DECEMBER 2022

ACADEMIC RESEARCH REPORT

FROM COVID-19 TO VECTOR-BORNE DISEASES: CAPITALIZING ON CITY DIPLOMACY FOR HEALTH

Alma Weijia Chen, Giulia Di Maio, Sara Emilie Lafontaine

REPORT PREPARED IN PARTNERSHIP WITH UN-HABITAT GENEVA

GENEVA GRADUATE INSTITUTE

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT

GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

UN HABITAT FOR A BETTER URBAN FUTURE

Acknowledgements
We are grateful for the Geneva Graduate Institute academic team for their support and giving us the opportunity to participate in this Applied Research Project. In particular, we are thankful to our Academic Supervisors, Dr. Carole Presern and Dr. Ryan Patrick Whitacre for their insightful suggestions and guidance on our research project. We would like to also extend our sincere thanks to Rafael Carrano Lelis, Applied Research Assistant, for his unparalleled support, patience, and valuable advice throughout the course of this project.

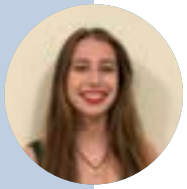
We would additionally like to extend our deepest gratitude to our Research Partner, UN-Habitat Geneva Office; in particular, to Dr. Graham Alabaster. We have appreciated your support and expertise on this topic, and we are grateful for your suggestions and constructive advice at every stage of our research process. We wish to extend this thanks to the other participating UN-Habitat country offices and all interviewees, without whom this project would not have been successful.

Word Count: 10,948 *(excluding foonotes and appendix)*

For more information, please email us at arp.2022citydiplomacyhealth@graduateinstitute.ch.

ABOUT THE RESEARCH TEAM

Alma Weijia Chen (she/her/elle)
Alma is a Master's candidate in Development Studies at the Geneva Graduate Institute, with concentrations in "Mobility, Spaces and Cities" and "Genders Studies". She holds a bachelor's degree in Social Sciences from the University of Hong Kong. Her research interests focus on diaspora studies, diplomatic studies, and global governance.



Giulia Di Maio (she/her/elle)
Giulia is a Master's candidate in Development Studies at the Geneva Graduate Institute, majoring in Gender and Mobility Studies. She holds a Bachelor of Arts in Global Governance from the University of Rome Tor Vergata. Her research interests currently revolve around reproductive politics, rights and technologies, and feminist theory.

Sara Emilie Lafontaine (she/her/elle)
Sara is a Master's candidate in International Affairs at the Geneva Graduate Institute with concentrations in Global Health and Environment, Resources, and Sustainability. She holds a Bachelor of Science in Public Health in Environmental Health Sciences from the University of North Carolina at Chapel Hill. Her research interests include environmental health, antimicrobial resistance in humanitarian aid, and human rights.

TABLE OF CONTENTS

LIST OF ACRONYMS

BOVA	Building Out Vector-Borne Disease (Network)
CCC	Urban Command and Control Center
COR	Centro de Operações da Prefeitura do Rio
COVID-19	Coronavirus Disease 2019
EAC	East African Community
FAO	Food and Agriculture Organisation
GVH	Global Vector Hub (Network)
HIV	Human Immunodefinciency Virus
ISA	International Sustainability Academy
IVM	Integrated Vector Management
MoU	Memorandum of Understanding
OAU	Organization of African Unity
OECD	Organization for Economic Co-operation and Development
OHCHR	Office of the High Commissioner for Human Rights
PAHO	Pan American Health Organization
PPE	Personal Protective Equipment
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Program
VBDs	Vector-Borne Diseases
WHO	World Health Organization
WMP	World Mosquito Program
WOAH	World Organisation for Animal Health

ABSTRACT

City diplomacy embodies cities' international engagement. The COVID-19 pandemic has given cities a fresh and urgent mandate for such engagement, especially in coordination and cooperation in the face of public health crises. However, knowledge from practitioners is lacking and the lessons have yet to be drawn to guide the response to other diseases. In collaboration with the UN-Habitat Geneva Office, this research exploratorily investigates emerging city diplomacy activities during the COVID-19 pandemic to inform vector-borne diseases (VBDs) management. Through a comparative lens, this research draws on the experiences of three cities from Asia, Africa, and Latin America, namely Guangzhou, China; Nairobi, Kenya; and Rio de Janeiro, Brazil. Based on analyses of the challenges and opportunities of city diplomacy practitioners during the pandemic, and their implications for the three cities' future VBDs management, policy recommendations are offered to tap into the potential of city diplomacy for health.

INTRODUCTION

Many global issues call for local solutions. Among others, the COVID-19 pandemic and vector-borne diseases (VBDs) exhibit the relevance of cities in managing global challenges.[1] Cities, as the contemporary fulcrum of global society and polities, carry out self-interested diplomatic activities in mediated relations between themselves and with other non-governmental political actors.[2] These activities occur along different dimensions such as security, development, economy, culture, and policy advocacy.[3] The COVID-19 pandemic has given cities a fresh and urgent mandate for coordination and cooperation, specifically on matters of "travel, medical supplies, and general harmonization of response procedures".[4] Cities have demonstrated many strengths in dealing with the global public health crisis, including their pragmatic orientation, trust from constituents, and credibility for action.[5] The problem-solving role of cities on the crisis frontlines has animated narratives and beliefs that cities are able to promote "multilateralism restored" from the bottom.[6] For example, UN-Habitat published *Cities and Pandemics: Towards a More Just, Green and Healthy Future,* a report foregrounding the role of cities in addressing inequality and improving resilience in the face of public health crises.[7] While the post-pandemic future is full of uncertainties, the COVID-19 pandemic has certainly propelled local actors to remain active globally.

Although it is acknowledged that city diplomacy plays a key role in health, knowledge from practitioners is lacking. The linkages between the current experiences of city diplomacy in COVID-19 and other diseases have also yet to be explored. To fill in this gap, this study is an applied research project in collaboration with the UN-Habitat Geneva Office to understand emerging city diplomacy activities during the COVID-19 pandemic to inform VBDs management. VBDs constitute a significant public and global health issue that accounts for "more than 17% of all infectious diseases, causing more than 700,000 deaths annually".[8] VBDs have been a focus of actors ranging from local, non-profit, international, and intergovernmental organizations, including the World Health Organization (WHO).[9] This study focuses on VBDs biologically transmitted by the mosquito vector genus *Aedes*, including *Aedes albopictus* and *Aedes aegypti.* Globalization and its ecological plasticity have greatly contributed to the widespread prominence of *Aedes* mosquitoes, a known vector of yellow fever, dengue, chikungunya, and Zika virus. Like the COVID-19 pandemic, VBDs

1 Michele Acuto, Anna Kosovac, and Kris Hartley, "City diplomacy: another generational shift?." *Diplomatica* 3, no. 1 (2021): 137-146.

2 Michele Acuto et al., "City Diplomacy' and Twinning: Lessons from the UK, China and Globally." *City Leadership Initiative, Department of Science, Technology, Engineering and Public Policy, University College London (UK Government Office for Science)*, (2016).

3 Anthony F. Pipa and Max Bouchet, "Multilateralism Restored? City Diplomacy In The COVID-19 Era," *The Hague Journal Of Diplomacy* 15, no. 4 (2020): 599-610, doi:10.1163/1871191x-bja10043; Acuto et al., "City Diplomacy' and Twinning: Lessons from the UK, China and Globally."

4 Acuto, Kosovac, and Hartley, "City diplomacy: another generational shift?," 6.

5 Pipa and Bouchet, "Multilateralism Restored? City Diplomacy In The COVID-19 Era."

6 Acuto, Kosovac, and Hartley, "City diplomacy: another generational shift?," 6-7.

7 UN-Habitat, *Cities and Pandemics: Towards a more just, green and healthy future,* 2021, https://unhabitat.org/cities-and-pandemics-towards-a-more-just-green-and-healthy-future-0.

8 "Vector-borne Diseases," World Health Organization (WHO), 2020, https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases.

9 "Network seeks to build better in bid to fight diseases in urban settlements," UN-Habitat, April 12, 2019, https://unhabitat.org/network-seeks-to-build-better-in-bid-to-fight-diseases-in-urban-settlements.

disproportionately target vulnerable groups and require cities and networks to collectively mobilize to build resilience.

This research adopts a bottom-up perspective to inquire if local actors, including mayors and municipal administrations, have explored and undertaken city diplomacy approaches. A comparative lens is adopted to analyze three case study cities: Guangzhou, China; Nairobi, Kenya; and Rio de Janeiro, Brazil. Ultimately, it aims to connect theories and practices by offering policy recommendations to tap into the potential of city diplomacy for health. This project is in line with UN-Habitat's *New Urban Agenda*, which delineates commitments to strengthening city collaborations and improving health.[10] It provides a renewed understanding of city diplomacy, combining academic and practical perspectives to comparatively consider local experiences. This report not only benefits local actors who are interested in improving public health management through city diplomacy, but also benefits individuals and organizations working in the fields of global health governance and city diplomacy.

10 UN-Habitat, *New Urban Agenda,* 2017, https://habitat3.org/wp-content/uploads/NUA-English.pdf.

LITERATURE REVIEW

A. CITY DIPLOMACY

The increasing rates of globalization and range of diplomatic actors and venues demonstrate diplomacy is no longer an exclusive function of sovereign states.[11] Scholars argue for expanding the concept of diplomacy beyond state-centric analyses of political agendas and towards the so-called "society-centric perspective" that emphasizes non-state processes and relations.[12] Among other transnational actors, cities are subnational entities that locally experience and contribute to solving global issues. Cities engage in diplomacy through mediated relations between themselves and with other non-governmental political actors.[13] The term "city" encompasses a duality of spatial and political meanings: As a territory, "city" is an urban area with administrative boundaries; As a government, "city" represents a public, subnational body responsible for the governance of an urban territory. Common city features of an executive branch, political assembly, and permanent staff lay the groundwork for city diplomacy and service provision to their local communities.[14]

City diplomacy is defined as "the institutions and processes by which cities, or local governments in general, engage in relations with actors on an international political stage with the aim of representing themselves and their interests to one another".[15] Formal and informal relationships have long existed between many levels of sub-national, local governments, and external entities.[16] Acuto, Kosovac, and Hartley note that the historical understanding of international relations scholars about city diplomacy has experienced various generations "from cultural exchange and bilateral city-to-city relationships to complex mechanisms and circuits for international coalition-building and policy diffusion".[17] Reflecting on the impact of the COVID-19 pandemic on cities' mandate, a new generational shift towards global urban governance may be happening. Appendix 1 summarizes some of the tools, or embodiments, that are commonly seen in city diplomacy.

Unclear definitions and authority for international engagement within the scope of city diplomacy promote confusion. To add some clarification, Lara proposes a typology of activities that cities use to insert themselves into the international system, which distinguishes cities' role in the international system at three levels: cities as a locus where some actors interact and/or are located; cities as actors with agency in the international system; and cities with the ability to influence other

11 Geoffrey Pigman, *Contemporary diplomacy* (Polity, 2010).

12 Bertrand Badie, "Transnationalizing diplomacy and global governance," in *Diplomacy in a globalizing world: Theories and practices*, ed. P. Kerr and G. Wiseman (Oxford: Oxford University Press, 2012).; Donna Lee, and Brian Hocking, "Economic diplomacy," in Oxford *Research Encyclopedia of International Studies* (2010).; Donna Lee and David Hudson, "The old and new significance of political economy in diplomacy," *Review of International Studies* 30, no. 3 (2004): 343-360.; Michaella Vanore, "Diasporas as Actors of Economic Diplomacy," in *Routledge International Handbook of Diaspora Diplomacy,* ed. L. Kennedy, (Routledge, 2022), 156-168.

13 Acuto et al., "City Diplomacy' and Twinning: Lessons from the UK, China and Globally."

14 Ibid.

15 Rogier van der. Pluijm and Melissen, *City diplomacy: The expanding role of cities in international politics,* (Hague: The Netherlands Institute of International Relations Clingendael, 2007), 11.

16 Pigman, *Contemporary diplomacy*, 46.

17 Acuto, Kosovac, and Hartley, "City diplomacy: another generational shift?," 138-139.

practitioners and decision-makers.[18] While all these levels present distinctive values, current literature has failed to capture the full dynamics in play due to a tendency to focus on local governments as a single primary actor.[19] Kihlgren Grandi points out that most of the available publications on city diplomacy center on municipal planning or on its international impact.[20] Likewise, Acuto and Leffel critically comment that literature on city diplomacy is typically oriented towards the outputs and impacts in relation to global governance, further noting that there is a lack of explicit "inside out" view of how networks function.[21] To advance the academic agenda on city diplomacy, a gap to be filled lies in exploring the agency of cities in dealing with global issues and their internal dynamics involving a wide range of local actors.

B. CITY DIPLOMACY FOR HEALTH

Transnational city networks have jointly committed to address public health challenges and economic recovery throughout the COVID-19 pandemic.[22] Cities have proven their potential as global health actors, particularly in the initial stage of pandemic response. Although the role of city diplomacy in global health has historically been limited, the COVID-19 pandemic response and outcomes have influenced urban networks and collaboration mechanisms, offering innovative ways to understand city diplomacy networks, such as for VBDs. However, a gap in literature exists regarding the role of city networks as governance structures facilitating city-to-city cooperation and pandemic preparedness.[23]

The COVID-19 pandemic revealed the weaknesses and limitations of the United Nations system and other multilateral institutions regarding their ineffective global coordination and unilateral response.[24] In spite of these weaknesses, cities demonstrated strong solidarity in the creation of networks to coordinate local response and recovery plans and develop a collective policy approach to the crisis.[25] For example, cities engaged in city-to-city collaboration to exchange personal protective equipment (PPE) and leverage existing networks to gain access to more COVID-19 tests.[26] Cities acted as "important vehicles of nation-wide measures" in the local support to and enforcement of the confinement measures,[27] spearheading bottom-up, innovative responses.[28] The OECD further argues that domestic and international city networks play a vital role in peer learning, exchanging knowledge, and taking leadership in policy-making, such as for health.[29]

As densely populated areas, cities have historically been the epicenters of outbreaks of infectious

18 Ray Lara.,"How Are Cities Inserting Themselves in the International System?," in *City Diplomacy* (Palgrave Macmillan, Cham, 2020), 189-214.
19 Weijia Chen, "Rethinking city and diaspora as non-state actors of diplomacy: the role of Chinese diaspora in Wenzhou-Prato sister city relationship," *Int. J. Diplomacy and Economy,* no. 2 (2022): 169–189.
20 Grandi Kihlgren, City diplomacy.
21 Michele Acuto and Benjamin Leffel, "Understanding the global ecosystem of city networks," *Urban Studies* 58, no. 9 (2021), https://doi.org/10.1177/0042098020929261.
22 Pipa and Bouchet, "Multilateralism Restored? City Diplomacy In The COVID-19 Era," 606.
23 Acuto, Kosovac, and Hartley, "City diplomacy: another generational shift?"
24 Pipa and Bouchet, "Multilateralism Restored? City Diplomacy In The COVID-19 Era," 559.
25 Ibid.
26 Ibid.
27 Milena Milosavljevic, "The potential of Transnational City Networks as actors in Global Health Governance at times of Global Health Emergencies: Case of the COVID-19 pandemic response" (Masters diss., Malmö University, 2022).
28 Ibid.
29 Organization for Economic Co-operation and Development, "Cities policy responses," July 23, 2020, https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/.

diseases. Today, 55 % of the world population lives in cities (4.2 billion inhabitants),[30] and by 2050, city-dwellers will account for two-thirds of the world's population.[31] Pandemics have afflicted humans throughout history, influencing societal relations, health systems, and city development.[32] Nowadays, cities are increasingly exposed to pandemics through trade, connections, and networks, offering them the ability to share policies and pursue collective goals in highly efficient ways.[33] At a regional scale, the creation of shared decision-making platforms and the establishment of regional boards aimed at unifying the networks of cities could help to address the gaps identified in city management and responses to COVID-19.[34] While the COVID-19 pandemic has highlighted gaps in many countries' preparedness and response systems, city diplomacy and local government relationships based on health community engagement are dependent on cooperation, resilience-building in preparedness, and response strategies.

These factors are equally important for VBD preparedness and control. Many WHO regions have implemented vector-control policies and strategies, such as the strengthening of surveillance, monitoring and control of VBDs through community engagement.[35] Initiatives such as the Global Vector Hub (GVH) Network hold crucial roles in promoting response strategies to VBDs, considering existing COVID-19 measures. Through data-sharing platforms and the provision of vector control guidelines and research tools, the GVH aims to strengthen the capacity response to VBDs at a global level. However, there are gaps in knowledge, communication, and specific guidance for COVID-19 mitigation and vector surveillance.[36] These gaps and limited research of VBDs during the pandemic are further hindered by a lack of access to physical resources (e.g., laboratories, testing facilities), absence of funds, and limited staff.[37] Scarce funding for community knowledge of VBDs, of government guidelines, and precise information from the local governments are additional shortcomings in the collective VBD response strategy.

The Building Out Vector-borne Diseases (BOVA) Network in sub-Saharan Africa has also committed to implementing resilient strategies to control malaria and other Ae. aegypti VBDs.[38] The BOVA Network's interdisciplinary approach includes information sharing, funding strategies, and adequate staff for developing VBD control strategies to reduce the threat of insect-transmitted diseases in the environment.[39] The existence of transnational networks of this kind demonstrates an intersectoral approach is important when addressing broad and multi-sectoral health problems, such as VBDs and COVID-19.

C. VECTOR-BORNE DISEASE IN CITIES DURING THE COVID-19 ERA

VBDs are a significant public health issue in cities "caused by pathogens transmitted to the host

30 "Urban Development," World Bank, April 20, 2020, https://www.worldbank.org/en/topic/urbandevelopment/overview.
31 David Koranyi, "How city governments can help revitalise the multilateral system," *European Council on Foreign Relations*, March 15, 2021, https://ecfr.eu/article/how-city-governments-can-help-revitalise-the-multilateral-system/.
32 UN-Habitat, *Cities and pandemics: Towards a more just, green and healthy future.*
33 Ibid.
34 Ibid.
35 Ashok Moloo, "Genuine intersectoral collaboration is needed to achieve better progress in vector control," *World Health Organizatio*n, April 11, 2022, https://www.who.int/news/item/11-04-2022-genuine-intersectoral-collaboration-is-needed-to-achieve-better-progress-in-vector-control.
36 "The global open-access community for vector control information and research," Global Vector Hub, 2021, https://globalvectorhub.lshtm.ac.uk/.
37 Ibid.
38 "Building Out Vector-borne diseases in Sub-Saharan Africa: the BOVA Network," *MESA Alliance*. Feb 14, 2020, https://mesamalaria.org/mesa-track/building-out-vector-borne-diseases-sub-saharan-africa-bova-network
39 Ibid.

by arthropod vectors", such as the mosquito vector genus *Aedes*.[40] VBDs disproportionately affect at-risk populations with low socioeconomic status, as well as the most vulnerable groups: young children, pregnant women, people living with HIV, internal migrants, workers with increased vector exposure, people in natural disasters and other humanitarian emergencies, and people who lack adequate living conditions regarding basic facilities, services, housing, health, nutrition, water, and sanitation.[41]

Transmission and control strategies in cities, including in Guangzhou, Nairobi, and Rio de Janeiro, focus on addressing elements of the determinants of VBDs: vector biology, socioeconomic factors, the physical environment, and health systems.[42] These interventions largely depend on context, local ecology, environmental factors, and extent of community participation. For instance, Ae. aegypti behavior varies in terms of feeding patterns and insecticide resistance.[43] Considering living conditions are closely tied to vulnerability, socioeconomic factors include social behaviors, urban slums and housing, industrial activities, access to safe water, mobility, and waste management in relation to poverty and social inequalities.[44] With differing environmental factors and the creation of breeding sites as a result of human activities, the health system is a key factor through effective technologies, service delivery, research, and funding.[45] Multi-sectoral approaches to VBDs are therefore important; the transdisciplinary One Health approach combining the human-animal-environment intersections may be used to promote integrated strategies to address VBDs.[46] In the context of climate change, One Health may help address critical gaps in VBD preparedness and response, promote knowledge-sharing across several disciplines, and improve outcomes.[47]

Integrated vector management (IVM) is a method that aims to improve the sustainability, efficiency, and cost-effectiveness of vector control.[48] Overall VBD prevention and control strategies are necessary for personal protection, environmental management, and community mobilization.[49] However, across existing guidance, technical, and evaluative documents on vector control and response, there are critical gaps regarding monitoring, evaluation, community engagement, and sustainability.[50] Additionally, there is a lack of high-quality evidence-based research in determining

---

40 World Health Organization, *Multisectoral approach to the prevention and control of vector-borne diseases*, 2020, https://apps.who.int/iris/handle/10665/331861.

41 Ibid., 8.

42 Ibid., 9.

43 Ibid., 15.

44 Ibid., 11-12.

45 Ibid., 12.

46 Bruce Wilcox, Jennifer Steele, and Carsten H. Richter, "Operationalizing a One Health Approach Building on the TDR-IDRC Research Initiative on Vector-Borne Diseases in the Context of Climate Change," prepared for the World Health Organization, Special Programme for Research and Training in Tropical Diseases, Vectors, Environment and Society, *ASEAN Institute for Health Development, Thailand*, (2019), https://tdr.who.int/docs/librariesprovider10/one-health/tdr-initiative-one-health-report-29-nov-2019.pdf?s-fvrsn=1eef7f49_5.

47 The *One Health Joint Plan of Action* aims to address these gaps, and was developed by the Food and Agriculture Organization, United Nations Environment Programme, World Health Organization, and World Organisation for Animal Health in October 2022. This plan specifies an action track for "controlling and eliminating endemic zoonotic, neglected tropical and vector-borne diseases" with the objective to "reduce the burden of endemic zoonotic, neglected tropical and vector-borne diseases by supporting countries in implementing community-centric, risk-based solutions, strengthening policy and legal frameworks from the local to the global level and across sectors, and increasing political commitment and investment" (p. 34). See: FAO, UNEP WHO, and WOAH, *Global Plan of Action on One Health. Towards a more comprehensive One Health, approach to global health threats at the human-animal-environment interface*., 2022, Rome. https://doi.org/10.4060/cc2289en

48 "Integrating vector management," World Health Organization, 2022, https://www.who.int/westernpacific/activities/integrating-vector-management.

49 World Health Organization, *Multisectoral approach to the prevention and control of vector-borne diseases*, 14.

50 "Vector control with a focus on Aedes aegypti and Aedes albopictus mosquitoes," European Centre

the effectiveness of current vector control strategies,[51] and an insufficient global political will despite the *2004 Global Strategic Framework for Integrated Vector Management*.[52] The current approach to IVM fails to clearly integrate communities and these evidence-based outcomes into practice.[53] The *Global vector control response 2017-2030* highlights these gaps with regards to evaluation, community involvement, and sustainability, stating the need for "inclusion of community engagement strategies in the policy agenda and budget".[54]

The co-occurrence of VBDs and COVID-19 may exacerbate these gaps and produce outcomes including "co-infections; delays in diagnosis, treatment, and mitigation measures; overwhelming of the healthcare system; underreporting of cases; deterioration in surveillance and control interventions; and exacerbation of social inequalities".[55] Furthermore, SARS-CoV-2 and several VBDs share similar clinical symptoms and are affected by seasonal transmission.[56] Kerr et al. also note integrating testing for COVID-19 and VBDs can provide "bi-directional benefits", since overall health infrastructure is disrupted.[57] In addition to testing, COVID-19 could help inform VBD vaccination strategies. Potential vaccines for Zika and chikungunya are currently in research stages, and there is a vaccine for both yellow fever and dengue[58], although largely inaccessible. These benefits are not widely shared; for example, Kenya only has a 7% immunization coverage for yellow fever, with political instability affecting vaccine distribution.[59]

The 2017 World Health Assembly resolution WHA70.16 urges Member States to "develop, or adapt, as appropriate, existing national vector control strategies and operational plans".[60] The WHO further states country leadership, advocacy, coordination, and regulatory, policy, and normative support are crucial for the implementation of the *Global vector control response 2017-2030*.[61] City diplomacy can play a role within strengthening subnational capacities in alignment with national plans, engaging communities, and contributing to knowledge-sharing practices. As both COVID-19 and VBDs are affected by globalization, importation of pathogens, and cross-border travel, collaboration between cities is necessary to offer innovative opportunities to protect public health.

---

for Disease Prevention and Control, 2017, https://www.ecdc.europa.eu/sites/default/files/documents/Vector-control-Aedes-aegypti-Aedes-albopictus.pdf.

51 Leigh R. Bowman, Sarah Donegan, and Philip J. McCall, "Is Dengue Vector Control Deficient in Effectiveness or Evidence?: Systematic Review and Meta-analysis," *PLoS Negl Trop Dis* 10, no. 3 (2016), doi:10.1371/ journal.pntd.0004551.

52 World Health Organization, Strategy Development and Monitoring for Parasitic Diseases and Vector Control Team, *Global strategic framework for integrated vector management,* 2004, https://apps.who.int/iris/handle/10665/68624.

53 World Health Organization, *Global Vector Control Response 2017-2030*, 2017, https://www.who.int/publications/i/item/9789241512978.

54 Ibid., 38.

55 Marie-Marie Olive et al., "The COVID-19 pandemic should not jeopardize dengue control," *PLoS Negl Trop Dis* 14, no. 9 (2020): e0008716, 1. https://doi.org/10.1371/journal.pntd.0008716.

56 Harapan Harapan et al., "Covid-19 and dengue: Double punches for dengue-endemic countries in Asia," *Rev Med Virol* 31, no. 2 (2021), doi: 10.1002/rmv.2161.

57 Genevieve Kerr et al., "Lessons for improved COVID-19 surveillance from the scale-up of malaria testing strategies," *Malaria Journal* 21, 223, https://doi.org/10.1186/s12936-022-04240-4.

58 Wen-Hung Wang et al., "Targets and strategies for vaccine development against dengue viruses," *Biomedicine & Pharmacotherapy* 144, (2021), 112304, https://doi.org/10.1016/j.biopha.2021.112304.

59 World Health Organization, "Yellow fever - East, West, and Central Africa," September 2, 2022, https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON405.

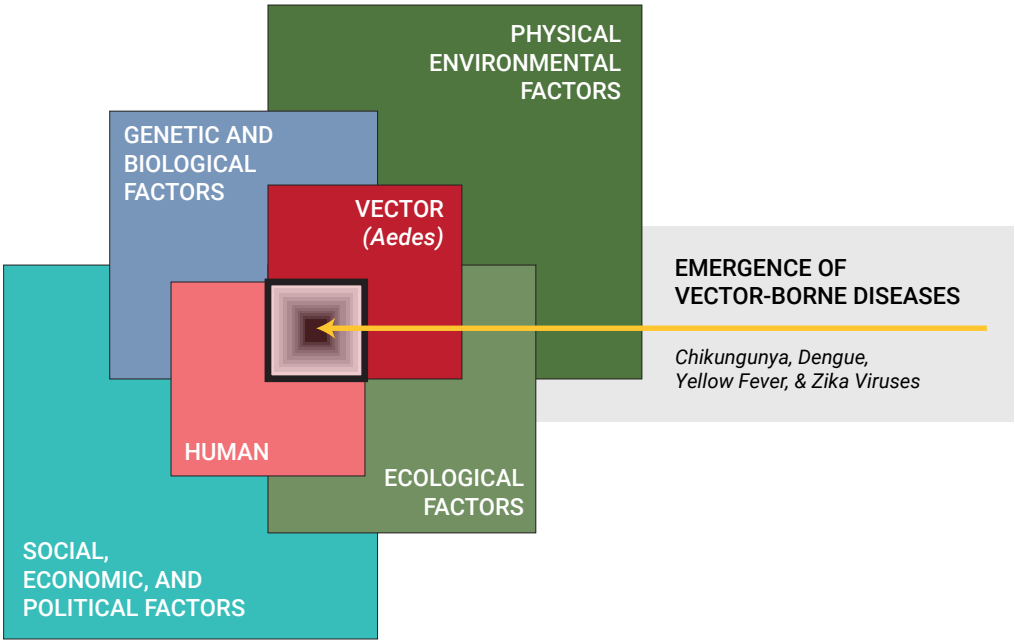
60 World Health Organization, *Global vector control response: an integrated approach for the control of vector-borne diseases, WHA70.16*, 2, https://apps.who.int/gb/ebwha/pdf_files/WHA70/A70_R16-en.pdf?ua=1.

61 World Health Organization, *Global Vector Control Response 2017-2030*, 32.

METHODOLOGY

The following research uses a qualitative methodology that aims to incorporate an understanding of VBD emergence and response, COVID-19 pandemic and diplomacy outcomes, and existing city diplomacy and urban networks. The linkages within and between each of these factors contribute to the efficiency, effectiveness, sustainability, and feasibility of policies and interventions. Additionally, the model framework adapted from the 2003 Convergence Model of the Institute of Medicine[62] provides a basis for conceptualizing the integration of environmental, biological, social, economic, political, and ecological factors (Figure 1).

Figure 1. Conceptual model framework leading to the emergence of VBDs[63]



A comparative case study approach with the selection of Guangzhou, China; Nairobi, Kenya; and Rio de Janeiro, Brazil is used to understand these linkages and contexts. In addition to having

62 Mark S. Smolinski, Margaret A. Hamburg, and Joshua Lederberg, eds., *Microbial Threats to Health: Emergence, Detection, and Response* (Washington (DC): National Academies Press, 2003), 5, https://www.ncbi.nlm.nih.gov/books/NBK221486/.

63 This figure was adapted from the Institute of Medicine's 2003 Convergence Model to make it more specific to the *Aedes* vector and VBDs. The original model framework is from: Mark S. Smolinski, Margaret A. Hamburg, and Joshua Lederberg, eds., Microbial Threats to Health: Emergence, Detection, and Response (Washington (DC): National Academies Press, 2003), 5).

existing UN-Habitat collaborations and connections, the selection criteria for the case study cities include:

1. ***Participation in South-South, North-South, and/or North-South-South city diplomacy activities.*** Although the majority of city diplomacy activities are concentrated in Europe, there is a multiplication of South-South and North-South-South triangular city diplomacy.[64] Case study cities should participate in these city diplomacy activities.

2. ***Rapid urbanization and transformation of urban spaces.*** Rapid urbanization and inadequate housing planning can contribute to VBD prevalence through sectors including water, sanitation, and hygiene (WASH), and affect social determinants of health.[65] Understanding local contexts and urbanization from a city perspective will be considered within case study cities.

3. ***Vector-borne disease prevalence.*** As the scope of this research focuses on city diplomacy and practices from COVID-19 city networks to improve VBDs and response, the selected cities should have experienced relevant epidemics or have a current prevalence of VBD, specifically of the mosquito vector *Aedes* genus.

4. ***City size and integration in the global economy.*** Alongside administrative or size-based definitions of cities, the term "global city" is often used in relation to city diplomacy. Global cities share four main characteristics: having influence in the world economy, locations for financial and service firms, sites of production and leading industries, and markets.[66] As international actors, the selected case study cities should be integrated into the global economy, while having the ability and political means to engage in city diplomacy.

The research team conducted 14 in-depth interviews: three expert interviews (on global health, VBDs and city diplomacy, and overall city diplomacy respectively), five interviews for Guangzhou, four interviews for Nairobi, and two interviews for Rio de Janeiro (Appendix 3). Semi-structured interviews were conducted through virtual video calls with a set of guidelines and questions that were modified or expanded upon as needed during interview conversations.[67] These interviews were conducted through virtual video calls on Cisco Webex, as we were able to obtain verbal and non-verbal data, build a relationship with the individual, and enable sharing of information and links through the chat function. However, the research team also recognizes challenges in online interviews as noted by Seitz, which include the inability to read body language, loss of intimacy, and inaudible segments.[68] Snowball sampling was used to bridge the qualitative data and obtain a greater personal network of individuals to interview.[69] Thorough notetaking was done throughout interviews, with interviews recorded when given consent. A debriefing report was produced after each interview, based on which the interview data was reorganized and analyzed to draw findings and interpretations.

64 Michele Acuto et al., "City Networks: New Frontiers for City Leaders" in *UCL City Leadership Lab Report,* (London: University College London, 2017).

65 World Health Organization, *Multisectoral approach to the prevention and control of vector-borne diseases.*

66 Saskia Sassen, *The Global City: New York, London, Tokyo* (Princeton University Press, 2001), 3-4, https://doi.org/10.2307/j.ctt2jc93q.

67 The interview guide developed for this research can be accessed via: https://drive.google.com/file/d/1u43xVvqPglSZQx-qr6ovefbqZNAB-z8c/view?usp=share_link

68 Sally Seitz, "Pixilated partnerships, overcoming obstacles in qualitative interviews via Skype: a research note," *Qualitative Research* 16, no. 2 (2016): 229–235, https://doi.org/10.1177/1468794115577011.

69 Patrick Biernacki and Dan Waldorf, "Snowball Sampling: Problems and Techniques of Chain Referral Sampling," *Sociological Methods & Research* 10, no. 2 (1981): 141–63, https://doi.org/10.1177/004912418101000205.

CASE STUDIES

CASE 1: GUANGZHOU, CHINA

Guangzhou is the largest trading city in southern China, with over 15.3 million registered inhabitants in 2020.[70] Being one of the largest cities with the highest population density in the world, Guangzhou is prone to the spread of epidemics, among which the SARS crisis in 2002 is a widely known example. Moreover, with a humid subtropical climate influenced by the Asian monsoon season, Guangzhou is the dengue epicenter in mainland China.[71] Whilst the spread of many VBDs has steadily decreased in China in the past decades, the incidence of dengue has witnessed a peculiar increase from 0.009 per 100,000 population in 2008 to 0.19 per 100,000 population in 2018.[72] This case study draws on interviews with an UN-Habitat officer in China, a Chinese scholar of city diplomacy, and three local government officers from Guangzhou. As the analysis will show, although Guangzhou is an active actor in city diplomacy, it seems uninterested and incapable of promoting city diplomacy for health, neither in the experienced response to COVID-19 nor in potential VBD management in the near future.

CITY DIPLOMACY APPARATUS

The concept of city diplomacy should not be taken for granted. Interview data show that in the Chinese socio-political context, "diplomacy (*wai jiao*)" is usually restricted to national-level activities. Although in recent years, "diplomacy" has been expanded to include public diplomacy on the people-to-people level, cities are not commonly regarded as diplomatic actors, but rather a subject of "foreign affairs" (*wai shi*).[73] A Chinese city's function in foreign affairs effectively equals the definition of city diplomacy in this research.[74] However, the conceptualization of "foreign affairs" in the Chinese context reflects the characteristics of China's political system, where there is a strong coherence between local- and central-level policies. In other words, city diplomacy is largely subject to national strategies.[75]

"China is very keen on promoting city diplomacy, which is in line with its national strategy of opening up since the late 1970s".[76] Among others, bilateral city relationships are an important way to promote people-to-people diplomacy in China, and the Chinese People's Association for Friendship with Foreign Countries is the governmental organization managing Chinese cities' international

70 In addition, Guangzhou hosts 10 million floating population, people who do not have a permanent residence status. See "Guangzhou Social Blue Book: Guangzhou's floating population growth and flow lead the country", Guangzhou Development Research Institute, September 9, 2021, http://gda.gzhu.edu.cn/info/1097/4479.htm.

71 Zhoubin Zhang et al., "The increasing menace of dengue in Guangzhou, 2001–2016: the most important epicenter in mainland China," *BMC infectious diseases* 19, no. 1 (2019): 1-8.

72 Xiangyu Guo et al., "The impact of COVID-19 continuous containment and mitigation strategy on the epidemic of vector-borne diseases in China," *Parasites & vectors* 15, no. 1 (2022): 1-11.

73 Interview with staff of Foreign Affairs Office, Town C, Guangzhou

74 This research defines city diplomacy as that is, "the institutions and processes by which cities, or local governments in general, engage in relations with actors on an international political stage with the aim of representing themselves and their interests to one another". Rogier van der. Pluijm and Melissen, *City diplomacy: The expanding role of cities in international politics,* (Hague: The Netherlands Institute of International Relations Clingendael, 2007), 11.

75 All interviews for the case study of Guangzhou support this point.

76 Interview 10.

outreach. There are two major types of city-to-city bilateral relationships as officially recognized. The first one is "International Friendly Exchange Cities", a loose relationship.[77] The second one is "Sister City Relationship", a more comprehensive package of cooperation. Establishing a Sister City Relationship requires going through strict approval procedures by the local provincial government, the Chinese People's Association for Friendship with Foreign Countries, and the Ministry of Foreign Affairs to initiate the drafting and negotiation of a sister city agreement. As an analogy, our interviewee from Guangzhou's Foreign Affairs Office explained that the former is like dating in a romantic relationship, while the latter is marriage after both parties grow more committed.[78] To date, Guangzhou has established sister city relationships with 38 cities from 35 countries, and international friendly exchange city relationships with 63 countries from 45 countries.[79]

Once a bilateral agreement is signed, multiple departments in the municipal government will be involved in the implementation. Indeed, a fragmentation of players has been observed––there is no clear indication of who is responsible for city diplomacy and how.[80] That said, city diplomacy practices most often surround cultural and scientific themes. Thus, departments related to these themes play more central roles in facilitating international exchanges compared to others.

CITY DIPLOMACY FOR HEALTH: THE IMPACT OF THE COVID-19 PANDEMIC

The COVID-19 pandemic has hit Guangzhou's city diplomacy with reduced in-person interactions with foreign cities. Although in-person exchange has been made almost impossible due to China's border regulations under the pandemic, online exchanges have been significantly boosted. Knowledge-based exchanges through webinars and online conferences have taken place.[81] New city diplomacy programs such as sister city relationships have also been signed via video calls, but the fact that the newly signed agreements barely led to materialization renders city diplomacy under the pandemic more formalist than practical.[82]

In terms of the issue areas covered by city diplomacy, some scholars have proposed that Guangzhou should leverage the opportunities provided by the COVID-19 and take the initiative to launch city diplomacy programs for health –– for example, a "city network for global health governance partnership".[83] However, this idea is not welcome by local practitioners. For one thing, countermeasures toward the COVID-19 pandemic are labeled as sensitive issues in China. The COVID-19 response strategy is not something to be discussed with foreign counterparts.[84] For another, in line with the matter of inclusivity as mentioned earlier, public health involves higher stakes and allows less room for free exchanges.[85]

Overall, given China's centralized political system and the politicized nature of its COVID-19 response, the government of Guangzhou has had limited autonomy and capacity to push forward city diplomacy as a means to improve public health. Nevertheless, it does not mean that city diplomacy has completely lost its relevance. On the one hand, non-governmental organizations

77 "What is the difference between an international friendship city and an international friendship exchange city?," Foreign Affairs Office of Shenzhen Municipal Government, December 19, 2016, http://fao.sz.gov.cn/hdjl/ywzsk/swcs/content/post_64259.html.

78 Interview 7.

79 "List of Guangzhou International Friendship Cities," Foreign Affairs Office of Guangzhou Municipal Government, April 19, 2022, http://www.gzfao.gov.cn/ztlm/yhcs/content/post_221924.html.

80 All interviews for the case study of Guangzhou support this point.

81 Interview 10.

82 Interview 3.

83 Ying Zhou, "Yiqing xia de Guangzhou Chengshi Gonggong Waijiao" (Guangzhou's City Public Diplomacy in Fighting COVID-19), *Public Diplomacy Quarterly,* 2021, https://www.cnki.com.cn/Article/CJFDTotal-GGWJ202102006.htm.

84 Interviews 4, 7.

85 Interview 3.

shoulder an important role to broker inter-city collaborations. For example, Guangzhou and Rio de Janeiro have formed a friendly-city bond since 2018. During the COVID-19 pandemic, the Guangzhou Preventative Medicine Association organized a series of webinars with medicine companies based in Rio de Janeiro to discuss international cooperation to combat COVID-19 using traditional medicines.[86] Our interviewees also confirmed that the Guangzhou government supports local NGOs to broker city diplomacy activities using existing channels such as bilateral friendly-city bonds.[87] On the other hand, there is ample room for exploring various urban issues affected by COVID-19, which have usually been overshadowed by the disease per se. For example, UN-Habitat invited Wuhan, the Chinese city that reported the first COVID-19 case, to share its solid waste management during the pandemic with international counterparts on a webinar.[88] Although COVID-19 is a securitized issue in China, there are numerous aspects of city life affected by the pandemic still open to international engagement. City diplomacy for health needs to be understood and treated with a broadened scope.

FROM COVID-19 TO VECTOR-BORNE DISEASES

Existing studies on the links, and potential synergies, between COVID-19 control strategies and those for VBDs are limited. Being the first of its kind, Xiangyu Guo and colleagues investigated the effect of COVID-19-response measures on VBDs in China based on nationwide data. They found that the morbidity and mortality rates of VBDs in China decreased by 72.95% and 77.60%, respectively, from 2015–2019 to 2020–2021.[89] The reductions are possibly associated with the continuous COVID-19 mitigation and contamination strategy implemented in China, which has reduced citizens' outdoor activities and facilitated the identification of all imported VBDs and further curbed the secondary spread of these diseases in domestic areas.[90] That said, their studies focused on the national level and provided little information on local-level contexts.

According to an interviewee from a district-level Center for Disease Control and Prevention in Guangzhou, dengue has temporarily disappeared in Guangzhou during the COVID-19 pandemic. Guangzhou being the dengue epicenter in mainland China, outbreaks of dengue used to be ignited by imported cases from Southeast Asia in the monsoon season. Thus, strict border measures including mandatory quarantine during the COVID-19 have effectively cut off the source of dengue in Guangzhou.[91]

However, it is unlikely that the COVID-19 response strategy will be extended to future dengue prevention. First, although dengue in Guangzhou is a cross-border issue, it has been treated as a local problem.[92] A set of common practices developed by the local government to cope with dengue over time include sending local cadres to inspect each household to ensure still water is removed.[93] In comparison, COVID-19 has been countered with nationwide mobilization and stringent measures in China, which are too costly for the prevention of local outbreaks of VBDs. Second, international communication directly linked to infectious diseases is in most cases channeled through the customs, which are controlled by the national government.[94] In general, city diplomacy practices for public health issues by the Guangzhou government, if any, can hardly go

86 "Guangzhou and Rio are connected," Guangdong Administration Bureau of Chinese Medicine, accessed October 10, 2022, http://szyyj.gd.gov.cn/gkmlpt/content/3/3291/post_3291175.html?jump=-false#1972.
87 Interview 4.
88 Interview 10.
89 Guo et al., "The impact of COVID-19 continuous containment and mitigation strategy on the epidemic of vector-borne diseases in China."
90 Ibid.
91 Interview 4.
92 Ibid.
93 Interview 3.
94 Interview 4.

beyond knowledge-based sharing. COVID-19 has further limited, at least temporarily, the autonomy of Chinese local authorities to engage in international cooperation for health. When this report was being finalized, protests were spreading in major Chinese cities, including Guangzhou, against the prolonged zero-covid policy. The accentuated tensions surrounding COVID-19 have two short-term implications. On the one hand, the city dipolicy may receive limited resources as everything is mobilized to maintain domestic social stability. On the other hand, public health it has become a highly securitized issue that city diplomacy would probably not meddle with.

CASE 2: NAIROBI, KENYA

Nairobi City has been the capital of Kenya since 1963 with the country's largest city population of 5.12 million. It is located 1,795 meters above sea level with a temperate climate and low temperatures, representing sub-optimal conditions for the proliferation of *Ae. aegypti*.[95] The rapid urbanization of the country, as well as the increased domestic and international trade, have led to major ecological and social changes facilitating the spread and distribution of *Ae. aegypti* in urban areas.

Malaria is the most prevalent vector-borne disease, perpetuating since Nairobi was first established as a colonial headquarters. Major outbreaks are associated with wet and warm climate events, drug resistance, and changes in livelihoods and demography.[96] While malaria causes the largest disease burden in the country, recent outbreaks of other VBDs, such as dengue (2021) and chikungunya (2016), have raised public health concerns in the country and local communities. This case study takes into account data collected from four interviews: two UN-Habitat Officers, a Project Coordinator for Nairobi City County Government, and an environmental planning and management professional at International Sustainability Academy (ISA). Nairobi is not significantly engaged in city diplomacy for health. While city-to-city cooperation agreements have been undertaken during the pandemic, city diplomacy itself highly depends on Nairobi City County, which does not consider it as a priority.

CITY DIPLOMACY APPARATUS

Kenya's foreign relations have been influenced by its colonial and development history. After gaining independence in 1963, Kenya took control of its foreign policy and began to actively engage in regional and international affairs. Since its foundation, the foreign relations of the country had an Afro-centric orientation, committed to the East African Community (EAC), and the Organization

95 Bryson A. Ndenga et al., "Characteristics of Aedes aegypti adult mosquitoes in rural and urban areas of western and coastal Kenya." *PLOS ONE* 12, no. 12 (2017): e0189971. https://doi.org/10.1371/journal.pone.0189971.

96 Sandra A. Mudhune et al., "The clinical burden of malaria in Nairobi: a historical review and contemporary audit," *Malaria journal* 10, no. 1 (2011): 1-10. doi:10.1186/1475-2875-10-138.

of African Unity (OAU).[97] Furthermore, the establishment of UN-Headquarters Africa in Nairobi places Kenya as an international hub and continues to inform the country's aspirations within the international arena.[98]

Kenya is divided into 47 County Governments, semi-autonomous entities directly elected by the people that have financial, legislative, and administrative independence.[99] The country's decentralized system of governance has enabled County Governments to undertake multilateral agreements internationally within a limited framework. Paradiplomacy, as exercised by the County Governments in Kenya, involves important political actors seeking their own interests in the international arena; however, there are policy and legislative gaps regarding how counties may engage with foreign actors.[100]

Nairobi does not have a robust city diplomacy apparatus due to the sensitive relationship between the City County and the central Kenyan government. In Kenya, international relations is considered a reserved topic for the national governments; thus, the interactions of subnational entities could "undermine the international coherence of the country".[101] Their presence is somewhat considered a violation of the sovereign state. Only the sovereign state, not its constituent actors, has the power to undertake diplomatic agreements. However, as stated by Anna Kajumulo Tibaijuka, Executive Director at UN-Habitat, in order to have an efficient decentralized government, cooperation with other cities provides good opportunities for exchanging information in different areas, from poverty reduction to public health matters.[102] The role of city-level actors should therefore be strengthened.

In 2019, the Nairobi City County Government signed a Memorandum of Understanding (MoU) with Nairobi Sister Cities International Organization, the non-profit Sister Cities International based in the USA, founded by President Dwight D. Eisenhower.[103] The aim of the initiative was to create links between people from different cities within Kenya and internationally for "local and global friendships, peace, unity and prosperity".[104] The purpose of the MoU was to establish an Assembly that would interlink the country and its residents with other cities of the world, providing a forum of socio-economic matters.[105] This represented a significant step towards the building of a city diplomacy apparatus in the country.

The Chinese government has also played an active role in establishing multilateral relations with Kenya. While China's role in the health diplomacy scenario was already visible during the Ebola epidemic, in 2020, the multilateral relationships with African countries steadily increased through the provision of medical equipment and knowledge-sharing conference sessions with health leaders from twenty African countries.[106] There is now a plan in place to develop an agreement

97 Republic of Kenya - Ministry of Foreign Affairs, "Introduction - Foreign Policy," accessed December 1, 2022, https://mfa.go.ke/historyfp/.

98 Ibid.

99 Joyce Nyambura, "Country Government Structure in Kenya." ICMA, April 26, 2022, https://icma.org/articles/article/county-government-structure-kenya.

100 André Lecours, "Political issues of paradiplomacy: lessons from the developed world," The Netherlands Institute of International Relations 'Clingendael', The Hague, The Netherlands, 2008.

101 Ibid.

102 OHCHR, "City-To-City Cooperation discussed at 'Meeting of Mayors', part of Brussels Conference on Least Developed Countries," May 15, 2001, https://www.ohchr.org/en/press-releases/2009/10/city-city-co-operation-discussed-meeting-mayors-part-brussels-conference.

103 "Establishment of Nairobi City County Sister Cities Committee," Nairobi City County Assembly, https://nairobiassembly.go.ke/motion/establishment-of-nairobi-city-county-sister-cities-committee/.

104 Ibid.

105 Interview 14.

106 Maddalena Procopio, "China's Health Diplomacy in Africa: Pitfalls behind the Leading Role," *Italian Institute for International Political Studies*, April 7, 2020, https://www.ispionline.it/en/pubblicazione/chinas-health-diplomacy-africa-pitfalls-behind-leading-role-25694.

with the city of Beijing to build an African Center for Disease Prevention and Control research facility in Nairobi.[107] This will position Kenya as a regional and continental hub in medical research and disease control, and demonstrates how Nairobi is participating both regionally and internationally through city diplomacy.

CITY DIPLOMACY FOR HEALTH: THE IMPACT OF THE COVID-19 PANDEMIC

As a major metropolitan and internationally connected city, there was a regional trend around Nairobi, as its initial strategic response plan to contain the virus was followed by secondary cities, such as Mombasa.[108] To contain COVID-19, the government first established a National Emergency Response Committee, responsible for coordinating capacity building for medical professionals, enhancing surveillance, establishing points of entry and exit of the country, and preparing isolation and treatment facilities. Although the Committee took important steps to contain the virus, at the national level, Kenya experienced limited capacity and effectiveness in implementing adequate mechanisms and responding to the national emergency.[109]

In terms of challenges, Kenya encountered difficulties in implementing specific policy mechanisms, such as the imposition of travel bans and quarantine measures. Policy gaps were identified under the healthcare system: medical equipment was inadequate and medical personnel had insufficient training to respond to the pandemic.[110] The financial instability of the country also led to major consequences in the first response phase, reflected in the affordability of testing kits and the poverty reduction strategies adopted by the government, which ultimately provided scarce protection for vulnerable groups.[111]

Cooperation with other cities consisted of the exchange of knowledge and practices, especially in the first months of the pandemic. The use of digital platforms and mobile device-based communications tools by national authorities facilitated information-sharing with local communities. In partnership with technology companies, both software-based and digitized systems adopted by Nairobi were key elements in the COVID-19 response that will remain for "urban network learning".[112] During the pandemic, the city also cooperated with the cities of Kigali, Rwanda, and Milan, Italy, to strengthen food waste reduction and management, in line with FAO's *New Urban Agenda* (2019).[113] In the face of COVID-19-related challenges, the city-to-city cooperation of the municipality of Milan with Nairobi and Kigali led to knowledge-sharing and the development of their own action plans on urban food waste management. Furthermore, the creation of a joint open-source platform with learning materials and modules on food waste and reduction was adapted during COVID-19 to facilitate virtual training and exchanges between the three cities.[114]

At the regional level, Nairobi further strengthened its relationship with Uganda in terms of knowledge-sharing practices and information. Although the cooperation between the two states began in 1896, at the onset of the pandemic, the countries collaborated through the East African

107 Ibid.
108 Interview 9.
109 "Kenya's Response Policy to COVID-19," The Center for Policy Impact in Global Health, August 2020, https://centerforpolicyimpact.org/wp-content/uploads/sites/18/2020/08/Kenya-Policy-Response-to-COVID.pdf
110 Ibid.
111 Interview 5.
112 Interview 9.
113 "Urban Food Agenda: Milan, Nairobi And Kigali Meet To Achieve Sustainable Urban Food Systems," Food and Agriculture Organization, October 12, 2020, https://www.fao.org/urban-food-agenda/news-events/news-detail/en/c/1363258/.
114 OHCHR, "City-To-City Cooperation discussed at 'Meeting of Mayors', part of Brussels Conference on Least Developed Countries."

Community by exchanging strategic plans.[115] Through the COVID-19 response plan, the two countries agreed to undertake a joint strategy for preventing and controlling communicable diseases, epidemics, and VBDs that might threaten the health and lives of the partner state.[116] Furthermore, other neighboring countries, including Tanzania, incorporated practices done by Nairobi regarding their preparedness and response plan, financial accountability, and management of supplies and funding.[117]

FROM COVID-19 TO VECTOR-BORNE DISEASES

Research on the linkages between COVID-19 preparedness strategies and VBDs in Kenya is currently limited. Existing studies mostly focus on the COVID-19 response strategies and their impact on malaria preparedness strategies.[118] In this context, there is much to learn about the containment of COVID-19 in the country, and its comparison with historical VBDs such as malaria. While prevention and containment measures of COVID-19 have been carried out on a constant basis and are now included in the law, some of the existing control measures for malaria (e.g., adoption of mosquito bed nets, spraying of insecticides in houses) are still considered "optional" by the government. Scholars argue that COVID-19-imposed lockdowns have negatively influenced prevention strategies for VBDs and further increased the risk of outbreaks, as people in their homes maintained close contact with mosquito breeding sites, consequently reducing preventive measures for VBDs.[119] Although malaria has killed more people in Kenya than COVID-19,[120] more consideration has been given to COVID-19, rather than malaria control and prevention.

While COVID-19 mitigation strategies reduce the number of COVID-19-related deaths, the long-term effects of the health system disruption risks increasing VBD morbidity.[121] With a lack of awareness of the importance of response strategies,[122] this highlights the need for major commitments from governments and local actors in the fight against VBDs both during and after the COVID-19 pandemic. Existing resources should be leveraged to improve the response of VBDs, such as community and management strategies. Cooperation with other cities could help to address future health-related challenges using key elements, such as government campaigns and collaboration through urban networks.[123]

115 Joweria Namutebi, "The Covid-19 pandemic and Uganda-Kenya Relations," (Master diss., Makerere University, 2022).
116 Ibid.
117 Interview 5.
118 Damaris Matoke-Muhia, "Learning from COVID-19 to accelerate malaria vaccines development," Sci Dev Net, February 8, 2021, https://www.scidev.net/sub-saharan-africa/opinions/learning-from-covid-19-to-accelerate-malaria-vaccines-development/.
119 Ibid.
120 Interview 5.
121 Ellie Sherrard-Smith, Alexandra B. Hogan, and Thomas S. Churcher, "The potential public health consequences of COVID-19 on malaria in Africa," *Nature Medicine,* (2020): 1411-1416, https://doi.org/10.1038/s41591-020-1025-y.
122 Matoke-Muhia, "Learning from COVID-19 to accelerate malaria vaccines development."
123 Interview 13, 14

CASE 3: RIO DE JANEIRO, BRAZIL

The Cidade de São Sebastião do Rio de Janeiro is the capital of the State of Rio de Janeiro, Brazil. Rio de Janeiro is the second most populated city with an estimated population of 6.3 million and overall metropolitan population of 13.63 million in 2021. Rio de Janeiro has a highly diversified economy and one of the highest per capita incomes in Brazil at $16,282 with significant socioeconomic disparities.[124] Population growth and density has led Rio to be an epicenter of epidemics for VBDs: Rio de Janeiro was the source of dengue outbreaks across Brazil in 1981, 1986, 1990, and 2001,[125] with the first Zika and chikungunya epidemics coinciding with dengue in 2015 and 2016. The simultaneous occurrence of these diseases is reinforced by high mobility, sustained transmission of arboviruses, vector abundance, and environmental pressures, more often found in locations of low socioeconomic status and high population density.[126] This section draws on two interviews with a public health researcher in the World Mosquito Program based in Rio de Janeiro, and a medical doctor specialized in infectious diseases from the City Health Department.[127] Although COVID-19 provided an opportunity for Rio de Janeiro to engage more in city diplomacy, city diplomacy for health and VBDs will rely on political will and city motivations.

CITY DIPLOMACY APPARATUS

Rio de Janeiro has historically been active in city diplomacy, having one of the oldest Management Offices of International Relations in Brazil, established in 1987.[128] The approval of the decentralization structure and architecture of the Brazilian federation in the 1988 Constitution supported the development of Rio as an international agent. These actions aimed to be constitutionally formalized under law 475/2005, or the "PEC of Paradiplomacy", although it is currently shelved in the House of Representatives to preserve current municipal-federal relationships.[129] This contributes to a constitutional gap in which federate-states and cities lack national support to engage in international actions.[130] The lack of foreign policy led to fragmentation, but allowed for freer municipal action in

124 "Rio de Janeiro metropolitan area profile," Brookings, 2016, https://www.brookings.edu/wp-content/uploads/2016/07/Rio.pdf

125 Helena R.C. Araújo et al., "Aedes aegypti Control Strategies in Brazil: Incorporation of New Technologies to Overcome the Persistence of Dengue Epidemics," *Insects* 6, no. 2 (2015): 576-594. https://doi.org/10.3390/insects6020576.

126 Federico Borre et al., "Impact of the COVID-19 Pandemic on Infectious Diseases in Brazil: A Case Study on Dengue Infections," *Epidemiologia* 3, no. 1 (2022): 97-115. https://doi.org/10.3390/epidemiologia3010009.

127 Interviews were supported by Brazilian Center for International Relations Articles (Portuguese) on Rio de Janeiro's city diplomacy practices and strategies described by Laudemar Aguiar, Head of International Relations at the City of Rio de Janeiro, and Pedro Spadale, Regional Manager of the Head of Rio de Janeiro Office. See: Laudemar Aguiar and Anna Carolina Mendes, "Paradiplomacia e a atuação internacional da cidade do Rio de Janeiro" in "A Inserção Internacional do Rio de Janeiro," *CEBRI* 3, no. 8 (2014), https://www.cebri.org/en/doc/175/a-insercao-internacional-do-rio-de-janeiro.; Pedro Spadale, "Relações Internacionais de Unidades Subnacionais: a experiência do estado do Rio de Janeiro" in "A Inserção Internacional do Rio de Janeiro," *CEBRI* 3, no. 8 (2014), https://www.cebri.org/en/doc/175/a-insercao-internacional-do-rio-de-janeiro.

128 Marcos V. I. Mendes and Ariane Roder Figueira, "Paradiplomacy and the International Competitiveness of Cities: the case of Rio de Janeiro," *Revista Brasileira de Política Internacional* 60, no. 1 (2017), https://doi.org/10.1590/0034-7329201700103.

129 Ibid., 6.

130 Carlos R. S. Milani and Maria C. M. Ribeiro, "International relations and the paradiplomacy of Brazilian cities: crafting the concept of local international management," *Brazilian Administration Review* 8, no. 1

terms of obtaining policy funding and promoting political will.[131] Rio de Janeiro also experiences continuity issues when municipal and national governmental changes occur.[132] During COVID-19, this was relevant as the "confusing federal politics" contributed to a weak coordination in the pandemic response, pushing municipalities, including Rio de Janeiro, to engage in lateral conversations with other cities.[133]

Nevertheless, like many Brazilian cities, Rio de Janeiro participates in national associations and networks including the Confederação Nacional de Municípios (National Confederation of Municipalities); the Frente Nacional de Prefeito (the National Front of Mayors); the regional city network, Mercociudades; and the Brazilian Forum of International Relations.[134] This has resulted in a focus on South-South cooperation. Rio de Janeiro approaches these cooperation mechanisms through paradiplomacy in which it establishes formal or informal contracts, permanent or temporary, with public and private foreign entities.[135] Although the most common paradiplomatic activity conducted by the City has been in sustainability, investment, and trade, there is a strong motivation to cooperate internationally and regionally, such as with the FONARI, the National Forum of Secretaries and Managers of International Relations.[136] Bilateral cooperation is also often motivated by political-historical reasons and specific interests, such as with the 2016 Rio Olympics in which paradiplomacy was conducted to improve vector-borne disease and city management, and technical exchange.[137] For example, during the COVID-19 pandemic, Rio de Janeiro became the first international city to sign a Memorandum of Understanding with the United States Consulate to strengthen cooperation in various priorities including health.[138]

Furthermore, Rio de Janeiro has increased its participation in city diplomacy. Between 2009 and 2016, the number of Rio de Janeiro's sister and partner cities increased from 89 to 117 cities, with a similar increase in participation in international city networks from 9 to 15 networks during this time period.[139] The City does not always aim to strengthen bilateral cooperation through a legal manner, and rather uses legal mechanisms to support financial responsibilities.[140] The City also works closely with the State of Rio de Janeiro, and although sisterstate-type partnerships do not guarantee results, overall partnerships aim to complete "twinning" in which states develop bilateral exchange and mature jointly.[141] One challenge faced in particular in Rio is the lack of effectiveness of international action when not supported by a clear vision and responsibility in international relations.

CITY DIPLOMACY FOR HEALTH: THE IMPACT OF THE COVID-19 PANDEMIC

The decentralized nature of the Brazilian federation has granted Rio de Janeiro the autonomy to participate in city diplomacy for health. Brazil's "structuring cooperation in health" practice is based on social determinants, international cooperation, and strategic planning.[142] However, the

(2011): art. 2, 21-36, https://doi.org/10.1590/S1807-76922011000100003.

131 Aguiar and Mendes, "Paradiplomacia e a atuação internacional da cidade do Rio de Janeiro."

132 Ibid.

133 Interview 11.

134 Milani and Ribeiro, "International relations and the paradiplomacy of Brazilian cities".

135 Aguiar and Mendes, "Paradiplomacia e a atuação internacional da cidade do Rio de Janeiro".

136 Ibid., 13-14.

137 Ibid., 14.

138 "U.S. Consulate and Rio city sign MOU to enhance economic and social cooperation," *US Mission Brazil*, December 15, 2021, https://br.usembassy.gov/u-s-consulate-and-rio-city-sing-mou-to-enhance-economic-and-social-cooperation/.

139 Mendes and Figueira, "Paradiplomacy and the International Competitiveness of Cities: the case of Rio de Janeiro."

140 Spadale, "Relações Internacionais de Unidades Subnacionais: a experiência do estado do Rio de Janeiro."

141 Ibid., 29.

142 Alexandre A. Alvarenga et al., "Challenges for the Brazilian State from the COVID-19 pandemic: the

governmental architecture and historical discouragement of city multilateral funding until 2010[143] contributed to a reduced national capacity for the COVID-19 response, due to coordination issues between regional and national governments, and differences in socioeconomic vulnerability across Brazilian states. Rio de Janeiro therefore primarily assumed responsibility for the COVID-19 response within the city, such as through policies of social isolation,[144] communications campaigns, a declaration of a State of Calamity,[145] and the city-level development of vaccination and testing centers.[146] In developing these centers, Rio de Janeiro created an expert board and collaborated with other Brazilian cities and sister cities.[147] For instance, collaboration with cities within the State of Mato Grosso was conducted in an informal manner, communicating through channels including Whatsapp and phone calls to discuss best practices on vaccination and testing centers, presentation of data, and adapting to changes through a "down-up collaboration".[148] Rio de Janeiro also had a sporadic informal collaboration with the City of New York to discuss how to organize large vaccination and testing centers effectively.[149]

In addition to city-to-city collaborations, Rio de Janeiro worked closely with international non-governmental organizations to help with financing, knowledge-sharing, and data analysis capacities, such as through the Pan American Health Organization (PAHO), where Rio de Janeiro often served as an example for other cities.[150] Established in 2011, Rio de Janeiro's Urban Control and Command Centers (COR) are also used to collect geo-localized data, visualize data for decision-making, strengthen operational processes, and inform populations about how to stay safe during COVID-19 and emergencies.[151] During COVID-19, COR's work focused particularly on improving real-time information to citizens, providing a dashboard for COVID-19 multisectoral data on urban services, developing a private Vulnerability Dashboard, and strengthening partnerships with the Federal University of Rio de Janeiro and local organizations, such as Cyberlabs regarding artificial intelligence.[152]

Although the COVID-19 pandemic has been an opportunity for Rio de Janeiro to participate in knowledge-sharing, these actions have not been done as effectively for VBDs. Dengue, Zika, and chikungunya share similar symptoms and regional surveillance is insufficient. No current surveillance network exists for VBDs in Brazil or Rio de Janeiro, as the local context is equally significant.[153] Although Rio de Janeiro works closely with the World Mosquito Program, which is linked to the Minister of Health and works with the City's Secretaries of Health and Education at different levels,[154] interviewees stated the technology needed for surveillance and communications is available.[155] Events and trainings, such as the Regional Dengue Symposium (2015) in Rio de

---

case of paradiplomacy in the state of Maranhão," *Cad. Saúde Pública* 36, no. 12 (2020): e00155720, https://www.scielo.br/j/csp/a/Zf3ZbZDvsFWHPVNbXwcGQbz/?format=pdf&lang=en.

143 Renato Balbim. "International city's networks and diplomacy," Institute for Applied Economic Research, Discussion Paper (2021), http://dx.doi.org/10.38116/dp257.

144 Nuno Crokidakis, "COVID-19 spreading in Rio de Janeiro, Brazil: Do the policies of social isolation really work?," *Chaos, Solitons & Fractals* 136, no. 109930 (2020), https://www.sciencedirect.com/science/article/pii/S0960077920303295.

145 Rio Prefeitura, "Guidelines and measures Taken by Rio de Janeiro City Hall to avoid the spread of Covid-19," (2020), https://www.citiesforglobalhealth.org/sites/default/files/documents/2020-04/A%C3%A7%C3%B5es%20PCRJ%20contra%20Covid-19%20-%20Management.pdf.

146 Interview 11.

147 Ibid.

148 Ibid.

149 Ibid.

150 Interview 11, 6

151 Larissa Paredes Muse et al., "The role of Urban Control and Command Centers in the face of COVID-19: the case of COR in Rio de Janeiro, Brazil," *IEEE International Smart Cities Conference (ISC2)* (2020), doi:10.1109/ISC251055.2020.9239068

152 Ibid., 5-7.

153 Interview 6, 11.

154 Interview 6.

155 Interview 11.

Janeiro involving over 100 public health actors and stakeholders,[156] also present opportunities to continue VBD discussions.

FROM COVID-19 TO VECTOR-BORNE DISEASES

The mechanisms between COVID-19 and VBDs require greater research in Rio de Janeiro. Within the Brazilian context, as cases of COVID-19 increased, the cases of dengue decreased, likely due to COVID-19 measures, underreporting of dengue, and a focus on COVID-19 testing.[157] Considering the reduced testing for these diseases during COVID-19, Périssé et al. estimate prevalence of Zika could be at least five times greater, and prevalence of chikungunya 45 times greater.[158] Previous programs such as the HIV and Dengue Fever Program, as well as the Brazilian Dengue Control Program, experienced interruptions as consistent epidemics led to a fragile health system with poor coordination.[159] Historically, VBD programs have also used the same control and prevention methods, even if they are ineffective, with a demonstrated political resistance to new technologies.[160]

There has therefore been a significant investment in reorganizing the health sector through primary care in 2009 to address these issues.[161] The next 2012 dengue epidemic saw a decreased mortality, and Rio de Janeiro became the first pilot city to receive Wolbachia mosquitoes through the World Mosquito Program.[162] The challenges experienced by this program included difficulties in deployment within dense urban and slum areas, capacity and staff, budget constraints, and cost of production of Wolbachia mosquitoes.[163] These challenges were exacerbated during the COVID-19 pandemic, in which everything was suspended.[164] Although the VBD outbreaks had been centered around vector control, research and development, and access to care, parallels can be made with the COVID-19 pandemic and response.[165]

The COVID-19 pandemic also occurred after the 2019 dengue and 2015-2017 Zika epidemics. Considering the consequent national health system impact, the COVID-19 response occurred primarily at the municipal level due to weak coordination from the national government. The continuity of COVID-19 vaccination and testing centers, communications on public health measures, and increased collaboration could be applied to other health sectors, including VBDs. Like COVID-19, the spread of VBDs in Rio de Janeiro is influenced by globalization and cross-border travel, implying lessons learned from COVID-19 are valuable for VBD strategies.[166]

156 Pan American Health Organization, "Regional Dengue Symposium addresses today's challenges in dengue control," November 3, 2015, https://www3.paho.org/hq/index.php?option=com_content&view=article&id=11412:symposium-dengue-control&Itemid=0&lang=pt#gsc.tab=0.

157 Borre et al., "Impact of the COVID-19 Pandemic on Infectious Diseases in Brazil: A Case Study on Dengue Infections."

158 André R.S. Périssé et al., "Zika, dengue and chikungunya population prevalence in Rio de Janeiro city, Brazil, and the importance of seroprevalence studies to estimate the real number of infected individuals," *PLoS One* 15, no. 12 (2020): e0243239. https://doi.org/10.1371/journal.pone.0243239.

159 Sergio Cimerman et al., "Deep impact of COVID-19 in the healthcare of Latin America: the case of Brazil," *The Brazilian Journal of Infectious Diseases* 24, no. 2 (2020): 93-95, https://doi.org/10.1016/j.bjid.2020.04.005.

160 Interview 6.

161 Interview 11.

162 Ibid.

163 Ibid.

164 Interview 6

165 Borre et al., "Impact of the COVID-19 Pandemic on Infectious Diseases in Brazil: A Case Study on Dengue Infections."

166 Interview 11.

DISCUSSION

A. MOTIVATIONS, DIMENSIONS, AND PRIORITIES OF CITY DIPLOMACY

It is evident that city diplomacy occurs in different manners, informally and formally, within each of the case study cities and overall internationally. Within the findings, each city demonstrated various motivations and dimensions for which city diplomacy can be carried out. The motivation to carry out city diplomacy depends on a city's relative position in a topic area. When a city is relatively weak, it is motivated to seek support through city diplomacy; when a city is relatively strong, it is motivated to share best practices and useful knowledge through city diplomacy. For example, Guangzhou may be motivated to share promising new control techniques to control the vector of dengue, which resulted from recent eradication trails on two islands by combining sterilization with a bacterium, reducing *Ae. albopictus* populations by up to 94%.[167] In brief, if city diplomacy is to be realized, it has to be useful to a city, either through compensating for a city's disadvantages or scaling up a city's advantages.

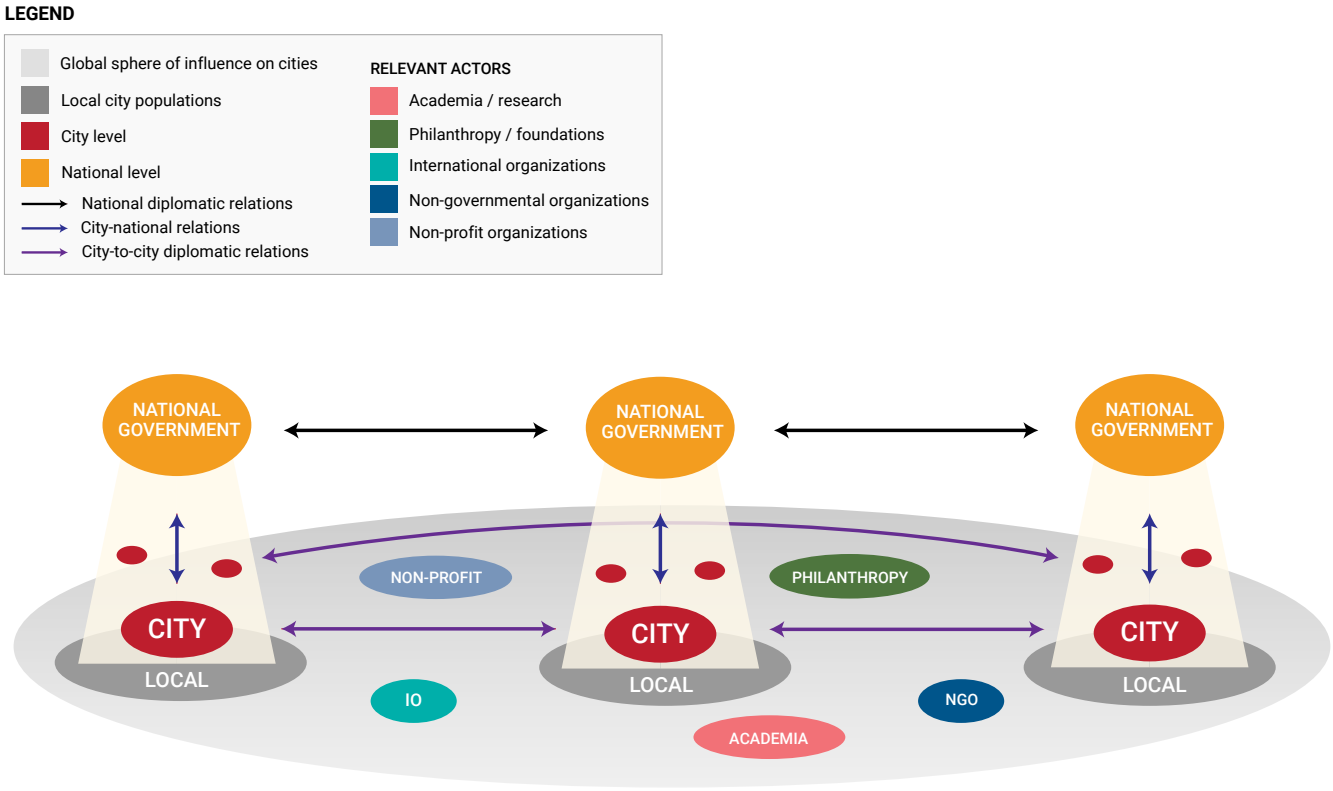
City diplomacy is also multi-dimensioned (Figure 2). There is a vertical dimension of top-down process where higher-level governments dictate or guide the city diplomacy to be realized on the lower levels. As the *2022 cities and international engagement survey* shows, "while cities expressed confidence in their capacity to address global challenges, they see benefits in more engagement with national foreign affairs offices", and most cities expressed support for dedicated national funding for city diplomacy.[168] Meanwhile, there is a horizontal dimension of spontaneous peer interaction between and among local actors at the city level, as seen during events including the UNECE Forum of Mayors[169]. A multiplicity of global city networks are examples of the horizontal playing field of city diplomacy. Our case studies show that vertical city diplomacy practices are more prevalent in centralized political systems (e.g., China) and horizontal city diplomacy practices tend to dominate in decentralized political systems (e.g., Brazil and Kenya), indicating a correlation between political systems and structuring of international relations policies. That said, the vertical and horizontal dimensions of city diplomacy are not contradictory. They exist simultaneously and mutually affect one another.

167 Giorgia Guglielmi, "World's most invasive mosquito nearly eradicated from two islands in China," *Nature*, 2019, https://www.nature.com/articles/d41586-019-02160-z.

168 Daniel Pejic, Michele Acuto, and Anna Kosovac, 'City diplomacy during COVID-19: the 2022 cities and international engagement survey,' Melbourne Centre for Cities; Chicago Council on Global Affairs, 2022.

169 As part of our background research, the research team attended the Economic Commission for Europe (ECE) Second Forum of Mayors from 4-5 April 2022 at the Palais des Nations, in Geneva, Switzerland. It was held in hybrid format under the theme "Recovering from the COVID-19 pandemic while advancing the implementation of the SDGs". By participating in the Forum, the team observed the nature of city diplomacy bringing together participants from the UNECE region and specialized organizations, NGOs, and academia. This Forum is an example of a tool used to bridge and connect actors through horizontal mechanisms, in which actors seemed to adopt a cooperative approach in describing their successes and experiences in community engagement. The Forum assumed a very political connotation, given the ongoing conflict in Ukraine, and presented an opportunity to understand how multilateralism works in and for cities.

Figure 2. Vertical and horizontal dimensions of city diplomacy[170]



Despite the great potential of city diplomacy to emerge from different motivations and dimensions, we found that city diplomacy often tends to show a concentration on "softer topics", such as culture. Cultural city diplomacy embodies international engagement activities with reference to a city's local or traditional culture. For example, the knowledge-sharing webinar that Guangzhou and Rio de Janeiro held to combat the COVID-19 virus had an explicit reference to traditional medicine. In this case, a seemingly public health-oriented city diplomacy activity soft-landed on the ground of traditional culture. In the view of an interviewee working for the culture department of Guangzhou, "culture is one of the few topics that are really inclusive, in the sense that there is no right or wrong, superior or inferior. It is only based on such inclusivity that we can talk about exchange; otherwise, exchange will become an aid, behind which inevitably lies an unequal power relationship."[171] Therefore, city diplomacy, as it is often conducted through "friendly city" or "sister city" bilateral agreements, implies an inherently friendly and cooperative relationship. Being impelled to be "friendly", cities may limit themselves to stay away from controversial and more sensitive issues such as health.

170 Illustration of the multidimensional nature of city diplomacy. This figure focuses on cities' international engagement, which is simultaneously influenced by cities' relationships with national governments. A caveat is that city diplomacy can also be affected by intergovernmental processes among national governments, which is not explicitly shown in this figure.

171 Interview 3.

B. SYNTHESIZED ANALYSIS OF THE CASE STUDIES

COVID-19 and the impact of VBDs have collectively affected the manner in which Guangzhou, Nairobi, and Rio de Janeiro operate and collaborate with other cities (see Table 1 for a summary on the three case study city findings).

Table 1. Comparison Matrix of Case Study Cities

City	Guangzhou, China	Nairobi, Kenya	Rio de Janeiro, Brazil
Geography	23°07'48"N 113°15'36"E Climate: Humid subtropical climate	1°09'S 36°39' 1°27'S 37°06'E Climate: Subtropical highland climate	22.9068° S 43.1729° W Climate: Humid tropical marine climate
Socio-demographic context	Population size: 15.31 million Population density: 2,500/km2 GDP per capita: $23,436 (2021)	Population size: 4,397,073 million Population density: 4850/km2 GDP per capita: $6,344 (2021)	Population size: 13.63 million (includes metropolitan region, 6.7 million in city only) Population density: 5,377/km2 GDP per capita: $16,282 (2016)
Prevalent VBD	Dengue (mosquito vector species *Aedes albopictus*)	(Malaria) Sporadically: Dengue and Chikungunya	Dengue, Zika, Chikungunya, Yellow Fever (*Aedes aegypti*)
Major historical epidemics	SARS 2002-2004	Malaria (peaks: 1926-1940)	Dengue, Zika, Chikungunya, Yellow Fever (*Aedes aegypti*)
Risk factors	• High population density • Humid climate • Urban village	• Rapid urbanization • High population density • Tropical climate	• Ecological factors and tropical climate • High population density and urbanization
Key local actors in city diplomacy & health	• Guangzhou municipal health commission • Guangzhou People's Government Foreign Affairs Office • Guangzhou Center for Disease Control and Prevention (CDC)	• Nairobi County Government • Nairobi Ministry of Foreign Affairs • Nairobi City County Sister Cities Committee	• Brazilian National Health Foundation (in relation to Rio de Janeiro state) • Rio Prefeitura Secretaria Municipal de Saúde • International Relations Department of Rio de Janeiro

City diplomacy under COVID-19	• Largely halted • Limited activities were conducted virtually	• A chance to engage with other cities, mostly at regional level • Use of digital platforms for information and knowledge sharing	• An opportunity to engage in regional informal collaborations to share • Improvements in data analysis and sharing practices
Prospect of city diplomacy for health	• Health has become a securitized issue. Thus, city diplomacy for health does not have a promising outlook.	• Limited and highly dependent on the willingness of the City County to take the initiative to establish city-to-city cooperation. • Mostly at regional level and with other African countries.	• Regional collaborations have been helpful during the COVID-19 pandemic, but future city diplomacy for health is dependent on the City's political will and leadership to engage in more diplomacy efforts for health.

DIGITAL TOOLS AND DATA

Cities use similar tools of city diplomacy to collaborate for knowledge-sharing of information and practices. For example, the use of webinars and conferences in Guangzhou, digital platforms for information exchange in Nairobi, and digital software improvements for data analysis in Rio de Janeiro are shared strategies among cities. These tools also indicate that cities have the motivation and political will to engage in international action. However, under national governments, health is perceived as a sensitive issue and cities aim to have a coherence between local- and national-level policies. Data is confidential and private, and the mode of engagement for city diplomacy through city networks, twinning, and sister-city relationships impacts the feasibility of engagement and the development of city policies. This engagement also significantly depends on social determinants of health, international cooperation, and planning of health systems and strategies.

REGIME TYPE AND LOCAL LEADERSHIP

Common barriers exist in terms of constraints by political systems and allocation of city diplomacy responsibility across systems. The centralized system in China and decentralized nature of Brazil and Kenya influence how these cities play a role internationally. Actions in Guangzhou demonstrate it is an active player in city diplomacy; however, it is more uninterested in promoting city diplomacy for health due to the securitization of COVID-19 and health topics. Its city diplomacy for health has therefore been conducted primarily virtually with limited opportunities for advancements. In contrast, in Nairobi and Rio de Janeiro, the COVID-19 pandemic encouraged various cooperation agreements at the local, regional, and national levels. Sensitive relationships between these levels affect capacity for city diplomacy, additionally dependent on whether international relations is viewed as a city or national responsibility, such as in the case of Nairobi. Regime type is therefore among the primary factors and challenges influencing the city diplomacy's apparatus of a state.

Leadership is equally important in city diplomacy participation. Without effective leadership by city

leaders, adequate training, and demonstrated commitments by local governments within the given political system, city diplomacy efforts are more difficult to achieve. This is clearly seen within our research findings: in a centralized system, as in the case of Guangzhou, local governments have a strong motivation for city diplomacy as long as it aligns with the national strategy and resources are generally ensured. However, local governments often have a low level of autonomy in deciding the types and themes of city diplomacy activity they can engage in. In a decentralized system, local governments generally have a higher level of autonomy and fewer limits in their international engagement. Many of these initiatives are also conducted on an informal and ad hoc basis, as seen through Rio de Janeiro's collaborations. Yet, their motivation to engage in cooperation with other cities may be low because of the lack of top-down incentives or the absence of local practical demand. The fragmentation of players and unclear allocation of responsibility, whether for local or national governments, can negatively affect city diplomacy efforts. Furthermore, cities lack adequate funding, training, and resources to engage in city diplomacy for health.[172] These findings are in line with the *2022 Cities and international engagement survey*[173] (see Appendix 2 for more details on city-specific challenges and opportunities).

COVID-19 AND VBDS

Our findings illustrate that COVID-19 has had a significant impact on cities' attitudes toward city diplomacy for health. In both Nairobi and Rio de Janeiro, the preparedness and response measures adopted for COVID-19 negatively affected the management of VBDs. In the first case, the COVID-19 response may have negatively affected VBDs prevention since people in their homes maintained close contact with mosquito breeding sites. In Rio de Janeiro, COVID-19 has negatively influenced VBDs prevention and control due to a lack of VBD testing, insufficient data about the current prevalence of VBDs, and barriers to carrying out VBD strategies in dense urban areas, which may be applicable to other contexts as well. The opposite outcome has been registered in Guangzhou, where the COVID-19 response with strict quarantine measures and policy guidelines helped to contain the spread of dengue in the city with limited travel and importation.

As something that has affected the health, social and political scenario, COVID-19 has taken up priority in all three cities, demonstrating that in times of crisis, cities struggle with managing multiple health issues considering resources and limited flexibility. City diplomacy exists for sustainability, trade, and other sectors, but there is an overall lack of motivation to engage in city diplomacy for health with a higher priority for VBDs. Although all three case study cities have international relations offices, their international engagement is strongly limited by their political systems, priority for health considering various offices and city departments, capacity, and financing. Challenges regarding coordination between the regional and national governments, differences in socioeconomic vulnerability across cities and regions, and a reduced capacity towards VBDs throughout the COVID-19 pandemic also negatively impact the VBD response. In an ideal city diplomacy strategy, cities should have resource-based access to information technology, substantial autonomy, as well as an efficient local dialogue between the different sectors in the city.[174]

172 Ibid.

173 Anna Kosovac et al., "Conducting City Diplomacy: A Survey of International Engagement in 47 Cities," The Chicago Council on Global Affairs, October 7, 2020, https://globalaffairs.org/research/report/conducting-city-diplomacy-survey-international-engagement-47-cities.

174 OHCHR, City-To-City Cooperation discussed at 'Meeting of Mayors', part of Brussels Conference on Least Developed Countries" May 15, 2001 https://www.ohchr.org/en/press-releases/2009/10/city-city-cooperation-discussed-meeting-mayors-part-brussels-conference

LOCAL NEEDS AND OPPORTUNITIES FOR VBDS

The COVID-19 provides opportunities for increased collaboration and focus on VBDs. Our findings demonstrate how there is a broadened spectrum of actors and venues of city diplomacy. Although capacity and motivations for city diplomacy depend largely on resources, authority, and existing mechanisms for health, city leaders can utilize the academic research sector more to inform policy. IOs in particular engage in research and can facilitate city diplomacy for knowledge-sharing. The academic sector also helps inform WHO and related initiatives on VBDs and best practices, such as on the use of Wolbachia mosquitoes in Rio de Janeiro. VBD strategies are often considered optional and steeped in local practices that may be ineffective. With limited resources and capacity, cities can use academic work to a greater extent to achieve better outcomes.

This knowledge-based sharing can become a prominent form of city diplomacy in which institutional engagement and capacity is facilitated through digitalization. COVID-19 has illustrated how communication avenues and engagement between local communities and cities are strengthened. Education should be a focus to ensure top-down dissemination of institutional knowledge to inform local communities on how to manage VBDs from a housing and health perspective. Furthermore, existing centers built for COVID-19 vaccinations and testing could be adapted to other uses, such as for VBDs or training centers. However, awareness of VBD issues needs to increase within city leadership to ensure the sustainable and effective use of these technologies and communication tools, including to prevent misinformation.

While public health management itself can be a challenging issue as a major theme of city diplomacy, cities have more latitude to explore urban issues related to health––for example, waste management under public health crises. Cities can improve their organizational capacity for diplomacy by continuing to improve trust and relationships with other cities, while ensuring that their diplomacy strategies are conducted equitably and with a continuation of knowledge and best practices for VBDs. Although a new city network or coalition is likely not the best route for VBD knowledge-sharing due to increased fragmentation, networks for climate change, the environment, resilience, and related sectors could align their strategies with health priorities. As VBDs are intersectoral, cities can also align other city-specific initiatives in the environment and resilience sectors with health to ensure all VBD determinants are being addressed. COVID-19 has highlighted the fragility of health systems worldwide and the lack of training and accountability for city diplomacy. However, the sharing of systemic challenges and differing local contexts emphasize the need for greater international action. Cities can maximize lessons from COVID-19 to make prevention of VBDs integrated into relevant city departments with engagement by local communities.

POLICY RECOMMENDATIONS

In line with the findings, eight recommendations are provided within three levels of policy application; namely individual, organizational, and systemic, as outlined by current scholarship in public policy.[175] In this context, the individual level refers to city leaders; the organizational level refers to city diplomacy institutions or governmental bodies, at either municipal or national levels, that engage in city diplomacy; the systemic level refers to global-scale policy challenges and the geopolitical contexts that shape diplomacy, as well as the allocation of financial and human resources to support city diplomacy.[176]

INDIVIDUAL LEVEL

Increase awareness of the VBD issue among city leadership. Although mayors are generally aware that VBDs are a significant health issue, the economic case and awareness of autonomy must be made for its impact to improve the priority-setting of VBDs on city agendas. City mayors have taken decisive action for COVID-19, including on improving data analysis and capacity building. However, more research on novel technologies, effectiveness of community and behavioral change interventions, and current health resilience is needed to help create political cases for health agenda priority-setting.[177]

Provide city leaders with the managerial and capacity skills and training necessary to engage in city diplomacy. As city engagement with other cities and multilateral institutions relies heavily on leadership motivations, such as in Rio de Janeiro and Nairobi, city leaders should be given managerial and communications training. Although support from national governments is important,[178] training in international relations to ensure skills in diplomacy and engagement is needed to promote more positive outcomes. Local Ministries of Health or the WHO could facilitate these trainings after assessing relevant needs.

Adapt COVID-19 risk communications lessons and tools to VBDs. The COVID-19 pandemic changed the way in which local governments communicate and disseminate information among local communities. Digital communication strategies, such as adapting digital platforms and softwares for data analysis and capacity emerging from COVID-19, serve as an opportunity to improve stakeholder engagement and educate citizens to a greater extent on vector control, protective measures, and related city actions. For instance, with more research emerging on the recent approval of the dengue vaccine,[179] these communication routes could be utilized to promote VBD vaccines as a preventative measure. Urban control centers can further incorporate COVID-19 communications lessons, as in Rio de Janeiro, to increase stakeholder engagement and integrate data for communications purposes.

175 Wu Xun, Michael Ramesh, and Michael Howlett, "Policy capacity: A conceptual framework for understanding policy competences and capabilities," *Policy and Society* 34, no. 3-4 (2015): 165-171.
176 Kosovac et al., "Conducting City Diplomacy: A Survey of International Engagement in 47 Cities."
177 Interview 12.
178 Kosovac et al., "Conducting City Diplomacy: A Survey of International Engagement in 47 Cities," 21.
179 World Health Organization, "Vaccines and immunization: Dengue," April 20, 2018, https://www.who.int/news-room/questions-and-answers/item/dengue-vaccines.

ORGANIZATIONAL LEVEL

Develop a national, widely accessible, and transparent VBD monitoring and surveillance system supported by city data and vulnerability mapping. The *Global vector control response 2017-2030* recommends national and regional vector control strategic plans should be developed, given similar challenges established in our findings, ineffective vector interventions, limited vector control monitoring, and insufficient surveillance funding.[180] Rapid research and surveillance actions during COVID-19 should be applied to VBDs to develop or improve national systems supported by adequate infrastructure, tools, research, and human resources. Although this will require significant investments, the importation of pathogens and morbidity highlights the importance of data in promoting evidence-based solutions and decision-making. These systems should incorporate vulnerability mapping and transparency to understand socio-economic factors and consider environmental and climate conditions.

Delineate leadership, authority, and institutional responsibilities for city diplomacy engagement. Lacking authority can deter city leaders from engaging in city diplomacy, as seen in Nairobi. Although many cities, such as Guangzhou, have international relations offices, cities should have authority and be positioned in a concrete manner to engage internationally. This should be reflected not only in health endeavors, but also multi-sectoral issues in VBDs, the environment, and resilience.

Allocate national government funding for city diplomacy activities while ensuring city and leadership autonomy. Funding is a demonstrated challenge for engaging in city diplomacy when not given explicit authority or the resources to travel to or attend other city or regional events. As networking is important for city diplomacy, funding should be allocated by national governments to sub-national and local governments. While funding may look different based on regime type, it is important that the autonomy of cities not be impeded by national government funding.

SYSTEMIC LEVEL

Align health in current city networks and international initiatives. Current city networks for the environment and resilience, such as C40, should incorporate health to a greater extent using a multi-sectoral lens. When considering One Health as an approach to VBDs, health should be linked across disciplines rather than as a parallel system. Existing platforms can re-strategize post-COVID-19.

Develop coordinated guidance and strategies for city diplomacy and health regarding VBDs and local contexts. Although the *Global vector control response 2017-2030* provides an important starting point for vector control, it fails to include the role of cities and diplomacy strategies. International organizations, such as UN-Habitat or WHO, should develop guidance in collaboration with national governments to promote city diplomacy for health, establish city-level focal points, and promote capacity building. These strategies should consider a multi-sectoral approach incorporating One Health, existing capacity and resources, and local contexts specific to environmental and social determinants of health factors.

180 World Health Organization, *Global vector control 2017-2030*, 12.

CONCLUSION

Based on an innovative comparative study on Guangzhou, Nairobi, and Rio de Janeiro, this research finds divergent views on the potential of city diplomacy in global health for vector-borne diseases from the perspectives of academics and practitioners. On the one hand, academics tend to hold an overall positive attitude towards the potential of city diplomacy for health in the post-covid era. Some scholars suggest that cities have demonstrated many strengths in dealing with the global public health crisis, among which are cities' pragmatic orientation.[181] Others propose that cities should seize the great timing that has attached heightened significance to international cooperation for health and launch city diplomacy initiatives with a focus on health, which has been largely absent before.[182] On the other hand, practitioners seem to show limited interest in city diplomacy specifically for the purpose of public health. Sometimes it is exactly the programmatic orientation and political system that gives the local actors insufficient incentives to engage in international actions beyond their quotidian local mandates. In addition, depending on the political system in which a city diplomacy apparatus partakes, a range of institutional barriers may be facing local actors and thereby disincentivizing them to carry out city diplomacy.

Nonetheless, it is important to point out that this research has several limitations. First, in relation to different contexts relevant to VBD management, the three case studies may not be representative of cities on a global scale. While the *2022 cities and international engagement survey* concluded that some areas witnessed an increase in the international engagement of city governments post-COVID-19,[183] these research findings send a somewhat different message by identifying the challenges facing the three case study cities. That said, these findings support how health is not among the top priority areas for city international engagement. Second, due to limited time and resources, this research has treated practitioners of diplomacy exclusively as local government members or officials of international organizations. This approach limits the scope of city diplomacy to largely government-led activities, while both existent scholarship and our interview data show support for systematically incorporating non-governmental actors, including corporates and civil society, into the study and practice of city diplomacy.[184]

This research aims to set forth further exploration on capitalizing on the local experience of city diplomacy during the pandemic for broader global health governance for VBDs. Moving forward, future research can contribute to the long-term cause of a more comprehensive and consistent collection of empirical evidence based on representative data to identify best practices of city diplomacy for health. In addition, systematic investigations on a wider spectrum of local actors to include corporates and civil society would be highly valuable, as well as on behavioral aspects of VBD strategies. As the global society is recovering from the COVID-19 pandemic and building a post-pandemic world, the development of city diplomacy in the longer term should be closely followed and the exact relationships between COVID-19 and VBDs response have to be further explored.

181 Pipa and Bouchet, "Multilateralism Restored? City Diplomacy In The COVID-19 Era."
182 Zhou, "Guangzhou's City Public Diplomacy in Fighting COVID-19."
183 Pejic, "City diplomacy during COVID-19: the 2022 cities and international engagement survey."
184 Kosovac et al., "Conducting City Diplomacy: A Survey of International Engagement in 47 Cities."

REFERENCES

Acuto, Michele, Mika Morissette, Dan Chan, and Benjamin Leffel. "'City Diplomacy' and Twinning: Lessons from the UK, China and Globally." *City Leadership Initiative, Department of Science, Technology, Engineering and Public Policy, University College London (UK Government Office for Science)*, (2016).

Acuto, Michele, Anna Kosovac, and Kris Hartley. "City diplomacy: another generational shift?." *Diplomatica* 3, no. 1 (2021): 137-146.

Acuto, Michele, Hugo Decramer, Mika Morissette, Jack Doughty, and Yvonne Ying. "City Networks: New Frontiers for City Leaders." In *UCL City Leadership Lab Report.* London: University College London, 2017.

Acuto, Michele, and Benjamin Leffel, "Understanding the global ecosystem of city networks." *Urban Studies* 58, no. 9 (2021). https://doi.org/10.1177/0042098020929261.

Aguiar, Laudemar, and Anna Carolina Mendes. "Paradiplomacia e a atuação internacional da cidade do Rio de Janeiro." In "A Inserção Internacional do Rio de Janeiro." *CEBRI* 3, no. 8 (2014). https://www.cebri.org/en/doc/175/a-insercao-internacional-do-rio-de-janeiro.

Alvarenga, Alexandre A., Erika Maria Sampaio Rocha, Jonathan Filippon, and Maria Angélica Carvalho Andrade. "Challenges for the Brazilian State from the COVID-19 pandemic: the case of paradiplomacy in the state of Maranhão." *Cad. Saúde Pública* 36, no. 12 (2020): e00155720. https://www.scielo.br/j/csp/a/Zf3ZbZDvsFWHPVNbXwcGQbz/?format=pdf&lang=en

Araújo, Helena R.C., Danilo O. Carvalho, Rafaella S. Ioshino, André L. Costa-da-Silva, and Margareth L. Capurro. "Aedes aegypti Control Strategies in Brazil: Incorporation of New Technologies to Overcome the Persistence of Dengue Epidemics" *Insects* 6, no. 2 (2015): 576-594. https://doi.org/10.3390/insects6020576.

Badie, Bertrand. "Transnationalizing diplomacy and global governance." In *Diplomacy in a globalizing world: Theories and practices,* edited by P. Kerr and G. Wiseman. Oxford: Oxford University Press, 2012.

Balbim, Renato. "International city's networks and diplomacy". Institute for Applied Economic Research. May 2021. Discussion Paper. http://dx.doi.org/10.38116/dp257

Biernacki, Patrick, and Dan Waldorf. "Snowball Sampling: Problems and Techniques of Chain Referral Sampling." *Sociological Methods & Research* 10, no. 2 (1981): 141–63. https://doi.org/10.1177/0049124181010002 05.

Borre, Federico, Juliette I. Borri, Yuval Z. Cohen, Mariana Gasparoto, and Tsewang B. Gurung. "Impact of the COVID-19 Pandemic on Infectious Diseases in Brazil: A Case Study on Dengue Infections." *Epidemiologia* 3, no. 1 (2022): 97-115. https://doi.org/10.3390/epidemiologia3010009.

Bowman, Leigh R., Sarah Donegan, and Philip J. McCall. "Is Dengue Vector Control Deficient in Effectiveness or Evidence?: Systematic Review and Meta-analysis." *PLoS Negl Trop Dis* 10, no. 3 (2016): e0004551. doi:10.1371/ journal.pntd.0004551.

Brookings. “Rio de Janeiro metropolitan area profile.” 2016. https://www.brookings.edu/wp-content/uploads/2016/07/Rio.pdf.

Chen, Weijia. “Rethinking city and diaspora as non-state actors of diplomacy: the role of Chinese diaspora in Wenzhou-Prato sister city relationship.” *Int. J. Diplomacy and Economy* 8, no. 2 (2022): 169–189.

Cimerman, Sergio, Alberto Chebabo, Clovis Arns da Cunha, and Alfonso J. Rodríguez-Morales. “Deep impact of COVID-19 in the healthcare of Latin America: the case of Brazil.” *The Brazilian Journal of Infectious Diseases* 24, no. 2 (2020): 93-95. https://doi.org/10.1016/j.bjid.2020.04.005.

Crokidakis, Nuno. “COVID-19 spreading in Rio de Janeiro, Brazil: Do the policies of social isolation really work?” *Chaos, Solitons & Fractals* 136, no. 109930 (2020). https://www.sciencedirect.com/science/article/pii/S0960077920303295.

European Center for Disease Prevention and Control. “Vector control with a focus on Aedes aegypti and Aedes albopictus mosquitoes.” 2017. https://www.ecdc.europa.eu/sites/default/files/documents/Vector-control-Aedes-aegypti-Aedes-albopictus.pdf.

FAO, UNEP, WHO, and WOAH. *Global Plan of Action on One Health. Towards a more comprehensive One Health, approach to global health threats at the human-animal-environment interface.* Rome. 2022. https://doi.org/10.4060/cc2289en

Food and Agriculture Organisation. “Urban Food Agenda: Milan, Nairobi and Kigali meet to achieve sustainable urban food systems.” October 12, 2020. https://www.fao.org/urban-food-agenda/news-events/news-detail/en/c/1363258

Foreign Affairs Office of Shenzhen Municipal Government. “What is the difference between an international friendship city and an international friendship exchange city?”. December 19, 2016. Accessed 7 July 2022. http://fao.sz.gov.cn/hdjl/ywzsk/swcs/content/post_64259.html.

Global Vector Hub. “The global open-access community for vector control information and research,” 2021. https://globalvectorhub.lshtm.ac.uk/

Grandi Kihlgren, Lorenzo. *City diplomacy.* Springer Nature, 2020.

Guangdong Administration Bureau of Chinese Medicine. “Guangzhou and Rio are connected.” Accessed October 10, 2022. http://szyyj.gd.gov.cn/gkmlpt/content/3/3291/post_3291175.html?jump=false#1972

Guangzhou Development Research Institute. “Guangzhou Social Blue Book: Guangzhou's floating population growth and flow lead the country.” September 9, 2021 , http://gda.gzhu.edu.cn/info/1097/4479.

Guglielmi, Giorgia. “World’s most invasive mosquito nearly eradicated from two islands in China.” *Nature*, 2019, https://www.nature.com/articles/d41586-019-02160-z.

Guo, Xiangyu, Chenjin Ma, Lan Wang, Na Zhao, Shelan Liu, and Wangli Xu. "The impact of COVID-19 continuous containment and mitigation strategy on the epidemic of vector-borne diseases in China." *Parasites & vectors* 15, no. 1 (2022): 1-11.

Harapan Harapan, Mirza Ryan, Benediktus Yohan, Rufika Shari Abidin, Firzan Nainu, Ahmed Rakib, Israt Jahan, et al. “Covid-19 and dengue: Double punches for dengue-endemic countries in Asia.” *RevMed Virol* 31, no. 2 (2021). doi:10.1002/rmv.2161.

Kerr, Genevieve, Leanne J. Robinson, Tanya L. Russell, and Joanne Macdonald. “Lessons for improved COVID-19 surveillance from the scale-up of malaria testing strategies.” *Malaria Journal* 21, 223, https://doi.org/10.1186/s12936-022-04240-4.

Koranyi, David. “How city governments can help revitalise the multilateral system. European Council on Foreign Relations.” *European Council on Foreign Relations,* March 15, 2021. ecfr.eu/article/how-city-governments-can-help-revitalise-the-multilateral-system/.

Kosovac, Anna, Kris Hartley, Michele Acuto, and Darcy Gunning. “Conducting City Diplomacy: A Survey of International Engagement in 47 Cities”. The Chicago Council on Global Affairs. October 7, 2020. https://globalaffairs.org/research/report/conducting-city-diplomacy-survey-international-engagement-47-cities

Lara, Ray. "How Are Cities Inserting Themselves in the International System?" In *City Diplomacy,* 189-214. Palgrave Macmillan, Cham, 2020.

Lecours, André. “Political issues of paradiplomacy: lessons from the developed world.” The Netherlands Institute of International Relations ‘Clingendael’, The Hague, The Netherlands, 2008.

Lee, Donna, and Brian Hocking. “Economic diplomacy.” In *Oxford Research Encyclopedia of International Studies,* 2010.

Lee, Donna, and David Hudson. “The old and new significance of political economy in diplomacy.” *Review of International Studies* 30, no. 3 (2004): 343-360.

Matoke-Muhia, Damaris. “Learning from COVID-19 to accelerate malaria vaccines development.” *Sci Dev Net*, February 8, 2021. https://www.scidev.net/sub-saharan-africa/opinions/learning-from-covid-19-to-accelerate-malaria-vaccines-development/.

MESA Alliance. “Building Out Vector-borne diseases in Sub-Saharan Africa: the BOVA Network.” February 14, 2020. https://mesamalaria.org/mesa-track/building-out-vector-borne-diseases-sub-saharan-africa-bova-network

Mendes, Marcos Vinícius Isaias, and Ariane Roder Figueira. "Paradiplomacy and the International Competitiveness of Cities: the case of Rio de Janeiro." *Revista Brasileira de Política Internacional* 60, no. 1 (2017). https://doi.org/10.1590/0034-7329201700103.

Milani, Carlos R. S., and Maria C. M. Ribeiro. “International relations and the paradiplomacy of Brazilian cities: crafting the concept of local international management.” *Brazilian Administration Review* 8, no. 1 (2011): art. 2, 21-36. https://doi.org/10.1590/S1807-76922011000100003.

Milosavljevic, Milena. “The potential of Transnational City Networks as actors in Global Health Governance at times of Global Health Emergencies: Case of the COVID-19 pandemic response.” Master diss., Malmö University, 2022.

Moloo, Ashok. “Genuine intersectoral collaboration is needed to achieve better progress in vector control.” World Health Organization, April 11, 2022. https://www.who.int/news/item/11-04-2022-genuine-intersectoral-collaboration-is-needed-to-achieve-better-progress-in-vector-control

Mudhune, Sandra A, Emelda A Okiro, Abdisalan M Noor, Dejan Zurovac, Elizabeth Juma, Sam A Ochola, and Robert W Snow. "The clinical burden of malaria in Nairobi: a historical review and contemporary audit" *Malar J* 10, no. 1 (2011). doi:10.1186/1475-2875-10-138.

Muse, Larissa Paredes, Pedro Reis Martins, Alexandre Hojda, Patrícia Araújo de Abreu, and Priscila Couto de Almeida. "The role of Urban Control and Command Centers in the face of COVID-19: the case of COR in Rio de Janeiro, Brazil." *IEEE International Smart Cities Conference (ISC2),* (2020). doi:10.1109/ISC251055.2020.9239068

Nairobi City County Assembly. "Establishment of Nairobi City County Sister Cities Committee". November, 19, 2019. https://nairobiassembly.go.ke/motion/establishment-of-nairobi-city-county-sister-cities-committee/

Namutebi, Joweria. "The Covid-19 pandemic and Uganda-Kenya Relations." (Master diss., Makerere University, 2022).

Ndenga, Bryson Alberto, Francis Maluki Mutuku, Harun Njenga Ngugi, Joel Omari Mbakaya, Peter Aswani, Peter Siema Musunzaji, John Vulule, et al. "Characteristics of Aedes aegypti adult mosquitoes in rural and urban areas of western and coastal Kenya." *PLOS ONE* 12, no. 12 (2017): e0189971. https://doi.org/10.1371/journal.pone.0189971.

Nyambura, Joyce. "Country Government Structure in Kenya." ICMA, April 26, 2022, https://icma.org/articles/article/county-government-structure-kenya.

OHCHR. "City-To-City Cooperation discussed at 'Meeting of Mayors', part of Brussels Conference on Least Developed Countries." May 15, 2001. Accessed 28 October 2022. https://www.ohchr.org/en/press-releases/2009/10/city-city-cooperation-discussed-meeting-mayors-part-brussels-conference.

Olive, Marie-Marie, Thierry Baldet, James Devillers, Johanna Fite, Marie-Claire Paty, Christophe Paupy, Philippe Quénel, et al. "The COVID-19 pandemic should not jeopardize dengue control." *PLoS Negl Trop Dis* 14, no. 9 (2020): e0008716, 1.https://doi.org/10.1371/journal.pntd.0008716.

Organization for Economic Co-operation and Development. "Cities policy responses." July 23, 2020. https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/.

Pan American Health Organization. "Regional Dengue Symposium addresses today's challenges in dengue control." November 3, 2015. Accessed 28 November 2022. https://www3.paho.org/hq/index.php?option=com_content&view=article&id=11412:symposium-dengue-control&Itemid=0&lang=pt#gsc.tab=0.

Pejic, Daniel, Michele Acuto, and Anna Kosovac. 'City diplomacy during COVID-19: the 2022 cities and international engagement survey.' Melbourne Centre for Cities; Chicago Council on Global Affairs. 2022. doi: 10.26188/19719676

Périssé, André Reynaldo Santos, Reinaldo Souza-Santos, Rosemere Duarte, Fernanda Santos, Célia Regina de Andrade, Nádia Cristina Pinheiro Rodrigues, Joyce Mendes de Andrade Schramm, et al. "Zika, dengue and chikungunya population prevalence in Rio de Janeiro city, Brazil, and the importance of seroprevalence studies to estimate the real number of infected individuals," *PLoS One* 15, no. 12 (2020): e0243239. https://doi.org/10.1371/journal.pone.0243239.

Pigman, Geoffrey. *Contemporary diplomacy.* Polity, 2010.

Pipa, Anthony F., and Max Bouchet. "Multilateralism Restored? City Diplomacy | In The COVID-19 Era." The *Hague Journal Of Diplomacy* 15, no. 4 (2020): 599-610. doi:10.1163/1871191x-bja10043.

Pluijm, Rogier van der, and Jan Melissen. City diplomacy: The expanding role of cities in international politics.

Hague: The Netherlands Institute of International Relations Clingendael, 2007.

Procopio, Maddalena. "China's Health Diplomacy in Africa: Pitfalls Behind the Leading Role." *Italian Institute for International Political Studies*, April 7, 2020. https://www.ispionline.it/en/pubblicazione/chinas-health-diplomacy-africa-pitfalls-behind-leading-role-25694.

Republic of Kenya - Ministry of Foreign Affairs. "Introduction - Foreign Policy." Accessed 1 December 2022. https://mfa.go.ke/historyfp/

Rio Prefeitura. "Guidelines and measures Taken by Rio de Janeiro City Hall to avoid the spread of Covid-19." 2020. https://www.citiesforglobalhealth.org/sites/default/files/documents/2020-04/A%C3%A7%C3%B5es%20PCRJ%20contra%20Covid-19%20-%20Management.pdf.

Sassen, Saskia. *The Global City: New York, London, Tokyo*. Princeton University Press, 2001. https://doi.org/10.2307/j.ctt2jc93q.

Sherrard-Smith, Ellie, Alexandra B. Hogan, and Thomas S. Churcher. "The potential public health consequences of COVID-19 on malaria in Africa." *Nature Medicine,* (2020): 1411-1416. https://doi.org/10.1038/s41591-020-1025-y.

Smolinski, Mark S., Margaret A. Hamburg, and Joshua Lederberg, eds. *Microbial Threats to Health: Emergence, Detection, and Response*. Washington (DC): National Academies Press, 2003. https://www.ncbi.nlm.nih.gov/books/NBK221486/.

Spadale, Pedro. "Relações Internacionais de Unidades Subnacionais: a experiência do estado do Rio de Janeiro." In: "A Inserção Internacional do Rio de Janeiro," *CEBRI* 3, no. 8 (2014). https://www.cebri.org/en/doc/175/a-insercao-internacional-do-rio-de-janeiro.

Tasca, Renato, Mariana Baleeiro Martins Carrera, Ana Maria Malik, Laura Maria César Schiesari, Alessandro Bigoni, Cinthia Ferreira Costa, and Adriano Massuda. "Managing Brazil's Health System at municipal level against Covid-19: a preliminary analysis." *SAÚDE DEBATE* 46, no. 1 (2022): 15-32. https://scielosp.org/pdf/sdeb/2022.v46nspe1/15-32/en.

The Center for Policy Impact in Global Health. "Kenya's Response Policy to COVID-19". August 2020. https://centerforpolicyimpact.org/wp-content/uploads/sites/18/2020/08/Kenya-Policy-Response-to-COVID.pdf

UN-Habitat. *Cities and Pandemics: Towards a more just, green and healthy future*. 2021. https://unhabitat.org/cities-and-pandemics-towards-a-more-just-green-and-healthy-future-0.

UN-Habitat. "Network seeks to build better in bid to fight diseases in urban settlements." April 12, 2019. https://unhabitat.org/network-seeks-to-build-better-in-bid-to-fight-diseases-in-urban-settlements.

UN-Habitat. *New Urban Agenda.* 2017. https://habitat3.org/wp-content/uploads/NUA-English.pdf.

United Nations Development Programme. "Covid-19: Cities in the Frontline of Response and Recovery: Calls for Adequate Investments at Local Level: United Nations Development Programme." July 28, 2020. https://www.undp.org/press-releases/covid-19-cities-frontline-response-and-recovery-calls-adequate-investments-local.

US Mission Brazil. "U.S. Consulate and Rio city sign MOU to enhance economic and social cooperation." December 15, 2021. https://br.usembassy.

gov/u-s-consulate-and-rio-city-sing-mou-to-enhance-economic-and-social-cooperation/.

Vanore, Michaella. "Diasporas as Actors of Economic Diplomacy," in *Routledge International Handbook of Diaspora Diplomacy,* edited by L. Kennedy, 156-168. Routledge, 2022.

Wen-Hung Wang, Aspiro Nayim Urbina, Chih-Yen Lin, Zih-Syuan Yang, Wanchai Assavalapsakul, Arunee Thitithanyanont, Po-Liang Lu, Yen-Hsu Chen, Sheng-Fan Wang. "Targets and strategies for vaccine development against dengue viruses." *Biomedicine & Pharmacotherapy* 144. (2021). https://doi.org/10.1016/j.biopha.2021.112304

Wilcox, Bruce, Jennifer Steele, and Carsten H. Richter. "Operationalizing a One Health Approach Building on the TDR-IDRC Research Initiative on Vector-Borne Diseases in the Context of Climate Change," prepared for the World Health Organization, Special Programme for Research and Training in Tropical Diseases, Vectors, Environment and Society. *ASEAN Institute for Health Development, Thailand* (2019). https://tdr.who.int/docs/librariesprovider10/one-health/tdr-initiative-one-health-report-29-nov-2019.pdf?sfvrsn=1eef7f49_5.

World Bank. "Urban Development." April 20, 2020. https://www.worldbank.org/en/topic/urbandevelopment/overview.

World Health Organization. *Global vector control response 2017-2030*. 2017. https://www.who.int/publications/i/item/9789241512978.

World Health Organization. *Global vector control response: an integrated approach for the control of vector-borne diseases, WHA70.16.* 2017. https://apps.who.int/gb/ebwha/pdf_files/WHA70/A70_R16-en.pdf?ua=1.

World Health Organization. "Integrating vector management." 2022. Accessed 2 July 2022. https://www.who.int/westernpacific/activities/integrating-vector-management.

World Health Organization. *Multisectoral approach to the prevention and control of vector-borne diseases.* 2020. https://apps.who.int/iris/handle/10665/331861.

World Health Organization. *Strengthening preparedness for COVID-19 in cities and urban settings: interim guidance for local authorities*. 2020. https://apps.who.int/iris/handle/10665/331896.

World Health Organization. "Vaccines and immunization: Dengue." April 20, 2018. https://www.who.int/news-room/questions-and-answers/item/dengue-vaccines.

World Health Organization. "Vector-borne diseases." 2020. https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases. Accessed 2 June 2022.

World Health Organization. "Yellow fever - East, West, and Central Africa." September 2, 2022. https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON405.

World Health Organization, Strategy Development and Monitoring for Parasitic Diseases and Vector Control Team. Global strategic framework for integrated vector management. World Health Organization (2004). https://apps.who.int/iris/handle/10665/68624.

Wu, Sijia, Hongyan Ren, Wenhui Chen, and Tiegang Li. "Neglected urban villages in current vector surveillance system: evidences in Guangzhou, China." *International journal of environmental research and public health*

17, no. 1 (2020): 2. doi: 10.3390/ijerph17010002.

Wu, Xun, Michael Ramesh, and Michael Howlett. "Policy capacity: A conceptual framework for understanding policy competences and capabilities." *Policy and Society* 34, no. 3-4 (2015): 165-171.

Zhang, Zhoubin, Qinlong Jing, Zongqiu Chen, Tiegang Li, Liyun Jiang, Yilan Li, Lei Luo, John Marshall, and Zhicong Yang. "The increasing menace of dengue in Guangzhou, 2001–2016: the most important epicenter in mainland China." *BMC infectious diseases* 19, no. 1 (2019): 1-8.

Zhou, Ying. "Yiqing xia de Guangzhou Chengshi Gonggong Waijiao" (Guangzhou's City Public Diplomacy in Fighting COVID-19). *Public Diplomacy Quarterly*, 2021. https://www.cnki.com.cn/Article/CJFDTotal-GGWJ202102006.htm.

APPENDIX 1: TOOLS OF CITY DIPLOMACY

Tools[185]	Definition	Features	Examples
Bilateral ties	Arrangements between two municipalities in different states to formalize collaborative relationships	• Nonbinding and symbolic nature • Endurance of formal ties • A high level of flexibility due to vague terms used by the agreements	Sister-city agreements; Memorandum of Understanding (MoU).
City networks	Formalized multilateral cooperations between three or more cities coming together to cooperate on one specific sector of the municipal action or on all of them.	• Fast-growing and multiplication • Nonbinding frameworks of action • Usually not to be limited by frictions between states	International Union Of Cities; C40; LUCI; UCLG; Eurocities.
Joint international projects	Bilateral or multilateral projects with a list of concrete objectives to be met in a precise time frame, which is usually short to middle-term.	• An alternative to perpetual bilateral projects requiring shorter-term commitment • Often shaped by project calls issued by international organizations • Lack of coherence and consistency	European Union's Urbact program; C40's Clean Bus Declaration.
International events	Cities host international events as tools to raise their international profiles while boosting the local economy in both the short and long term.	• City branding • Urban space can be reshaped in depth by infrastructure and beautification projects • Bidding for major international events usually implies a complex and intense diplomatic action	The Olympics; the World Fair; Cannes and Venice's film festivals; Art Basel.

185 Kihlgren Grandi, City diplomacy, 10-19.; Acuto et al., "City Diplomacy' and Twinning: Lessons from the UK, China and Globally."

APPENDIX 2: CHALLENGES AND OPPORTUNITIES FACING LOCAL PRACTITIONERS IN THE THREE CASE

City	Challenges	Opportunities
Guangzhou, China	• Sensitivity around public health issues, especially against the backdrop of the securitization of COVID-19 • Exclusivity of public health issues due to the high stakes involved • Centralized political system that renders limited flexibility in conducting international outreach at the sub-national level	• Engaging NGOs, multinationals, and multilaterals as effective brokers of city diplomacy • Widening the scope and venue of city diplomacy • Harnessing the advance of digital communication tools
Nairobi, Kenya	• Lack of a public policy strategy for the protection of vulnerable population • Poor financial accountability • Decentralized political system that limits the engagement of city-level actors in the international arena	• Participatory planning: an active engagement and participation of citizens in the urban planning system. • Leveraging digital softwares developed during the pandemic for future needs. • Foster city-to-city cooperation, taking into account also IOs and NGOs in the country.
Rio de Janeiro, Brazil	• Funding restrictions for sub-national states and cities • Decentralized political system that provides limited support at the sub-national level • VBDs are considered to be an overall government problem and local populations do not take initiative	• Improving city diplomacy partnerships and solidifying informal collaborations • Digital communication tools and surveillance technologies • Alignment of health with other sectors

APPENDIX 3: LIST OF INTERVIEWEES

Number	Corresponding purpose	Date	Interviewee(s)
1	Expert interview: Global Health	19/08/2022	Prof. Suerie Moon, Geneva Graduate Institute
2	Case Study 1: Guangzhou	22/08/2022	Prof. Ying Zhou, Jinan University
3	Case Study 1: Guangzhou	08/09/2022	Department of Culture, Sport, and Media, Town C, Guangzhou
4	Case Study 1: Guangzhou	09/09/2022	Center for Disease Control and Prevention, Town C, Guangzhou
5	Case Study 2: Nairobi	19/09/2022	Anne Aol, Environmental Planning and Management Professional - International Sustainability Academy (ISA)
6	Case Study 3: Rio de Janeiro	22/9/2022	Principal Investigator of the Brazil WMP Project, Public Health Researcher, World Mosquito Program (WMP)
7	Case Study 1: Guangzhou	26/09/2022	Foreign Affairs Office, Town C, Guangzhou
8	Expert interview: VBDs & City diplomacy	28/9/2022	Steve Lindsay, WHO's Strategic and Technical Advisory Group on Neglected Tropical Diseases; Public Health Entomologist, Professor at Durham University
9	Case Study 2: Nairobi	11/10/2022	Paula Pennanen-Rebeiro-Hargrave, Human Settlements Officer at UN-Habitat HQ
10	Case Study 1: Guangzhou	13/10/2022	Zhanshan Zhang, UN HABITAT China Office; Graham Alabaster, UN- HABITAT Geneva Office
11	Case Study 3: Rio de Janeiro	17/10/2022	Medical Doctor in Infectious Diseases, Rio de Janeiro City Health Department

12	Expert interview: City diplomacy	19/10/2022	Prof. Michele Acuto, University of Melbourne
13	Case Study 2: Nairobi	18/11/2022	Urban Planner and National Programme Officer - UN-Habitat HQ
14	Case Study 2: Nairobi	29/11/2022	Coordinator Safer Nairobi Initiative and Project Coordinating Officer for UN-Habitat and Nairobi City County Government

Contact us at arp.2022citydiplomacyhealth@graduateinstitute.ch

GENEVA GRADUATE INSTITUTE
INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

UN HABITAT
FOR A BETTER URBAN FUTURE