

A New Dimension of International Relations: The Role of Science Diplomacy in Jordan's Response to COVID-19

Emad A. Ayasreh*

<https://doi.org/10.51405/20.1.10>

Date of Submission: 20/02/2022

Date of Acceptance: 20/03/2022

Abstract

Science diplomacy is a rapidly growing field in foreign policy and international relations, gaining even greater importance since the onset of the Covid-19 pandemic. This study explores the substantial role of science diplomacy and international institutions in promoting coordinated efforts during Jordan's response to the pandemic. It examines science diplomacy within the country and its increasing significance in addressing global challenges, with particular emphasis on its contributions to health diplomacy amid the pandemic. The researcher adopts a qualitative research methodology guided by a case study approach. Data were collected from various resources, including journal articles, official international and domestic reports, news reports, and website documents. The thematic analysis of the data highlights the crucial role of Jordan's international collaboration in its response to Covid-19. Notably, international institutions such as WHO, GAVI, CEPI, UNICEF, USAID, EU, and the World Bank played instrumental roles in supporting Jordan's efforts in combating the pandemic.

Keywords: International relations, science diplomacy, health diplomacy, foreign policy, soft power, COVID-19, Jordan.

1. Introduction

1.1 Background and Context

The COVID-19 pandemic has provided many examples of the health policies of individual states becoming integrated into the overall foreign policy;⁽¹⁾ however, the pandemic has also uncovered numerous weaknesses in areas in which science and international relations intersect.⁽²⁾ Although past worldwide health crises have motivated the institutionalization of multilateral mechanisms and expanded the abilities of worldwide organizations, it is currently apparent that those steps were inadequate. The COVID-19 pandemic has led to some of the most striking scientific efforts in history (for instance, until June 2020, nearly 30,000 scientific papers had been written on COVID-19).⁽³⁾ Still, in most parts of the world, the response has been an ad hoc one rather than one put into place by design.⁽⁴⁾ The pandemic is a political problem as it is a health tragedy.⁽⁵⁾ The weaknesses in readiness and design uncovered by the emergency show a need for extending and further developing scientific practices, points of interaction, and instruments. Doing so is vital for meeting worldwide emergencies in the future more effectively.⁽⁶⁾

One way of approaching this need is science diplomacy, which deals with issues that require accurate input and information from scientists from all nations; they are not resolvable by scientists in an isolated country acting alone. Science diplomacy occurs when networks make coordinated efforts of reasoned, practical people using broadly based techniques for progress inconsistent worldwide exchanges (and it is also a strategy for setting up essential relations among countries) and a course of action that addresses issues of importance to more than one country. Scientific procedures are insisted on and used by specialists to address challenges such as pandemics, which can affect every aspect of society.⁽⁷⁾

The goals for Jordan are twofold: The first goal is to actively participate in international diplomacy, and the second is to partner with worldwide organizations to vaccinate its citizens against the coronavirus. The researcher wanted to build the functional and institutional structures to achieve these objectives.

1.2 Statement of the Problem and Research Questions

This worldwide spread of the coronavirus has added a degree of vulnerability that we never experienced until recently. It has exposed much financial and social vulnerability in many nations. We have also experienced political vulnerability, and there has been some resistance to accepting scientific data on COVID-19, which has led to the vulnerability of the health care system.

The dire effects of the coronavirus have added a remarkable degree of urgency to the political and academic efforts. Never before in history has information on the genome of infection been shared so rapidly among researchers worldwide after its disclosure. This desire to move quickly has set off coordinated activities worldwide.⁽⁸⁾

The grave consequences of the pandemic have also brought up issues of shared responsibility. The United Nations (UN) Sustainable Development Goals (SDGs) focus on the significance of the shared liability among nations. The shared responsibility connected with COVID-19 has prompted acknowledging that we want action. Because of the participation of public and private institutions and scientists, open science has been advanced, and international joint efforts have been encouraged much more than at any time in recent memory. Simultaneously, we have noticed the dramatic effects of nonactivity during an emergency.⁽⁹⁾

In such exceptional circumstances, global health diplomacy is perceived as an essential component in the practice of smart diplomacy, increasing traditional scopes of economic, political, and military diplomacy;⁽¹⁰⁾ scientific efforts affect political decisions and should shape and influence them. People have looked to scientists to create and distribute vaccines, react appropriately to the pandemic, and go to suitable lengths to mitigate it. Policymakers must pay attention to scientists, and scientists must determine the most pressing needs for data. We wanted the scientific community to respond to the pandemic, and we depended on science to provide proof of the response. This proof should then illuminate political decisions.⁽¹¹⁾

Decisions, in any case, continue to have a political dimension. Decisions should be based on evidence, but that is not always the case. During the coronavirus pandemic, decisions have been made within political cycles, and science has not always been considered in the decisions. The pandemic has expanded the ways in which we view political processes. It is essential to be aware of their association with scientific research and findings in circumstances where science is not always concerned. The requirement for reasonable, fair, and even-handed political activity extends to efforts for immunization. This is an issue that affects all people. Political support for vaccination is needed at the highest levels of government. As citizens, we should be aware of the political influence on health uncovered by COVID-19 and try to influence political activity for good health outcomes.⁽¹²⁾

Jordan is a country in which salaries are low. As a citizen of Jordan, the researcher wanted to investigate why specific actions were taken and how science diplomacy was used during the pandemic. The researcher wanted to

review the premises that characterize actions of science diplomacy in the current global framework. The leading objective of this study was to describe the role of science diplomacy in Jordan's response to the coronavirus. To address this objective, the researcher found that it was vital to answer these questions:

1. What role has Jordan played in international collaborations in response to COVID-19?
2. How did international institutions help in Jordan's response to COVID-19?

This study hypothesizes that Jordan's international science diplomacy played a significant role in the country's response to COVID-19, especially in vaccination.

1.3 Purpose and Significance of the Study

The study explored the role of science diplomacy in Jordan's response to COVID-19. This knowledge will better understand how science diplomacy, particularly health diplomacy, can meet common world challenges, especially pandemics.

Despite the expansion of science diplomacy to address global challenges such as pandemics, the existing literature lacks information on the holistic role of science diplomacy in Jordan's response to COVID-19. This is a gap in knowledge that the current study aimed to address. In addition, the study will encourage the making of decisions that will lead to more effective actions.

1.4 Outline of the Study

Section 2 introduces the literature review incorporating this investigation's conceptual and theoretical frameworks. A thorough explanation of the methodology for this study is given in section 3. Section 4 presents the results of this study and the themes that emerged from the data analysis. Lastly, section 5 summarizes the research findings, including the study's discussion, limitations, conclusions, and recommendations.

2. Synthesis of Literature Review

2.1 Conceptual and Theoretical Framework

Scientists and diplomats are not obvious allies. While science is concerned with proving truth, 17th-century diplomat Sir Henry Wotton memorably described an ambassador as an honest man sent abroad to lie for the interest of his country. Regardless of their purpose, scientists have a long history of supporting international collaboration. In 1723, Philip Zollman was appointed Foreign Secretary of the Royal Society.⁽¹³⁾⁽¹⁴⁾ His responsibility was to communicate with scientists all around the world in order to keep the Society's Fellows informed of the most recent ideas and research results.⁽¹⁵⁾

However, the term "science diplomacy" is a 21st-century phenomenon.⁽¹⁶⁾ and has only been in use in the vocabulary of international relations since around two decades.⁽¹⁷⁾ Meanwhile, multiple efforts to define science diplomacy have resulted in various typologies of activities and motives linked with science diplomacy.⁽¹⁸⁾

A joint meeting of the American Association for the Advancement of Science (AAAS) and the Royal Society in 2010 developed a three-pronged categorization that is now widely utilized, and it has been used as a major concept of science diplomacy. It sees science diplomacy operating in three dimensions:⁽¹⁹⁾ The first is *science in diplomacy*, which utilizes science to advice foreign policy, such as the IPCC (Intergovernmental Panel of Climate Change); the second is *diplomacy for science*, in which diplomacy is employed in scientific collaborations, such as the SKA (Square Kilometre Array); and the third is *science for diplomacy*, in which science is used for better international relations, such as the AAAS Centre for Science Diplomacy.⁽²⁰⁾⁽²¹⁾

Health diplomacy is a primary concern of science diplomacy.⁽²²⁾ Not all health diplomacy is about health; health diplomacy can be defined "as international aid or cooperation meant to promote health or that uses health programming to promote non-health-related foreign aims."⁽²³⁾ Historically, health diplomacy has remained outside the focus of international relations, and it has become progressively more critical during the COVID-19 pandemic because the disease affected nearly every country globally.⁽²⁴⁾

Scientists soon realized that sharing data and health care efforts among nations would be crucial for controlling the spread of the disease. They also knew that efforts in science diplomacy need not stop with the coronavirus; they should continue on a global scale to enhance health and control disease worldwide. Efforts are needed among all nations, including developing countries. Because of the fundamental need to foster health diplomacy globally, science diplomacy needed additional consideration from policymakers and political activists everywhere. A successful model could be set up to address existing limits and influence possible improvements in health care.⁽²⁵⁾ Knowledge of international relations can directly foster health diplomacy.⁽²⁶⁾

In the historic year 2020, the world focused on health diplomacy to address the COVID-19 pandemic.⁽²⁷⁾ The speed with which COVID-19 set off a clinical, economic, and social crisis was a factor in motivating the gathering and open sharing of new research data and practices. Scientists have been subsequently endeavoring to obtain data that can address the pandemic's physical and societal effects, such as reasons for the high variations in death rates in different

countries or districts,⁽²⁸⁾ Accurate research data have become more critical as the coronavirus has spread.

Theories and practices of foreign policy and diplomacy, including frameworks of hard and soft power, are going through changes in outlook; an expanding number of actors and techniques are enhancing the outcomes of international relations in the new world order. Simultaneously, global health programs ascend the political spectrum in scale, scope, and influence.⁽²⁹⁾ Nevertheless, not all international multilateral efforts have improved global public health as their principal aim.⁽³⁰⁾ At this time, the pandemic tragedy cannot be resolved except through international cooperation, global unity, and multilateralism. This perspective concludes that COVID-19 could be an exceptional prospect for the scope of global health diplomacy.⁽³¹⁾

Considering science diplomacy as a component of general diplomacy or an instrument of action, the perspectives of neoliberal institutionalists ought to be reviewed. It could be expected that the main directions of Jordan's science diplomacy would be to join the efforts of other nations, to expand worldwide associations to provide more opportunities and share more advances in science and technology, to support international efforts for scientific studies, and to become more knowledgeable about utilizing science to meet specific political targets. Jordan is one of the states that wish to review its status in developing and supporting global science and explorative collaborations.

2.2 Premises That Characterize Actions of Science Diplomacy in the Current Global Framework

The actions necessary for science diplomacy occur at different levels of society and the scientific establishment. Mutual respect between workers at these levels is essential, as is a good organization. Good organization requires planning, arranging, structuring, and administering studies, programs, and funds. Efforts for an organization may have to address an amalgam of political cycles, changing interests, and demands, which may be conflicting. Decisions about scientific practices may have to be made in a political environment. The decisions may have significance for the freedom and prosperity of a nation. Such concerns are not new in politics; they were present for some time before COVID-19 appeared. However, COVID-19 has brought "health as a political choice"⁽³²⁾ to the forefront of national concerns. It showed us how momentous political decisions are, how administrative issues affect the pursuit of an autonomous course of action, and how a political agenda can influence the management of a crisis, be it a pandemic or another emergency. We constantly face political decisions for prosperity, and COVID-19 has made us more aware of the consequences of these decisions in our own lives.

Political decisions are made at the national and international levels. Political decisions in many countries have hindered the spread of the disease, but the types of measures chosen have ranged from extreme to hardly any. At the international level, foundations concerned with health have made many decisions to mitigate the pandemic while also dealing with political concerns.⁽³³⁾ As a result, global health diplomacy at each level of practice was, and is, essential and required for good global health action.⁽³⁴⁾

Since the vaccine for COVID-19 has become available, vaccination has been one area in which national and international efforts have been substantial. For instance, GAVI: the Global Alliance for Vaccines and Immunization has immunized many of the world's children against deadly and incapacitating contagious illnesses, including COVID-19.⁽³⁵⁾ Vaccination programs are still underway in developing countries in the Global South and for poor groups in developed countries that have borne the heavy brunt of COVID-19.⁽³⁶⁾

Other ways science has eased the pandemic are by testing individuals for the disease at border crossings between nations and sharing epidemiological information among countries. These efforts have significantly helped avoid and control contagious illnesses such as COVID-19.

Strategic gatherings of nations that support diplomacy and foster human resources for handling general health conditions are central to global health diplomacy. Skills in diplomacy and negotiation, knowledge of applied science, and the recognition of cultural diversity are fundamental needs for health attachés in this field. Furthermore, a methodology that successfully brings together health diplomacy and international diplomacy requires experts from all levels of society who develop resources and share information to meet mutual aims.⁽³⁷⁾

3. Method

3.1 Case Study Design

The purpose of the current study was to investigate the role of science diplomacy in Jordan in tackling the COVID-19 pandemic. The researcher chose a qualitative case study approach to focus on the dynamics of a single case. This approach made the researcher get a deeper understanding of the exploring subject. Other benefits are that such an approach can sufficiently help describe the phenomenon's existence.⁽³⁸⁾

3.2 Data Collection Strategy

The data on the topic was limited, and there were very few scientific studies investigating Jordan's response to COVID-19 from the perspective of science diplomacy. A comprehensive search allowed the researcher to gather scattered

data that were sufficient to introduce the topic and answer the study's questions. The data sources consisted of available journal articles, news reports, and official documents published by relevant institutions such as EU Neighbours, which is part of the EU's Neighbourhood Communication Programme; the Global Alliance for Vaccines and Immunization (GAVI); The United Nations Human Settlements Programme (UN-Habitat); The United Nations International Children's Emergency Fund (UNICEF); The United States Agency for International Development (USAID); and the World Bank.

The academic databases the researcher considered to find the sources used in this study were mainly Scopus, Google Scholar, and official websites. The main keywords the researcher used to search were "COVID-19" OR "COVID-19 vaccine" OR "Coronavirus" OR "science diplomacy" OR "health diplomacy" OR "global health diplomacy" OR "international relations" OR "foreign policy" OR "Jordan." The data were collected since the COVID-19 pandemic with a timeline between 2020 and 2022.

3.3 Data Analysis Strategy

The researcher made a thematic analysis of the data gathered to answer the study questions. Thematic analysis is a method that can be generally utilized across a wide-ranging scope of epistemologies and research questions. It is a method for detecting, analyzing, organizing, summarizing, and reporting themes found in data. This type of analysis can lead to trustworthy and insightful findings.⁽³⁹⁾

The first step of the analysis occurred during the data collection: The researcher became familiar with the raw data and reviewed previous analytical thoughts and knowledge about the topic. The raw data were stored and archived on a cloud drive, and each source was inserted using reference management software. The second step was producing the initial codes that allowed the researcher to determine how the data related to the study's topics. The initial codes were hierarchical to set up different levels of codes that matched the study's subjects. The adoption of a coding framework provided a clear trail of evidence supporting the trustworthiness of the study.⁽⁴⁰⁾ The third step was producing themes from codes; the inductive approach was used to obtain themes from the raw data to get a detailed description of the phenomenon. A deductive approach was used to obtain themes from the theory, which in this study was neoliberal intuitionism. The deductive approach helped make a detailed analysis of the data.⁽⁴¹⁾ The fourth step was reviewing themes, and the fifth step was writing a detailed analysis of each theme reviewed. The last step was writing about the findings.

4. Results

4.1 Jordan's International Collaboration

"Diplomacy for science" assumed a pivotal role in expanding Jordan's cooperation during the pandemic. In mid-2020, public authorities with the help of the World Health Organization (WHO) instituted an appraisal of Jordan's discovery of and response to COVID-19; together, they generated the National Preparedness and Response Plan. This was executed through the COVID-19 Emergency Response Project, partly funded by the World Bank Group, with the principal goal of setting up a clinical foundation for and preparing key staff for disease control.⁽⁴²⁾

The board of the World Bank endorsed the Country Partnership Framework (CPF) of Jordan in July of 2016, and its Performance and Learning Review (PLR) was offered in May of 2021. The CPF had two main points: developing service delivery access and quality and expanding financial opportunities and human resources. The PLR added a third point: assist the steps put in place to respond to and mitigate the effects of COVID-19 by expanding the CPF for one year (until FY23) and spotlighting changes made and results achieved.⁽⁴³⁾

Since the CPF was put into place, the World Bank's portfolio in Jordan extended quickly to help bring about changes and, in FY20 to 21, take the steps necessary to respond to the COVID-19 pandemic. As of the end of September 2021, the Bank's active portfolio in Jordan had 15 goals, the cost of which was estimated to be US\$3.25 billion; the money would be spent on advances in loans, the financing of concessions, and grants. Around 58% (or US\$1.9 billion) had been dispensed out of the total funds. The World Bank Group approached the concessional resources by helping Jordan's Syrian Crisis Response; they did this by an unusual assignment of funds, US\$200 million, from the International Development Association (IDA) and the foundation of the Global Concessional Financing Facility. This facility has subsidized several efforts in Jordan in 10 sectors. One was the sector of health, nutrition, and population; through the Jordan COVID-19 Emergency Response, it received US\$70 million (US\$13.75 million Trust Fund co-financing). Likewise, for the sector of social protection and jobs, the Jordan Emergency Cash Transfer COVID-19 Response project received US\$640 million (US\$24.17 million Trust Fund co-financing).⁽⁴⁴⁾ The Jordan Emergency Cash Transfer COVID-19 Response project gave financial backing to low-income families impacted by the pandemic in Jordan.⁽⁴⁵⁾

On January 19, 2021, the Royal Scientific Society (RSS) and UN-Habitat consented to arrangements for a joint examination project titled "COVID-19 in the Wastewater Cycle: Survival, Risk, and Surveillance in Jordan," started by the UN's Global Water Operators' Partnerships' Alliance (GWOPA). The COVID-

19 pandemic has reignited interest in wastewater observation, explicitly how sewage frameworks are checked for the presence of infectious microbes and other microorganisms. The finding of the coronavirus in wastewater offers early detection of likely cases of infection, and the discovery of the infection in sewage has been utilized as a common sign of the infection's spread in communities. Poor metropolitan communities and refugee camps are generally defenseless against COVID-19 flare-ups because of their dense populations and crowded conditions. This vulnerability was compounded by a decreased financial ability to offer polymerase chain reaction (PCR) testing when required. Jordan has the second-highest number of refugees per capita on the planet. Approximately 83% are living in metropolitan areas,⁽⁴⁶⁾ and the rest live in one of 12 refugee camps, according to the UN Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and UN High Commissioner for Refugees (UNHCR).⁽⁴⁷⁾⁽⁴⁸⁾ As of December 15, 2021, 2,871,550 tests for the coronavirus had been done. This was among the most special testing rates of middle-income Middle Eastern and North African nations, and it was due to a coordinated effort between the Ministry of Health and private laboratories in Jordan.⁽⁴⁹⁾

However, considering the restricted resources in Jordan for massive COVID-19 testing, wastewater studies can give significant early notification of contamination among Jordanian peoples, especially disadvantaged groups and refugees. Therefore, joint efforts have been ongoing for more than half a year to detect the coronavirus in the wastewater cycle from the source points at King Abdullah University Hospital in Irbid, focusing on wastewater treatment plants. The project will offer a maintainable early warning system that can be used in Azraq Syrian refugee camp and Jerash Palestinian refugee camp. The Water and Environment Center and Bio-Safety and Bio-Security Center at the RSS will be accountable for carrying out this venture, which will supplement the society's endeavors in monitoring wastewater across Jordan.

The RSS is an essential establishment for consultation and specialized assistance in Jordan; in addition, it is a regional forerunner in science and innovation. It advocates for a customer-driven methodology and is strongly committed to improving the status of the residents of Jordan. Facilitated by UN-Habitat, GWOPA assists administrators of water systems and promotes collaborations among them so that high-quality assistance is available to all. GWOPA is a worldwide organization established in 2009 to help water administrators through Water Operator's Partnerships. The partnerships are between at least two water administrators, who mutually increase their abilities to keep water supplies safe and adequate for residents. The partnerships are not driven by hopes of making a profit but to give each partner more expertise in the

field. The undertaking in Jordan will provide partners with essential knowledge and training in combatting the coronavirus and checking for COVID-19 in urban areas and networks of people. It is thought that the venture will benefit 70,000 to 80,000 individuals. They will include the Azraq refugee camp inhabitants, which is home to 36,874 Syrian refugees, and the Jerash refugee camp, which is home to more than 29,000 Palestinian refugees. Authorities will administer the program from the Ministry of Health and Ministry of Water and Irrigation, and the wastewater treatment plant staff.⁽⁵⁰⁾

In 2019, USAID consented to a Joint Financing Arrangement with the governments of Denmark and Jordan to help the Ministry of Health offer health care to Syrian refugees living in Jordan. Since then, USAID has found additional sources of funding, so today, it has US\$85 million in funds and US\$60million earmarked for technical support.⁽⁵¹⁾

USAID has trained more than 9,000 medical providers for public and private health clinics throughout Jordan and offered information on screening for the disease and providing emergency and long-term care for COVID-19 patients. Over 1,100 health care workers have been given information on the best way to deal with contamination and take precautionary measures to restrict the spread of the infection in their offices.⁽⁵²⁾

4.2 Jordan's Efforts in Supporting Science and Technology

Policymakers should continue to support innovative developments in science to address primary shortcomings, beginning with helping people access computers and computer training, and other technological devices. For instance, Jordan has been developing many inventive ways to deal with distance learning. In Jordan, a public-private collaboration between the Ministry of Education, Ministry of Digital Economy and Entrepreneurship, and a privately owned business called "Mawdoo3" created "Darsak," an education portal for all grades that follows the Jordanian educational plan.⁽⁵³⁾⁽⁵⁴⁾⁽⁵⁵⁾

Volunteers played a significant role in helping in response to the pandemic. For example, in the COVID-19 Jotech Community, tech-savvy volunteers developed a mobile application called "Aman" for the Ministry of Health. The application notifies users if they are near a diagnosed COVID-19 patient.⁽⁵⁶⁾

The private sector also helped the public state-run administration address the issue of manufacturing medical devices. For instance, in Jordan, Eon Dental, a company that regularly makes dental products by three-dimensional printing, is working with the Jordanian RSS to produce spare parts for ventilators used with critical COVID-19 cases.⁽⁵⁷⁾⁽⁵⁸⁾ More than 3,800 ventilator parts have been created.⁽⁵⁹⁾ The pandemic fosters 3D printing - quick prototyping and the capability to produce parts on request at any place on the planet.⁽⁶⁰⁾

Meanwhile, “Altibbi,” a digital health platform, launched a COVID hotline in cooperation with Jordan's Ministry of Health. The platform provides telehealth health services and consultations.⁽⁶¹⁾

The crown prince has called for a coordinated effort among all partners to control the epidemiological situation in the Kingdom. One collaboration has been between the Ghiath and Nadia Sukhtian Charitable Foundation and Billion to One, an American company specializing in accurate diagnostics. The two groups are directing their efforts toward creating local testing protocols. Furthermore, the TechWorks Initiative of the Crown Prince Foundation is using three-dimensional printing to form health care products. The Jordan Strategy Forum, an economic research organization, has organized gatherings and coordinated online seminars with specialists, government authorities, and agents of worldwide associations to examine the financial circumstances of Jordan resulting from COVID-19.⁽⁶²⁾

Embracing and carrying out the WHO's special regulations for mitigating a health care crisis was likewise vital.⁽⁶³⁾

USAID surveyed 34 public, private, and college laboratories that process COVID-19 tests to find bottlenecks, streamline the process, and increase the speed with which tests are handled. Since 2002, USAID has redesigned and modernized 349 health care clinics across the Kingdom. Jordan is one of only a handful of nations with reliable, up-to-date information on maternal mortality rates due to its Maternal Mortality Surveillance and Response System, established with USAID support. By recording maternal deaths and their causes, the system provides meaningful information, empowers physicians to recognize the leading causes of maternal deaths, carries out designated intercessions, and screens their adequacy.⁽⁶⁴⁾

In May of 2020, as the world appeared to be in a freefall from the COVID-19 pandemic, a group of Jordanian pioneers provided medical workers and hospitals with face shields and respirators. From then on to the present time, engineers from the European Union–supported Shamal Start project united with the Crown Prince Foundation's TechWorks Initiative to respond to the COVID-19 emergency in imaginative and unified ways.⁽⁶⁵⁾

As Jordan responds to COVID-19, USAID is expanding its association with the government of Jordan to lead donor support, coordinate life-saving help, and prioritize investments. USAID helps to establish coalitions between experts who can plan for responses and is working with the Ministry of Health to support public and private emergency clinics and clinicians who can diagnose and treat COVID-19 patients, extend measures for contamination avoidance and control,

continue testing protocols to control COVID-19 and provide advertising campaigns to promote mask-wearing and social distancing.⁽⁶⁶⁾

4.3 Science Diplomacy and COVID-19 Vaccinations

At the beginning phase of this pandemic, it immediately became clear that we do not just need the vaccines; we also need to ensure that everyone in the world has access to them. Such a situation triggered the global leaders to find a solution, COVAX, the result of significant collaboration between most countries in the world.⁽⁶⁷⁾

COVAX is a worldwide partnership between the WHO, GAVI, and Coalition for Epidemic Preparedness Innovations (CEPI), alongside crucial delivery partner UNICEF.⁽⁶⁸⁾ It has brought together 190 nations with more than 7 billion residents and guarantees fair and equal access to COVID-19 vaccines provided by UNICEF. On March 12, 2021, Jordan received 144,000 AstraZeneca/SK Bioscience COVID-19 vaccine from the COVAX Facility at Queen Alia International Airport. The EU, WHO, and UNICEF support the Jordanian government's public immunization crusade. The EU has made a sum of €8 million accessible to help the Ministry of Health acquire COVID-19 vaccines. They are distributed by the COVAX Facility through its Jordan Health Program for Syrian Refugees and Vulnerable Jordanians, carried out by the WHO and subsidized by the Madad Fund.⁽⁶⁹⁾

"We now see the results of partnership with the COVAX Facility, where Jordan participates as a fully self-financing country. This supply is very timely to support our efforts to accelerate the COVID-19 national immunization campaign. We will keep offering the COVID-19 vaccines to the most vulnerable populations," said Nathir Obeidat, Minister of Health at the time.⁽⁷⁰⁾

EU Ambassador to Jordan Maria Hadjitheodosiou stated that "the European Union has been leading international efforts to ensure vaccine equity and delivery to low- and middle-income countries. Through Team Europe's €2.2 billion contribution to the COVAX Facility, we aim to ensure that all our partners have access to safe and effective vaccines... We can only add our voice to that of the Jordanian government in encouraging people to register on the Ministry of Health's platform to receive the vaccine, as they are steadily becoming available."⁽⁷¹⁾

Dr. Maria Cristina Profili, WHO Representative to Jordan, said, "The COVID-19 vaccines are a key tool in bringing [the] COVID-19 pandemic under control. As [a] key COVAX partner, WHO is providing full support to the Ministry of Health in planning, implementation, and monitoring of the national immunization campaign."⁽⁷²⁾

Said Tanya Chapuisat, Representative of UNICEF for Jordan, "One year since the COVID-19 pandemic was declared, each delivery of vaccines brings hope for recovery and gets us one step closer to a return to normality for millions of children in Jordan. UNICEF is proud to support the Ministry of Health and our partners to be part of this equitable global provision of vaccines."⁽⁷³⁾

Discussion, Conclusions and Recommendations

The leading aim of this study was to describe the role of science diplomacy in Jordan's response to the COVID-19 pandemic. In this regard, the researcher wanted to enhance the functional and institutional structures that could be part of the process for achieving two goals for Jordan's foreign policy: the first goal was to actively participate in international diplomacy, and the second was to partner with worldwide organizations in vaccinating Jordan's citizens against the coronavirus. The researcher argued in the hypothesis of this study that Jordan's international science diplomacy played a significant role in the country's response to COVID-19, especially in the area of vaccination. The limitation of the study was the limited sources because the topic is new. The method used in answering these questions was a qualitative case study approach, and the data were analyzed carefully using thematic analysis. In doing so, the researcher found the answers to the two vital research questions: What role has Jordan played in international collaborations in response to COVID-19? How did international institutions help in Jordan's response to COVID-19?

Although a conversation around Jordan's response to COVID-19 was described in a few studies, such as a study done by Ekenberg et al.,⁽⁷⁴⁾ there were no articles on the subject of science diplomacy, except for a notable article by Najib⁽⁷⁵⁾ and a few articles that addressed the worldwide situation and the responses of other countries. The current study is one of the first comprehensive scholarly examinations of the role of Jordan's science diplomacy in response to COVID-19. The researcher employed a political orientation to discuss the topic.

As the results show, Jordan has played a significant role in global collaborations, and its international endeavors have been vital in the underlying response to the COVID-19 pandemic. This success has been encouraging, and the pandemic challenge has also opened doors for all low-income nations such as Jordan to acquire autonomy by advancing scientific knowledge and innovative products and processes. This approach can help in three different ways:

1. It can enhance a quick response to a sudden challenge or crisis.
2. It can foster science diplomacy and international collaborations.
3. It can fulfill specific foreign policy goals.

Global collaboration and public endeavors have been vital in Jordan's underlying response to the COVID-19 pandemic. All low-income nations can acquire autonomy by advancing scientific knowledge and innovative products and processes.

COVID-19 has highlighted the significant role of evidence-based choices in handling humankind's incredible difficulties.⁽⁷⁶⁾ One can see that reason would suggest that Jordan and other Middle Eastern nations should adopt science diplomacy as a necessary process for reinforcing public health care and territorial health security.

To satisfactorily confront future health and monetary difficulties, small states need to expand their interest in innovative work and advanced collaborations around the world, and one way to do this is through a suggestion by Najib under the title "A Valuable Opportunity for Science Policy and Diplomacy in the Region."⁽⁷⁷⁾ The pandemic can be viewed as an important learning opportunity that has opened a valuable door for governments in the area and motivated institutional reform. Up to this point, science diplomacy has been a new and relatively restricted field in the Arab world; most colleges in the region do not offer a degree in this field, and there is no systematic track by which scientists can contribute their knowledge to diplomacy. There is a requirement for organizations with integrity to work with the public and give legislatures free, straightforward guidance on science diplomacy. The COVID-19 emergency has made this requirement even more crucial. Nations across the Arab region have shown excellent intergovernmental coordination across health services, internal institutions, instructional entities, and international organizations. The coronavirus pandemic has likewise offered a clear chance for state-run administrations to acquire residents' trust by defending hard choices with scientific truths and demonstrating their capacity to protect lives. As a rule, everyday choices have been evidence-based, and government pioneers presently perceive the significance of scientific information in illuminating their policies. It is an ideal time to make a change in outlook in administration and build up proper channels for Arab researchers, specialists, and clinical experts to effectively participate in governmental efforts and organizations today and in the future post-COVID-19 period.

There is also a chance to revive science diplomacy in the area. Since the COVID-19 emergency started, worldwide collaborations have been generally restricted to the long-standing hubs of scientific endeavor (i.e., the United States, China, and Europe), leaving behind nations from different world regions. The Arab world should now search internally and cultivate efforts in the region to share theories, knowledge, and resources and explore areas of research that could lead to significant scientific discoveries. Fortunately, some regional efforts

could be a beginning stage for regional science diplomacy. For instance, the 2017 World Science Forum on Science for Peace in Jordan underlined the role of science diplomacy in the country and called for endeavors to focus scientific work to address regional challenges.

The current emergency could, without a doubt, be the catalyst for regional or other local efforts to encourage public state-run administrations to battle the increasing threats to health and the environment and to provide food security for all. While this is not a groundbreaking thought, it is still vital. Addressing it would undoubtedly gather support from other Arab states if a balanced, stable country implemented it with a forward-looking reputation for dealing with regional issues.⁽⁷⁸⁾

بعدُ جديدٌ للعلاقات الدوليّة:

دور دبلوماسية العلوم في استجابة الأردنّ لوباء "كوفيد - 19"

عماد عبد الله عياصرة، قسم العلوم السياسية، جامعة اليرموك، إربد، الأردنّ.

ملخص

تعدّ دبلوماسية العلوم من أكثر المجالات تنامياً في السياسة الخارجية والعلاقات الدولية، واكتسبت دبلوماسية العلوم أهمية كبيرة منذ ظهور وباء (كوفيد-19). ومن هذا المنطلق، سعى البحث إلى استكشاف دور دبلوماسية العلوم والمؤسسات الدولية في دعم جهود الأردنّ للاستجابة لوباء (كوفيد-19). ويضطلع هذا البحث ببيان أهمية دبلوماسية العلوم المتزايدة في حل التحديات العالمية، ولا سيما إسهاماتها الرئيسية في دبلوماسية الصحة التي تلعب دوراً مهماً في مواجهة الوباء. وظّف الباحث منهج البحث النوعي مسترشداً بدراسة الحالة. تم الحصول على البيانات من مصادر عديدة، ومن أمثلة ذلك: الأبحاث الأكاديمية، التقارير الرسمية الدولية والمحلية، التقارير الإخبارية، وكذلك الوثائق المتاحة على المواقع الإلكترونية. كشفت نتائج التحليل الموضوعي النهائي للبيانات أن تعاون الأردنّ الدولي لعب دوراً مهماً في مواجهة الوباء. كما كشفت النتائج أن المؤسسات الدولية، وخاصة منظمة الصحة العالمية، والتحالف العالمي للقاحات والتحصين، والائتلاف المعني بابتكارات التأهب لمواجهة الأوبئة، واليونيسف، والوكالة الأمريكية للتنمية الدولية، والاتحاد الأوروبي، فضلاً عن البنك الدولي، قد ساعدت في هذا الجهد الحيوي.

الكلمات المفتاحية: العلاقات الدولية، دبلوماسية العلوم، دبلوماسية الصحة، السياسة الخارجية، القوة الناعمة، كوفيد-19، الأردنّ.

Notes

1. Tanisha M. Fazal, "Health Diplomacy in Pandemical Times," *International Organization* 74, no. S1 (2020): E78–97.
2. Mitchell Young, "Building Better Science Diplomacy for Global Challenges: Insights from the COVID-19 Crisis," *S4D4C POLICY BRIEF* (June 2020).
3. WHO Global Research Database, <https://www.s4d4c.eu/policy-brief-building-better-science-diplomacy-for-global-challenges-insights-from-the-covid-19-crisis/>.
4. Young, "Building Better Science Diplomacy."
5. Sara E. Davies and Clare Wenham, "Why the COVID-19 Response Needs International Relations," *International Affairs* 96, no. 5 (2020): 1227.
6. Young, "Building Better Science Diplomacy."
7. Simone Turchetti and Roberto Lalli, "Envisioning a 'Science Diplomacy 2.0': On Data, Global Challenges, and Multi-Layered Networks," *Humanities and Social Sciences Communications* 7, no. 1 (2020): 1–9.
8. William Colglazier et al., "COVID-19 as a Revelation: Challenges in Global Health Diplomacy & Disaster Diplomacy," *Science & Diplomacy* (2021).
9. Ibid.
10. Matthew D. Brown et al., "Applied Global Health Diplomacy: Profile of Health Diplomats Accredited to the UNITED STATES and Foreign Governments," *Globalization and Health* 14, no. 1 (2018): 1–11.
11. Colglazier et al., "COVID-19 as a Revelation."
12. Ibid.
13. The Royal Society, "New Frontiers in Science Diplomacy," Science Policy Centre, 2010, The Royal Society.
14. Vaughan C. Turekian et al., "The Emergence of Science Diplomacy," in *Science Diplomacy*, by Lloyd S Davis and Robert G Patman (WORLD SCIENTIFIC, 2015), 3–24.
15. The Royal Society, "New Frontiers in Science Diplomacy."
16. Vaughan Turekian, "The Evolution of Science Diplomacy," *Global Policy* 9 (November 2018): 5–7.
17. Pierre-Bruno Ruffini, "Conceptualizing Science Diplomacy in the Practitioner-Driven Literature: A Critical Review," *Humanities and Social Sciences Communications* 7, no. 1 (December 2020): 124–124.
18. Turekian, "The Evolution of Science Diplomacy."
19. Matthew Adamson and Roberto Lalli, "Global Perspectives on Science Diplomacy: Exploring the Diplomacy-knowledge Nexus in Contemporary Histories of Science," *Centaurus* 63, no.1 (February 2021): 1–16.
20. The Royal Society, "New Frontiers in Science Diplomacy."

21. Joan Leach, "The Role of Science Communication in International Diplomacy," in *Science Diplomacy*, by Lloyd S Davis and Robert G Patman (WORLD SCIENTIFIC, 2015), 155–69.
22. Daniel B. Oerther and Hester Klopper, "Improved Health Diplomacy Is Necessary for Resilience after COVID-19," *Journal of Environmental Engineering* 147, no. 11 (2021).
23. Fazal, "Health Diplomacy in Pandemical Times," E78.
24. Ibid.
25. Soheila Rajaie, "Health Diplomacy during the Covid-19 Pandemic (Persian)," *Strategic Studies of Public Policy* 10, no. 37 (2020): 418–21.
26. Davies and Wenham, "Why the COVID-19 Response."
27. Colglazier et al., "COVID-19 as a Revelation."
28. Turchetti and Lalli, "Envisioning a 'Science Diplomacy 2.0,'" 1–9.
29. Sebastian Kevany, "Global Health Diplomacy, 'Smart Power,' and the New World Order," *Global Public Health* 9, no. 7 (2014): 787–807.
30. Fazal, "Health Diplomacy in Pandemical Times."
31. Sanaz Taghizade et al., "COVID-19 Pandemic as an Excellent Opportunity for Global Health Diplomacy," *Frontiers in Public Health* 9 (July 2021): 755.
32. Ilona Kickbusch, "Health Is a Political Choice—But Health for Whom?" *BMJ Opinion* (2017), as cited in Colglazier et al., "COVID-19 as a Revelation."
33. Colglazier et al., "COVID-19 as a Revelation."
34. Brown et al., "Applied Global Health Diplomacy."
35. GAVI, "About Our Alliance," GAVI: The Vaccine Alliance, 2022, <https://www.gavi.org/our-alliance/about>.
36. Aida Mencía-Ripley et al., "Decolonizing Science Diplomacy: A Case Study of the Dominican Republic's COVID-19 Response," *Frontiers in Research Metrics and Analytics* 6, no. 1 (2021).
37. Monir Uddin Ahmed et al., "An Overview of Science Diplomacy in South Asia," *Science & Diplomacy* (2021).
38. Johanna Gustafsson, "Single Case Studies vs. Multiple Case Studies: A Comparative Study," 2017.
39. Lorelli S. Nowell et al., "Thematic Analysis: Striving to Meet the Trustworthiness Criteria," *International Journal of Qualitative Methods* 16 (2017): 1–13.
40. Ibid.
41. Ibid.
42. Love Ekenberg et al., "A Multicriteria Approach to Modelling Pandemic Response under Strong Uncertainty: A Case Study in Jordan," *Sustainability* 14, no. 1 (2022): 81.
43. World Bank, "Jordan Overview: Development News, Research, Data," 2022, <https://www.worldbank.org/en/country/jordan/overview#2>.

44. Ibid.
45. World Bank, "Jordan Emergency Cash Transfer COVID-19 Response," 2022, <https://projects.worldbank.org/en/projects-operations/project-detail/P173974>.
46. UN-Habitat, "UN-Habitat and the Royal Scientific Society (RSS) to Implement a COVID-19 Response Project in Jordan," 2021, <https://unhabitat.org/un-habitat-and-the-royal-scientific-society-rss-to-implement-a-covid-19-response-project-in-jordan>.
47. UNHCR, "Refugee Camps—Jordan," UNHCR, 2022, <https://www.unhcr.org/jo/refugee-camps>.
48. UNRWA, "Where We Work," UNRWA, 2022, <https://www.unrwa.org/where-we-work/jordan>.
49. N. ben Mimoune, Y. Abouzzohour, and T. Goldner, "Policy and Institutional Responses to COVID-19 in the Middle East and North Africa: Jordan," Brookings Doha Center, 2020.
50. UN-Habitat, "UN-Habitat and the Royal Scientific Society."
51. USAID, "Improving Health Care Quality—Jordan," 2021, <https://www.usaid.gov/jordan/fact-sheets/improving-health-care-quality>.
52. Ibid.
53. Kaliope Azzi-Huck, Andreas Blom, and May Bend, "Innovation in Responding to Coronavirus Could Pave the Way for Better Learning Outcomes in MENA," *World Bank Blogs*, 2020.
54. MOE, "Darsak," The Ministry of Education, Jordan, 2022, <https://darsak.gov.jo/>.
55. Dalal Najib, "COVID-19 and the Arab World: Between a Rock and a Hard Place," *Science & Diplomacy* (2021).
56. Natasha Tynes, "Arab Healthcare Innovation Responds to Pandemic," *Nature Middle East* (June 2020).
57. Najib, "COVID-19 and the Arab World."
58. Tynes, "Arab Healthcare Innovation."
59. Jordan News Agency (Petra), "Jordanian Firm Kicks off Pilot Manufacture of Ventilator Parts," 2020, https://petra.gov.jo/Include/InnerPage.jsp?ID=24233&lang=en&name=en_news.
60. Mark Zastrow, "Open Science Takes on the Coronavirus Pandemic," *Nature* 581, no.7806 (2020): 109–10.
61. Tynes, "Arab Healthcare Innovation."
62. Mimoune, Abouzzohour, and Goldner, "Policy and Institutional Responses."
63. Ala'a B. Al-Tammemi, "The Battle against COVID-19 in Jordan: An Early Overview of the Jordanian Experience," *Frontiers in Public Health* 8 (May 2020): 188.

64. USAID, “Improving Health Care Quality— Jordan.”
65. EU Neighbours, “Jordanian Innovators Breathe Hope Back into a Covid-19 Stricken World,” 2020, <https://www.euneighbours.eu/en/south/eu-in-action/stories/jordanian-innovators-breathe-hope-back-covid-19-stricken-world>.
66. USAID, “Improving Health Care Quality—Jordan.”
67. Seth Berkley, “COVAX Explained,” 2020, <https://www.gavi.org/vaccineswork/covax-explained>.
68. GAVI, “What Is COVAX?” GAVI: The Vaccine Alliance, 2022, <https://www.gavi.org/covax-facility>.
69. UNICEF, “First Shipment of European Union–Funded COVID-19 Vaccines from COVAX Facility Arrived in Jordan,” UNICEF, 2021, <https://www.unicef.org/jordan/press-releases/first-shipment-european-union-funded-covid-19-vaccines-covax-facility-arrived-jordan>.
70. Ibid.
71. Ibid.
72. Ibid.
73. Ibid.
74. See Ekenberg et al., “A Multicriteria Approach.”
75. See Najib, “COVID-19 and the Arab World.”
76. Sandra López-Vergès et al., “The Role of Science Diplomacy in Panama’s Response to COVID-19,” *Science & Diplomacy*, no. January issues (2021).
77. Najib, “COVID-19 and the Arab World.”
78. Ibid.

References

- Adamson, Matthew, and Roberto Lalli. “Global Perspectives on Science Diplomacy: Exploring the Diplomacy-knowledge Nexus in Contemporary Histories of Science.” *Centaurus* 63, no. 1 (February 2021): 1–16. <https://doi.org/10.1111/1600-0498.12369>.
- Ahmed, Monir Uddin, Syed Ishtiaque Ahmed, Nova Ahmed, Almas T. Awan, Anindita Bhadra, Suraj Bhattarai, Mahesh Kumar, et al. “An Overview of Science Diplomacy in South Asia.” *Science & Diplomacy* (2021). <https://www.sciencediplomacy.org/article/2021/overview-science-diplomacy-in-south-asia>.
- Al-Tammemi, Ala’a B. “The Battle against COVID-19 in Jordan: An Early Overview of the Jordanian Experience.” *Frontiers in Public Health* 8 (May 2020): 188. <https://doi.org/10.3389/FPUH.2020.00188>.

- Azzi-Huck, Kaliope, Andreas Blom, and May Bend. "Innovation in Responding to Coronavirus Could Pave the Way for Better Learning Outcomes in MENA." *World Bank Blogs*. 2020. <https://blogs.worldbank.org/arabvoices/innovation-responding-coronavirus-could-pave-way-better-learning-outcomes-mena>.
- Berkley, Seth. "COVAX Explained." 2020. <https://www.gavi.org/vaccineswork/covax-explained>.
- Brown, Matthew D., Julie N. Bergmann, Thomas E. Novotny, and Tim K. Mackey. "Applied Global Health Diplomacy: Profile of Health Diplomats Accredited to the UNITED STATES and Foreign Governments." *Globalization and Health* 14, no. 1 (2018): 1–11. <https://doi.org/10.1186/S12992-017-0316-7>.
- Colglazier, William, Michaela Told, Mamadi Yilla, Juan Garay, and Glenn Fernandez. "COVID-19 as a Revelation: Challenges in Global Health Diplomacy & Disaster Diplomacy." *Science & Diplomacy* (2021). <https://www.sciencediplomacy.org/perspective/2021/covid-19-revelation-challenges-in-global-health-diplomacy-disaster-diplomacy>.
- Davies, Sara E., and Clare Wenham. "Why the COVID-19 Response Needs International Relations." *International Affairs* 96, no. 5 (2020): 1227. <https://doi.org/10.1093/IA/IIAA135>.
- Ekenberg, Love, Adriana Mihai, Tobias Fasth, Nadejda Komendantova, Mats Danielson, and Ahmed Al-Salaymeh. "A Multicriteria Approach to Modelling Pandemic Response under Strong Uncertainty: A Case Study in Jordan." *Sustainability* 14, no. 1 (2022): 81. <https://doi.org/10.3390/SU14010081>.
- EU Neighbours. "Jordanian Innovators Breathe Hope Back into a Covid-19 Stricken World." 2020. <https://www.euneighbours.eu/en/south/eu-in-action/stories/jordanian-innovators-breathe-hope-back-covid-19-stricken-world>.
- Fazal, Tanisha M. "Health Diplomacy in Pandemical Times." *International Organization* 74, no. S1 (2020): E78–97. <https://doi.org/10.1017/S0020818320000326>.
- GAVI. "About Our Alliance." GAVI: The Vaccine Alliance. 2022. <https://www.gavi.org/our-alliance/about>.
- GAVI. "What Is COVAX?" GAVI: The Vaccine Alliance. 2022. <https://www.gavi.org/covax-facility>.

- Gustafsson, Johanna. "Single Case Studies vs. Multiple Case Studies: A Comparative Study." 2017. <https://www.semanticscholar.org/paper/Single-case-studies-vs.-multiple-case-studies%3A-A-Gustafsson/ae1f06652379a8cd56654096815dae801a59cba3>
- Jordan News Agency (Petra). "Jordanian Firm Kicks off Pilot Manufacture of Ventilator Parts." 2020. https://petra.gov.jo/Include/InnerPage.jsp?ID=24233&lang=en&name=en_news.
- Kevany, Sebastian. "Global Health Diplomacy, 'Smart Power,' and the New World Order." *Global Public Health* 9, no. 7 (2014): 787–807. <https://doi.org/10.1080/17441692.2014.921219>.
- Kickbusch, Ilona. "Health Is a Political Choice—But Health for Whom?" *BMJ Opinion* (2017). <https://blogs.bmj.com/bmj/2017/10/02/ilona-kickbusch-health-is-a-political-choice-but-health-for-whom/>.
- Leach, Joan. "The Role of Science Communication in International Diplomacy." In *Science Diplomacy*, by Lloyd S Davis and Robert G Patman, 155–69. WORLD SCIENTIFIC, 2015. https://doi.org/10.1142/9789814440073_0008.
- López-Vergès, Sandra, Thais Collado, Marta Pulido-Salgado, Jenny Pimentel, Anabella Vásquez Fábrega, and Ivonne Torres-Atencio. "The Role of Science Diplomacy in Panama's Response to COVID-19." *Science & Diplomacy*, no. January issues (2021).
- Mencía-Ripley, Aída, Robert Paulino-Ramírez, Juan Ariel Jiménez, and Odile Camilo. "Decolonizing Science Diplomacy: A Case Study of the Dominican Republic's COVID-19 Response." *Frontiers in Research Metrics and Analytics* 6, no. 1 (2021). <https://doi.org/10.3389/FRMA.2021.637187>.
- Mimoune, N. ben, Y. Abouzzohour, and T. Goldner. "Policy and Institutional Responses to COVID-19 in the Middle East and North Africa: Jordan." Brookings Doha Center. 2020. <https://www.brookings.edu/wp-content/uploads/2020/12/MENA-Covid-19-Survey-Jordan-12-20-.pdf>.
- MOE. "Darsak." The Ministry of Education, Jordan. 2022. <https://darsak.gov.jo/>.
- Najib, Dalal. "COVID-19 and the Arab World: Between a Rock and a Hard Place." *Science & Diplomacy* (2021). <https://www.sciencediplomacy.org/article/2021/covid-19-and-arab-world-between-rock-and-hard-place>.

- Nowell, Lorelli S., Jill M. Norris, Deborah E. White, and Nancy J. Moules. "Thematic Analysis: Striving to Meet the Trustworthiness Criteria." *International Journal of Qualitative Methods* 16 (2017): 1–13. <https://doi.org/10.1177/1609406917733847>.
- Oerther, Daniel B., and Hester Klopper. "Improved Health Diplomacy Is Necessary for Resilience after COVID-19." *Journal of Environmental Engineering* 147, no. 11 (2021): 01821003. [https://doi.org/10.1061/\(ASCE\)EE.1943-7870.0001939](https://doi.org/10.1061/(ASCE)EE.1943-7870.0001939).
- Ruffini, Pierre-Bruno. "Conceptualizing Science Diplomacy in the Practitioner-Driven Literature: A Critical Review." *Humanities and Social Sciences Communications* 7, no. 1 (December 2020): 124–124. <https://doi.org/10.1057/s41599-020-00609-5>.
- Rajaie, Soheila. "Health Diplomacy during the Covid-19 Pandemic (Persian)." *Strategic Studies of Public Policy* 10, no. 37 (2020): 418–21. http://sspp.iranjournals.ir/article_244256.html?lang=en.
- Taghizade, Sanaz, Vijay Kumar Chattu, Ebrahim Jaafari-pooyan, and Sebastian Kevany. "COVID-19 Pandemic as an Excellent Opportunity for Global Health Diplomacy." *Frontiers in Public Health* 9 (July 2021): 755. <https://doi.org/10.3389/FPUBH.2021.655021/BIBTEX>.
- The Royal Society. "New Frontiers in Science Diplomacy." Science Policy Centre. 2010. The Royal Society.
- Turchetti, Simone, and Roberto Lalli. "Envisioning a 'Science Diplomacy 2.0': On Data, Global Challenges, and Multi-Layered Networks." *Humanities and Social Sciences Communications* 7, no. 1 (2020): 1–9. <https://doi.org/10.1057/s41599-020-00636-2>.
- Turekian, Vaughan. "The Evolution of Science Diplomacy." *Global Policy* 9 (November 2018): 5–7. <https://doi.org/10.1111/1758-5899.12622>.
- Turekian, Vaughan C., Sarah Macindoe, Daryl Copeland, Lloyd S. Davis, Robert G. Patman, and Maria Pozza. "The Emergence of Science Diplomacy." In *Science Diplomacy*, by Lloyd S Davis and Robert G Patman, 3–24. WORLD SCIENTIFIC, 2015. https://doi.org/10.1142/9789814440073_0001.
- Tynes, Natasha. "Arab Healthcare Innovation Responds to Pandemic." *Nature Middle East* (June 2020). <https://doi.org/10.1038/nmiddleeast.2020.62>.

- UN-Habitat. “UN-Habitat and the Royal Scientific Society (RSS) to Implement a COVID-19 Response Project in Jordan.” 2021. <https://unhabitat.org/un-habitat-and-the-royal-scientific-society-rss-to-implement-a-covid-19-response-project-in-jordan>.
- UNHCR. “Refugee Camps—Jordan.” UNHCR. 2022. <https://www.unhcr.org/jo/refugee-camps>.
- UNICEF. “First Shipment of European Union–Funded COVID-19 Vaccines from COVAX Facility Arrived in Jordan.” UNICEF. 2021. <https://www.unicef.org/jordan/press-releases/first-shipment-european-union-funded-covid-19-vaccines-covax-facility-arrived-jordan>.
- UNRWA. “Where We Work.” UNRWA. 2022. <https://www.unrwa.org/where-we-work/jordan>.
- USAID. “Improving Health Care Quality—Jordan.” 2021. <https://www.usaid.gov/jordan/fact-sheets/improving-health-care-quality>.
- WHO Global Research Database. n.d. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>.
- World Bank. “Jordan Emergency Cash Transfer COVID-19 Response.” 2022. <https://projects.worldbank.org/en/projects-operations/project-detail/P173974>.
- World Bank. “Jordan Overview: Development News, Research, Data.” 2022. <https://www.worldbank.org/en/country/jordan/overview#2>.
- Young, Mitchell. “Building Better Science Diplomacy for Global Challenges: Insights from the COVID-19 Crisis. With Contributions from: Aukes, E.J., Dall, E., Elorza, A., Kuhlmann, S., Lacunza, I., McGrath, P., Melchor, L., & Meyer, N. Vienna: S4D4C.” *S4D4C POLICY BRIEF* (June 2020). <https://www.s4d4c.eu/policy-brief-building-better-science-diplomacy-for-global-challenges-insights-from-the-covid-19-crisis/>.
- Zastrow, Mark. “Open Science Takes on the Coronavirus Pandemic.” *Nature* 581, no. 7806 (2020): 109–10. <https://doi.org/10.1038/d41586-020-01246-3>.