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EDITORIAL

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Gender, health, and development in the context of pandemic: Reflecting on the International Day of Action for Women's Health

The COVID-19 pandemic has heightened and exposed existing fractures and fissures. It has revealed the depths to which inequalities are entrenched in our everyday lives and are baked into local, national, and global structures. "We are all in this together" has been an oft-repeated slogan despite knowing from previous epidemics—like HIV/AIDS—that this was far from true (Momplaisir, 2020). As countries in the Global North continue successful mass vaccination programs (Dyer, 2020), those in the Global South continue to suffer vaccine apartheid (Sariola, 2021). Vaccine inequalities are also present in how women's unpaid household labor and care work underpins uptake, and how vaccine delivery is often carried out by precarious health workers (the majority of whom are women) (Harman et al., 2021). We know that this disparity comes alongside existing concerns about the devastating and lasting impact of disrupted health services and quarantine measures on women and girls' access to health, including sexual and reproductive health services like abortion and contraception.[1]

Similarly, LGBTQI persons have been disproportionately impacted by the pandemic (Cousins, 2020; Dawson et al., 2021). Intensified gender-based violence and intimate partner violence has created a "shadow pandemic" (Walters, 2020). Structural racism, intersecting with other forms of structural violence, has particularly harmed Black and Brown people (Otu et al., 2020). In Gaza, currently experiencing another devasting cycle of violence and attacks, the lack of basic supplies like water and generators exacerbates already extremely precarious and volatile conditions for peoples' health and wellbeing (Devi, 2021). We know, for example, that conflict intensity affects maternal and neonatal health outcomes (Leone et al., 2019)—and this is heightened under pandemic conditions. Governments have instituted increasingly draconian and regressive policies on human rights (including abortion and trans rights), as well as expanded the use of surveillance measures to target activists (Khosla, 2020).

These are all manifestations of structural violence (Nandagiri et al., 2020), of how the global (e.g., vaccine apartheid), the national (e.g., conflict conditions, under-resourced health systems), the local (e.g., community norms) all shape and are shaped by the personal and the political. These are issues—and questions—of power and its manifestations, how it is understood, wielded, challenged, and experienced by made-marginalized communities like women and girls, and LGBTQI persons.

It is this understanding—of women, queer, and trans health as an intrinsically political question grappling with power and inequities, situated in local and transnational webs—that underpins *May 28: The International Day of Action for Women's Health*. The International Day of Action's roots lies in the international feminist solidarities of women's movements. In 1987, *at the fifth International Women's Health Meeting in Costa Rica*, the first campaign (Campaign on Maternal Mortality and Morbidity) was launched on May 28. Campaigns committed to locating women's health—access to quality health care, sexual and reproductive health, abortion, patents, HIV/AIDS, amongst others—within broader social

and political conditions, including international trade agreements, healthcare expenditure, global/national economies, labor markets, and human rights. Understanding that different countries and communities experience differing inequities to different degrees, the overarching "thematic focus" enables adaptation to specific contexts and calls for action, whilst still linking to global, feminist solidarity. It encourages continuing links between movements and regions, particularly for building feminist South–South solidarities and communities and produces a sharp analysis of the structural causes (including, e.g., the impact of structural adjustment programs or the lasting influence of colonialism) underlying inequities and ill-health of women and girls, LGBTQI persons, and other made-marginalized communities.

It is fitting that this Virtual Issue of *World Medical & Health Policy*, focusing on race, gender, sexuality, and Health Equity, commemorates The International Day of Action for Women's Health and fosters its critical vision in these so-called "unprecedented" pandemic times. An aim of the Day has been to draw on evidence and lived realities to raise consciousness and awareness of the continuous threat and danger faced by women and girls, LGBTQI groups and others made marginalized by structural and social inequities. The virtual issue speaks to my understanding of academic research as political—that our empirical data, theories, and analyses are in the service of confronting and redressing these entrenched inequities.

When looking at the immense body of work and analyses in the International Day of Action campaigns, many of the fissures and fractures identified in this so-called "unprecedented" moment seem rather familiar. In many ways, the pandemic (and many individualized local and policy responses to it) entrenched and expanded structural violence. The 2021 Call for Action (*#EndInequalityPandemic*)[2] demonstrates how structural violence is constantly challenged and resisted. At this moment, it is the new iterations of international feminist solidarities that are exceptional, and the reimagining of care, communities, and collective action that it makes possible.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

ENDNOTES

[1]I acknowledge the trans, queer, and nonbinary exclusionary language of "women" in the title. Most feminist collectives—including many that coordinate the International Day of Action understand trans, queer, and nonbinary communities as an indelible and equal part of their movements and campaigns; affected by, resisting, and confronting similar forms of structural violence.

[2]The 2021 International Day of Action for Women's Health Campaign is focused on #EndInequalityPandemic. Campaign materials are available at https://www.may28.org, and the Call for Action is available at: http://www.may28.org/wp-content/uploads/2021/05/May-28-2021-C4A-FINAL.pdf.

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REFERENCES

Cousins, S. (2020). COVID-19 has "devastating" effect on women and girls. *The Lancet*, *396*(10247), 301–302.

Dawson, L., Kirzinger, A., & Kates, J. (2021). The impact of the COVID-19 pandemic. Henry J. Kaiser Family Foundation.

Devi, S. (2021). COVID-19 surge threatens health in the Gaza strip. *The Lancet*, *397*(10286), 1698.

Dyer, O. (2020). Covid-19: Many poor countries will see almost no vaccine next year, aid groups warn. *BMJ*, *371*, m4809.

Harman, S., Herten-Crabb, A., Morgan, R., Smith, J., & Wenham, C. (2021). COVID-19 vaccines and women's security. *Lancet*, *397*(10272), 357–358.

Khosla, R. (2020). Technology, health, and human rights: A cautionary tale for the post-pandemic world. *Health and Human Rights*, *22*(2), 63–66.

Leone, T., Alburez-Gutierrez, D., Ghandour, R., Coast, E., & Giacaman, R. (2019). Maternal and child access to care and intensity of conflict in the occupied Palestinian territory: a pseudo-longitudinal analysis (2000–2014). *Conflict and Health*, *13*, 36.

Momplaisir, F. (2020). The COVID-19 pandemic: We are all in this together. *Clinical Infectious Diseases*, *71*(15), 892–893.

Nandagiri, R., Coast, E., & Strong, J. (2020). COVID-19 and abortion: Making structural violence visible. *International Perspectives on Sexual and Reproductive Health*, *46*(1), 83–89.

Otu, A., Ahinkorah, B. O., Ameyaw, E. K., Seidu, A.-A., & Yaya, S. (2020). One country, two crises: What Covid-19 reveals about health inequalities among BAME communities in the United Kingdom and the sustainability of its health system? *International Journal for Equity in Health*, *19*(1), 189.

Sariola, S. (2021). Intellectual property rights need to be subverted to ensure global vaccine access. *BMJ Global Health*, *6*(4), e005656.

Walters, J. (2020). COVID-19 shelter-at-home orders: Impacts and policy responses in the context of intimate partner violence. *World Medical & Health Policy*, *12*, 533–539.

World Medical and Health Policy

Moderating the Impact of Nurse Emigration on the Health Sector: The State and Policy Instrument Choice

Exequiel Cabanda

This paper offers an unconventional approach to the migration-development nexus by zooming in on the health sector. Although state strategies promoting nurse migration are widely studied, comprehension on how the state functions as a central actor in emigration is empirically deficient in accounting for the different development levels experienced by sending countries. Drawing from the literature on policy instrument choice, this paper examines how the Philippines as the leading nurse sending state in the world intervenes in the emigration of Filipino nurses and what are the effects of these interventions? Based on a key informant survey (N = 100), regression results show that the state's regulatory authority in the remittance market triggers the positive contribution of nurse remittances on health sector development. This paper concludes by discussing how the choice of policy instruments is a crucial decision point for nurse-sending countries when maximizing the development impact of emigration on the health sector.

KEY WORDS: health, migration-development, nurse migration, policy instruments, state

Introduction

The migration-development nexus portrays migration as an integral part of development either as a cause or as an effect in three important themes: remittances, brain drain, and diaspora (Geiger & Pécoud, 2013; Raghuram, 2009; Skeldon, 2014). This paper offers an unconventional approach to the migration-development nexus by zooming in on the country's health sector in examining the role of the sending state in nurse emigration. Extant literature reveals that in some countries migration contributes to development at various levels; others experience minimal effects and some countries incur negative outcomes. Although sending state strategies to promote nurse migration are discussed in many studies, insights on how the state functions as a central actor in the emigration process—especially in explaining why source countries experience different levels of development—are empirically deficient.

Given that nurse manpower is an important human resource needed for achieving the health component of Sustainable Development Goal (SGD) No. 3—Good Health and Well-Being, the emigration of nurses presents a great challenge for countries that already have vulnerable health systems (Kalipeni, Semu, & Mbilizi, 2012). Thus, nurse migration is a global phenomenon that raises questions about its effects on sending countries, and one that is popularly perceived to cause

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brain drain (Connell & Buchan, 2011) or has the potential to improve the quality of a health system (as an indicator of health sector development) which is not often the case. This paper challenges the conventional market-based approach in framing the migration-development nexus and suggests that the impact of nurse migration on health sector development is not directly a result of market forces. The resulting impact is moderated by the state through its policy instrument choice as part of the strategies to institutionalize nurse export as a development tool. The research questions are: (i) how does a sending state intervene in nurse migration, and (ii) what are the effects of these interventions? This paper draws from the literature on policy instrument choices to examine how state interventions moderate the effect of nurse emigration on the health sector.

This paper centers on the case of the Philippines and the emigration of Filipino nurses. Leading a country that brokers labor to the world, the Philippine government is engaged in the production of nurses for foreign employment and has established government institutions to oversee and monitor the orderly deployment of nurses abroad (Guevarra, 2009; Ortiga, 2018; Rodriguez, 2010). As a result, the country produces 100,000–150,000 nurses annually with only 5 percent employed locally (Huston, 2015, p. 363). In the United States alone, there are currently 150,000 Filipino nurses. Total migrants' remittances have a 10 percent share in the Gross Domestic Product (GDP) of the Philippines; while migrant-nurses contributed, on average, US $1 Billion dollars annually (Relos, 2014) to the Philippine economy.

This paper is organized as follows. The next section discusses the important and recent literature on migration-development, as well as the gap in the literature and policy instrument choice as the theoretical framework of the study. Then, this paper presents the development of hypotheses that integrates the state's policy instruments in the migration-development nexus using the case of nurse migration. The methodology section describes the procedures for the key informant survey, sampling method, and model specifications. Regression results show that the state's regulatory authority as a policy instrument in the remittance market triggers the positive contribution of nurse remittances to health sector development. By contrast, partnerships with hospitals in host countries did not lead to any significant improvement in the development impact of knowledge transfer—the flow of technical knowledge and skills, competency, and philanthropy to source countries. This paper concludes with key implications of utilizing policy instrument choice in accounting for the migration-development effects and lessons learned for nurse sending countries.

Literature Review, the Gap and the Role of Policy Instrument

International migration has been widely studied across different academic disciplines such as economics, sociology, anthropology, geography, and political science, among others. In studying international migration, scholars put more emphasis on migrant workers' remittances, which constitute one, if not the largest flow of foreign capital to migrant-sending countries. Utilizing macro-level analysis, these scholars are mostly interested in the motivations behind remittance behavior and the

migration-development context of remittances. In terms of examining the different factors that affect remittance flow, altruistic behavior, or the migrant's way of supporting left-behind families (Antoniades, Seshan, Weber, & Zubrickas, 2018; Azizi 2017), investments and loan repayments (Azizi, 2019b) have been found to be key motivations for sending remittances to home countries. Another way of studying remittances is through the lens of migration-development, which examines whether migration (through remittances) boosts the economic development of migrant-sending countries. For instance, recent studies in the field of economics show that remittances improve the financial development of developing countries, which is a promising indicator for long-term economic growth (Azizi, 2020; Peprah, Ofori, & Asomani, 2019). Remittances have also been instrumental in alleviating poverty, especially in developing countries (Azizi, 2019a; Inoue, 2018). In the case of human capital development, migrant workers' remittances increase important education-related indicators such as enrollment rates in all levels and completion rates in primary and lower secondary levels (Azizi, 2018). Furthermore, remittances also improve the health and well-being of children (Atake, 2018; Azizi, 2018) and reduce their mortality rate (Azizi, 2018).

Consequently, some scholars have shifted their focus from macro and panel data to individual migrants and their families, communities, and professional groups as units of analysis in order to capture the micro effects of migration on development. For example, some scholars suggest the complexity of studying migration-development especially pointing to the uneven and diverse impacts of migration on development that go beyond economic measures (Pratt, Johnston, & Banta, 2017; Raghuram, 2009; Skeldon, 2014). These studies emphasize the importance of migrants as agents of development by incorporating spatial (space) and temporal (time) dimensions of migration and socio-economic attributes of migration-development nexus. Although the study of international migration and development has been changing rapidly in the information age with the advent of artificial intelligence and big data (Azizi & Yektansani, 2020; Beduschi, 2020), research that examines the reasons behind the uneven effects of migration on development is still scarce, especially in the context of health sector development.

This paper shows that the intervention of the sending state matters in managing how nurse migration affects health sector development through their choice of policy instruments. Policy instruments refer to the different modalities on how the government implements policies (Howlett, 1991, p. 2). Although policy instruments appear in many forms, there are two major categories that governments utilize. The first includes the substantive instruments that aim to alter the product mix, which considers the type, price, quantity, and other characteristics of producing goods and services (Howlett, 2005, pp. 34–35). The second major category of policy instruments comprises the procedural policy instruments which refer to tools that tweak or manipulate the policy process and other procedures which indirectly impact policy outcomes (Howlett, 2000, p. 413) and aim to change political behavior along the process of decision-making. Accordingly, these two sets of policy instruments could explain the modalities of state intervention in managing nurse migration through a combination of government resources, such as nodality,

treasure, authority, and organization (substantive instruments) and treaties or political agreements to secure employment markets (procedural instruments) to achieve development. The following section applies these two sets of policy instruments in the discussion of the migration-development nexus in nurse migration and explores how these instruments moderate the development effects.

The Migration-Development Nexus and Nurse Migration: Developing Two Hypotheses

Although economic development is a widely applied measure for development, migration scholars agree that development is a broad concept that consists of different socio-economic variables. Aside from GDP per capita, other indicators include urbanization, and education (Skeldon, 2014), or human development, including health (Asongu, 2014). Other scholars argue that development is complex, and these variables do not reflect the social dimension of development, specifically that development occurs in different spaces such as nursing care (Piper, 2009). Accordingly, remittances and knowledge transfer serve as key sources of development as a result of skilled migration (De Haas, 2012). This section discusses the relationship between these migration-development indicators, especially focusing on nurse migration, and how to integrate and situate the role of the sending state in the migration-development nexus.

Remittances

Migrant-sending countries and international organizations such as the World Bank portray remittances as a balancing equation to the dominant brain drain narrative (Faini, 2007; Ostergaard-Nielsen, 2010). Specifically, remittances function as a steady source of external financing, exceeding economic development assistance for middle- and lower-income countries (Maimbo & Ratha, 2005). Although remittances can help alleviate poverty levels and improve human capital (Skeldon 2008, p. 9), their effects on nurse-sending countries' economic development are mixed. For instance, for nurse-sending states like the Philippines, migrant workers' remittances contribute almost 10 percent of the GDP (Agcaoili, 2017) and generate economic development on local and national levels (Ahmad & French, 2014; Bayangos & Jansen, 2011). By contrast, in the case of India, this cash transfer did not lead to economic growth (Mallick, 2012; Siddique, Selvanathan, & Selvanathan, 2012). Even Kerala, an Indian state known for emigrant nurses, has not "experienced a parallel increase in economic growth" despite the continuous flow of remittances" (Skeldon, 2008, p. 9).

One possible explanation to account for these effects is that households utilize remittances for pure consumption rather than investing them in profitable activities but are expected to create multiplier effects in sectors such as education and health (De Haas, 2005). In other words, in the long run, these multiplier effects can help channel investments to the education and health sectors to improve the quality of services, which benefits individuals. Another reason is that

remittances do not usually move toward national investment projects that could lead to sectoral development like health (Goode, 2009; McElmurry et al., 2006). Other scholars argue that the effect of remittances should depend on the current level of development of the sending government (De Haas, 2005; Page & Plaza, 2006). Yet, these reasons suggest that the effects of migration on economic development occur mostly as a product of market outcomes, which supersedes the integral role of the sending state in labor migration. These effects could be uncovered by focusing on the policy instrument choice of sending states in labor migration. For example, some countries like the Philippines actively promote skilled migration by setting-up a timely and cost-efficient transfer—the reduction of transaction cost—of remittances from the host country to the migrant's country of origin (De Haas, 2005). In Morocco, according to Iskander (2010), the government created state banks to cater to remittance transfers. This government strategy also aims to integrate migrant workers into the formal financial sector to contribute to community development.

Putting this in the context of nurse migration, the developing countries' health sector absorbs most of the effects, especially on the loss of nursing manpower and impacts on the health system quality (Kalipeni et al., 2012; Yeates, 2009b); while other states such as the Philippines participate in "nurses for export" projects to profit from remittances (Rodriguez, 2010; Yeates, 2009b). As such, nurses are one of the primary sources of migrants' remittances. For example, migrant nurses in Australia from Tonga and Samoa remit more than other professions (Brown & Connell, 2004), while Filipinos and South African nurses in the United Kingdom remit at least 26 percent of their income (Buchan, Jobanputra, Gough, & Hutt, 2005). Thus, by intervening in the remittance market, the state maximizes migrants as agents of development being the source of foreign capital that can generate development. Specifically, this intervention refers to the government's regulatory policies on remittances or also known as substantive policy instruments. Through the multiplier effect, this policy instrument is expected to channel every remittance dollar to profitable activities that boost economic development or sectoral development in education and health (Bagasao, 2005; Lamberte, 2002). As a proxy variable for state intervention, this policy instrument serves as a moderating variable that aims to maximize the contribution of remittances to sending countries' sectoral development as indicated in Hypothesis 1:

H1: The migrant-sending state's regulatory authority of providing greater access to remittance services moderates the relationship between remittances and development. That is, with the presence of this policy instrument, migrants' remittances are expected to positively affect the development of source countries.

Knowledge Transfer

Although remittances continue to dominate debates on the migration-development nexus, scholars also recognize its social dimension or non-monetary

aspect through social remittance (Levitt, 1998; Levitt & de la Dehesa, 2003; Piper, 2009). Social remittance refers to the "ideas, behaviors, identities, and social capital that flow from receiving- to sending-country communities" (Levitt, 1998, p. 926). Knowledge transfer is a form of social remittance from migrants abroad, which means the flow of knowledge, skills, ideas, and practices to the home countries (King, Lulle, & Buzinska, 2016). Conversely, only highly-skilled migrants, who have worked abroad and accumulated human capital, share their learning with local industries when they return to their home countries (Nyberg–Sørensen, Van Hear, & Engberg–Pedersen, 2002, p. 23).

Although returning nurses contribute to the health system in terms of their newly acquired knowledge abroad, according to Lorenzo, Galvez-Tan, Icamina, & Javier, (2007, p. 1413), most nurses do not permanently return except for personal and family reasons. These reasons include sick family members, the expiry of contracts, and enough savings to set-up a business—a less likely situation (Lorenzo et al., 2007, p. 1413). This is because nurses, especially those who emigrated to North America, have been granted permanent residency together with their families (Lorenzo et al., 2007, p. 1408). This scenario could be problematic if these nurses are expected to continue to contribute to the country's development objectives. Similarly, diaspora organizations also facilitate knowledge transfer by organizing short-term trips for philanthropic activities such as training, seminars, and charitable missions or fund education scholarships for students (Brinkerhoff, 2008; Opiniano, 2005).

Some sending governments encourage skilled migrants to return and share their acquired knowledge from abroad. For instance, some source countries like China and the Philippines provide incentives (e.g., grants or research funds) on the temporary return of scientists, researchers, and health professionals (Clemens, 2011; Faist, 2008; Saxenian, 2002; Skeldon, 2008) to improve research in science, technology and good practices in the health sectors. The goal of these incentives is to engage these returning citizens in mentoring programs to share their skills with their counterparts. Other governments have engaged in bilateral cooperation with host countries to encourage contract-based employment to promote temporary migration (Ruhs, 2006). Bilateral treaties or any cooperation agreement between two parties are procedural policy instruments (Howlett, 2005) that could maximize the positive contribution of migrant workers to their home countries through a knowledge circulation. Nonetheless, this type of intervention is rarely empirically tested to demonstrate how it contributes to, or what effect it has on, the development of home countries. Hypothesis 2 portrays this form of the procedural instrument as a moderating factor in the migration-development nexus.

H2: The cooperation or partnership of migrant-sending states with host countries as a procedural policy instrument moderates the relationship between knowledge transfer and development. That is, the more the migrant-sending states cooperate with host countries (e.g., bilateral cooperation, hospital-hospital partnership), the greater the knowledge circulation's impact is expected to be on the source countries' development.

By integrating these two policy instruments—regulatory authority and cooperation between sending and receiving countries, this paper examines how the specific forms of state intervention in managing nurse migration generate diverse impacts on health sector development. The next section describes the data, the specific variables for this study, and the methods used to test the two hypotheses.

Methodology

This study centers on the case of the Philippines because of the following defining characteristics. First, the Philippines is distinctively known as a labor brokerage state, where government policies are strategically in place for the production and deployment of labor for export, specifically nurses (Ortiga, 2014, 2017; Rodriguez, 2010). The Philippine government's labor export policy started in the 1970s as a stop-gap economic policy. This policy aimed to address widespread unemployment, debt crisis, government corruption, and lack of foreign capital investments because of economic mismanagement and the oil price increase in the world market during the period (Acacio, 2008; Aguilar, 2014). Since then, despite changes in presidential administrations, labor export remains as the top priority for policymakers. Conversely, labor export continues to address the loopholes of domestic employment policy and to generate foreign remittances for the economy. Furthermore, the Philippines is the leading producer of nurses in the world with a far more advanced government migration infrastructure that promotes nurse emigration compared to other nurse producing countries like India (Thompson & Walton-Roberts, 2019). Moreover, the country is also the primary provider of seafarers in the world who have been a reliable source of manpower for oil tankers, container ships, and luxury cruise liners (McKay, 2007). This dependence on labor-export policy is also one of the unintended effects of the structural adjustment programs of the International Monetary Fund (IMF) and World Bank (Castro-Palaganas et al., 2017). These programs have been argued to contribute to a high unemployment rate and depletion of foreign reserves in the country.

Second, it has various migrant institutions in place, more specifically, government agencies responsible for managing labor migration. The Philippine Overseas Employment Administration (POEA), the Overseas Workers Welfare Administration (OWWA) and the Philippine Overseas Labor Office (POLO) were established to manage overseas employment and the return of Filipino migrant workers. Moreover, the country has various legislations intended for migrant workers which include the Migrant Workers and Overseas Filipino Act of 1995 that underscores human rights protection for Filipino migrant workers. Most importantly, the Philippines has a state banking service that executes the regulatory authority of the Philippine government in the remittance sector, with the expectation that this will boost remittance inflow and investments from migrants.

Third, migrant nurses are one of the leading sources of remittances and are active in many philanthropic projects in the country. Strategically, the Philippines educates and trains Filipino nurses as "ideal" migrant care workers for foreign employment (Ortiga & Rivero, 2019) and these nurses have developed more skills

as they gain more experience abroad. As a colonial legacy of the American occupation (1896–1946), the policy of producing nurses for foreign employment was clearly verbalized by former President Ferdinand Marcos in the 1973 convention of the Philippine Nurses Association:

> *It is our policy to promote the migration of nurses…we will now encourage the training of all nurses because, I repeat, this is the market that we should take advantage of. Instead of stopping the nurses from going abroad why don't we produce more nurses? If they want one thousand nurses we produce a thousand more (quoted in Choy, 2003, pp. 1115–16, italics by Choy).*

With this explicit policy on nurse emigration which has not changed over the years, Filipino nurses are expected to contribute to the development of the country not only through monetary remittances but also in terms of knowledge transfer. In this aspect, Filipino nurses are more likely to facilitate the flow of knowledge, skills, and good practices to the health sector and could thus contribute to the development of the health system.

Fourth, albeit an export-driven strategy and surplus of nurses, the country's health sector can also be vulnerable, and correct policy instrument choice of the sending state is thus crucial for achieving positive development outcomes from nurse migration. This is because some Filipino nurses have given up their plans to work abroad and have instead shifted to non-nursing-related jobs considering the low wages and undesirable working conditions in Philippine hospitals (Ortiga & Macabasag, 2020a). Even so, some of these nurses deferred their migration plans because of the volatility of labor market demands for foreign nurses in receiving countries (Ortiga & Macabasag, 2020b).

Survey Instrument and Data collection

This study employs a key informant survey as a source of data through a purposive and snowball sampling method that targets a specific type of respondents. Key informant surveys involve the selection of key individuals whose professions and organizational affiliations suggest that they have expert knowledge about the characteristics of the population being studied (Eyler et al., 1999; Spiegel & Hyman, 1991). Although this type of survey is purposive and does not represent "some larger population," it can be "exactly what is needed in a case study of […] clearly defined and relatively limited group[*s*]" (Schutt, 2006, pp. 156–57). In the absence of complete and reliable time-series data on the health professional migration (Bidwell et al., 2013; Martineau & Willetts, 2006), a key informant survey is the best alternative to obtain quantitative data on nurse migration from experts.

The design of the key informant survey engages relevant literature that is closely related to the research questions (Eyler et al., 1999). The questions were developed to address wider aspects of health system quality (Lorenzo et al., 2007; Ortiga, 2014; Yeates, 2009a) which constitute an indicator of development in the context of health, namely: remittances (Rodriguez, 2010; Skeldon, 2008, 2009), and knowledge transfer through return and circular migration, through diaspora organizations, and through

Table 1. Variables and Definitions of Key Informant Survey

Variables	Survey Frame/Definitions	Scale	Mean	SD
Dependent variable: Health System Quality (*HSQ*)	The readiness of your health sector in terms of nurse-to-patient ratio and the full capacity and capability to control the spread of infectious diseases and epidemics	5—*Strongly Agree*; 1—*Strongly Disagree*	4.04	1.72
Independent variables				
Remittance (*REMIT*)	The importance of remittance on improving public services such as education, health, and other public services.	1—*lowest*; 10—*highest*	7.85	1.74
Return and Circular Migration ($TRANSFER_{retmig}$)	If the return and circular migration facilitate knowledge transfer, increase the competency of the nursing profession.	5—*Strongly Agree*; 1— *Strongly Disagree*	6.70	2.82
Diaspora Network ($TRANSFER_{diaspora}$)	If diaspora organizations facilitate knowledge transfer through collaboration with home countries on medical training and funding scholarships for nursing education.	5—*Strongly Agree*; 1—*Strongly Disagree*	7.10	2.71
State Intervention (*STATE*) Regulatory authority (*REGAUTO*)	The government providing cost-efficient transfer of remittances from migrant- nurses because the government recognized them as "heroes" through their contribution to the economy.	5—*Strongly Agree*; 1—*Strongly Disagree*	2.45	0.94
Partnership with Host Countries (*PROPAR*)	Hospital partnership agreement between source and host country (Canada, UK, Singapore)	1—*Yes*; 2—*No*	1.08	0.27
Control variables				
Education (*EDU*)	Respondents from the nursing education sector ($n = 10$)	0—*Yes*; 1—*No*	0.10	0.30
Health (*HE*)	Respondents from the health sector (hospitals) ($n = 67$)	0—*Yes*; 1—*No*	0.67	0.47
Professional Organization (*PO*)	Respondents from the nurse professional organizations ($n = 14$)	0—*Yes*; 1—*No*	0.07	0.26
Labor (*LO*)	Respondents from the labor sector ($n = 9$)	0—*Yes*; 1—*No*	0.12	0.33
			N =	*100*

hospital-to-hospital partnerships (Lorenzo et al., 2007; Skeldon, 2009) between the Philippines and the United Kingdom, Canada, and Singapore (Table 1). The researcher selected the United Kingdom, Canada, and Singapore for the following reasons. Canada and the United Kingdom are primary destination countries for Filipino nurses with active recruitment policies through government-to-government arrangements. Relatively, Singapore is an emerging destination country for Filipino nurses because of its aging population and the lack of interest for the nursing profession among Singaporeans (Matsuno, 2009). The addition of these destination countries in the framing of the questions adds context in terms of the migration destinations of Filipino nurse migrants. This approach helps guide the respondents in answering questions on the migration and development aspect of nurse migration. After the survey instrument was finalized, the researcher conducted a pilot survey with 20 respondents consisting of migrant and non-migrant nurses to evaluate the questionnaire under actual survey conditions. Cronbach's α was also used to assess the reliability or internal consistency of the survey questionnaire. The pilot test of the survey questionnaire obtained a high internal consistency of 0.83, which means that the instrument was acceptable and ready for dissemination.

In determining the key informants, the researcher targeted the relevant organizations in the Philippine nursing industry which is composed of health, education, labor, and nurse professional organization sectors (Lorenzo et al., 2007; Ortiga, 2014; Rodriguez, 2010). The researcher identified the names of key informants from their organizational affiliations and designated positions (purposive sampling), which are indicated on their institutional websites and through referrals from other informants (snowball sampling). They are the top officials from the following institutions:

- Department of Health (DOH) (DOH-funded hospitals)
- Department of Labor and Employment (DOLE) (labor)
- Philippine Regulatory Commission (PRC) (education)
- Association of Deans of Philippine Colleges of Nursing, Inc. (ADPCN) (education)
- Philippine Nursing Association (PNA) (professional organization)
- Association of Nursing Service Administrators in the Philippines (ANSAP) (professional organization)

In total, the researcher identified 152 key informants for the survey, who are in a position to answer questions about the migration-development context of Filipino nurse migration. The data collection covered the period from December 2016 to November 2017. For key informants who are part of bigger government agencies and organizations (e.g., DOH-funded hospitals), the researcher sought the endorsement of the department secretary and undersecretary to comply with the bureaucratic practice in the Philippines. The researcher distributed the questionnaire via an online survey using Qualtrics. Due to other informants' difficulty in accessing the online platform, the researcher conducted face-to-face survey administration with the assistance of survey enumerators. Based on these procedures, the survey obtained a response rate of 66 percent, yielding a total number of survey respondents of 100 ($N = 100$).

Variables and Method

This paper utilized ordinary least square (OLS) regression with moderation to assess the moderation effects of state intervention on the relationship between migration and development in the health sector (Table 1).

For the dependent variables, health system quality *(HSQ*) is the indicator for health sector development. *HSQ* refers to the preparedness of the health sector to confront health risks through a sufficient nursing workforce able to respond to the demand of health services in the occurrence of disease outbreaks and epidemics. This indicator reflects the UN-SDG No. 3—Good Health and Well-Being and corresponds consistently to the development contributions of the nursing workforce (Benton and Shaffer, 2016). For the predictor variables, migration variables include remittances (*REMIT*), knowledge transfer from the return and circular migration (*TRANSFERretmig*), and knowledge transfer from diaspora organizations (*TRANSFERdiaspora*). These knowledge transfer variables refer to technical knowledge and skills, competency, and philanthropy in the health sector. The role of the sending state variables includes regulatory authority (*REGAUTO*), which reflects the policy instrument of providing greater access to the cost-efficient transfer of remittances back to the home countries (De Haas, 2010; Rodriguez, 1996). The other variable is the procedural instrument through partnerships with host countries (*PROPAR*), which indicates the partnership of hospitals (Lorenzo et al. 2007) in the Philippines and the hospitals in host countries such as the United Kingdom, Canada, and Singapore. The control variables are the specific institutional affiliations of the respondents such as health, education, labor, and professional organization to isolate the effects of their affiliations in the regression model.

Results

Table 2 presents five OLS regression models (Models 1–5) that establish the moderating role of the state in the migration-development nexus. In these models, the researcher tested the effects of independent variables such as (i) *REMIT*, (ii) *KTRANSFER*, and (iii) *STATE*—such as regulatory *REGAUTO* and *PROPAR*—on *HSQ* as a dependent variable. These series of models highlight the changes in the value of the R^2 that indicate (or not) a positive moderating effect of the nurse-sending state's migration-related intervention (*REGAUTO* and *PROPAR*) on the perceived effects on the emigration of Filipino nurses (migration) and health system quality (development) in the Philippines.

As expected, in Model 1 the regression results reveal the positive and significant effect of knowledge transfer variables—$TRANSFER_{retmig}$ ($B = 0.411$; $p = .042$) and $TRANSFER_{diaspora}$ ($B = 0.483$; $p = .005$) on *HSQ* at $\alpha = 0.05$ which suggest the importance of accounting for the effect of knowledge transfer on health sector development. The negative and not significant coefficient of *REMIT* ($B = -0.217$; $p = .173$) was also anticipated considering that remittances do not always lead to sectoral development, which will be discussed further in the next section. The results also reveal an R^2 of 0.212, which signifies the explanatory power of these independent variables in predicting *HSQ*, the indicator for health

Table 2. Regression Results

Dependent Variable:	Regression				
Health System Quality (*HSQ*)	1	2	3	4	5
Predictors					
Remittance (*REMIT*)	−0.217	−0.218	−0.190	−0.210	−0.215
Knowledge Transfer (*KTRANSFER*)					
Return and Circular Migration ($TRANSFER_{retmig}$)	0.411**	0.421**	0.408**	0.408**	0.405**
Diaspora Networks ($TRANSFER_{diaspora}$)	0.483***	0.482***	0.461***	0.491***	0.488***
State Intervention (*STATE*)					
Regulatory Authority (*REGAUTO*)	–	−0.071	−0.085	–	–
Part. with H. Countries (*PROPAR*)	–	–	–	−0.054	−0.054
Interaction variable					
$REMIT \times REGAUTO$	–	–	0.286**	–	–
$TRANSFER_{retmig} \times PROPAR$	–	–	–	–	−0.064
Controls sector					
Education (*EDU*)	−0.785	−0.736	−0.711	−0.815	−0.822
Health (*HE*)	−0.286	−0.267	−0.229	−0.321	−0.329
Labor (*LO*)	−1.161*	−1.122*	−1.235**	−1.215*	−1.229*
Professional Organization (PO)	−1.389**	−1.322**	−1.338**	−1.401**	−1.428**
Constant	4.558***	4.530***	4.501***	4.590***	4.600***
F	5.64***	5.01***	5.15***	4.92***	4.28***
R^2	0.212	0.214	0.241	0.213	0.214
ΔR^2	–	–	0.027	–	0.001
N	100	100	100	100	100

*$p < .10$.
**$p < .05$.
***$p < .01$.

sector development. Specifically, the model explains 21 percent of the variance in the country's *HSQ*.

Meanwhile, adding state intervention variables such as *REGAUTO* in Model 2 and *PROPAR* in Model 3 did not substantially improve the explanatory power of these regression models. The regression analysis obtained an *R*-square of 0.214 for Model 2 and 0.213 for Model 3 from the R^2 of 0.212 in Model 1. These state intervention variables—*REGAUTO* ($B = -0.071$; $p = .669$) and *PROPAR* ($B = -0.054$; $p = .593$) are likewise not statistically significant at $\alpha = 0.05$. The result means that taken independently, these state variables did not impact *HSQ*. By contrast, based on these two models, knowledge transfer variables remain statistically significant for explaining *HSQ*, while *REMIT* is not statistically significant as shown in Model 1. In Models 4 and 5, the existing independent variables in Model 2 were expanded by adding an interaction variable to test the moderating effect of the state's two policy instruments—*REGAUTO* and *PROPAR* on the relationship between nurse migration and *HSQ*.

First, in Model 4, all the independent variables were standardized to address the issue of multicollinearity by multiplying *REMIT* with *REGAUTO* to create an interaction variable $REMIT \times REGAUTO$. When added to the regression equation, the coefficient of the interaction variable is positive and significant ($B = 0.286$;

$p = .046$) at $\alpha = 0.05$. Based on this model, the researcher found that R^2 increases from 0.214 in Model 2 to 0.241 in Model 4 or by 2.7 percent, which implies that the moderating effect is positive and statistically significant ($F = 5.15$; $p = .000$). This interactive term ($REMIT \times REGAUTO$) reveals that the combination of migrant remittances and the country's regulatory authority of providing cost-efficient transfer of remittances to home countries generates a positive improvement in the health system. The result provides strong support for Hypothesis 1.

Second, using the same procedure as for Model 4, in Model 5 the researcher created an interaction term—$TRANSFER_{retmig} \times PROPAR$—to test the moderating effect of this policy instrument in facilitating knowledge transfer through return migration. From the regression results, the interactive term $(TRANSFER_{retmig} \times PROPAR)$ has a negative coefficient and is not statistically significant ($B = -0.064$; $p = .557$). By comparing the value of R^2 of 0.213 in Model 3 to 0.214 in Model 5, the interaction term did not add to the explanatory power of the existing independent variables to predict *HSQ*. The result of Model 5 suggests that despite hospital-to-hospital cooperation between the host and destination countries, (a) migrant nurses may not return permanently, and (b) if they return for a short-term, the effect is negligible or not significant. Hence, this process did not contribute to the circulation of knowledge back to the source country's health institutions. The next section explains the implication of these results.

Discussion

Although nurses are likely to remit more compared to other migrant professionals (Brown & Connell, 2004), these remittances contribute largely to the welfare of migrants' families and less to investment projects that could channel long-term benefits to the health sector. The regression results (Models 1–5) demonstrate the impression that this monetary transfer under free-market conditions does not significantly lead to the improvement of the delivery of health services in the Philippines, even considering that Filipino nurses remit US$1 Billion annually (Relos, 2014). These weak and insignificant regression results imply that without state regulation in the remittance market, migrant remittances could not sufficiently deliver a positive and significant impact on health sector development. Although the results are based on the perception of key informants from multisectoral agencies and organizations concerning nurse migration, the results reflect the challenges and potential impacts of the outward mobility of nurses on the health sector in the absence of the intervention of their home governments.

Although many studies have shown that most remittances are utilized at the household level, Yeates (2009b) points out that, theoretically, remittances have a multiplier effect that could diffuse development benefits including the improvement of health care delivery. Although how to achieve the multiplier effect is beyond the scope of this paper, the regression results suggest that sending state intervention in nurse migration is a necessary condition to guarantee that migrant's remittances circulate and flow to the health sector. That is, aside from the presence of sending government institutions and other marketing strategies to deliberately

promote emigration, a policy instrument ensuring that migrants send remittances in a cost-efficient manner is also an equally important intervention the moment these migrants have settled in host countries. Based on the results (Model 3), it is apparent that a combination of the regulatory authority of the state on remittances (*REMIT* × *REGAUTO*) and the remittance behavior of migrant nurses generate a positive effect on the development of the health sector (as measured by *HSQ*) as compared to the results without state intervention. This result presents a challenge to the free-market assumption and approach to understanding labor migration: through government intervention, remittances move to more profitable investment projects instead of being restricted for household consumptions.

Notably, the Philippine government's regulatory intervention of instituting a state-run financial institution for foreign workers provides parallel evidence for Hypothesis 1. In January 2018, the Philippines opened its first ever bank that caters exclusively to the needs of Filipino migrant workers. Executive Order No. 44 dated 28 September 2017, the law creating the Overseas Filipino Bank (OFB), stipulates that "there is a need to establish a policy bank dedicated to providing financial products and services to overseas Filipinos and focused on delivering quality and efficient foreign remittance services." As a policy instrument that conveys the government's authority (regulation) and organization (public enterprise), the creation of this financial institution intends to effect change in a policy environment (Howlett, 2005). Conversely, the establishment of this bank provides more competition in the remittance market. Ideally, this reduces the cost of remittance. Moreover, this bank strategically promotes savings and investment behavior among nurses and other migrant workers, which theoretically affects positively both the country's sectoral and national development.

Furthermore, Lorenzo et al. suggested hospital-to-hospital partnerships in the host and source countries (2007, pp. 1416–17). The goal is to provide good leverage for the health system by improving the knowledge and manpower base of local hospitals. However, the combination of this policy instrument *(*$TRANSFER_{retmig}$ × *PROPAR)* (Model 5) does not significantly improve the relationship between knowledge transfer and health system quality. This result implies that this social dimension of migration-development is evident without the intervention of the state in contrast with the intervention in a remittance market. In most cases, Filipino migrant-workers, such as nurses, voluntarily return for many reasons (e.g., end of a contract, family decisions, and retirement) (Martin, Abella, & Midgley, 2004). This occurs in the absence of bond-like instruments of the Philippine government forcing them to return. The majority of these nurses reintegrate into the health system, sometimes accepting a leadership position, which increases knowledge capital in the country's delivery of health services.

Conclusions and Policy Implications

This paper reveals that even beyond the commodification and production of labor resources for export, the sending government utilizes regulatory authority and collaborative schemes to maximize the contribution of nurse migration to

health sector development. Put simply, although migrant workers are the central actors in the migration-development nexus, their contribution to the development of their home countries is contingent on the state's policy instrument choice that empowers or weakens them as agents of development. In this context, migrant nurses are indeed agents of the development of the health sector.

The role of the sending state in the areas of migration and development policy helps one to make sense of the active presence of the sending state in all stages of the migration process. Specifically, the sending state intervenes in labor production, deployment and, more importantly, in tailoring financial regulation in response to the remittance behavior of migrant-workers. Notably, the results also reveal that the absence of these interventions may explain why skilled migration may have less favorable impacts on other migrant-sending countries. Although far from being a perfect model, the Philippines shows us a relevant example of how the government provides a policy environment for financial institutions (public or private) to operate not only in nurse migration but to the migration industry in general. Although the Philippine export model has been replicated by other sending countries in terms of recruitment, placement, welfare support to migrants abroad, etc., this specific intervention enables remittance and investment services to be more accessible at any given time to the migrants. The intervention of the Philippine government in the remittance sector is a good practice that other sending countries, especially those that are considered as "new players" could replicate. For instance, Vietnam has started sending nurses to Germany a few years ago, but its remittance industry is not well-developed. The government provides either little or no support to how migrant's remittances could be channeled efficiently to boost sectoral development.

The results of this study suggest that this regulative authority of the state allows migrants' remittances to contribute more toward health sector development. In short, how sending states decide to organize the channeling of remittances matters. Likewise, the results also show how effective government intervention in the remittance aspect is compared to maximizing the positive impact of knowledge transfer to health sector development. The sending government intervention efforts in this area are far more challenging, especially because the circulation of knowledge is a complex process to examine in the health sector. This is because conceptually there are different categories of knowledge that were not specifically unpacked in the survey questionnaire.

As a limitation, due to the small population size of the health or nursing policy sector in the Philippines and its corresponding number of key informants, the current sample used in this study could not be increased. However, it is important to emphasize that because of this limitation, the results presented here can only serve as a starting point in exploring the broader role of the sending states in the migration-development nexus. Aside from nurses, the policy case could be extended to include other skilled professions such as engineers, IT professionals, seafarers, and academic researchers or scientists. In addition, considering that the nature of the survey data is based on Likert-scale responses, the results should be interpreted carefully. The researcher did not interpret, for instance, the x number of

unit increase of remittances (independent variable) to have a corresponding y unit increase (or decrease) in health system quality (dependent variable). This is because the data are not actual remittances (in dollars) or health system quality (which does not have a unit measure). Through the survey, the purpose of this regression analysis is to illustrate how the causal relationship between migration and development operates in the health sector and how the sending state moderates this relationship. Regardless of this constraint, the sending state's choice of policy instruments is a crucial decision point for nurse-sending countries when maximizing the development impacts on the health sector.

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Notes

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References

Acacio, Kristel. 2008. "Managing Labor Migration: Philippine State Policy and International Migration Flows, 1969–2000." *Asian and Pacific Migration Journal* 17 (2): 103–32.

Agcaoili, Lawrence. 2017. "Remittances Rise 5% in 2016, Hit Record $26.9 B." *Philippine Star* http://www.philstar.com/business/2017/02/16/1672562/remittances-rise-5-2016-hit-record-26.9-b. Accessed September 22, 2017.

Aguilar, Filomeno, Jr. 2014. *Migration Revolution: Philippine Nationhood and Class Relations in a Globalized Age*, Singapore: NUS Press.

Ahmad, Nazneen, and Joseph J. French. 2014. "Evidence on the Linkages between Remittances and the Macroeconomy." *Journal of Economics* 40 (1): 31–46.

Antoniades, Alexis, Ganesh Seshan, Roberto Weber, and Robertas Zubrickas. 2018. "Does Altruism Matter for Remittances?" *Oxford Economic Papers* 70 (1): 225–42.

Asongu, Simplice A. 2014. "The Impact of Health Worker Migration on Development Dynamics: Evidence of Wealth Effects from Africa." *The European Journal of Health Economics* 15 (2): 187–201.

Atake, Esso Hanam. 2018. "The Impacts of Migration on Maternal and Child Health Services Utilisation in Sub-Saharan Africa: Evidence from Togo." *Public Health* 162: 16–24.

Azizi, Seyed Soroosh. 2017. "Altruism: Primary Motivation of Remittances." *Applied Economics Letters* 24 (17): 1218–21.

———. 2018. "The Impacts of Workers' Remittances on Human Capital and Labor Supply in Developing Countries." *Economic Modelling* 75: 377–96.

———. 2019a. "The Impacts of Workers' Remittances on Poverty and Inequality in Developing Countries." *Empirical Economics*, https://doi.org/10.1007/s00181-019-01764-8

———. 2019b. "Why Do Migrants Remit?" *The World Economy* 42 (2): 429–52.

———. 2020. "Impacts of Remittances on Financial Development." *Journal of Economic Studies* 47 (3): 467–77.

Azizi, Seyed Soroosh, and Kiana Yektansani. 2020. Artificial Intelligence and Predicting Illegal Immigration to the USA, *International Migration*. https://onlinelibrary.wiley.com/doi/abs/10.1111/imig.12695

Bagasao, Ildefonso F. 2005. "Migration and Development: The Philippine Experience." In *Remittances: Development Impact and Future Prospects*, eds. Samuel Munzele Maimbo, and Dilip Ratha. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/435901468139206629/Remittances-development-impact-and-future-prospects. Accessed October 25, 2018.

Bayangos, Veronica, and Karel Jansen. 2011. "Remittances and Competitiveness: The Case of the Philippines." *World Development* 39 (10): 1834–46.

Beduschi, Ana. 2020. "International Migration Management in the Age of Artificial Intelligence." *Migration Studies.* https://academic.oup.com/migration/advance-article/doi/10.1093/migration/mnaa003/5732839

Benton, David C., and Franklin A. Shaffer. 2016. "Human Resources for Health 2030 and the Regulatory Agenda." *Journal of Nursing Management* 24 (6): 705–7.

Bidwell, P., N. Humphries, P. Dicker, S. Thomas, C. Normand, and R. Brugha. 2013. "The National and International Implications of a Decade of Doctor Migration in the Irish Context." *Health Policy* 110 (1): 29–38.

Brinkerhoff, Jennifer M. 2008. "The Potential of Diasporas and Development." In *Diasporas and Development: Exploring The Potential*, ed. Jennifer M. Brinkerhoff. London: Lynne Rienner, 1–17.

Brown, Richard P. C., and John Connell. 2004. "The Migration of Doctors and Nurses from South Pacific Island Nations." *Social Science & Medicine* 58 (11): 2193–2210.

Buchan, James, Renu Jobanputra, Pippa Gough, and Ruth Hutt. 2005. *Internationally Recruited Nurses in London: Profile and Implications for Policy*, London: King's Fund.

Castro-Palaganas, E., D. L. Spitzer, M. M. M. Kabamalan, M. C. Sanchez, R. Caricativo, V. Runnels, R. Labonté, G. T. Murphy, and I. L. Bourgeault. 2017. "An Examination of the Causes, Consequences, and Policy Responses to the Migration of Highly Trained Health Personnel from the Philippines: The High Cost of Living/Leaving-a Mixed Method Study." *Human Resources for Health; London* 15 (25): 25.

Choy, Catherine Ceniza. 2003. *Empire of Care: Nursing and Migration in Filipino American History*, Durham: Duke University Press.

Clemens, Michael A. 2011. "Economics and Emigration: Trillion-Dollar Bills on the Sidewalk?" *The Journal of Economic Perspectives* 25 (3): 83–106.

Connell, John, and James Buchan. 2011. "The Impossible Dream? Codes of Practice and the International Migration of Skilled Health Workers." *World Medical & Health Policy* 3 (3): 1–17.

De Haas, Hein. 2005. "International Migration, Remittances and Development: Myths and Facts." *Third World Quarterly* 26 (8): 1269–84.

———. 2010. "Migration and Development: A Theoretical Perspective." *International Migration Review* 44 (1): 227–64.

———. 2012. "The Migration and Development Pendulum: A Critical View on Research and Policy." *International Migration* 50 (3): 8–25.

Eyler, A. A. 1999. "Key Informant Surveys as a Tool to Implement and Evaluate Physical Activity Interventions in the Community." *Health Education Research* 14 (2): 289–98.

Faini, Riccardo. 2007. "Remittances and the Brain Drain: Do More Skilled Migrants Remit More?" *The World Bank Economic Review* 21 (2): 177–91.

Faist, Thomas. 2008. "Migrants as Transnational Development Agents: An Inquiry into the Newest Round of the Migration–Development Nexus." *Population, Space and Place* 14 (1): 21–42.

Geiger, Martin, and Antoine Pécoud. 2013. "Migration, Development and the 'Migration and Development Nexus." *Population, Space and Place* 19 (4): 369–74.

Goode, Angelo S. 2009. "Global Economic Changes and the Commodification of Human Capital: Implications of Filipino Nurse Migration." *East Asia* 26 (2): 113–31.

Guevarra, Anna R. 2009. *Marketing Dreams, Manufacturing Heroes: The Transnational Labor Brokering of Filipino Workers*, New Brunswick, NJ: Rutgers University Press.

Howlett, Michael. 1991. "Policy Instruments, Policy Styles, and Policy Implementation." *Policy Studies Journal* 19 (2): 1–21.

———. 2000. "Managing the 'Hollow State': Procedural Policy Instruments and Modern Governance." *Canadian Public Administration* 43 (4): 412–31.

———. 2005. "What Is a Policy Instrument? Tools, Mixes, and Implementation Styles." In *Designing Government: From Instruments to Governance*, eds. F. Pearl Eliadis, Margaret M. Hill, and Michael Howlett. Canada: McGill-Queen's Press.

Huston, Carol, L. 2015. "The Challenges of International Nurse Migration: Seeking Global Solutions." In *Global Health Nursing in the 21st Century*, eds. Suellen Breakey, Inge Corless, Nancy Meedzan, and Patrice Nicholas. New York: Springer Publishing Company, 357–74.

Inoue, Takeshi. 2018. "Financial Development, Remittances, and Poverty Reduction: Empirical Evidence from a Macroeconomic Viewpoint." *Journal of Economics and Business* 96: 59–68.

Iskander, Natasha. 2010. *Creative State: Forty Years of Migration and Development Policy in Morocco and Mexico*, Ithaca, NY: Cornell University Press.

Kalipeni, Ezekiel, Linda L. Semu, and Margaret Asalele Mbilizi. 2012. "The Brain Drain of Health Care Professionals from Sub-Saharan Africa: A Geographic Perspective." *Progress in Development Studies* 12 (2–3): 153–71.

King, Russell, Aija Lulle, and Laura Buzinska. 2016. "Beyond Remittances: Knowledge Transfer among Highly Educated Latvian Youth Abroad." *Sociology of Development* 2: 183–203.

Lamberte, Mario. 2002. "Investments of OFWs in Rural Banks." In *ERCOF International Conference, Davao, Philippines*, April, 10–12.

Levitt, Peggy. 1998. "Social Remittances: Migration Driven Local-Level Forms of Cultural Diffusion." *The International migration review* 32 (4): 926–48.

Levitt, Peggy, and Rafael de la Dehesa. 2003. "Transnational Migration and the Redefinition of the State: Variations and Explanations." *Ethnic and Racial Studies* 26 (4): 587–611.

Lorenzo, Fely Marilyn E., Jaime Galvez-Tan, Kriselle Icamina, and Lara Javier. 2007. "Nurse Migration from a Source Country Perspective: Philippine Country Case Study." *Health Services Research* 42 (3): 1406–18.

Maimbo, Samuel Munzele, and Dilip Ratha, eds. 2005. *Remittances: Development Impact and Future Prospects*. The World Bank. http://documents.worldbank.org/curated/en/435901468139206629/Remittances-development-impact-and-future-prospects. Accessed November 19, 2018.

Mallick, Hrushikesh. 2012. "Inflow of Remittances and Private Investment in India." *Singapore Economic Review* 57 (1): 1–22.

Martin, Philip, Manolo Abella, and Elizabeth Midgley. 2004. "Best Practices to Manage Migration: The Philippines." *International Migration Review* 38 (4): 1544–59.

Martineau, Tim, and Annie Willetts. 2006. "The Health Workforce: Managing the Crisis Ethical International Recruitment of Health Professionals: Will Codes of Practice Protect Developing Country Health Systems?" *Health Policy* 75 (3): 358–67.

Matsuno, Ayaka. 2009. *Nurse Migration: The Asian Perspective*, Switzerland: International Labor Organization. Report. http://www.ilo.org/asia/publications/WCMS_160629/lang–en/index.htm. Accessed March 14, 2018.

McElmurry, B. J., K. Solheim, R. Kishi, M. A. Coffia, W. Woith, and P. Janepanish. 2006. "Ethical Concerns in Nurse Migration." *Journal of Professional Nursing* 22 (4): 226–35.

McKay, Steven C. 2007. "Filipino Sea Men: Constructing Masculinities in an Ethnic Labour Niche." *Journal of Ethnic and Migration Studies* 33 (4): 617–33.

Nyberg–Sørensen, Ninna, Nicholas Van Hear, and Poul Engberg–Pedersen. 2002. "The Migration–Development Nexus: Evidence and Policy Options." *International Migration* 40 (5): 49–73.

Opiniano, Jeremaiah M. 2005. "Filipinos Doing Diaspora Philanthropy: The Development Potential of Transnational Migration." *Asian and Pacific Migration Journal* 14 (1–2): 225–41.

Ortiga, Yasmin Y. 2014. "Professional Problems: The Burden of Producing the 'Global' Filipino Nurse." *Social Science & Medicine* 115: 64–71.

——— 2017. "The Flexible University: Higher Education and the Global Production of Migrant Labor." *British Journal of Sociology of Education* 38 (4): 485–99.

——— 2018. *Emigration, Employability and Higher Education in the Philippines*, Abingdon, Oxon: Routledge.

Ortiga, Yasmin Y., and Romeo Luis A. Macabasag. 2020a. "Temporality and Acquiescent Immobility among Aspiring Nurse Migrants in the Philippines." *Journal of Ethnic and Migration Studies* 1–18.

———. 2020b. "Understanding International Immobility through Internal Migration: 'Left behind' Nurses in the Philippines." *International Migration Review* 1–22.

Ortiga, Yasmin Y., and Jenica Ana Rivero. 2019. "Bodies of Work: Skilling at the Bottom of the Global Nursing Care Chain." *Globalizations* 16 (7): 1184–97.

Ostergaard-Nielsen, Eva. 2010. International Migration and Sending Countries: Key Issues and Themes, *Migration: Critical Concepts in the Social Sciences, Policies, ed. Steven Vertovec*, Abingdon, Oxon and New York, NY: Routledge, 59–82.

Page, John, and Sonia Plaza. 2006. "Migration Remittances and Development: A Review of Global Evidence." *Journal of African Economies* 15 (suppl 2): 245–336.

Peprah, James Atta, Isaac Kwesi Ofori, and Abel Nyarko Asomani. 2019. "Financial Development, Remittances and Economic Growth: A Threshold Analysis." *Cogent Economics & Finance* 7 (1) 1625107.

Piper, Nicola. 2009. "The Complex Interconnections of the Migration–Development Nexus: A Social Perspective." *Population, Space and Place* 15 (2): 93–101.

Pratt, Geraldine, Caleb Johnston, and Vanessa Banta. 2017. "Lifetimes of Disposability and Surplus Entrepreneurs in Bagong Barrio, Manila." *Antipode* 49 (1): 169–92.

Raghuram, Parvati. 2009. "Which Migration, What Development? Unsettling the Edifice of Migration and Development." *Population, Space and Place* 15 (2): 103–17.

Relos, Gel S. 2014. "A Tribute to Filipino Nurses All over the World." *Asian Journal.* http://asianjournal.com/editorial/a-tribute-to-filipino-nurses-all-over-the-world/. Accessed April 6, 2015.

Rodriguez, Edgard R. 1996. "International Migrants' Remittances in the Philippines." *The Canadian Journal of Economics/Revue canadienne d'Economique* 29: S427–32.

Rodriguez, Robyn M. 2010. *Migrants for Export: How the Philippine State Brokers Labor to the World*, Minneapolis, MN: University of Minnesota Press.

Ruhs, Martin. 2006. "The Potential of Temporary Migration Programmes in Future International Migration Policy." *International Labour Review* 145 (1–2): 7–36.

Saxenian, Annalee. 2002. "Transnational Communities and the Evolution of Global Production Networks: The Cases of Taiwan, China and India." *Industry and Innovation* 9 (3): 183–202.

Schutt, Russell. 2006. *Investigating the Social World with SPSS Student Version 14.0: The Process and Practice of Research*, Thousand Oaks, CA: Pine Forge Press.

Siddique, Abu E., A. Selvanathan, and Saroja Selvanathan. 2012. "Remittances and Economic Growth: Empirical Evidence from Bangladesh, India and Sri Lanka." *Journal of Development Studies* 48 (8): 1045–62.

Skeldon, Ronald. 2008. "International Migration as a Tool in Development Policy: A Passing Phase?" *Population and Development Review* 34 (1): 1–18.

———. 2009. "Of Skilled Migration, Brain Drains and Policy Responses." *International Migration* 47 (4): 3–29.

———. 2014. *Migration and Development: A Global Perspective*, New York: Routledge.

Spiegel, Allen D., and Herbert H. Hyman. 1991. *Strategic Health Planning: Methods and Techniques Applied to Marketing and Management*, Norwood, NJ: Greenwood Publishing Group.

Thompson, Maddy, and Margaret Walton-Roberts. 2019. "International Nurse Migration from India and the Philippines: The Challenge of Meeting the Sustainable Development Goals in Training, Orderly Migration and Healthcare Worker Retention." *Journal of Ethnic and Migration Studies* 45 (14): 2583–99.

Yeates, Nicola. 2009a. *Globalizing Care Economies and Migrant Workers*, Basingstoke: Palgrave Macmillan.

———. 2009b. "Production for Export: The Role of the State in the Development and Operation of Global Care Chains." *Population, Space and Place* 15 (2): 175–87.

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The COVID-19 pandemic: Stay Home policy and exposure to risks of infection among Nigerians

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Abstract

The global threat which continues to accompany SARS-CoV-2 has led to a global response which adopts lockdown and stays home policy as means of curtailing its spread. This study investigates compliance with the Stay Home policy and exposure to COVID-19 in Nigeria. A survey was conducted from April 4 to May 8, 2020 using a cross-sectional mixed-methods approach to elicit responses from 879 participants across six geopolitical zones of Nigeria. Descriptive, χ^2, and multiple regression tests were used to analyze survey data using SPSS, whereas NVivo v12 was used for thematic analysis of qualitative data. States with complete lockdown had 72.4% of respondents complying fully with the policy compared with 44.2% of respondents in zones with the partial lockdown. Market places, classified as high-risk zones, were the most visited ($n = 505$; 71.0%). Though compliance was influenced by the nature of lockdown enforced ($\chi^2 = 70.385$, $df = 2$; $p < 0.05$), being a female, a widow, and unemployed were associated with increased compliance. Exposure to COVID-19 was associated with being married, unemployed, and having no income. Fear, anxiety, and misperception play major roles in compliance. The authors conclude that compliance is not uniform and a more nuanced and targeted approach is required as the government continues to respond to the COVID-19 global pandemic.

Key Points

- Exposure to risk of COVID-19 infection was conditioned by social and economic realities.

- The nature of lockdown (partial or complete) influenced compliance with stay Home Policy.
- Visits among family members was higher in areas with complete lockdown compared to area with partial lockdown.
- Places classified as high-risk zones (market and religious centres) were the most patronised.
- Fear, anxiety and misperception play significant roles in compliance with Stay Home Policy.

KEYWORDS
COVID-19, Nigeria, stay at home

INTRODUCTION

The year 2020 began with a complex public health emergency – the outbreak and spread of a novel SARS-CoV-2 – the COVID-19 pandemic. The pandemic created a global health crisis (Coronavirus disease [COVID-19]—World Health Organization, https://www.who.int/emergencies/diseases/novel-coronavirus-2019), with no cure or potential remedies and therapies available at present (Rismanbaf, 2020). Since its outbreak, COVID-19 has spread to over 200 countries (Coronavirus disease [COVID-19]—World Health Organization, https://www.who.int/emergencies/diseases/novel-coronavirus-2019). In Africa, the first case of COVID-19 was confirmed on February 14, 2020, in Egypt (Shigemura et al., 2020). Two weeks after the case in Egypt, sub-Saharan Africa confirmed its first case in Nigeria on February 27, 2020 (Adegboye et al., 2020; Adepoju, 2020). Given its impact on the health and economies of developed countries, there was anxiety about the potential consequences the pandemic could have on Africa, owing to the level of poverty and poor health infrastructure in the continent (Nkengasong & Mankoula, 2020). Nigeria, with a population of about 200 million people ranked 158 out of 189 in the global development index (National Bureau of Statistics, 2017; UNDP "Human Development Reports," https://hdr.undp.org/en/countries/profiles/NGA). The health system has been in a prolonged crisis resulting from a massive export of its health professionals to Europe, Canada, and America, poor welfare, lack of appropriate infrastructure, inadequate doctor-patient ratio, and a meager budgetary allocation (Adeloye et al., 2017; Imafidon, 2018; https://yourbudgit.com/wp-content/uploads/2018/04/Nigeria-Health-Budget-Analysis.pdf; Omoleke & Taleat, 2017). As such, there was great concern regarding Nigeria's capacity to contain the epidemic owing to its weak health system (Adepoju, 2020; Ebenso & Otu, 2020).

On March 30, 2020, 4 weeks after the first case was confirmed in Nigerian, the government signed a nationwide COVID-19 Regulations which declared COVID-19 a dangerous infectious disease. Consequently, a 2-week complete lockdown on Lagos and Ogun States as well as the Federal Capital Territory (FCT) was effected (Kalu, 2020). Following a risk assessment at the expiration of the 2 weeks, the lockdown was extended by another 2 weeks with Kano State added to the list of states for complete lockdown. The lockdown was patterned after the ones implemented across multiple countries in Europe and America to curtail the spread of COVID-19, despite reservations of likely effectiveness in the context of low-income countries (Barnett-Howell & Mushfiq Mobarak, 2020). Strict measures, which included the use of law enforcement agents, were introduced and enforced. Governments at the state level also imposed partial lockdown in the form of a dusk to dawn curfew. Lockdown regulations included travel restrictions; either by air or road (including interstate border closure), closure of all schools as well as markets and recreational centers.

However, businesses considered as essential services such as those providing health-related and essential services, manufacturing and distribution companies, as well as commercial establishments involved in food processing, distribution/retail companies, power generation, transmission, and distribution companies and private security companies were exempted from the lockdown (Adeloye et al., 2017). Though the regulations affected the consumption of nonessential commodities such as hospitality business, fabrics, sports, and electronics, they also negatively affected the income-generating capacity of individuals, families, and groups (Lewnard & Lo, 2020). Though the "Stay Home" policy sought to reduce human physical contact thereby decreasing and ending disease transmission, it created a financial challenge in a society where the majority of its citizens are entrepreneurs (Qiu et al., 2017).

At the commencement of the lockdown and Stay Home policy on March 30, 2020, a cumulative total of 131 confirmed cases were initially reported in two states of Nigeria (Lagos and Ogun) and the Federal Capital Territory, and on April 11, Kano States recorded its index case (Iboi et al., 2020). However, 4 weeks into the lockdown, 33 states and the FCT had reported 1,532 confirmed cases. The infection had spread to nearly all states of the country. The demographics of patients with COVID-19 indicated that 14% of COVID-19 cases had travel history, 28% had contact with an infected person and 49% of patients had no epidemiological link. Also, more males (66%) tested positive for COVID-19 (Nigeria Centre for Disease Control, https://ncdc.gov.ng/diseases/sitreps/?cat=14%26name%3DAn%20update%20of%20COVID-19%20outbreak%20in%20Nigeria). Though many studies have been devoted to understanding the epidemiology of COVID-19 and the social response in terms of social and physical distancing, hand washing, and the psychological impact of COVID-19 on people (Bedford et al., 2020; Desai & Aronoff, 2020; Shigemura et al., 2020), no empirical evidence has been presented on compliance with the Stay Home policy and the risks of COVID-19 infection in Nigeria. This study addresses this gap in the evidence by providing evidence for understanding the patterns of compliance with the Stay Home policy and the likely ways in which people are exposed to the risk of contracting COVID-19.

MATERIALS AND METHODS

We conducted a cross-sectional online mixed-methods study which combined a self-completed online survey using WhatsApp, Twitter, and Facebook with an in-depth interview of purposively selected participants, conducted by mobile phone, to investigate emergent issues around patterns of compliance and exposure to the risk of contracting COVID-19. The survey was administered to respondents aged 18 and above across the six geopolitical zones of Nigeria using a link created on Google Forms. The survey instrument contained closed and opened-ended questions on sociodemographic characteristics of respondents, compliance to government policy, and movement around risk zones. Study instrument validation was conducted by a pretest with purposively selected individuals based on sex (four males, two females) who resided in the northern and southern parts of Nigeria.

SAMPLING AND SAMPLE SIZE

The survey was administered over a 5-week period from April 4 to May 8, 2020. Because the lockdown did not permit face-to-face interviews, the online survey and telephone interview strategies were adopted for the research.

Six research assistants (RAs) were recruited to broadcast the survey link on social media across the six geopolitical zones. The survey link was also shared among authors (David O. Akeju [DOA], Samuel O. Adejoh [SOA], Bassey Ebenso [BE], and Ayoola J. Fakunmoju [AJF]) and RAs

who thereafter shared on WhatsApp, Facebook, and Twitter tagging colleagues and friends. To encourage wider public interest and participation in the research, colleagues and friends to the research team were instructed to share the link to the survey with their friends on social media. The qualitative data collection process involved the use of in-depth interviews (IDIs) to elicit information through in-depth engagement with respondents across six geopolitical zones. A sample size of 20 IDIs was considered to be sufficient for exploring perceptions and the Stay Home policy and respondents' experiences of lockdown measures. Using a quota sampling technique, three to four IDIs were conducted from each geopolitical zone. Interviews were discontinued after 22 IDIs were conducted as no new themes emerged from interviews.

MEASUREMENT

Compliance was measured by whether people stayed home fully, partially, or did not stay home at all. It was also measured by whether they received guests or visited anyone during the lockdown. Our measurement of risk was informed by the guideline which restricted human interaction to between 10 and 20 people within a group (https://gloepid.org; The New York Times, 2020). As such, we categorized risk zones as places where more than 10 people are concentrated and interacted with each other. We classified places such as markets or shopping malls; churches or mosques; hospital or clinic; work/office, and parties as *high-risk zones*. The low-risk zone included visits to friends or family, and walking or exercise. Complete lockdown was defined as total restrictions of movements, whereas partial lockdown was defined as either a dusk to dawn curfew or a total restriction of movement to specific days of the week.

DATA ANALYSIS

Quantitative data were exported from Google Forms and processed (DOA) using the Statistical Package for Social Sciences (SPSS) version 22. Open-ended responses in the Google Forms were recoded into numeric data, whereas some close-ended responses, for example, places where people visited during the lockdown, were recategorized into high- or low-risk zones. Descriptive analysis was conducted using simple frequency distribution tables and the χ^2 and multiple regression tests were used to understand socioeconomic factors associated with compliance and exposure to risks of COVID-19 infections. Qualitative data were transcribed verbatim (AJF) and nodes were mutually created inductively and deductively by two members (DOA and SOA) of the research team. Qualitative data were analyzed (SOA) adopting thematic analysis (Braun & Clarke, 2006) and a computer-assisted analysis procedure using NVivo version 12 to code and classify responses in line with relevant themes.

CONSENT AND ETHICAL APPROVAL

The survey exposed no participants to physical risks, although it was not known whether they themselves or family and friends had contracted COVID-19. No other ethical issues or harms were anticipated. An overview of the survey content was provided alongside details for individuals to consent to participation. Stored questionnaire responses were anonymized, and data were stored securely in Google Forms until the survey duration was completed. Ethical approval was granted from the University of Lagos Teaching Hospital ethical review board (UTHHREC/EREV/0420/08).

RESULTS

Descriptive data

Eight hundred and eighty-three ($n = 883$) respondents participated in the survey. Of this, four respondents outside Nigeria (three from the United Kingdom and one from the United States) participated in the survey. These were excluded from the analysis to give a total of 879 respondents. In terms of geographical spread, average participation was 12.8% across five geopolitical zones (Northeast: $n = 106$, 12.1%), Northcentral: $n = 122$, 13.9%), Northwest $n = 117$, 13.3%), Southeast: $n = 102$; 11.6%), Southsouth $n = 114$, 13.0%) except in the Southwest zone where participation was higher ($n = 318$, 36.2%). There were more male respondents (53.4%) than females. The mean age was 33.11 ($SD = 8.3$). Age range of respondents was 18–65 years, the majority were single ($n = 431$; 49.0%) or married ($n = 425$; 48.4%), and employed ($n = 578$; 65.8%). Most respondents had tertiary education ($n = 850$; 96.7%) and were living in urban areas ($n = 782$; 89.0%). About half ($n = 463$; 52.7%) of respondents earned regular monthly income.

Patterns of compliance with Stay Home policy

Results in Table 1 show that more respondents ($n = 281$; 72.4%) within complete lockdown zones complied fully with the Stay Home policy relative to zones with partial lockdown ($n = 217$; 44.2%). Compliance in complete and partial lockdown zones was statistically significant ($\chi^2 = 70.385$, $df = 2$; $p < 0.05$), with most respondents ($n = 776$; 88.3%) agreeing it was an effective means to curtailing the spread of COVID-19. Movement across the two zones was statistically significant ($\chi^2 = 52.254$; $df = 1$; $p < 0.05$) and there were more movement in partial lockdown zones ($n = 272$; 70.1%) compared to the proportion who did so in complete lockdown zone ($n = 439$; 89.4%). Similarly, reception for guests was statistically significant ($\chi^2 = 4.612$; $df = 1$; $p < 0.05$) as it was more common in partial lockdown zones ($n = 178$; 36.3%) compared to those in complete lockdown zones ($n = 114$; 29.4%). The itinerary of those who did not comply with the lockdown ($n = 711$; 80.9%) indicates that market places were the most visited ($n = 505$; 71.0%), with a high proportion of people in partial lockdown zones visiting markets ($n = 320$; 72.9%) and a little less proportion doing so in complete lockdown zones ($n = 185$; 68.0%). Places visited by respondents differed significantly by type of lockdown ($\chi^2 = 26.969$; $df = 6$; $p < 0.05$) as people in complete lockdown zones visited friends and families more ($n = 44$; 16.25%) compared to those who did so in partial lockdown zones ($n = 37$; 8.45%).

In terms of visitation to high- and low-risk zones by those who did not comply with lockdown measures, data suggests the majority ($n = 613$; 86.2%) visited high-risk zones. When disaggregated by clusters, results show visitation to risk zones was statistically significant ($\chi^2 = 15.361$; $df = 1$; $p < 0.05$) by lockdown—more people in partial lockdown areas interacted within high-risk zones ($n = 396$; 90.2%) compared to those who did so ($n = 217$; 79.8%) in complete lockdown zones.

Socioeconomic factors influencing compliance and movement around risk zone

Results in Table 2 show that being a female ($\beta = 0.210$; $t = 6.372$; $p < 0.005$; $R^2 = 0.044$), a widow ($\beta = 0.080$; $t = 2.379$; $p < 0.005$; $R^2 = 0.009$), unemployed ($\beta = 0.140$; $t = 4.108$; $p < 0.005$; $R^2 = 0.024$) or housewife ($\beta = 0.079$; $t = 2.359$; $p < 0.05$; $R^2 = 0.024$) and having random income ($\beta = 0.128$; $t = 3.649$; $p < 0.005$; $R^2 = 0.018$), daily income ($\beta = 0.076$; $t = 2.199$; $p < 0.005$;

TABLE 1 A contingency table showing compliance with Stay Home policy and exposure to risks by nature of lockdown

Compliance and exposure to risk	Nature of lockdown		
	Partial lockdown, *n* (%)	Complete lockdown, *n* (%)	Total, *n* (%)
Compliance with stay at home policy			
Proportion that complied fully	217 (44.2)	281 (72.4)	498 (56.7)
Proportion that complied partially	188 (38.3)	75 (19.3)	263 (29.9)
Proportion that did not comply	86 (17.5)	32 (8.2)	118 (13.4)
Total	491 (100.0)	388 (100.0)	879 (100.0)
$\chi^2 = 70.385$; $df = 2$; $p < 0.05$; likelihood = 71.974			
Perception of the effectiveness of staying home			
Effective in curtailing COVID-19	440 (89.6)	336 (86.6)	776 (88.3)
Not effective in curtailing COVID-19	51 (10.4)	52 (13.4)	103 (11.7)
Total	491 (100.0)	388 (100.0)	879 (100.0)
$\chi^2 = 1.905$; $df = 1$; $p > 0.05$; likelihood = 1.893			
Movement during lockdown/curfew			
Proportion who went out	439 (89.4)	272 (70.1)	711 (80.9)
Proportion who did not go out	52 (10.6)	116 (29.9)	168 (19.1)
Total	491 (100.0)	388 (100.0)	879 (100.0)
$\chi^2 = 52.254$; $df = 1$; $p < 0.05$; likelihood = 52.505			
Receiving guest during the lockdown/curfew			
Proportion who received guests	178 (36.3)	114 (29.4)	292 (33.2)
Proportion who did not receive guests	313 (63.7)	274 (70.6)	587 (66.8)
Total	491 (100.0)	388 (100.0)	879 (100.0)
$\chi^2 = 4.612$; $df = 1$; $p < 0.05$; likelihood = 4.638			
Places visited			
Market/shopping	320 (72.9)	185 (68.0)	505 (71.0)
Friends and families	37 (8.4)	44 (16.2)	81 (11.4)
Religious houses	38 (8.7)	10 (3.7)	48 (6.8)
Work	28 (6.4)	15 (5.5)	43 (6.0)
Hospital/clinic	5 (1.1)	7 (2.6)	12 (1.7)
Exercise	6 (1.4)	11 (4.0)	17 (2.4)
Party	5 (1.1)	0 (0.0)	5 (0.7)
Total	439 (100.0)	272 (100.0)	711 (100.0)
$\chi^2 = 26.969$; $df = 6$; $p < 0.05$; likelihood = 27.710			

TABLE 1 (Continued)

Compliance and exposure to risk	Nature of lockdown		Total, *n* (%)
	Partial lockdown, *n* (%)	Complete lockdown, *n* (%)	
Risk zones			
Visited high-risk zone	396 (90.2)	217 (79.8)	613 (86.2)
Visited low-risk zone	43 (9.8)	55 (20.2)	98 (13.8)
Total	439 (100.0)	272 (100.0)	711 (100.0)

$\chi^2 = 15.361$; $df = 1$; $p < 0.05$; likelihood = 14.918

$R^2 = 0.018$), or no income ($\beta = 0.053$; $t = 1.539$; $p < 0.005$; $R^2 = 0.018$), were statistically significant with compliance with Stay Home policy.

When exposure to risks was predicted, results from a logistic regression show that being married ($\beta = 0.92$; $t = 2.702$; $p < 0.05$; $R^2 = 0.011$), having secondary education ($\beta = -0.081$; $t = -2.397$; $p < 0.05$; $R^2 = 0.10$), being unemployed ($\beta = -0.185$; $t = -5.464$; $p < 0.05$; $R^2 = 0.041$), and being a student ($\beta = -0.122$; $t = -3.602$; $p < 0.05$; $R^2 = 0.041$), having random income ($\beta = -0.086$; $t = -2.452$; $p < 0.05$; $R^2 = 0.015$), or no income ($\beta = -0.143$; $t = -4.138$; $p < 0.05$; $R^2 = 0.015$) were statistically significant with movement around risk zones.

Qualitative findings

A total of 22 participants (male: $n = 9$; 40.9%, female: $n = 13$; 59.1%) across the six geo-political zones shared their experience about the Stay Home policy with an average of 3.7 participants per zone, a minimum of three and a maximum of five participants. The average age of participants was 39.7 with a Standard Deviation of 12.01. Majority of the participants ($n = 13$; 59.1%) had Diploma and graduate certificates, whereas $n = 9$ (40.9%) had secondary/primary education. A large proportion was married ($n = 14$; 63.6%), whereas about a third were single ($n = 7$; 31.8%).

Factors influencing compliance with Stay Home policy

Compliance was mediated by anxiety and fear among some segments of the study participants. The fear of being infected with COVID-19 increased compliance among educated people who had steady and regular income. There were some categories of people who did not comply because of their engagement in small-scale businesses which helps in meeting personal and family needs. Among this category, the Stay Home policy was compared to caging animals without feeding them. As one of the respondents puts it:

> So you have people flouting the lockdown rule and there is the other aspect of "We can't see COVID", we can't see it, some people can't even feel it when they are sick, but they can clearly feel hunger. So if they comply for a week, after a few days they are going to go out and look for what to eat because that's the clear danger they can see, every other thing we're talking about is abstract. So the lockdown is not necessarily wrong but maybe the way we are applying it or all the other things we were supposed to put in place prior now have not been put in place. (IDI_Female_Married_Professional_34years_Northcentral)

TABLE 2 A regression analysis of socioeconomic factors influencing compliance to Stay Home policy and movement within risk zone

Model	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	*β*	*t*	Significance
(Constant)	0.469	0.022		20.945	0.000
Female*	0.209	0.033	0.210	6.372	0.000
(Constant)	0.580	0.024		24.344	0.000
Married	−0.037	0.034	−0.037	−1.080	0.280
Separated	−0.080	0.177	−0.015	−0.454	0.650
Divorced	0.134	0.188	0.024	0.712	0.477
Widowed*	0.420	0.177	0.080	2.379	0.018
(Constant)	0.566	0.017		33.239	0.000
Secondary	0.045	0.118	0.013	0.383	0.702
No education	−0.020	0.151	−0.005	−0.136	0.892
(Constant)	0.519	0.020		25.426	0.000
Unemployed*	0.178	0.043	0.140	4.108	0.000
Student	0.064	0.049	0.045	1.306	0.192
Housewife*	0.293	0.124	0.079	2.359	0.019
(Constant)	0.505	0.023		22.092	0.000
Random Income*	0.138	0.038	0.128	3.649	0.000
Daily Income*	0.145	0.066	0.076	2.199	0.028
No Income	0.090	0.058	0.053	1.539	0.124
Exposure to risk					
(Constant)	0.712	0.021		33.554	0.000
Female	−0.032	0.031	−0.034	−1.019	0.309
(Constant)	0.659	0.022		29.865	0.000
Married*	0.085	0.031	0.092	2.702	0.007
Separated	−0.034	0.163	−0.007	−0.208	0.836
Divorced	−0.230	0.175	−0.045	−1.320	0.187
Widowed	−0.034	0.163	−0.007	−0.208	0.836
(Constant)	0.706	0.016		44.948	0.000
Secondary*	−0.261	0.109	−0.081	−2.397	0.017
No education	−0.251	0.139	−0.061	−1.809	0.071
(Constant)	0.763	0.019		40.671	0.000
Unemployed*	−0.218	0.040	−0.185	−5.464	0.000
Student*	−0.163	0.045	−0.122	−3.602	0.000

TABLE 2 (Continued)

Model	Unstandardized coefficients		Standardized coefficients		
	B	Standard error	*β*	*t*	Significance
Housewife	−0.138	0.114	−0.040	−1.207	0.228
(Constant)	0.747	0.021		35.310	0.000
Random Income*	−0.086	0.035	−0.086	−2.452	0.014
Daily Income	−0.033	0.061	−0.019	−0.540	0.589
No Income*	−0.223	0.054	−0.143	−4.138	0.000

*$p < 0.05$.

Among those who did not comply with Stay Home policy were people who doubted the reality of COVID-19 and those who believed it was a disease for only the rich. This was a prominent belief among those from lower socioeconomic groups.

> Really there is many people didn't believe with corona because this corona especially we here in the North it use to affect the big men. … But just in the urban area maybe mostly corona is affecting them, this is why in the village they didn't even believe with it up till tomorrow [There are many people in the north that do not believe there is corona virus since it is big men that are affected. It doesn't affect the villagers and farmers because the virus is only in the urban areas]. (IDI_Male_Artisan_41years_Northwest)

On the basis of these factors and perception, compliance with the Stay Home policy was generally low among a segment of the population across the geopolitical zones of the country, particular in states where there were partial lockdown or curfew. Policy guidelines also affected compliance in some ways. The rules guiding partial lockdown in some states allowed for people to move within specific days of the week which were opened for business or move between certain times of the day. These open days and time, although meant for engaging in essential services, were the loopholes exploited by people in partial lockdown zones to defy the Stay Home policy.

Exposure to risk

Qualitative data from both northern and southern zones show that one main point of convergence was the marketplace. Household needs constitute one of the most essential needs of man. For most people, the marketplace was the most important place to visit because of the need to replenish household stocks that have been exhausted. As revealed in the quote below, the market was usually congested:

> Even on Tuesday wey state government declare make everybody enter market, even by myself I experience it. Because the congestion of the people even to breathe, you cannot fit breathe because too much people. If you ask some people they will say no it is a lie, nothing like COVID-19 [People sometimes are nonchalant, for instance, the state government said every Tuesday we can go to the market, the place is always too congested such that one is unable to breathe, because people believe there is nothing like COVID-19]. (IDI_Male_Married_Artisan_50years_Northwest)

A similar scenario played out in the southern part of the country where the need to trade compelled people to visit market places. Respondents reported that sustaining the family was crucial as support was not coming from the government.

> Some people no fit obey the order to stay at home because they need money. Like me now, I come sell my palm oil and garri that is why I came out, if government want make we dey house, make them give us money as Buhari dey give their people for North [I came out to sell my palm oil and garri, if the government wants us to stay at home they should give us money]. (IDI_Female_Widowed_Artisan_59years_Southeast)

Data revealed that the frequency of visit to the market, particularly for those in higher socio-economic groups, was influenced by poor electricity supply. Power supply was generally poor. Buying and storing food items beyond 1 week was impossible. This would result in patronizing the market places very frequently and regularly among people with regular income.

> I cannot go to the market and say I'm shopping for 2 months because it will get spoilt. So I have to go to the market every week or every 2 weeks to buy the little quantity of food that I think will not get spoilt in the house due to lack of electricity. So with things like that, we can't apply the lockdown full scale the way civilized countries are applying the lockdown. (IDI_Female_Married_Professional_34years_Northcentral)

DISCUSSION

This study investigated the extent of compliance with the Stay Home policy and exposure to risks of COVID-19 infection among Nigerians. Findings from the study demonstrate lockdown and Stay Home policy as a potentially effective strategy for curtailing the spread of the COVID-19 pandemic. It highlights the importance of adapting global ideas to suit local realities (Block et al., 2020; Kuiper et al., 2020). Though compliance with the Stay Home policy was generally high across partial and complete lockdown areas, few recorded cases of non-compliance were significant enough to increase exposure to COVID-19 infection (Kuiper et al., 2020). This suggests that compliance with the Stay Home policy was not uniform. Market places were major points of interaction and economic exchange for purchasing to meet essential household or personal needs. Though such action is deemed to be compliant with lockdown and Stay Home policy—since some essential services, such as those involved in food farming and processing were not exempted from operating—movement around market places impedes the practice of physical distancing and increases the risk of exposure to COVID-19 (GloEpid, https://gloepid.org; https://covid19.ncdc.gov.ng/faq/). Market stalls in many places are structurally compromised and usually overcrowded in addition to the fact that monetary exchange represents a viable means of transmitting COVID-19 into homes and subsequently the community (Angelakis et al., 2014; Kampf et al., 2020).

The implementation of the lockdown and Stay Home policy occurred without efforts to accommodate likely social, economic, structural, and cultural factors as compared to more nuanced lockdown approaches implemented in, for example, the Netherlands where remarkably high compliance was recorded (Kuiper et al., 2020). This is thought to be linked to first determining social behavioral patterns that reinforce compliance to plan and implement effective physical distancing and Stay Home policy (Kuiper et al., 2020). In this study, visits to family members and friends during the lockdown underscores the social nature of man and the value attached to care and support from families and friends. The lockdown and

Stay Home policy were abrupt. It weakened existing social dynamics, cohesion, and family ties which people were not prepared to compromise. An understanding of these realities may help to inform the design and implementation of more effective lockdown and physical distancing policies following the identification of key behavioral patterns that reinforce compliance and limit interaction (Block et al., 2020; Kuiper et al., 2020). This would have formed part of a local strategy that adopts the enforcement of guidelines around identified behavioral patterns and risk zones such as market places. Though previous research highlights the influence of conspiracy beliefs in shaping compliance with Stay Home policies (Allington & Dhavan, 2020), our study highlights these beliefs exist amidst other factors.

LIMITATIONS

Only people with mobile phones and other digital mobile technology participated in the survey. This may cause a bias in responses skewed towards the middle- and upper-class population or those in urban centers who had access to the internet and social media applications. There were no measures in place to monitor the age of respondents. The study focuses mainly on people's compliance with the Stay Home policy and did not consider other regulations associated with physical distancing such as hand-washing and the use of sanitizers or nose masks.

CONCLUSIONS

Compliance with the Stay Home policy is not uniform across the geopolitical zones in Nigeria. More nuanced and targeted approaches are required as the government continues to respond to the COVID-19 global pandemic. Policymakers are yet to fully understand factors influencing compliance with full and partial lockdown policy and as such planning and design of policy frameworks that can effectively attract compliance is elusive.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

ETHICS STATEMENT

Ethical approval was granted from the University of Lagos Teaching Hospital Ethical Review Board (UTHHREC/EREV/0420/08).

AUTHOR CONTRIBUTIONS

David O. Akeju conceptualized the study. David O. Akeju, Samuel O. Adejoh, Ayoola J. Fakunmoju, and Titilayo Tade designed the instruments used in the study. David O. Akeju, Samuel O. Adejoh, Bassey Ebenso, and Babasola O. Okusanya oversaw the implementation of the whole study. David O. Akeju and Samuel O. Adejoh collected qualitative data. David O. Akeju and Matthew J. Allsop conducted quantitative data analysis, David O. Akeju, Samuel O. Adejoh, and Ayoola J. Fakunmoju conducted data analysis. David O. Akeju wrote and the manuscript and all authors revised the manuscript.

DATA AVAILABILITY STATEMENT

The data collected and analyzed during the current study are available from the corresponding author, upon request.

REFERENCES

Adegboye, O. A., Adeshina, I. A., & Gayawan, E. (2020). Early transmission dynamics of Novel Coronavirus (COVID-19) in Nigeria. *International Journal of Environmental Research and Public Health*, *17*(9), 3054.

Adeloye, D., David, R. A., Olaogun, A. A., Auta, A., Adesokan, A., Gadanya, M., Opele, J. K., Owagbemi, O., & Iseolorunkanmi, A. (2017). Health workforce and governance: The crisis in Nigeria. *Human Resources for Health*, *15*, 32.

Adepoju, P. (2020). Nigeria responds to COVID-19; First case detected in sub-Saharan Africa. *Nature Medicine*, *26*(4), 444–448.

Allington, D., & Dhavan, N. (2020). *The relationship between conspiracy beliefs and compliance with public health guidance with regard to COVID-19*. Centre for Countering Digital Hate.

Angelakis, E., Azhar, E. I., Bibi, F., Yasir, M., Al-Ghamdi, A. K., Ashshi, A. M., Elshemi, A. G., & Raoult, D. (2014). Paper money and coins as potential vectors of transmissible disease. *Future Microbiology*, *9*(2), 249–261.

Barnett-Howell, Z., & Mushfiq Mobarak, A. (2020). *Should low-income countries impose the same social distancing guidelines as Europe and North America to halt the spread of COVID-19?* Yale School of Management, Yale University. https://yrise.yale.edu; https://som.yale.edu/should-low-income-countries-impose-the-same-social-distancing-guidelines-as-europe-and-north-america-to-halt-the-spread-of-covid-19

Bedford, J., Enria, D., Giesecke, J., Heymann, D. L., Ihekweazu, C., Kobinger, G., Lane, H. C., Memish, Z., Oh, M., Sall, A. A., Schuchat, A., Ungchusak, K., & Wieler, L. H. (2020). COVID-19: Towards controlling of a pandemic. *Lancet (London, England)*, *395*(10229), 1015–1018.

Block, P., Hoffman, M., Raabe, I. J., Dowd, J. B., Rahal, C., Kashyap, R., & Mills, M. C. (2020). Social network-based distancing strategies to flatten the COVID-19 curve in a post-lockdown world. *Nature Human Behaviour*, *4*(6), 588–596.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Desai, A. N., & Aronoff, D. M. (2020). Masks and Coronavirus Disease 2019 (COVID-19). *JAMA*, *323*(20), 2103.

Ebenso, B., & Otu, A. (2020). Can Nigeria contain the COVID-19 outbreak using lessons from recent epidemics? *The Lancet Global Health*, *8*(6), e770. https://linkinghub.elsevier.com/retrieve/pii/S2214109X20301017

Iboi, E., Sharomi, O. O., Ngonghala, C., & Gumel, A. B. (2020). Mathematical modeling and analysis of COVID-19 pandemic in Nigeria. *Mathematical Biosciences and Engineering*, *17*(6), 7192–7220.

Imafidon, J. (2018). *One-way traffic: Nigeria's medical brain drain. A challenge for maternal health and public health system in Nigeria?* (Masters Thesis). University of California, Los Angeles, CA. https://escholarship.org/uc/item/5q36r5xq

Kalu, B. (2020). COVID-19 in Nigeria: A disease of hunger. *The Lancet Respiratory Medicine*, *8*(6), 556–557.

Kampf, G., Todt, D., Pfaender, S., & Steinmann, E. (2020). Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, *104*(3), 246–251.

Kuiper, M. E., de Bruijn, A. L., Folmer, C. R., Olthuis, E., Brownlee, M., Kooistra, E. B., Fine, A., & van Rooij, B. (2020). *The intelligent lockdown: Compliance with COVID-19 mitigation measures in the Netherlands* (No. 2020-20). Amsterdam Law School Legal Studies Research Paper.

Lewnard, J. A., & Lo, N. C. (2020). Scientific and ethical basis for social-distancing interventions against COVID-19. *The Lancet Infectious Diseases*, *20*(6), 631–633.

National Bureau of Statistics. (2017). Demographic statistics bulletin.

Nkengasong, J. N., & Mankoula, W. (2020). Looming threat of COVID-19 infection in Africa: Act collectively, and fast. *Lancet (London, England)*, *395*(10227), 841–842.

Omoleke, I. I., & Taleat, B. A. (2017). Contemporary issues and challenges of health sector in Nigeria. *Research Journal of Health Sciences*, *5*(4), 210–216. https://www.ajol.info/index.php/rejhs/article/view/165775

Qiu, W., Rutherford, S., Mao, A., & Chu, C. (2017). The pandemic and its impacts. *Health, Culture and Society*, *9*, 1–11. https://hcs.pitt.edu/ojs/index.php/hcs/article/view/221

Rismanbaf, A. (2020). Potential treatments for COVID-19; a narrative literature review. *Archives of Academic Emergency Medicine*, *8*(1), e29. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7085862/

Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the Novel 2019 Coronavirus (2019-NCoV) in Japan: Mental health consequences and target populations. *Psychiatry and Clinical Neurosciences*, *74*(4), 281–282.

The New York Times. (2020, March 16). Gatherings should be limited to 10 people, Trump Says. https://www.nytimes.com/2020/03/16/world/live-coronavirus-news-updates.html

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Mixed signals: The inadequacy of provider-per-enrollee ratios for assessing network adequacy in California (and elsewhere)

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Abstract

Health insurance regulators often set minimum ratios of provider = per-enrollee for health insurance plans to try to ensure that their provider networks offer enrollees adequate access to medical care. However, plan-specific ratios only have an unambiguous interpretation when each provider participates in only one single network. Based on network data, we show that endocrinologists, obstetrician–gynecologists, cardiologists, and pediatricians in California participate on average in 64, 66, 72, and 63 networks, respectively. Such high participation rates in networks make provider-per-enrollee ratios measured at the plan level meaningless as metrics for access. We recommend that plan-specific ratios be abandoned in favor of a more qualitative approach with strong dispute resolution protections as well as "police patrols" (e.g., regulator surveys to assess waiting times for appointments) and "fire alarms" (e.g., investing resources in consumer advocate organizations).

KEYWORDS

access to care, provider networks, regulation

Key points

- Provider-to-enrollee ratios are one of several tools used by regulators to ensure adequate networks for consumers.
- These ratios are only meaningful indicators of network adequacy in very rare circumstances.
- Reliance on these ratios thus does little to ensure access to medical care for consumers.
- Qualitative standards with strong dispute resolution protections, consumer empowerment, and regulatory oversight may provide better protections.

INTRODUCTION

The growing literature assessing the narrowness of provider networks (E. J. Brown et al., 2016; Feyman et al., 2019; Haeder et al., 2015a, 2015b; Jacobson et al., 2017; Polsky et al., 2016) and the frequency and sources of surprise medical billing have brought to the fore the growing concerns about network adequacy and its impact on patient access (Haeder et al., 2019c) and quality of care (Haeder, 2019a; Haeder et al. 2020a). To be sure, regulators have employed a variety of tools to ensure that networks provide adequate access for consumers (Hall & Ginsburg, 2017). One commonly employed regulatory approach is the specification of minimum provider-to-enrollee ratios. That is, insurance carriers must include a minimum number of providers for a specified number of enrollees to be allowed to sell their products to consumers. In many ways, these ratios are considered the "gold standard" when it comes to regulating network adequacy because they establish a hard, quantitative indicator that, at least in theory, can be easily assessed. But do minimum provider-to-enrollee ratios really guarantee consumer access? That is, are ratios really meaningful indicators of network adequacy?

To answer this question, we utilize data on provider networks in California for individual, small group, and Medicare Advantage plans, as well as most networks for mid-large groups, to assess the number of networks in which individual providers participate. Specifically, we assess network participation by endocrinologists, obstetrician–gynecologists (OBGYNs), cardiologists, and pediatricians. We selected these specialties because they have been subject to a number of network-focused studies (Haeder, 2019a, 2019b, 2020b; Haeder et al., 2015a, 2016, 2019a, 2020a) and because they have seen considerable regulatory attention by state regulators (California Department of Managed Health Care, 2021). To provide further nuance, we also analyze potential differences in network participation based on the degree of rurality of the provider. Based on our findings, we conclude by offering a more meaningful alternative for ensuring adequate consumer access to medical care.

REGULATING PROVIDER NETWORKS AND THEIR ADEQUACY

The U.S. health care system has long struggled with high and increasing costs (Reinhardt, 2019). Insurers have responded to this challenge with a variety of approaches. One of the major arrows in their quiver has been the establishment of provider networks, that is, restricting the choice of consumers by selectively contracting with a subset of available providers to obtain discounted prices. To be sure, less choice has benefited consumers in one important way: Lower premiums (Dafny et al., 2017; Polsky et al., 2016). However, narrowing networks to achieve lower premiums has not been gained without controversy. Indeed, in the 1990s, as restrictions grew more extensive and became more common, Americans became increasingly frustrated in accessing physicians of choice, fueling a backlash against the managed care revolution (White, 1999). Questions of network adequacy have returned to the broader health policy discussion with the establishment of the Affordable Care Act's (ACA's) insurance marketplaces (Corlette et al., 2015; Haeder et al., 2015b, 2015a; Polsky & Weiner, 2015) as well as the growing enrollment in Medicare Advantage (Haeder, 2019a, 2019b; Jacobson et al., 2019). Yet, these issues of inadequacy arise in all insurance markets (Corlette et al., 2014). The focus on provider networks is particularly important because the insurance market reforms of the ACA have left provider networks as one of the few remaining tools for insurers to contain costs.

To reign in overly restrictive networks created by insurers, regulators at the state and federal levels have long sought to ensure an adequate supply of providers for consumers

(V. Y. Brown & Hartung, 1998; Holahan et al., 1998). Of course, the concept of "network adequacy" is inherently vague and more empirical work is needed to assess the effect of provider networks on health outcomes (Haeder et al., 2019b). Nonetheless, state and federal governments became active in this field in response to the 1990s consumer backlash to the expansion of managed care (Miller, 1997). Regulatory approaches have varied. At the most radical end of the spectrum, some states have sought to counteract restrictive contracting by essentially breaking open provider networks via *Any-Willing-Provider* and *Freedom-of-Choice* laws to preserve consumer choice (Corlette et al., 2014).

Yet many more have come to accept limitations on consumers' choices and have instead moved to provide guideposts for insurers. Broadly speaking, these network adequacy regulations come in two forms. Many regulators have employed qualitative standards that rely on wording like "adequate," "reasonable," and "sufficient" without specifying an exact definition (Hall & Brandt, 2017; U.S. Government Accountability Office, 2015). Others have increasingly favored explicitly quantitative metrics. These regulations, in turn, fall into four broad categories (Lipson et al., 2017). First, some regulators have set standards that require that providers be within a certain distance from enrollees either measured in driving time or mileage. These time-and-distance standards, also included as part of the recent VA MISSION Act (U.S. Department of Veterans Affairs, 2019), seek to ensure geographic access by forcing insurers to offer a geographically decentralized network of providers (Lipson et al., 2017). Second, some standards have focused on timely access by imposing certain maximum wait times for scheduling emergency and routine appointments. Third, some regulators have been concerned with providing equitable access to medical care by requiring certain accommodations, like access to translators or culturally competent providers. Yet others specify the number of providers insurers have to include in their networks through provider-to-enrollee ratios (Jones & Lewin, 1996; Rosenbaum et al., 1997). Regulators have sometimes employed multiple standards from multiple categories by establishing hybrid standards. All in all, it is worth noting that these standards vary widely across regulatory programs and appear to lack any empirical grounding (Brodsky et al., 2015; Haeder et al., 2019b; Murrin, 2014). Importantly, as a large number of recent articles on these regulatory instruments show, they seem to be rather ineffective in many cases (see Haeder, 2020a).

THE PROBLEMS WITH PROVIDER-TO-ENROLLEE RATIOS

The aforementioned provider-to-enrollee ratios, the number of providers that insurers must include in their network per beneficiary, is one commonly employed standard. Such standards emerged in the 1990s and they have become increasingly popular (Jones & Lewin, 1996; Rosenbaum et al., 1997). Indeed, the National Association of Insurance Commissioners specifically recommends these ratios in their most recent model act for provider networks[1]. Not surprisingly, a number of regulators have integrated ratios into their regulatory assessment of insurance coverage, including for several of the ACA marketplaces (Corlette et al., 2015), in 20 of the 33 states with risk-based Medicaid managed care program (Office of the Inspector General, 2014b), and, perhaps most prominently, by the Centers for Medicare & Medicaid Services for Medicare Advantage plans (Centers for Medicare & Medicaid Services, 2017). Interestingly, across specialties and programs, provider ratios vary widely (Gifford et al., 2011), as illustrated in Table 1. For example, in state risk-based Medicaid managed care programs ratios for primary care providers alone range from 1 primary care provider per 100 beneficiaries to 1 primary care provider per 2500 beneficiaries (Office of the Inspector General, 2014b). As a comparison, plans in Medicare Advantage[2] must ensure that there is one endocrinologist and one OBGYNs per

TABLE 1 Select provider-to-enrollee rations across various programs, regulators, and times

Locality	Year	Regulatory target	Ratios
California	2020	Managed Care Plans (McCarty & Farris, 2013)	1 Physician per 1200 enrollees 1 Primary care provider per 2000 enrollees
California	2020	Health insurance (but not managed care products) (California Department of Insurance, 2020)	1 Physician per 1200 enrollees 1 Primary care provider per 2000 enrollees
Colorado	2016	Individual market (Ahn et al., 2016)	1 Physician per 1000 enrollees for primary care, pediatric care, obstetrics/gynecology, mental, behavioral, and substance abuse care
Illinois	2011	Medicaid managed care (Gifford et al., 2011)	1 Pediatrician per 2000 children enrollees
Kentucky	2013	Medicaid managed care (Office of the Inspector General, 2014b)	1 Physician per 1500 enrollees No requirement for specialists
Maryland	2011	Medicaid managed care (Gifford et al., 2011)	1 Primary care provider per 1200 enrollees
Massachusetts	2016	Children's health insurance program (U.S. Government Accountability Office, 2016)	1 Primary care provider per 200 enrollees
Montana	2013	Managed care plans (McCarty & Farris, 2013)	1 Mid-level primary care provider 1500 projected enrollees OR 1 Primary care provider per 2500 projected enrollees
National	2020	Medicare advantage (Centers for Medicare & Medicaid Services, 2017)	1.67 Primary care physicians per 1000 urban enrollees 1 Endocrinologist per 25,000 urban enrollees 1 Cardiologist per 3704 urban enrollees 1 Obstetrician–gynecologists per 25,000 urban enrollees 1.67 Primary care physicians per 1000 rural enrollees 1 Endocrinologist per 33,333 rural enrollees 1 Cardiologist per 4348 rural enrollees 1 Obstetrician–gynecologists per 33,333 rural enrollees
Nevada	2013	Medicaid managed care (Office of the Inspector General, 2014b)	1 Primary care provider per 1500 enrollees 1 Specialist per 1500 enrollees
New York	2015	Medicaid managed care (New York State Department of Health, 2015)	No more than 1500 enrollees for each physician OR 2400 for a physician practicing in combination with a registered physician assistant or a certified nurse practitioner No more than 1000 enrollees for each certified nurse practitioner

(Continues)

TABLE 1 (Continued)

Locality	Year	Regulatory target	Ratios
New York	2015	HIV SNP program (New York State Department of Health, 2015)	1 Physician OR primary care provider certified nurse practitioner per 350 enrollees
			1 Physician practicing in combination with a registered physician assistant or a certified nurse practitioner per 500 enrollees
South Carolina	2011	Medicaid managed care (Gifford et al., 2011)	1 Primary care provider per 2500 enrollees
Wisconsin	2013	Medicaid managed care (Office of the Inspector General, 2014b)	1 Primary care provider per 100 enrollees

25,000–33,333 beneficiaries, one cardiologist per 3704–4348 beneficiaries, and one primary care provider per 599–704 beneficiaries.[3]

Establishing a metric to assess network adequacy is an attractive approach because it creates easily recognizable and assessable targets for regulators, consumers, and insurers. Importantly for regulators, network adequacy review can easily be automated when a target measure is a simple number, thus preserving scarce regulatory resources (Corlette et al., 2014; Howell et al., 2012; Medicaid and CHIP Payment and Access Commission, 2017; U.S. Government Accountability Office, 2015). However, as a number of studies have anecdotally pointed out, provider-to-enrollee ratios, as currently calculated, are inherently ill-suited to ensure consumer access to medical services in the U.S. context (Hall & Ginsburg, 2017; U.S. Government Accountability Office, 2015).[4] This is because regulators assess adequacy at the plan level, ignoring the fact that the majority of physicians participate in many plans and, therefore, their "total panel" of patients is actually the sum of patients across all the plans in which they participate. As a Government Accountability Office analysis of Medicare Advantage networks put it, when relying on provider-to-enrollee ratios "it is difficult to determine the number of potential beneficiaries providers could reasonably serve" (U.S. Government Accountability Office, 2015, p. 12). As a result, "provider networks may appear to regulators and beneficiaries as more robust than they actually are" (U.S. Government Accountability Office, 2015, p. 32). Below, we present the first empirical analysis of the extent of the problem of regulating consumer access via provider-to-enrollee ratios.

DATA AND METHODS

To illustrate empirically the inadequacies of the ratio approach to ensuring adequate consumer access to medical care, we analyzed the number of provider networks in which each endocrinologist, OBGYNs, cardiologist, and pediatrician in California participated. To overcome the well-known accuracy problems of provider network directories, we followed the approach described by Haeder et al. (2019a), which utilizes provider quality data to establish the actual, rather than stated, the universe of providers in a given specialty. We used data from the *California Healthcare Performance Information System* (CHPI) for the four specialties. CHPI was a 501(c)(4) nonprofit, public benefit corporation made up of health-care purchasers, plans, providers, and consumers that collected data based on claims filed to a number of private and public payers in California. CHPI offers a comprehensive overview of the California health-care system by aggregating information from

Medicare and private carriers like UnitedHealthcare, Anthem Blue Cross, and Blue Shield of California that account for more than 12 million consumers. We then merged these data to provider network information from *Vericred* using its National Provider Identifier records. According to its website, *Vericred* network data contain complete network information on individual, small group, and Medicare Advantage plans as well as most networks for mid-large groups and therefore accounting for the vast majority of commercial carriers' networks. The Vericred data have been used frequently in analyses of provider networks. However, we merge the two data sources to overcome potential inaccuracies in the Vericred data that may arise from inaccurate listing of specialties in provider directories (Haeder et al., 2016). That is, because the CHPI data are based on actual medical claims, we know that these providers compromise the verified provider for the respective specialties. For our analysis, we used data from 2018.

RESULTS

Table 1 presents the descriptive statistics for network participation by the four specialties in California overall and split by degree of rurality.[5] On average, endocrinologists, OBGYNs, cardiologists, and pediatricians are part of 64, 66, 72, and 63 networks, respectively. For all four specialties, medians are slightly larger than means. The number of networks ranges from 1 to 150 for endocrinologists, 1 to 173 for OBGYNs, 1 to 184 for cardiologists, and 1 to 172 for pediatricians. The descriptive statistics also illustrate the dearth of medical providers, particularly endocrinologists, in rural parts of the state. We note that because of the participation of providers in large numbers of networks, the interpretation of provider-to-enrollee ratios is inherently ambiguous in real-world applications (Table 2).

Figure 1 presents our analysis in graphical form. Specifically, we have graphed deciles for each of the five specialties based on the number of provider networks in which individual physicians are participating. For example, for endocrinologists, the lowest decile accounts for up to 25 networks while the highest decile accounts for up to 150 networks. Results for all four specialties are similar.[6] Figure 2 separates the distribution of network participation by the Level of Rurality. Specifically, we present separate graphs for large metropolitan, metropolitan, and micropolitan and rural areas. The graphs illustrate the similarities in network participation in both types of metropolitan areas, as well as the differences that are apparent when comparing them to micropolitan and rural areas. Once more, the lack of endocrinologists in rural areas is apparent.

We offer two real-world illustrations of the inherent limitations of provider-to-enrollee ratios as instruments to regulate provider network adequacy. First, the California Department of Managed HealthCare has established provider-to-enrollee ratios for primary care providers (1:2000) as well as other providers (1:1200). At the mean number of plans in which physicians participate, this implies that one endocrinologist could be responsible for 76,740 patients (63.95 network contracts × 1200 patients), an OBGYNs could be responsible for 132,140 patients (66.07 × 2000) as a primary care provider and 79,284 patients (66.07 × 1200) as a specialist, a cardiologist could be responsible for 86,052 patients (71.71 × 1200), and a pediatrician could be responsible for 125,640 patients (62.82 × 2000).

Second, plans could satisfy CMS's adequacy standards if they include one endocrinologist, one obstetrician, and one OB/GYN per 25,000–33,333 beneficiaries, one cardiologist per 3704 to 4348 beneficiaries, and one primary care provider per 599–704 beneficiaries. At the mean number of plans in which physicians participate, this implies that one endocrinologist could be responsible for 1,598,750 (63.95 network contracts × 25,000 patients) to 2,131,646 (63.95 × 33,333) patients. The ranges are 1,849,960 (66.07 × 25,000) to 2,202,311 (66.07 × 33,333) for OBGYNs, 265,613 (71.71 × 3704) to

TABLE 2 Descriptive statistics: Number of networks physicians participate in by four specialties in California by Level of Rurality 2017

	Number of networks					Number of providers
	Mean	Median	Min	Max	*SD*	
Endocrinologists						
All	63.95	66.0	1	150	28.79	315
Large metro	61.61	61.0	1	136	28.81	221
Metro	69.19	71.5	1	150	28.51	90
Micro/rural	75.50	73.5	56	99	17.82	4
OBGYNs						
All	66.07	67.0	1	173	29.13	993
Large metro	65.66	66.0	1	173	30.15	577
Metro	67.41	69.0	1	153	27.91	387
Micro/rural	56.34	63.0	1	109	22.08	29
Cardiologists						
All	71.71	73.0	1	184	28.73	1043
Large metro	71.59	72.5	1	157	29.1	578
Metro	71.92	75.0	1	184	28.39	433
Micro/rural	70.75	69.5	14	137	27.47	32
Pediatricians						
All	62.82	64.0	1	172	28.64	1429
Large metro	61.80	62.0	1	172	28.76	831
Metro	64.96	68.0	1	167	28.12	557
Micro/rural	54.29	54.0	4	151	30.92	42

Abbreviation: OBGYN, obstetrician–gynecologist.

Source: Authors analysis of data from Vericred and the California Healthcare Performance Information System.

311,795 (71.71 × 4348) for cardiologists, and 37,629 (62.82 × 599) to 44,225 (62.82 × 704) for pediatricians.

DISCUSSION

Even upon cursory observation, these numbers appear excessively high. More than likely, not all or even most consumers will experience these excessive ratios. However, given the poor construction of these measures, some consumers very likely will be. Future empirical assessments will assess the extent of the issue and develop more suitable measures. For now, from a policy perspective, these illustrations raise significant concerns about the value of minimum provider ratios in ensuring adequate patient access to medical services. It is worth noting that both regulators used in these examples rely on hybrid approaches to regulating network adequacy. That is, both have combined provider-to-enrollee ratios with

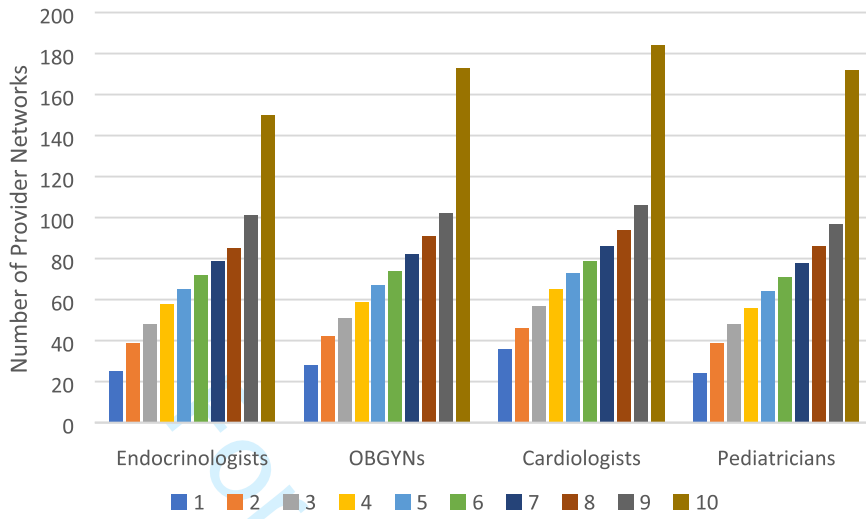

FIGURE 1 Distribution of decile for network participation by four specialties in California. Notes: Graph contains deciles for each of the five specialties based on the number of provider networks in which individual physicians are participating. OBGYN, obstetrician–gynecologist. Source: Authors' analysis of data from Vericred and the California Healthcare Performance Information System

time-and-distance standards. However, as described above, time-and-distance standards are focused on *decentralizing* the supply of providers, that is, increasing geographic access, and thus to preclude excessive driving time for patients to see their providers. At the same time, as pointed out by the Government Accountability Office (U.S. Government Accountability Office, 2015), they have no apparent influence on the *absolute* number of providers offered in-network by plans, and hence do not increase what scholars have referred to as overall realized access (Andersen & Davidson, 2007). Moreover, the providers included to achieve the desired level of decentralization also are likely to participate in a number of networks. In short, time-and-distance standards affect the *location* of providers; they are unlikely to affect *access* to services per se.

One of the regulators, the California Department of Managed Health Care, has gone a step further by also including timely access standards that rely on aggregate data across the plans it regulates. However, it has been pointed out that, again, plans regulated by other entities (like CMS or even the California Department of Insurance) are not included in this analysis (Wishner & Marks, 2017). Moreover, timely access standards rely extensively on the co-operation of consumers, for example in reporting problems and filling out surveys, to achieve validity and avoid selection bias. Unquestionably, the reported data from patient surveys are likely biased because the most vulnerable consumers, including nonnative English speakers, the undocumented, or the disabled, are least likely to respond and report problems (Trubek, 1995).

In view of the lack of empirical assessment, it is unclear what ratio would ensure "adequate" access for consumers. Future work also ought to address what an appropriate provider-to-enrollee ratio should look like and better understand the dynamics underlying network development. Of course, consumer access is also determined by the distribution of providers. That is, in some areas, ratios might be particularly high because few providers are available for inclusion in networks. Yet in other cases, high ratios may be the results of such issues as rent extraction by providers or stringent access restrictions by carriers to rein in costs.

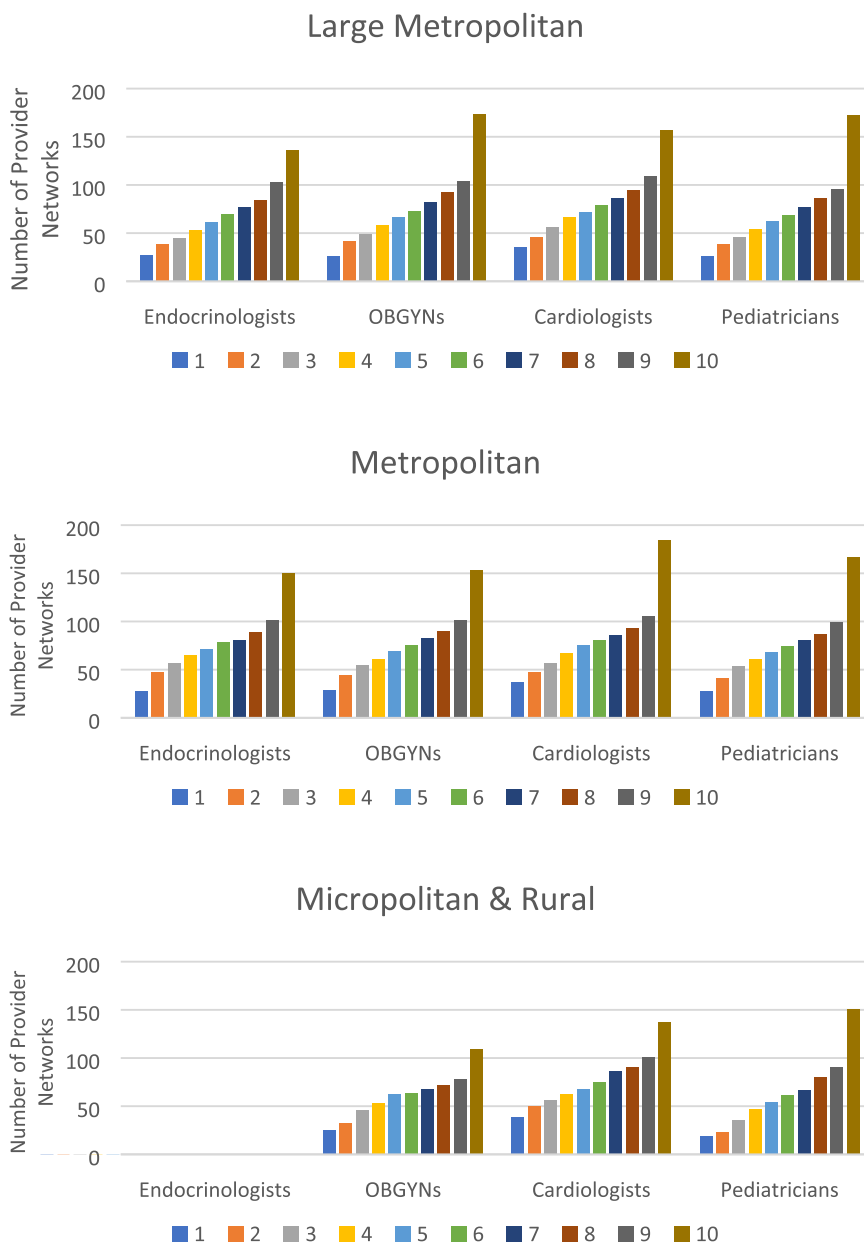

FIGURE 2 Distribution of decile for network participation by four specialties in California by Level of Rurality. Notes: Graph contains deciles for each of the five specialties based on the number of provider networks in which individual physicians are participating. OBGYN, obstetrician–gynecologist. Source: Authors analysis of data from Vericred and the California Healthcare Performance Information System

LIMITATIONS

There are limitations to our study. First, while we rely on high-quality data sources, these sources may nonetheless contain errors and omissions. However, our analytical approach, that is, relying on claims data and merging this information with Vericred data, reduces the relevance of these concerns to the findings. Second, we rely only on a single year of data for

our study. Yet it seems unlikely that networks would dramatically differ from year to year. Third, due to data limitations, we focus our work on only one state. However, California is the nation's biggest insurance market, and it offers a range of settings in terms of rurality and other important demographics. Moreover, the economics of insurance markets and network development are inherently similar across the entire country, limiting concerns about generalizability. Fourth, we rely on data for four specialties to illustrate the limitations of provider-to-enrollee ratios. However, we are able to mitigate concerns about generalizability by analyzing specialties with diverse numbers of physicians from low (endocrinologists) to medium (OBGYNs and cardiologists) to high (pediatricians). This bracketing approach makes it likely that our findings apply to other specialties.

CONCLUSION AND POLICY IMPLICATIONS

Provider networks serve as a crucial pathway that connects health insurance to health-care access in the United States (Haeder et al., 2019b). However, they can also act as impediments for consumer access to care. Regulators should be commended for seeking to monitor insurer restrictions that might interfere with the opportunity for patients to access needed services. However, our findings indicate that provider-to-enrollee or provider-to-population ratios suffer a fatal flaw that makes their utilization as a measure of network adequacy inherently futile and misleading: They do not account for providers' participation in multiple networks, thus significantly overstating access to medical services. We also note that our estimates are incomplete because providers are likely part of additional networks that are not included in the Vericred data set, such as Medicaid, the Children's Health Insurance Program, or self-insured entities.

Neglecting the structure of the American insurance system, regulated by various regulators across the 50 states and the federal government, renders the supposedly hard quantitative standard even more meaningless as regulators of individual insurance products conduct their regulatory and oversight activities wholly independently from each other. California, the example we use in this analysis, serves as an excellent case-in-point: Health maintenance organizations are regulated by the California Department of Managed Care, more traditional insurance products are regulated by the California Department of Insurance, ACA marketplace plans are regulated by both as well as Covered California and CMS, Medicaid is regulated by the California Department of Health Care Services as well as CMS, and Medicare Advantage is regulated by CMS (Haeder et al., 2019b). Of course, California is not alone in terms of fragmented regulation. New York, for example, has three main regulators for state-regulated products alone, the Department of Health, the state's ACA marketplace, New York State of Health, and the Department of Financial Services (Newell, 2017). Thus, there is no one comprehensive data repository that has information about all plans and the physicians serving patients in public programs like Medicaid, TRICARE, and Medicare and private insurance including the markets for individual, small, and large groups, as well as the self-insured. Hence, regulators do not calculate ratios based on the total “patient panel” of any physician but solely at the individual plan level. As we show here, the discrepancies are large.

Importantly, a number of studies have illustrated the limitations of other quantitative adequacy regulations, such as time-and-distance standards for Medicare Advantage (Haeder, 2019a, 2019b, 2020b) and ACA marketplace beneficiaries (Haeder, 2019b; Haeder et al., 2019a, 2020a, 2020b) as well as commercial plans (Haeder et al., 2019a, 2020b, 2020a). A slew of studies have pointed out problems with regulators' reliance on wait times (Haeder et al., 2016; Office of the Inspector General, 2014a). Hence, it is unlikely that hybridizing numerous failing standards will overcome the

limitations of each individual approach. Yet provider networks are ubiquitous in the U.S. health-care system today. And barring the unlikely establishment of a Medicare-for-all type reform that would eliminate all networks and provide Americans with access to all providers, networks are here to stay. While expanding coverage to more Americans without insurance is an important goal for improving people's health and financial security, many consumers would be better served if policymakers focused more on the apparent technical detail of network adequacy regulations to ensure meaningful access for those who are covered by insurance.

In a perfect world, we would have a national database that combines all pertinent information from providers, carriers, and patients to allow regulators to effectively assess provider networks and patient access. Some regulators, for example in New York (Newell, 2017) and California (Wishner & Marks, 2017), have moved in this direction, but their data are inherently incomplete, raising concerns about the validity of their analyses. In view of current realities, it has been pointed out that "to ensure the adequacy of provider networks, neither general qualitative standards ('sufficient to avoid unreasonable delay') nor quantitative standards (specified capacity, provider distribution, or wait times) are sufficient, either alone or in combination" (Hall & Ginsburg, 2017). We agree with many recommendations presented by Hall and Ginsburg (2017) in their layered approach to network adequacy regulation, including their suggestions that regulators should take a qualitative approach because the regulation of provider networks and their adequacy is inherently complex and raises a number of technical, political, and administrative difficulties that defy simple policy solutions (Haeder et al., 2019b). We similarly agree on the importance of backstop dispute resolution processes. However, in view of our analysis of provider-to-enrollee ratios and other recent work on time-and-distance standards as well as wait times, we hold much less confidence in the utility of existing quantitative solutions.

Instead, we recommend policymakers follow an approach that we term "police patrols and fire alarms," a concept first introduced into the political science literature by McCubbins and Schwartz (1984) about Congressional oversight of administrative agencies. Police patrol oversight is "comparatively centralized, active, and direct […] with the aim of detecting and remedying any violations […] and, by its surveillance, discouraging such violations" (McCubbins & Schwartz, 1984, p. 166). Fire alarm oversight, on the other hand, "is less centralized and involves less active and direct intervention" (McCubbins & Schwartz, 1984, p. 166). That is, policymakers establish a system that empowers individual citizens and organized interest groups by facilitating their access to information, giving them standing to challenge policies, or helping them bring attention to alleged violations.

Translating the concept to the context of provider networks, policymakers should endow regulators with additional and more sophisticated resources to "police" network adequacy, that is, to actively and frequently monitor insurance networks through secret shopper surveys and other validation instruments that collect such information as network participation and wait times. For example, CMS has started to more actively patrol the accuracy of provider directories (Centers for Medicare & Medicaid Services, 2018). More of this is needed, and only governmental regulators have the potential resources to sustain patrols long-term (Gormley & Weimer, 1999). Of course, this recommendation flies in the face of the current realities of insurance regulation. Budget restrictions have severely impacted regulators' willingness to invest in network monitoring staff and there generally is little ongoing oversight (Corlette et al., 2014, 2015; Howell et al., 2012; Medicaid and CHIP Payment and Access Commission, 2017). For example, one study looked at several states and found that only California had dedicated staff for network adequacy review (Wishner & Marks, 2017), while CMS has only 13.3 full-time equivalent staff reviewing all Medicare Advantage applications (U.S. Government Accountability Office, 2015). This raises concerns that the California illustration we use here, and the significant limitations that we illustrate using the

network data, may be something of a "best-case scenario" because no other state invests resources in network adequacy oversight. At the same time, there is no empirical answer to this question without more efforts to collect data in other states. However, CMS recently improved its efforts to review the accuracy of provider directories. Nonetheless, we see few alternatives for increasing regulatory police patrol.

Yet, we should also empower consumers and consumer advocates with the resources necessary to "ring the fire alarm," that is, to file and pursue complaints about limitations on access to needed medical services. As has been pointed out, individual consumers are often ill-equipped to take on large and powerful bureaucracies, particularly when it comes to medical care and insurers (Rodwin, 1996; Wishner & Marks, 2017). Instead, consumers are much more successful when resources exist to support them and form lasting coalitions as was the case in the disability rights movements and women's health movements (Rodwin, 1996). Ample examples exist when it comes to health access issues. In California, for instance, resources might be invested in expanded funding for Certified Application Assisters (Paredes & Galloway-Gilliam, 2010) or the Office of the Patient Advocate (Haeder et al., 2019b). Further, data from both "police patrols and fire alarms" should be transparent and made publicly available to highlight insurer behavior (Pawson, 2002), and, coupled with financial sanctions. Ultimately, given political realities, we believe that a layered approach augmented by police patrols and fire alarms, is technically feasible, politically plausible, and, importantly, potentially offers improved consumer access to medical services not now meaningfully ensured by minimum ratios of physicians to enrollees as currently calculated.

From a broader perspective, our findings raise questions about whether provider networks may lead to a very inefficient distribution of providers among populations. This would be particularly concerning if future empirical studies were to find that distributions are particularly large for Medicaid plans, which by definition serve low-income and often high-needs populations. In this vein, global comparisons raise additional questions about the inherent value of provider networks in the first place. Single-payer systems use "open networks" that offer the most efficient assignment of providers to enrollees. For example, in the UK National Health Service, consumers are free to register with any practice they prefer since 2015 (National Health Service, 2021). Similarly, the choice is virtually unrestricted in France (Dutton, 2012). Even in multi-payer systems similar to the United States, the choice can be unrestricted as the case of Germany where patients are generally free to choose their providers with the exception of those providers who only see privately insured patients (Institute for Quality and Efficiency in Health Care, 2018).

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

ENDNOTES

[1]The model act can be found at https://www.naic.org/store/free/MDL-74.pdf.

[2]Centers for Medicare and Medicaid Services (CMS) provides these per 1000 beneficiaries. They range from 0.03 to 0.04 for endocrinology, depending on county rurality, while they range from 0.23 to 0.27 for cardiology, 0.03 to 0.04 for obstetrics and gynecology, and 1.42–1.67 for primary care.

[3]The ratios can be found in the Centers for Medicare and Medicaid Services HSD file at https://www.cms.gov/Medicare/Medicare-Advantage/MedicareAdvantageApps/index.

[4]It is also worth noting that regulators rely on provider directories provided by insurers to make their calculations. However, ample studies have highlighted the inherent inaccuracies in these directories. See U.S. Government Accountability Office (2015), Medicaid and CHIP Payment and Access Commission (2017), and Haeder et al. (2016).

[5]We follow the categorization used by the Centers for Medicare and Medicaid Services (see Centers for Medicare & Medicaid Services, 2016).

[6]The Vericred data set includes 2.6 million unique National Provider Identifiers (NPIs). We note that for comparative purposes that the mean number of networks per NPI is 32.51 (27.37 standard deviations) with a median of 25 and a range of 1–258.

REFERENCES

Ahn, S., Corlette, S., & Lucia, K. (2016). *Can telemedicine help address concerns with network adequacy? Opportunities and challenges in six states*. Urban Institute.

Andersen, R. M., & Davidson, P. L. (2007). Improving access to care in America: Individual and contextual indicators. In R. M. Andersen, T. H. Rice, & G. F. Kominski (Eds.), *Changing the US Health Care System: Key issues in health services policy and management* (pp. 3–31). John Wiley & Sons.

Brodsky, K., Smith, B., & Rodin, D. (2015). *Making Affordable Care Act Coverage a Reality: A national examination of provider network monitoring practices by states and health plans*. Health Management Associates.

Brown, E. J., Polsky, D., Barbu, C. M., Seymour, J. W., & Grande, D. (2016). Racial disparities in geographic access to primary care in Philadelphia. *Health Affairs*, *35*(8), 1374–1381.

Brown, V. Y., & Hartung, B. R. (1998). Managed care at the crossroads: Can managed care organizations survive government regulation. *Annals of Health Law*, *7*, 25–72.

California Department of Insurance. (2020). *Provider network adequacy*. California Department of Insurance.

California Department of Managed Health Care. (2021). *Timely access compliance and annual network reporting*. California Department of Managed Health Care.

Centers for Medicare & Medicaid Services. (2016). *Contract year (CY) 2017 medicare advantage health service delivery (HSD) provider and facility specialties and network adequacy criteria guidance and methodology*. Centers for Medicare & Medicaid Services.

Centers for Medicare & Medicaid Services. (2017). *Medicare advantage network adequacy criteria guidance*. Centers for Medicare & Medicaid Services.

Centers for Medicare & Medicaid Services. (2018). *Online provider directory review report*. Centers for Medicare & Medicaid Services.

Corlette, S., Giovannelli, J., & Lucia, K. (2015). *Implementing the Affordable Care Act: State regulation of marketplace plan provider networks*. The Commonwealth Fund.

Corlette, S., Volk, J. A., Berenson, R. A., & Feder, J. (2014). *Narrow provider networks in new health plans: Balancing affordability with access to quality care*. Georgetown University Health Policy Institute. http://www.urban.org/UploadedPDF/413135-New-Provider-Networks-in-New-Health-Plans.pdf

Dafny, L. S., Hendel, I., Marone, V., & Ody, C. (2017). Narrow networks on the health insurance marketplaces: Prevalence, pricing, and the cost of network breadth. *Health Affairs*, *36*(9), 1606–1614.

Dutton, P. V. (2012). *Differential diagnoses: A Comparative history of health care problems and solutions in the United States and France*. Cornell University Press.

Feyman, Y., Figueroa, J. F., Polsky, D. E., Adelberg, M., & Frakt, A. (2019). Primary care physician networks in Medicare advantage. *Health Affairs*, *38*(4), 537–544.

Gifford, K., Smith, V. K., Snipes, D., & Paradise, J. (2011). *A profile of Medicaid managed care programs in 2010: Findings from a 50-state survey*. Kaiser Family Foundation.

Gormley, W. T. Jr., & Weimer, D. L. (1999). *Organizational report cards*. Harvard University Press.

Haeder, S. F. (2019a). Quality regulation? Access to high-quality specialists for Medicare advantage beneficiaries in California. *Health Services Research and Managerial Epidemiology*, *6*, 233339281882447. https://doi.org/10.1177/2333392818824472

Haeder, S. F. (2019b). A tale of two programs: Access to high quality providers for medicare advantage and affordable care act beneficiaries in New York State. *World Medical & Health Policy*, *11*(3), 212–230. https://doi.org/10.1002/wmh3.309

Haeder, S. F. (2020a). Inadequate in the best of times: Reevaluating provider networks in light of the coronavirus pandemic. *World Medical & Health Policy*, *12*(3), 282–290. https://doi.org/10.1002/wmh3.357

Haeder, S. F. (2020b). Quality advantage? Provider quality and networks in Medicare advantage. *Journal of Public and Nonprofit Affairs*, *6*(2), 138–158. https://doi.org/10.20899/jpna.6.2.138-158

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2015a). California Hospital Networks are narrower in marketplace than in commercial plans, but access and quality are similar. *Health Affairs*, *34*(5), 741–748. https://doi.org/10.1377/hlthaff.2014.1406

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2015b). Narrow networks and the Affordable Care Act. *Journal of the American Medical Association*, *314*(7), 669–670. https://doi.org/10.1001/jama.2015.6807

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2016). Secret shoppers find access to providers and network accuracy lacking for those in marketplace and commercial plans. *Health Affairs*, *35*(7), 1160–1166. https://doi.org/10.1377/hlthaff.2015.1554

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2019a). A consumer-centric approach to network adequacy: Access to four specialties in California's Marketplace. *Health Affairs*, *38*(11), 1918–1926. https://doi.org/10.1377/hlthaff.2019.00116

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2019b). A knotty problem: Consumer access and the regulation of provider networks. *Journal of Health Politics, Policy and Law*, *44*(6), 937–954. https://doi.org/10.1215/03616878-7785835

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2019c, June 5). Surprise billing: No surprise in view of network complexity. Health Affairs Blog [Web log post]. https://doi.org/10.1377/hblog20190603.704918/full/

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2020a). Going the extra mile? How provider network design increases consumer travel distance, particularly for rural consumers. *Journal of Health Politics, Policy and Law*, *45*(6), 1107–1136. https://doi.org/10.1215/03616878-8641591

Haeder, S. F., Weimer, D. L., & Mukamel, D. B. (2020b). Integrating travel distance into assessments of provider networks using a dyadic approach: The case of California's affordable care marketplace. *SAGE Research Methods Cases: Medicine and Health*. https://doi.org/10.4135/9781529723021, https://methods.sagepub.com/case/travel-distance-provider-networks-dyadic-californias-affordable-care

Hall, M. A., & Brandt, C. (2017, November 1). Network adequacy under the Trump Administration. Health Affairs Blog [Web log post].

Hall, M. A., & Ginsburg, P. B. (2017). *A better approach regulating provider adequacy*. The Brookings Institution.

Holahan, J., Zuckerman, S., Evans, A., & Rangarajan, S. (1998). Medicaid managed care in thirteen states. *Health Affairs*, *17*(3), 43–63.

Howell, E. M., Palmer, A., & Adams, F. (2012). *Medicaid and CHIP risk-based managed care in 20 states: Experiences over the past decade and lessons for the future*. Urban Institute.

Institute for Quality and Efficiency in Health Care. (2018). *Health care in Germany: The German Health Care System*. Institute for Quality and Efficiency in Health Care (IQWiG).

Jacobson, G., Freed, M., Damico, A., & Neuman, T. (2019). *A dozen facts about Medicare advantage in 2019*. San Francisco, CA: Kaiser Family Foundation.

Jacobson, G., Rae, M., Neuman, T., Orgera, K., & Boccuti, C. (2017). *Medicare advantage: How robust are plans' physician networks?* Menlo Park, CA: Kaiser Family Foundation.

Jones, S. B., & Lewin, M. E. (Eds.). (1996). *Improving the Medicare market: Adding choice and protections*. National Academy Press.

Lipson, D. J., Libersky, J., Bradley, K., Lewis, C., Siegwarth, A. W., & Lester, R. (2017). *Promoting access in Medicaid and CHIP managed care: A toolkit for ensuring provider network adequacy and service availability*. Division of Managed Care Plans, Center for Medicaid and CHIP Services, CMS, U.S. Department of Health and Human Services.

McCarty, S., & Farris, M. (2013). *ACA implications for state network adequacy standards*. Robert Wood Johnson Foundation.

McCubbins, M. D., & Schwartz, T. (1984). Congressional oversight overlooked: Police patrols versus fire alarms. *American Journal of Political Science*, *28*(1), 165–179.

Medicaid and CHIP Payment and Access Commission. (2017). *Report to Congress on Medicaid and CHIP, March 2017*. Medicaid and CHIP Payment and Access Commission.

Miller, T. E. (1997). Managed care regulation: In the laboratory of the states. *Journal of the American Medical Association*, *278*(13), 1102–1109.

Murrin, S. (2014). *State standards for access to care in Medicaid managed care*. Department of Health and Human Services.

National Health Service. (2021). *Patient choice of GP practices*. National Health Service.

Newell, P. (2017). Networks at the nexus: Revisiting New York State's Provider Network Standards and Protections. United Hospital Fund.

New York State Department of Health. (2015). *Medicaid managed care/family health plus/HIV special needs plan/health and recovery plan model contract*. New York State Department of Health.

Office of the Inspector General. (2014a). *Access to care: Provider availability in Medicaid managed care*. Office of the Inspector General, U.S. Department of Health and Human Services.

Office of the Inspector General. (2014b). *State standards for access to care in Medicaid managed care*. Office of the Inspector General, U.S. Department of Health and Human Services.

Paredes, M., & Galloway-Gilliam, L. (2010). *Bridging the Health Divide: California's Certified Application Assistants*. Community Health Councils. http://chc-inc.org/downloads/CAA%20Profile.pdf

Pawson, R. (2002). *Evidence and policy and naming and shaming*. ESRC UK Centre for Evidence Based Policy and Practice, Queen Mary University of London. http://ezproxy.library.wisc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=8815189&site=ehost-live

Polsky, D., Cidav, Z., & Swanson, A. (2016). Marketplace plans with narrow physician networks feature lower monthly premiums than plans with larger networks. *Health Affairs*, *35*(10), 1842–1848.

Polsky, D., & Weiner, J. (2015). *The skinny on narrow networks in health insurance marketplace plans*. Philadelphia, PA: Leonard Davis Institute of Health Economics.
Reinhardt, U. E. (2019). *Priced out: The economic and ethical costs of American Health Care*. Princenton, NJ: Princeton University Press.
Rodwin, M. A. (1996). Consumer protection and managed care: The need for organized consumers. *Health Affairs*, *15*(3), 110–123.
Rosenbaum, S., Shin, P., Smith, B., Wehr, E., Borzi, P., Zakheim, M. H., Shaw, K., & Silver, K. (1997). *Negotiating the New Health System: A Nationwide Study of Medicaid Managed Care Contracts*. George Washington University, Center for Health Policy Research.
Trubek, L. G. (1995). The social HMO for low-income families: Consumer protection and community participation. *Seton Hall Law Review*, *26*, 1143–1162.
U.S. Department of Veterans Affairs. (2019). Veteran Community Care. U.S. Department of Veterans Affairs.
U.S. Government Accountability Office. (2015). *Medicare advantage: Actions needed to enhance CMS oversight of provider network adequacy*. U.S. Government Accountability Office.
U.S. Government Accountability Office. (2016). *Provider networks: Comparison of child-focused network adequacy standards between CHIP and private health plans*. U.S. Government Accountability Office.
White, J. (1999). "Choice, Trust, and Two Models of Quality". *Journal of Health Politics, Policy and Law*, *24*(5), 993–999.
Wishner, J. B., & Marks, J. (2017). Ensuring compliance with network adequacy standards: Lessons from four states. Urban Institute.

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COMMENTARY

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Canadian policy changes for alcohol-based hand rubs during the COVID-19 pandemic and unintended risks

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Abstract

The COVID-19 pandemic led to major changes in public policies to address supply chain disruption and escalated the price of consumer disinfectant products. To address market demands on alcohol-based hand rubs and disinfectants, Health Canada implemented major changes to the regulations regarding composition, handling, transportation, and packaging to insure product availability. Furthermore, accelerated licensing of ingredients and packaging did not meet standard medical quality guidelines yet were authorized for manufacturing and packaging of alcohol-based hand rubs and disinfectants. The accountability associated with these policy changes were reactive, including industry self-reporting, consumer reporting, and Health Canada advisories and recalls that were responsive to products after they were available in the market. Nonetheless, Canadian public health policy increased hand sanitizers availability. However, some of the interim policies have raised major public health concerns associated with ethanol quality, packaging, and labeling, and enforcement of regulations. In this paper, we review the changes in the Canadian regulations amid the current pandemic and we evaluate the unintended health risks that might arise from these changes.

KEYWORDS

COVID-19, ethanol, hand sanitizer, pandemic, public policy, regulations

[Article updated on June 24, 2021 after first online publication: The first author's affiliation was corrected, which required the other author affiliations be renumbered.]

Key points

- Canadian policy adaptations were- and are- responsive to real-time cases, and accelerated the availability of essential alcohol-based hand rubs.
- Permittance of technical-grade ethanol for hand sanitizer formulation increases risk of exposure to impurities from the ethanol manufacturing process.
- Increased flexibility in hand sanitizer formulation, substitutions, manufacturing increases risk if exposure to unlabelled ingredients and contaminants (subject to recall).
- Relaxation of packaging, and labelling requirements leads to consumer confusion and accidental ingestion, use of materials that are not compatible with the contents leading to leaks and contamination of the product.

INTRODUCTION

Covid-19 crisis and hand hygiene

In December 2019, Chinese authorities (Wuhan, China) alerted the World Health Organization (WHO) of pneumonia-like infections later attributed to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2; aka COVID-19). COVID-19 has high person-to-person transmission and demonstrates increased mortality rate compared the seasonal flu (World Health Organization [WHO], 2020). By March 2020, the WHO declared the COVID-19 outbreak a global pandemic and many Governments subsequently declared states of emergency and tightened restrictions on travel and public gatherings.

Governments and health-care agencies have recommended behavioral modification (e.g., social distancing), the use of hygiene products, and personal protective equipment to slow the spread of the virus. Personal hygiene products are critically important for frontline workers, and the general public in mitigating the spread of COVID-19. This has led to stockpiling and panic buying of essential items (e.g., soaps and hand sanitizers) (Statistics Canada, 2020). Approximately 77% of people preferred using hand sanitizers, over handwashing, to maintain hand hygiene (Grand View Research, 2020). In Canada, alcohol-based hand rubs (ABHRs) and soap sales during the first week of March 2020 increased by 792% and 68%, respectively, compared to 2019 (Statistics Canada, 2020). An increase in ABHR sales resonated globally, with increases of 255%, 751%, 485%, and 23.15% in the United Kingdom, Germany, United States of America, and China, respectively (Korea Trade-Investment Promotion Agency [KOTRA], 2020). In 2017, the global ABHR market was valued at 2.4B USD and projected to increase to 5.5B USD by 2024 (Ridder, 2020). However, due to the COVID-19 pandemic, the market exhibited an exponential growth of 600% from 2019 to 2020 (Research and Markets, 2021).

This unprecedented demand for ABHRs has disrupted supply chains and put pressure on policy makers to amend regulations to address current shortages. Additional considerations that were included in the policy change were fake claims of homemade sanitizers, terminology regarding alcohol quality (e.g., technical and pharmaceutical grade) and the impact of COVID-19 on previous enforcement protocols. In Canada, ABHRs are classified as natural health products (NHPs) and are regulated by Health Canada. Typically, pharmaceutical- or food-grade ethanol must be used in the preparation of ABHRs.

However due to the onset of COVID-19, Health Canada has amended regulations to permit the use of technical-grade ethanol, including higher levels of allowable impurities, to alleviate the growing demand for ABHRs (Health Canada, 2020f). Changes in the legislation can also lead to undesirable consequences, such as nonconformance with newly imposed labeling requirements and the added risk of contaminants present in the ethanol ingredient. These added risks to the consumer are related to ABHR use as labeled, for example, elevated levels (1000 ppm) of acetaldehyde inhalation are linked to headaches and carcinogenicity, and changes to reproductive tissue in rats and humans (Lui et al., 2014; Maxwell et al., 2010; Woutersen et al., 1986). Ethyl acetate removes oil from the skin and can cause dry skin and irritation (400 ppm; Nelson et al., 1943). Further risk is added in the case of accidental ingestion of ABHR through confusion over inadequate labeling, nontraditional packaging in food containers, and abuse. Methanol and ethanol poisoning are the highest risk, although elevated levels of impurities pose a risk when ingested as well (Health Canada, 2013; Tse, Purdy, et al., 2021). The levels of these impurities were controlled in the interim ABHR policy, however, some commercially available ABHRs were noncompliant (Tse, Nelson, et al., 2021). In this paper, we analyze changes to Health Canada's policies related to ABHRs intended for domestic and personal use during the COVID-19 pandemic.

Hand sanitizers

ABHRs are crucial in mitigating the spread of infectious disease when water and soap are unavailable (Jing et al., 2020; Widmer, 2000). Hand hygiene products can be divided into washes and rubs. Washes (e.g., antibacterial soaps) are intended for use on wet hands and designed to be rinsed off with water. They are effective on soiled hands, removing oil and dirt that can retain infectious materials. When hands are not visibly dirty, and water is unavailable, ABHRs can be used as an alternative (Archer et al., 2007; Girou et al. 2002; Widmer, 2000).

There are two categories of hand sanitizer rubs: Alcohol-based and alcohol-free. ABHRs must contain 62%–95% (v/v) of alcohol (as ethanol, isopropanol or *n*-propanol). These sanitizers are commercially available as foam, gel, spray, cream, or wipes. Alcohol-free hand rubs typically consist of nonalcoholic active components (e.g., chlorhexidine, hexachlorophene, povidone-iodine, quaternary ammonium compounds, triclosan, or chloroxylenol) (Jing et al., 2020).

The WHO has recommended two ABHR formulations, which were later modified, by the European Committee for Standardization, in 2010 to improve efficacy by increasing alcohol content and decreasing glycerol content (WHO, 2010). Current formulations require a minimum of 80% alcohol or 75% isopropyl alcohol as they have potent viricidal efficacy (EN 1500, 2013; Kratzel et al., 2020; Siddharta et al., 2017; Suchomel et al., 2013).

Canadian alcohol-based hand sanitizer regulations during COVID-19

In Canada, ABHRs are classified under the Non-prescription Natural Health Products Directorate, and are regulated by Health Canada. Any entity that manufactures, processes, packages, labels, imports, and/or stores ABHRs must have a site license, and each ABHR formula must also obtain a product license and be assigned a natural product number (NPN).

Health Canada temporarily eased existing regulations on the manufacturing, formulation, and distribution of ABHRs to expand available ethanol resources and meet market demand. Permittance of lower quality technical-grade ethanol helped to alleviate growing demand for ABHRs. However, this lower grade of ethanol contains elevated concentrations of contaminants. In March and April 2020, Health Canada published modified guidelines and supporting documents that included:

- Guide on Health Canada's interim expedited licensing approach for production and distribution of alcohol-based hand sanitizers (Health Canada, 2020h)
- Hard-surface disinfectants and hand sanitizers (COVID-19): Information for manufacturers (Health Canada, 2020c)
- Interim guide for production of ethanol for use in alcohol-based hand sanitizers (Health Canada, 2020f)
- Health Canada's decision on technical-grade ethanol for the manufacture of hand sanitizers: Notice to industry (Health Canada, 2020d)

The interim measures enacted by Health Canada included seven major components (timelines are illustrated in Figure 1 and the impacts of interim legislation are highlighted in Figure 2).

Simplified application for both site licenses and product licenses and expedited product approvals

The amended application process is intended to foster conditions that increase ethanol and ABHR products by permitting market entry for new manufacturers and distributors. Before the pandemic, pharmaceutical companies, household product companies, and personal care product entities were primary suppliers of ABHRs, in Canada. Since simplification of the application process, microbreweries, fuel ethanol producers, animal feed facilities, and so forth were approved to produce ABHRs. This regulatory change led to a significant increase in the number of ABHRs registered by Health Canada from March to July 2020 (Health Canada, 2020a). The simplified license approach encouraged producers to prioritize ABHRs production. Under interim guidelines, products must comply with recommendations from Health Canada's Antiseptic Skin Cleansers monograph, for personal use, with time-intensive requirements (e.g., time-to-effect requirement) waived (Health Canada, 2020h). For example, antiseptic products are expected to have a minimum time-to-effect of 30 s (for waterless hand rubs) to 1 min (for washes or scrubs using water). Health Canada must be notified of the intent to use interim licensed products for medical and commercial environments.

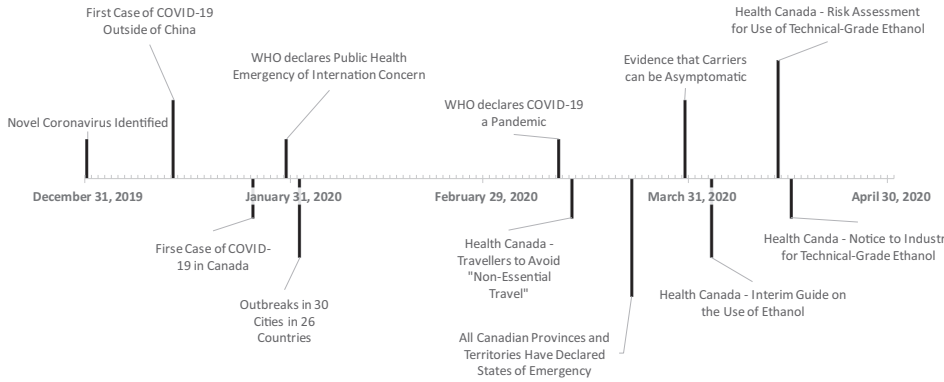

FIGURE 1 A timeline of COVID-19 events and Health Canada response with respect to Sanitizers

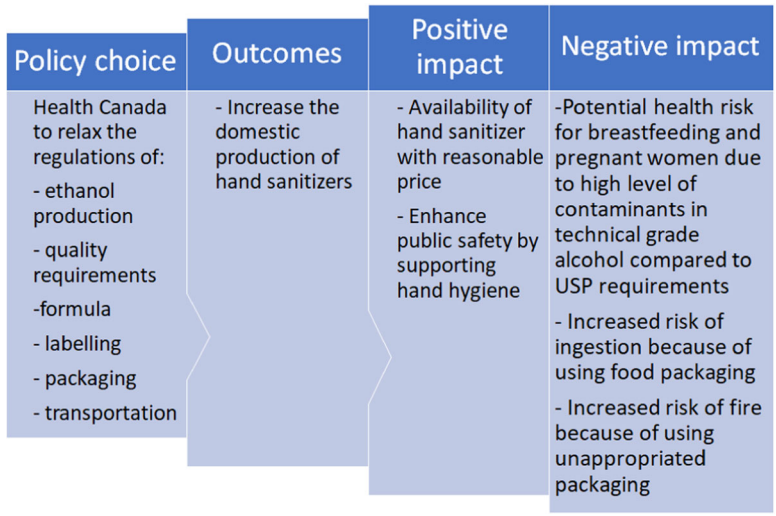

FIGURE 2 Impact of the new regulations of alcohol-based hand sanitizers on public safety

Interim flexibility pertaining to ethanol quality

Regulations before the COVID-19 pandemic consisted of using pharmaceutical-grade or food-grade ethanol for ABHR formulas. Under Canadian interim guidelines, ethanol producers should ensure products are free of foreign chemicals, that might influence color, clarity, specific gravity, UV absorbance or leave a residue. Ethanol that does not meet United States Pharmacopeia (USP) or Food Chemical Codex specifications, and contains less than 1000 ppm of acetaldehyde, could be marketed as "technical-grade" and was authorized for its production in the manufacture of ABHR products on a case-by-case basis (Health Canada, 2020d, 2020g). As the Canadian ethanol production plants reduced the acetaldehyde concentrations in their products, and as 2020 progressed, Health Canada repeated its risk assessment of technical-grade ethanol. The limit for acetaldehyde was reduced to 400 ppm in June and 75 ppm in September (Health Canada, 2020g). Industrial-grade (i.e., more than 1000 ppm acetaldehyde) ethanol was never permitted by Health Canada for formulation into ABHRs and products with higher concentrations of acetaldehyde have been recalled. Manufacturers of technical-grade ethanol in Canada are required to prioritize production of high-quality ethanol and to prepare and retain certificates of analysis for all production lots. These manufacturers must inform users of elevated contaminant concentrations and their inherent risks (e.g., use by children, pregnant or breastfeeding women, or use on damaged skin). Technical-grade ethanol is not to be resold and its production is expected to be discontinued after the COVID-19 interim response measures are lifted.

As of June 12, 2020, Health Canada has authorized 45 companies to manufacture ABHRs using technical-grade ethanol supplied by eight approved ethanol manufacturers. These manufacturers have vastly increased the availability of ABHRs in the Canadian market, providing these essential products for use in homes and businesses to combat the current COVID-19 crisis. However, as of January 15, 2021, Health Canada is no longer accepting new notification forms for the exceptional release of hand sanitizers (Health Canada, 2020a).

On November 26, 2020 Health Canada updated their guidelines on technical-grade ethanol by requiring all technical alcohol for use in hand sanitizers contain no more than 75 ppm of acetaldehyde. On January 15, 2021 Health Canada discontinued the interim

licensing measures for ABHRs but not surface sanitizers. The standard licensing process was reinstated (Health Canada, 2020a).

Recommended formulas

Health Canada monograph requires the use of 60%–80% ethanol (v/v), or 75% isopropyl alcohol (v/v) in ABHRs (Health Canada, 2020f). However, to ensure the efficacy of ABHRs, the WHO formulation was recommended for the preparation of ABHRs, which includes the addition of glycerol and hydrogen peroxide (WHO, 2010).

List of alternatives for rheology modifiers

Carbomer is a common thickening agent used in production of gelled ABHRs. Like many other raw materials, the availability of these materials suffered from disrupted supply chains. In response to the unavailability of carbomer and other rheologic modifiers, Health Canada approved certain substitutions such as alkyl acrylate cross-polymer, ammonium acryloyldimethyltaurate, and microcrystalline cellulose (Health Canada, 2020e).

Labeling requirements

The labeling must clearly state the blending of technical-grade alcohol in the formulation of ABHR products and the risks associated with their use. Labeling checklist and claims must be verbatim as they occur in applicable product licenses. This condition was used to prevent false or misleading claims (e.g., broad claims of effectiveness against coronavirus without submission of additional supporting documents) (Health Canada, 2020d).

Flexibility for the packaging materials and sizes

Only one application and NPN is required for different sizes of ABHR product with the same formula and dose recommendation. Any container that is chemically resistant to the ABHR ingredients is currently authorized for packaging, including food or pharmaceutical-grade packaging. Although packaging in food containers could, and has, lead to accidental ingestion of these products (British Columbia Centre for Disease Control [BC-CDC], 2020; United States Food and Drug Administration [US-FDA], 2020). It is recommended that the size of the opening be minimized to prevent evaporation. Packages that are non-resealable should only be used for single-use applications and labeled as "refills." The packaging is also not required to have security features such as safety seals (Health Canada, 2020c).

Flexibility regarding good manufacturing practises (GMP) requirements applied on NHPs

The stability test, quality assurance report, microbiological contaminants or other forms of evidence required as part of the standard process for the NHPs are waived for ABHRs that contain more than 50% alcohol as a final concentration (Health Canada, 2020c, 2020h).

DISCUSSION

Compliance and enforcement of the new regulations

Health Canada is consistently updating the interim ABHR regulations with respect to current scientific evidence (e.g., toxicity and risk assessments). Compliance is being achieved by combining different enforcement strategies. Usually, the Regulatory Operations and Enforcement Branch and Health Canada inspectors are required to enforce regulations by visiting production sites and analyzing available products. In the site licence application, Health Canada requires an attestation certifying that the manufacturing site complies with applicable GMPs for NHPs, and undergoes routine inspections ensuring compliance with federal and provincial regulations. It is unclear whether site inspections are being conducted under travel and workplace restrictions. Ethanol producers are required to maintain certificates of analyses demonstrating product compliance with the Antiseptic Skin Cleansers monograph. Technical-grade alcohol producers are required to provide a certificate of analyses to Health Canada, detailing impurities and deviations from the USP monographs (USP, 2020). Producers are also required to inform consumers of the technical-grade classification, formulae, and recommended use and restrictions for the products. Consequently, consumers play a vital role in enforcement by reporting adverse effects related to the use of ABHR products to the Canada Vigilance regional office. In general, Health Canada gives a period of 15 days for ABHR manufacturers to report any adverse reactions related to the use of their products. Approval for use of technical-grade ethanol comes with the explicit condition that Health Canada may issue immediate notices to cease sale of ethanol and its products, issue recalls, and perform on-site visits and product seizures. It is expected that companies would follow regulations as deviations might severely impact their businesses and licensing. Currently, 52 out of 5050 products have been listed for recall by Health Canada due to use of industrial-grade ethanol or of noncompliant technical-grade ethanol (e.g., contamination with methanol and ethyl acetate) (Health Canada, 2020i, 2020j).

Public safety impact of the new regulations

The outcome from interim COVID-19 ABHR regulations has encouraged local manufacturers and distributors to increase ABHRs supply to address growing demand. Availability of ABHRs is paramount in providing protection and maintaining public health. However, some of the new ABHR regulations have raised concerns regarding ethanol quality, inadequate labeling, packaging in food containers, and enforcement efforts. Changing policy due to an emerging crisis can be difficult, especially when there is insufficient scientific data to support strong decisions. There have been insufficient efforts devoted to exploring possible consequences, (e.g., nonconforming label requirements of technical-grade ethanol, impurities in technical-grade ethanol), and little evidence of a structured approach to such analyses (Callele et al., 2018). The added risk to the population based on the use of technical-grade ethanol for ABHRS has been calculated to be acceptable by Health Canada as part of their ongoing risk assessments in April, June, and September 2020, provided that duration of use is limited (Health Canada, 2020g). Added risk due to inadequate labeling and nontraditional food packaging has been observed in cases of accidental ingestion (BC-CDC, 2020), but reports are not tracked or released by all jurisdictions in Canada. The added benefit of access to ABHRs is in higher rates of hand hygiene practice and reduced rates of worker or student absenteeism (Grand View Research, 2020; Hübner et al., 2010; White et al., 2005; Widmer, 2000).

Risks associated with ethanol quality

Contaminants produced during ethanol production can arise as a result of feedstock used or process conditions. Alcohols with similar boiling points are difficult to separate using single distillation methods, resulting in contaminants in the final product. High concentrations and prolonged exposure to these contaminants can be associated with adverse health effects. Ethanol grade is classified depending on impurity levels. Typically, pharmaceutical grade ingredients are required to formulate ABHRs, however, technical-grade ethanol is permitted during the current pandemic (Health Canada, 2020b, 2020d, 2020f; USP, 2020).

On April 17, 2020, Health Canada's *Decision on technical-grade ethanol for the manufacture of hand sanitizers: Notice to industry* permitted use of non-USP compliant ethanol in ABHRs, with written authorization (Health Canada, 2020d). The guide does not provide specific information regarding impurities, only indicating that producers notify consumers of increased impurities and maintain records for Health Canada.

Permission guidelines that governed the use of technical-grade alcohol in ABHR formulations confused both manufacturers and consumers. Health Canada has recently recalled 11 ABHRs that were produced with technical-grade ethanol confirming the challenges in producing ABHRs according to interim guidelines. Flexibility in the new regulations and constant evolution complicated compliance and enforcement activities. In addition, consumers were concerned about health risks associated with contaminants found in "technical-grade" ethanol.

In response, Health Canada released a risk assessment, that resulted in new labeling requirements for ABHRs formulated with "technical-grade" alcohol (Health Canada, 2020g). The risk assessment study concluded that applying ABHRs containing acetaldehyde, a known carcinogen and teratogen (Lui et al., 2014; Woutersen et al., 1986), at concentrations up to 1000 ppm (v/v) was tolerable for causal and short-term domestic use. This was later updated in June 2020 when new regulations required that acetaldehyde levels be reduced below 400 ppm. The benefits of ABHRs during the COVID-19 pandemic outweighs the risk associated with contracting COVID-19. However, this ongoing risk assessment does not provide cumulative effects of other ethanol contaminants, or concurrent exposure from other food and chemical sources (Liu & Pilone, 2000; Uebelacker & Lachenmeier, 2011). Nevertheless, Health Canada requires that health-care workers and ABHR manufacturers add warning labels to inform consumers of risks of using such products to children or, pregnant or breastfeeding women.

Before COVID-19, there were significant concerns among the health-care community regarding indiscriminate use of over-the-counter hand disinfectant products which may lead to the selection of bacteria with enhanced antibiotic resistance. Fears of contracting COVID-19 is driving the trend of overuse, raising concerns that long-term, daily use of these products may outweigh their benefits. Additional studies are needed to investigate effects of repeated use and daily recommended exposure of ABHRs formulated with technical-grade ethanol. Risk assessments of prolonged exposure should not be limited to acetaldehyde but must also consider other potentially toxic impurities (e.g., methanol) (Chan & Chan, 2018; Onuki et al., 2016).

Risk associated with packaging

Traditionally, ABHRs were packaged in liquid pump dispensers or small squeezable containers. However, Heath Canada's interim regulations expanded packaging options used to store ABHRs. Under the interim regulations, any package that is chemically resistant to the alcohol is permitted, including food and beverage containers. It is recommended, that the

size of the opening on the container should be as small as possible to reduce spills, inhalation, and evaporation. Currently, many Canadian ABHRs manufacturers (e.g., distilleries), have reused the color and design of their existing food product labels and packaging for ABHR containers. However, brightly colored labels and cartoon depictions can encourage exploratory behavior in children (Engel & Spiller, 2010) and can confuse consumers between food, beverage, and ABHR products, resulting in accidental poisoning. In response, Health Canada released an advisory reminding Canadians to be cautious when using hand sanitizers, disinfectants, or household cleaning products. Increased acute poisoning from intentional and unintentional ingestion of ABHRs has previously been reported (BC-CDC, 2020; Chan & Chan, 2018; Gormley et al., 2012; Health Canada, 2013; Rayar & Ratnapalan, 2013), and these risks may increase with the use of technical-grade ethanol.

Single-use containers (e.g., non-resealable) are permitted under the interim guidelines and should be labeled as "refill" products to be transferred into secondary containers after opening. However, the use of wide-mouth ABHRs containers (e.g., glass jars), is discouraged by Health Canada, as these containers can increase the risk of spills, and subsequent exposure and ignition.

Further concerns arise with ABHRs packaged via beverage manufacturing processes. For example, carbonation can elicit unintentional chemical reactions (e.g., acidification). Acidification of ABHRs may cause dermatitis (Beiu et al., 2020; Gould et al., 2007), and affect the primary mechanisms involved in ethanol-protein interactions and decrease ABHR efficacy. Carbonation of the sanitizers is not permitted in the interim guideline, as carbon dioxide is considered as an additional ingredient. However, nontraditional producers may not be aware of these chemical changes which can influence ABHR efficacy. To mitigate these potential risks, these additional ingredients should be avoided, and existing household cleaner or chemical containers should be employed.

CONCLUSION

Canadian public health policy has played a crucial role in increasing ABHRs availability and ensuring public safety during the COVID-19 pandemic. Health Canada has released interim guidelines and regulations to accelerate ethanol production for the formulation of ABHRs. These interim measures remained in place, until the supply of high-grade ethanol had stabilized. They continue to modify the guidelines in response to public need and industry activity, along with ongoing risk assessments of the interim approved product class. The interim policy changes were made in consultation with scientists and industry, and policy adaptations are responsive to real-time cases. The modifications permitted by these policy changes included the use of nontraditional sources of ethanol, substitution of rheological ingredients, and flexibility in manufacturing, packaging, and labeling practices.

To reduce health risks associated with technical-grade ethanol, regulations should explicitly display the threshold limitations of contaminants permitted in ABHR products. To discourage exploratory behavior and unintentional poisonings, chemical or household packaging and appropriate labeling must be mandatory for these products. Food packages should be prohibited, and critical information regarding usage and warnings must also be highlighted on the package label. Compliance with interim policies is incomplete as observed in the marketplace (e.g., inadequate labeling, unsuitable packaging, etc.). Though it is important to support local businesses producing ABHRs, policies must also focus on new-to-the-market businesses involved in ABHR production. This includes improved communication with industry in regard to the proper handling and production of technical-grade ethanol; as well as, informing consumers of potential hazards associated with these products. Clarification regarding impurity levels, stricter packaging and labeling requirements,

and increased public education on compliance and risk regarding interim ABHRs will further mitigate risks and enhance public health measures in Canada.

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CONFLICT OF INTERESTS

Dr. Martin J. T. Reaney is the founder of, and has an equity interest in, Prairie Tide Diversified Inc. (Saskatoon, SK, Canada: Previous company name is Prairie Tide Chemicals Inc.).

ETHICS STATEMENT

All authors contributed to the conceptualization and writing of this commentary.

REFERENCES

Archer, J. R. H., Wood, D. M., Tizzard, Z., Jones, A. L., & Dargan, P. I. (2007). Alcohol hand rubs: Hygiene and hazard. *British Medical Journal*, *335*(7630), 1154–1155. https://doi.org/10.1136/bmj.39274.583472.ae

Beiu, C., Mihai, M., Popa, L., Cima, L., & Popescu, M. N. (2020). Frequent hand washing for COVID-19 prevention can cause hand dermatitis: Management tips. *Cureus*, *12*(4), e7506. https://doi.org/10.7759/cureus.7506

British Columbia Centre for Disease Control (BC-CDC). (2020, May 25). Poison control records spike in calls about children and adults accidentally ingesting hand sanitizer. http://www.bccdc.ca/about/news-stories/stories/2020/poison-control-records-spike-in-calls-about-children-and-adults-accidentally-ingesting-hand-sanitizer

Callele, D., Penzenstadler, B., & Wnuk, K. (2018). Public policy challenges: An RE perspective. In: R. Chitchyan, B. Penzenstadler, & C. C. Venters (Eds.), *Proceedings of the 7th International Workshop on Requirements Engineering for Sustainable Systems (RE4SuSy 2018) co-located with the 26th International Conference on Requirements Engineering (RE 2018), Banff, Alberta, Canada, August 20, 2018* (Vol. 2223, pp. 24–33). CEUR Workshop Proceedings.

Chan, A. P. L., & Chan, T. Y. K. (2018). Methanol as an unlisted ingredient in supposedly alcohol-based hand rub can pose serious health risk. *International Journal of Environmental Research and Public Health*, *15*(7), 1440. https://doi.org/10.3390/ijerph15071440

EN 1500. (2013). *Chemical disinfectants and antiseptics. Hygienic hand rub. Test method and requirements (phase 2/step 2)*. European Committee for Standardization.

Engel, J. S., & Spiller, H. A. (2010). Acute ethanol poisoning in a 4-year-old as a result of ethanol-based hand-sanitizer ingestion. *Pediatric Emergency Care*, *26*(7), 508–509. https://doi.org/10.1097/PEC.0b013e3181e5bfc9

Girou, E., Loyeau, S., Legrand, P., Oppein, F., & Brun-Buisson, C. (2002). Efficacy of hand rubbing with alcohol based solution versus standard handwashing with antiseptic soap: Randomised clinical trial. *British Medical Journal*, *325*, 362. https://doi.org/10.1136/bmj.325.7360.362

Gormley, N. J., Bronstein, A. C., Rasimas, J. J., Pao, M., Wratney, A. T., Sun, J., Austin, H. A., & Suffredini, A. F. (2012). The rising incidence of intentional ingestion of ethanol-containing hand sanitizers. *Critical Care Medicine*, *40*(1), 290–294. https://doi.org/10.1097/CCM.0b013e31822f09c0

Gould, D. J., Hewitt-Taylor, J., Drey, N. S., Gammon, J., Chudleigh, J., & Weinberg, J. R. (2007). The CleanYourHandsCampaign: Critiquing policy and evidence base. *Journal of Hospital Infection*, *65*(2), 95–101. https://doi.org/10.1016/j.jhin.2006.09.028

Grand View Research. (2020, April). *Hand sanitizer market size, share and trends analysis report by product (gel, foam, liquid), by distribution channel (hypermarket and supermarket, drug store, specialty store, online), by region, and segment forecasts, 2020–2027* (Market Analysis Report No. GVR-3-68038-249-5). https://www.grandviewresearch.com/industry-analysis/hand-sanitizer-market

Health Canada. (2013, October 24). Two deaths linked to ingestion of hand sanitizer containing methanol. *Government of Canada*. https://healthycanadians.gc.ca/recall-alert-rappel-avis/hc-sc/2013/36469a-eng.php

Health Canada. (2020a, March 18). Hard-surface disinfectants and hand sanitizers (COVID-19): Disinfectants and hand sanitizers accepted under COVID-19 interim measure. https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/products-accepted-under-interim-measure.html

Health Canada. (2020b, March 20). Antiseptic skin cleansers (domestic/personal use). http://webprod.hc-sc.gc.ca/nhpid-bdipsn/atReq.do?atid=antiseptic_antiseptique&lang=eng

Health Canada. (2020c, March 29). Hard-surface disinfectants and hand sanitizers (COVID-19): Information for manufacturers. https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/information-manufacturers.html

Health Canada. (2020d, April 17). Technical-grade ethanol for use in hand sanitizers and hard-surface disinfectants–Notice to industry. https://www.canada.ca/en/health-canada/services/drugs-health-products/natural-non-prescription/legislation-guidelines/covid19-technical-grade-ethanol-hand-sanitizer.html

Health Canada. (2020e, April 23). List of alternative rheology modifiers for use in the production of hand sanitizers. https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/information-manufacturers/list-alternative-rheology-modifiers.html

Health Canada. (2020f, May 9). Interim guide on the production of ethanol for use in alcohol-based hand sanitizers: Background. https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/interim-guide-ethanol-hand-sanitizers.html

Health Canada. (2020g, May 12). Technical-grade ethanol for the manufacture of hand sanitizers during the COVID-19 pandemic: Risk assessment summary report. https://www.canada.ca/en/health-canada/services/drugs-health-products/natural-non-prescription/legislation-guidelines/covid19-technical-grade-ethanol-hand-sanitizer/risk-assessment-summary-report.html

Health Canada. (2020h, July 31). Licensing approach to produce and distribute alcohol-based hand sanitizers: Guidance document. https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/covid-19-expediated-licensing-alcohol-hand-sanitizer.html

Health Canada. (2020i, March 18). Hard-surface disinfectants and hand sanitizers (COVID-19): List of hand sanitizers authorized by Health Canada. https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/hand-sanitizer.html

Health Canada. (2020j, June 17). Recall of certain hand sanitizers that may pose health risks. https://healthycanadians.gc.ca/recall-alert-rappel-avis/hc-sc/2020/73385a-eng.php

Hübner, N.-O., Hübner, C., Wodny, M., Kampf, G., & Kramer, A. (2010). Effectiveness of alcohol-based hand disinfectants in a public administration: Impact on health and work performance related to acute respiratory symptoms and diarrhoea. *BMC Infectious Diseases*, *10*(1), 250. https://doi.org/10.1186/1471-2334-10-250

Jing, J. L. J., Pei Yi, T., Bose, R. J. C., McCarthy, J. R., Tharmalingam, N., & Madheswaran, T. (2020). Hand sanitizers: A review on formulation aspects, adverse effects, and regulations. *International Journal of Environmental Research and Public Health*, *17*(9), 3326. https://doi.org/10.3390/ijerph17093326

Korea Trade-Investment Promotion Agency (KOTRA). (2020). Hand sanitizer market trends caused by COVID-19 in China, Germany, and USA. *KOTRA and KOTRA Overseas Market News*. https://www.kotra.or.kr/foreign/biz/KHENKO100M.html

Kratzel, A., Todt, D., V'kovski, P., Steiner, S., Gultom, M., Thao, T., N., Holwerda, M., Steinmann, J., Niemeyer, D., Dijkman, R., Kampf, G., Drosten, C., Steinmann, E., Thiel, V., Pfaender, S., & Ebert. (2020). Inactivation of severe acute respiratory syndrome coronavirus 2 by WHO-recommended hand rub formulations and alcohols. *Emerging Infectious Diseases*, *26*(7), 1592–1595. https://doi.org/10.3201/eid2607.200915

Liu, S.-Q., & Pilone, G. J. (2000). An overview of formation and roles of acetaldehyde in winemaking with emphasis on microbiological implications. *International Journal of Food Science and Technology*, *35*(1), 49–61. https://doi.org/10.1046/j.1365-2621.2000.00341.x

Lui, S., Jones, R. L., Robinson, N. J., Greenwood, S. L., Aplin, J. D., & Tower, C. L. (2014). Detrimental effects of ethanol and its metabolite acetaldehyde, on first trimester human placental cell turnover and function. *PLOS One*, *9*(2), 87328. https://doi.org/10.1371/journal.pone.0087328

Maxwell, R. C., Spangenberg, R. J., Hooek, J. B., Silberstein, S. D., & Oshinsky, M. L. (2010). Acetate causes alcohol hangover headache in rats. *PLOS One*, *31*(12), 15963. https://doi.org/10.1371/journal.pone.0015963

Nelson, K. W., Ege, J. F., Ross, M., Woodman, L. E., & Silverman, L. (1943). Sensory response to certain industrial solvent vapours. *Journal of Industrial Hygiene and Toxicology*, *25*, 282.

Onuki, S., Koziel, J. A., Jenks, W. S., Cai, L., Grewell, D., & van Leeuwen, J. H. (2016). Taking ethanol quality beyond fuel grade: A review. *Journal of the Institute of Brewing*, *121*, 800. https://doi.org/10.1002/jib.364

Rayar, P., & Ratnapalan, S. (2013). Pediatric ingestions of household products containing ethanol: A review. *Clinical Pediatrics*, *52*(3), 203–209. https://doi.org/10.1177/0009922812470970

Research and Markets. (2021, March). Hand sanitizer market size, market share, application analysis, regional outlook, growth trends, key players, competitive strategies and forecasts, 2021 to 2029 (Market Analysis Report). https://www.researchandmarkets.com/reports/5308734/hand-sanitizer-market-size-market-share

Ridder, M. (2020, November 23). Forecasted value of hand sanitizer market worldwide in 2017 and 2024 (in Billion U.S. Dollars). *Statista*. https://www.statista.com/statistics/888373/market-value-of-hand-sanitizer-global/

Siddharta, A., Pfaender, S., Vielle, N. J., Dijkman, R., M., Friesland, Becker, B., J., Engelmann, M., Todt, D., Windisch, M. P., Brill, F. H., Steinmann, J., Steinmann, J., Becker, S., Alves, M. P., Pietschmann, T., Eickmann, M., Thiel, V., … Yang. (2017). Virucidal activity of World Health Organization—Recommended

formulations against enveloped viruses, including zika, ebola, and emerging coronaviruses. *The Journal of Infectious Diseases*, *215*(6), 902–906. https://doi.org/10.1093/infdis/jix046

Statistics Canada (StatsCan). (2020, May 11). Canadian consumers adapt to COVID-19: A look at Canadian grocery sales up to April 11. *Statistics Canada*. https://www150.statcan.gc.ca/n1/pub/62f0014m/62f0014m2020005-eng.htm

Suchomel, M., Kundi, M., Pittet, D., & Rotter, M. L. (2013). Modified World Health Organization hand rub formulations comply with European efficacy requirements for preoperative surgical hand preparations. *Infection Control and Hospital Epidemiology*, *34*(3), 245–250. https://doi.org/10.1086/669528

Tse, T. J., Purdy, S. K., Shen, J., Nelson, F., Mustafa, R., Wiens, D. J., & Reaney, M. J. T. (2021). Toxicology of alcohol-based hand rubs formulated with technical-grade ethanol. *Toxicology Reports*, *8*, 785–792. https://doi.org/10.1016/j.toxrep.2021.03.034

Tse, T. J., Nelson, F. B., & Reaney, M. J. T. (2021). Analyses of commercially available alcohol-based hand rubs formulated with compliant and non-compliant ethanol. *International Journal of Environmental Research and Public Health*, *18*(7), 3766. https://doi.org/10.3390/ijerph18073766

Uebelacker, M., & Lachenmeier, D. W. (2011). Quantitative determination of acetaldehyde in foods using automated digestion with simulated gastric fluid followed by headspace gas chromatography. *Journal of Automated Methods and Management in Chemistry*, *2011*, 907317. https://doi.org/10.1155/2011/907317

United States Food and Drug Administration (US-FDA). (2020, August 27). COVID-19 update: FDA warns consumers about sanitizer packaged in food and drink containers. https://www.fda.gov/news-events/press-announcements/covid-19-update-fda-warns-consumers-about-hand-sanitizer-packaged-food-and-drink-containers

United States Pharmacopeia (USP). (2020, August 17). Excerpted USP-NF and FCC standards: A hand sanitizer resource. https://www.usp.org/sites/default/files/usp/document/health-quality-safety/usp-hand-sanitizer-ingredients.pdf

White, C., Kolble, R., Carlson, R., & Lipson, N. (2005). The impact of a health campaign on hand hygiene and upper respiratory illness among college students living in Residence Halls. *Journal of American College Health*, *53*(4), 175–181. https://doi.org/10.3200/JACH.53.4.175-181

Widmer, A. F. (2000). Replace hand washing with use of a waterless alcohol hand rub? *Clinical Infectious Diseases*, *31*(1), 136–143. https://doi.org/10.1086/313888

World Health Organization (WHO). (2010, April). Guide to local production: WHO-recommended handrub formulations. https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf

World Health Organization (WHO). (2020, March 3). WHO Director-General's opening remarks at the media briefing on COVID-19. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---3-march-2020

Woutersen, R. A., Appelman, L. M., Garderen-Hoetmer, A. V., & Feron, V. J. (1986). Inhalation toxicity of acetaldehyde in rats. III. Carcinogenicity study. *Toxicology (Amsterdam)*, *41*(2), 213–231. https://doi.org/10.1016/0300-483X(86)90201-5

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World Medical and Health Policy

BOOK REVIEW

Sandro Galea. *Well: What We Need to Talk About When We Talk About Health.* Oxford: Oxford University Press, 2019. 304. Hardback. ISBN 978-0190916831.

This book presents multiple perspectives on how health is shaped by conditions outside the health-care system itself. As the title depicts, Galea explores multiple ways of how various life circumstances affect health and argues why understanding and improving them are imperative to improve individual and collective health. This book is divided into 20 chapters, each with its own theme and explanation of how that particular theme can shape our health. The central tenet of the book is derived from Galea's experience as a physician and epidemiologist. Training in medicine and epidemiology, which is a branch of medicine that explores the spread of diseases in populations, enables Galea to incorporate different perspectives within and outside the health-care spectrum. With leadership positions in academic institutions and professional work in different parts of the world, Galea draws on an academic and professional background in medicine and public health to narrate the notion that "Our health is determined by and limited by, the world in which we live" (p. xviii). Throughout the book, we are introduced to different characters, both actual and fictional, to illustrate how their situations relate to social determinants of health and what outcomes might result if causes and conditions were different. Some of these examples even come from movies such as *The Devil Wears Prada* and *Star Trek II* to Charles Dickens's classic literature, *A Christmas Carol*. This storytelling approach further emphasizes the main idea that there are many forces around us that shape health, most of which we, ironically, do not talk about. This idea is conspicuous throughout the book, which aims to shift the conversation of health, individually and collectively. As the world is currently focused on achieving universal health coverage, this is relevant timing to drive the conversation to create a healthier world.

The United States spends more on health care than any other country, yet has worse outcomes than any other high-income country. This book examines political, social, economic, and environmental effects on society and subsequently, health. At the beginning of the book, we are introduced to a character named Sofia, who

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although a fictional character, represents the real-life story of how health is "shaped by a range of social, economic and environmental conditions" (p. 2). The story of Sofia is then reiterated in the following chapters to illustrate how the various chapter themes intertwine to shape our health, including how her life trajectory changed with the changes in her living conditions. Each chapter starts with a story to introduce the idea of the chapter and is then followed by evidence from prior studies. Toward the end of each chapter, Galea argues why it is imperative to improve individual and societal conditions to achieve better health.

Aside from political, social, economic, and environmental factors, Galea also draws on personal and interpersonal factors such as "Love and Hate" (Chapter 7), "Compassion" (Chapter 8), "Knowledge" (Chapter 9), and "Humility" (Chapter 10). The use of these factors, along with sociocultural factors, is consistent with the ecological models, which are pervasively used in public health. The models focus on the basics of people's interactions with their physical and sociocultural environments, including their personal attributes, relationships, living conditions, and policies. Using the simple storytelling approach, for instance by referring to *Star Wars* and *Harry Potter* in Chapter 10, the book further elucidates that love and hate encompass a part of the complex ecosystem "that makes up the 'water' of our health" (p. 69). In addition, this book also presents a combination of the scientific "head" and emotional "heart" arguments. For instance, in Chapter 10 on "Humility", Galea introduces the idea that humility is important in the sense that "humility is an acknowledgment that the world is shaped by forces bigger than we are," while also addressing the fact that HIV persists in South Africa because of the complexity of factors. This means having the humility to recognize even the drug with high effectiveness will not be enough to eradicate HIV without solving the structural factors and inequality that persist to promote the disease.

The comprehensive use of theories, storytelling approach, and arguments allow readers to follow the logical flow of how these factors are linked to health. While this serves as the major strength of the book, this book does not provide readers with tangible and specific calls to action for them as members of society. While the aim of this book is mainly to expand the conversation and dominant beliefs regarding health beyond simply focusing on "health care" or the practice of medicine, readers may want to see what they, as a part of society, can contribute to improving the conditions. For instance, in the chapter "People" (Chapter 6), Galea talks about investing in common spaces to strengthen social ties and to acknowledge loneliness and its effects on health. This can be further specified by citing evidence-based actions such as allocating more resources to community centers for policymakers and organizing community events for community members.

This book concludes with the chapter, "Values," to accentuate how Sofia's story at the beginning can have a different ending when she is supported by a society that values health. This last chapter also consolidates all of the different ideas from the previous chapters, that is, embracing health as a value also means engaging with the full complexity of the conditions that shape it, such as love, hate, compassion, power, politics, and others. This reiterates the main argument that Americans confuse the terms "health" and "health care," in which we "invest

almost solely in the latter at the expense of the former" (p. 199). Through the lens of a writer, a doctor, an immigrant, an academic, and a father, this book will be a useful read not only for health-care professionals but also for a general audience with an interest in health and social justice. As further mentioned by Galea at the end of this book, it depends on us to embrace health as a value and to make it possible for people to achieve their full potential to live well.

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World Medical and Health Policy

BOOK REVIEW

Lisa M. Sullivan and Sandro Galea, eds. 2019. *Teaching Public Health.* Baltimore, MD: Johns Hopkins University Press. $46.49. pp. 352. ISBN: 9781421429809.

What does earning an academic degree in public health entitle you to? If you are lucky, a lifetime of professional growth and fulfillment. Public health is so broad that you will most likely find some niche that will allow you to make a contribution to the betterment of mankind. Yes, there are so many possibilities! But, where does one start? Your career in public health does not start when you have earned your degree. It should have already started while you were in college (possibly even high school), taking those courses that would provide you with the knowledge base that would serve as a foundation upon which to build on during your lifetime of learning and service as a public health professional.

The edited volume *Teaching Public Health* is presented in four parts, with editors Sullivan and Galea's invited authors offering their pedagogical expertise in how to best prepare practitioners for tomorrow. This is not an easy task given that the focus for public health interventions tends to change over time. Part I, "The Public Health Teaching Continuum" provides a historical perspective on the development of public health education, which has grown to 64 accredited schools and 115 accredited programs of public health in 2017.

Teaching Public Health is a textbook meant for those who are interested in preparing individuals to enter the workforce as public health practitioners. Their vision for graduate public health education is based on three principles:

1. Public health education is relevant, authentic, and practical,
2. Public health education is inclusive,
3. Public health education is ongoing. (p. 10)

Public health demands professionals and leaders who are agile and adaptable, excellent communicators, skilled in the methods of public health science and

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practice, and both competent and confident with a natural inquisitiveness that enables them to continually learn and grow (p. 15).

And, "public health educators must provide a wide range of applied skills and an equally broad knowledge base for their graduates" (p. 28). This would include "a basic understanding (or, mastery depending on their academic level) of the broad range of technical public health skills including epidemiology, biostatistics, environmental health, health administration, health behavior change, … also possess crosscutting skills that are necessary for professional success, including teamwork, professionalism, problem solving, communication skills, and innovation, among others" (p. 28).

Part II, in "The Public Health Teaching Continuum," R. Pack and R. Wykoff note, "The greatest difference from the liberal arts is that public health education must explicitly provide an educational experience that prepares its graduates with a defined set of practical skills necessary for success in a specific job market" (p. 27). L. D. Arnold offers a broader approach to undergraduate public health education that should incorporate professional development so that graduates would be prepared to enter the workforce even if they should decide not to go on to graduate school (p. 58).

Adding associate-level public health education can be seen as diversifying the public health workforce because students attending community colleges tend to come from underserved communities. Graduates at this level would become public health generalists, with specialization, or health navigators (K. Johnson and R. Riegelman, pp. 64, 66).

The master of public health (MPH) is the most recognized public health degree, and the most desired degree in public health training for health professionals. Today, numerous dual and combined degree programs include the MPH (i.e., MD/MPH, MBA/MPH, etc.) to broaden and supplement the primary degree. The most useful report was the summary of findings from the National Board of Public Health Examiners 2014 survey of MPH graduates about what knowledge, attitudes, and skills were needed in the workplace. Findings include: "The three most highly rated job tasks were: collecting valid and reliable data, using information technology for data collection, and employing ethical principles in the collection, use, and dissemination of data" (Diener-West, p. 84).

E. Declercq provides an overview of the challenges in offering the DrPH, which is a doctoral-level practice-based degree that is becoming more popular but finds it hard to find its place in academia where the PhD dovetails better with higher education when it comes to research and funding for that activity.

J. Lee's "Lifelong Learning" chapter makes a case for a learning continuum from macrolearning (cognitive, broad concepts, principles, and practices) to microlearning (topical, problem-based), including numerous training resources.

T. Uden-Holman looks at interprofessional education that encourages collaborative learning among students from various disciplines while raising the issue that this is hard between clinical and nonclinical students.

Part III's "Innovation in Public Health Teaching" offered the opportunity for those teaching in public health programs to share their approaches to

accommodating the growing diversity of the student population and how faculty is re-envisioning how to cover basic material while integrating the experiences students may be having as members of subpopulation groups.

Active and collaborative learning promotes student engagement (Cardarelli, Carman, Conatser, p. 148); addressing cultural competency by using the classroom as a cultural experience that encourages a deeper understanding of shared meaning beyond racial and ethnic group behavior (Alexander, p. 161); refocusing courses to emphasize economic and political determinants of health rather than health behaviors to look at health equity made more sense as a student-centered approach in diverse classrooms (Conroy, Altfeld, Herbert-Beirne, Jagai, and Mitchell, p. 176).

Kleinbaum offers some teaching tactics to make classrooms friendly, from making a good first impression, simplifying communication to the use of small group discussions, peer instruction, flipped classroom to the use of teaching assistants to learning management systems, distance learning and modern technology to present materials (pp. 188–92). Greece and Wolff offer a step-by-step approach to practice-based teaching by engaging community organizations (p. 203), while Kane advances using the case method to engage students in meaningful discussions (pp. 211–12).

Linnan, Landfried, French, and Moracco provide a comprehensive evidence-based description of their successful group-based service learning teaching approach, documenting the many capstone projects their students have completed over an 8-year period (pp. 234–35). White and Breckenridge introduce the concept of collaborative learning, a more formalized approach to group projects (p. 249).

Classroom diversity is addressed by Cozier and Godley in how to deal with microaggressions and misunderstandings in classroom discussions in public health courses (p. 258). Gerber and Dolan advocate for service learning as part of the public health curriculum to allow students to actively engage with local communities (p. 269).

Technology resources can foster active learning in today's public health classroom. Lamort and Ryan provide an overview of these resources as well as additional tools for the faculty. Evans and Schwartz present the use of a teaching assistant program to provide doctoral public health students the opportunity to systematically increase their teaching responsibilities while completing their studies (pp. 290–91). Lang and Walker complete Part III with how course evaluations can be used to inform teaching strategies (p. 303).

In Part IV, Valladares, Fisher Salgado, Snyder, and Rabionet address the challenges of public health education in preparing future practitioners to function in interprofessional roles and the need to remember that lifelong learning is necessary to keep up with the ever-changing needs of the communities they will serve for years to come.

Finally, Galea and Sullivan summarize the contributions of the many authors who shared their experiences in teaching students across many geographic areas and communities and to remind us that public health education is an ongoing process for those who chose public health as the career path they would like to contribute to during their professional lives.

This textbook is a wonderful introduction to the fascinating world of public health practice. It offers practical approaches to how educators who seek to teach in this field can use a variety of pedagogical approaches to reach and excite their students about a very challenging profession.

As I write this review, the world is in the midst of combating the COVID-19 pandemic that started a new decade with much apprehension. It is also a wonderful opportunity for students to learn how public health is so much a part of our daily lives, and that without their future contributions to the field, the world would be less able to function on many societal levels. Those who have chosen to teach in the field of public health will find this textbook useful as they prepare their charges to meet the demands of professionals dedicated to ensuring the public's health.

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World Medical and Health Policy

BOOK REVIEW

Beth Schaefer Caniglia, Beatrice Frank, John L. Knott Jr., Kenneth S. Sagendorf, and Eugene A. Wilkerson, eds. 2020. *Regenerative development could be the new paradigm for a climate-resilient urban future, London. Routledge Advances in Climate Change Research. pp. 283. ISBN 978-1-138-55692-8.*

What is regenerative development? Does this new paradigm have the potential to lead us to a healthier, more sustainable urban future with greater climate resilience? 18 authors including senior scholars, consultants, experienced practitioners, and educators contributed to answering these questions from a spectrum of disciplines in 13 chapters. The book frames the regenerative development paradigm as grounded in a worldview where humans are deeply embedded in nature with complex and dynamic interconnection with all living organisms. It defines "common good" as "a thriving and abundant future for all" through citizenship and collective action and emphasizes the significance of systems approach for regenerative development throughout the sub-themes, from psychology to architecture, institutions, economics, education, society, and to culture.

The book begins by engaging with existing literature regarding sustainability, resilience, and regenerative development. Next, it extends discussions surrounding four main themes: systems thinking, novel paradigms, ethics and justice, and changes in social and economic institutions such as economic transformation, collective or social memory, workforce, education, and more.

(1) Systems thinking is deemed critical for achieving a more holistic and comprehensive vision. As Beth Caniglia argues, systems thinking allows multiple forms of capital to coevolve to improved states than current applications of resiliency and sustainability. Similarly, Thomas Dietz argues for improving human well-being while allowing the biosphere to flourish, that is, thinking

[Correction added on 19 February 2021, after first online publication: Title has been updated to "Regenerative development could be the new paradigm for a climate-resilient urban future"]

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about development and conservation, human well-being, and the biosphere as in one complex coupled human-environmental system.

(2) Novel paradigms from behavioral and psychological sciences are explored. Carol Sanford discusses emerging paradigms that generate diverse worldviews in regenerative development, including evolve capacity, do good, arrest disorder, and extract value paradigms. Nicholas Mang follows by highlighting the need for psychological paradigms to understand better how humans can become integral members and contributors to the ecological systems.

(3) Ethics and justice as core values in regenerative development are discussed. David Pellow emphasizes the need to address environmental injustice, e.g., the impacts of discrimination on marginalized populations. Thomas Burns, Tom Boyd, and Carrie Leslie argue that mismatch between societal institutions and the alienated individualism of modern society needs to be resolved to make the environment a central organizing principle of regeneration or to enable ethical, deliberative governance.

(4) Having set the core value foundation, systems thinking as a central approach, and behavioral and psychological paradigms, the book then shifts to discuss changes in social and economic institutions. Hunter Lovins discusses regenerative economy and the need to change the current economic model to create an economy to serve life rather than consumption, and describes the principles and means needed, e.g., economic decarbonization and the shift to regenerative agriculture. John Knott, the founder of CityCraft®, explains how to implement regenerative building and design through two case study areas in Dewees Island and Noisette. Rebecca Sheehan discusses regenerative socio-cultural capital of memorialization, the principles to enhance communal narratives and to keep the social memory of public spaces alive. Jennifer Cross and Josette Plaut discuss the principles of regenerative development from a social science standpoint and the core capabilities of regenerative practitioners. Eugene Wilkerson and Allison Dake argue that workforce in regenerative development should play a role with more societal impact, rather than simply be temporary capital assets. Lastly, Kenneth Sagendorf and Barbara Jackson reflect on how education can benefit from the principles of heroic leadership, with self-awareness, ingenuity, love, and heroism, integrated with systems thinking, to produce the next generation of regenerative development professionals.

The book offers a generous and interdisciplinary collection of profound theoretical reflection and practical introduction to regenerative development organized with rigorous logic and without too many jargons. It is suitable for a wide range of readers—students, teachers, urban planners, policymakers, and citizens who share an interest in environmental and human health, sustainability, and the common good of our urbanized future under climate change. The book inspires and supports readers to build a broad and holistic worldview. The authors' efforts to construct a comprehensive knowledge framework for regenerative development reflect their noble conscience as intellectuals and active citizens.

The relatively weak side of the book could be that it is relatively normative and falls short in providing more straightforward "how-to" policymaking suggestions. However, this is a common shortcoming of knowledge products in many fields of academia nowadays; it arises from the mismatch between scientific expectations to explore eternal truths and the practical urgency for resolving real-world sustainability issues arising from rapid urbanization and climate change. Recognizing this shortcoming is certainly important, yet, the fact that many intellectuals and active citizens are working with valuable knowledge to construct a novel discourse for sustainability and the greater common good is plausible.

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World Medical and Health Policy

BOOK REVIEW

Sara Hughes. *Repowering Cities: Governing Climate Change Mitigation in New York City, Los Angeles, and Toronto*. Ithaca and London: Cornell University Press, 2019. $41.95. pp. 224. Hardcover. ISBN 9781501740411.

As the amount of research on urban responses to climate change has grown in recent years, so too has the recognition of the city as a site for combating the threat of climate change. The raison d'etre of cities should remain at the core of mitigation efforts, considering that cities may be responsible for up to 75 percent of global emissions of carbon dioxide from anthropogenic sources, as suggested in the International Energy Agency (IEA) and the Stern Review (International Energy Agency, 2008; Stern, 2007). Hari Osofsky has argued the nature of climate change regulation necessitates multi-scalar legal approaches, that is, ones that simultaneously engage more than one level of governance (Osofsky, 2009).

Hughes in her book, *Repowering Cities*, focuses on local efforts to address global climate change. New York City, Los Angeles, and Toronto serve as empirical bases for examining how city governments make a commitment to climate change mitigation and then transition to fulfilling it: the governance processes and political mechanisms by which a city government works to steer its city in a new direction.

Hughes has devoted much of her scholarship to addressing climate change in association with cities. She is well-positioned to continue to make significant contributions to this important research area. Her analytical introduction underscores the nuances of each chapter and prepares the reader for a better understanding of what follows. Hughes's initial paragraph of her introduction saying "an inversion is taking place" signals city government is better placed and better prepared to deal with non-routine challenges such as climate change. New York City, Los Angeles, and Toronto may not adequately represent all of the major cities of the developing world, yet the author's selection of these cities seems well suited for her project.

In Chapter 1 titled, "Progress or Pipe Dream? Cities and Climate Change Mitigation," she details current research on cities and climate change. Cities emerging as innovative, entrepreneurial, and innovative actors addressing climate change, accompany recent developments in collective urban governance and responsibility. For instance, the International Council for Local Environmental Initiatives (ICLEI),

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an initiative of Local Governments for Sustainability, has grown over the past two decades to include over 1,000 members worldwide. Thus, ICLEI membership accounts for approximately 15 percent of global anthropogenic greenhouse gas emissions. Furthermore, the C40 Cities Climate Leadership Group (C40), which is a group of 40 of the world's global cities to address climate change, is collaborating with ICLEI to establish a global standard for accounting and reporting community-scale greenhouse gas (GHG) emissions that can be used across multiple platforms. In 2009, the Mayors of Europe entered into the Covenant of Mayors, an initiative involving local and regional authorities voluntarily committing to increasing energy efficiency and renewable energy source use within their territories. She mentions that the cities have climate change programmes but they are piecemeal, slow, and quite often show a gap between rhetoric and reality. The gap between ambition and reality should have been explored from the angle of the scope of local climate co-benefits. For instance, the cities in developing countries where climate change has yet to figure prominently on the agenda can think of climate change programmes in lieu of potential improvement in air quality.

In her second chapter focusing on the "Evaluation of Urban Governance," she states city governments devise their climate policy mitigation agendas in accordance with their context; associated with three governing strategies—institution building, coalition building, and capacity building—which support city governments' capacity to govern by mobilizing needed actors and resources. Hughes is of the view that the yardstick to assess cities' contributions to climate change mitigation should go beyond direct reductions in GHG emissions and incorporate indirect catalytic effects at other scales. The empirical study of the three cities is purely guided by the mitigation-centric influence as compared to an adaptation-centric approach.

Her fourth chapter titled, the "Means behind the Methods," focuses on governing strategies deployed by the three cities to reduce greenhouse gases. The governing strategies facilitate action toward climate change and channel resources toward such efforts. She discusses how the three cities have used the three governing strategies, institution building, coalition building, and capacity building, to support efforts to reduce GHG emissions. She mentions the specific plans of the three cities, which include agendas of GHG reduction, banking on the energy use benchmarking programme and legislations.

The fifth chapter evaluates the progress that the three cities have made in reducing greenhouse gases. In addition to a 12–26 percent reduction of GHG since 2007, she says that each city's governing efforts have produced broader systems changes—or catalytic efforts-by providing lessons or motivations for other cities or levels of government to act on climate change. Realizing the target requires what New York City governor Bloomberg suggests: "you can't manage what you can't measure." The idea to select 2005 as the GHG peak year by New York City supported by the role of systematic and transparent inventorying of GHG emissions from sources and trends to realize the target might encourage major cities of the world to follow it to make deep cuts in GHG globally."

The idea to select 2005 as the GHG peak year by New York City accompanied by systematic and transparent inventorying of GHG emissions from sources might encourage other major cities of the world to move in a similar direction.

In her conclusion, Hughes captures what has already been discussed and analyzed in the preceding chapters. As compared to routine concerns of city governments, such as public health and sanitation, the book by focusing on non-routine concerns of climate change is a significant contribution by itself. Hughes recommends that city governments must move from adopting a policy platform or emission reduction target to reconfiguring political, institutional, and organizational landscapes to overcome the uncertainty of dealing with the challenges of climate change.

It is an oversimplification to say that the strategies deployed by the three cities to reduce GHG can be used by all of the cities of developed and developing countries alike to reduce GHG. She largely addresses the role of legislative and executive agencies focusing on GHG reduction. Local efforts should also include the role of the lower judiciary. One may disagree with Hughes' assessment that unlike national bodies, city governments are free from partisan bickering and therefore able to move forward with good ideas as they arise. This book reads very well and is useful for students and researchers interested in urban governance and climate change. Moreover, practitioners and policymakers, including city planners and mayors may learn from the strategies deployed by the three cities to reduce GHG.

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References

International Energy Agency. 2008. *World Energy Outlook 2008*. Paris: IEA. https://webstore.iea.org/download/direct/769

Osofsky, Hari. 2009. "Is Climate Change International? Litigation's Diagonal Regulatory Role." *Virginia Journal of International Law* 49: 585–650.

Stern, Nicholas. 2007. *The Economics of Climate Change: The Stern Review*, (p. 517). London, UK: Cambridge University Press, Cambridge.

World Medical and Health Policy

BOOK REVIEW

Richard Rothstein, *The Color of Law: A Forgotten History of How Our Government Segregated American. New York: Liveright, 2017. pp. 368. ISBN-13: 978-1631492853S.*

The Color of Law illustrates the history of segregation in the United States through case studies and narratives of victims of structural violence disenfranchised by racist policies and programs destroying any chance of upward mobility for Black and Brown folks throughout the country. Through 300+ pages, this book details how the U.S. government created and supported residential segregation through the Federal Housing Administration and housing policies and programs in general. Through this entity, several pieces of legislation arose from the 1930s outright making home loans unaffordable to historically marginalized populations, denying them access to building generational wealth. The contemporary nature of this book cannot be overstated. Over the decades, the connection between housing and health has been well-established. As a social determinant of health, housing plays a critical role in individual as well as population health (Krieger & Higgins, 2002; Taylor, 2018). This book artfully captures the historic context and highlights the structural racism pathways that further elaborate contemporary conditions on health and housing nexus.

This form of segregation is called *de jure* segregation and is highlighted throughout the book. The contemporary relevance of this book is incredibly valuable to the issues Black and Brown residents face related to gentrification and displacement in the U.S.. Residential integration has mostly stalled since the steady decline from 1880 to the mid-20th century leaving school systems and communities segregated, less culturally diverse, and ill-equipped to bring folks out of poverty into non-precarious socioeconomic status. Rothstein calls upon us to make institutional and structural changes to positively affect those impacted by these policies.

Through 12 chapters, Rothstein highlights the impacts of various racist ideologies, policies, and programs that were supported by local, state, and the federal government over a span of nearly 150 years beginning Post-Civil War. The book's lack of time-linearity sometimes makes it a less easy read as some of these chapters can be a bit disjointed as the author shows connectivity and the complex nature of

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de jure segregation across 150 years. However, the high-quality examples Rothstein draws upon are captivating and help the reader understand the depth in which structural racism has impacted the U.S. Black communities including health outcomes. For instance, Rothstein highlights the role of housing in disproportionately higher rates of asthma among Black American children (p. 2, ch. 12) and the role of municipal codes in health outcomes (ch. 2).

As Rothstein notes from the outset, if the government explicitly segregated the population in the Bay area, one of the most liberal areas in the country, it is a reasonable assumption that our government also segregated other metropolitan regions with at least as much determination (p. 3). Despite pro-segregation groups taking their arguments to the courts and losing (e.g. *Buchanan v. Warley*), they still enforced racial zoning ordinances in cities such as Atlanta, St. Louis, and Chicago's suburbs (Ch. 3). In the 1950s, many families were barred from certain neighborhoods because of the Federal Housing Administration—and the Veterans Administration—imposed conditions (i.e., having racial covenants in deeds) (p. 70), effectively eliminating opportunities for Black soldiers (p. 85). Even after the 1948 *Shelley v. Kraemer* case, which prohibited governments from enforcing racial-restrictive covenants such as deeds barring the sales to African Americans, these covenants, and support by the FHA, overtly persisted until President John F. Kennedy's executive order prohibiting the use of federal funds to support racial discrimination in housing (p. 88).

Richard Rothstein highlights how public housing was not exempt from these policies as Housing Authorities were discriminatory with Black families and wrote several disqualifying factors for prospective tenants such as out-of-wedlock birth and even poor housekeeping habits to discourage applications (p. 19). Rothstein then draws upon the Internal Revenue Service's complicity in promoting *de jure* segregation by allowing tax exemptions for white-only academies following the *Brown v. Board of Education* case (p. 102), and the "reverse redlining" (i.e., excessive marketing of exploitative loans in Black communities) persisting as recent as the last decade. These subprime mortgages went into default during the 2008 economic downturn, forcing many middle-class Black residents into low-income areas (p. 109). Former Secretary of Housing and Urban Development Shaun Donovan stated that because of Countrywide's and other lenders' practices, strong, middle-class Black neighborhoods "saw nearly two decades of gains reversed in a matter of not years—but months (p. 112).

Rothstein further highlights how disposable income among Black families was suppressed due to exorbitant taxes and rent hikes in Black neighborhoods contrasted to white, more affluent neighborhoods. Rothstein eloquently details the impact of residential segregation and the difficulties of undoing more than a century's worth of complacency and complicity in racially derived programs and policies. Rothstein underlines how parents' economic status impacts generational wealth; how abatement of labor market discrimination was too late resulting in unaffordable housing outside of urban neighborhoods and much more. Current policies and a lack of adequate increase in wages for working-class families over the past several decades have only expanded the wealth gap. Couple this with the lack

of affluent role models, poor education, and greater community instability resulting in stress, Black children are far more likely to be negatively impacted and stay poor—especially compared with their white counterparts (Ch. 11). It is critical to note because a community's stability (Bures, 2003) and income security (Ettner, 1996; Haan, Kaplan, & Camacho, 1987) are directly associated with improved physical and mental health outcomes.

In conclusion, one theme remains prevalent: change cannot happen as long as the myth of segregation being in America's past persists. Rothstein justifiably makes it clear that it is imperative that Black people be included in programs that support their upward mobility in order to maximize the reversal of *de jure* segregation. This informative and well-researched account of how the government promoted segregation and its lasting impacts will be useful to a wide audience; particularly for those who are looking for tangible examples and ideas to combat structural racism in the United States.

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References

Bures, Regina M. 2003. "Childhood Residential Stability and Health at Midlife." *American Journal of Public Health* 93 (7): 1144–48.

Ettner, Susan L. 1996. "New Evidence on the Relationship Between Income and Health." *Journal of Health Economics* 15 (1): 67–85.

Haan, Mary, George A. Kaplan, and Terry Camacho. 1987. "Poverty and Health: Prospective Evidence From the Alameda County Study." *American Journal of Epidemiology* 125 (6): 989–98.

Krieger, James, and Donna L. Higgins. 2002. "Housing and Health: Time Again For Public Health Action." *American Journal of Public Health* 92 (5): 758–68.

Taylor, Lauren. 2018. "Housing and Health: An Overview of the Literature." *Health Affairs Health Policy Brief.* https://doi.org/10.1377/hpb20180313.396577

World Medical and Health Policy

Book Review

Filho, Walter Leal Ulisses M. Azeiteiro Fátima Alves. *Climate Change and Health: Improving Resilience and Reducing Risks. Cham: Springer International Publishing AG Switzerland, 2016. pp. 532. ISBN 978-3-319-24658-1, 978-3-319-24660-4 (eBook).*

It seems that most people have inadequate knowledge of the serious impact of climate change on health and well-being. However, the word "climate change" is about to spread around the world and constitutes key elements of the United Nations Sustainable Development Goals. *Climate Change and Health: Improving Resilience and Reducing Risks* points out "climate change is seen—and perceived—as being one of the most important challenges of modern times." Additionally, the editors explain that "climate change may affect our health in a far-reaching way than we may think." For example, we don't have direct evidence of the relationship between the COVID-19 pandemic and climate change, but it does not mean that we will not soon regard the COVID-19 pneumonia as one of the infectious diseases, such as those discussed in the second part of the book, which is induced by climate change (Harvard C-CHANGE, 2020).

This book is the seventh volume of the "Climate Change Management" series edited by Walter Leal Filho, which aims to create and share knowledge about the socioeconomic, political, and cultural dimensions of climate change, including the social determinants of health. In this book, Leal Filho, a professor at Hamburg University of Applied Sciences in Germany and Manchester Metropolitan University in the United Kingdom, and his coeditors have assembled 27 chapters into 4 parts: "Human Health and Climate Change;" "Climate Change and Infectious Diseases;" "Climate Change and Health: Education, Training and Governance;" and "Climate Change and Health Across Regions." It is crucial that climate change is recognized as a multifactorial problem that affects our health through multiple direct and indirect pathways. The readers of the book will concretely understand these associations in reading these four aforementioned evidence-based sections.

The first part of the book, "Human Health and Climate Change," includes chapters regarding psychiatric disorders, cardiovascular disease, air quality, and food security. In the middle section, the writers pose a question "Can concern for

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air quality improvement increase the acceptability of climate change mitigation policies?" They conclude there is a win-win strategy to use air quality concerns as a driver for climate change policies with detailed scientific evidence. This approach strongly integrates climate change with health. In this context, the World Medical Association (WMA) encourages shifting urban traffic to public transportation systems aligning with the WMA Statement on the Prevention of Air Pollution due to Vehicle Emissions (WMA, 2014).

The second part of the book, "Climate Change and Infectious Diseases," presents several models, which predict forthcoming infectious diseases associated with climate change. The writers also tell us the history of infectious disease prevention and recurrence. The history overlaps that of clinical research, a branch of medical science that determines the safety and effectiveness of medications, devices, diagnostic products, nutrition or behavioral changes, and treatment regimens intended for human use, and strongly supports the importance of research on climate change (Nakamura, Khawaja, Castillo, Fregni, & Freedman, 2018).

As a physician, I wish the editors had included a chapter describing universal health coverage in the third part of the book, "Climate Change and Health: Education, Training, and Governance." The book explains that climate conditions interfere with people's health in a number of ways, quantifying its risk in public health. Consequently, many readers will realize that the integrated health care system contributes to people's health, closely associated with climate change, although disease-specific programs are always necessary. Universal health coverage is one of the most promising systems though efforts are necessary to leave nobody behind (Kloiber & Apinis, 2019).

"Climate Change and Health Across Regions," the fourth and last part of the book, focuses on heat vulnerability, poverty, and health inequality, in other words, the social determinants of health. The WMA, having been giving thoughtful attention to the social determinants of health, mentions them in the WMA Declaration of Delhi on Health and Climate Change. The book offers precious regional experiences with in-depth interviews to consider how we should "adapt to the adverse effects of climate change" (WMA, 2017, para. 4).

Although it would be great to add information about cancer, universal health coverage, and how to promote ethical research regarding climate change and health, the book is outstanding and provides significant perspectives and exhaustive information on the basic concepts of climate change and health. It is a worthwhile resource for those interested in either climate change or health, or both.

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References

Harvard C-CHANGE. 2020. *Coronavirus, Climate Change, and the Environment* [Online]. https://www.hsph.harvard.edu/c-change/news/coronavirus-climate-change-and-the-environment/. Accessed April 17, 2020.

Kloiber, Otmar, and Peteris Apinis. 2019. "The Astana Conference on Primary Health Care. Interview with Otmar Kloiber, Secretary General of the World Medical Association by WMJ Editor Peteris Apinis." *World Medical Journal* 65 (1): 13–5.

Nakamura, Rui, Faiza Khawaja, Laura Castillo, Felipe Fregni, and Steven Freedman. 2018. "Basics of Clinical Research: Introduction to Clinical Research." In *Critical Thinking in Clinical Research*, eds. Felipe Fregni, and Ben M.W. Illigens. New York: Oxford University Press, 3–25.

The World Medical Association (WMA). 2014. *The World Medical Association Statement on the Prevention of Air Pollution due to Vehicle Emissions* [Online]. https://www.wma.net/policies-post/wma-statement-on-the-prevention-of-air-pollution-due-to-vehicle-emissions/. Accessed April 17, 2020.

The World Medical Association (WMA). 2017. *The World Medical Association Declaration of Delhi on Health and Climate Change* [Online]. https://www.wma.net/policies-post/wma-declaration-of-delhi-on-health-and-climate-change/. Accessed April 17, 2020.

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BOOK REVIEW

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"Save My Kid": How Families of Critically Ill Children Cope, Hope, and Negotiate an Unequal Healthcare System

Amanda M. Gengler

New York City, New York. New York University Press, 2020. $30.00. pp 241. Paperback. ISBN: 9781479864621

Navigating the world of pediatric health care can be overwhelming for parents of critically ill children from all backgrounds. In *Save My Kid*, Amanda Gengler, a professor of Sociology at Wake Forest University in Winston Salem, North Carolina, USA, does a phenomenal job of explaining how issues such as race, social-economic status, and class can further complicate this experience for some families. One of the most compelling aspects of *Save My Kid* is Gengler's ability to convey the narratives and stories of both families and medical providers in a way that clearly captures the essence of her book, while also providing balance and a fair assessment from both sides of these complex discussion.

Save My Kid gives life and voice to the emotional and often hidden struggles families grapple with while seeking the best care possible for their sick children. It specifically addresses the bias and barriers that are systemically present within the healthcare system. Families are often met with undue grief and frustration in obtaining quality care for their child (ren) unless they are privy to knowledge and resources which they can leverage to advocate and demand appropriate care.

Gengler interviews several families and medical providers to gather case studies, by which she then draws contrast and comparisons between the various cases. By identifying the interconnected themes between the cases, she helps to solidify that the challenges families face are not isolated incidents, experiences, or just chalked up to personal emotions, but rather they are systemic issues that perpetuate an imbalanced healthcare system for children. Gengler explores the concept of "hope" throughout her work and explains how "hope" is a vehicle that manages to carry many families through their journeys. According to Gengle, "hope" helps families to cope, drives their strength to advocate for their sick child, and helps them to stay focused on the health of their child amidst the distractions of bias, inequality, and frustration. "Hope" serves its purpose in these complex circumstances, however, Gengler argues that "hope" does not resolve these issues that overwhelmingly need to be addressed within pediatric health care.

Gengler's book has much to offer the pediatric medical community. It offers significant insights regarding communication with families, and how medical professionals can best work with families to understand their experience and create the best outcome for the patient. This study reminds us that families are all different and that medical professionals must be careful not to assume what each family's knowledge, skills, and awareness is regarding medical conditions or medical-related matters. Taking into consideration some of the more escalated conflicts described in the family and physician stories shared in this text, this study also offers to physicians and other medical professionals, solutions to preventing,

de-escalating, and resolving conflicts between families and medical staff. Gengler offers several examples of medical professionals who express their own frustrations with health care, but also take seriously their responsibility to demonstrate compassion and advocate for every patient and family within their care.

Concerning limitations, this book was likely already in publication by the time the COVID-19 pandemic arrived in the United States in early 2020, but it would be interesting to learn, what, if any, impact, and implications the COVID-19 pandemic has had on exacerbating the issues raised in this study. It would particularly be interesting to explore how class and race have played a role in the access of healthcare and health resources within the pediatric context during the course of the pandemic. In addition, though not a limitation, it would be interesting to build upon Gengler's work and learn more about how both families and medical professionals together suggest dealing with and overcoming these systemic hurdles and creating a more just healthcare system.

Overall, I highly recommend this book to any current or aspiring healthcare professionals working in the specialty of pediatric health care. This book provides readers with a landscape view of what families experience and how they perceive their experiences within health care. This book also highlights the unequal system pediatric patients and families are faced with navigating. It would make an ideal addition to required readings lists for nursing programs, medical schools. and other health professions training. If you're interested in learning more about how inequality and injustice show up in pediatric health care, and how we can become better advocates within health care, this book is a must-read.

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