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COVID-19 and the Future of Urban Life

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In Summer 2020 amid the global pandemic, the Department of City and Regional Planning at University of California, Berkeley hosted a colloquium series at which faculty and graduate students presented their work related to COVID-19. The discussion spanned a wide range of topics around urban form, economic productivity, design, food justice, housing and displacement, political movement, and social control both in the context of countries in the Global South and the U.S. This *White Paper* contains six essays originated from the colloquium, each bringing a unique vision of how the COVID-19 pandemic is currently shaping and will continue to shape our cities in the future and what lessons we can learn from it.

The COVID-19 pandemic has caused unimaginable adversity, with nations across the globe devising ways to cope with the loss of life, economic productivity, and social fabric. Due to the agnostic nature of the virus, no facet of society, whether in the Global North or South, has been left untouched. As beacons of economic and social agglomeration, the pre-pandemic city, in particular, has seen a rapid transformation, in often unforeseen directions. Local businesses have shuttered, while large technology companies have thrived; offices have closed, while their adjacent streets have been opened for active mobility and social activities; apartment rents have decreased, while single-family home prices have increased; the underprivileged have been adversely affected by both the virus as well as the economic reality of the pandemic, while the affluent have been largely untouched in both health and economy. Responses to COVID-19 in various nations have only exacerbated existing socioeconomic inequities, and, expectedly, not all federal, state, or local responses have been beneficial to all strata of society. This white paper focuses on several core themes that have evolved over the course of the pandemic and have behaved differently across geographies: (1) urban economics and equity (2) social and economic power dynamics, and (3) strategies to preserve urban social and economic systems.

The first two essays, by assistant professor Sai Balakrishnan and doctoral student Liubing Xie, initiate the conversation with two cases in the Global South, India and China, respectively. Balakrishnan's piece brings attention to the issue of global urban inequality revealed by COVID-19 through India's agrarian-urban spatial rift, as well as the undocumented farm workers essential to the food supply chain in the U.S., while Xie's essay illustrates the practice of mobility control and community surveillance in Beijing as a means to contain the virus. In the following essay, Professor Karen Chapple, Chair of City and Regional Planning, examines the potential residential and business displacements and replacements due to COVID-19, arguing that despite the heuristic narrative of inner-city resurgence by knowledge workers, it will likely strengthen the existing trends of urban inequality and displacement. The next essay by Zachary Lamb, assistant professor in DCRP, describes the 'resident-owned communities' (ROC) co-ops' responses to COVID-19 and shows that the social solidarity, communications infrastructure, and institutional capacity built by ROCs, as well as the network assistance provided by ROC-USA, serve as valuable resources for these socially and economically vulnerable communities in the midst of crisis. Meiqing Li, a doctoral student in DCRP, reviews the historical debate on density and public health, suggesting that in a post-pandemic world, cities can learn from one another's experience in density management. This is echoed by the concluding piece by doctoral candidate Pavan Yedavalli, who proposes a scientific framework for cities to incorporate a time-variant measure of density in order to limit the exposure to particles.

We hope this collective effort shared by the DCRP community can provide insights into the future of our cities at this extraordinary time.

COVID-19 and Labor-Oriented Economic Geographies

Sai Balakrishnan

COVID-19 has exposed and made visible long-festering forms of global urban inequalities. In this article, I will focus on a key dimension of the COVID-19 crisis in India, that of agrarian-urban inequalities. Though focused on India, I am keen on analyzing these agrarian-urban inequalities through a comparative lens, and I will conclude by bringing these agrarian-urban questions back home to the context of the U.S. and Northern California.¹

On 24 March, 2020, the Prime Minister of India, Narendar Modi, announced one of the most severe lockdowns imposed by any country as a response to the COVID-19 crisis. The government sealed district and state boundaries and suspended all public transportation; the restriction to movement across boundaries was violently enforced by the police. Within days of the lockdown, harrowing accounts and visually poignant media reports started pouring in, thanks to intrepid journalists on the ground, on the large-scale human exodus of migrants out of cities and urban regions back to their home villages. The scale of the forced human movement across boundaries was immense, matched by some estimates only by the historic precedent of the violent sorting of Hindus and Muslims during the 1947 India-Pakistan Partition. As urban migrant workers embarked on their treacherous journeys, their routes revealed the spatial fault-lines of uneven development in India: migrants were largely walking home from the cities and urban enclaves in the prosperous western regions of India back to their villages in the eastern regions. In other words, these migrant journeys revealed that India's most vulnerable labor force was migrating almost across the width of the country—from east to west—in search of work.

These long-distance migrant journeys also exposed the exclusionary nature of India's contemporary urbanization. After economic liberalization, which was officially enacted in 1991, urban policy has largely taken the form of logistics infrastructures and urban enclaves, which policy-makers argue are needed to unshackle India from its socialist agrarian past and propel the society into a globally competitive urban future. These logistics and urban enclaves—such as economic corridors, Special Economic Zones (SEZs), and container ports—are largely concentrated in the western and southeastern regions of the country. More than 90 percent of the labor employed in these enclaves are unorganized casual workers, hired on flexible contracts without benefits so that their labor resources match the temporal needs of a “just-in-time” and “lean” economy. As they lack urban social welfare protection, these informal workers continue to rely on the marginal plots of land in their home villages in the eastern region of the country as an essential safety net during times of crisis. And it was to these safety nets that they were returning when the emergency lockdown was imposed.

In a recent blog article (Balakrishnan, 2020), I argued that we cannot understand India's spatial rift without bringing into view the longer arc of colonial and postcolonial agricultural modernization. One of the most important insights from mapping contemporary India's spatial rift is the almost neat overlap between contemporary urban enclaves, where work, albeit in the form of urban informal work, is available, and the former Green Revolution regions. The Green Revolution was an agricultural modernization program that coalesced around Cold War geopolitics, when the U.S., via a network of

¹ Thanks to the participants in the fall 2020 DCRP PhD colloquium who encouraged me to look at how the agrarian-urban question from India travels to other contexts, including the U.S.

scientists and private foundations, exported scientific expertise and financial aid to Third World countries for modernizing peasants and averting a turn to communism (cf. Cullather, 2010). If we had to draw a broad-brush map of the Green Revolution regions, it would trace an arc from the northwest to the southeast, and it is these regions that saw the emergence of agrarian prosperity and organized agrarian classes. The geography of the Green Revolution itself was shaped by prior colonial-era irrigation canals, but the point I want to underscore here is how an uneven geography of agrarian capitalism became the seedbed for a new geography of urban spatial rifts in the early 21st century (for a map of these overlapping agrarian-urban geographies, see Balakrishnan 2020).

India's ongoing migrant crisis raises urgent questions on what a labor-oriented economic geography could look like. At its core, the crisis shows us that agrarian distress and urban informal work are two sides of the same coin, and India's most vulnerable labor force of nearly 100 million internal migrants are caught in a spatial rift between agrarian expulsion and urban exclusion. The crisis also brings to the fore not just the inadequacy, but the very exclusions inherent in familiar taken-for-granted categories like city/village and urban/rural. Due to its specific development trajectory, India has made more progress in rural social welfare programs than in urban ones: for instance, the right to employment program² that guarantees rural residents 100 days of paid work per year is unique in that no country, not even western social-democratic states, has anything resembling a right-to-work guarantee. But these "rural" safety nets exclude urban informal workers, many of whom are engaged in complex seasonal patterns of migration. How can those who labor on their subsistence plots of land (and also on the lands of larger landowners) during harvest season but then migrate to urban enclaves during the lean agricultural months to work as casual workers be categorized: are they urban or rural workers, are they self-employed or informal workers? India's most vulnerable workers do not fit into neat governmental categories, and to foreground labor in economic geography demands a fundamental rethink of the very categories we use for social welfare and public action.

If the migrant crisis exposed precarious labor arrangements across India's agrarian-urban spatial rift, the COVID-19 crisis also made visible the otherwise invisibilized labor linkages across the agrarian-urban divide in the U.S. During the pandemic, media reports in the U.S. have been struck by two images that exemplify the geographies of food and cities (Page, 2020): on the one hand, farmers in Idaho have been stuck with mammoth mountains of rotting potatoes, and on the other hand, long lines of cars wait outside food banks as the U.S. faces one of its worst employment crises. At a time of unprecedented need, why is there not an easy and straightforward link between farms and food banks? And the answer lies in the U.S. agro-food supply chain, which employs more than 21 million workers and is the nation's largest employment sector (Food Chain Workers Alliance and Solidarity Research Cooperative, 2016). Most of these workers are not unionized, and are paid some of the lowest wages in the U.S. economy. From farm workers (most of whom are undocumented), pork, meatpacking and other food-processing workers, truck drivers for warehouse and food distribution companies, grocery store workers, and restaurant servers, cooks, and dishwashers, the agro-food supply chain is labor-intensive. And it is at a time of crisis, when the logistics infrastructures that connect farms and food banks break down, that these otherwise invisibilized workers are made visible. These geographies of commodified food are of proximate concern for those of us in Berkeley, with one of the two largest industrialized agricultural regions in the U.S. being right here in our backyard of Central Valley, California.

² The right-to-work act is part of a wider raft of rights-based laws enacted by the United Progressive Alliance, a national coalition of left and left-of-center political parties that governed India from 2004–2014. The right-to-work act is called the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA).

In the varied institutional contexts of India and the U.S., the pandemic crisis has exposed the crucial role of labor (largely exploited labor) in articulating logistics infrastructures that cut across the agrarian-urban divide. It is the invisibilized labor of peasant-migrants in India and undocumented farmworkers in the U.S. that ensure the seamless, frictionless working of these logistics infrastructures. Creative labor organizing recognizes these labor links, and in one of the most effective efforts of labor organizing across the agrarian-urban divide, the United Farm Workers, an agrarian, largely Mexican-American group active in organizing farmworkers in Central Valley, combined forces with the Oakland-based urban, African-African Black Panther Party in 1968 to disrupt the agro-food chain of the largest supermarket corporation on the west coast, Safeway (Araiza, 2009). The pandemic is now revealing these labor linkages in new ways, as labor disruptions threaten to disarticulate these logistics / global supply chains. And the state is responding to these labor threats through exceptional measures that range from coercive to placatory. In India, throughout the lockdown, logistics enclaves (such as container ports) were categorized as essential services and they continued uninterrupted operations. A skeptical view of the lockdown is that the Indian state kept workers “kettled” in during the crisis, thus ensuring minimal labor interruptions to the circulation of commodities and capital. Meanwhile, in the U.S., in a surprising move, the Department of Homeland Security has granted “essential work” letters to undocumented farm workers on the grounds that they are “critical to the food supply chain” (Jordan, 2020).

In our “business as usual” times, labor that underpins these logistics infrastructures is largely invisibilized. I use “invisibilized” as a verb because workers are not invisible, but are rendered invisible through processes in which urban planning and planners are implicated, including the seemingly naturalized categories we use of the urban/rural. To view the urban only as the governmental category of the city brackets out of view essential workers such as peasant migrants in India’s urban enclaves or the undocumented farm workers in U.S. industrial agriculture.³ These categories abet in the making of an ‘essential but disposable’ labor force, and when planners use these spatial categories of city / suburb / village uncritically, they are complicit in processes that render invisible the unequal connections across these seemingly disparate urban and rural sites. If the pandemic can augur new critical openings for planners, an urgent call-to-action that arises is the following: how can we foreground labor in analyses of economic geography, particularly when labor is trapped in these liminal “desakota”⁴ geographies that are not-city, not-suburb, not-village? Perhaps one possible way forward is to critically and fundamentally rethink the keywords that form the title of Berkeley’s planning department—“urban” and “region”—and to imagine new spatial categories of the “regional” that can center the lives, livelihoods, and life-worlds of invisibilized non-urban labor in the making of urban regions.

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³ On critiques of the category of the city and its conflation with urbanization, see, inter alia, Brenner, 2019. Also see Chhabria, 2019, for a brilliant critique that situates the category of the “city” within longer colonial-capitalist histories.

⁴ On desakota, see McGee, Terry (1991); on a critical re-reading of desakota in the context of industrial agriculture and the prison-industrial complex in Central Valley, California, see Gilmore (2008).

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Surveillance and Control of Mobility during the COVID-19 Pandemic in Beijing

Liubing Xie

Although COVID-19 hit the city of Wuhan hard at the very beginning of the global pandemic, the scale of the outbreaks in other cities and regions of China has been limited. China successfully "flattened the curve" in February 2020, only one month after the initial outbreak in Wuhan, and it managed to further limit the community transmission to a negligible amount in March. The speed of China's response is remarkable, albeit the initial concealment of information and the scale and severity of the lockdown was unprecedented. In this article, I address how the state mobilized such a scale of surveillance and control of mobility in a relatively short period of time, delineating the way in which the state achieved its goal of large-scale surveillance of people's everyday life. Taking Beijing as an example, based on some preliminary analysis of press coverage and phone interviews, I suggest that the infrastructure of surveillance and control was formed long before the COVID-19 pandemic through the meticulously designed built forms of *shequ* (社区) or *xiaoqu* (小区), as well as the grid management (网格化管理) *shequ* governance structure.

Monitoring Border-crossing at all Scales

Before delving into the micro-scale surveillance and control of mobility at the scale of *shequ*, I will first review the multi-scale border control that was developed according to the complex and hierarchical structure of the Chinese bureaucratic system. Many provinces and cities in China deployed strict lockdowns and mandatory 14-day quarantines for people arriving from other regions at the earlier stages of the pandemic. Within cities, *shequ* monitors the mobility of residents within the residential compounds. The degree of surveillance and control is adjusted according to the assessed risk at the subdistrict office (街道) and district levels. When COVID-19 became a pandemic, the state closed the national border and limited the return of overseas Chinese nationals.¹ Therefore, since Wuhan's city-wide lockdown, techniques of border control have both scaled up to the national level and scaled down to the district, subdistrict, and *shequ* levels. The swift and flexible adjustment of the severity of border control seems to have effectively contained the spread of the virus. Moreover, I argue that the micro-level border control

based on the grid of *shequ* has been central to China's multi-scale management of border-crossing as it effectively regulates the conduct of every individual and directly engages with residents' everyday life.

Shequ at the Front Line of the "People's War" against the Pandemic

Community building and community self-governance have been central practices that have helped to reconstruct the Chinese urban governance structure when the socialist time work unit system disintegrated and neoliberal techniques of governance were deployed by the post-socialist state (Bray, 2006). *Shequ* or *xiaoqu* in post-socialist China is at once a built form of residential compounds that resemble western gated communities and a basic unit for urban governance and self-governance. At the time of COVID-19 pandemic, this networked structure of urban communities of *shequ* was activated and given new functions and meanings. The state and state-owned media widely used the rhetoric of war to mobilize people to participate in the common goal of "fighting the pandemic" (抗疫), and *shequ* is viewed as the frontline of the "people's war" (人民的战争). The vice mayor of Beijing announced:

Beijing pushes a range of human forces to 'sink down' (力量下沉), around 1.6 million party members and citizens have dedicated themselves to the work at *shequ* level, launched blanket investigations, strictly controlled *shequ* and villages, and implemented the isolation and observation of 3.65 million people. We could say that we have started a people's war at the front line of *shequ*.

The disciplinary structure of *shequ* grid networks, which were previously largely invisible, were activated and became the sites where both the state power and grassroots organizations meet under the banner of the people's war against the pandemic. Many historians (e.g., Strand, 1989; Reed, 2000) have suggested that the boundaries of state and society in China have never been clearly demarcated. *Shequ* and its functioning at the time of the pandemic have exemplified this entanglement of state and society. On the one hand, the state and its discourse infiltrate society and everyday life; on the other hand, the self-governing communities (Rose, 2013), with the assistance of residents, volunteers, and non-governmental organizations (NGOs), become central in educating, surveilling, and controlling urban residents.

Because of the particular built environment of *shequ* or *xiaoqu*, which is enclosed by gates and walls and is densely populated, a "stay at home" or "shelter in place" order would either not work in China or it would not work the same way as it does in Western countries. Instead, the Chinese government has emphasized the enclosed management of *xiaoqu* (小区封闭式管理). When not able to effectively distance households from each other due to physical proximity, the Chinese government turned to managing the isolation and distance of residents mainly at the level of *shequ*. Furthermore, the built form of enclosed spaces, coupled with a digital gating system and easily patrolled and policed streets, provides a prototypical structure for surveillance and control of mobility. One of the most prominent functions of the *shequ* compound is the strict control of entrance by deploying both a digital gating system and security guards. Only residents who are assigned a special ID card by the resident committees are allowed to enter; the number of times a person is allowed to leave the residential compounds is regulated; when residents enter the compounds, security guards check their body temperature with a forehead thermometer.

A more networked system of grid management has strengthened the capability of *shequ* to conduct blanket surveillance. The grid management system was proposed and implemented nationally to improve the governance of *shequ* in 2013.² Each *shequ* is comprised of several "grid" units, each with a grid manager in charge of daily patrol and report. Under the grid manager, resident volunteers, who are each in charge of one building, serve as sources of information and channels for intervention. Each *xiaoqu* then constitutes part of the city-wide grid networks. During the pandemic, the grid management system deployed the surveillance of all households and public space within the *shequ*, detected the residents with recognizable symptoms, registered and enforced the transfer of infected individuals to quarantine centers,

educated and informed residents using public notification, digital platforms, or door-to-door investigation, and, in some cases, organized swab tests for all residents.

As the disciplinary infrastructure for surveillance and control, *shequ* has several interconnected aspects, including the physicality of the *shequ* compounds, the smallest unit of urban governance structure (self-) governed by the residents' committee and its grid management system, and the site where the state molds residents into "high-quality (有素质)" and responsible subjects and mobilizes them at the time of the pandemic through the rhetoric of the people's war. Similar to Foucault's (1975) account of panopticon technology, in the pandemic of COVID-19, *shequ* and its grid management system economize the deployment of both personnel and time, and amplify the intensity of China's surveilling and disciplining power.

Digital Platforms for Informing and Surveilling all Citizens

Micro-level surveillance and control through the governance of the built environment and the social organization of the *shequ* has been perfected by the use of various digital platforms. Multiple digital platforms have been developed and used by the authorities to collect information and inform and educate the public about the pandemic, often at the level of the *shequ* and used by the *shequ*.³ For example, it is required that people returned to Beijing to use Jingxin Xiangzhu to register to the corresponding *shequ*, register their body temperature twice a day during the 14-day mandatory quarantine, and check the results of swab tests. A Tencent Pandemic Map has been used for contact tracing at the level of the *shequ*, reporting the name of the *shequ* where the infected person lives, his/her workplace, and his/her mobility trajectories. The use of digital platforms for surveillance has surfaced and has become unprecedentedly visible because of the pandemic. It is worth pursuing further inquiries along this line.

Graduated Surveillance across *Shequ*

Ong's (2006a, 2006b) work on graduated citizenship has challenged the assumed notions of the universality of welfare provision across a given nation; instead, she depicts a system of variegated rights that are unevenly distributed in various zones. In the context of China, Zhang (2008) has documented the transition from the egalitarian *danwei* system to the stratified living spaces of *xiaoqu* communities. At the time of the pandemic, it has been revealed that different segments of society that are enjoying graduated citizenship are also subjected to different degrees of surveillance, which I call "graduated surveillance". While the upper-scale newly built *shequ* is mostly managed by the property owner's association and hired property management agencies, lower-income or dilapidated *shequ* are subject to the governing and surveillance of the residents' community that has a direct link with the subdistrict government. Based on my preliminary interviews, the lower-income *shequ* often surveil all the residents by door-to-door investigation and encourage mutual surveillance between residents during the pandemic. In these *shequ*, returned migrant tenants are subjected to particularly aggressive surveillance. In contrast, in the higher-scale middle-class *shequ*, the hired property management agencies undertake a much more laid-back approach.

Thus, based on above preliminary investigation, I conclude several hypotheses for further exploration: 1) flexibly monitoring border-crossing at all scales has been an effective measure to contain the spread of COVID-19 in China; 2) the walled and gated built form of *shequ* has provided a physical structure for the residents' committee to monitor all residents; 3) a hybrid use of digital platforms and the operation of residents' committee have perfected the surveillance of all residents; and 4) the blanket surveillance and control by the state power through residents' committees is more often applied to dilapidated and lower-class *shequ* than the newly-built high-end *shequ*.

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¹ At the time of strict lockdown, the entering of foreign nationals are strictly barred, and the Five-one policy that reduces around 90 percent of volumes of flights limits the possibilities of overseas Chinese nationals to return.

² See for example the official news website of Chinese Communist Party: <http://dangjian.people.com.cn/n/2015/0214/c117092-26567291.html>

³ These apps include for example State Council Miniprogram (国务院小程序), Jiangkang Bao (健康宝), Jingxin Xiangzhu (京心相助), Jinagxin Xianghu (京心相护) etc.

COVID-19 and Exclusionary Cities: A Speculation on Displacements and Replacements

Karen Chapple

Economic downturns disrupt both real estate and labor markets, accelerating processes of displacement. The 2020 recession has led to widespread speculation on both the demise of cities as teleworkers flee to the suburbs, and the resurgence of cities that repurpose commercial buildings and streets as livable environments for post-pandemic occupancy.¹ In their synthesis, Richard Florida, Michael Storper, and Andrés Rodríguez-Pose (2020) reason that regions will continue on their divergent paths, exacerbating inter-regional inequality, as the dominant agglomerations will continue to innovate and attract talent. Whether these knowledge workers choose to live in cities or suburbs, new economic and cultural opportunities, coupled with reduced real estate costs, could lead to the permanent transformation of metropolitan structure.

The narrative of potential transformation sounds plausible until we consider that the knowledge workers described as driving these patterns constitute only 30% of the workforce (Dobbs et al. 2012). Left out of the story are dislocated workers, not just the 19.4 million whose employers have stopped paying them and the 3.8 million who have (thus far) permanently lost their jobs, but the estimated four million who have involuntarily retired early and the permanently “scarred” new labor market entrants and working mothers, as much as 20% of the workforce.² Also largely missing are the impacts of the hundreds of thousands of business closures that are emptying out urban storefronts, suburban malls, and industrial

spaces.³ The latter changes do mean lower land costs and more affordable cities. But the job losses and scarring affect both the low- and high-skilled labor force, adding up to millions of years of lost wages.⁴ Unemployment could also push out the most precariously housed, with an estimated 17 million households already unable to pay rent.⁵ Overall, downward mobility and new housing challenges will shrink the middle class, exacerbating existing trends of income inequality, and in turn impacting patterns of displacement.

Before embracing a story of either urban demise or resurgence, or even widespread displacement, we should also consider the long-term migration patterns in U.S. metropolitan areas. Despite the continued influx of youth into cities, the core has never reached positive net migration, and after a brief uptick in the early 2010s has lost even more population in recent years (Appendix A, Figure 1). That migration to the urban core remains net negative contradicts the dominant “back to the city” narrative. Clearly youth are occupying urban centers (Moos et al. 2019; Cortright 2020), but other cohorts are not.⁶

Over time, cumulative lost wages are likely to exacerbate both economic and exclusionary displacement, as households can no longer afford to live in the urban core. What will be the impacts of this displacement, and what will the replacement look like? Theories of urban economics offer consistent predictions of what will happen to the businesses, so that is where we start, again considering not the office spaces occupied by the knowledge workers, but those housing the rest of the workforce. Lost and declining wages will reduce consumption of retail goods, food, and personal services, resulting in declining revenues and more closures, particularly in downtown areas. Vacancy rates are already relatively high, due in part to the growth of online purchasing but also because of the overbuilding of suburban malls and the overzoning for main street ground floor retail (Grant 2014). Given that the pre-pandemic market could not support this much retail space, the post-pandemic future is bleak. Experiments in adaptive reuse have proven that conversion to residential use is viable, and nonprofits might also reutilize some space (Larrain de Andraca 2020), but replacement with job-generating uses is unlikely at a large scale. However, industrial space in many regions has experienced low vacancy rates of late, so the new availability of low-cost industrially zoned land is likely to lead to some job creation, to the extent that buildings are flexibly configured and readily adaptable to new uses (Chapple 2014).

Residential impacts are harder to predict, partly because neighborhood change is slow and also because households are increasingly sticky: the share of population that moves each year has declined steadily for the past 35 years and is now at just 9.8% (Appendix A, Figure 2). Declining mobility occurs due to rising inter-regional and intra-regional inequality: As housing markets heat up, households are reluctant to move, in part because of the exclusion of higher-cost regions or higher-income neighborhoods. Notably, in the 2008 Great Recession, when unemployment rates were even higher than today’s, overall household mobility dropped, suggesting that in downturns, household coping strategies compounded by exclusionary rents prevent mass evictions and displacement. The COVID-19 crisis lands amidst these fundamentals, which, like inter-regional inequality, are unlikely to shift. Even though upper-income tenants are already leaving their overpriced urban apartments, landlords are struggling to find replacements, increasing concessions dramatically as a result. If a displacement crisis does occur with the expiration of eviction moratoria, some middle-income tenants may capitalize on lower rents to stay in the urban core, but many of the most vulnerable may choose to double up temporarily rather than seek out new housing (Shrimali & Wang, 2020).

Easier to predict are the impacts of exclusionary displacement. Our research at the Urban Displacement Project shows that the nature of the displacement crisis is widely misunderstood: not only is displacement happening as much or more from exclusive areas as low-income gentrifying neighborhoods, but also few low-income households are able to move into areas where the median

income is over 80% of the region's (Chapple & Thomas 2020). In the unequal post-COVID-19 city, these exclusive areas are likely to become even more so. Even as rent levels decrease in overpriced urban markets, wages will as well, so that few new households will be able to move in. Many of the younger labor market entrants who were to constitute the market for newly constructed luxury residential buildings will delay household formation and continue living with their parents (Myers and Park 2019). By and large, core urban neighborhoods will remain out of reach for low- and moderate-income households.

Thus, as inequalities worsen in the post-COVID-19 world – and assuming that an eviction crisis does not increase mobility and displacement rates to 1980s levels – cities are likely to become more segregated, and upward mobility will remain out of reach, as the pandemic-induced delay in education and employment displaces the American Dream for younger generations. An array of anti-displacement policies will be critical to assist the most vulnerable in the short term -- emergency rental assistance, just cause eviction policies, and rent stabilization programs, to name a few. But at the same time, we will need to move towards *pro-replacement policies* in the long term.

Proactive pro-replacement policies will ensure that as space opens up in American cities, whether vacant commercial space, high-end residential towers, or older housing stock, new low- and moderate-income households will be able to move in. In the real estate market, this means public or nonprofit land acquisition funds moving aggressively to procure at-risk buildings (or even entitlements) intended for the high-end market to convert them to permanent affordability for households and businesses. But workers and businesses will still need significant income to afford life in the urban core. We know how to address income inequality already: most notably on the supply side, education (from preschool to college), wage and family supports (such as the earned income tax credit and childcare subsidies), and entrepreneurship assistance, and on the demand side, raising wages and productivity through business supports and tax policy (Pike et al. 2016). What better time to implement these ideas than during a long-term global recession?

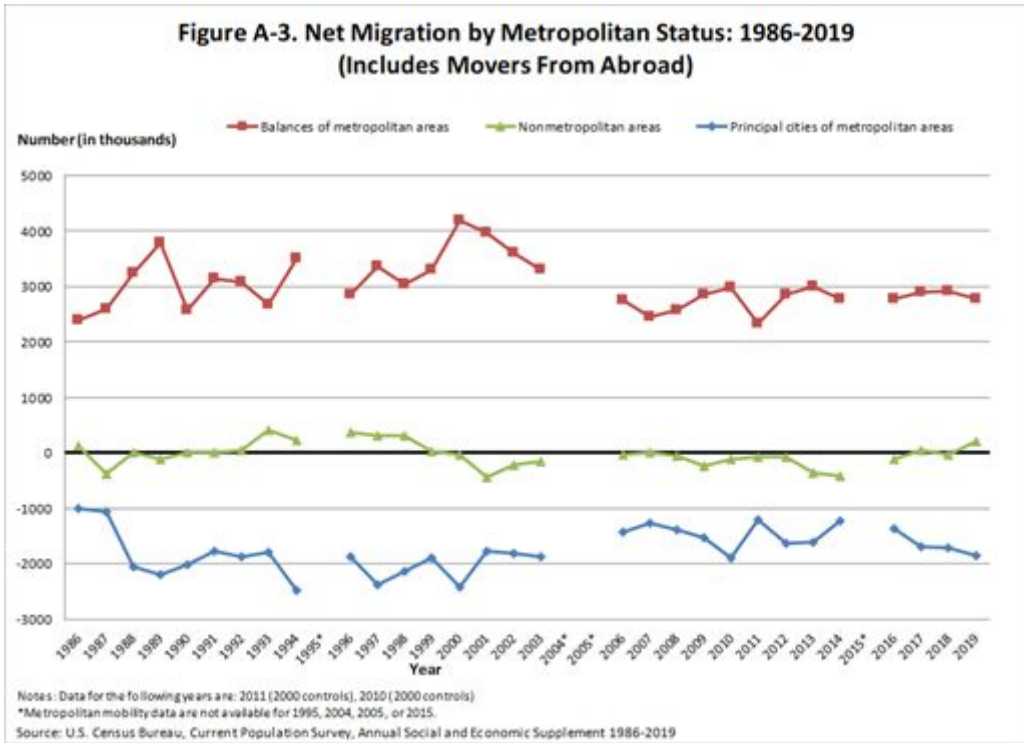
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Appendix A

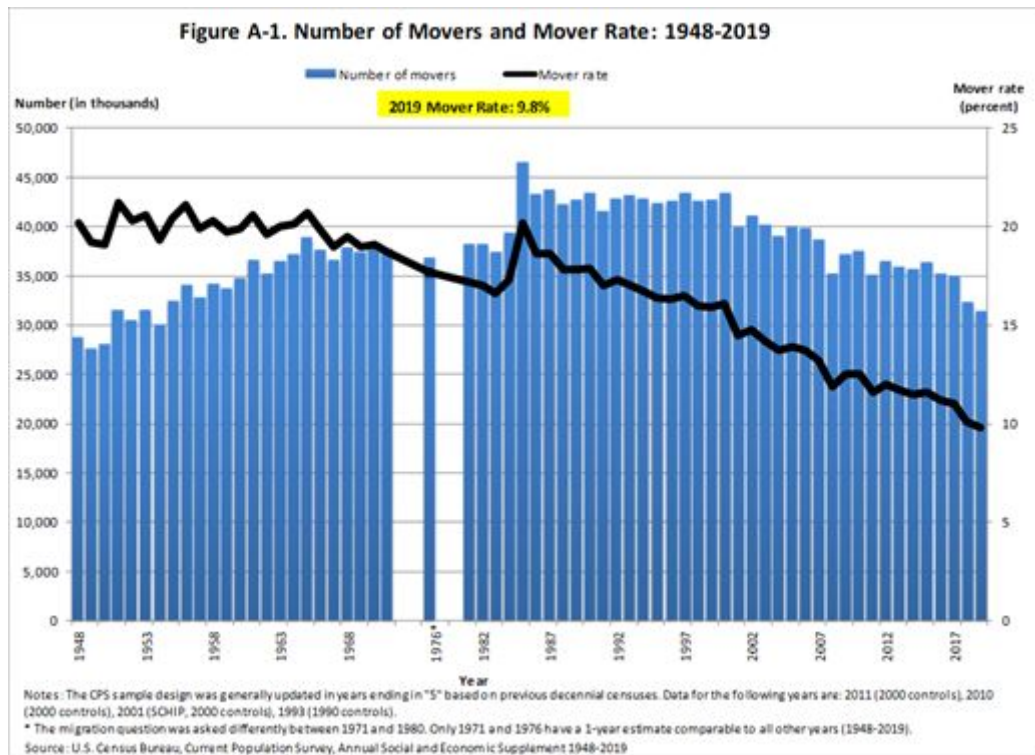
Figure 1. Net Population Migration across Metropolitan and Non-Metropolitan Areas



Source:

<https://www.census.gov/content/dam/Census/library/visualizations/time-series/demo/geographic-mobility/figure-a-3.png>

Figure 2. Number of movers and mobility rate.



Source: <https://www.census.gov/library/visualizations/time-series/demo/historic.html>

¹ Planetizen provides a convenient [summary of the debate and links to articles](#) on both sides.

² Sources: The 3.8 million permanent job losers includes 1.3 million unemployed in February 2020 as well as 2.5 million since; see the Bureau of Labor Statistics at <https://www.bls.gov/news.release/empsit.nr0.htm>. For early retirements, see an analysis by the New School's Schwartz Center for Economic Policy Analysis, <https://www.economicpolicyresearch.org/jobs-report/over-half-of-older-workers-unemployed-at-risk-of-involuntary-retirement>. The scarred labor force includes some 20 million labor market entrants currently 18-24 years old, projected to lose 5-10% of the total present value of their first ten years of earnings (von Wachter 2020). In addition some 30% of working mothers (7 million) are experiencing some unemployment which may permanently scar their career earning potential (Stevenson 2020). The U.S. had some 151 million jobs in March 2020; depending on the amount of overlap, these two groups, plus the job losers and retirees, might comprise an estimated 15-23% of the labor force.

³ There is no systematic census of business closures across the U.S.. Yelp found that almost 164,000 businesses had closed as of August 31, 2020. <https://www.yelpeconomicaverage.com/business-closures-update-sep-2020>

⁴ Rothstein (2019) finds that the Great Recession reduced employment rates by over 15 percentage point years, half during the 7 years of high unemployment, and half over the medium and long term ("The lost generation? Scarring after the Great Recession," Goldman School of Public Policy Working Paper, 2019, https://eml.berkeley.edu/~jrothst/workingpapers/rothstein_scarring_052019.pdf).

⁵ Estimates of residential displacement range from about 30-40% of renter households (roughly 30-40 million households), and suggest that an additional three million homeowners will lose their homes to foreclosure (Benfer et al. 2020).

⁶ Cortright's analysis shows that 363,000 25-34 year olds moved into "close-in neighborhoods" in the 52 largest US metros from 2000 to 2016, a number insufficient to change the overall trajectory of out-migration.

⁷ Hamza Shaban, "Not even a pandemic can break rich cities' grip on the U.S. economy," *Washington Post*, October 15, 2020; Jonathan Lansner, "Coronavirus forces California landlords to double rent discounts," *San Jose Mercury News*, September 2, 2020.

COVID-19, Climate Change, and Cooperative Adaptation

Zachary Lamb

In March of 2020, I was working with colleagues to initiate a new research project examining how cooperative land ownership and governance shapes adaptation to climate change related hazards. We were hiring research assistants and making plans for a summer of fieldwork in several 'resident-owned communities' (ROCs), a fast-growing form of cooperatively owned manufactured housing community (MHC) that is gaining momentum in several states across the country, from New Hampshire to Oregon. Those plans changed quickly as the COVID pandemic worsened. We cancelled our fieldwork. Though the immediate threats from COVID made climate change seem remote and abstract, the unfolding of an extremely destructive hurricane season and massive wildfires in the west made clear that understanding and confronting climate change cannot be delayed, even in the midst of a pandemic. We also realized that the pandemic might actually present a rare chance to observe community-driven crisis response in action. While only a small subset of ROCs have been clearly impacted by climate change, the pandemic was impacting them all. We got to work observing online meetings and conducting remote interviews to explore new variants on our pre-existing research questions. Now we were asking: How does cooperative land ownership and governance shape how ROCs are addressing the crises associated with COVID?

The threat to ROCs from the COVID pandemic is distinctly different from geophysical threats like floods, droughts, or wildfires. Though it is clear that built environments shape pandemic exposure through factors like ventilation and indoor crowding, the pandemic, unlike geophysical hazards, does not directly impact the built environment. As long as housing units themselves are not overcrowded, MHCs could be relatively safe during a pandemic because of their physical characteristics. Unlike many other forms of affordable housing, MHCs do not typically have shared ventilation systems or substantial shared indoor spaces in which the virus could be readily transmitted. According to our interviews, many ROCs further reduced the chances of viral spread by closing the shared facilities they did have, including playgrounds and community rooms as the pandemic surged.

While physical conditions matter, decades of research on hazards has made clear that the physical dimension is only one side of determining who and what is vulnerable. With its horrifically uneven impact across differences of race, ethnicity, and income, the COVID pandemic has highlighted many ways in which widening socio-economic inequalities shape health and life chances. Residents of ROCs and other MHCs are disproportionately low-income. While we do not have complete demographic data on ROC residents, MHCs are disproportionately home to elderly, immigrant, and disabled populations, all of which are associated with heightened social vulnerability generally and with elevated risks from COVID. A representative from a ROC in Minnesota estimated that 75% of their households included immigrant employees at a local food processing plant, just the sort of facility in which major COVID outbreaks occurred over the summer of 2020. Another ROC representative reported that undocumented residents were especially impacted by the pandemic, not just because many were required to stay on the job as 'essential workers,' but also because they were not eligible for government assistance provided as COVID-driven layoffs and unemployment surged.

Interviews with co-op leaders, technical assistance providers, and national leaders in the ROC movement suggest that they mounted quick responses from various levels to avoid the feared public health and economic damage from the pandemic. At the level of individual communities, interviews indicated a number of ways that ROCs acted to limit physical contact, including shifting the many meetings necessary for co-op self-governance from in-person to video conferencing platforms. While some communities with limited connectivity or limited technical capacity have struggled with the shift to online meetings, most ROCs transitioned to remote meetings without much struggle. One ROC in Vermont developed their own strategy for secret ballot voting for remote meetings. Representatives from some of the groups that provide technical assistance to ROCs reported that the shift to remote meetings has in-turn made their work more efficient as they can support rural communities with less time driving for physical meetings. In a parallel adaptation, ROC-USA transitioned their training programs for co-op board members to an all-online format, enabling peer-to-peer learning between communities to continue in spite of travel restrictions.

Beyond the demands of formal co-op governance, interviewees reported that the pre-established social media groups, phone lists, and mailing strategies that they had established to initiate and manage their cooperatives, gave them tools to coordinate responses to COVID. ROCs reported various forms of mutual aid activity, including mask making and distribution, checking on and running errands for immune compromised neighbors, and organizing regular ‘distanced walks’ to encourage residents to maintain physical activity and social connection in spite of social distancing protocols.

In addition to the public health threats and challenges for community cohesion and governance, COVID has threatened the economic viability of some ROCs. ROCs rely on residents’ monthly lot fee payments to raise operating funds and to pay down the co-ops’ mortgage debts. While age-restricted communities with many retired residents on fixed incomes were partially insulated from the economic threats, many ‘all-ages’ communities saw substantial declines in their lot fee revenues with the onset of widespread unemployment, especially among residents in service and retail jobs. Some communities with adequate reserves opted to temporarily cut rents to reduce the burden on financially stressed households. Early on in the pandemic, ROC-USA set up an emergency fund for households in need, arranged a new line of credit for ROCs under financial strain, and individually contacted all 250 ROC communities to check on their physical and financial health.

Writing in mid-October 2020, it is too early to make definitive pronouncements about the impacts of a pandemic that is still raging. Even so, the COVID responses of the ROC co-op network suggest some emerging insights. First, while the physical environment of ROCs and other MHCs may be well-suited to minimizing virus transmission, these communities are quite socially and economically vulnerable to the impacts of the pandemic. Second, the social solidarity, communications infrastructure, and institutional capacity that ROCs build through their formation and operations, can serve them well in adapting to crises. Finally, while the technical, financial, and institutional capacity of ROC co-ops varies from community-to-community, the technical assistance and network linkages provided by ROC-USA has proven valuable in enabling cross-community learning, facilitating resource sharing, and providing emergency financial support. These months of conversations with leaders and members in the ROC movement have raised an unlikely question: could it be that these communities, often ignored or stigmatized as ‘trailer parks,’ hold crucial insights for how working and low-income people can build collective strength and resilience in the face of crises, whether the threat comes from climate change, pandemics, and whatever else may come?

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Managing Density During a Pandemic: A historical review

Meiqing Li

While it might be too early to predict the impact this COVID-19 pandemic will bring to cities, history offers us clues. Just as many public health crises have led to great social changes, by the time we uncover our faces from the rest of the world, we know it will never be the same. The Black Death pandemic in 14th century Europe precluded the Renaissance. From John Snow's investigation of cholera in 19th century London to the recent SARS outbreak in East Asia, lessons from the past advanced our knowledge that helped prepare for future challenges. In New York City alone, several infectious disease outbreaks since the 17th centuries made profound changes to the city's housing policy and public health infrastructure (Nevius, 2020).

Living amid a global pandemic in the 21st century poses unprecedented challenges, but more often we see a cyclical history where the same problems re-emerge. A prevailing one centers around the debate on *density*. As planners strive to envision cities with a sustainable future, issues of the different types of density, its impact on health, as well as means to mitigate the negative impacts are all worth more discussion. I conducted a historical review by revisiting literature and cases to examine how certain types of density on the one hand can generate negative externalities for public health and well-being, while on the other hand have significant implications for cities to take proactive actions on the built environment post-pandemic.

The Cost of Density

We urbanist planners tend to associate density with countless benefits including productivity, accessibility and smaller environmental footprint, favoring a compact development model. Nevertheless, as COVID-19 reveals, we have so far focused much less on addressing the cost of density, for example housing affordability and congestion -- what some economists called the "demons of density" (Glaeser, 2011; Duranton & Puga, 2020). Granted, most cities in the U.S. are still far from realizing the benefits of density before negative impacts take place. But for many places in the rest of the world, especially some hyper-dense environments in Asia, managing density has long been a central theme in planning practice (Yeh, 2011). If density is the sustainable direction to go, the lessons from elsewhere will not only serve a few global cities, but also a broad spectrum of other cities that have seen a revived discussion on density and health.

Historically there has been a negative perception of urban density, accompanied by an appreciation of the benefits of suburban, low-density living. Despite the myth driving these associations, the negative perception of density persists as a major resistance to urban densification and other compact development strategies. Moreover, research by Hooper (2018) suggests that density perceptions are relatively stable regardless of hygiene primes (subconscious memory factors from a particular stimulus), indicating that planning can do little to change people's perception about density. On the other hand, empirical evidence suggests the real impact of density, particularly that of extremely high density living in some Asian cities like Hong Kong with its low death and disease rates, which significantly diverge from the U.S. perception (Schmitt, 1963). This seems like a revived debate in the planning literature from decades ago, on two sources of negative impact: one from the public health perspective on the relationship between density and infectious diseases (Corburn, 2007), and another on social impact, or social pathology related to deviant behavior, crime, and suicide (Calhoun 1962). Given other factors like cultural, socioeconomic, education, and individual health conditions, questions around the independent significance of density on both effects remains unsettled.

Density and COVID-19

The COVID-19 pandemic exacerbates skepticism towards cities (Brasuell, 2020). Meanwhile, empirical evidence adds to the historical debate, contesting prevalent measures of density in the context of pandemics. One common measure takes population density by county, which consistently shows no significant relationship with the COVID-19 infection rate (Hamidi et al., 2020; New York City Citizen Housing Planning Council, 2020). By relying on the coarse measure of population density defined as population by area, whether we look across the globe, among counties, or between neighborhoods, the pattern of infection diverges significantly from the distribution of population (NYCCHPC, 2020). However, there does seem to be some correlation between overcrowding of internal spaces and the infection rate, specifically households and some institutional settings. Less is known about the public realm where people congregate for group events and activities. Although medical and public health professionals, as well as the general public, have long perceived urban parks and open spaces as mitigation measures to defend against diseases, contagion, and epidemics, how to effectively manage public spaces deserves more attention within the planning community (Crompton, 2013; Honey-Roses, et al., 2020). This is an area where cities can draw lessons and expertise from their peers in other parts of the world.

Lessons for High-Density Living

The divergent perception and impact of 'density' in cities across the globe reflect cultural norms, but more importantly a diversity of short-term and long-term strategies managing density, or more accurately crowdedness. We have been extensively exposed to contingent anti-contagion policies, such as travel bans, quarantine/isolation and social distancing commonly adopted by different countries, during this pandemic (Hsiang et al, 2020). But what might be our steps forward in a post-pandemic era in order to counter the cost of high-density living? The more meaningful lessons from cities recovered from past pandemics are not about contingent measures, but ensuring the built environment and infrastructure are prepared for future risks. For example, in Hong Kong, where space is extremely constrained, the government's long-term strategies for density management take two forms: (1) density control and environmental design that covers both private and public housing developments, as well as (2) public amenities (Chan, et al., 2002; Yeh, 2011). Unlike those in history, modern-day pandemics introduce much bigger challenges due to higher mobility and connectivity in a global network. The lessons for high-density living should not only be valuable for a few global cities, but also have implications for many dense human settlements in the Global South, regarding both design for public spaces and resilience of public health infrastructure.

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How Cities will Adapt to Covid-19: Understanding the Role of Time

Pavan Yedavalli

Knowledge spillover and agglomeration economies are two of the defining characteristics of booming urban civilization (Buckley, Clarke Annez, & Spence, 2008; Florida, 2012; Greenstone, Hornbeck, & Moretti, 2010). With the clustering of people comes consumption and innovation, whether at workplaces, restaurants, bars, retail, or cultural activities such as museums and theatres (Florida, 2012). The COVID-19 pandemic has dramatically affected these urban societies in myriad ways, to say nothing of the staggering number of deaths across the world. Mandatory shelters-in-place and subsequent lockdowns have occurred not only at the onset of the pandemic while the dispersion and infection dynamics of CoV-2 were unknown but also in the second wave of colder winter weather and increased holiday travel. These have led to the loss of livelihoods and precipitous declines in economic output. As

many leaders, scientists, and physicians have noted, it did not have to be this way in cities (Nouvellet, 2020). This paper attempts to marry the science of the SARS-CoV-2 particle dynamics with the notion of density in cities, proposing a new lens through which planners and policymakers should base future guidelines.

CoV-2 Particle Dynamics

After over one million deaths across the world caused by COVID-19, it is now well-known that the SARS-CoV-2 virus is primarily transmitted either via droplets or aerosols, rather than surface transmissions (Anchordoqui & Chudnovsky, 2020; Bromage, 2020; van Doremalen et al., 2020). The downward terminal speed, v_{down} , of any particle is a function of its mobility, μ , mass, and gravity, as shown in Equation 1.

Equation 1

$$v_{down} = \mu mg$$

Equation 2

$$\mu = \frac{1}{6\pi\eta r}$$

where η is the viscosity of the air and r is the radius of the virus particle (Anchordoqui & Chudnovsky, 2020). A droplet is at least 5 to 10 microns in radius and can be transmitted in particles from high velocity and dispersive actions such as sneezing or coughing (Scudellari, 2020). An aerosol, on the other hand, is smaller, and tends to emerge from less emitting actions such as breathing or speaking (Bromage, 2020). Aerosols also follow the patterns of airflow in the surrounding fluid, whether a confined indoor environment or a dispersed outdoor environment (Anchordoqui & Chudnovsky, 2020; Scudellari, 2020). As a result, they frequently stay in the air longer than droplets due to their smaller mass and thus smaller v_{down} from Equation 1, but they do not contain as much of the virus in one unit.

Time-varying Density

Since CoV-2 particles can be in both quickly-falling droplet form or longer-lasting aerosol form, static measures, such as masking, six-foot social distancing, and shelters-in-place, have been instituted effectively to varying degrees in cities across the world (Flaxman et al., 2020). Chu et al. notes that masking can decrease the radius of particle dispersal around the infected person by up to 80% (Chu et al., 2020), and social distancing of at least 1 meter, as noted by Wells in the seminal 1934 study, can also limit the probability that a person is in the range of the highest density of particles (Chu et al., 2020).

However, despite these static approaches being hitherto successful, it has been under a limited scope of economic activity, as many industries and cities have only recently started reopening in staggered phases (Bartik, Cullen, Glaeser, Luca, & Stanton, 2020). In order to truly return to a lifestyle resembling that of pre-pandemic times, city planners and policymakers must capture a component that, until now, has only been discussed in healthcare outcomes related to CoV-2: time. Skeptics believe that cities of higher density are hotbeds of CoV-2 activity (Porter, 2020). However, many of the densest cities in the world, including Tokyo, Taipei, Singapore, and Seoul, have had low infection rates, and studies have shown that areas with higher densities, in fact, have significantly lower COVID-19 mortality rates than areas with lower densities (Hamidi, Sabouri, & Ewing, 2020). It is not density, a time-invariant measure of people per unit area, that should be the scapegoated metric for infection rates, but instead time-varying

density, a measure of people per unit area per unit time. Recognizing the incompleteness of the density metric, researchers from the World Bank showed that crowding, defined as a normalized population by floor area, is more telling, as cities with similar densities, namely Kinshasa, Mumbai, and Cairo, have drastically different crowding metrics, and thus different CoV-2 infection rates (Cities, Crowding, and the Coronavirus: Predicting Contagion Risk Hotspots, 2020). While this study augments the density metric further into crowding, it does not factor in time, a critical component in (1) the dispersal of CoV-2 particles, and (2) the exposure risk.

Limiting the time exposed to potential CoV-2 particles must be realized by enforcing constant turnover of people when going about daily activities. Constant turnover can be particularly beneficial for establishments that require indoor operation. The infectious dose, or the minimum number of virus particles required to make a person sick, has been determined as 1000 CoV-2 particles, but crucially, in order to become infected, all of these 1000 particles must be absorbed by the body in a short enough period of time that the person's innate immune system does not fight off small doses of the virus (Bromage, 2020). This unit of time depends on the person's innate immunity, and thus can vary from person to person, leaving those with pre-existing conditions and weakened immune systems, such as the elderly, more vulnerable to the virus (Zhao et al., 2020; Davies et al., 2020). Assuming a less vulnerable population, if an infected person is asymptomatic and is present in an indoor public environment, then those who may be exposed may save themselves from infection by reducing the amount of time they are potentially exposed.

Consider a boundary case. In a crowded indoor space of radius r with N people, 1 of the N people is an asymptomatic carrier. This person emits approximately 200 CoV-2 aerosol particles per minute by talking. Assuming the carrier is not masked, these particles will disperse across the room based on the indoor air circulation patterns (Bromage, 2020). For a gathering of 1 hour (60 minutes), there are now 12000 CoV-2 aerosol particles in the room, given the 1.1 hour half-life of CoV-2 particles now known (Nouvellet et al., 2020). If 1000 viral particles are needed to become infected, up to 12 out of the N people may contract the virus, assuming a uniform spatial distribution of the particles. If each person stayed in that area for 30 minutes instead, 6000 CoV- 2 particles are traveling in the air, thereby decreasing the possible number of infected people by half. If the asymptomatic person was masked, then only 40 aerosol particles are emitted per minute. For one hour, this results in 2400 CoV- 2 aerosol particles in the room, which means up to 2 people may get infected. If everyone is in the area for 30 minutes instead, 1200 CoV-2 particles are in the air, and up to 1 person may become infected, if concentrated in that person's breathing area. This example illustrates the sensitivity of CoV-2 exposure to time, and the linearity suggests that short, bursty activities, along with air filtration and recirculation every few minutes, can be proposed as a measure to open up activity, particularly indoors, more extensively.

The New Normal

The COVID-19 pandemic has already created short-term shocks to major urban centers, reflected in lower real estate and rental prices as well as less local economic output (Chernick, Copeland, & Reschovsky, 2020). However, if time-based policy for local businesses and services is instituted in cities, economic output will begin to rise, returning the cultural amenities, energy, and vitality of cities, as famous urbanists Kevin Lynch and Jane Jacobs emphasize, that was responsible for over 70% of the global GDP pre-pandemic (McKinsey & Company, 2011). While productivity has seen unexpected heights during the COVID-19 pandemic with the ease of remote work and the advent of powerful online software and collaboration tools, increasing evidence has shown depression and anxiety levels reaching all-time highs, with social isolation and burnout as the main causes (Bartik et al., 2020; VanderWeele, 2020). Cities can do their parts to help their unhappy citizens by creating time-varying health and safety

guidelines that optimize for economic and social activity in addition to public health (Scudellari, 2020; Florida, Rodriguez-Pose, & Storper, 2020). These policies, along with social distancing and masking, may provide a more optimal solution in this new normal of living with the virus.

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