INTRODUCTION

Improving the design and operation of the built environment at multiple spatial scales from interior design to urban planning to promote health and wellness is emerging as a top health care and public health priority in the United States (Bell and Cohen, 2010; Marks, 2009; Robert Wood Johnson Foundation Commission to Build a Healthier America, 2014; Williams and Marks, 2011). It is also and is one of four core strategies recommended by the National Prevention Council (National Prevention Council, 2011). This growing focus on developing healthy places stems from the recognition that the physical and operational characteristics of personal environments—homes, workplaces, public spaces, schools, and transportation systems—significantly influence population health by impacting the ability of people to access health care resources and to integrate healthy behaviors into their daily lives (Dannenberg, et al., 2003). A growing number of built environment projects intentionally target population health outcomes. Examples include the use of health impact assessment to guide affordable housing development in Denver, Colorado (Christensen et al., 2012), and the Atlanta Beltline Project (Ross et al., 2012), as well as the health-focused renovation of a primary school in central Virginia (Center for Active Design, 2014). However, these exemplary projects and collaborations remain the exception, not the rule.

Improving population health at a national and global scale through equitable access to healthy places will require a comprehensive change of practice in the real estate industry. Traditional public health interventions, used in isolation, are often not well suited to driving large-scale change in private industry sectors. However, partnerships with nonhealth sectors allow new tools and capacities to be applied, frequently yielding new insights and improved results (IOM, 2014). In this paper, we apply principles of market transformation, the strategic framework used within the green building industry, to analyze and recommend opportunities to drive broad-scale consideration of health and wellness outcomes within real estate development. Our recommendations are based on market research conducted as part of an interdisciplinary collaboration between public health and green building researchers at the University of Virginia School of Medicine and the U.S. Green Building Council (USGBC). Specifically, we discuss three primary market conditions that currently inhibit systematic investment in health and wellness in the building industry:

- Societal costs and savings linked to health impacts of real estate development currently operate as economic externalities; they are unmeasured, unregulated, and largely unconsidered. This inhibits broad-scale action and investment to promote healthy places.
- Project teams, including architects, urban planners, and real estate developers, lack sufficient practice-based tools and metrics to apply public health evidence on a routine basis.
- Real estate investors cannot competitively benchmark or differentiate property into tiers of performance based on health-promoting attributes, preventing targeted investment.

We conclude the paper by highlighting emerging efforts to address these inhibitory market
conditions by applying green building principles (and tools) of market transformation in order to drive investment in healthy places and help improve population health at a national and global scale.

THE CURRENT STATE OF PRACTICE

The built environment has direct and indirect consequences for human health (Dannenberg et al., 2003). Yet, today, the positive and negative health impacts of building design, construction, and operation function largely as economic externalities (Pyke, 2012). These health impacts affect people and the economy, yet they have no specific weight in decision making. Take the example of a new exurban development that places several hundred new homes on the outskirts of a metropolitan area. Urban sprawl is demonstrated to increase automobile dependence, which leads to a broad variety of negative health consequences, including increased risk of traffic injury (Trowbridge and McDonald, 2008; Ewing and Dumbaugh, 2009), delayed emergency response (Trowbridge et al., 2009), decreased daily physical activity (Ewing et al., 2006), and decreased social capital (Besser et al., 2008). Each of these has societal health impacts and associated costs for which project teams (e.g., architects, planners, and developers) and their clients currently are not held accountable from a performance or financial perspective (Bleich and Sturm, 2009). At the same time, the additional value of real estate projects with features and/or management practices that promote health and wellness cannot be efficiently assessed or priced into a development. This prevents individual developers at the project level and investors at the portfolio level from realizing the added value of investments in health-promoting features. This market distortion dramatically reduces incentives for innovation by project teams and other real estate industry stakeholders to target and invest in improved health outcomes.

Both the public health and green building industries lack appropriate metrics to measure the health promoting capacity of a building, neighborhood, or portfolio of buildings. Real estate project teams require relatively short-term, proximal measures of performance (e.g., financial return on investment or improved occupant experience) calculated on a project-by-project basis and generally at the measurement scale of a building or neighborhood development. In contrast, most public health departments generally monitor and report statistics at the county or city scale and focus most directly on longer-term or “distal” population health outcomes, such as infant mortality or incidence of adult-onset diabetes, metrics that often reflect factors beyond the direct control and relevant timescale of real estate project teams (Trowbridge et al., 2014).

In general, there is a lack of practice-relevant tools for the promotion of health within the real estate industry. This lack stems in part from a prevailing misalignment between the focus of built environment and public health research and the real-world needs of decision makers within the real estate industry (Trowbridge et al., 2014). The majority of this scientific work focuses on analyzing the association between features of the built environment and health outcomes or behaviors. However, translation of public health measurement tools, metric sets, and research findings into actionable project-level guidance for architects, planners, developers, and other real estate industry stakeholders remains nascent. In addition, there is not an equivalent workforce to promote population health through the design, construction, and operation of built environments. This fundamentally limits the adoption of health-promoting practices. Green building’s experience with professional training and accreditation provides a template for rapidly creating a broad-based and effective pool of skilled labor drawn from current allied groups, including architects, engineers, planners, and public health professionals (Botchwey et al., 2009; Botchwey and Trowbridge, 2011).
GREEN BUILDING PRINCIPLES OF MARKET TRANSFORMATION

Over the past 20 years, the green building industry has utilized tools and practices on the basis of market transformation principles to drive the adoption of sustainable built environment design and operation practices on a broad scale. Market transformation is defined, in the context of the green building movement, as “a process of strategic intervention in the market to bring about widespread, permanent change . . . creating the conditions for higher investment in energy-efficient buildings” (Institute for Market Transformation, 2015). Elements of green building market transformation include rating systems, third-party review and certification, labeling, and workforce development (Pyke et al., 2010). These elements work together to drive broad-scale change in design, engineering, construction, facility management, and investment practice.

In the United States alone, more than 33,000 homes and commercial and industrial projects have been certified using the USGBC’s Leadership in Energy and Environmental Design, or LEED, framework since its inception in March 2000 (USGBC, 2015b). In support of this movement, more than 195,000 practitioners have been accredited as LEED professionals (Tufts, 2014). Recent research illustrates the scope of adoption, which includes participation by almost 70 percent of large commercial office buildings (Kok and Holtermans, 2014) and some level of engagement in 75 percent of commercial new construction in the United States. This has accelerated the uptake of energy-efficient design (Krizmane, 2014) and the use of water conservation measures (Johnson and Sigmon, 2015).

Application of green building principles of market transformation is not limited to the scale of single buildings. Just as it provides market intervention at the project scale through products such as LEED, the green building industry also provides intervention at the scale of investment portfolios. For example, the Global Real Estate Sustainability Benchmark (GRESB) provides quantitative scores and comparative benchmarks for real estate portfolios (i.e., management funds with ownership or equity stakes in hundreds to thousands of buildings) to help institutional investors visualize risks and opportunities associated with the sustainability performance of their portfolios (GRESB, 2015a). Participation in GRESB has grown steadily since its launch in 2009, and, in 2015, 707 public and private real estate funds responded to its annual 50-question survey, reflecting $2.3 trillion in real estate investment (GRESB, 2015b). GRESB has demonstrated an ability to drive global market transformation by differentiating high-performing from poorly-performing funds. From 2009 to 2014, the portion of GRESB participants who tracked the energy consumption of their assets increased from 19 percent to 79 percent (Kok, 2014).

Applying Green Building Market Transformation Principles to Promote Population Health

Through interventions at the project and portfolio levels, green building has been able to internalize costs and benefits associated with sustainability performance that were previously economic externalities. This has allowed built environment stakeholders at various levels to benefit financially from investments in sustainability. We believe the same market transformation approaches and capacities that have created and continue to fuel the green building movement can be used to (1) better understand market conditions that currently inhibit the promotion of healthy places on a broad scale and (2) offer a new platform and tools for population health promotion. With funding from the Robert Wood Johnson Foundation, our interdisciplinary research team is beginning work to apply a green building market transformation lens to promoting healthy places on a national scale. Here we describe the basis for our current approach and early stage intervention strategies at both the real estate project and portfolio levels.
**Project-Level Interventions**

Project teams, including architects, urban planners, and developers, increasingly understand the potential positive impact and business value of prioritizing health promotion in their projects. However, project-level investment in health must be addressed in the context of myriad competing objectives and real-world constraints, such as zoning codes, budgets, site restrictions, and so forth. The success of the green building industry stems from its ability to provide project teams with a coordinated set of interventions to advance sustainability goals in a feasible and cost-effective manner within this complex and constrained ecosystem. Simplistically, green building platforms such as USGBC’s LEED system give sustainability a seat at the project team table by providing practice-based guidance on how to deliver high-performing buildings and neighborhoods. Project teams are provided incentives to follow this guidance because LEED certification differentiates “green” property from nongreen conventional property. Dissemination of this information allows market participants—tenants, owners, investors, and policy makers—to express their preference for the human and environmental benefits of “green” property (Matisoff et al., 2014). This differentiation propels a virtuous cycle where superior green property is in greater demand than conventional property, motivating market participants to supply more green property and drive the market toward higher levels of performance.

The green building industry has begun to create the coordinated set of interventions needed to inform and motivate the creation of health-promoting property. However, these efforts are at an early, fragmented stage of development, and they have not yet influenced the overwhelming majority of industry practice. For example, the USGBC recently launched new LEED pilot credits targeting physical activity (Lee, 2012), worker safety (Langford, 2015), and social equity (Todd and Kaplan, 2014). These new credits join longer-standing USGBC products such as the LEED-ND rating system (USGBC, 2015a) that target walkability, healthy food access, and provision of healthy affordable housing as central themes at the neighborhood scale. Moreover, USGBC has partnered with the International WELL Building Institute to introduce the WELL rating system with a specific focus on health and wellness promotion. WELL addresses a larger set of health-promoting features associated with air and water quality, nutrition, physical activity, and many additional factors (International Well Building Institute, 2014).

While health-focused tools are increasing in number, project teams lack a location- and context-specific process for health promotion. Our team hopes to fill this gap and create synergy across emerging tools by working with multiple partners to develop an integrative process credit framework for health promotion—a tool that mirrors existing criteria for energy and water management (Lewis, 2004). This framework will define a robust, multistep process to help project teams understand population health needs, prioritize interventions across one or multiple rating systems, and follow through with relevant monitoring. Adaptations of this process credit for health promotion will be developed for use within multiple green building rating systems. The first iteration was recently launched as part of the 2015 Green Communities Criteria for affordable housing developed by Enterprise Community Partners (Health Impact Project, 2015). A version of the integrative process credit for health and wellness is planned for pilot release within the LEED certification system in 2016.

**Portfolio-Level Interventions**

Collaboration among health care, public health, and built environment professionals (e.g., architects, urban planners, and developers) has largely focused on increasing consideration of health and wellness impacts at the project level. However, real estate is driven by global flows of institutional capital. The constraints and actions of project teams ultimately
reflect the priorities of property owners and institutional-level investors, such as pension funds and investment banks. These flows of capital are guided by strategies to maximize risk-adjusted return. Today, many owners and investors—many of whom operate dozens or even hundreds of projects—recognize the importance of health and wellness as a positive attribute of the buildings and communities they create and operate. However, their decisions are rarely informed by public health concepts or data. These influential decision makers do not have the practical indicators needed to understand, compare, and differentiate investment portfolios on the basis of health-promoting attributes, which prevents targeted investment. Engaging owners and investors is critical to providing the mandate and resources project teams need to create, build, and operate health-promoting built environments.

Parallelly, needs and opportunities for intervention at the project scale, we believe green building market transformation principles can guide the development and implementation of portfolio-level tools to engage real estate investors in population health promotion. Examples of health initiatives exist at the portfolio scale, such as work stemming from the San Francisco Federal Reserve to link together community development and public health efforts (Erickson and Andrews, 2011). Our work aims to complement these initiatives and others by providing tools and metrics for use by market rate investors utilizing the GRESB platform. As noted previously, GRESB provides real estate investors with information about absolute and relative portfolio performance based on detailed data submitted annually from real estate portfolio managers regarding the environmental, social, and governance performance of real estate holdings. GRESB uses these data to formulate and publish weighted sustainability scores (i.e., GRESB benchmarks) for each real estate portfolio. Similar to the added value that LEED certification brings to a project, a higher GRESB score has become associated with a higher performing portfolio (Fuerst, 2015).

Today, GRESB predominantly reflects investor interest in such issues as greenhouse gas emissions and energy efficiency. It has a modest set of questions related to health and wellness; however, it does not adequately address the full range of health promotion opportunities related to building occupants, surrounding communities, or society at large. In concert with our work to provide an integrative process for considering health at the project level, our team is beginning work with GRESB to incorporate a holistic consideration of health into the annual real estate portfolio assessment process. Principles of market transformation dictate that this collaboration will necessitate two foci of intervention. First, institutional investors—the core audience for GRESB data—need to become more aware of the connections between their portfolios and population health outcomes. Investors need to understand that their decisions have direct and indirect consequences and that they can act to create value or, conversely, to create risks. Second, GRESB needs to provide portfolio managers practical, answerable questions that can be used to evaluate their policies, actions, and monitoring schemes through a health lens. These questions must be specific, relevant, and, ideally, actionable. The combination of increasing investor awareness and availability of practical metrics for large portfolios will help make it possible for real estate investors to understand and invest in health-promoting property at unprecedented scales. This in turn will help create a well-defined and robust market for health-focused projects and innovation in the same way the green building industry has developed a robust economy around sustainability.

**CONCLUSIONS**

The built environment is a powerful determinant of population health. Buildings and communities can inspire or frustrate, connect or isolate, or empower or demotivate. Today, the positive and negative health-related attributes of buildings and communities are unregulated, unpriced, and largely invisible for project teams or even sophisticated institutional investors. The result is an undersupply of health-promoting property and unnecessary costs borne by
individuals, communities, and society at large. Fortunately, green building offers a practical framework to drive positive change across scales. New tools for project teams make it possible to design, build, and operate health-promoting buildings. New tools for investors empower institutions to direct large-scale flows of capital toward portfolios that address population health needs. This paper offers a practical blueprint for the market interventions needed to overcome current barriers and dramatically improve built environments around the world. The population health research community is able to support this transformation by pursuing translational research to better understand the implications of market failure and by developing practical strategies to improve project and portfolio performance.

REFERENCES


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