

# COMMENTARY: T<sup>x</sup>™: AN APPROACH AND PHILOSOPHY TO ADVANCE TRANSLATION TO TRANSFORMATION

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The translational science spectrum consists of phases or types of research, from discoveries that advance our understanding of the biological basis of health and disease to interventions that engage individuals and social systems toward improved population health. The health research system has widely acknowledged flaws that delay (or even deny) the fruits of research findings for the population and for chronically disadvantaged groups. Coined and patented at Morehouse School of Medicine (MSM), T<sup>x</sup>™ symbolizes an approach and scientific philosophy that intentionally promotes and supports the convergence of interdisciplinary approaches and scientists to stimulate exponential advances for the health of diverse communities. While the T<sup>x</sup>™ patent is new, this approach to research translation is embedded within the MSM tapestry with historically aligned research from the Translational Collaborative Center exemplars as well as newly funded scholars. T<sup>x</sup>™ scholarship is characterized by the five tenets and practices that ultimately culminate in the conduct of research with results that broaden the evidence-base through data-driven proof of impact on health equity in underserved or special populations. T<sup>x</sup>™ is a destination that is ever-evolving and responsive to the research, priority populations and partners through translational research and corresponding approaches that transform health, thereby advancing health equity. *Ethn Dis.* 2019;29(Suppl 2): 349-354. doi:10.18865/ed.29.S2.349

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## INTRODUCTION

The translational science spectrum consists of phases or types of research, from discoveries that advance our understanding of the biological basis of health and disease to interventions that engage individuals and social systems toward improved population health. The schematic depiction of translational research is often a series of “Ts” (“T” for translation stage) proceeding in order from T<sub>0</sub> to T<sub>5</sub> (with variations in the number of discrete stages identified). However, a more nuanced understanding of the path from discovery to impactful application allows for the fact that the “Ts” represent phases that are neither unidirectional or linear in nature. Indeed, basic science discoveries increase our fundamental knowledge of the nature of living things and often inform and/or stimulate a cascade of research ini-

tiatives that culminate in clinical research or clinical trials. However, the path from observation and analysis of phenomena to real world health impact can emanate from *any* of the T phases. According to the National Institutes of Health, translation is the process through which scientific discoveries (laboratory, clinic and community, among others) advance improvements in the health of individuals or populations — “from diagnostics and therapeutics to medical procedures and behavioral changes.”<sup>1</sup>

The health research system has widely acknowledged flaws that delay (or even deny) the fruits of research findings for the population, and for chronically disadvantaged groups. Studies suggest that it takes an average of 17 years for some scientific discoveries to advance across the translation phases into practice.<sup>2</sup> This sluggishness can be significantly

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exacerbated among minority populations, which are most often already suffering a greater burden of the disease in question. A myriad of other interwoven variables including but not limited to, variations in population genetics, sociodemographic factors, environmental exposures, and systemic factors may impede adoption of cutting-edge approaches for the populations of greatest need. For instance, there is a well-recognized need to increase the proportion of African Americans (AAs) who participate in clinical trials in order to test the potential benefits of newly developed therapeutics.<sup>3</sup> New drugs, tested in non-diverse human groups, may belatedly be challenged by the discovery of differing therapeutic/toxicity profiles, unexpected allergy-inducing potential, or other concerns (famously seen in the angiotensin converting enzyme inhibitor antihypertensives) when they go to market for the wider population. The higher incidence of such problems among AAs (or other groups)<sup>4</sup> may be interpreted by practicing clinicians as a reason to avoid using a certain drug class —leading to “non-implementation” of a therapeutic advance, based on the fallacious assumption that all AAs are at risk for a poor response to the new agent.<sup>5</sup> The effect of large-scale avoidance of new medications that actually may be good for the majority of affected AAs can result in a widening of a health disparities gap. Health insurance challenges, other impediments to care access, even the details of the provider-patient relationship can further degrade the opportunity for improving health outcomes.

Understanding this level of complexity and corresponding solutions is beyond the limited scope of any single translational research discipline or category along the translational (T<sub>0-5</sub>) continuum. There is growing recognition of a need for new approaches and lenses through which to not only conduct collaborative research but advance approaches to health equity through responsive interventions and programs. These approaches must be tailored to the contexts of priority communities, practice, policy and industry partners that are central to moving the proverbial needle. Efforts to accelerate chronic disease prevention and reduce health inequities are increasingly focused on policy, systems, and environmental change approaches. The Centers for Disease Control and Prevention (CDC) has highlighted the importance of coordination among multiple sectors as a key to successful efforts.<sup>6</sup> The National Academies of Medicine has further emphasized the importance of engaging the non-health sectors in changing policies and environments to address chronic disease.<sup>7</sup>

We need more research and improved ways to adopt research discoveries to improve the health of populations. This will require a multiplicity of disciplines, perspectives, and interdisciplinary scientists (from biomedical, sociocultural and behavioral) in collaboration and characterized by systematic communication and iterative interaction. This ideally would allow discovery and the advancement gained in any phase of the “T” continuum to inform and enhance other phases of research or implementation.

## **T<sup>x</sup>™: AN APPROACH AND SCIENTIFIC PHILOSOPHY**

Coined at Morehouse School of Medicine (MSM), T<sup>x</sup>™ symbolizes an approach and scientific philosophy that intentionally promotes and supports convergence of interdisciplinary approaches and scientists to stimulate exponential advances for the health of diverse communities (Figure 1). The “T” of the trademark acknowledges the importance of the phases of the translational continuum. However, the exponent “x” represents the goal to move research from the Translational to the Transformational. This research engages diverse disciplines and perspectives early in the process of identifying/framing the problem or opportunity. Furthermore, it brings to bear different repositories of knowledge, skill and lived experience.

### **What is T<sup>x</sup>™ Scholarship?**

MSM T<sup>x</sup>™ is a comprehensive approach and philosophy that advances the science, practice and evaluation of improving health outcomes. It addresses disparities by simultaneously engaging multiple disciplines as it recognizes the multiple layers and dimensions of complex health problems. The aim of T<sup>x</sup>™ is the advancement of health equity, which is the cornerstone of MSM’s vision. T<sup>x</sup>™ scholarship is characterized by the practices outlined herein.

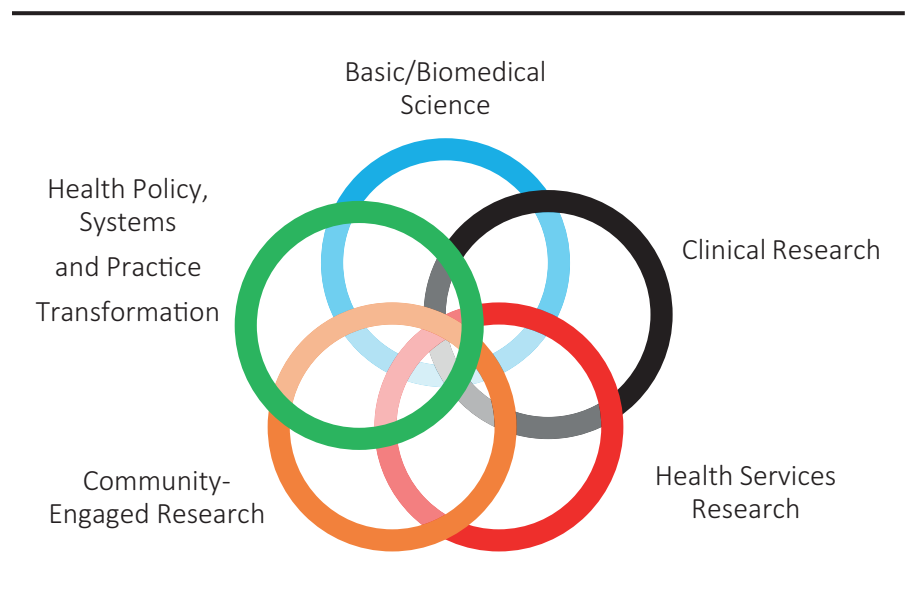
#### *Engagement across the Translational Continuum*

The T<sup>x</sup>™ practice engages multidisciplinary researchers across the translational continuum (basic to

population-based scientists) to work together toward the development, implementation, evaluation and dissemination of innovative science. Rubio and others have built upon well-respected definitions of translation research, coining it as a discipline that involves the intentional collaboration of researchers along the T spectrum, thereby moving bi-directionally and in a multidisciplinary fashion.<sup>8</sup> In order to fully actualize this through a T<sup>x</sup>™ scholarship lens, approaches to training, scholarship and faculty promotion must foster and reward collaborative researchers who demonstrate how they contribute to and capitalize on the exponential research innovations that emerge from cross-translational research.

#### *Engagement of the Community: Patients and Neighborhood Residents*

From the inception of research concept and/or identification of potential community needs, strengths and implications/impact of research, T<sup>x</sup>™ scholarship is conducted through community-engaged research partnerships, including but not limited to community-based participatory research (CBPR). CBPR is a research approach that emphasizes community-academic partnership and shared leadership in the planning, implementation, evaluation, and dissemination of program processes and outcomes. Advantages of CBPR are strengthened neighborhood-campus relationships, improved research question relevance, enhanced research recruitment, implementation, collective dissemination, and shared benefit for a diverse group of stake-



**Figure 1. T<sup>x</sup>™: The Morehouse School of Medicine translational and transformative research approach**

holders.<sup>9-11</sup> Conceptually, outcomes include both answering a research question and addressing community-identified social, economic, or policy concerns thereby establishing and maintaining community buy-in, ownership, and sustainability, all of which are both means toward and correlates of effective interventions.<sup>9</sup>

#### *The Interdisciplinary Team*

Interdisciplinary teams (that may include but are not limited to non-academic-industry, agency, and policy partners) are convened to prioritize multi-level translation, dissemination and proof of impact strategies associated with research and evaluation, encompassing both processes and outcomes. Transformative research that embodies T<sup>x</sup>™ research also engages other relevant stakeholders (non-academic and beyond community residents and patients) pivotal to the

uptake and adaptation of research findings in practice. Tabak et al describes the relatively recent (15-year) evolution of implementation science.<sup>12</sup> These approaches infuse research into practice through integrating practitioners into research evaluation (so called “practice-based evidence”). This expanded approach to team science to include practice partners (clinical, industry, public health) leaders, from the inception and conceptualization of research development, increases relevance and resonance of discoveries toward adopting approaches in real-time, rather than in a purely controlled setting. These intentional efforts result in the implementation of effective interventions in the real world.<sup>10</sup>

#### *Adoption and Adaptation to Communities*

T<sup>x</sup>™ practice includes adoption and/or adaptation to communi-

ties of 1) the population (especially those who are underserved/at-risk/vulnerable); 2) science; and 3) practice (clinical, public health, policy) based on cooperative needs. Collaboration should involve people or organizations from multiple sectors (eg, planners, developers, media specialists, neighborhood residents, elected officials) and geographical strata (eg, state, regional, local, neighborhood).<sup>2</sup> Collaborative groups that promote stakeholder engagement and interaction have been associated with increased relevance, feasibility, and long-term sustainability of initiatives.<sup>10</sup> These groups have the potential to advance strategies that increase resources, expand knowledge, and build relation-

ships thereby advancing the translation of evidence-based research.

*Data-driven Proof of Impact on Health Equity*

Finally, MSM T<sup>x</sup>™ scholarship is a practice and philosophy that prioritizes *the conduct of* research with results that broaden the evidence-base through data-driven proof of impact on health equity in underserved or special populations. As envisioned, T<sup>x</sup>™ science is not easy. In fact, it demands the highest levels of rigor from contributing disciplines if it is to realize its potential. It is imperative, however, that as definitions of vulnerable and health disparities populations expand and

contract with local, regional and global priorities that research is both translational and transformative in response. Our collective responses to emerging health disparities, with their multilevel and complex fundamental causes, are ideally focused yet comprise multipronged and integrated methods suited to the nettlesome problems they aim to confront.

**THE T<sup>x</sup>™ PATENT**

While the T<sup>x</sup>™ patent is relatively new, this approach to research translation is embedded within the MSM tapestry. One T<sup>x</sup>™ research-to-practice example was focused on

**Table 1. Inaugural T<sup>x</sup>™ projects supported by Morehouse School of Medicine, 2018**

Title	Purpose/aims	Partners	Expected outcomes
Key cultural variables influencing mental health among Haitians living in the US	1) To elucidate views and beliefs related to mental health/illness, mental health services, and alternative means of coping with psychosocial distress within Haitian/Haitian American communities in Georgia; 2) To assess mental health needs as well as existing community strengths, assets, and resiliencies within Georgia's Haitian/Haitian American population	Haitian Chaplaincy of Georgia; Emory University; International Women of Hope (local Haitian women's community organization); Haitian American Chamber of Commerce	Informs development of community- and individual-level interventions to improve mental health outcomes and reduce disparities. Findings may also provide insights that can inform work with similar populations, including immigrants from other Caribbean countries living in the US
Integrating prescription reconciliation telehealth in primary care	1) To Improve patient access to care through telehealth; 2) To Improve clinical outcomes through telehealth prescription reconciliation; 3) To evaluate the quality of a prescription reconciliation telehealth service	National Center for Primary Care; Morehouse School of Medicine Department of Family Medicine; Telehealth Services; Clinical Informatics; Integrative Medicine	Implementation science through a telemedicine innovation to support a medical intervention designed to improve chronic disease care and access for a predominantly African American underserved community. Addresses the triple aims of the Affordable Care Act through 1) decreased health care cost; 2) improved patient outcomes; and 3) access to care
Determining a role for circadian rhythms and shift work in chlamydial pathogenesis	1) To determine the effect of genetic disruption of circadian rhythms on chlamydial pathogenesis; 2) To determine the effect of shift work on chlamydial pathogenesis using a validated mice model	At Morehouse School of Medicine: Departments of Microbiology, Biochemistry, Immunology; Departments of Pediatrics (Clinical & Translational Science Unit), Physiology and Neurobiology, Pharmacology and Toxicology; Clinical Research Center	Illumination of the effect of shift work on women's reproductive health. This work will determine if shift workers, as a vulnerable group, may require special implementation emphasis with respect to regular screenings for sexually transmitted diseases and associated complications

addressing the racial/ethnic health disparities in colorectal cancer mortality and related screening where AAs bear the burden of poorer outcomes. In 2010, supported by a CDC grant, the MSM Prevention Research Center (PRC) demonstrated the efficacy of a colorectal cancer educational intervention and developed a community coalition called The Metropolitan Atlanta Coalition on Cancer Awareness. Tested using a CBPR approach guided by a community coalition board, unscreened AAs worked with a health educator who led an intervention that included education on colorectal cancer clinical features, risks, types of screening tests and the importance of getting screened. Upon conclusion, intervention participants had a screenings rate twice that of the control group.<sup>13</sup> To test the intervention in real-world settings, the PRC partnered with the county health department to conduct the intervention in the county's 17 senior centers, with health department staff functioning under "usual" conditions. The outcomes of this second, implementation science-based phase was almost the same as it had been in the community intervention trial.<sup>14</sup>

The intervention was subsequently administered to five of the state-sponsored cancer coalitions – regional organizations of health professionals and cancer advocates that promote cancer prevention. A grant from the National Cancer Institute (NCI) enabled the testing and adaptation of the study, ultimately entitled Educational Program to Increase Colorectal Cancer Screening (EPICS) at 20 sites around the coun-

try.<sup>15</sup> At these sites, the health educators and community health workers (CHWs) are volunteer members of community coalitions that were organized several years earlier by the National Black Leadership Initiative on Cancer, an NCI-sponsored cancer prevention program. In this project, the intervention is being tested under varying circumstances to identify the best approach to training the health educators and CHWs. At this writing, results are being analyzed. This example demonstrates the translation of community-governed research with demonstrated efficaciousness and subsequent real-world scaling toward measured efficacy in practices settings.

Several research efforts supported by the MSM Transdisciplinary Collaborative Center for Health Disparities Research and the research in this supplement of *Ethnicity & Disease* embody T<sup>x</sup>™ scholarship. One prime example is the collaborative nature of local health advocates, child health clinical practitioners, behavioral scientists, and local government entities in developing a multi-state policy research and action network (Collaborative Action for Child Equity – CACE) to identify and address parental and child psychosocial health disparities through the dissemination and policy implementation of a quality parenting program (Smart and Secure Children).

MSM made an institutional investment in funding inaugural T<sup>x</sup>™ pilot projects (Table 1) in 2018. As indicated by each project and its partners, while their foci represent different research types (basic, clinical and social behavioral, respectively), their

implications are community or population focused in real-world settings.

## CONCLUSION

The vision of Morehouse School of Medicine is to lead the creation and advancement of health equity. Health equity is a destination pathed with approaches that are designed to ensure that "every person has the opportunity to attain his or her full health potential and no one is disadvantaged from achieving this potential because of social position or other socially determined circumstances."<sup>16</sup> These advances require the contributions of disciplines beyond the "bench and bedside," and may include health services, community-based participatory research or population-based approaches that consider lifestyle and behavioral modification strategies. This evidence-based approach must then be applied and associated with the adoption of interventions into routine patient and population health care. T<sup>x</sup>™ is, therefore, a destination that is ever evolving and responsive to the research, priority populations and partners through translational research and corresponding approaches that transform health, thereby advancing health equity.

### CONFLICT OF INTEREST

No conflicts of interest to report.

### AUTHOR CONTRIBUTIONS

Research concept and design: Henry Akintobi, Hefner, Taylor; Acquisition of data: Henry Akintobi; Manuscript draft: Henry Akintobi, Hopkins, Holden, Hefner, Taylor; Administrative: Henry Akintobi, Hopkins, Holden, Hefner; Supervision: Henry Akintobi, Taylor

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