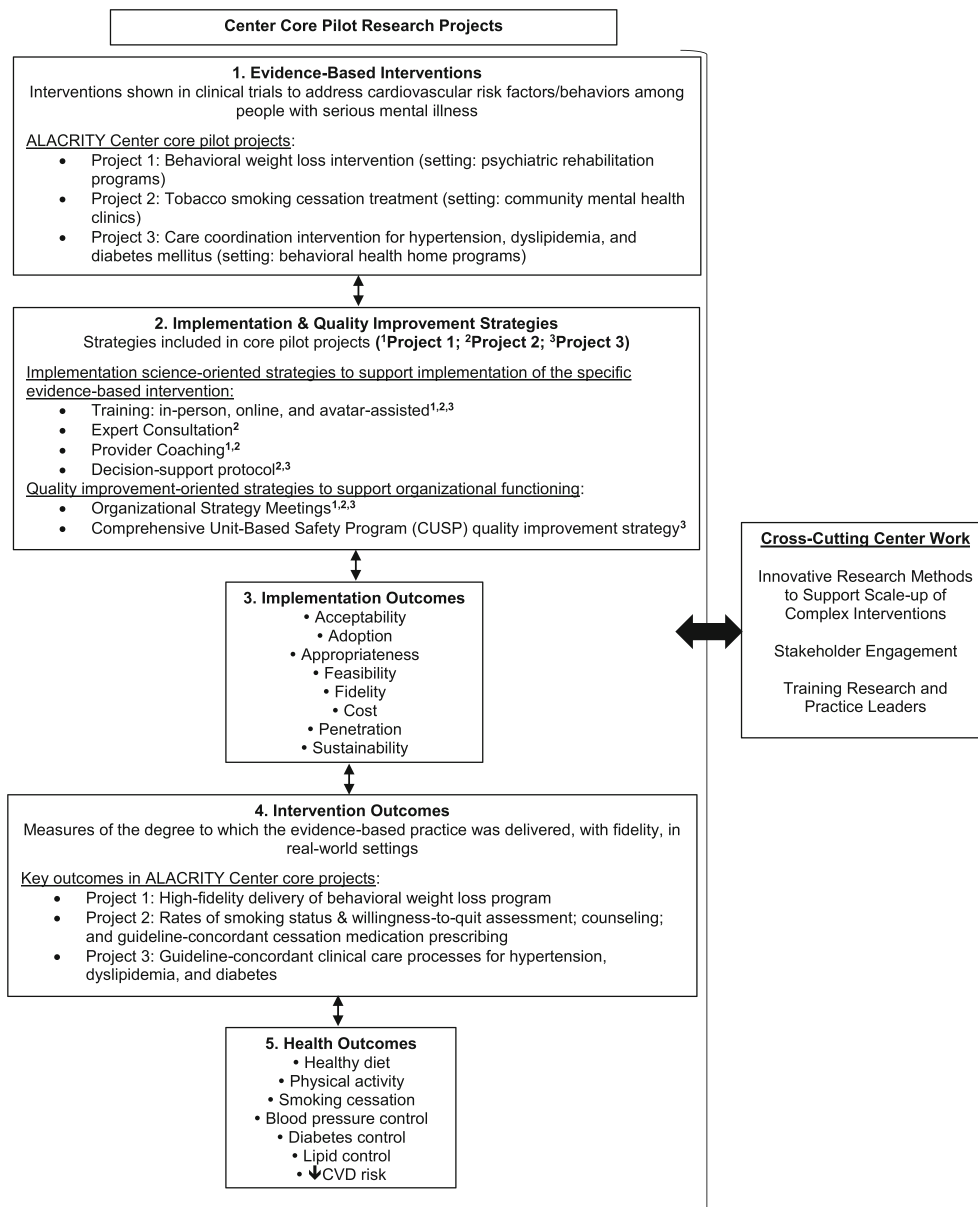

Figure 1 ALACRITY Center for Health and Longevity in Mental Illness Conceptual Framework.

interventions, stakeholder engagement, and training research and practice leaders (Fig. 1). Researchers spanning all the methods sub-cores come together to incubate innovative methods. For example, methods core researchers are collaborating on developing new methods for agent-based modeling of complex interventions. Pilot research project data will be incorporated into the models, and model results will then feedback into the research projects by forecasting how the implementation strategies being piloted might influence long-term intervention delivery and health outcomes. Such forecasts will help inform refinements to the strategies that will be tested in the post-pilot hybrid implementation-effectiveness trials.

Stakeholder engagement is also incorporated into all Center activities, led by the joint efforts of a stakeholder advisory board comprised of approximately 30 key practice and policy leaders (Fig. 2). The stakeholder advisory board includes leaders and front-line providers working in a range of community-based primary care and mental health settings; state and federal decision-makers, e.g., Medicaid program directors and other state/federal agency representatives; representatives of state and national mental health advocacy and professional organizations; peers; and people with SMI and family members (Fig. 2). The board strategically includes Maryland leaders as well as individuals representing national organizations who are well-positioned to support national scale-up in the future.

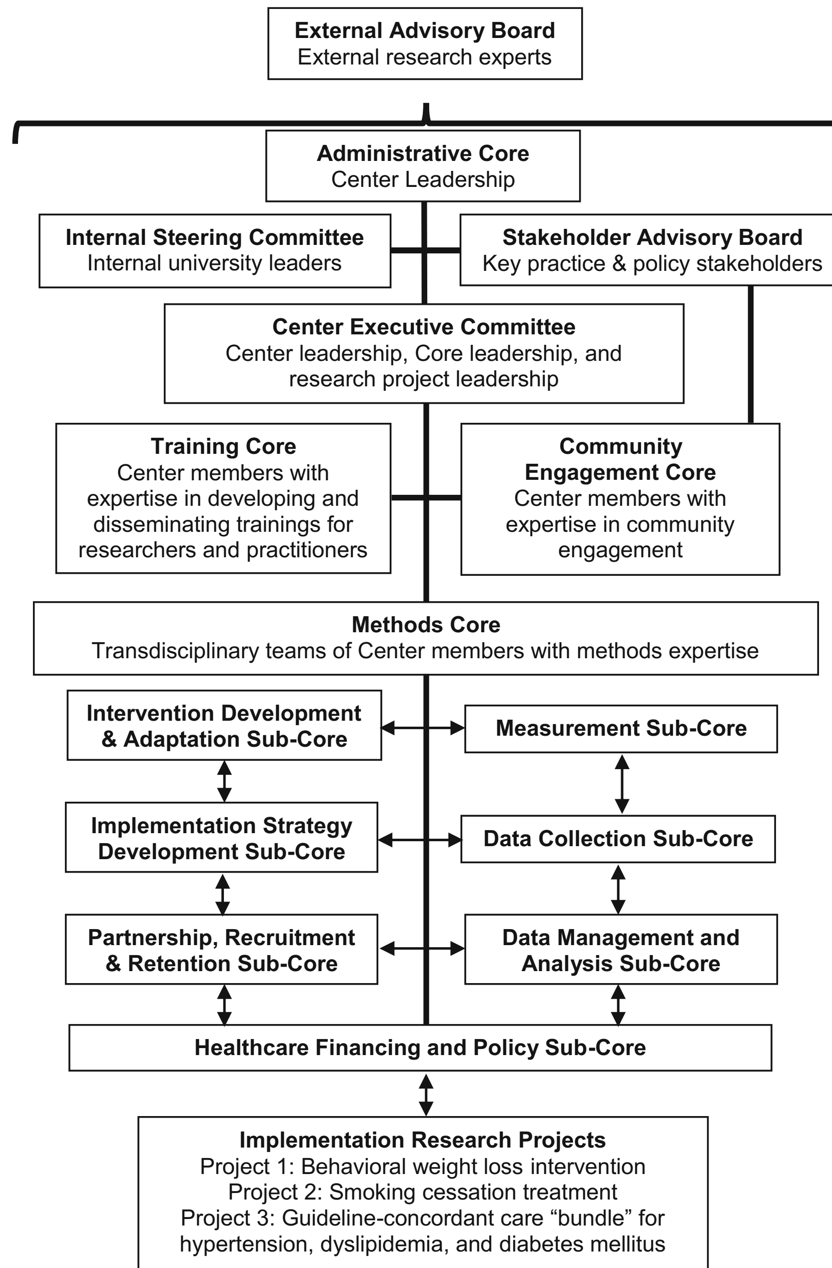

Figure 2 ALACRITY Center for Health and Longevity in Mental Illness organizational structure.

Stakeholder advisory board members are involved in all Center activities, including but not limited to identifying research priorities; providing input on recruitment, intervention, and data collection materials; developing and conducting trainings; reviewing pilot grant proposals submitted through the Center's seed funding program; mentoring seed funding awardees, each of whom is matched with a research mentor and a policy/practice mentor; and disseminating research findings.

The third key cross-cutting element of the Center's work is training the next generation of research and practice leaders focused on reducing premature mortality in SMI. This effort is led by the Center's training core (Fig. 2) and includes career development and mentorship programs for research trainees and junior faculty; seed funding awards; Center internships; and development and dissemination of trainings and other resources (e.g., fact sheets, policy memos) for a range of audiences.

Moving Forward

The immediate next step following completion of the Center's three pilot projects is to conduct large-scale, hybrid implementation-effectiveness trials rigorously evaluating the degree to which the strategies identified as promising in the pilots can facilitate high-fidelity intervention implementation resulting in improved cardiovascular health outcomes among people with SMI in real-world community mental health settings. Our vision is that Center activities around these

interventions will then shift toward supporting national scale-out through activities such as train-the-trainer, certification, and accreditation programs and development and spread of financing mechanisms, e.g., insurer reimbursement.

In parallel with workaround bringing these initial three interventions to scale, we envision the Center moving forward with developing and testing strategies to support widespread implementation of additional evidence-based interventions, potentially including interventions that address conditions contributing to premature mortality in SMI other than cardiovascular disease (e.g., cancer, liver disease). Primary care has a central role to play in addressing the medical conditions that drive premature mortality in SMI, and we view strategies to bridge the specialty mental health and primary care sectors—such as the cardiovascular risk factor care coordination intervention in pilot project 3—as one of the Center's core contributions to the field. In the long term, our vision is to support the development and adoption of models that allow PCPs to achieve their stated goal of sharing responsibility for the physical health of patients with SMI with specialty mental health providers.[28] The Center's three initial pilot projects focus on implementation of cardiovascular risk reduction interventions in community mental settings. In the future, we anticipate developing and testing primary care setting–based strategies as well. Social services are included in pilot project 3's care coordination intervention, but otherwise, the Center's initial pilot projects do not address the social determinants of cardiovascular risk, a key limitation. In the future, we anticipate expanding our work to address social determinants, for example, through development of strategies for integrating financing and delivery of evidence-based healthcare and social services (e.g., supportive housing and employment) for people with SMI.

Moving forward, the ALACRITY Center will increasingly focus on policy issues. The Center's healthcare financing and policy core (Fig. 2) is currently laying the groundwork for this line of work by characterizing existing financing mechanisms and policy facilitators and barriers to nationwide scale-up of the three evidence-based interventions of interest in the Center's ongoing pilot research projects. Existing policies may impede scale-up. For example, state laws prohibiting Medicaid beneficiaries from receiving both a mental health and a physical health service in one day hinder delivery of coordinated cardiovascular care for people with SMI, and the prior authorization requirements for evidence-based smoking cessation medications imposed by some state Medicaid programs are a barrier to cessation treatment.[56, 57] In addition to removing policy barriers, new policies are likely needed: for example, insurance reimbursement mechanisms for tailored behavioral weight loss programs and two-way financing mechanisms that adequately reimburse both primary care and mental health providers for care coordination activities. The ALACRITY Center's future work will include a strong focus on development, evaluation, and dissemination—in close collaboration with our stakeholder advisory board—of such policies.

To the extent that our and other Centers funded through the ALACRITY initiative succeed in overcoming the research-practice gap for "wicked problems" like premature mortality in SMI, this initiative could serve as a model for T2 translation for clinicians, researchers, funders, and community partners working to translate research into practice around a variety of complex medical and public health problems.

Corresponding Author: *Emma E. McGinty, PhD, MS; Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA (e-mail: bmcginty@jhu.edu).*

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