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Review Article

Master-planned communities in the United States as novel contexts for individual and population-level research

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ABSTRACT

It has long been known that social and physical environments can shape individual and population health, for better or worse. Master-planned communities (MPCs) in the US are custom-designed residential neighborhoods with defined boundaries planned and developed under a single, private owner or entity from their inception. Across the US, these vary greatly in scale ranging from 100 to over 50,000 homes, but broadly all provide residents with housing, infrastructure, landscaping, and purpose-built facilities to support socialization. Current research in the urban planning literature suggests that MPCs can influence the health of their residents. However, few studies have examined the use of MPCs as settings to conduct individual or population health research. In this paper, we examine the potential of MPCs as context for observational or intervention studies aimed at understanding individual and population-level health and well-being. We first summarize links between built and social environment and individual and population health research. Next, we describe the history of planned communities in the US. Then, we review specific features of MPCs related to governance, development, design, and social structure. We end by exploring how those specific features may lead to potential opportunities and challenges when using MPCs in health research. Through this discussion, we highlight MPCs as overlooked settings that may offer potential for collaborative, innovative, and socially engaged health research.

1. Introduction

We examine the potential of master-planned communities (MPCs) as context for individual biomedical and population-level health research. US MPCs are custom-designed residential neighborhoods planned from their inception, typically constructed on undeveloped land. They often incorporate recreational-open space and commercial amenities, often including community and educational facilities. Most MPCs are developed by a private development company and maintained by management companies or homeowner's associations (HOA) (Rosenblatt et al., 2009). MPCs provide housing as well as infrastructure, landscaping, and community facilities like schools, health facilities, and shopping centers, and are becoming increasingly prevalent in the US (Foundation for Community Association Research, 2021).

MPCs offer an underexplored opportunity for health research. To our knowledge, MPCs have not been systematically included as health-related research settings. While urban planning and public health collaborations have examined links between the built environment and health generally (Day et al., 2006), fewer empirical studies focus on MPCs and health specifically (Nicholls et al., 2018; Francis et al., 2014).

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For example, longitudinal work has found longer commutes among MPC residents (Nicholls et al., 2018) or specific material environmental features (Maller et al., 2016) are associated with lower physical activity. Qualitative work in MPCs indicates that sense of community, security, and pleasing aesthetics are associated with better mental health (Francis et al., 2014) and MPCs may contribute to safety, walkability, and accessibility in older residents (Alidoust and Bosman, 2017). A recent review of community-led housing, including models similar to MPCs like co-operatives and tenant-managed organizations, has identified community health benefits, including healthy aging, social inclusion, and physical activity (McClymont et al., 2019). However, given the limited published literature on health research in MPCs, there is potential to expand this field, possibly benefitting both research and residential communities. MPCs are characterized by private development, purposeful planning, uniform design, community amenities, and sense of community, and MPCs residents range from being broadly sociodemographically representative to focused on specific groups (e.g., aged 55+). Unique features of MPCs and characteristics of MPC residents may have implications for health that could elucidate paths to intervention. MPCs may offer a context for accelerated research, as these contexts may be particularly receptive to and prepared for implementing community-based research. Focusing on MPC communities may address important health-related questions and reveal community features that broadly promote health, informing the development of future healthy communities.

To explore the opportunities of MPC settings, we first describe how place has been considered in individual and population-level health research, focused on residential context. Second, we explore the history of development of US planned communities to provide historical context of MPCs and motivation behind their built and social characteristics. Third, we summarize features of MPCs with respect to construction, design features, governance, and social structure. In describing key features, we hope to make clear how and why MPCs are suitable settings for research participation, design, and implementation. Finally, we summarize potential opportunities and challenges in the MPC setting for health research. With this overview, we provide health researchers the historical context and our assessment of MPC characteristics that make them promising research settings. We think research projects partnered with and conducted in MPCs will motivate innovative, effective, and sustainable research that is aligned with community values, and benefits the health of MPC residents and the broader population.

2. The built and social environment in health research

Effects of place on individual and population health are broadly recognized in medical and public health literature (Duncan and Kawachi, 2018; Roux, 2001). “Place” generally refers to where people live, learn, grow, work, and play, with residential place being particularly central to one's life and health. Place encompasses not only physical location, but also “locale” and “sense of place” reflecting objective and subjective dimensions of a social location, personal and shared meaning of physical locales, and human agency to shape and develop physical spaces (Cresswell, 2014). Place thus encapsulates both built and social features. Built environments include human-made spaces that people occupy daily, including housing, green space and parks, sidewalks and roads, and other public spaces. Built environments influence, among other things, patterns of traffic flow, perceptions of safety and security, and population density (Renalds et al., 2010). Social environments comprise both material and social characteristics (Roux, 2001), including interpersonal relationships, social participation, and feelings of community. Socio-environmental aspects are linked to and influenced by the built environment, and in turn, both built and social aspects of residential place influence health. Residential place is an important socio-ecological level, interacting with other levels like interpersonal relationships, community institutions, cultural values, and policies dynamically over time to affect health (Dunn et al., 2014).

Accumulating observational evidence indicates that built and social environments influence residents' physical and mental health (Duncan and Kawachi, 2018). Recent meta-analyses suggest that greater walkability, including street connectivity and nearby destinations, and easier access to greenspace are associated with 20% lower risk for obesity and diabetes (Chandrabose et al., 2019). Other built environment features, including poor housing quality, residential crowding, loud noise sources, presence of pollutants or toxins, and insufficient daylight, are linked to poorer mental and behavioral health (Evans, 2003; Núñez-González et al., 2020), while neighborhood aesthetic quality, greenspace, and availability of public transport are related to positive well-being (Moore et al., 2018). Socio-environmental features, including social support and social capital, are associated with lower risk for heart disease (Compare et al., 2013), lower prevalence of mental disorders (Murayama et al., 2012), and higher life satisfaction and well-being (Reblin and Uchino, 2008). Moreover, health-promoting and health-damaging aspects of built and social environments are not equitably distributed. Marginalized populations, including racial/ethnic minorities, people from low socioeconomic backgrounds, and sexual/gender minorities, are disproportionately impacted by deteriorative features of built and social environments (Gelormino et al., 2015).

Much place-based research has defined “community” based on geographical boundaries categorized by Census tracts or block groups, which may ignore broader municipal policy environments that shape communities (Arcaya et al., 2016). Failing to incorporate community context limits the scope and impact of research and may obscure important effects, both compositional (e.g., characteristics of community residents) and contextual (e.g., characteristics of the community context itself). Further, overlooking the neighborhood's unique needs and strengths may result in less effective intervention or policy efforts. Enhanced focus on residential place as a central ecological context may benefit the applicability and effectiveness of health-related research. Researchers have only begun to understand how to study and conceptualize how to intervene with our built and social environs. Focusing on MPCs as research settings is a strategy to integrate innovative health research and health promotion to benefit both health science and communities.

3. History and structure of master-planned communities

3.1. History of planned communities in the United States

The evolution of US MPCs began centuries ago, as briefly summarized in Table 1. Early influences of planning movements began in late 1800s in the US and Great Britain (Banerjee, 2011). At the intersection between public health and urban planning, early city planning movements focused on preventing infection, promoting health, and mitigating hazardous exposures (Kochtitzky et al., 2006). City Beautiful and Garden City movements focused on design aesthetics and fostering sense of community, involving towns of limited size and density, surrounded by a belt of undeveloped land (Banerjee, 2011). Inspired by these movements and homegrown political impetus, several US planned communities were established in the 1920s and ‘30s, characterized by high-density, pedestrian orientation, and emphasized public space (Lee and Stabin-Nesmith, 2001). New Deal policy following the Great Depression provided suburban housing to many middle-income Americans (Bostic et al., 2012). This resulted in government-sponsored Greenbelt Towns, suburban communities reflecting the British Garden City model (Parsons, 1990).

After World War II in the 1940s and ‘50s, the need for mass-produced houses heralded in Levittowns, which predicated the modern suburb with homogeneous communities and suburban sprawl (Bauman et al., 2000). The post-war period also involved a public health and urban planning focus on housing and neighborhood standards to promote health, encouraged by the American Public Health Association (American Public Health Association Committee on the Hygiene of Housing,

Table 1
Brief history of planned communities in the United States.

Era	Inciting factors	Evolution	Impact
Late 1800–1920s – Rise of City Planning	Need for improved health and sanitation and desire for alternative to overcrowded, polluted, and chaotic industrialized cities	City Beautiful and Garden City (Great Britain) movements – Focused on design aesthetics and developing small towns surrounded by greenbelts	Influenced early planned communities in the US
1920–1940s –Great Depression and Dew Deal era	Need for affordable housing and employment following the Great Depression	Individual private developments began; New Deal policy passed the Housing Act and created the Federal Housing Administration	Development of several large-scale private planned communities (e.g., Radburn, NJ) and government-sponsored greenbelt towns and suburbs to house many middle-income Americans
1940–1950s – Post World War II	Need for mass-produced houses and communities for returning veterans and families following WWII	Development of Levittowns, first mass-produced suburban communities developed in NY, PA, and NJ; public health policy and intervention in urban planning	Development of the modern American suburb with homogeneous communities and suburban sprawl
1960–1970s – Civil Rights era	Social unrest and criticism of suburbs leading to environmental problems, cultural conformity, and social isolation	Development of New Town movement as a return to Garden City influences; these developments were supported by inception of the Dept. of Housing and Urban Development (HUD)	Development of New Towns in Reston, VA, Columbia, MD, and Irvine, CA, involving careful planning, open space, and mixed residential and occupational use; HUD supported promotion of community development and further federal resources for private builders
1980s-present	Further development of New Town movement	New Urbanism developed, including principles of preventing urban sprawl, mixed land use, and creating sense of community through planning principles	Modern master planned communities throughout the US developed under New Urbanism principles

1948). The 1960s and '70s saw a return to early British planning models with the New Town movement, a response to 1960s social unrest and criticisms of suburban developments and related environmental problems, cultural conformity, and social isolation (Forsyth, 2005). New Towns were characterized by coordinated and comprehensive planning, with co-located residential and occupational opportunities. The Department of Housing and Urban Development (HUD) was created in 1965, further increasing federal sponsorship of urban planning and community development (Biles, 1998).

Many modern MPCs are rooted in the New Urbanism movement beginning in the 1980's, which is considered a continuation of the New Town movement, with its return to traditional neighborhood values (Talen, 2005). New Urbanism promotes preventing suburban sprawl and creating walkable neighborhoods through integrated planning processes (Dowling and McGuirk, 2005; Rubenstein, 2013). An overarching tenet is belief that the built environment can foster sense of community and develop social capital among residents. Developments in this tradition use architectural design principles, including density, public space, and mixed land use, to enhance attachment to place and social interaction (Dowling and McGuirk, 2005).

MPCs have become a significant part of the housing market in the US and elsewhere like Australia and Great Britain. Modern MPCs are heterogeneous, varying in size, governance or ownership structure, and amenities or facilities provided. In 2016, an examination of the 50 largest US metropolitan areas found 79% of the population lived in suburbs and 27% lived in some form of planned community (Foundation for Community Association Research, 2021; Urban Land Institute, 2016). Community developments are increasing – an estimated 60% of new US housing built for sale in 2018 was in a community association (Foundation for Community Association Research, 2021). Indeed, current US MPCs include both well-established, decades-old, extensively developed communities and those more recently developed or populating new-growth areas (Urban Land Institute, 2016).

There is a misconception that US MPCs comprise largely homogeneous populations of white, middle- or upper middle-class residents (Gordon, 2004). Notably, exclusionary housing policies and development practices in US planned communities and suburbs have produced and perpetuated residential segregation of communities of color, as described elsewhere (Zenou and Boccard, 2000). However, planned developments today include a range of housing types and sociodemographic representation, and typically reflect racial/ethnic population compositions comparable to other suburban areas (Kato, 2006a; Ben-Joseph, 2004). Estimates from 2016 across a range of suburban developments find that between 27% and 62% of residents identify as racial/ethnic minorities (Urban Land Institute, 2016). Further, median household income in MPCs and suburban developments ranged from $46,000 to $96,000 with varied housing types (e.g., single family, multifamily housing), suggesting a range of socio-economic representation (Urban Land Institute, 2016). While scholars have theorized the potential for MPCs to increase spatial and social segregation (Blakely and Snyder, 1997; Dowling et al., 2010), little empirical work has examined how the public or neighboring residents perceive MPCs, thus research into external perceptions of these communities is warranted.

3.2. *Built and social features of master-planned communities*

MPCs share several hallmark characteristics related to the built environment, like development and design features, and the social environment, like ownership and social features (Fig. 1).

First, most MPCs are owned and operated by private developers or public-private partnerships, where public partners may be local city or county municipalities. Private ownership may create privately funded and operated associations to govern local affairs in lieu of local municipality management (Cheshire et al., 2009). Some developers create built-in revenue streams and then turn over governance to residents, where owner's corporations or HOAs collectively manage common areas and varying amounts of community services (Thompson, 2013). MPCs may provide infrastructure services that replace those offered by municipalities, including facility and property maintenance, garbage collection, and security. In some MPCs, developers may also provide key community services like schools, healthcare, shopping centers, and recreation (Rosenblatt et al., 2009).

Second, MPCs involve purposefully planned development and land-use. A comprehensive master plan typically defines and guides community development and construction, in contrast to building upon existing infrastructure. Many US MPCs are established on the urban fringe, where larger land plots are available. Large plots and access to natural resources allow MPCs to develop without existing infrastructure

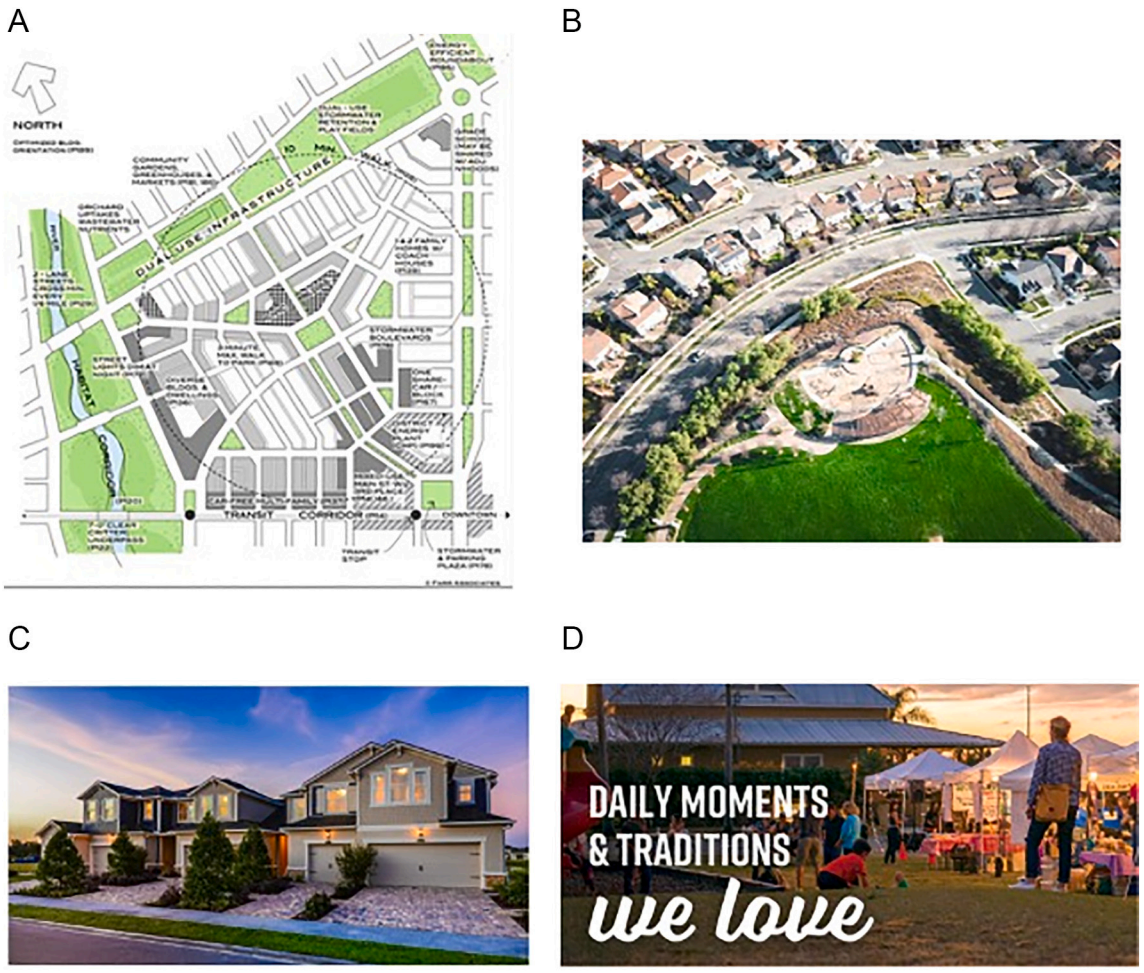

Fig. 1. Examples of common built and social features of master planned communities.

and to incorporate outdoor recreation, parks, and open space (Tilt and Cerveny, 2013). MPCs tend to incorporate mixed land use - a planned combination in each area of residential, commercial, community, and recreational facilities, allowing for compatible but different land uses in close proximity (Rubenstein, 2013). Many MPCs follow the New Urbanism tradition of mixed land use, resulting in lower dependence on cars and greater walkability (Plas and Lewis, 1996). MPCs often prioritize public space, exemplified by town layouts that center around public spaces.

Third, MPCs often have design guidelines which dictate architecture and design aesthetic and provide community amenities. Private ownership provides developers greater levels of control, for example, enabling standardized building design and more clustered housing like duplexes, townhomes, and condominiums (Ben-Joseph, 2004). Housing styles may be predetermined by developers, often including multiple housing types and amenities dictated by various age, income, and household segments the MPC hopes to serve (Durand et al., 2011). MPC developers may seek to meet residents' social and environmental needs by creating high-quality community facilities and amenities, like recreational and cultural activities (Rosenblatt et al., 2009). Research suggests closer proximity to neighborhood facilities (e.g., restaurants, parks, recreation centers) is associated with greater social connectedness, sense of trust, and safety among community members (Cox and Streeter, 2019). Uniform aesthetic and community amenities are seen as key marketing points for developers, who promote these community features to attract residents (Lee and Stabin-Nesmith, 2001; Cheshire et al., 2009).

Fourth, MPCs create and provide social communities. A core New Urbanism principle is that a sense of community can be engineered through design; MPC developers employ a variety of strategies to fulfill this desired prospect. Built environmental aspects, like central shopping centers, extensive landscaping, and connected walking paths, are designed to increase social interactions and promote social integration (Rosenblatt et al., 2009). Uniform aesthetics can foster a sense of community and cohesion (Rosenblatt et al., 2009). MPC marketing materials often promote sense of community by highlighting desirable environmental features and the close-knit community (Walters and Rosenblatt, 2008). Developers provide facilities for community, sport, and recreation, and establish key recurring events or celebrations to create lasting community bonds (Walters and Rosenblatt, 2008). Some MPCs explicitly focus on certain lifestyle features; they attract residents who share hobbies (e.g., golf or leisure activities) or life stages (e.g., retirement age or age-restricted [age 55+] communities) to solidify community identity. However, MPCs that promote exclusive, distinctive communities may increase feelings of separation of residents from surrounding communities (Thompson, 2013). For example, cultivated social identities within MPCs and physical boundaries (e.g., gates, walls) around MPCs are associated with social distinction, exclusivity, and polarization between the MPC and neighboring areas (Thompson, 2013).

4. Opportunities and challenges for conducting research in master-planned communities

Features of MPCs make them particularly appropriate contexts for health research. Next, we summarize opportunities and challenges across the research process for conducting observational and

experimental health research within MPCs (Table 2).

4.1. Opportunities

1. *Defined study population facilitates **representative sampling**.*

Predefined geographical and jurisdictional boundaries of MPCs identify the study population. Boundaries create an identifiable and conceptually relevant population, necessary for any research study (Roux, 2001). Sampling frames (i.e., list of all sampling units, such as residents or households) may be available via the governance structure. MPC management may keep updated residential rosters, including information like addresses, family members' ages, phone number or email contacts, etc. Sampling frames are often not readily available or can be expensive to acquire. Available information on residents' characteristics may also guide targeted sampling procedures. These are major strengths, in contrast to less clearly-defined communities, wherein researchers grapple with challenges of defining relevant social and geographical boundaries (Kawachi and Berkman, 2003).

2. *Features of MPCs facilitate both **recruitment and research participation**.*

Many MPCs have communication mechanisms and venues to help recruit and retain participants in research studies. Mechanisms may include trusted communication networks and forums (e.g., email listservs, message boards, social media platforms), as well as central gathering spaces (e.g., community centers, gyms, shopping and recreation areas). While other communities have similar forums or spaces, many MPCs are relatively larger in scale than smaller developments with centralized communication, such as condo associations. Community-wide contact information may be available and centrally managed by the development company, HOA, or other community advisors. Although address-level data is available through market research companies, the data must be purchased and may not be up-to-date. Depending on communications and governance structures, MPCs may offer more reliable information about residents free of charge.

Informed by a community-based participatory research perspective (Israel et al., 2005), direct, purposeful engagement with community members in the research process can benefit participation. In MPCs, cultivated sense of community may increase buy-in for community-based research as residents who choose to live in MPCs may have specific characteristics making them particularly likely to engage in community-based activities. Community identity, sense of agency, decision-making power, and belief that supporting research may benefit themselves and their community may increase motivation to participate. High social integration and cohesion in MPCs, relative to less-structured communities, could enable more comprehensive community-based interventions that involve participation from most residents. Organized social infrastructure may rely on a network of community leaders, who can be hired, appointed, or volunteer in formal (e.g., HOA managers) or informal roles (e.g., more socially engaged residents). Leaders could serve as trusted liaisons between research and resident communities, increasing awareness of research and encouraging participation.

3. *MPC features provide opportunities for **rigorous and innovative study designs**.*

MPCs may be venues for designing longitudinal cohorts and examining how aspects of place impact health. There may be enhanced opportunity to follow individuals over time, since 60%–71% of housing in US MPCs is owner-occupied, which increases tenure and decreases housing turnover (Urban Land Institute, 2016). Longer tenure and high proportion of households with children (37% of MPCs households have children, versus 31% in the broader US) (Urban Land Institute, 2016; US Census Bureau, 2018) may allow for extensive longitudinal and

Table 2
Opportunities and challenges for using master planned communities in medical and public health research.

Research domain	Opportunities	Challenges
Study population and sampling	- MPC boundaries create identifiable and conceptually relevant study population - Sampling frame and information on residents is available for recruitment	- Specifically defined community may exclude other potential participants creating an "us" versus "them" dynamic - Relatively limited geographic distribution of MPCs
Recruitment and participation	- Sense of community and community identity increases participation and buy-in among residents - Existing communication mechanisms are available to recruit residents and retain them in research studies - Residents' agency in community decision-making increases their motivation to participate	- Residents may feel coercion to participate in community-based research - Neighboring community members may be excluded from research and unable to participate
Study design	- Information on MPC residents enables the tracking and following of participants over long periods of time - Researchers can examine effects of place on health (e.g., contextual features between different MPCs, specific settings or contexts within MPCs) - Researchers can implement community-based intervention components, including through unique partnerships with MPC leadership	- There is little or no variability in some factors of potential interest, precluding their study
Internal validity	- Homogeneity of the MPC context may control for potential confounding factors - Continued engagement by residents may result in better study retention over time	- Participant awareness of research goals may lead to participant, response, or social desirability bias - There may be contamination between intervention and control groups within MPCs - Self-selection into living in MPCs may introduce selection bias
External validity	- Age-restricted communities or specific MPC populations may generalize to broader populations with similar characteristics	- Lower generalizability of the populations living in MPCs and the residential built environmental features
Logistic considerations	- MPCs have existing resources and personnel able to support research efforts - MPC central governance provides communities both control and flexibility to implement interventions	- Changes in MPC governance may alter relationships with researchers
Sustainability	- MPCs engaging in participatory research and community engagement may lead to effective and contextually relevant change - Engagement in research might bring MPCs marketing and economic development benefits	- Sustained changes are contingent on continued support and effort from MPC governance
Dissemination	- Community engagement in the research process will result in more effective and ongoing dissemination of	- Dissemination may create false perception of direct, immediate benefits to the

(*continued on next page*)

Table 2 (*continued*)

Research domain	Opportunities	Challenges
	relevant results to the community - Pace of sharing research findings may be accelerated due to established social and communication networks	community from the research
Community impact	- Accelerated integration and adoption of research recommendations into MPCs	- Investment and attention of the MPC directed at health research, potentially precluding efforts in other domains

intergenerational studies. MPCs provide an opportunity to directly examine the effects of place on health. For example, research across MPCs provides homogeneous comparison groups that may differ by only a few relevant contextual characteristics (e.g., geographic location, housing types). MPC-based research can examine exposures within communities themselves. For example, research may examine effects of workplaces or schools on health, nested within shared MPC contexts. Longitudinal cohorts in MPCs may provide opportunities for nested clinical trials, given the noted infrastructure available for research activities.

MPCs may be efficient venues for community-level and community-based interventions. Central governance allows for coordination and control, and existing MPC facilities may serve as venues for intervention activities. Effective experimental designs involve researcher manipulation of intervention elements, while holding constant extraneous factors to discern causal effects. Centralized control over many social, recreational, and service-based factors may result in more innovative and extensive intervention components involving the built environment or MPC policy, which would be more difficult in community settings without central governance. Greater environmental control in general would help produce "cleaner" control conditions, and thus extraneous or confounding factors, like other community-based health promotion campaigns, could be reduced. Implementing community-wide interventions or policies in MPCs may be easier compared to other community settings where there may be regulatory or governance restrictions.

4. *MPCs' uniform contexts benefit **internal validity***, or the ability to disentangle causal effects.

A major internal validity threat is confounding, when associations between an exposure and outcome are distorted by other factors related to both the exposure and outcome. One way to account for confounders is by restricting samples so confounders are consistent throughout the population. MPCs represent populations that are homogeneous in many contextual variables (e.g., housing quality, healthy food availability, school quality) that might be confounders, therefore lowering potential bias. If MPC residents have increased engagement in research, they may be more likely to continue to participate over long periods of time. Improved retention benefits internal validity, as differential attrition or dropout can bias causal inference.

5. *Uniform design and structure benefit **external validity***, or the generalizability of findings from a given study to specific populations or contexts.

Although generalizability to broad communities may be limited, research in specific MPCs may be ideal for assessing selected scientific questions. For example, research in age-restricted communities (e.g., residents aged 55+ (Trolander, 2011)) may be relevant for broader aging populations. Additionally, given that US MPCs reflect a broad range of architectural, governance, and community features, specific MPCs characteristics may enhance or hinder the applicability of research findings to other settings.

6. *MPC features are advantageous for specific research-related **logistical considerations***.

Many MPCs have dedicated personnel, facilities, and resources that could be leveraged to support research efforts. Existing communication channels could help distribute surveys and study materials, and community facilities could be utilized for research activities. Collaboration with MPC governance could provide infrastructure to implement research projects quickly and effectively and reach community members "where they are", rather than requiring travel to offsite research institutions. Further, depending on the MPC stage of development, researchers could work with developers to include intervention features into community planning. Since many MPCs involve some level of residential governance or collective decision making, residents are familiar with working collaboratively and might be better prepared for engaging in community-level research, relative to less centrally-coordinated communities.

7. *MPCs governance can lead to greater **sustainability** of changes following interventions.*

Innovative community-informed research benefits both researchers and MPCs. Private governance may provide greater opportunities to engage in community-based participatory-action research. Without private governance, settings may be more constrained by local politics, policies, and bureaucracies, hindering researchers' ability to work with community members. Community engagement results in more effective, culturally- and contextually-relevant research that produces sustainable change in communities (Israel et al., 2005). Existing MPC features, like recreational activities, community cohesion, and community governance, may be leveraged to promote and intervene for health. Community engagement in research increases recognition of the community identity, existing resources, and knowledge.

MPCs can demonstrate commitment to health, innovation, and community wellbeing through participation in health research. Successful community-informed interventions and policies could be highlighted as desirable resources in MPCs. Cutting-edge science may attract entrepreneurs and new business and thus may improve the regional economy.

8. *Community-engaged MPCs research may result in **effective dissemination** of findings*.

Active community-research partnerships may promote ongoing and effective dissemination of research findings within the community. Communication from these partnerships will be directly relevant for community members, generating products for both scientific and community audiences. Further, communication structures in MPCs are effective avenues to coordinate, communicate, and disseminate research-related information.

Dissemination and implementation of research recommendations may be accelerated in MPCs, compared to other community-based settings. MPCs may be motivated to adopt research-informed changes, particularly if they have demonstrated effectiveness within their context. Further, MPCs may be able to implement changes more quickly due to private governance.

4.2. Challenges

1. *The identifiable study population may lead to exclusion of neighboring residents.*

MPC boundaries and neighboring residents may complicate the

study population definition. For example, neighboring residents may be similar to MPC residents and could feasibly be included to increase sample size. Researchers must decide whether to expand the study population and obtain information on all neighboring residents for a sampling frame in probabilistic sampling. This would extend the meaning of community beyond the defined MPC. Conducting research entirely within an MPC may exclude geographically adjacent and interacting communities from potential benefits of research participation.

2. *Although various forms of planned communities are common across the US, large-scale established MPCs are relatively geographically limited* (e.g., *top selling MPCs are in Florida, Texas, and Arizona* (Logan and Pischke, 2020)).

This geographic restriction limits generalizability of research and opportunities for research engagement with local researchers or institutions.

3. *Research in MPCs has some potential for coercion in recruitment and participation.*

If most residents support their MPC participation in research or the governing body approves, residents may feel coerced to participate in research activities. Rental versus owner status may cause social divisions within communities (Cheshire et al., 2010), and renters may feel less connected or have lower community engagement, potentially limiting willingness to participate.

4. *Specific MPCs features may lead to limitations in study design.*

There may be little or no variability in some factors of interest, including compositional (e.g., residents are all aged 55+) or contextual (e.g., access to healthy food and recreational facilities is similar for all residents) factors, if they are common among the entire community. With little variability, those factors cannot be directly assessed in relation to health in a single MPC, thereby limiting potential scientific inquiry.

5. *MPCs settings may lead to limited internal validity in research.*

MPC residents would likely be aware of research activities occurring in their community. Knowledge of specific research goals may lead to response bias – where participants' knowledge or belief about research goals influences study responses. MPC residents might be particularly invested in the success of health research given their sense of ownership in community matters, further influencing study responses. Biases may impact intervention or observational results, and direction of biases is not always predictable. A related potential phenomenon is social desirability bias, where participants respond in ways that align with social norms or are more socially acceptable, regardless of their knowledge of research goals.

There may be higher risk for contamination in interventions delivered within close-knit communities. Contamination occurs when intervention components designated for an intervention group are experienced by the control group. Contamination hinders identification of intervention effects and may be more likely in MPCs compared to general community settings. Residents may commute outside of MPCs for work or education, which could complicate research that assumes MPC residents are regularly exposed to the MPC context (e.g., commuters may not experience community-level interventions if they spend time outside of the MPC).

As residents self-select into living in MPCs, studies may be at risk for selection bias, whereby the group under study differs systematically from the population of interest. For example, MPCs targeted at leisure or outdoor activity may attract physically-active residents, or emphasis on social cohesion may attract more socially-active residents. When specific resident characteristics are related to research questions, studies may be biased due to confounding and potentially over-exaggerate findings (e.g., MPCs aiming to promote health may attract healthier residents, such that new health interventions may result in even greater improvements).

6. *Using MPCs in research may limit external validity.*

Characteristics of MPCs may impact generalizability. Despite relatively broad representation, MPC residents may significantly differ from the larger population in relevant ways. Again, given residents' choice of living in MPCs, research conducted in MPCs may not reflect phenomenon and relationships in broader populations that do not share similar characteristics. Research conducted in the context of MPC-specific design features and amenities might not directly translate to different contexts.

Although suburbs are diversifying (Kato, 2006b) and some planned communities are less racially segregated than neighboring areas (Micklow and Warner, 2014), MPCs still may reflect high socioeconomic and low racial/ethnic minority groups. Thus, generalizability of MPC research to more diverse populations is limited. Careful ethical considerations should be made regarding equity in representativeness of research and exclusion from potential benefits of research.

7. *MPC features may lead to logistical concerns for long-term research.*

Internal governance may change over time thereby altering existing relationships with research groups. Changes to MPC governance may limit long-term researcher-community partnerships and preclude extended longitudinal research, potentially influencing study design and integrity over time. Sustainability of research efforts in MPCs is contingent in part on the MPC governance structure and their continued support and cooperation. Rental tenants may turn over frequently, hindering follow-up participation in long-term studies.

8. *Dissemination strategies within MPCs have potential limitations.*

Active research participation and ongoing feedback within the community may cause residents to expect health benefits, particularly in the short term. Depending on the research being conducted, it must be made clear that most health research is conducted to inform future policy or interventions rather than directly or immediately benefit research participants. Researchers must realistically and accurately communicate outcome expectations and the pace of science, implementation, and change for participants.

5. Conclusions

Consistent with a socio-ecological perspective of health, public health efforts must examine health-related processes and implement intervention components at multiple ecological levels (Hall et al., 2018). These efforts will necessitate collaboration with varied stakeholders, including those within communities and across scientific, policy, and practice disciplines. MPCs may represent a specific opportunity as a collaborative community prepared to engage in health research, with the possibility to leverage existing resources and partnerships efficiently. Health researchers can broaden their options by considering these communities as both venues and partners, and by working to identify and develop collaborations with MPCs to make this research option a reality.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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