



OAS|CICTE

BIOSECURITY IN THE AMERICAS

A REGIONAL THREAT ASSESSMENT



CASE OF: CHILE



UNIVERSITY OF
MARYLAND

START 
NATIONAL CONSORTIUM FOR THE
STUDY OF TERRORISM AND RESPONSES TO TERRORISM

UWT 
UNCONVENTIONAL WEAPONS AND TECHNOLOGY



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BIOSECURITY IN THE AMERICAS

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ABOUT THIS REPORT

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The conclusions of this research and the contents of this publication are those of the authors’ presented exclusively for informational purposes and do not represent the official position of the OAS, its General Secretariat, its Member States, CICTE, the EU, the University of Maryland, or START.

ABOUT CICTE

CICTE is the Inter-American Committee against Terrorism it is the only regional entity of the Organization of the American States whose purpose is to prevent and combat terrorism in the Americas. Its main goal is to prevent and combat terrorism in the Americas.

CICTE promotes cooperation and dialogue among member states to counteract terrorism, in accordance with the principles of the OAS Charter, with the Inter-American Convention against Terrorism, and with full respect for the sovereignty of countries, the rule of law and international law.

ABOUT THE CICTE UNSCR 1540 IMPLEMENTATION PROGRAM

CICTE’s 1540 Implementation program provides assistance to countries in the Hemisphere that request it, to comply with their obligations under Resolution 1540 (2004) of the United Nations Security Council (UNSC) on the non-proliferation of weapons of mass destruction to non-state agents.

The goals of the program are: Support member states to comply with and enforce Resolution 1540; Promote a regional framework for the implementation of Resolution 1540 (2004) in the Hemisphere; and Strengthen the network of contact points on Resolution 1540 (2004) in the region.

ABOUT START

The National Consortium for the Study of Terrorism and Responses to Terrorism (START) is a university-based research, education and training center comprised of an international network of scholars committed to the scientific study of terrorism, responses to terrorism and related phenomena. Led by the University of Maryland, START is a Department of Homeland Security Emeritus Center of Excellence that is supported by multiple federal agencies and departments. START uses state-of-the-art theories, methods and data from the social and behavioral sciences to improve understanding of the origins, dynamics and effects of terrorism; the effectiveness and impacts of counterterrorism and CVE; and other matters of global and national security. For more information, visit www.start.umd.edu or contact START at infostart@umd.edu.

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PROLOGUE

As we have seen in recent years, the world is vulnerable to biological threats. In the case of the Americas, the H1N1 epidemic of 2009 and, more recently, the COVID-19 pandemic have demonstrated, as reflected by World Health Organization figures, a disproportionately high number of deaths in the region compared to other parts of the globe. These statistics confirm a pressing need to strengthen the region's prevention, detection and response capabilities.

Fortunately, the level of terrorist threats to biosecurity in Latin America is relatively low; in fact, the region's threats typically take the form of crimes, which are more difficult to predict but easier to prevent. Implementation of internal measures and national biosafety and biosecurity regulations in laboratories and research centers is an essential step to prevent biological accidents (whether intentional or unintentional), to mitigate risks and to prepare adequate responses in the unfortunate event of any accident.

To address these needs, the Inter-American Committee against Terrorism of the Organization of American States (CICTE/OAS) has carried out in recent years a project entitled "Strengthening biosafety and biosecurity in Latin America in line with Resolution 1540", generously funded and supported by the European Union.

Thanks to the collaboration between CICTE/OAS and the National Consortium for the Study of Terrorism and Responses to Terrorism (START) of the University of Maryland, in the context of this project we have already launched two free online courses on biosafety and biosecurity in Spanish for laboratory personnel, scientists and decision makers. Through these courses we intend to contribute to lay the foundations of a biosafety culture, create a Latin American network of expertise and strengthen biosafety and biosecurity standards and measures throughout our continent.

As part of these collaborative efforts, START shares in this publication the findings and results of an excellent investigation of potential biosecurity threats in Chile.

In recent years, Chile has demonstrated an unwavering commitment to biorisk reduction, demonstrating a marked interest, at all levels of the public and private sector, in consolidating safer environments. Precisely to this end, Chile has identified its priorities in this area and CICTE/OAS has facilitated its cooperation within the framework of various funded programs. This has included, for example, a peer review exercise with Colombia, through which both countries have shared their experiences and practices in this area. Other similar exercises are planned thanks to the support of the country's authorities. Chile is one of the eight beneficiary countries of the project supported by the European Union and, in that sense, this report seeks to contribute to its efforts to further strengthen its controls and develop safer activities regarding the handling of biological agents.

We hope that this work will prove to be an effective tool so that Chile, and other countries in the region that are moving in this direction, can continue to consolidate their regulatory and control mechanisms in this area in accordance with established international standards.

I want to thank the experts who have participated in this project, sharing their knowledge and experiences. Undoubtedly, their ideas and proposals allow us to move forward in the right direction. I also would like to thank all the Colombian authorities for their trust, their solid commitment and their ongoing work in pursuit of compliance with their international obligations.

With this publication, CICTE/OAS reiterates to the government of Chile and to all the countries of the Americas its traditional institutional support for the international disarmament and non-proliferation regime and expresses, once again, its willingness to collaborate in these efforts aimed at ensuring, from multiple perspectives, a greater regional security for all.

A handwritten signature in blue ink, appearing to read 'Alison August Treppel', written over a light blue grid background.

Alison August Treppel

Executive Secretary of the Inter-American
Inter-American Committee against Terrorism

Introduction

Utilizing funds provided by the European Union (EU), the Organization of American States (OAS), through the Secretariat of the Inter-American Committee against Terrorism (CICTE), and in conjunction with the University of Maryland (UMD), the National Consortium for the Study of Terrorism and Responses to Terrorism (START) has undertaken a two-pronged effort to enhance biosecurity in Central and South American countries. This two-pronged effort comprised a comprehensive biosecurity threat assessment of the Central and South American region and a set of four country-level threat assessments.

This report provides a biosecurity threat assessment of the Republic of Chile for policy-focused individuals and those responsible for working in or managing the activities of laboratories. For policy makers it is important that they have, at a minimum, a broad understanding of the basic requirements and practices of biosecurity. Although there is no expectation that they will be provided with an in-depth understanding of biosecurity principles, practices, or measures, they should take away a core understanding that can be a sufficient basis for decision-making or interaction with officials from different branches or divisions of government, as well as an awareness of the need to seek clarification or explanation when meeting with others who may have much more detailed responsibilities in these matters.

For laboratory personnel, who as a rule have a need for, and typically receive, much more detail-oriented training in the specific application of biosecurity principles to their day-to-day work, this report is intended to provide a holistic overview that will contextualize and reinforce specific requirements.

For both audiences the report also aims to highlight the existence and nature of various active biosecurity threats and illustrate how these can be mitigated or eliminated through rigorous and diligent application of their training.

In this report “biosecurity” is understood as encapsulating the combination of protocols, policies, procedures, methods, equipment, and measures taken to protect biomaterials from unauthorized access, unintentional loss, theft, or misuse by outside actors or personnel exploiting their access to such materials.

It should be noted and understood that this report is not intended to operate as a needs assessment. Nor does this report represent an assessment of risk at any individual facility. Individual facilities should always conduct their own independent biosecurity risk assessments as part of their overall biosecurity risk mitigation effort.

What is Biosecurity?

Biosecurity is a term with potentially broad application and definitions that can vary significantly depending on the particular agency, industry or context in which the topic is being discussed. This has the potential to lead to misunderstanding, particularly when laboratory personnel, or those whose primary work is tied to the laboratory/scientific enterprise, interact with other fields that must also practice biosecurity such as food and agriculture research or production. In addition, there is potential for complexities to be introduced by something as simple as differences in the translation of the concept from one language to another.¹ A further complexity is introduced by the unfortunate tendency to use the term “biosecurity” inappropriately to describe two separate, though inter-related, concepts– specifically, biosafety and biosecurity² Failure to adequately differentiate these two concepts can greatly complicate efforts to train and prepare personnel, or set appropriate expectations or priorities.³ Finally, definitions and understanding of the implications of those definitions, change over time. This chapter of the report discusses the different ways in which the term is used internationally and across different sectors to highlight the existence of differences that may be encountered by officials and practitioners, and which introduce the potential for miscommunication; introduces the basic definition of biosecurity that will be used throughout the overall project; and provides an explanation for the particular definition chosen.

Biosecurity defined

This section presents the specific definitions of biosecurity and biosafety used in this document and for all subsequent related analyses.

Biosecurity

This is a term used to encapsulate the combination of protocols, policies, procedures, methods, equipment, and measures taken to protect biomaterials from unauthorized access, unintentional **loss, theft, or misuse** by outside actors or personnel exploiting their access to such materials. Various approaches are adopted to discussions of biosecurity. As nonexclusive examples there are the Three Biosecurity Elements (physical security,

¹ Example: Spanish language terms *bioseguridad* and *bioproteccion* may both be translated into English as “biosecurity,” greatly complicating discussions.

² Biosafety is a narrower concept than biosecurity, but the two concepts are occasionally conflated. This is discussed in more detail below.

³ An example of this phenomenon can be seen in an article discussing biosecurity in the context of workplace culture. In this article, the authors conflate “biosafety, laboratory biosecurity, and responsible conduct in the life sciences” and fail to discuss the individual concepts separately. The implication is that there is no significant difference in terms of implementation or practice between them. Perkins, D., Danskin, A., Rowe, E., and Alicia A. Livinski. 2019. “The Culture of Biosafety, Biosecurity, and Responsible Conduct in the Life Sciences: A Comprehensive Literature Review.” *Applied Biosafety*. 24(1). March.

<https://www.liebertpub.com/doi/full/10.1177/1535676018778538>

personnel reliability, and information security),⁴ or the Five Pillars of Biosecurity (inventory process, physical security, a personal reliability program, transport programs, and information security processes).⁵ Both of these examples include common elements, which will be discussed in greater detail below. These include, but are not limited to, **physical security** (e.g., physical barriers such as fences for facility-wide security of buildings and equipment, and key code locks on laboratory doors, refrigerators, etc. to where biological material or samples are kept); **information security** measures to prevent unauthorized access to facilities and data (e.g., technologies to protect access to information, etc.), accountability measures to monitor stocks of materials and track consumption or access (e.g., biological sample inventory logs, personnel logs, etc.), and **personnel reliability** (e.g., personnel screening and security training, personnel trustworthiness, etc.).⁶

The fundamental element is prevention of improper access to and security of biological materials.

Biosafety

This is a term used to encapsulate the combination of codified principles, technologies and practices that ensure safe handling of, and protect laboratory workers, the public, and the environment from **unintended exposure** to the infectious agents and toxins used in the laboratory. Examples, which will be discussed in greater detail below, include good laboratory practices (GLP)⁷ and good microbiological practice and procedure (GMPP);⁸ proper use and ample supply of personal protective equipment (PPE); mitigation and response measures if accidental release, exposure, laboratory-acquired infection (LAI) occur; and laboratory design, equipment, and maintenance appropriate to a facility's assigned biosafety level (BSL). The fundamental element is prevention of unintentional exposure to, or release of, biological materials.

Note that biosafety is not the primary focus of this report, but it will occasionally be

⁴ U.S. Department of Health and Human Services. 2015. "Biosecurity."

<https://www.phe.gov/s3/BioriskManagement/biosecurity/Pages/default.aspx>

⁵ "Biosecurity." Office of Environmental Health and Radiation Safety (EHRS). University of Pennsylvania. <https://ehrs.upenn.edu/health-safety/biosafety/research-compliance/biosecurity>

⁶ In addition, biosecurity includes such matters as management practices, transport security, risk assessments, biorisk assessments, threat assessments, response and mitigation plans, and biosecurity training and awareness.

⁷ This refers to typical best practices such as wearing closed-toe shoes and not bringing food or drink into the laboratory workspace. The World Health Organization (WHO) expands on this in section 3.1.1 "Best Practice" in WHO's *Laboratory Biosafety Manual*, 4th edition. 2020.

⁸ GMPP are best practices that go hand-in-hand with good laboratory practices and are meant to keep laboratory personnel safe while handling biological materials and agents, as well as the environment, and can be seen as forming the basis of biosafety practices. See section 3.1 "Good microbiological practice and procedure" in WHO's *Laboratory Biosafety Manual*, 4th edition. 2020. p. 27.

mentioned or discussed in the context of discussions of biosecurity.

Terminology differences: Biosecurity vs. Biosafety

Although specialists may be familiar with the nuances of language used by the wide range of global and national organizations interested in or engaging with the field of biosecurity and biosafety, this may not be the case for all potential audiences. An unfortunate truth is that there is some overlap between biosecurity and biosafety that can complicate understanding and variations in definitions or specific language used can complicate understanding. These differences can become more impactful, especially when biosecurity or biosafety are being discussed in the context of specific applications. As an example, for policymakers, in terms of understanding basic principles, the differences in detail between research laboratories working with human and animal pathogens may be less important than understanding common underlying principles and practices. However, it is important to note that the application of biosecurity principles and measures are not exclusively limited to laboratories. Certainly, policymakers need to have an appreciation that use of terminology such as “biosecurity” may extend into fields other than the laboratory without being explicitly defined as doing so. It is important that they be able to recognize this breadth of application even if their responsibilities and concerns are narrower in focus.

International Organizations

At the international level, definitions of biosecurity and biosafety can differ depending on the mission and focus of the institution or non-governmental organization (NGO). The differences in definition and application can range from subtle shifts in terminology use from how we have defined them above, moderate to significant terminology overlap or fusion that can lead to concept conflation, or stark contrast. The starkest differences are typically seen around the agricultural and veterinary or animal health application of biosecurity and biosafety concepts. The following discussion will highlight key world organizations and institutions’ use of biosecurity and biosafety concepts, to help navigate the similarities and differences.

World Health Organization (WHO)

The WHO is the leading international institution that produces standards and recommendations of best practices for biosecurity and biosafety for the health sector.⁹ Its subsidiary and Regional Office to the Americas, the Pan American Health Organization (PAHO),¹⁰ follows suit. WHO – and by extension PAHO – define and frame the concept of

⁹ “Health” in this context is meaning animal and human health, particularly as it relates to communicable and non-communicable diseases. It is not serving as a comprehensive definition of all aspects of health that are also of importance to the international community (such as poverty, food insecurity, etc.).

¹⁰ PAHO serves both as the WHO’s Regional Office of the Americas, as well as their health agency to the Inter-

biosecurity as a narrow and complementary subset of “biosafety.” While WHO/PAHO maintains the fundamental distinction between biosecurity and biosafety that we adhere to in this report, the implementation of their standards and guidance can result in the two terms overlapping, potentially subsuming Biosecurity.

The clearest example of this concept overlap is encapsulated in their main publication of standards and best practice guidance, the *Laboratory Biosafety Manual*, now in its 4th edition, released in June 2020.¹¹ This manual, per its title, primarily includes standards for good laboratory practices, containment and biosafety measures, and designations that are core to biosafety specifically. However, their specific inclusion of biosecurity as a separate, important concept, only began with the 3rd edition (2004) with the understanding that global events had necessitated a dedicated focus on biosecurity as well as biosafety, and that biosafety was a core foundation for biosecurity.¹² Biosecurity, as they define it, is congruent with how we define the term in this report, yet their definition specifically emphasizes laboratory applications of biosecurity.

Centers for Disease Control and Prevention

Within the United States, the U.S. Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) play a central role in public health response and research and maintain a mirror biosafety and biosecurity advisory manual to the WHO’s *Laboratory Biosafety Manual*. This joint CDC/NIH publication is the “*Biosafety in Microbiological and Biomedical Laboratories*” (BMBL), currently in its 6th edition (2020). The BMBL categorizes biosecurity in line with the definition employed in this report and also recognizes that although biosafety and biosecurity are inter-related, complementary concepts, they nevertheless remain distinct. It also reiterates that a key component or foundation of biosecurity is to have robust and rigorous biosafety measures and protocols in place.¹³

In their efforts the CDC/NIH, via the BMBL, also briefly highlight terminology differences between different fields such as agriculture and veterinary practice, where biosecurity focuses on the impacts on and risks to animal populations, food supply, and environment.¹⁴

Americas System. See: Pan American Health Organization (PAHO). “Who We Are.” <https://www.paho.org/en/who-we-are>.

¹¹ *Laboratory Biosafety Manual*. (4th ed.). 2020. WHO.

<https://www.who.int/publications/i/item/9789240011311>

¹² *Laboratory Biosafety Manual*. (3rd ed.). 2004. WHO, pg. 47.

¹³ The BMBL adds that “laboratories with good biosafety programs already fulfill many of the basic requirements needed to secure biological materials.” See. 2020. BMBL, 6th edition. p. 119. Measures, protocols, etc. specific to biosecurity as we have defined are indeed needed (physical security, information security, personnel reliability), but as noted, good biosafety programs will set a good foundation.

¹⁴ *Biosafety in Microbiological and Biomedical Laboratories*. (6th ed.). 2020. CDC/NIH, p. 119.

European Union

The European Union (EU) employs a wide range of use for the terms biosecurity and biosafety, through their extensive interlocking network of national and regional legislation and associated regulations enacted since the late 1980s. Much of the EU's application of the term biosecurity focuses on international norms and treaties such as the Biological and Toxin Weapons Convention (BWC). Consequently "biosecurity" is mostly used in regulations and legislation intended for the control of imports, exports, customs, transnational shipment (to include mandating and defining secure packaging and transport), interdicting illicit use of pathogenic materials, and finally addressing worker protection.¹⁵ The various translations of the term "Biosecurity" are of course also used in the context of regulation of laboratories and the various other institutions or industries that regularly work with microorganisms. In a much starker contrast, the EU also employs "biosecurity" to address plant and animal health, particularly around reducing the risk of unintentional introduction of invasive species or infectious diseases.¹⁶ While an issue of critical importance in its own right, this use of "biosecurity" is quite expansive and has the potential to confuse those readers or listeners unfamiliar with the particular context of a discussion by conflating this issue with the narrower definitions that are the focus of this report. "Biosafety" is also expanded and conflated as well, additionally referring to food safety.¹⁷ Due to the EU's extensive and interconnected regulation and legislation networks and the importance that trade plays, it is unsurprising that the focus on biosecurity would be conflated to include these areas. To further complicate the matter, they do incorporate WHO definition and guidance on biosecurity and biosafety as described here into subsequent EU regulations and legislation.

World Organization for Animal Health

The World Organization for Animal Health (WOAH, founded as OIE) presents two prevailing approaches to how they define biosecurity and biosafety. The first is congruent to how we have defined and identified specific distinction between biosecurity and biosafety within this report. The second, particularly as it applied to their international guidance on animal health, significantly blends the two concepts of biosecurity and biosafety together under the umbrella of "biosecurity" but defined as management to prevent exposure of animals and the environment to harmful biological materials (or pathogens) and vice versa.¹⁸

¹⁵ Although not an exhaustive list, these export-control-related regulations and legislation can be found in Table 1 and 2 of Bielecka and Mohammadi's "State-of-the-Art in Biosafety and Biosecurity in European Countries" article, where Table 2 focuses more on international norms and guidance that the EU follows and implements, including regulation from INTERPOL. See: Bielecka, Anna and Ali Akbar Mohammadi. 2014. "State-of-the-Art in biosafety and biosecurity in European countries." *Archivum Immunologiae et Therapiae Experimentalis* (Warsz) 62: 171-174. DOI: 10.1007/s00005-014-0290-1.

¹⁶ See: European Commission. "Plant health and biosecurity." https://ec.europa.eu/food/plants/plant-health-and-biosecurity_en#international-cooperation.

¹⁷ See: European Commission. "Biological safety." https://ec.europa.eu/food/safety/biological-safety_en

¹⁸ The World Organisation for Animal Health (WOAH, founded as OIE) definition maps with the definition of

Industry differences?

Internationally, the view of day-to-day lab work, like public health monitoring, is that it represents a low risk; thus, most of this work will only need to meet standard good laboratory safety practices (GP), and not fall within the need of high levels of risk assessment and mitigation that other work – such as research that requires the use of biological material with higher biosafety level designation – would necessitate.¹⁹ In this context, biosecurity refers to the securing of biological materials from loss of control due to theft or unauthorized and/or accidental release of biological materials.

Agricultural sectors and industries tend to define biosecurity as protecting animal populations, colonies, or livestock of contamination by namely disease-causing microorganisms (pathogens), or from contamination in general.²⁰ This focus leads to such implementation as feed and water security measures, animal quarantine and isolation measures and veterinary treatments when sick, preventative vaccinations, etc.

These differences in the use and understanding of the concept biosecurity is crucial as countries develop and implement biosecurity legislations intended to address issues such as bioterrorism and biocrime.

Language differences

Language translation of words and terms plays a critical role in the understanding and conceptualization of any topic and is critical to be aware of when discussing and advancing biosafety and biosecurity globally. The nuance of languages, and the cultures behind those nuances, are powerful and important, and in cases, there just are not ways to map one-to-one- word translation between languages to match those nuances. Examples of where this phenomenon plays a central role in conceptualization of biosecurity and biosafety can be found in Argentina’s Asociación Argentina de Microbiología (AAM) or Argentina Association of Microbiology and the Organization of American States (OAS) publications.

The terms “*bioseguridad*” and “*bioprotección*” are Spanish-language terms used by both institutions to denote “biosafety” and “biosecurity,” in that order. However, “*bioseguridad*”

“biosafety” as described in this report, rather than aligning with the definition of “biosecurity” herein. This also highlights the potential conflation problem as noted previously in the report, as well as highlighting a key difference in application of the definition of “biosecurity” across different industries (this case being animal health versus medical or human health). The WOA’s definition of “biosecurity” described here can be found in their *Terrestrial Animal Health Code*, “Glossary” section: <https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmlfile=glossaire.htm>.

¹⁹ In comparison to lab work, or research whose design or subject biological material poses a significant risk (i.e. Biosafety Level (BSL) designation). The World Health Organization (WHO)’s *Laboratory Biosafety Manual, 3rd Edition* presents this comparison; see figure 2.2 of that manual.

²⁰ CDC/NIH. *Biosafety in Microbiological and Biomedical Laboratories*. 6th edition. June 2020. P. 119

has been a widely used Spanish-language term to mean both biosafety and biosecurity. Another Spanish-language term used to mean biosecurity is “*biocustodia*,” introduced by the Spanish government in 2008.

Risk, Threat, and Vulnerability

Throughout this report, reference will be made to the terms risk, threat, and vulnerability. At times these terms will be used in a more specific way as biorisk and biothreat.

Threat: A natural or man-made occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations, the environment and/or property. When applied to facilities or processes, threats are frequently, and erroneously, understood as having an external origination. In truth, threats can be both external and internal in nature with the latter often described as an “insider threat.” Threats may also include protected items themselves, depending on their intrinsic qualities. Threats, whatever their nature, exploit vulnerabilities to cause harm.

Vulnerability: A physical feature or operational attribute that renders an entity open to exploitation or susceptible to a given hazard. As such, a vulnerability represents a potential source of harm, failure or loss. In the absence of threats, vulnerabilities remain but have no current effect. They are nascent.

Risk: The potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences. As such, risk is a product of the dynamic interaction of threats, vulnerabilities, and consequences. Determination of the level of risk associated with a given facility or activity does not require that threats be active – they may simply be potential – or that vulnerabilities are being actively exploited.

Application of the concepts of threat, vulnerability, and risk to the biosecurity field remain under-developed.²¹ Discussion is complicated by the use of terms such as biothreat or biorisk, which are not consistently defined or applied in literature or regulations, nationally or globally. In addition, usage of these terms frequently does not fully align with common understanding of the usage of concepts such as threat, vulnerability, and risk as detailed above.

²¹ Burnette, Ryan N. and Chuck Tobin. 2021. *The Biothreat Assessment as a Foundation for Biosecurity*. In . *Applied Biosecurity: Global Health, Biodefense and Developing Technologies*, edited by Ryan N. Burnette, 13-35. Switzerland: Springer.

Biorisk: This concept is widely used but not consistently defined, even in WHO usage. There are several basic definitions of “biorisk” in use. A 2006 definition refers to “[t]he probability or chance that a particular adverse event [...], possibly leading to harm, will occur.”²² A 2022 definition describes “biorisk” as “[t]he risk that a biological event [...] will adversely affect the health of humans, nonhuman animals and the environment.”²³

As a first observation, it is clear that these two definitions are measuring different phenomena. The first is concerned with the probability of an “adverse event” occurring. The second is concerned with the probability of an adverse event causing harm.

It should be noted that the concept of “biorisk” requires that multiple assessments (threat, vulnerability, and risk) have been undertaken as a first step to determining the actual level of biorisk.²⁴ Vulnerabilities and threats will have been clearly identified as part of the process of assessing a level of biorisk for a facility. This document will minimize use of the term biorisk, limiting it to circumstances in which it is clearly intended to describe the final product of an assessment process to determine risk in line with the 2022 WHO usage.

Biosecurity Threat: The term biosecurity threat is used to discuss potential deliberate acts that could exploit biosecurity or biosafety gaps and/or failures. An example might be the theft of active biological materials from a vaccine production facility with the intent of using those materials to mount a bioterrorist attack.

In the context of this report, it should be noted that discussions of threat or risk are not focused on the intrinsic qualities of specific pathogens and their capacity to cause harm if deliberately or accidentally released. Although this is an important aspect of understanding the level of risk posed by any given facility, this element is most appropriately addressed as one component of the overall risk, or biorisk, assessment process discussed below.

Risk and Threat Assessment

Although WHO and other international bodies have developed concepts such as biorisk assessments, the focus of these assessments is heavily influenced by the needs and requirements of biosafety. Most significantly, the emphasis is on determining the potential for harm inherent to a particular biological agent, after which the potential for release of that

²² “Biorisk Management: Laboratory biosecurity guidance.” WHO/CDS/EPR/2006.6. World Health Organization. 2006. p. iii.

²³ “Towards a global guidance framework for the responsible use of life sciences: summary report of consultations on the principles, gaps and challenges of biorisk management.” WHO/SCI/RFH /2022.01World Health Organization. 2022. <https://apps.who.int/iris/bitstream/handle/10665/354600/WHO-SCI-RFH-2022.01-eng.pdf>

²⁴ Assessments are discussed in more detail below.

agent in the course of storage, transportation or handling is assessed, and appropriate mitigation strategies identified, mandated, and implemented.²⁵ At no point does the WHO biosafety manual mandate or encourage consideration of external threats or assessment of that might be exploited by external (for example, terrorists) and internal (for example, malicious insiders) threat actors. A key feature is the definition of hazard “as biological agents which have the potential to cause adverse effects to personnel and/or humans, animals, and the wider community and environment.”²⁶ Although this approach is appropriate to efforts to prevent the unintentional release of a bioagent, the core focus of biosafety, it is fundamentally inadequate for assessments of vulnerabilities or risks associated with biosecurity threats.

Biorisk assessment: This is a well-developed field of practice and is widely applied for the purposes of laboratory biosafety management. Regular biorisk assessments are an important element of overall laboratory management and contribute to effective biosecurity.

Biothreat Assessment: This is a developing field that seeks to address gaps in traditional biorisk assessment practices by combining traditional approaches of agent-focused biosafety or biosecurity risk assessment with a process focusing on threats directed at facilities in order to arrive at a holistic determination of overall risk. This approach is discussed in more detail in the *What Does Biosecurity Entail?* section of this report.

Methodology

This study was divided into two phases: data collection and country risk analysis. Collected data was analyzed by the research team to produce an overall risk assessment for the country based on infrastructure and environmental factors at the country level and the country’s capabilities. The following sections describe in more detail the methodologies utilized for each phase of the study.

Data Collection

Data used in this country report were collected between June 30, 2021, and June 30, 2022. During this period, START collected data on each country for the date range of January 1, 2015 until June 30, 2022. The readers of this report, therefore, should consider the information and assessment “as of date” of this country report to be June 30, 2022.

²⁵ *Laboratory Biosafety Manual*. (4th ed.). 2020. WHO. “Risk Assessment.”

<https://www.who.int/publications/i/item/9789240011311>

²⁶ WHO. 2020. *Laboratory Biosafety Manual*. 4th edition. p. x. Presented in their Manual’s “Glossary of Terms” section.

The first step in data collection consisted of extensive open-source research that included querying electronic databases and using a variety of online search tools. Sources identified included academic articles, government and international agency reports, news stories, and industry publications and websites. Throughout the research and assessment effort the research team made a point of utilizing a mix of Spanish and English-language source materials. This stage of the data collection also entailed use of geographic information systems (GIS) and satellite imagery analysis. During this stage, researchers used multiple sources to corroborate the information, where possible.

As a rule, data collection emphasized contemporary materials or records addressing activities or events over the preceding 10 years (2012-2022). However, where necessary, for instance assessment of terrorist capabilities or identification of national biological warfare activities, data was gathered for longer periods reaching back as far as the 1990s.

Threat Assessment Process

The threat assessment process employed for the generation of the country reports was purely qualitative in nature due to the fact that no relevant events of a biosecurity nature, such as biological warfare, biological weapons, or biological terrorism are known to have occurred in Chile.

Accordingly, an approach was adopted whereby data was gathered on facilities or activities within Chile with relevance to biosecurity as potential targets of biosecurity threats or present potential biosecurity vulnerabilities. It should be noted that this assessment does not address specific risk for individual facilities in Chile.

In addition, we assessed factors such as internal conflict, external threat actors (state and non-state), particularly considering any indication of past or present engagement in activities that might indicate potential for interest in biological threat activities within the Chilean borders. Furthermore, we also examined factors such as organized and general criminal activity.

Additionally, we evaluated Chile's legislative frameworks, biological incident response capabilities, and plans for introduction of new facilities – whether through government or commercial investment – in the context of current or potential threats.

Finally, we generated an overall country assessment for Chile by taking all of the factors mentioned above into consideration.

Country Overview

Sociocultural Environment

Geography and Demographics

Geography

Chile is the southern-most country in the world, with its southern islands nearest to Antarctica. Chile's primary landmass has an unusual geography which complicates economic development and administration. The longest north-south country in the world, extending over 4,270 km from the sub-Antarctic to the tropics, Chile is also extremely narrow, ranging from 347 km east-west at its widest point to a mere 64 km at its narrowest point. A significant portion of Chile's land is mountainous, dominated by the Andes. In addition, Chile also possesses several Pacific islands such as Easter Island and the Juan Fernandez islands. A claim over the Antarctic Peninsula is maintained but currently unenforced as per the terms of the Antarctic Treaty system. Chile possesses an extremely diverse range of terrestrial and oceanic climate zones.

Demographics

Chile has a population of 19,212,362 people (2021 statistics) with a life expectancy at birth of 80 years. Chile's population distribution reflects its relatively high-income status with moderate population growth. Significantly Chile is in the process of aging, which is likely to place new burdens upon the health system over time.²⁷ Chile's population is highly urbanized (88%)²⁸ with the bulk of the population concentrated in the middle third of the country.²⁹ As of 2020, almost 9 percent of Chile's population were immigrants, with the largest point of origin being Venezuela (449,000). Additional significant sources of immigration are Peru, particularly into Chile's northern regions, and Haiti.³⁰ Chile has several minority indigenous populations, the largest of which is the Mapuche (9.1%)

²⁷ Graph retrieved from the United States Census Bureau, International Database (IDB) website. Database tabulation that was chosen to populate the graph cited here are as follows: "Population by Age", Chile for "Select by Country/Area", 2022 for "Select Year(s)", and Pyramid for "Show" graph style. Accessed via: https://www.census.gov/data-tools/demo/idb/#/country?COUNTRY_YEAR=2022&COUNTRY_YR_ANIM=2022&FIPS_SINGLE=C12.

Additional population analysis drawn from the 2022 CIA World Factbook country profile on Chile. See: <https://www.cia.gov/the-world-factbook/countries/chile/#people-and-society>.

²⁸ World Bank. "Urban Population (% of Total Population) - Chile."

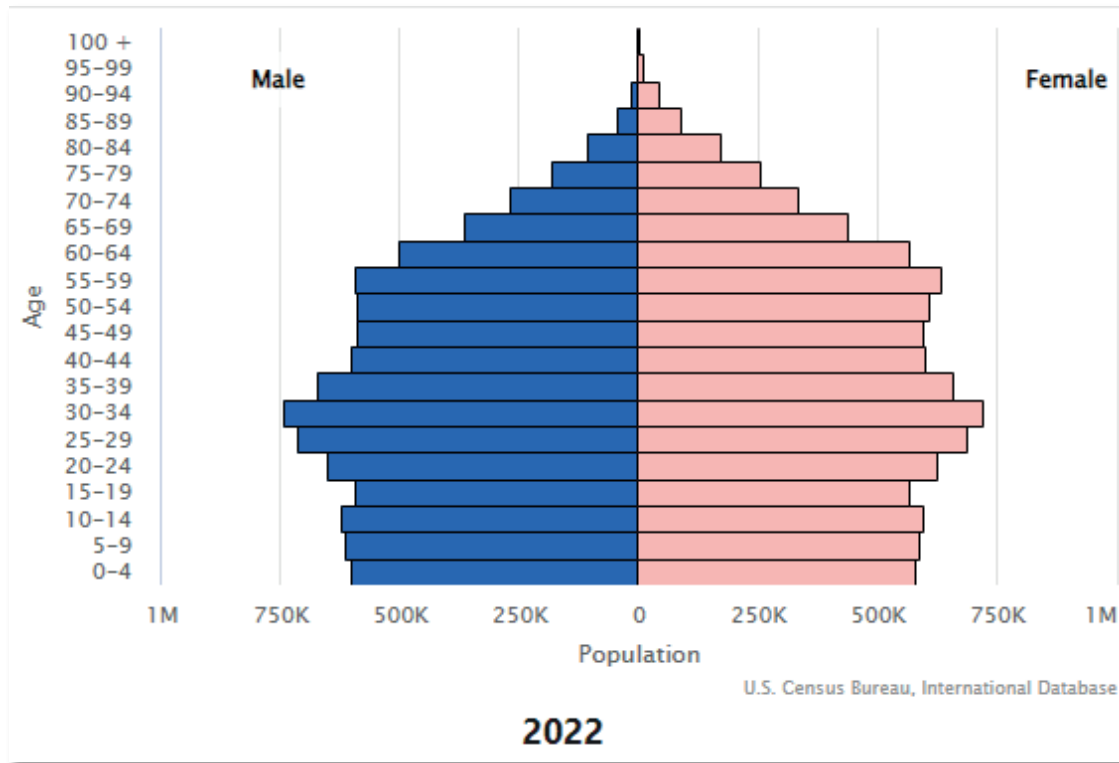
<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=CL>. Doña-Reveco, Cristián. 2022. "Chile's Welcoming Approach to Immigrants Cools as Numbers Rise." Migrant Policy Institute, May 18. <https://www.migrationpolicy.org/article/chile-immigrants-rising-numbers>.

²⁹ 2022. CIA World Factbook. "Chile." <https://www.cia.gov/the-world-factbook/countries/chile/#geography>.

³⁰ Doña-Reveco, Cristián. 2022. "Chile's Welcoming Approach to Immigrants Cools as Numbers Rise." Migration Policy Institute. May 18. <https://www.migrationpolicy.org/article/chile-immigrants-rising-numbers>.

followed by the Aymara (0.7%). A variety of other small indigenous populations making up approximately 1 percent of the total population are distributed throughout Chile (Likan Antai, Quechua, Colla, Diaguita, Kawesqar, Yagan or Yamana) including on Easter Island (Rapa Nui).³¹

Figure 1: Population Pyramid – Chile



Religion

The predominant religion in Chile is Roman Catholicism, accounting for approximately 62 percent of the population. The remaining portion of the population that reported religious

³¹ 2022. CIA World Factbook. “Chile.” <https://www.cia.gov/the-world-factbook/countries/chile/#people-and-society>.

status consist of Evangelical (18%)³², atheist or agnostic (4%), and none (17%).³³ Religious affiliation with Roman Catholicism has declined since 2013, from 57 percent down to 45 percent. Simultaneously, non-religious identity in Chile has increased from 26 percent to 35 percent, also since 2013, an exponential increase compared to the gradual increase in the remainder of Latin America (11% to 18%).³⁴

Religious tension and discrimination have been on the rise 2016, notably toward the smaller Jewish communities in Chile, despite increased international religious freedom engagement by the Chilean government and domestic religious groups.³⁵ Churches have also been a

³² The Church of Jesus Christ of Latter-day Saints is not considered nor counted in this category, although they have had a long history in Chile, and report to have just over 600,000 members, accounting for 3.15 percent of the population. In surveys and prior census responses, those who respond report anywhere from 0.7 percent to 0.9 percent. If the 3.15 percent is accurate, this would constitute the second largest religious group in Chile after Roman Catholics. See: "Facts and Statistics – Chile." Newsroom, The Church of Jesus Christ of Latter-day Saints. <https://newsroom.churchofjesuschrist.org/facts-and-statistics/country/chile>. Also see: 2021. "Religion Affiliation in Chile as of 2020, by Type." Statista. <https://www.statista.com/statistics/1066977/religious-affiliation-in-chile/>. Latinobarometro also offers survey results in their time series (1995-2020) database of religious group identification change for Chile. Retrieved from <https://www.latinobarometro.org/latOnline.jsp> with the following variable/tabulation selection: <ONLINE ANALYSIS>, <2020>, <CHILE>, <VIEW RESULTS>, SOCIODEMOGRAPHIC VARIABLES>, <RELIGION>, <TIME SERIES>.

³³ 2018 estimates. 2022. CIA World Factbook. "Chile." <https://www.cia.gov/the-world-factbook/countries/chile/#people-and-society>. In searching for official census records to verify religious demographics for Chile, it appears the latest data reported was in the 2002 census. The 2017 Chile census did not ask for religious affiliation. See: 2022. "Chile Census Data." East View Information Services. <https://www.eastview.com/resources/gca/chile-census-data/>. Also of note, variability in open source reporting for religious affiliation percentages appear to center around two factors: whether the reporting is structured on absolute share of the population or percentage of survey response. Examples of sources reporting the most recent estimates of religious demographic data in terms of absolute percentages of population are the CIA World Factbook and Chile's National Office of Religious Affairs (ONAR). For CIA World Factbook, see above citation. ONAR statistics were reported on page 2 of the Chile 2020 International Religious Freedom Report, published by the U.S. Department of State: <https://www.state.gov/reports/2020-report-on-international-religious-freedom/chile/>. Other sources such as Latinobarometro and Statista report percentages of survey response. See: Latinobarometro's 2020 report, accessed here: <https://www.latinobarometro.org/latContents.jsp>, in: <DOCUMENTS>, <RESULT DOCUMENTS>, <CHILE.> and selecting 2020 as the report year. For Statista, see: 2021. "Religion Affiliation in Chile as of 2020, by Type." <https://www.statista.com/statistics/1066977/religious-affiliation-in-chile/>.

³⁴ Latinobarometro released a 2018 comparative study analyzing religious attitudes among predominant religious groups (Roman Catholic, Evangelical, and non-religious) population in Latin America and Chile that shows the same trend. See: 2018. "EL PAPA FRANCISCO Y LA RELIGIÓN EN CHILE Y AMÉRICA LATINA, LATINOBARÓMETRO 1995 – 2017." p. 14, 19. https://m.cooperativa.cl/noticias/site/artic/20180112/asocfile/20180112124342/f00006494_religion_chile_america_latina_2017.pdf. Latinobarometro also offers an "Online Analysis" or "Anallsis Online" function that provides for selection of year, country, and result topic, and results offered via time series (1995-2020) and various graph types. To see the time series of religious group identification change for Chile, follow: <ONLINE ANALYSIS>, <2020>, <CHILE>, <VIEW RESULTS>, SOCIODEMOGRAPHIC VARIABLES>, <RELIGION>, <TIME SERIES>. Available at: <https://www.latinobarometro.org/latOnline.jsp>.

³⁵ 2020. U.S. Department of State. "Chile 2020 International Religious Freedom Report." p.5-7. <https://www.state.gov/reports/2020-report-on-international-religious-freedom/chile/>. Also see page 1-2 of

target of arson with increasing frequency, also since 2016, with attacks not limited to a single sect, but including Protestant and Catholic churches.³⁶ Anti-Semitism and anti-discrimination are now frequent topics in Chile's national politics, with the visit of Palestinian Authority leader Mahmoud Abbas to Chile in May 2018, supported by then Chilean President Sebastián Piñera; in June 2021 a draft bill was presented by the Chile-Palestine Inter-Parliamentary Group of the Chamber of Deputies for boycotting imports of Israeli goods, services and products that prompted swift response by the Jewish Community of Chile (CJCH) in opposition; and in the latest 2021/2022 presidential election in Chile, now Chilean President Gabriel Boric has also garnered support among the Palestinian Chilean population.³⁷ There is little indication that discrimination toward other religious denominations is occurring with equal frequency.

Socioeconomic Environment

Economic Conditions

Chile is among the wealthiest and most highly developed countries in Latin America, being one of only two countries in the region to be classed by the World Bank as high-income in 2020.³⁸ Chile was the first South American country to become a member of the Organisation for Economic Co-operation and Development (OECD), joining in 2010.³⁹

The Chilean economy is export-oriented with a heavy emphasis on agricultural products and extractive industry, with copper representing up to half of all export value.⁴⁰ Exports represent approximately 30 percent of GDP in typical years rendering Chile highly

their 2021 International Religious Freedom report for Chile: <https://www.state.gov/reports/2021-report-on-international-religious-freedom/chile/>.

³⁶ 2021. U.S. Department of State. "Chile 2021 International Religious Freedom Report." p. 1-2. <https://www.state.gov/reports/2021-report-on-international-religious-freedom/chile/>.

³⁷ Chile is home to the second largest Palestinian population outside of the Middle East. Their more vocal presence in politics countering support for Israeli has been a main friction point in Chilean national politics and religious engagement. 2021. U.S. Department of State. "Chile 2021 International Religious Freedom Report." p. 1-2. <https://www.state.gov/reports/2021-report-on-international-religious-freedom/chile/>. Additionally reported in: Maltz, Judy. 2021. "In Chile Election, Jews Must Choose Between a Pinochet Supporter and an Israel Basher." Haaretz, December 17. <https://www.haaretz.com/israel-news/2021-12-17/ty-article-magazine/in-chilean-election-jews-must-choose-between-a-pinochet-supporter-and-israel-basher/0000017f-f1be-d223-a97f-fdffa12f0000>; And: Savage, Sean. 2018. "Situation in Chile getting Colder for its Small Jewish Community." Sun-Sentinel, Jewish Journal, May 16. <https://www.sun-sentinel.com/florida-jewish-journal/fl-jjps-chile-0523-20180516-story.html>.

³⁸ World Bank. 2021. "The World by Income and Region." <https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html>

³⁹ Organisation for Economic Co-operation and Development (OECD). "Chile's Accession to the OECD." <https://www.oecd.org/chile/chilesaccessiontotheoecd.htm>

⁴⁰ Organisation for Economic Co-operation and Development (OECD). OECD Economic Surveys: Chile. 2021. Figure 1.7. p. 19.

<https://www.oecd.org/economy/surveys/Chile-2021-OECD-economic-survey-overview.docx.pdf>.

vulnerable to the effects of changes in economic conditions in its primary markets which are highly concentrated (China – 38%, USA – 12%).⁴¹ As was the case for many countries, Chile’s economy was significantly negatively impacted by the global fallout from the 2020-2022 COVID-19 pandemic. The economy contracted by 6 percent in 2020 before rebounding strongly in 2021 with GDP growth of 11.7 percent. In 2022 there were signs of downturn once more, exacerbated by rising global inflation, continuing supply chain disruptions, significant rises in the price of oil, and the gathering impact of the strengthening U.S. dollar in the first half of the year.⁴²

Chile continues to suffer from the effects of uneven distribution of wealth, both regionally and within the population which contribute to social tensions. Although the economy has recovered somewhat from the 2020 shock it remains fragile and domestic demand will likely continue to be impacted by external factors and continuing COVID-19 outbreaks.

Industry, Trade, Commercial Flows

Since 2010, Chile has expanded its foreign partnerships, including joining the Organisation of Economic Co-Operation and Development (OECD) Convention, and a number for trade agreements, including the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) in 2018, and with the EU, and Mercosur. Although their participation in the Trans-Pacific Trade Partnership (TPP) is not new—in 2008 Chile was an initial signatory state of its parent agreement, P4—the CPTPP is the re-negotiated agreement after the United States withdrew in 2017.

Chile has a significant trade relationship, both import and export, with Asia (South Korea, Japan, and China) and the United States: China accounts for 32 percent of Chile’s export partnership and 24 percent of their imports, with the United States accounting for 14 percent of exports and 20 percent of imports.⁴³ A significant portion of exports to China is copper (raw material), whose shipment has also served as a source of controversy within Chile over the last decade, due in part to recent trade disagreements and trade policy adjustments in China. Additionally, interdiction of plots to illegally export copper to China have increased, with Chile’s investigative police force, (Policía de Investigaciones de Chile - PDI), successfully retrieving 50 tons of copper wire illegally set for export, worth \$250 million USD in a single January 2020 incident.⁴⁴ In addition to copper—wherein Chile is the world’s leading producer and exporter—wine is also a central industry in Chile’s economy.

⁴¹ Organisation for Economic Co-operation and Development (OECD). OECD Economic Surveys: Chile. 2021. <https://www.oecd.org/economy/surveys/Chile-2021-OECD-economic-survey-overview.docx.pdf>.

⁴² IMF DataMapper, April 2022. “Chile.” See: <https://www.imf.org/en/Countries/CHL>.

⁴³ These percentages are 2019 estimates.

⁴⁴ Dalby, Chris. 2020. “Chile’s Copper Robbing Epidemic Likely Fueled by China Demand.” InSight Crime, January 23. <https://insightcrime.org/news/brief/chile-copper-china-demand/>. Also see: Ojeda, Juan Manuel.

Infrastructure

Chile has an extensive bus system that services both metropolitan areas, running north-south, and interiorly to rural or small towns. In the Santiago metropolitan area, there are several transportation options including metro light rail, and designated taxi route services (particularly from Santiago International Airport).⁴⁵ In 2020, the Ministry of Transportation announced initiatives to enhance and expand public transportation options and infrastructure upgrades.⁴⁶ Chile ranks 14th in the world for its 481 airports.⁴⁷ Chile also has seven major sea ports: Coronel, Huasco, Lirquen, Puerto Ventanas, San Antonio, San Vicente, Valparaiso.⁴⁸

In relation to energy and infrastructure, Chile has, over the last decade, invested in significant overhauls to include sustainable construction in concert with environment sustainability plans (overall and with urban development),⁴⁹ electronic vehicles and transportation efficiency,⁵⁰ and climate change mitigation plans for infrastructure.⁵¹

In addition, Chile is pursuing a strong commitment to significantly reduce not only greenhouse gas emissions by 2050, but also exponentially increase its investment in renewable energy sources to combat climate change.^{52,53} Chile is also shifting to invest in green hydrogen.⁵⁴

2020. "PDI frustra exportacion de 84 toneladas de cobre robado a China." La Tercera, Jan 1. <https://www.latercera.com/nacional/noticia/pdi-frustra-exportacion-84-toneladas-cobre-robado-china/975277/>

⁴⁵ Santiago International Airport. <https://www.santiago-airport.com/taxi.php>

⁴⁶ 2020. "Chile Announces New Investments to Improve Public Transport." BNAmérica, August 17. <https://www.bnamericas.com/en/news/chile-announces-new-investments-to-improve-public-transport>.

⁴⁷ World Data. "Transport and Infrastructure in Chile."

<https://www.worlddata.info/america/chile/transport.php>. Also see: 2022. CIA World Factbook. "Chile." <https://www.cia.gov/the-world-factbook/countries/chile/#transportation>.

⁴⁸ 2022. CIA World Factbook. "Chile."

<https://www.cia.gov/the-world-factbook/countries/chile/#transportation>

⁴⁹ Gobierno de Chile. Ministerio de Medio Ambiente (MMA). 2013. "Estrategia Nacional de Construcción Sustentable." https://mma.gob.cl/wp-content/uploads/2014/10/2_Estrategia-Construccion-Sustentable.pdf.

⁵⁰ Gobierno de Chile. Ministerio de Energía. "Estrategia Nacional de Electromovilidad." https://www.energia.gob.cl/sites/default/files/estrategia_electromovilidad-8dic-web.pdf.

⁵¹ Gobierno de Chile. 2017. "Plan de Adaptación y Mitigación 2017-2022 de los Servicios de Infraestructura al Cambio Climático." <https://mma.gob.cl/wp-content/uploads/2017/12/Plan-de-Accion-MOP.pdf>.

⁵² Climate Change plan. Gobierno de Chile, Ministerio de Medio Ambiente (MMA). 2017. "Plan de Acción Nacional de Cambio Climático 2017-2022."

https://mma.gob.cl/wp-content/uploads/2017/07/plan_nacional_climatico_2017_2.pdf.

⁵³ Details of this and other sectors for investments, the Ministry of Environment has compiled an outline here: "Adaptación y Mitigación." <https://cambioclimatico.mma.gob.cl/adaptacion-y-mitigacion/>. Also see: Gobierno de Chile. Ministerio de Energía. 2017. "Plan de Mitigación de Gases de Efecto Invernadero para el Sector Energía." https://www.energia.gob.cl/sites/default/files/plan_de_mitigacion_energia.pdf.

⁵⁴ Osborn, Catherine. 2022. "Chile Bets Big on Green Hydrogen." *Foreign Policy*, April 22.

<https://foreignpolicy.com/2022/04/22/chile-green-hydrogen-clean-energy-industry-investment-climate->

Public Health

Chile's national public health system is structured within, and overseen by, the Ministry of Health (MINSAL, in Spanish: Ministerio de Salud de Chile), with the core mission of coordinating funding, executing, directing, and coordinating public health policy.⁵⁵ MINSAL is divided into two under-secretariats: Undersecretary for Public Health (Subsecretaria de Salud Pública) and Undersecretary for Health Networks (Subsecretaria de Redes Asistenciales). The Undersecretary for Public Health is responsible for organizing and administering the following subagencies.⁵⁶

The funding arm of the MINSAL is **Fondo Nacional de Salud (FONASA)**, which collects and directs funds to state public health entities.

Instituto de Salud Pública de Chile (ISP) serves as the state/national reference body and laboratory for disease surveillance.⁵⁷ This National and Reference Biomedical Laboratory (of ISP) also serves as the official laboratory for Chile's international collaborations and is Chile's PAHO/WHO local counterpart.⁵⁸ ISP also conducts trainings for clinical laboratories, as well as occupational, environmental, public health, medical regulation, assessment and research focus areas.⁵⁹

Superintendencia de Salud (Superintendence of Health) is the legal body overseeing legal and financial guarantees and obligations under Chile's health insurance system.⁶⁰

change/

⁵⁵ Gobierno de Chile. Ministerio de Salud. 2022. "Funciones y objetivos." <https://www.minsal.cl/funciones-objetivos>, accessed May 15, 2022.

⁵⁶ The Organisation for Economic Co-Operation and Development (OECD) provides a similar breakdown of Chile's national public health governance structure, with Figure 1.8 showing the hierarchal organization of MINSAL and this governance structure. See Chapter 1, section 1.3.1: OECD. 2019. *The Public Health System in Chile*. In *OECD Reviews of Public Health: Chile: A Healthier Tomorrow*. OECD Reviews of Public Health, OECD Publishing, Paris.

<https://www.oecd-ilibrary.org/sites/9789264309593-5-en/index.html?itemId=/content/component/9789264309593-5-en#figure-d1e3756>.

⁵⁷ Instituto de Salud Pública de Chile (ISP). "Vigilancia de Laboratorio."

<https://www.ispch.cl/biomedico/vigilancia-de-laboratorio/>. As part of their surveillance and reporting system, the ISP maintains an interactive database that also highlights monthly and yearly reported and confirmed cases of viruses, bacteria, and parasites of concern that are mandatory to report. See: Instituto de Salud Pública de Chile (ISP). "Reporte Mensual." https://vigilancia.ispch.gob.cl/app/reportes_mensual.

⁵⁸ Organizational chart of Chile's MINSAL's main agencies. See: Instituto de Salud Pública de Chile (ISP). 2022. "ISP en estructura MINSAL." <https://www.ispch.cl/isp-en-estructura-minsal/>.

⁵⁹ Instituto de Salud Pública de Chile (ISP). 2022. "Organigrama." <https://www.ispch.cl/organigrama/>

⁶⁰ Superintendencia de Salud. 2022. "Historia." <http://www.supersalud.gob.cl/portal/w3-propertyvalue-6120.html>.

CENABAST – Supply Center for the National Health Services System (SNSS) is the main medical procurement agency, providing clinical, drug, medical device supplies to the whole SNSS.⁶¹

The National Health Services System (SNSS) of Chile consists of 29 autonomous health services (units), covering the 346 local government municipalities (comunas) and 16 regions of Chile.⁶² Additionally, reporting from these municipalities is sent to the regional ministries (Secretaría regional ministerial, or SEREMIS), that report to the ISP’s Department of Epidemiology.

Chile’s public health system appears to be well adjusted, and balanced between national public and private provisions. Beyond the main national structure described here, there is a great deal of private structure, though Chile does also offer nationalized health care, and additional private health insurance structures as well (though costlier). A key challenge for Chile’s public health sector is the vast geographic spread of the country, along with the general centralization of services at the regional level, and extremes of climate and terrain across the northern and southern most regions.

Governing Environment

Government

Chile is a presidential republic. Major protests that erupted in 2019 triggered by economic hardships precipitated a 2020 national constitutional plebiscite on the question of establishing a national convention to revise the constitution, a process which began in July 2021 following a positive result in the plebiscite.⁶³ At the present time the constitution, although much amended, remains that adopted under the Pinochet dictatorship in 1980. A referendum in September 2022 rejected a draft revised constitution with the result that the national convention will work on modifications before resubmitting the draft constitution to the people.⁶⁴

⁶¹ Central de Abastecimiento del Sistema Nacional de Servicios de Salud (CENABAST). 2017. “Quiénes Somos.” <https://www.cenabast.cl/institucion/quienes-somos/>

⁶² Gobierno de Chile. “Instituciones.” <https://www.gob.cl/instituciones/#regions>

⁶³ Mander, Benedict. 2019. “Inequality in ‘Stable’ Chile Ignites the Fires of Unrest.” *Financial Times*, October 21. <https://www.ft.com/content/fac69b5e-f36a-11e9-b018-3ef8794b17c6>.

⁶⁴ 2022. “Chile Overwhelmingly Rejects Progressive New Constitution.” Reuters. September 5. <https://www.reuters.com/world/americas/chileans-head-polls-decide-progressive-new-constitution-2022-09-04/>

Law

Chile has applied a sharp focus on addressing corruption and human rights, and possesses several laws, organizations and programs that address these concerns. This is a result of governmental and societal urgency to prevent a dictatorship rising again in their country, after suffering decades of corruption and human rights abuses under the Pinochet government.⁶⁵

Foreign Policy

Chile continues to structure its foreign policy around a key pillar of emphasis on maintaining and strengthening regional relationships, alliances and cooperation, bolstering diplomatic ties and connections with its neighbor countries as well as broader Latin and South America. This is to not only support mutual cooperation but also to address regional and international concerns such as poverty, trade, defense and social wellbeing.

Chile also has significant international alliances and relationships, through trade and international cooperative agreements, treaties, and international organizations like the United Nations. Key components of Chile's international engagement center around economics, commercial and free trade, promotion of democracy and government transparency, security (human, health, food, democratic), human rights and combatting terrorism. Addressing these concerns and policy areas, Chile is member and participant to several international organizations and agreements, including the Pacific Alliance, Mercosur, European Free Trade Association (EFTA), Trans-Pacific Strategic Economic Partnership (P4), and numerous free trade and trade agreements with countries across the world.⁶⁶ Chile also engages with every region of the world, with increasing engagement with Africa, consistent

⁶⁵ Klein, Marcus. 2003. "The Human Rights Violations of the Pinochet Regime and Their Legacy." *Revista Europa de Estudios Latinoamericanos y del Caribe*, 74: 107-118. Accessed via JSTOR: <https://www.jstor.org/stable/25676023>. Also see: Cuffe, Sandra. 2021. "Still a lot of pain': Dictatorship Victims Haunt Chile Election." Al Jazeera, December 17. <https://www.aljazeera.com/news/2021/12/17/still-alot-of-pain-dictatorship-victims-haunt-chile-election>. Also see: Feinberg, Richard E. 2019. "Order from Chaos: Chileans Learned the Right Lessons after the Pinochet era." Brookings, November 18. <https://www.brookings.edu/blog/order-from-chaos/2019/11/18/chileans-learned-the-right-lessons-after-the-pinochet-era/>.

⁶⁶ Current list of entered economic agreements are provided here: Gobierno de Chile. Subsecretaria de Relaciones Económicas Internacionales. 2022. "Acuerdos económico - comerciales vigentes." <https://www.subrei.gob.cl/acuerdos-comerciales/acuerdos-comerciales-vigentes>. For detailed information on Trans-Pacific Strategic Economic Partnership (P4), please see: New Zealand Foreign Affairs and Trade (MFAT). Government of New Zealand. 2022. "Trans-Pacific Strategic Economic Partnership (P4)." <https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/trans-pacific-strategic-economic-partnership-p4/#:~:text=The%20Trans%2DPacific%20Strategic%20Economic,the%20Pacific%20and%20the%20Americas.>

strong ties with Asia, links to the Middle East, and long-standing strategic relationships with the United States and European Union.⁶⁷

Chile is party to on-going border and maritime disputes with Bolivia, Peru, and Argentina, two of which have been sent to the International Court of Justice (ICJ) for adjudication.⁶⁸

Military

In comparison to its close regional neighbors, Chile's military force ranks average in terms of numbers, with approximately 75,000 active-duty armed forces personnel and 50,000 national police forces personnel.⁶⁹ Chile engages regularly with international organizations and neighboring countries in international training for CBRN response, including a 2021 training with the Organisation for the Prohibition of Chemical Weapons (OPCW).⁷⁰

Instability/Cleavages

As discussed in the "Governing Environment – Government" section of this report, Chile's government structure transitioned from decades of dictatorship to a democratic system in the 1990s, though retaining the Constitution of 1980 prepared and adopted under the dictatorship. Economic constraints and the ongoing COVID-19 pandemic have fueled protests for a constitutional reform, and to address the growing rates of inflation and economic burden placed on the citizenry. The 2019 social unrest and political protests over rising inflation and transportation costs that were further fueled by perceived government inaction on the matter led to the preparation of a revised draft Constitution and which was subsequently rejected in a September 2022 national referendum.⁷¹

⁶⁷ Detailed descriptions of Chile's engagement with each world region is provided by the Ministry of Foreign Affairs, on their "Foreign Policy Priorities" webpage, found here: <https://www.minrel.gob.cl/minrel/politica-exterior/prioridades-de-la-politica-exterior>

⁶⁸ Bolivia's request for maritime border and territory arbitration and resolution entered The Hague-based ICJ in April 2014, with some movement with a 2018 ruling in Chile's favor, is still ongoing and will likely continue for the foreseeable future. Peru's submission to the ICJ was also in 2014, with a resolution set by the ICJ in 2016, after which efforts continue to maintain and smooth relations between Peru and Chile. This is of great economic importance for Chile, given Peru is the third largest destination of foreign investments. Ministry of Foreign Affairs, on their "Foreign Policy Priorities" webpage, found here: <https://www.minrel.gob.cl/minrel/politica-exterior/prioridades-de-la-politica-exterior>

⁶⁹ 2022. CIA World Factbook. "Chile." <https://www.cia.gov/the-world-factbook/countries/chile/#military-and-security>.

⁷⁰ Organisation for the Prohibition of Chemical Weapons (OPCW). 2021. "CBRN Experts from Latin America and the Caribbean Expand Chemical Incident Response Capabilities." May 20. <https://www.opcw.org/media-centre/news/2021/05/cbrn-experts-latin-america-and-caribbean-expand-chemical-incident>

⁷¹ Reporting on the 2019 social protests, see: Laing, Aislinn, Dave Sherwood and Fabian Cambero. 2019. "Explainer: Chile's Inequality Challenge: What Went Wrong and Can it be Fixed?" Reuters. Retrieved from: <https://www.reuters.com/article/us-chile-protests-explainer-idUSKBN1X22RK>. Reporting on Chile's economy rate fluctuation, see: International Monetary Fund. 2021. "Chile: Financial System Stability Assessment." IMF Country Report No. 21/262. <https://www.imf.org/en/Publications/CR/Issues/2021/12/09/Chile-Financial-Systems-Stability->

Criminality

Of its Central and South American neighbors, Chile is considered the safest in relation to criminality, violence, and crime, although from 2020 to present, homicide rates have increased to 3.6 per 100,000 inhabitants.⁷²

Assessment

Chile possesses unique geographical topography, climate, and terrain that distinguishes it from its neighboring countries and other Central and South America countries. This unique and diverse landscape also presents potential challenges, namely for Chile's public health sector given centralization of services at the regional level, and extreme climates and terrain across the northern and southern most regions. Potential problems related to monitoring Chile's very long land borders are partially mitigated by the inhospitable or even impassable terrain along much of the border. Economically Chile is relatively prosperous compared to neighboring countries and this provides the government with more resources to address societal issues. At the same time Chile faces the prospect of an aging population, as well as potential difficulties related to climate change which could negatively impact the economy, which is still heavily dependent on potentially climate sensitive agricultural exports.

Terrorist/Insurgent Threat

Overview

Chile has seen a rise in left-wing terrorism and indigenous insurgency since 2010. Although the number of violent incidents has increased over time it has not, to date, as a general rule, resulted in significant numbers of injuries or deaths. Aside from a small number of noteworthy exceptions, the bulk of harm arising from these activities has been property

Assessment-510866. Also: International Monetary Fund. 2021. "2021 Article IV Consultation, Press Release; Staff Report; And Statement by the Executive Director for Chile."

<https://www.imf.org/en/Publications/CR/Issues/2021/04/22/Chile-2021-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-Executive-50178>.

⁷² This is the highest homicide rate per 100,000 reported by Statista for the year range studied, 2014 to 2021, wherein the record the rate for 2014 as 3.0, and 2017 as 3.3. The rates reported by Statista from 2018 and 2019 were 2.7 and 2.6, respectively. 2022. Statista. "Homicide Rate in Chile from 2014 to 2021." <https://www.statista.com/statistics/984913/homicide-rate-chile/>. This Statista report cited the 2021 Homicide Roundup published by InSight Crime, accessed here: <https://insightcrime.org/news/insight-crimes-2021-homicide-round-up/>. The 3.6 per 100,000 population statistic is found in this subsection, "2021 Homicide Rates in Latin America and the Caribbean." The report's graphic for this statistic can be directly accessed here: https://insightcrime.org/wp-content/uploads/2022/01/Homicide-Rates-in-Latin-America-and-the-Caribbean-2021_InSight-Crime_Map_Jan-2021-1.jpg.

damage. There are no indications that any of the groups engaged in ideologically motivated violence in Chile have, or are likely to develop, any interest in the use of biological materials.

Terrorist / Insurgent Groups

Foreign

Foreign terrorist groups have generally not maintained a significant presence in Chile in the 21st century. A notable exception is the Lebanon-based Hizb'allah organization, which is reported to maintain a limited presence in Chile, primarily in the form of various front-companies operating from the Iquique free trade zone,⁷³ although there are also allegations of Hizb'allah connections to transnational criminal organizations and smuggling of illicit substances.⁷⁴ Available information indicates that Chile primarily serves as an economic resource for Hizb'allah though the possibility remains that personnel and facilities in Chile may be providing logistic support or operational coordination of the group's activities throughout Latin America.

Much open-source discussion of Hizb'allah's activities in Chile repeats older information related to the situation in the 1990s and early 2000s. It is difficult, using open-sources, to arrive at a confident determination as to how much of this continues to remain valid in the 2020s.

The Islamic State has no direct connections to Chile. However, Chilean sources do note at least two Chile-associated individuals who travelled to Syria/Iraq in the mid-2010s in order to fight for, or support another fighting for, the Islamic State. Both of these cases involved Chilean emigrants to Nordic countries (Norway and Sweden).⁷⁵

One area of potential confusion surrounds the group referring to itself as the "Conspiracy of Cells of Fire" which was the purported perpetrator of two 2014 incidents in Santiago, Chile. This group is a Greece-based anarchist group that was designated as a terrorist organization by the United States Department of State in 2011. This organization is also referred to as: Conspiracy of Fire Nuclei (SPF) (their official name), and Conspiracy of Cells of Fire, Synomosia Pyrinon Tis Fotias, and Thessaloniki-Athens Fire Nuclei Conspiracy.⁷⁶ The extent

⁷³ Alma Keshavarz. 2015. "Iran and Hezbollah in the Tri-Border Areas of Latin America: A Look at the 'Old TBA' and the 'New TBA.'" *Small Wars Journal*, November 12. <https://smallwarsjournal.com/jrnl/art/iran-and-hezbollah-in-the-tri-border-areas-of-latin-america-a-look-at-the-%E2%80%99Cold-tba%E2%80%9D-and-the>

⁷⁴ United States, Department of State. 2020. "Country Reports on Terrorism. Chile." <https://www.state.gov/reports/country-reports-on-terrorism-2020/>

⁷⁵ "Chilean Children in ISIS Camps: What are the Threats to Chile?" 2019. *Chile Today*, April 11. <https://chiletoday.cl/chilean-children-in-isis-camps-what-are-the-threats-to-chile/>

⁷⁶ This source is archived material, written and archived by the United States Department of State. 2011. "Press

to which the incidents in Chile are directly connected to the Greek “core” group is impossible to ascertain from available open-source materials. Exchanges of information are possible as part of connectivity within the broader international radical left. However, there are no indications that any level of collaborative planning or operational control exists.

Table 1: List of Active Foreign Terror / Insurgent Groups

Group	Activity	Still Active	Biosecurity Relevant
Hizb’allah	Financing, outreach, operational support	Yes	No
Conspiracy of Cells of Fire	Terrorism	Unknown ⁷⁷	Maybe

Domestic

Domestic terrorism and insurgency has been a problem for the Chilean government for several decades and based on open-sources appears to be have been growing in significance since 2010. There are two primary ideological sources of conflict fueling the ongoing attacks.

The first is left-wing extremism, typically of an anti-capitalist or anarchist nature. Chile has a long tradition of left-wing terrorism, which was particularly strong during the period of military rule from 1973 to 1990. Thereafter the violence declined significantly. Starting in 2007 left-wing violence began to increase once more, although it has at no point approached the levels seen in the 1980s.⁷⁸ It is possible that policy changes arising out of the 2021 Presidential elections may result in a change in the frequency of left-wing violence, but there was insufficient data to reach conclusions at the time of writing.

Release: Terrorist Designation of Conspiracy of Fire Nuclei.” October 13. <https://2009-2017.state.gov/r/pa/prs/ps/2011/10/175362.htm>. If this direct link cannot be reached, this source can be accessed via the United States, Department of State archived website for 2009-2017, <https://2009-2017.state.gov/index.htm>, and utilizing the following tabulation path: <Press>, <Press Releases>, <Press Releases: 2011>, <Press Releases: October 2011>. This <Press> tab and <Press Releases> subtab categorize archive material from the Under Secretary for Public Diplomacy and Public Affairs’ Bureau of Public Affairs: Office of Press Relations, which provided the original press release.

⁷⁷ There is no record in the GTD’s recent release (2019) that indicates incidents conducted by this group went beyond the two listed in 2014. Despite lack of more recent incidents, there is no evidence to suggest they have disbanded, either. The assumption behind this answer of “unknown” is that they are still active, but little evidence available to confirm this status.

⁷⁸ This is concluded from analyzing the data of “Incidents Over Time” for Chile in the most recent 2019 release of the National Consortium for the Study of Terrorism and Responses to Terrorism (START)’s Global Terrorism Database Global Terrorism Database (GTD). An “Incidents Over Time” line chart from 1970 to 2020 populates when “Chile” is inputted in the “Search” bar function on the GTD’s main webpage, accessible here: START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>.

The left-wing groups mounting attacks use a number of names, and it is not clear that identified groups represent the only perpetrators of violence or indeed that all of the named groups represent distinct groups. It is possible that additional independent left-wing actors, either individuals or small cells, are also contributing to the attacks. In addition, as noted in the section on international terrorism there are apparent connections between some domestic left-wing extremists and equivalent foreign groups.

The second source of extremism in Chile is an indigenous movement, composed of multiple groups, focused on opposing the Chilean state as part of the so-called Mapuche conflict. Goals include protection of indigenous rights, return of land alienated from the indigenous people in the 19th and 20th centuries and potentially independence, or at least regional autonomy, for the indigenous population in the Araucanian region of Chile and Argentina. The intensity of the dispute between the Mapuche community and the Chilean government has intensified since 2015 with increasing, though still small, numbers of armed clashes between Chilean government personnel and Mapuche extremists.⁷⁹ The frequency of arson attacks, along with other sabotage directed at logging companies operating in the Araucania and Los Rios regions has stepped up and continues in 2022.⁸⁰

Table 2: List of Active Domestic Terror/Insurgent Groups

Group	Activity	Incident⁸¹	Still Active	Biosecurity Relevant⁸²
Antagonistic Nuclei of the New Urban Guerrilla ⁸³	Terrorism	2016	Yes	No
Arauco Malleco Coordinating Group (CAM) - Chile ⁸⁴	Terrorism	2020 ⁸⁵	Yes	No

⁷⁹ Newman, Lucia. 2021. "A Journey Through Chile's Conflict with Mapuche Rebel Groups." Al Jazeera, April 12. <https://www.aljazeera.com/features/2021/4/12/a-journey-through-chiles-conflict-with-mapuche-resistance-groups>.

⁸⁰ Camero, Paola. 2022. "Ataque incendiario en Mariquina: fiscalía apunta motivación en la causa mapuche y la libertad de algunos presos." Soy Chile, Valdivia, February 15. <https://www.soychile.cl/valdivia/sociedad/2022/02/15/744611/encapuchados-queman-18-camiones.html>.

⁸¹ This field records the year of the most recent incident recorded in the START Global Terrorism Database for the particular group.

⁸² Biosecurity relevance is based on whether the group has undertaken attacks against biosecurity relevant infrastructure, or alternatively demonstrated interest in pursuit or use of biological agents for use as weapons.

⁸³ Muñoz Alarcón, Paulo. 2011. "Fiscalía Sur indagará si artefacto en Vitacura corresponde a reivindicación en caso Bombas." La Tercera, May 11. <https://www.latercera.com/noticia/fiscalia-sur-indagara-si-artefacto-en-vitacura-corresponde-a-reivindicacion-en-caso-bombas/>

⁸⁴ CAM has existed since 1998.

⁸⁵ 2017. "Conoce la historia de Weichán Auka Mapu: los descolgados radicales de la CAM." Soy Chile, Temuco. <https://www.soychile.cl/Temuco/Policial/2017/09/03/485258/>. Additional history on the group is also

Group	Activity	Incident ⁸¹	Still Active	Biosecurity Relevant ⁸²
The Complices Sediciosos/Fraccion por la Venganza		2019 ⁸⁶	Unknown	No
Individuals Tending Toward Savagery		2019 ⁸⁷	Unknown	Yes ⁸⁸
International Revolutionary Front		2016 ⁸⁹	Unknown	No
Lautaro Youth Movement		2018 ⁹⁰	Unknown	No

reported by Al Jazeera: Newman, Lucia. 2021. "A Journey Through Chile's Conflict with Mapuche Rebel Groups." Al Jazeera, April 12. <https://www.aljazeera.com/features/2021/4/12/a-journey-through-chiles-conflict-with-mapuche-resistance-groups>.

⁸⁶ "Web anarquista publica comunicado de grupo que se adjudicó el envío de los paquetes bomba a la comisaría y Hinzpeter." 2019. El Mostrador EFE, July 29. <https://www.elmostrador.cl/noticias/pais/2019/07/29/web-anarquista-publica-comunicado-de-grupo-que-se-adjudico-el-envio-de-los-paquetes-bomba-a-la-comisaria-y-hinzpeter/>

⁸⁷ Individuals Tending Toward Savagery (ITS) are recorded to have committed attacks in Chile between 2017 and 2019, and internationally in Mexico in 2011 and 2013, and the United Kingdom in 2018. One domestic incident (Chile) of note that at least presents possible biosecurity concern is the September 7, 2018 incident wherein ITS detonated an explosive device at the Faculty of Agronomy at the University of Chile in La Pintana, Santiago, Chile. Internationally, ITS targeted a professor who studied nanotechnology at the Pachuca Polytechnic University in Pachuca, Mexico on December 7, 2011, and on January 31, 2013, they attacked a Pemex state oil company office in Mexico City, Mexico to protest destruction of the planet and use of nanotechnology. These incidents are recorded in the Global Terrorism Database (GTD) of the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland (UMD). These incidents are identified in the GTD as follows: GTD Incident ID: 201112070034 (2011 incident); 201301310030 (2013 incident); and 201809070035 (2018 incident). See: START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. Disclaimer: there may be other sources or databases that include additional incidents as "terrorism"; these incidents listed and spoken of here are subject to the GTD's inclusion criteria. The GTD inclusion criteria and codebook can be found here: <https://www.start.umd.edu/gtd/>.

⁸⁸ In Spanish, the group's name is: Individualistas Tendiendo a lo Salvaje (ITS). If ITS still operates, ITS could potentially pose as an external threat to chemical and biological facilities and laboratories, given the group's tendency to target science institutes and companies that deal with nanotechnologies. This group does not appear to have any interest in using or acquiring a biological agent to use as a weapon. See: START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>.

⁸⁹ Global Terrorism Database (GTD), Incident ID: 201602240069. See: START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. Disclaimer: there may be other sources or databases that include additional incidents as "terrorism"; these incidents listed and spoken of here are subject to the GTD's inclusion criteria. The GTD inclusion criteria and codebook can be found here: <https://www.start.umd.edu/gtd/>.

⁹⁰ Lautaro Youth Movement was suspected to be involved in a series of five (5) coordinated attacks using incendiary and explosive devices targeting churches on January 12, 2018, though the Weichán Auka Mapu claimed responsibility for all five attacks. These incidents are recorded in the Global Terrorism Database (GTD) of the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland (UMD). These incidents are identified in the GTD as five separate incidents, but noted as part of the same series of incidents, using the following designation: GTD Incident ID: 201801120014, 201801120015, 201801120016, 201801120017, and 201801120018. See: START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file].

Group	Activity	Incident ⁸¹	Still Active	Biosecurity Relevant ⁸²
Weichán Auka Mapu ⁹¹	Terrorism	2020	Yes	No

Terrorist/Insurgent Incidents Since 2010

Conventional

Since 2010 Chile has seen extensive, though small-scale extremist violence, generally involving the use of small improvised explosive devices or arson. Since 2018—when a record number of 47 terrorist events occurred, in comparison to 2017’s 27 events—the predominant focus were attacks against forestry equipment (trucks, backhoes, etc.) and facilities/companies.⁹²

Bombings by left-wing extremists, representing an unknown number of genuine groups, continue, though they have decreased somewhat in frequency since a peak around 2014. Although most incidents have appeared to prioritize property damage over taking lives, this has not always been the case, and irrespective of intent harm to individuals remains a possible outcome. In addition to economic targets, such as foreign business interests, attacks are frequently directed at police stations or gendarmerie facilities.⁹³ In September 2014, a particularly serious event resulted in the injury of 14 people when a bomb placed in a subway trashcan exploded.⁹⁴ In February 2020, several incendiary devices were thrown into

<https://www.start.umd.edu/gtd>. Disclaimer: there may be other sources or databases that include additional incidents as “terrorism”; these incidents listed and spoken of here are subject to the GTD’s inclusion criteria. The GTD inclusion criteria and codebook can be found here: <https://www.start.umd.edu/gtd/>.

⁹¹ A dissident splinter group of Arauco Malleco Coordinating Group (CAM), also listed in this table. Weichán Auka Mapu have been active since 2011. See: “Conoce la historia de Weichán Auka Mapu: los descolgados radicales de la CAM.” 2017. Soy Chile, Temuco, September 3. <https://www.soychile.cl/Temuco/Policial/2017/09/03/485258/>; Henriquez Ormeño, Eduardo. 2017. “Weichán Auka Mapu, la facción rebelde que tiene en jaque al Estado.” El Austral, Temuco, September 3. <https://www.australtemuco.cl/imprensa/2017/09/03/full/cuerpo-reportajes/4/>.

⁹² These statistics and incident summaries are based off the metadata provided in the most recent released update of the National Consortium for the Study of Terrorism and Responses to Terrorism (START)’s Global Terrorism Database (GTD) (2019). This database was filtered to look at years 2010 to 2019, inclusive, and incident location as Chile. Disclaimer: there may be other sources or databases that include additional incidents as “terrorism”; these incidents listed and spoken of here are subject to the GTD’s inclusion criteria. The GTD inclusion criteria and codebook can be found here: <https://www.start.umd.edu/gtd/>.

⁹³ “Chile: Explosives Attack Dec. 27 in Santiago Causes No Casualties.” 2021. Crisis24, December 27. <https://crisis24.garda.com/alerts/2021/12/chile-explosives-attack-dec-27-in-santiago-causes-no-casualties>.

⁹⁴ START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. The incident is listed in the GTD as GTD ID: 201409080007. Direct link to this incident listing: <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201409080007>.

a church where approximately 150 people were meeting to discuss the upcoming April 2020 Constitutional referendum.⁹⁵

As part of the so-called Mapuche Conflict there have been a number of violent incidents between police and extremists. As noted above, the frequency and severity of incidents such as arson attacks and armed confrontations has been increasing over time with little indication that the attacks will end in the near to medium term.

Table 3: Major Incidents of Domestic Terror/Insurgency

Group	Activity	Incident	Biosecurity Relevant
Conspiracy of Cells of Fire	Bomb	Subway attack injuring none (2014-07-13) ⁹⁶	No
Conspiracy of Cells of Fire	Bomb	Fast food restaurant attack injuring 14 (2014-09-08) ⁹⁷	No
Individuals Tending Toward Savagery	Bomb	Letter bomb at home of chairperson of board of the commercial enterprise Codelco, injuring 3 (2017-01-13) ⁹⁸	No
Individuals Tending Toward Savagery	Bomb	Bomb at bus stop injuring 5 (2019-01-04) ⁹⁹	No
Unknown	Bomb	Incendiary device thrown into political meeting (2020-02-27)	No

⁹⁵ "Molotov Bomb Thrown into Congregation in Chile." 2020. Lutheran World Federation, March 10. <https://www.lutheranworld.org/news/molotov-bomb-thrown-congregation-chile>.

⁹⁶ START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. The subway bombing incident is listed in the GTD as GTD ID: 201407130070. Direct link to this incident listing: <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201407130070>; Also see: Andres Henao, Luis. 2014. "Arrests in Chile Bomb Attack Focus on Anarchists." The San Diego Union-Tribune, September 9. <https://www.sandiegouniontribune.com/sdut-chile-steps-up-security-after-bomb-hurts-14-2014sep09-story.html>.

⁹⁷ START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. This incident is listed in the GTD as GTD ID: 201409080007. Direct link to this incident listing: <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201409080007>.

⁹⁸ START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. This incident is listed in the GTD as GTD ID: 201701130020. Direct link to this incident listing: <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201701130020>

⁹⁹ START (National Consortium for the Study of Terrorism and Responses to Terrorism). (2022). Global Terrorism Database 1970 - 2020 [data file]. <https://www.start.umd.edu/gtd>. This incident is listed in the GTD as GTD ID: 201901040015. Direct link to this incident listing: <https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201901040015>

Support

Support for foreign terrorist or insurgent operations by groups or individuals in Chile has been limited. The primary example is Hizb'allah which is reported to operate front-companies in Chilean free-trade-zones in order to support the organization's needs for revenue. Aside from the 1994 Asociación Mutual Israelita Argentina (AMIA) bombing, to which Argentinian authorities have alleged Chile-based Hizb'allah operatives contributed support, there have been no significant claims of terrorist operational support being provided out of Chile.

Biological, or other WMD

There are no indications that any Chilean extremist groups, to date, have explored or attempted the use of biological warfare agents or any other form of biological attack. The use of biological agents, or indeed other WMD would represent a significant departure from the typical pattern of activity associated with Chilean extremists.

No foreign extremist groups associated with the use of BW agents or other WMD are currently known to be active in Chile. As noted above, the Islamic State, which has made use of chemical warfare agents in the past, has no direct connections to Chile. It is unlikely that Chile would represent a first-choice target for foreign extremist organizations seeking to employ WMD.

Assessment

Terrorism in Chile is primarily a domestic phenomenon. There are no indicators, operational or ideological, that suggest any domestic terrorist or insurgent groups currently operating on Chilean soil have, or are likely to, develop in the near to medium term, any interest in the acquisition or deployment of biological warfare agents.

Domestic left-wing extremists pose a small biological risk in that their targeting of foreign businesses introduces the possibility that research facilities handling biological materials may be targeted and potentially cause an inadvertent or unintentional release in addition to the direct risk to the safety of personnel.

Foreign terrorist organizations do not appear to maintain any operational capabilities in Chile. In addition, those foreign organizations associated with Chile in the past do not have any connection to the acquisition or use of biological warfare agents or the use of biological materials to cause harm.

Accordingly, the overall risk of terrorist or insurgent engagement with biological agents in Chile is assessed to be low with the sole exception as noted above.

Organized Crime

Overview

Chile is generally seen as a country with, “low organized crime penetration and low levels of public violence,” which has led to a lack of oversight by both Chilean and international authorities, as reported by McDermott et al.¹⁰⁰ As a result of this lack of oversight, Chile, and in particular, the port city of San Antonio, has become a profitable traffic dispatch and transit port for illicit trafficking.¹⁰¹ Although experiencing less severe problems than many of its South American counterparts, Chile nevertheless has a significant organized criminal presence in the form of a mixture of international and domestic groups. Domestic organized crime consists of a collection of loose, anonymous family clan and mafia-style networks. These groups typically operate within their separate neighborhoods, which function as defined territories, collaborate with other local criminal organizations, and are speculated to maintain some level of connection to foreign actors (namely transnational criminal organizations).¹⁰² There is evidence of some corruption within state agencies including ties to organized crime.¹⁰³ However, this is not believed to be systematic or widespread in nature.

Transnational criminal organizations maintain a consistent presence, or relationship with Chilean groups, exploiting Chile as a transit hub for international human and drug trafficking specifically. Chile is a transit point for cocaine smuggling from Bolivia and Peru to various destinations throughout Europe and Africa.¹⁰⁴ There have been reports of Colombian drug

¹⁰⁰ Original report: McDermott, Jeremy, James Bargent, Douwe den Held, and Maria Fernanda Ramírez. 2021. “The Cocaine Pipeline to Europe.” February, Research Report, InSight Crime and the Global Initiative Against Transnational Organized Crime. <https://globalinitiative.net/wp-content/uploads/2021/02/The-cocaine-pipeline-to-Europe-GI-TOCInsightCrime.pdf>. This source is quoted in: Sampó, Carolina, and Valeska Troncoso. 2021. “Cocaine Trafficking from Non-Traditional Ports: Examining the Cases of Argentina, Chile and Uruguay.” *Trends in Organized Crime*. doi: <https://doi.org/10.1007/s12117-021-09441-y>.

¹⁰¹ McDermott, Jeremy, James Bargent, Douwe den Held, and Maria Fernanda Ramírez. 2021. “The Cocaine Pipeline to Europe.” February, Research Report, InSight Crime and the Global Initiative Against Transnational Organized Crime. <https://globalinitiative.net/wp-content/uploads/2021/02/The-cocaine-pipeline-to-Europe-GI-TOCInsightCrime.pdf>.

¹⁰² Here, “criminal networks” is defined by the 2021 Global Organized Crime Index as: “Criminal networks are involved in illicit trafficking of commodities but do not have territorial control or any of the other defining features of mafia-style groups.” For definition, see: 2021. Global Initiative Against Transnational Organized Crime. “Global Organized Crime Index 2021.” p. 23. <https://ocindex.net/downloads>. For Chile’s country profile report, specific detail regarding these criminal network/mafia-style presence, and their operations with domestic and foreign actors, see: 2021. Global Initiative Against Transnational Organized Crime. “Global Organized Crime Index: Chile.” p. 3-4. <https://ocindex.net/country/chile>.

¹⁰³ “Chile: Top Police Officers Arrested Over Corruption Charges.” 2021. TeleSur, June 1. <https://www.telesurenglish.net/news/Chile-Top-Police-Officers-Arrested-Over-Corruption-Charges-20210601-0016.html>.

¹⁰⁴ Clavel, Tristan. 2016. “Report Finds Drug Trafficking Through Chile is on the Rise.” InSight Crime, December 19. <https://insightcrime.org/news/brief/report-finds-drug-trafficking-through-chile-is-on-the-rise/>.

traffickers operating in Chile as well, with Bulgarian and French authorities making arrests for the trafficking of cocaine through Chile.¹⁰⁵

The predominant organized crime challenges confronting Chile are human smuggling and human trafficking, followed by the illegal cocaine and marijuana trade,¹⁰⁶ arms trafficking (primarily small arms),¹⁰⁷ and flora/fauna crimes. Chile serves as a staging, transfer, and destination point for human trafficking and smuggling victims, for both sexual and labor exploitation, from places such as Nepal, India, China, Bolivia, Paraguay, Ecuador and Argentina.¹⁰⁸ According to the Organized Crime Index, human smuggling operations into Chile originate primarily from the Dominican Republic, China, and Venezuela, with Chile serving as a transit stop for those continuing on to Argentina.¹⁰⁹ Chile is also a transit point for human smugglers moving Haitian migrants into North America, primarily Mexico and the United States.¹¹⁰ Illicit movement of human populations has the potential to enable the unmonitored introduction of disease. Flora and fauna crimes in Chile have the potential to introduce significant biosecurity risks due to a substantial illicit trade in exotic animals (such as monkeys, birds, and reptiles) for fur markets or other clandestine market purposes. In addition to presenting significant risk of adding to the Chile's problems with invasive species, this uncontrolled illicit trade has the potential to introduce animals or pathogens that may negatively impact Chile's agricultural economy. Furthermore, there is an associated risk that pathogens capable of affecting human populations may be introduced through this illicit trade. In addition to the risks posed to Chile's natural environment and agricultural economy by illicit imports, the same criminal groups are also engaged in exporting wildlife from and through Chile, introducing the possibility that criminal activities in Chile will contribute to biosecurity risks in neighboring countries. Illegal logging of the largely privately owned national forests remains a problem, exacerbated by a reliance on administrative rather than criminal penalties.¹¹¹ Additionally, San Antonio, Chile, is highly vulnerable to exploitation as

¹⁰⁵ Bargent, James. 2014. "Bulgarians Use Dakar Rally Truck to Smuggle Cocaine from Chile." InSight Crime, February 21. <https://insightcrime.org/news/brief/bulgarian-criminals-use-dakar-rally-truck-to-smuggle-cocaine-from-chile/>.

¹⁰⁶ Additional reports on this can be found here: Policía de Investigaciones de Chile (PDI). 2022. "Más de una tonelada de Cannabis incautada en 2022." March 11. <https://www.pdichile.cl/centro-de-prensa/detalle-prensa/2022/03/11/m%C3%A1s-de-una-tonelada-de-cannabis-incautada-en-2022>.

¹⁰⁷ Additional reports on this can be found here: Policía de Investigaciones de Chile (PDI). 2022. "Investigaciones tras la ruta del tráfico de armas." <https://www.pdichile.cl/centro-de-prensa/detalle-prensa/2022/01/21/investigaciones-tras-la-ruta-del-tr%C3%A1fico-de-armas>.

¹⁰⁸ Global Initiative Against Transnational Organized Crime. 2021. "Global Organized Crime Index: Chile." p. 3. <https://ocindex.net/country/chile>.

¹⁰⁹ Global Initiative Against Transnational Organized Crime. 2021. "Global Organized Crime Index: Chile." p. 3. <https://ocindex.net/country/chile>.

¹¹⁰ Interpol. 2021. "Chile: Police dismantle crime group smuggling hundreds of children." October 4. <https://www.interpol.int/en/News-and-Events/News/2021/Chile-Police-dismantle-crime-group-smuggling-hundreds-of-children>.

¹¹¹ Illicit flora & fauna trade is described in section "Criminal Markets: Environment" within the Chile country

a global trafficking hub due to its proximity to larger trafficking countries, such as Bolivia and Peru, reports of corruption at the borders, and its quality port infrastructure.¹¹²

Transnational Criminal Organizations

Chile is host to many foreign criminal organizations that engage in illicit activities both within and through Chile.¹¹³ There are a number of South American foreign organized criminal groups that operate within or aid in organization and shipment of illicit substances (arms, drugs, etc.) into and out of Chile. These are predominately Bolivian, Colombian, Paraguayan, and Peruvian drug cartels that are major cocaine and marijuana producers and supplies throughout Central and South America. Bolivian and Peruvian groups have been shown to cooperate with local organizations and European organized crime groups partner with Chilean groups to facilitate the illicit transit port in San Antonio.¹¹⁴ One impactful growing industry is the partnership of various Latin American and Chilean groups to facilitate the smuggling of migrants into northern Chile, which has led to an increase in Chilean criminal control of the mining, agricultural, and domestic service industries in the north.¹¹⁵ Additionally, these international criminal groups are becoming more violent. Particularly in the north, an increase in violence is indicated through a change in crime as described by Tarapacá prosecutor, Raúl Arancibia, “Hemos tenido delitos nuevos como la extorsión, sicariato, secuestros, y también ha habido mayor violencia, verdaderas ejecuciones,” [Translated to English: “We have had new crimes such as extortion, contract killings, kidnappings, and there has also been greater violence, true executions.”]¹¹⁶

profile report of the 2021 Global Organized Crime Index. See: 2021. Global Initiative Against Transnational Organized Crime. “Global Organized Crime Index: Chile.” p. 3. <https://ocindex.net/country/chile>

¹¹² Sampó, Carolina, and Valeska Troncoso. 2021. “Cocaine Trafficking from Non-Traditional Ports: Examining the Cases of Argentina, Chile and Uruguay.” *Trends in Organized Crime*. doi: <https://doi.org/10.1007/s12117-021-09441-y>. For further reading see: Lizana, Pilar. 2022. “Economía Ilegales: Factores que Facilitan el Accionar del Crimen Organizado en Chile.” Athena Lab Working Paper 16, May. <https://athenalab.org/wp-content/uploads/2022/05/DT16-Ekonomi%CC%81as-ilegales.pdf>.

¹¹³ InSight Crime. 2021. “Chile Profile.” <https://insightcrime.org/chile-organized-crime-news/chile/>. Accessed July 26, 2022.

¹¹⁴ InSight Crime. 2021. “Colombia Profile.” <https://insightcrime.org/chile-organized-crime-news/chile/>. Accessed July 26, 2022.

¹¹⁵ Alonso, Luis Fernando. 2016. “International Human Smuggling Ring Dismantled in Peru and Chile.” InSight Crime, October 21. <https://insightcrime.org/news/brief/human-smuggling-ring-dismantled-in-peru-and-chile/>.

¹¹⁶ Toro, Daniela. 2022. “El duro análisis del Fiscal de Tarapacá por violencia en la zona: “Necesitamos ayuda, estamos con el agua hasta el cuello.” Emol Nacional, June 3. <https://www.emol.com/noticias/Nacional/2022/06/03/1062971/fiscal-tarapaca-migracion-crimenes.html>.

Table 4: List of Active Transnational Criminal Organizations

Group Name	Country of Origin	Area of Activity
Luque Cartel ¹¹⁷	Paraguay	Los Andes, Santiago, Chile; Fernando de la Mora, Luque, Paraguay; Argentina ¹¹⁸
Medellin Cartel ¹¹⁹	Colombia	Arica, Chile
Unknown	Bolivia ¹²⁰	Arica, Chile
Unknown	Peru ¹²¹	Unspecified
Unknown	Bulgaria ¹²²	Valparaíso, Chile
Gulf Cartel ¹²³	Colombia	Unspecified
Cartel de Sinaloa ¹²⁴	Mexico	Unspecified
Cartel Jalisco Nueva Generación ¹²⁵	Mexico	Unspecified

¹¹⁷ Named in news reports about a major 2015 marijuana drug bust operation in Paraguay and Chile, implicating and arresting several key leadership of the Luque Cartel (Paraguay), who had been recruiting drug mule models to transport product from Paraguay to Chile, a major market for marijuana sale. Arámbulo. Darío. 2015. "Narcos ganan 10 veces más por venta en Chile." *Ultima Hora*, February 16. <https://www.ultimahora.com/narcos-ganan-10-veces-mas-venta-chile-n872819.html>.

¹¹⁸ "Condenan a 15 años de cárcel al líder del cartel de Luque." 2017. *Ultima Hora*, April 16. <https://www.ultimahora.com/condenan-15-anos-carcel-al-lider-del-cartel-luque-n1078402.html>.

¹¹⁹ In connection with Bolivia. In March 2021, Chilean police interdicted a rare 3-ton cache of cocaine and marijuana shipped from Bolivia that bore the late Pablo Escobar's cartel stamp signature. See: "Chile Drug Bust Nets Cocaine and Marijuana Stamped with Kingpin Pablo Escobar's Likeness." 2021. *Reuters*, March 12. <https://www.reuters.com/article/us-chile-drugs-escobar/chile-drug-bust-nets-cocaine-and-marijuana-stamped-with-kingpin-pablo-escobars-likeness-idUSKBN2B42L7>.

¹²⁰ Connection to March 2021 cocaine and marijuana interdiction in Chile, where Bolivia was determined to be the source point for the shipment. It is not stated nor determined what group is responsible. See: "Chile Drug Bust Nets Cocaine and Marijuana Stamped with Kingpin Pablo Escobar's Likeness." 2021. *Reuters*, March 12. <https://www.reuters.com/article/us-chile-drugs-escobar/chile-drug-bust-nets-cocaine-and-marijuana-stamped-with-kingpin-pablo-escobars-likeness-idUSKBN2B42L7>.

¹²¹ 2021. "CHL200551.E.: Chile: Gangs, Cartels and Organized Criminal Groups, Including Their Areas of Influence and Alliances Within and Outside the Country; Presence of Colombian Drug Cartels in the Country, Including Whether They May Pose a Threat to an Individual; State Protection Available to Persons Threatened by These Groups (2019–April 2021)." IRB – Immigration and Refugee Board of Canada. Government of Canada. May 10. <https://irb-cisr.gc.ca/en/country-information/rir/Pages/index.aspx?doc=458338&p1s=1>.

¹²² Bargent, James. 2014. "Bulgarians Use Dakar Rally Truck to Smuggle Cocaine from Chile." *InSight Crime*, February 21. <https://insightcrime.org/news/brief/bulgarian-criminals-use-dakar-rally-truck-to-smuggle-cocaine-from-chile/>.

¹²³ Toro, Daniela. 2022. "Los tentáculos del crimen organizado: El perfil de los cuatro principales carteles extranjeros que buscan asentarse en Chile." *EMOL*, June 15. <https://www.emol.com/noticias/Nacional/2022/06/15/1064079/carteles-droga-mexicanos-trafico-chile.html>.

¹²⁴ Delgado, Felipe. 2022. "Monsalve advierte presencia en Chile de tres de las más peligrosas bandas criminales del mundo." *El Narco En Chile*, BioBioChile.cl, June 26. <https://www.biobiochile.cl/especial/el-narco-en-chile/noticias/2022/06/26/monsalve-advierte-presencia-en-chile-de-tres-de-las-mas-peligrosas-bandas-criminales-del-mundo.shtml>.

¹²⁵ Delgado, Felipe. 2022. "Monsalve advierte presencia en Chile de tres de las más peligrosas bandas criminales del mundo." *El Narco En Chile*, BioBioChile.cl, June 26. <https://www.biobiochile.cl/especial/el-narco-en-chile/noticias/2022/06/26/monsalve-advierte-presencia-en-chile-de-tres-de-las-mas-peligrosas-bandas-criminales-del-mundo.shtml>.

Group Name	Country of Origin	Area of Activity
Tren de Aragua	Venezuela	La Serena, Coquimbo region, and Estación Central, Santiago province, Chile; Arica, Iquique, and Puerto Montt, Chile. ¹²⁶

Domestic Criminal Organizations

While domestic crime has been increasing in Chile over the past decades, it is still very low in comparison to neighboring countries. The largest threat from domestic criminal organizations is focused within the larger cities and is moderately diffuse and situationally dependent. The domestic criminal organizations listed below are noted street gangs in Chile that typically operate in separate and distinct poorer sections of the greater Santiago metropolitan area (specific sectors are listed in the table below) where public services, such as transport and schools, are rare, and the police are unable to maintain control.¹²⁷ These gangs tend to engage in lesser crimes, primarily low-level drug distribution, but also engage in frequent episodes of larceny, looting, and gun violence.¹²⁸ There is no indication of any larger domestic criminal organization that might represent a biosecurity threat.¹²⁹

Table 5: List of Active Domestic Organized Criminal Groups

Group Name	Area of Activity
Los Vatos Locos	Santiago, Chile ¹³⁰
Los Chubis	Santiago, Chile (San Luis de Quilicura sector) ¹³¹
Los del Cojo Juan	Santiago, Chile (San Luis de Quilicura sector) ¹³²
Los Guarenes	Santiago, Chile (La Pintana commune) ¹³³

¹²⁶ Saavedra, Guillermo. 2022. "Venezuelan Criminal Gang Tren de Aragua Arrives in Chile." *Diálogo*, February 15. <https://dialogo-americas.com/articles/venezuelan-criminal-gang-tren-de-aragua-arrives-in-chile/#.YsZEDHbMIQ8>.

¹²⁷ InSight Crime. 2021. "Chile Profile." <https://insightcrime.org/chile-organized-crime-news/chile/>. Accessed July 26, 2022.

¹²⁸ Guerra, Tabatha, and Juan Pablo Figueroa. 2012. "El domino del narco en las poblaciones más vulnerables de Santiago." *Ciper Chile*, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>.

¹²⁹ "Chile Profile: Criminal Groups." InSight Crime. <https://insightcrime.org/chile-organized-crime-news/chile/#Criminal%20Groups>.

¹³⁰ Ramsey, Geoffrey. 2012. "Drug Gangs Run 80 Neighborhoods in Santiago, Chile." InSight Crime, October 31. <https://insightcrime.org/news/brief/drug-gangs-neighborhoods-santiago-chile/>.

¹³¹ Guerra, Tabatha, and Juan Pablo Figueroa. 2012. "El domino del narco en las poblaciones más vulnerables de Santiago." *Ciper Chile*, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>.

¹³² Guerra, Tabatha, and Juan Pablo Figueroa. 2012. "El domino del narco en las poblaciones más vulnerables de Santiago." *Ciper Chile*, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>.

¹³³ Guerra, Tabatha, and Juan Pablo Figueroa. 2012. "El domino del narco en las poblaciones más vulnerables de Santiago." *Ciper Chile*, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>. Also see: Ramsey, Geoffrey. 2012. "Drug Gangs Run 80

Group Name	Area of Activity
Los Phillips	Santiago, Chile (La Pintana commune) ¹³⁴
Tirado Huilcal family	Santiago, Chile (La Chimba, Recoleta commune) ¹³⁵

Assessment

Despite the prevalence of extensive drug and human smuggling/trafficking networks, there is little indication of any criminal activity that represents a direct biosecurity threat. Criminal groups operating in Chile have not made use of, or sought to acquire, biological agents. There are no indications that Chilean criminal networks are engaged in activities supporting biological weapons proliferation by foreign states or terrorist groups. Illicit flora and fauna markets and networks do raise a biosecurity concern due to potential for unintended animal disease spread through export of Chile’s fauna to foreign countries, as well as potential for introducing invasive flora and fauna to Chile through import or to foreign countries through export.

Non-organized Crime

Overview

Non-organized crime activity in Chile is low relative to other countries in Latin America. Murder rates, along with other crimes of interpersonal violence, are lower than in the United States and much of Eastern Europe, although still significantly higher than is typical in Western Europe. In contrast to its relatively low murder rates, Chile reports one of the highest burglary rates in the world with 1,086 incidents per 100,000 inhabitants in 2018.¹³⁶

Neighborhoods in Santiago, Chile.” InSight Crime, October 31. <https://insightcrime.org/news/brief/drug-gangs-neighborhoods-santiago-chile/>.

¹³⁴ Guerra, Tabatha, and Juan Pablo Figueroa. 2012. “El domino del narco en las poblaciones más vulnerables de Santiago.” Ciper Chile, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>. Also see: Ramsey, Geoffrey. 2012. “Drug Gangs Run 80 Neighborhoods in Santiago, Chile.” InSight Crime, October 31. <https://insightcrime.org/news/brief/drug-gangs-neighborhoods-santiago-chile/>.

¹³⁵ This family is noted as not a cartel, but controls the cocaine paste sale and market in the town of La Chimba, Recoleta, part of the Santiago Metropolitan area. Guerra, Tabatha, and Juan Pablo Figueroa. 2012. “El domino del narco en las poblaciones más vulnerables de Santiago.” Ciper Chile, October 22. <https://www.ciperchile.cl/2012/10/22/el-dominio-del-narco-en-las-poblaciones-mas-vulnerables-de-santiago/>. Also see: Ramsey, Geoffrey. 2012. “Drug Gangs Run 80 Neighborhoods in Santiago, Chile.” InSight Crime, October 31. <https://insightcrime.org/news/brief/drug-gangs-neighborhoods-santiago-chile/>.

¹³⁶ “Burglary Rate in Selected Countries Worldwide in 2018 (per 100,000 inhabitants.” Statista. <https://www.statista.com/statistics/1238258/burglary-rate-country/>. Accessed August 5, 2022.

Industrial Espionage

While there are no publicly accessible reports pointing to significant industrial espionage cases, let alone case directly tied to biosecurity, it should be clearly understood that companies will frequently seek to conceal such developments.

Chile has been mentioned in a few cases of general espionage since 2000 that are worthy of note. In 2009, a Peruvian court ordered the arrest of two Chilean military Officers on charges of paying a Peruvian Air Force Officer to divulge secrets,¹³⁷ while later, in 2015, Peru recalled its ambassador due to reports of three members of the Peruvian Navy receiving money from Chile to pass on confidential information.¹³⁸ Finally, in 2011, a U.S. State Department cable revealed concern over the growing ties between China and the Chilean military.¹³⁹

Biocrime

None identified.

Assessment

Non-organized crime represents a relatively low-grade biosecurity threat at this time. There are no identified incidents of biocrime over the last several decades suggesting that this is unlikely to represent a significant future threat. The absence of such events historically does not preclude future events. The most likely biocrime incident, which would have the potential to represent a biosecurity threat as well, would involve an insider seeking to harm a colleague, or to leverage their access in order to harm others outside of the institution they are associated with.

Given Chile's high rate of property crime, to include burglary, there is a distinct possibility that laboratories, research institutes, or other facilities responsible for holding or transporting biomaterials may be subjected to criminal break-ins for the purposes of stealing non-bio-specific equipment or materials. Crimes of this nature have the potential to result in inadvertent release or loss of control of biomaterials and as such represent a potential biosecurity threat.

¹³⁷ "Peru and Chile in 'Spy' Scandal." 2009. BBC News, November 14. <http://news.bbc.co.uk/1/hi/8360144.stm>.

¹³⁸ "Peru Recalls Ambassador to Chile over 'Military Espionage.'" 2009. BBC News, March 7. <https://www.bbc.com/news/world-latin-america-31784336>.

¹³⁹ Gertz, Bill. 2011. "China's Espionage in Chile Raised U.S. Worry." Washington Times, April 18. <https://www.washingtontimes.com/news/2011/apr/18/chinas-espionage-in-chile-raised-us-worry/>.

Biological Programs and Infrastructure

Overview

The Chilean government supports and encourages the development of biological research capabilities as part of its ongoing pursuit of economic development. The bulk of this growing infrastructure is housed at and in collaboration with universities, in addition to the key national public health entities that serve research and implementation functions. However, there is a growing commercial research sector. International partnerships are important and are being employed to advance national capabilities. As is the case for many countries, Chile is exploring options for the introduction of modern domestic vaccine production capabilities in the wake of the experience of the 2020 COVID-19 pandemic.

Military Programs

Offensive BW

There are no indications that Chile has ever sought, acquired, or maintained a large-scale military biological warfare capability.

In 2013 public reporting stated that in the mid to late 1970s or early 1980s the Pinochet-led military government had obtained a quantity of botulinum toxin for use as an assassination tool.¹⁴⁰ Allegedly the unused portion of this material was discovered and subsequently destroyed in 2008. The discovery aligned with documentation that had been discovered earlier pointing to the importation of botulinum toxin from another country in the 1970s. There are no indications that Chilean authorities were engaged in the production of agents at any point in time.

The BW activity was undertaken by the Pinochet government and discontinued, and indeed forgotten, following the end of military rule. There are no indications that subsequent governments have sought or pursued any BW capabilities whatsoever.

Defensive BW

There is no available information pointing to the existence of a significant Chilean biological defense program. The Chilean military appears to maintain a basic CBRN defense capability embedded within the broader function of the military engineering function, but specific details on the level of readiness or level of capability are unavailable in open sources.

¹⁴⁰ Cooperativa. 2013. "Ex directora del ISP: Pinochet tenía armas químicas "para matar a la mitad de Santiago." August 22. <https://www.cooperativa.cl/noticias/pais/augusto-pinochet/ex-directora-del-isp-pinochet-tenia-armas-quimicas-para-matar-a-la/2013-08-22/071513.html>

Military Biological Infrastructure

Research

There is little publicly available information to indicate the existence of a dedicated military biological research infrastructure. In 2016 the Hospital Militar de Santiago partnered with the University of Chile in research to develop a Respiratory Syncytial Virus (RSV) vaccine.¹⁴¹ The role of the HMS appears to have been provision and monitoring of subjects for a Phase 1 trial of a candidate vaccine.¹⁴²

Training

Despite little publicly available information on military biological training or training facilities, there is indication that the Escuela Militar and Hospital Militar de Santiago (HMS) both provide some level of biological training as indicated in the table below, with the former providing CBRN response training. Specific details beyond this are unavailable in open-sources.

Table 6: Military Biological Facilities

Name	Location	Purpose	Agency
Escuela Militar ¹⁴³		CBRN response and general military force training	Military; Army
Hospital Militar de Santiago (HMS) ¹⁴⁴	Santiago, Chile	Diagnostic	Military; Army

¹⁴¹ Pontificia Universidad Católica de Chile. 2016. "Ciencias Biológicas firma convenio con Ejército para nueva etapa en investigación de vacuna contra virus sincicial." December 2. <https://www.uc.cl/noticias/ciencias-biologicas-firma-convenio-con-ejercito-para-nueva-etapa-en-investigacion-de-vacuna-contra-virus-sincicial/>.

¹⁴² Pontificia Universidad Católica de Chile. 2016. "Ciencias Biológicas firma convenio con Ejército para nueva etapa en investigación de vacuna contra virus sincicial." 2016. <https://www.uc.cl/noticias/ciencias-biologicas-firma-convenio-con-ejercito-para-nueva-etapa-en-investigacion-de-vacuna-contra-virus-sincicial/>.

¹⁴³ Ejército de Chile. 2015. "Escuela Militar Destaca En Competencia De Patrullas "sandhurst" De Ee.uu." April 13. <https://www.ejercito.cl/prensa/visor/escuela-militar-destaca-en-competencia-de-patrullas-sandhurst-de-ee-uu>.

¹⁴⁴ Ejército de Chile. 2015. "Santiago Military Hospital Inaugural Modern Biological Platform." July 14. <https://www.ejercito.cl/prensa/visor/hospital-militar-de-santiago-inauguro-moderna-plataforma-biologica>. This same facility is supporting RSV vaccine research with the Faculty of Biological Sciences at the Pontificia Universidad Católica de Chile. See: Pontificia Universidad Católica de Chile. 2016. "Ciencias Biológicas firma convenio con Ejército para nueva etapa en investigación de vacuna contra virus sincicial." 2016. <https://www.uc.cl/noticias/ciencias-biologicas-firma-convenio-con-ejercito-para-nueva-etapa-en-investigacion-de-vacuna-contra-virus-sincicial/>.

Civilian Biological Infrastructure

Research Facilities

Official

Chile has numerous civilian and non-military government owned or operated biological research facilities and institutes, housed at and in partnership with major universities and their sciences departments. The premiere official research institution in Chile is the National and Reference Biomedical Laboratory housed at the Instituto de Salud Pública (ISP), also described previously in the “Socioeconomic Environment – Public Health” section of this report. This National and Reference Biomedical Laboratory serves as Chile’s national biological reference and diagnostic laboratory, disease surveillance body, and international collaborator with the World Health Organization (WHO).

A second premiere national agency overseeing critical laboratories is the Servicio Agrícola y Ganadero (SAG), the national agency in charge of agriculture, livestock, forestry, and food and medicine safety.

Table 7: Official Research Facilities

Name	Location	Purpose	Agency
National and Reference Biomedical Laboratory ¹⁴⁵	Santiago, Chile	National reference body; Disease surveillance	Instituto de Salud Pública (ISP)
Servicio Agrícola y Ganadero (SAG) ¹⁴⁶	Santiago, Chile	National agency overseeing livestock, agriculture, forests, and food, animal and human health and medicine safety	Servicio Agrícola y Ganadero (SAG)
Instituto Forestal (INFOR) ¹⁴⁷	Santiago, Chile	Technical research institute	Ministerio de Agricultura
Faculty of Veterinary and Animal Sciences	Santiago, Chile		University of Chile
Centro de Diagnóstico de Enfermedades Aviares ¹⁴⁸	Santiago, Chile	Diagnostic; Research	University of Chile
Centro de Gestión Ambiental y Biodiversidad ¹⁴⁹	Santiago, Chile	Research; Response partnership	University of Chile
National Research and Development Agency ¹⁵⁰	Santiago, Chile		
El Departamento de Laboratorios Clínicos ¹⁵¹	Santiago, Chile	Public university; research, training, education/teaching; Also directs the laboratories of the UC-CHRISTUS Health Network	Pontificia Universidad Católica de Chile

¹⁴⁵ Instituto de Salud Pública (ISP). “Laboratorio Biomédicos.” <https://www.ispch.gob.cl/biomedico/>.

¹⁴⁶ SAG oversees and runs 16 laboratories and quarantine stations across Chile. For more information on these laboratories, please see: Servicio Agrícola y Ganadero (SAG). “Red Laboratorios.” <https://www.sag.gob.cl/content/red-laboratorios>. For information about SAG, see: Servicio Agrícola y Ganadero (SAG). “¿Qué es y qué hace el SAG?” <https://www.sag.gob.cl/quienes-somos/que-es-y-que-hace-el-sag>.

¹⁴⁷ Translated to English, it is: The Forestry Institute. See: Instituto Forestal. “¿Quiénes Somos?” <https://www.infor.cl/index.php/about-us/somos-infor>.

¹⁴⁸ Translated to English, it is: Avian Disease Diagnostic Center. It also serves as the reference laboratory for all avian diseases that are mandatory by the state to report (cases). See: Universidad de Chile. Facultad de Ciencias Veterinarias y Pecuarias. “Centro de Diagnóstico de Enfermedades Aviares.” <http://www.veterinaria.uchile.cl/facultad/centros/centro-de-diagnostico-de-enfermedades-aviares>.

¹⁴⁹ Translated to English, it is: Center for Environmental Management and Biodiversity.

¹⁵⁰ Formerly known as CONICYT; name changed in 2020. See: Agencia Nacional de Investigación y Desarrollo. “Agencia Nacional de Investigación y Desarrollo es la sucesora de CONICYT.” <https://www.anid.cl/blog/2020/01/14/agencia-nacional-de-investigacion-y-desarrollo-es-la-sucesora-de-conicyt/>.

¹⁵¹ Pontificia Universidad Católica de Chile. “Escuela de Medicina.” <https://medicina.uc.cl/divisiones/imagenes-laboratorios-y-patologias/laboratorio-clinico/>.

Name	Location	Purpose	Agency
UC CHRISTUS Health Network ¹⁵²	Santiago, Chile	Research and clinical services	Private; Collaborations with Pontificia Universidad Católica de Chile
El Instituto de Ingeniería Biológica y Médica ¹⁵³	Santiago, Chile	Research	Pontificia Universidad Católica de Chile
The Millennium Institute on Immunology and Immunotherapy ¹⁵⁴ El Instituto Milenio en Inmunología e Inmunoterapia, IMII	Santiago, Chile	Research consortium of Pontificia Universidad Católica de Chile, Universidad de Chile, and Universidad Andres Bello on basic (and applied) research in immunology and immunological therapies	
Biomedical Research Consortium-Chile ¹⁵⁵	Santiago, Chile	Research consortium between the Pontificia Universidad Católica de Chile and Abbott; (basic and applied), industry	
Hospital San Juan de Dios - CDT ¹⁵⁶	Santiago, Chile	Research; Development; Innovation; Hospital	
School of Biochemical Engineering ¹⁵⁷	Valparaíso, Chile		Pontificia Universidad Católica de Valparaíso, Chile
Institute of Biology PUCV ¹⁵⁸	Valparaíso, Chile	Research, teaching and education (immunology, pathogens, agriculture, etc.)	Pontificia Universidad Católica de Valparaíso, Chile
Laboratorio de Verificación y de Referencia Nacional y	Valparaíso, Chile	Research and national reference laboratory consortium for fish	Pontificia Universidad Católica de Valparaíso, Chile

¹⁵² Also referred to as: Red de Salud, UC CHRISTUS. See: UC CHRISTUS. 2022. “¿Quiénes somos?” <https://www.ucchristus.cl/>. For information on their clinical laboratories, please see their webpage: UC CHRISTUS. 2022. “Laboratorio Clínico.” <https://www.ucchristus.cl/examenes-y-procedimientos/laboratorio-clinico/sobre-el-laboratorio/laboratorios>.

¹⁵³ Pontificia Universidad Católica de Chile. Instituto de Ingeniería Biológica y Médica. “El Instituto.” <https://ingenieriabiologicaymedica.uc.cl/es/>.

¹⁵⁴ Millennium Institute on Immunology and Immunotherapy. 2022. “About Us.” <https://www.imii.cl/en/quienes-somos/>.

¹⁵⁵ BMRC Chile, Biomedical Research Consortium. “Background.” <https://www.bmrc.cl/en/about-us>. For information on their lines of research, please see: BMRC Chile, Biomedical Research Consortium. “Research Lines.” <https://www.bmrc.cl/en/lineas-de-investigacion-en>.

¹⁵⁶ Hospital San Juan Dios – CDT. 2017. “Dependencias – CDT.” <http://www.hsjd.cl/web/quienes-somos-cdt/#>

¹⁵⁷ Pontificia Universidad Católica de Valparaíso (PUCV). “Escuela de Ingeniería Bioquímica.” <https://www.pucv.cl/pucv/pregrado/escuela-de-ingenieria-bioquimica>.

¹⁵⁸ Pontificia Universidad Católica de Valparaíso (PUCV). Instituto de Biología PUCV. “Áreas de Investigación.” <https://www.pucv.cl/uuaa/instituto-de-biologia/areas-de-investigacion>

Name	Location	Purpose	Agency
Diagnóstico del Virus ISA en Peces Salmonídeos ¹⁵⁹		(salmonid) pathogens in partnership with Laboratory of Genetics and Molecular Immunology (GIM)	
Fundación Ciencia & Vida, Molecular Virology Laboratory ¹⁶⁰	Santiago, Chile	Research and training; research on hantavirus	
Facultad de Medicina y Ciencia ¹⁶¹	Santiago, Chile	Research, training, education, public university	Universidad San Sebastián
Bioquímica, Facultad de Medicina y Ciencia ¹⁶²	Santiago, Chile	Research, education, training on disease and biochemistry	Universidad San Sebastián
School of Chemistry and Pharmacology ¹⁶³	Santiago, Chile	Research	Universidad San Sebastián
Medicina Veterinaria ¹⁶⁴	Santiago, Concepción and Patagonia, Chile	Research, education, training	Universidad San Sebastián
Facultad de Ingeniería y Tecnología ¹⁶⁵	Santiago, Chile	Research, development; Partnership with the Veterinary Medicine program to research and	Universidad San Sebastián

¹⁵⁹ Translated to English, it is: Laboratory for Verification and National Reference and Diagnosis of the ISA Virus in Salmonid Fish. Pontificia Universidad Católica de Valparaíso (PUCV). “Centros y Laboratorios.” https://www.pucv.cl/pucv/investigacion-e-innovacion/centros-y-laboratorios/centros-y-laboratorios#vtxt_cuerpo_T9.

¹⁶⁰ Fundación Ciencia y Vida. “Molecular Virology.” <https://cienciavida.org/research/molecular-virology/>. This lab focuses much of its research on addressing hantavirus and has numerous international partners. One example of their published research on hantavirus: Serris, Alexandra, et al. 2020. “The Hantavirus Surface Glycoprotein Lattice and Its Fusion Control Mechanism.” *Cell* 183:442-456. doi: 10.1016/j.cell.2020.08.023.

¹⁶¹ Translated to English, it is: School of Medicine and Science. See: Universidad San Sebastian. “Facultad de Medicina y Ciencia.” <https://www.uss.cl/facultades-y-carreras/medicina-ciencia/>. Also see: Universidad San Sebastian. “Doctorado en Biología Celular y Biomedicina de la Facultad de Medicina y Ciencia.” <https://doctoradobiologiacb.uss.cl/#:~:text=El%20programa%20de%20doctorado%20en%20Biolog%C3%ADa%20Celular%20y%20Biomedicina%20tiene,y%20los%20posibles%20blancos%20de>.

¹⁶² Translated to English, it is: Biochemistry, School of Medicine and Science. See: Universidad San Sebastian. “Bioquímica.” <https://www.uss.cl/facultades-y-carreras/medicina-ciencia/bioquimica/>. An example of current joint research and project conducted by this unit: Universidad San Sebastian. Instituto de Políticas Públicas en Salud. 2021. “Desarrollan nuevo medicamento para combatir el COVID-19.” November 22. <https://www.ipsuss.cl/ipsuss/investigacion/desarrollan-nuevo-medicamento-para-combatir-el-covid-19/2022-01-05/142702.html>.

¹⁶³ Universidad San Sebastian. Instituto de Políticas Públicas en Salud. 2021. “Desarrollan nuevo medicamento para combatir el COVID-19.” November 22. <https://www.ipsuss.cl/ipsuss/investigacion/desarrollan-nuevo-medicamento-para-combatir-el-covid-19/2022-01-05/142702.html>.

¹⁶⁴ Translated in English, it is: Veterinary Medicine. See: Universidad San Sebastian. “Medicina Veterinaria.” <https://www.uss.cl/facultades-y-carreras/ciencias-naturaleza/medicina-veterinaria/>.

¹⁶⁵ Translated to English, it is: Faculty (School) of Engineering and Technology. See: Universidad San Sebastian. Instituto de Políticas Públicas en Salud. 2021. “Dispositivo nanotecnológico permitirá diagnóstico rápido de tuberculosis bovina.” July 6. <https://www.ipsuss.cl/ipsuss/investigacion/dispositivo-nanotecnologico-permitira-diagnostico-rapido-de-tuberculosis/2021-07-02/202515.html>.

Name	Location	Purpose	Agency
		develop bovine tuberculosis therapeutics and therapeutic delivery systems ¹⁶⁶ and studying antimicrobial resistance ¹⁶⁷	
Laboratorio de Genética y Genómica Aplicada, Escuela de Ciencias del Mar ¹⁶⁸	Valparaíso, Chile	Research, marine biology	Pontificia Universidad Católica de Valparaíso, Chile
Grupo de Marcadores Inmunológicos en Organismos Acuáticos, Instituto de Biología ¹⁶⁹	Valparaíso, Chile	Research, marine biology, immunology	Pontificia Universidad Católica de Valparaíso, Chile
Centro de Investigación y Gestión de Recursos Naturales (CIGREN), Instituto de Biología, Facultad de Ciencias ¹⁷⁰	Valparaíso, Chile	Research on aquatic and terrestrial ecosystems	Universidad de Valparaíso
Centro de Investigaciones Biomédicas (CIB) ¹⁷¹	Valparaíso, Chile	Research (basic and applied) and development	Universidad de Valparaíso

¹⁶⁶ Universidad San Sebastian. Instituto de Políticas Públicas en Salud. 2021. “Dispositivo nanotecnológico permitirá diagnóstico rápido de tuberculosis bovina.” July 6. <https://www.ipsuss.cl/ipsuss/investigacion/dispositivo-nanotecnologico-permitira-diagnostico-rapido-de-tuberculosis/2021-07-02/202515.html>

¹⁶⁷ Instituto de Políticas Públicas en Salud. 2021. “Académicos proponen medidas para mejorar trazabilidad de antibióticos en la leche.” August 30. <https://www.ipsuss.cl/ipsuss/investigacion/academicos-proponen-medidas-para-mejorar-trazabilidad-de-antibioticos-en/2021-08-30/111152.html>.

¹⁶⁸ For an example of joint research being conducted involving this laboratory, see: Figueroa, Carolina, et al. 2022. “Commercial Vaccines Do Not Confer Protection against Two Genogroups of *Piscirickettsia salmonis*, LF-89 and EM-90, in Atlantic Salmon.” *Biology* 11: 993. doi: <https://doi.org/10.3390/biology11070993>; For information on the Escuela de Ciencias del Mar, please see their main webpage: Pontificia Universidad Católica de Valparaíso, Chile. “Escuela de Ciencias del Mar.” <https://www.cienciasdelmar.pucv.cl/>.

¹⁶⁹ Examples of joint research being conducted involving this institute, please see: Figueroa, Carolina, et al. 2022. “Commercial Vaccines Do Not Confer Protection against Two Genogroups of *Piscirickettsia salmonis*, LF-89 and EM-90, in Atlantic Salmon.” *Biology* 11: 993. doi: <https://doi.org/10.3390/biology11070993>. Also see: Gómez, Ángeles. 2021. “Molecular Markers of Innate Immunity in *Salmo salar* Naturally Infected by *P. salmonis*. Luis Mercado Seminar.” IDiBE Universitat Miguel Hernández. <https://idibe.umh.es/inmunidad-innata-en-salmo-salar-p-salmonis-luis-mercado/>.

¹⁷⁰ Figueroa, Carolina, et al. 2022. “Commercial Vaccines Do Not Confer Protection against Two Genogroups of *Piscirickettsia salmonis*, LF-89 and EM-90, in Atlantic Salmon.” *Biology* 11: 993. doi: <https://doi.org/10.3390/biology11070993>; Universidad de Valparaíso, Chile. 2022. “Centro de Investigación y Gestión de Recursos Naturales (CIGREN).” <https://investigacion.uv.cl/2017/09/30/centro-de-investigacion-y-gestion-de-recursos-naturales-cigren/>. Additional resources on researcher centers available at Universidad de Valparaíso, please see: Universidad de Valparaíso, Chile. 2022. “Centros UV.” <https://investigacion.uv.cl/investigacion-asociativa/centros-uv/>.

¹⁷¹ Translated to English, it is: Biomedical Research Center. Universidad de Valparaíso, Chile. 2022. “Centro de Investigaciones Biomédicas (CIB).” <https://investigacion.uv.cl/2017/09/30/centro-de-investigaciones-biomedicas-cib/>.

Name	Location	Purpose	Agency
Centro de Micro-Bioinnovación (CMBi) 172	Valparaíso, Chile	Research, bacteriology, and microbiota	Universidad de Valparaíso
Laboratorio Bioensayos y Limnología Aplicada 173	Valdivia, Chile	Research on aquaculture contaminants	Instituto de Ciencias Marinas y Limnológicas (ICML), Universidad Austral de Chile
Genetics Laboratory ¹⁷⁴	Valdivia, Chile	Research on genomics in aquaculture	Instituto de Ciencias Marinas y Limnológicas (ICML), Universidad Austral de Chile
Laboratorio Ecología de Mamíferos Marinos ¹⁷⁵	Valdivia, Chile	Research on marine mammal ecology and potential threats to their ecosystems	Instituto de Ciencias Marinas y Limnológicas (ICML), Universidad Austral de Chile
Centro de Bioinformática y Simulación Molecular (CBSM) ¹⁷⁶	Talca, Chile	Research, education	Universidad de Talca
Laboratorio de Ingeniería de Proteínas y Microscopia, Facultad de Ingeniería ¹⁷⁷	Talca, Chile	Research, education, training	Universidad de Talca
Centro de Mejoramiento Genético y Fenómica Vegetal ¹⁷⁸	Talca, Chile	Research, education	Universidad de Talca

¹⁷² Translated to English, it is: Micro-Bioinnovation Center. Universidad de Valparaíso, Chile. 2022. Centro de Investigaciones Biomédicas (CIB).” <https://investigacion.uv.cl/2017/09/30/centro-de-micro-bioinnovacion-cmbi/>.

¹⁷³ Universidad Austral de Chile. Instituto de Ciencias Marinas y Limnológicas (ICML). “Laboratorio Bioensayos y Limnología Aplicada.” <https://www.icml.uach.cl/infraestructura/laboratorio-bioensayos-limnologia-aplicada.php>

¹⁷⁴ Universidad Austral de Chile. Instituto de Ciencias Marinas y Limnológicas (ICML). “Laboratorio Genética.” <https://www.icml.uach.cl/infraestructura/laboratorio-genetica.php>

¹⁷⁵ Universidad Austral de Chile. Instituto de Ciencias Marinas y Limnológicas (ICML). “Laboratorio Ecología de Mamíferos Marinos.” <https://www.icml.uach.cl/infraestructura/laboratorio-ecologia-de-mamiferos-marinos.php>

¹⁷⁶ Translated to English, it is: Center for Bioinformatics and Molecular Simulation (CBSM). Universidad de Talca. Facultad de Ingeniería. “Centro de Bioinformática y Simulación Molecular (CBSM).” <http://www.ingenieria.otalca.cl/cbsm>

¹⁷⁷ Translated to English, it is: Laboratory of Protein Engineering and Microscopy, of the School of Engineering. Universidad de Talca. Facultad de Ingeniería. “Laboratorio de Ingeniería de Proteínas y Microscopia.” <https://www.ingenieria.otalca.cl/Recurso/Detalles/73>.

¹⁷⁸ Translated to English, it is: Plant Genetic and Phenomic Improvement Center. Universidad de Talca. 2015. “Centro de Mejoramiento Genético y Fenómica Vegetal: Presentación.”

Name	Location	Purpose	Agency
Centro de Ciencia e Innovación en Biotecnología Vegetal (ceCIBUC), Facultades de Agronomía e Ingeniería Forestal y de Ciencias Biológicas ¹⁷⁹	Santiago, Chile	Research, education, training,	Pontificia Universidad Católica de Chile

http://www.fenomica.otalca.cl/html/quienes_somos/presentacion.html.

¹⁷⁹ Translated to English, it is: Center for Science and Innovation in Plant Biotechnology (ceCIBUC), of the Faculties (Schools) of Agronomy and Forest Engineering and Biological Sciences. Pontificia Universidad Católica de Chile. Facultades de Agronomía e Ingeniería Forestal. 2022. "ceCIBUC: Quienes Somos." <https://agronomia.uc.cl/centros-unidades-y-laboratorios/cecibuc>.

Commercial

Chile’s commercial biological research infrastructure appears to center around aquaculture and diseases that affect aquaculture and fish populations, in collaboration with international research organizations and consortiums, and Chilean universities. Other aspects of Chile’s commercial research infrastructure include consulting service companies aiding research laboratories and hospitals on biosafety standards, such as Bioseguridad Chile (BSC).

Table 8: Commercial Research Facilities

Name	Location	Purpose	Agency
Bioseguridad Chile (BSC) ¹⁸⁰	Santiago, Chile	Consulting, training, and sale of products to clinics, clinical labs, hospitals and research laboratories on biosafety standards and risk management.	Bioseguridad Chile (BSC)
NGEN Lab ¹⁸¹		Animal health and veterinary vaccines ¹⁸²	
Blue Genomics Chile ¹⁸³	Los Lagos, Chile	Research consortium of AquaGen Chile, AquaGen Norway, Vaxxinova Norway and Biobank in aquaculture research and development	
Vaxxinova ¹⁸⁴		Research and development partnership with Blue Genomics for salmon rickettsial septicaemia (SRS) vaccine candidate ¹⁸⁵	

¹⁸⁰ BioSeguridad Chile. 2022. “Nosotros.” <https://bioseguridadchile.cl/nosotros/>. Accessed July 14, 2022

¹⁸¹ NGEN Lab. “Homepage.” <https://www.ngenlab.cl/en/home/>. Accessed July 14, 2022

¹⁸² NGEN currently has five veterinary vaccine candidates as varying stages of clinical trial and development, in partnership with Cuba and Chile universities. These are listed on NGEN’s website homepage, under “Product Palette.” See: NGEN Lab. “Homepage.” <https://www.ngenlab.cl/en/home/>. Accessed July 14, 2022.

¹⁸³ Blue Genomics Chile. <https://www.linkedin.com/company/blue-genomics-chile>. Information on the joint research conducted by this consortium, see the following sources: Gobierno de Chile. Ministerio de Agricultura. 2022. “Conformación del Consorcio Blue Genomics Chile, Orientado al Desarrollo de Productos y Servicios Innovadores para la Industria Acuícola Chilena, a Partir de Herramientas de Genómica.” Observatorio para la Innovación Silvoagropecuaria y la Cadena Agroalimentaria. <https://opia.fia.cl/601/w3-article-4498.html>; AquaGen. 2021. “Blue Genomics, AquaGen y la Universidad de Chile estudian cinética de la infestación del piojo de mar en trucha arcoíris, salmón del Atlántico y salmón Coho.” January 15. <https://aquagen.cl/2021/01/15/blue-genomics-aquagen-y-la-universidad-de-chile-estudian-cinetica-de-la-infestacion-del-piojo-de-mar-en-trucha-arcoiris-salmon-del-atlantico-y-salmon-coho/>; Fish Information and Services (FIS). 2017. “Ovas de salmón coho resistentes al SRS ayudarán a reducir uso de antibióticos.” <https://seafood.media/fis/worldnews/worldnews.asp?l=s&id=92534&ndb=1>.

¹⁸⁴ Vaxxinova is a large multinational biotechnology company with operations in Chile. See: Vaxxinova. 2022. “Vaxxinova Aqua Business Unit Announces Technical and Commercial Director for Vaxxinova Chile.” April 1. <https://vaxxinova.com/vaxxinova-aqua-business-unit-announces-technical-and-commercial-director-for-vaxxinova-chile/>.

¹⁸⁵ Soto, Francisco. 2022. “New Live Vaccine Announced to Control SRS.” Fish Farming Expert, Norway, July 4. <https://www.fishfarmingexpert.com/article/new-live-vaccine-announced-to-control-srs/>.

Name	Location	Purpose	Agency
Instituto de Inverstigaciones Agropescuarias (INIA) ¹⁸⁶		Non-profit research consortium of INDAP ¹⁸⁷ , CORFO ¹⁸⁸ , Universidad de Chile, Pontificia Universidad Católica de Chile and Universidad de Concepción in agro-food development. ¹⁸⁹	Ministerio de Agricultura de Chile
IEB ¹⁹⁰		Research (basic and applied) on biodiversity and ecology	
Fundacion para la Innovacion Agraria (FIA) ¹⁹¹		Consulting, training, and innovation in the agriculture and forestry sectors	Ministerio de Agricultura de Chile
Algenis ¹⁹²	Santiago, Chile	Bioactive marine molecules for medical use ¹⁹³	
BioinGentech ¹⁹⁴	Santiago, Chile	PCR test diagnosis lab	Instituto de Salud Pública (ISP)

Production Facilities

Historically, the Chilean state took an active role in the creation and maintenance of facilities for domestic vaccine production.¹⁹⁵ Following the establishment of the Pinochet regime in 1973, vaccine production was suspended and institutes formerly responsible for producing vaccines were consolidated, and subsequently provided with limited resources and bare minimum state funding. Following the restoration of democratic government in 1990, efforts

¹⁸⁶ Translated to English, it is: Agricultural Research Institute (INIA). Ministerio de Agricultura. 2022. “Quiénes Somos.” Instituto de Investigaciones Agropecuarias. <https://www.inia.cl/nosotros/quienes-somos/>. Also see: Ministerio de Agricultura. 2022. “Categoría, INIA Quilamapu.” Instituto de Investigaciones Agropecuarias. <https://web.inia.cl/blog/category/inia-quilamapu/page/26/>.

¹⁸⁷ Ministerio de Agricultura. INDAP. “¿Qué es INDAP?” <http://www.indap.gob.cl/que-es-indap>

¹⁸⁸ Translated to English, it is: Production Development Corporation, which is a national agency connected with the Ministry of Agriculture that helps finance agriculture innovations. For more information, see: Ministerio de Agricultura. “Corporación de Fomento de la Producción.” <https://www.minagri.gob.cl/institucion/corfo/>.

¹⁸⁹ INIA runs a plethora of agriculture, virology and ecology laboratories, listed here: Ministerio de Agricultura. 2022. “Laboratorios.” Insitito de Investigaciones Agropecuarias. <https://www.inia.cl/productos-y-servicios-2/servicios/laboratorios/>. For description of INIA’s products and service, please see: Ministerio de Agricultura. 2022. “Productos y Servicios.” Insitito de Investigaciones Agropecuarias. <https://www.inia.cl/productos-y-servicios-2/>.

¹⁹⁰ Instituto de Ecología y Biodiversidad (IEB). “¿Qué es el IEB?” <https://ieb-chile.cl/equipo-ieb/>

¹⁹¹ Translated to English, it is: Foundation of Agriculture Innovation, which is the innovation agency hub for forestry and agriculture in the Ministry of Agriculture. See: Ministerio de Agricultura. 2022. “Sobre FIA.” <http://www.fia.cl/sobre-fia/>.

¹⁹² 2023. “Algenis Overview.” Pitchbook. <https://pitchbook.com/profiles/company/172559-44#overview>. Algenis’ main webpage does not appear to be accessible, despite it being cited and public. Initial source consulted (no longer active) is: Algenis. <http://www.algenis.com/estudios-clinicos/>.

¹⁹³ This company is also a production company.

¹⁹⁴ BioinGentech. “Homepage.” Last modified 2022. <https://www.bioingentech.cl/>.

¹⁹⁵ Ibarra M., Cecilia and Mirtha Parada V. 2020. “Producción de sueros y vacunas en Chile, la importancia del abastecimiento local.” *Revista chilena de infectología*. 418-419. doi: <http://dx.doi.org/10.4067/S0716-10182020000400413>.

were made to restore vaccine production, with some success. However, these efforts effectively ended in 2002 in the face of limited resources to provide funding in comparison to the extensive necessary upgrades, and as a result all vaccine production facilities were closed permanently, with their vaccine and medicine sanitary registrations not renewed.¹⁹⁶ Beginning in 2019, the ongoing COVID-19 pandemic spurred again the government to examine reestablishing a domestic vaccine production capability, and as such, Chile has partnered with China in building a fill-and-finish vaccine production plant for China's Sinovac COVID-19 vaccine that, when operational, will service not only Chile but also Latin America.

Chile has a variety of civilian and non-military government owned production facilities ranging in focus from cancer and diabetes medication to phage therapy products and agriculture and veterinary vaccine production.

Human

Chile produces a number of human biomedical therapies and related products. With the University of Maryland's Center for Vaccine Development and Global Health (CVD), Chile produces and researches typhoid vaccines. They also work with the United States' Desert King International to produce saponin products that are used as foaming agents and reagents in vaccines. Bertos Biotech is also an important producer of hantavirus vaccines. Nutrix and Grünenthal (Switzerland and Germany, respectively) also have production plants in Chile, producing diabetes management devices and hormone therapies, respectively.

Veterinary

Given the importance of agriculture, aquaculture and livestock exports to Chile's economy, Chile has numerous production companies that focus on veterinary medical products, services, therapeutics, and vaccines. These include the Facultad de Ciencias Veterinarias. Historically, the Julio Besnard Animal Vaccine Institute (IVA-JB) produced veterinary vaccines in addition to human vaccines. An additional vaccine production agency was established in 1892 called the Institute of Hygiene (IH) that performed complementary duties of the IVA-JB and became the ancestor institute to a long line of vaccine and therapeutics production institutes run by the government of Chile. In time, IH became the Instituto Bacteriológico (IB) in 1929.¹⁹⁷ IB served as a crucial production facility that

¹⁹⁶ Ibarra M., Cecilia and Mirtha Parada V. 2020. "Producción de sueros y vacunas en Chile, la importancia del abastecimiento local." *Revista chilena de infectología*. 418-419. DOI: <http://dx.doi.org/10.4067/S0716-10182020000400413>. See also the "Internal Research Partnerships - Veterinary" subsection of this report.

¹⁹⁷ It is unclear if the IVA-JB also ceased to exist when IH was created. In records compiled by Ibarra et al. 2020 study indicate that smallpox and rabies vaccine production concluded in 1929 at IVA-JB and began in 1929 at IH when IH was created. See Tables 1 and 2 (pages 415-417) of: Ibarra M., Cecilia and Mirtha Parada V. 2020. "Producción de sueros y vacunas en Chile, la importancia del abastecimiento local." *Revista chilena de*

produced numerous other vaccines, including those protecting against diphtheria and pertussis (whooping cough),¹⁹⁸ and also exported these vaccines to other Latin American countries. In 1979 IB morphed into the Institute of Public Health (Instituto de Salud Pública - ISP), becoming the regulatory and reference body of the state. The vaccine production role effectively ceased in 2005 while the organization continued to perform regulatory role (ISP is discussed earlier in the "Socioeconomic Environment – Public Health" section of this report).¹⁹⁹

Table 9: Civilian Biological Production Facilities

Name	Location	Purpose	Agency
Facultad de Ciencias Veterinarias ²⁰⁰	Chillán, Chile	Veterinary vaccine production; Clinical laboratory and services;	Universidad de Concepción
Universidad Católica	Chile	Sinovac COVID-19 vaccine production (fill and finish) ²⁰¹	Sinovac; China
Center for Vaccine Development (CVD), University of Maryland ²⁰²	Santiago, Chile	Typhoid Vaccine production and research	USA

infectologia, 37:413-421. doi: <http://dx.doi.org/10.4067/S0716-10182020000400413>.

¹⁹⁸ Although historical records on these facilities are incomplete and rare, Ibarra et al. produced a 2020 study compiling existing records. In addition, a series of interviews were conducted with former personnel. The extensive list of domestic vaccines produced from 1887 to 2005 can be found in Tables 1 (page 415) and 2 (pages 416-417). See: Ibarra M., Cecilia and Mirtha Parada V. 2020. "Producción de sueros y vacunas en Chile, la importancia del abastecimiento local." *Revista chilena de infectologia*, 37:413-421. doi: <http://dx.doi.org/10.4067/S0716-10182020000400413>.

¹⁹⁹ Ibarra et al. 2020. Pages 417-418. doi: <http://dx.doi.org/10.4067/S0716-10182020000400413>.

²⁰⁰ Reports suggest vaccine capability for the last ten years at the Faculty of Veterinary Sciences at Universidad de Concepción, including a recent project prototyping an injectable vaccine for *Lawsonia intracellularis* that affects pigs. Despite searching the University website page for any details on vaccine production, this claim could not be readily verified. Faculty of Veterinary Sciences at Universidad de Concepción webpage, "Servicios": <http://www.veterinariaudec.cl/sitio/index.php/servicios/#toggle-id-3>. Reporting claiming production capability. Reporting of vaccine capability: Rotecna. 2022. "The University of Concepción (Chile) Works on the Development of a Vaccine Against Lawsonia." *Rotecna Blog*, February 3. <https://www.rotecna.com/en/blog/the-university-of-concepcin-chile-works-on-the-development-of-a-vaccine-against-lawsonia/>.

²⁰¹ 2021. "Sinovac Announces That It Will Set Up a Vaccine Plant in Chile." *InvestChile Blog*, August 5. <https://investchile.gob.cl/sinovac-announces-that-it-will-set-up-a-vaccine-plant-in-chile/>; Additional sources reporting this vaccine plant development, see: "Coronavirus: China's Sinovac Investing US\$60 million in Chile Vaccine Facility." 2021. *South China Morning Post*, August 5. <https://www.scmp.com/news/world/americas/article/3143853/coronavirus-chinas-sinovac-investing-us60-million-chile-vaccine>; Gobierno de Chile. 2021. "Health Minister Praises Chinese Sinovac Laboratory's Decision to Set Up Vaccine Plant in Chile." <https://www.gob.cl/en/news/health-minister-praises-chinese-sinovac-laboratorys-decision-to-set-up-vaccine-plant-in-chile/>

²⁰² University of Maryland, School of Medicine. Center for Vaccine Development and Global Health. "Vaccine Development: Santiago, Chile." <https://www.medschool.umaryland.edu/CVD/Vaccines/Locations/Santiago-Chile/>

Name	Location	Purpose	Agency
Salmones Camanchaca ²⁰³	Puerto Montt, Chile	Salmon farming and production	
BioBichos ²⁰⁴	Chillán, Chile	Pest control and crop protection products and services	
Bertos Biotech, Centro de Biotecnología y Biomedicina (CBB)	Concepción, Coyhaique, and Chillán, Chile	Biomedical products and veterinary vaccines ²⁰⁵	
Instacrops ²⁰⁶	Santiago, Chile	Agriculture technology production and consulting; biotech startup	
Nutrix ²⁰⁷	Santiago, Chile	Diabetes management device and technology ²⁰⁸	Switzerland; Chile
Grünenthal ²⁰⁹	Santiago, Chile	Hormone therapy production	Germany; Chile
PHaGELab / Phage Technologies ²¹⁰	Santiago, Chile	Phage therapy production for aquaculture, livestock, swine and poultry	
Andes Biotechnologies ²¹¹	Santiago, Chile	Cancer drug development ²¹²	
Desert King International (DKI) ²¹³	Quilpué, Chile	Saponin product production ²¹⁴	USA

²⁰³ Salmones Camanchaca. 2020. "La Empresa." <https://salmonescamanchaca.cl/la-empresa/>. Salmones Camanchaca has partnered with the Pontificia Universidad Católica de Valparaíso, Chile and University of Waterloo, Canada as fish supplier for their recent fish vaccine study. See: Figueroa, Carolina et al. 2022. "Commercial Vaccines Do Not Confer Protection Against Two Genogroups of *Piscirickettsia salmonis*, LF-89 and EM-90, in Atlantic Salmon." *Biology* 11 993. doi: <https://doi.org/10.3390/biology11070993>. <https://www.mdpi.com/2079-7737/11/7/993>.

²⁰⁴ BioBichos. 2019. "Empresa". <https://biobichos.cl/index.php/es/empresa>.

²⁰⁵ Bertos Biotech's CBB has several vaccines, recombinant proteins and molecules, and biomedical products in various stages of development, such as a hantavirus vaccine, as indicated on their products website: Bertos Biotech, CBB. "Hantavirus Vaccine." *Bertos Biotech, CBB blog*. <https://www.bertosbiotech.com/en/projects/>.

²⁰⁶ Instacrops. "Who We Are." Accessed July 2022. <https://www.instacrops.com/en/home/>. Bertos Biotech also has offices in Colombia and Mexico.

²⁰⁷ Nutrix. "Homepage." Accessed July 2022. <https://nutrix.tech/>

²⁰⁸ This technology and device platform is called gSense that Nutrix offers via device and remote control and assistance of diabetes. See: Nutrix. "gSense." <https://gsense.club/>.

²⁰⁹ Grünenthal Pro. 2022. "Production Site Chile." <https://www.grunenthal-pro.com/our-sites/chile>.

²¹⁰ The company is referenced by both names separately in the following sources: Phage Lab. "Lab." Accessed July 2022. <https://phage-lab.com/lab/>; "Chilean Phage Technologies realiza segunda ronda de inversion." 2021. LexLatin, July 21. <https://lexlatin.com/noticias/phage-technologies-segunda-ronda-inversion>; Universidad Andrés Bello. "Initiative, Entrepreneurial Portfolio Series: Phage Technologies, S.A." <https://investigacion.unab.cl/emprededor/phage-technologies/>.

²¹¹ Andres Biotechnologies. "Pipeline and Clinical Trials." <https://andesbio.com/clinical-trials-pipeline/>.

²¹² This company has a few cancer treatments at various stages of production pipeline and human clinical trials. See: Andres Biotechnologies. "Pipeline and Clinical Trials: Phase I Overview." <https://andesbio.com/clinical-trials-pipeline/>.

²¹³ Desert King International. "Homepage." Access July 2022. <https://desertking.com/about-us/>.

²¹⁴ Laing, Alslinn and Allison Martell. 2021. "A Chilean Tree Holds Hope of New Vaccines - If Supplies Last." Reuters, October 6. <https://www.reuters.com/business/healthcare-pharmaceuticals/chilean-tree-holds->

International Research Partnerships

Human

Expanded during the ongoing COVID-19 pandemic, Chile’s research and development partners include Germany as an integral partner providing technology transfer to Chile enabling development of a capacity to develop human vaccines against COVID-19. Additionally, Chile works with the United States on vaccine research against typhoid and *Haemophilus influenza* type b (Hib) in collaboration with the University of Maryland, and with Pfizer in developing cancer diagnosis technologies. Currently, Chile is also partnering with China to establish a fill-and-finish plant for China’s Sinovac COVID-19 vaccine.²¹⁵

Veterinary

Two important veterinary and wider aquaculture vaccine research partnerships exist in Chile. The first is a partnership studying potential vaccine candidates against *Lawsonia intracellularis*, a persistent disease affecting swine populations. This research is being conducted in collaboration with Chile’s Universidad de Concepción and Pontificia Universidad Católica de Valparaíso (PUVC) and Ecuador’s Universidad de las Fuerzas Armadas ESPE, Department of Life Sciences and Agriculture. The second partnership is studying pathogens that affect salmonid fish populations—salmonid fish is a major export for Chile—and salmonid genetics to leverage immunological responses and subsequent therapeutics and vaccines to protect these fish against pathogens. This research is also in collaboration between Chile’s Pontificia Universidad Católica de Valparaíso (PUVC) and National Commission for Scientific and Technological Research (CONICYT), and Sweden’s Foundation for International Cooperation in Research and Higher Education (STINT).

Table 10: International Research Partnerships

Name	Foreign Partner Org	Purpose	Foreign Partner Country
N/A	Department of Life Sciences and Agriculture, Universidad de las Fuerzas Armadas ESPE	Veterinary vaccine research ²¹⁶	Ecuador

hope-new-vaccines-if-supplies-last-2021-10-06/.

²¹⁵ Cambero, Fabian. 2021. “China’s Sinovac to Invest \$60 million in Vaccine Facility in Chile.” Reuters, August 4. <https://www.reuters.com/article/us-health-coronavirus-chile-sinovac-biot/chinas-sinovac-to-invest-60-million-in-vaccine-facility-in-chile-idUSKBN2F51YJ>.

²¹⁶ Universidad de las Fuerzas Armadas ESPE (Ecuador) partnered to further develop and research a vaccine candidate for *Lawsonia intracellularis* in a joint study conducted by the Biotechnology and Biopharmaceuticals Laboratory and the Recombinant Biopharmaceuticals Laboratory of the Universidad de Concepción, and School of Biochemical Engineering, Pontificia Universidad Católica de Valparaíso, Chile. Salazar, S. et al. 2021. “Establishment of a Production Process for a Novel Vaccine Candidate Against *Lawsonia intracellularis*.” *Electronic Journal of Biotechnology* 50. 45-52. <https://doi.org/10.1016/j.ejbt.2021.01.002>.

Name	Foreign Partner Org	Purpose	Foreign Partner Country
Centro del Vacunas en Desarrollo – Chile (CVD-Chile) Roberto del Rio Children’s Hospital, Chile	University of Maryland	Vaccine research and development ²¹⁷	USA
Pontificia Universidad Católica de Valparaíso (PUVC); National Commission for Scientific and Technological Research (CONICYT) (Chile)	The Swedish Foundation for International Cooperation in Research and Higher Education (STINT)	Genomic and immunological research for pathogens affecting salmonid fish populations in Chile and Sweden ²¹⁸	Sweden
Pfizer, Center of Excellence in Precision Medicine (CEPM), Santiago, Chile	Pfizer ²¹⁹	Clinical study research; Molecular cancer and oncology diagnosis and treatment technologies	USA

²¹⁷ University of Maryland’s Center for Vaccine Development and Global Health (CVD) has partnered with universities and health services in Chile since 1978 through their sister-named program CVD-Chile. Currently there is indication they are jointly working on a typhoid vaccine (project in development), and have in the past collaborated in clinical trials for *Haemophilus influenza* type b (Hib) conjugate vaccines, live oral typhoid vaccine and more. Information available about this partnership appears limited to that provided by the University of Maryland. Searching the website of Roberto del Rio Children’s Hospital did not yield any further information on this partnership. University of Maryland, School of Medicine. Center for Vaccine Development and Global Health. “Vaccine Development: Santiago, Chile.” <https://www.medschool.umaryland.edu/CVD/Vaccines/Locations/Santiago-Chile/>. Also see: University of Maryland, School of Medicine. “Center for Vaccine Development and Global Health: Overview.” <https://www.medschool.umaryland.edu/CVD/>.

²¹⁸ Pontificia Universidad Católica de Valparaíso (PUVC). 2019. “Investigadores PUCV se adjudican Proyecto Conicyt de Genómica e Inmunología de Peces en 1° convocatoria conjunta Chile-Suecia.” <https://www.pucv.cl/pucv/noticias/primera-persona/investigadores-pucv-se-adjudican-proyecto-conicyt-de-genomica-e>

²¹⁹ Pfizer has been a partner with and has offices in Chile since 1957. In 2015, Pfizer and Chile established the Center of Excellence in Precision Medicine (CEPM) in Santiago as an international collaboration center to research and develop molecular cancer treatment technologies. Pfizer. 2022. “Nuestra Historia.” <https://www.pfizer.cl/nuestro-prop%C3%B3sito/nuestra-historia>. Also see: “Industry News: Pfizer Inaugurates Center of Excellence in Precision Medicine in Chile with Strong Focus on Genomics.” 2015. Select Science, July 9. <https://www.selectscience.net/industry-news/pfizer-inaugurates-center-of-excellence-in-precision-medicine-in-chile-with-strong-focus-on-genomics/?artID=37967>.

Future Development Plans

As discussed in the “Civilian Biological Infrastructure – Production Facilities” section of this report above, Chile is laying plans to expand its domestic vaccine capability and capacity in response to the limitations that the ongoing COVID-19 pandemic has highlighted domestically and globally. Chile has established and appears to build its future vaccine development capabilities on the basis of health diplomacy and mutual agreements with international vaccine producers to jump start the process. Aside from working with China, Chile is also establishing plans with Germany’s Max Planck Society for projects to build laboratories in Chile. “As Chile currently lacks installed capacity to produce human vaccines, the [Max Planck Society of Germany] project would facilitate ‘the transfer of technology from Germany for the installation of laboratories capable of conducting research into and development and production of human viral vaccines in Chile.’”²²⁰

Assessment

Chile possesses a centralized national biological research infrastructure that conducts international and domestic research partnerships. These ties serve as important bulwarks for Chile, due to their more limited commercial research, particularly in the area of vaccine development. The COVID-19 pandemic has highlighted at the global level, and for Chile as well, the need for domestic vaccine research and production capability and capacity. Chile is engaged in ongoing efforts to expand the size and sophistication of both its biological research and its bio industrial production. These increases in activity will also increase the number of facilities and personnel working with biomaterials potentially increasing the space subject to biosecurity threats. As such, the need for effective biosecurity review, training, and enforcement will grow over time.

Legal Framework

Overview

Chile works extensively with international organizations on matters of biosecurity and is member to several key international treaties, conventions and agreements that lay at the heart of global biosecurity efforts. Chile also works extensively with the United Nations Office of Disarmament on key non-proliferation issues of weapons of mass destruction

²²⁰ Peñafiel, Juan Jorge Faundes, Andrea Lucas Garín and Gloria Lillo Ortega. 2021. “Global perspectives on Covid-19 vaccination in Chile.” Henrich Böll Stiftung, June 14. <https://eu.boell.org/en/2021/06/14/covid-19-vaccination-chile>; Also see: 2021. “Proyecto busca recuperar la capacidad de producción de vacunas en Chile.” Agenda Saludable. January 28. <https://www.elmostrador.cl/agenda-pais/2021/01/28/proyecto-busca-recuperar-la-capacidad-de-produccion-de-vacunas-en-chile/>.

(WMD) and the UN 1540 Committee to prevent use, acquisition, access and proliferation of WMD materials by non-state actors, including biological agents and related materials.

Thus, much of Chile’s domestic legal framework emphasizes supporting non-proliferation, whether through legislation against terrorism financing, illicit trade, and security of trade and maritime control. This focus is also important given that Chile is a key regional exporter of raw materials and agriculture products.

International Law relevant to Biosecurity.

Treaties, Conventions, and agreements:

Chile is a member of two key conventions and protocols relevant to biosecurity: the Biological and Toxin Weapons Convention (BWC) and the Geneva Protocol of 1925. As an active member state party to the BWC, Chile continues to partner with numerous and diverse member states to propose, co-sponsor, and submit multilateral proposals and training activities to support the advancement and fulfillment of the BWC.²²¹ Chile also provides regular (yearly) BWC Confidence Building Measures (CBMs) reports.²²² UNSCR 1540 is a crucial resolution that extend to all countries, and through efforts to support this resolution, Chile has enacted an extensive set of laws and regulations (listed below in Table 13: “Domestic Legislation” in the and discussed in the “Domestic Legislation / Regulation – Proliferation Restrictions” section of this report) to prevent non-state actors from engaging with, acquiring, and developing chemical, nuclear or biological agents or materials.

Table 11: Treaties, Conventions and agreements

Name	Signature	Ratification
Biological Weapons Convention (BWC or BTWC)	10 April 1972 ²²³	22 April 1980
Geneva Protocol of 1925	17 June 1925	2 July 1935

²²¹ In 2017, Chile’s Chamber of Deputies hosted and sponsored the “Regional Parliamentary Workshop to Promote Ratification and Implementation of the Biological and Toxin Weapons Convention” in Santiago with their Canadian government partners to help promote and expand the importance of the BWC to the Latin American context. This workshop hosted delegations from across Central and South America and the Caribbean. See: Parliamentarians for Global Action (PGA). 2017. “Regional Parliamentary Workshop to Promote Ratification and Implementation of the Biological and Toxin Weapons Convention (Santiago, Chile).” May 29. <https://www.pgaction.org/news/regional-parliamentary-workshop-santiago.html>.

²²² Although member state party Confidence Building Measure (CBM) report submissions are inaccessible to the general public, a yearly submission record is provided that shows Chile’s long-time engagement with submitting CBMs since 1996. Accessed via: BWC Electronic Confidence Building Measures Portal. United Nations Office at Geneva (UNOG). “Available Confidence Building Measures Reports – Chile.” Last modified 2022, copyright 2018. <https://bwc-ecbm.unog.ch/ar/state/chile>.

²²³ “Status of the Treaty.” Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction. United Nations Office of Disarmament Affairs. <https://treaties.unoda.org/t/bwc>

Name	Signature	Ratification
United Nations Security Council Resolution 1540 (UNSCR 1540) ²²⁴	28 April 2004	
Cartagena Protocol on Biosafety to the Convention on Biological Diversity ²²⁵	2 May 2000	
European Union (EU) – Chile Association Agreement ²²⁶	2003	2003
Australia-Chile Free Trade Agreement ²²⁷	6 March 2009 ²²⁸	

Organizations

Chile is an active member of several international organizations that work in the biosecurity space, including the World Health Organization (WHO) and its subsidiary, the Pan-American Health Organisation (PAHO), the World Organisation for Animal Health (WOAH, founded as OIE), and the Organization of American States (OAS). Additionally, Chile has long-term ties with the Proliferation Security Initiative, which helps to support existing international non-proliferation resolutions, treaties, and multilateral regimes in pre-empting interdictions of illicit WMD materials.²²⁹

Table 12: Organizations

Name
World Health Organization (WHO) / Pan-American Health Organisation (PAHO)
World Organisation for Animal Health (WOAH, founded as OIE)
Organization of American States (OAS)
Proliferation Security Initiative (PSI)

²²⁴ United Nations, Office of Disarmament Affairs. “UN Security Council Resolution 1540 (2004)”. <https://www.un.org/disarmament/wmd/sc1540/>.

²²⁵ Although this Convention and Protocol specifically support biodiversity and biosafety, there is overlap in their application to and support for biosecurity. United Nations. 2002. Cartagena Protocol on Biosafety to the Convention on Biological Diversity. https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-8-a&chapter=27&clang=_en.

²²⁶ The EU and Chile entered a free trade agreement in 2003, part of which (Chapter 6, Article 6) addresses specific sanitary and phytosanitary measures for animal, plant and related products trade, which is of biosecurity interest. European Commission. 2002. “EU-Chile Interim Trade Agreement.” https://food.ec.europa.eu/horizontal-topics/international-affairs/agreements-non-eu-countries_en. Chile specific page: European Commission. “Chile.” https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/chile_en.

²²⁷ Australia and Chile entered a free trade agreement for Chilean export of agriculture and produce products, and this agreement specifically addresses, in part, phytosanitary measures, which is of biosecurity interest. MP Forrest, John. 2008. “Supplementary Statement – Mr. John Forrest MP.” Report 95: Australia-Chile Free Trade Agreement, Committee Activities (Inquiries and Reports), October 15. Parliament of Australia, Mallee. https://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Completed_Inquiries/jsct/4june2008/report1/supplementary.

²²⁸ Government of Australia, Department of Foreign Affairs and Trade. “Australia-Chile FTA.” <https://www.dfat.gov.au/trade/agreements/in-force/acfta/Pages/australia-chile-fta>.

²²⁹ Nuclear Threat Initiative (NTI). 2022. “Proliferation Security Initiative (PSI).” <https://www.nti.org/education-center/treaties-and-regimes/proliferation-security-initiative-psi/>.

Domestic Legislation/Regulation

This section of the report details national legislative or regulatory measures addressing biosecurity considerations.

Biosecurity in Law: General

There appears to be one prevailing biosecurity regulation in Chile, entitled “Manual de Normas de Bioseguridad y Riesgos Asociados-Fondecyt-CONICYT (2018) Regulation” (or “Manual on Norms of Biosecurity and Related Risks”), published by the National Commission for Scientific and Technological Research (CONICYT). Much of this particular regulation also includes biosafety standards; however, chapter nine (9) speaks directly to biosecurity concerns of intentional release or exposure of biological materials. This regulation also presents a breadth of requirements for laboratories and biological research centers, what is expected in terms of training, equipment, facility design, leadership responsibilities.²³⁰

Proliferation restrictions

The Republic of Chile has established a lengthy list of regulations, laws, decrees, etc. that provide avenues of response to proliferation issues of biological materials, namely through customs, import, transport, and health sanitary codes. Of note, the first three legislative works in the table below specifically address these issues. The first, Decree No. 385 of 5 May 1980, enacts the BWC (or BTWC) treaty within Chile. The second, Supreme Decree No. 176 of the Ministry of National Defence (20 August 2007) establishes the national authority in charge of all matters regarding the BWC (BTWC).

Additionally, the following table provides a summary of such laws and regulations as provided by the Permanent Mission of Chile to the United Nations by way of national reporting compiled in their latest Approved 1540 Committee Matrix, published 9 December 2020. This summarization in the table below, draws from the whole of this document, and makes note of what general matrix topic the given law, regulation, decree, etc. responds to.²³¹

²³⁰ Ministerio de Educación. CONICYT. 2018. “Manual de Normas Bioseguridad y Riesgos Asociados, Fondecyt – CONICYT.” <https://www.conicyt.cl/fondecyt/files/2018/08/MANUAL-DE-NORMAS-DE-BIOSEGURIDAD.pdf>.

²³¹ Throughout the 9 December 2020 Republic of Chile Approved 1540 Committee Matrix, the same law, regulation, decree, etc. is referenced as it supports multiple categories listed in the matrix, and thus various parts of said laws, etc. (different sections, articles, chapters, etc.) are referenced. Care has been taken to provide in the <LEVEL OF COVERAGE> column of our table a compiled list of all relevant sections, articles, etc. of a given law, regulation, decree, etc., to reduce redundancy.

Table 13: Domestic Legislation

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
National	Supreme Decree No. 385 of 5 May 1980 (Ministry of Foreign Affairs) – Promulgation of BWC ²³²	Enacts the BWC treaty in Chile	Yes
National	Supreme Decree No. 176 of the Ministry of National Defence (20 August 2007) ²³³	Regarding biological weapons	Yes Indicates the General Directorate of National Mobilization as the National Authority in matters related to the BTWC. ²³⁴ No criminal penalties listed.
National	Law No. 21.250 (2020) ²³⁵	Implements the CWC and BWC	Yes Article 3 presents the General Directorate of National Mobilization as the National Authority in matters related to the BWC and CWC, same as with Supreme Decree 176 of this Ministry of National Defence (2007), above. Title IV, Articles 34-39 specifically establish penalties.

²³² Decreto 385 de 1980. “PROMULGA CONVENCIÓN SOBRE LA PROHIBICIÓN DEL DESARROLLO, LA PRODUCCIÓN Y EL ALMACENAMIENTO DE ARMAS BACTERIOLÓGICAS (BIOLÓGICAS) Y TOXÍNICAS Y SOBRE SU DESTRUCCIÓN.” <https://www.bcn.cl/leychile/navegar?idNorma=400702>.

²³³ Decreto 176 de 2007. “DESIGNA AUTORIDAD NACIONAL EN LO RELATIVO A LA CONVENCIÓN SOBRE LA PROHIBICIÓN DEL DESARROLLO, LA PRODUCCIÓN Y EL ALMACENAMIENTO DE ARMAS BACTERIOLÓGICAS (BIOLÓGICAS) Y TOXÍNICAS Y SOBRE SU DESTRUCCIÓN.” <https://www.bcn.cl/leychile/navegar?idNorma=280846>.

²³⁴ Approved 1540 Committee Matrix, Republic of Chile, 9 December 2020, page 4. Accessed from: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>.

²³⁵ Ley 21.250 de 2020. <https://www.bcn.cl/leychile/navegar?idNorma=1148285>. Additional sources are: Cámara de Diputadas y Diputados. 2018. “Proyecto de Ley: Implementa la Convención sobre la Prohibición del Desarrollo, la Producción, el Almacenamiento y el Empleo de Armas Químicas y sobre su Destrucción y la Convención sobre la Prohibición del Desarrollo, la Producción y el Almacenamiento de Armas Bacteriológicas (Biológicas) y Toxínicas y sobre su Destrucción.” <https://www.camara.cl/legislacion/ProyectosDeLey/tramitacion.aspx?prmID=12430&prmBL=11919-02>.

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
National	Act No. 17.798 of 6 December 1977 ²³⁶	Arms control ²³⁷ Article 3, last paragraph prohibits possession of NW, CW and BW; Articles 2a) and 4 means of delivery	Yes Articles 13 and 14 of this act establish penalties for possession of NW, CW and BW
National	Act No. 18.314 on determining terrorist acts and their penalties ²³⁸	Articles 2 describes what constitutes terrorist acts, and Article 3 establishes penalties.	Yes Article 3 establishes penalties; Articles 8 and 9 also offer additional penalty measures for association.
National	Act No. 19.027 ²³⁹	Amends Act No. 18.314 (same topic coverage)	Yes Article 3 establishes penalties
National	Penal Code ²⁴⁰	Chilean Criminal law and penalties. Articles 291 and 316 deal directly with crimes using chemical, biological, radioactive, and pathogenic organisms/agents and establish associated penalties. Articles 7, 16, 17, 52, 53, and 294 deal with	Yes Penalties establishes in Penal Code Art. 7, 16, 17, 52, 53, 291, 294 (establishes punishment for associate with or aiding, abetting the crime) ²⁴² , Article 316

²³⁶ This law is now consolidated into Decree 400 “Establishes Consolidated, Coordinated and Systemized Text of Law No.17,798, on Arms Control” (FIJA TEXTO REFUNDIDO, COORDINADO Y SISTEMATIZADO DE LA LEY N° 17.798, SOBRE CONTROL DE ARMAS). Also see entry below in table for Decree 400. Text for Decree 400 can be found here: <https://www.bcn.cl/leychile/navegar?idNorma=13031&idParte=&idVersion=>.

²³⁷ Specific reference to firearms in this legislation.

²³⁸ Ley 18314 de 1984. Modified April 21, 2015. “DETERMINA CONDUCTAS TERRORISTAS Y FIJA SU PENALIDAD.” <https://www.bcn.cl/leychile/navegar?idNorma=29731>

²³⁹ Ley 19027 de 1990. “MODIFICA LEY N° 18.314, QUE DETERMINA CONDUCTAS TERRORISTAS Y FIJA SU PENALIDAD.” <https://www.bcn.cl/leychile/navegar?idNorma=30394>

²⁴⁰ Condigo Penal. 1874. <https://www.bcn.cl/leychile/navegar?idNorma=1984>

²⁴² Idib. Article 294, Penal Code (Codigo Penal) (1874, 2022). See: <https://www.bcn.cl/leychile/navegar?idNorma=1984>

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
		crimes of association, abetting, etc. and provide associated penalties. ²⁴¹	
National	Decree No. 400 (1978) ²⁴³	Arms control. Consolidates Act No. 17.798 of 6 December 1977. See above entry.	Also see above entry for Act No. 17.798 of 6 December 1977
National	Sanitary Health Code, Decree No. 725 ²⁴⁴	Title II, Article 56; Article 90 establishes the ability to regulate and control what toxic substances are shipped, sold, produced, transported, etc., whether they may be flammable, explosive, corrosive, or otherwise a risk to health, safety and welfare of animals and humans. ²⁴⁵	Article 90 establishes enforcement powers to the Director General of Health, wherein this DG can control, prohibit, or confiscate said products or materials if required. National Health Service
National	Decree No. 618 (1970) on Safety Regulations Dangerous Goods in Port Facilities ²⁴⁶	Handling Hazardous	Article 14 establishes permit suspension enforcement powers with the Port Captain

²⁴¹ This is a compilation of Articles listed in the Approved 1540 Committee Matrix in response to categories of attempt to engage, participate as an accomplice, and assist in table "II. OP 2 – Nuclear Weapons (NW), Chemical Weapons (CW) and Biological Weapons (BW)" on pages 7-8 of the 9 December 2020 Republic of Chile Approved 1540 Committee Matrix. Accessed from: United Nations Security Council, 1540 Committee. "Committee Approved Matrices." <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>.

²⁴³ This decree consists of the consolidation of Act No. 17.789 798 of 6 December 1977. Also see the entry for that law in the above table. Accessed here:

<https://www.bcn.cl/leychile/navegar?idNorma=13031&idParte=&idVersion=>

²⁴⁴ Condigo Santario, Decreto 725. 1967. Modified October 28, 2021.

<https://www.bcn.cl/leychile/navegar?idNorma=5595&idParte=&idVersion=>

²⁴⁵ Article 90, Chilean Sanitary Code. Accessed via: "Chile – Health Code [Promulgated by Decree-Law No. 725 and Amended Up to Law No. 21030]." 2017. World Intellectual Property (WIPO) IP Portal.

<https://wipolex.wipo.int/en/legislation/details/18882>

²⁴⁶ Decreto 618 de 1970. "APRUEBA REGLAMENTO DE SEGURIDAD PARA LA MANIPULACION DE EXPLOSIVOS Y OTRAS MERCADERIAS PELIGROSAS EN LOS RECINTOS PORTUARIOS."

<https://www.bcn.cl/leychile/navegar?idNorma=253932>

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
		materials in ports; Articles 6, 7, 11.6	
National	Supreme Decree No. 777 (1978), approving the Regulations of the Republic as the International Maritime Dangerous Goods Code (IMDG Code) ²⁴⁷	Maritime regulations	
National	Decree No. 298 (1994) ²⁴⁸	Transport regulations (safety)	
National	Decree No. 329. Customs National Law ²⁴⁹	Title VI	Yes
National	Act No. 200.997 of 13 March 2017 ²⁵⁰	Modification of Decree 329, Customs National Law; Article 80	
National	Law No. 19.913 (2003) ²⁵¹	Terrorism Financing and Money Laundering	Creates the Financial Analysis Unit; power to review suspicious activity and referrals to the Public Ministry; Title II, Articles 19 through 26 provide penalties
National	Law No. 19.300 ²⁵²	Environmental health; Article 2 provides definitions for biodiversity, biotechnology, containment	

²⁴⁷ Referenced here: Approved 1540 Committee Matrix, Republic of Chile, 9 December 2020, page 12. Accessed from: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>

²⁴⁸ Referenced here: Approved 1540 Committee Matrix, Republic of Chile, 9 December 2020, page 11. Accessed from: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>

²⁴⁹ Decreto 329 de 1979. "APRUEBA LEY ORGÁNICA DEL SERVICIO NACIONAL DE ADUANAS." <https://www.bcn.cl/leychile/navegar?idNorma=5441>.

²⁵⁰ Referenced here: Approved 1540 Committee Matrix, Republic of Chile, 9 December 2020, page 17. Accessed from: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>. Also available here: Ley 200.997 de 2017. <https://www.bcn.cl/leychile/navegar?idNorma=1100901&idParte=9779550>.

²⁵¹ Ley 19913 de 2003. "CREA LA UNIDAD DE ANALISIS FINANCIERO Y MODIFICA DIVERSAS DISPOSICIONES EN MATERIA DE LAVADO Y BLANQUEO DE ACTIVOS."

<https://www.bcn.cl/leychile/navegar?idNorma=219119>

²⁵² Ley 19300 de 1994. Modified June 13, 2022. "APRUEBA LEY SOBRE BASES GENERALES DEL MEDIO AMBIENTE." <https://www.bcn.cl/leychile/navegar?idNorma=30667>

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
National	Manual de Normas de Bioseguridad y Riesgos Asociados-Fondecyt-CONICYT (2018) ²⁵³	Regulation; “Manual on Norms of Biosecurity and Related Risks” covers laboratory biosecurity regulations for physical containment. Also covers accidental and intentional release (see chapter 9.1 “Intentional Release” ²⁵⁴	Yes Chapter 9.1.1 references national Act No. 18.314 on terrorist acts (listed in this table above)
National	DFL1 Enforcement Decree 1 (Ministry of Health) of 2005 ²⁵⁵		Yes Articles 3 and 4 establish enforcement mechanisms for the Minister of Health to help enforce health and security regulations, and conditions at all private and public health facilities. ²⁵⁶
National	Technical Normative for the Transportation of Infectious Substances at the National Level towards the Institute of Public Health 2008 ^{257,258}	National regulations for transporting infectious substances such	

²⁵³ Ministerio de Educación. CONICYT. 2018. “Manual de Normas de Bioseguridad y Riesgos Asociados-Fondecyt-CONICYT.” <https://www.conicyt.cl/fondecyt/files/2018/08/MANUAL-DE-NORMAS-DE-BIOSEGURIDAD.pdf>

²⁵⁴ Also described in detail in NTI’s/JHU’s “Global Health Security (GHS) Index 2021” under section 1.3.1.c) “Agency for enforcement of biosecurity laws/regulation” in Chile country report. Data retrieved from their 2021 full report database: Nuclear Threat Initiative (NTI), Johns Hopkins University (JHU). 2021. “Report and Data: Data Model.” <https://www.ghsindex.org/report-model/>

²⁵⁵ DFL1. 1979. “FIJA TEXTO REFUNDIDO, COORDINADO Y SISTEMATIZADO DEL DECRETO LEY N° 2.763, DE 1979 Y DE LAS LEYES N° 18.933 Y N° 18.469.” <https://www.bcn.cl/leychile/navegar?idNorma=249177>

²⁵⁶ Also described in detail in NTI’s/JHU’s “Global Health Security (GHS) Index 2021” under section 1.3.1.c) “Agency for enforcement of biosecurity laws/regulation” in Chile country report. Data retrieved from their 2021 full report database: Nuclear Threat Initiative (NTI), Johns Hopkins University (JHU). 2021. “Report and Data: Data Model.” <https://www.ghsindex.org/report-model/>

²⁵⁷ In Spanish, “Normativa técnica para el transporte de sustancias infecciosas a nivel nacional hacia el Instituto de Salud Pública”. This description summarized from JHU’S “Global Health Security (GHS) Index 2021” under section 1.3.4a) “National transport regulations for Category A and B infectious substances” in Chile country report. Data retrieved from their 2021 full report database: Nuclear Threat Initiative (NTI), Johns Hopkins University (JHU). 2021. “Report and Data: Data Model.” <https://www.ghsindex.org/report-model/>.

²⁵⁸ A new 2021 edition of this technical guidance exists. See: Gobierno de Chile. Ministerio de Salud. 2021. “Guía

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
		as Category A and B substances.	
National	Decreto 20 Approves Regulation of Clinical Laboratories ²⁵⁹	Establish regulations for clinical laboratories, such as needed facilities, personnel, equipment, procedures, etc.	Yes Article 2 establishes enforcement capability with the Technical Director of the Clinical Laboratories, whose duties are outlined in Article 21 and corresponds with the Regional Ministerial Secretary of Health (Article 4).
National	Decree No. 7 (2019) APRUEBA EL REGLAMENTO SOBRE NOTIFICACIÓN DE ENFERMEDADES TRANSMISIBLES DE DECLARACIÓN OBLIGATORIA Y SU VIGILANCIA ²⁶⁰	National regulation for timeline and process of mandatory disease reporting. Article One, Article 1.a) lists the biological pathogens that require immediate notification of suspected clinical samples and to which authorities to report; Article One, Article 1.b) lists the biological pathogens that require reporting within 24 hours; Article 4 establishes the notification process.	Yes Article 9 establishes penalties (sanctions) for failure to comply with this law, and the reporting requirements (refers to sanctions provided in Book X of the Sanitary Code).

Técnica Para el Transporte de Sustancias Infecciosas Hacia el Instituto de Salud Pública.” Instituto de Salud Pública, March. <https://www.ispch.cl/wp-content/uploads/2021/03/Gu%C3%ADa-T%C3%A9cnica-para-el-Transporte-de-Sustancias-Infecciosas-hacia-el-Instituto-de-Salud-P%C3%BAblica.pdf>.

²⁵⁹ Decreto 20 de 2011. “APRUEBA REGLAMENTO DE LABORATORIOS CLÍNICOS.”

<https://www.bcn.cl/leychile/navegar?idNorma=1039479>

²⁶⁰ Decreto 7 de 2019. “APRUEBA EL REGLAMENTO SOBRE NOTIFICACIÓN DE ENFERMEDADES TRANSMISIBLES DE DECLARACIÓN OBLIGATORIA Y SU VIGILANCIA.”

<https://www.bcn.cl/leychile/navegar?idNorma=1141549>. English translation of the decree title is: “Approves the Regulation on Notification of Communicable Diseases of Mandatory Declaration and Their Surveillance.”

Legislative Category	Relevant Legislations (Text)	Level of Coverage	Provides For Enforcement
National	Exempt Resolution 2229 (2001) ESTABLECE NORMAS DE INGRESO DE MATERIAL BIOLÓGICO Y DEROGA RESOLUCIONES QUE INDICA ²⁶¹	Establishes regulation of entry of biological materials into the country (whether agriculture, livestock, etc.)	

²⁶¹ Translated to English, it is: Exempt Resolution 2229, Establishes Regulations for the Entry of Biological Material and Repeals Resolutions that Indicate.” Resolución 2229 Exenta de 2001.
<https://www.bcn.cl/leychile/navegar?idNorma=190087>.

Assessment

Chile has established an extensive set of legislation and regulation in relation to disrupting terrorism financing and punitive measures for illicit behavior, which provide a solid foundation for addressing that specific domestic concern. In addition, Chile possesses a solid and even recently expanded base of legislation and regulation addressing the safe transport and handling of biological materials, particularly in ports and between facilities. Chile has established a system for national regulation and regulatory approval of clinical laboratories and facilities that cover the breadth of biosecurity and biosafety issues.

Law Enforcement & Intelligence

National Law Enforcement Capabilities

Relevant Biosecurity Capabilities

Chile has two main public security entities. The Carabineros are managed by the Ministry of Interior, but under the command of the Ministry of Defense. Thus, effectively, the Carabineros are a national militarized police force. The second public security entity is the Chilean Investigative Police (PDI), a civilian police force that focuses on investigating domestic crimes.²⁶² There is no identifiable open-source information to suggest capabilities or responsibilities toward detecting and/or responding to biosecurity incidents.

Areas of Weakness

Chile's law enforcement effectiveness is hindered by a multitude of internal weaknesses or problems, which include reports of falsification of evidence, misuse of public channels, corruption, excessive use of force, and human rights violations, particularly against protestors from October 2019 to March 2020.²⁶³ External issues that Chilean law enforcement face include the rise of domestic and international criminal groups, an increase in trafficking flows, porous borders, specifically in the north, and increases in violent crime both in type and quantity.²⁶⁴

Border Security

Border security in Chile is a function of the Chilean national police, or Carabineros de Chile, which are a unified paramilitary security entity under the Ministry of the Interior.²⁶⁵ The

²⁶² InSight Crime. 2021. "Chile Profile." <https://insightcrime.org/chile-organized-crime-news/chile/>

²⁶³ "EYES ON CHILE: POLICE VIOLENCE AND COMMAND RESPONSIBILITY DURING THE PERIOD OF SOCIAL UNREST." 2020. Amnesty International, October.

<https://www.amnesty.org/en/latest/research/2020/10/eyes-on-chile-police-violence-at-protests/>

²⁶⁴ InSight Crime. 2021. "Chile Profile." <https://insightcrime.org/chile-organized-crime-news/chile/>

²⁶⁵ Gobierno de Chile. Unidad de Pasos Fronterizos. "Quiénes Somos."

National Customs Service, or Servicio Nacional de Aduanas, is responsible for verifying, tracking, and inspecting imports and exports, as well as international visitors and luggage.²⁶⁶ Together these agencies are responsible for everything and everyone that enters or exits Chile.

In 2017, in a sign of increasing cooperation on border security, Chile and Peru opened the first joint border control center.²⁶⁷

Intelligence Agencies

Chile's intelligence community consists of the National Intelligence Agency (Agencia Nacional de Inteligencia – ANI), the Defense Intelligence Directorate of the Joint Chiefs of Staff (DID), the Intelligence Directorates of the Armed Forces, and the Intelligence Directorates of the Public Order and Security Forces, which consists of the Carabineros de Chile and the Chilean Investigative Police (PDI).²⁶⁸

The ANI serves as Chile's domestic intelligence body and is an all-civilian intelligence service that functions to ingest and analyze both national and international information, produce reports for government leadership, cooperate with military and police, and interrupt terrorist plots or groups.²⁶⁹

Biological Proliferation

There is no public, open-source information available that indicates responsibility over and against biological proliferation within Chilean law enforcement and intelligence agencies. As noted in the "Domestic Legislation / Regulation" section of this report, Law 21.250 (2020) names the General Directorate of National Mobilization as the National Authority to the Biological Weapons Convention (BWC), although there is no indication if this authority also bears responsibility for gathering intelligence to support nonproliferation efforts.

Relationship to Domestic Law Enforcement

There is no open-source information on this topic. However, Chile's political history suggests that the interaction of intelligence agencies and domestic law enforcement may be complicated or restricted due to public concerns.

<http://www.pasosfronterizos.gob.cl/quienes-somos/>

²⁶⁶ "Aduanas: Chile Customs." Aduana. <https://www.aduana.cl/aduana/site/edic/base/port/inicio.html>

²⁶⁷ Cruzada, Jesus Cordova. "Integrated border control between Peru and Chile." World Customs Organization. <https://mag.wcoomd.org/magazine/wco-news-85/integrated-border-control-peru-chile/>

²⁶⁸ Interpol. "Chile." <https://www.interpol.int/Who-we-are/Member-countries/Americas/CHILE>

²⁶⁹ Interpol. "Chile." <https://www.interpol.int/Who-we-are/Member-countries/Americas/CHILE>

International Law Enforcement Partnerships

Chile is connected with the International Law Enforcement Academy (ILEA), and has conducted programs with the European Union and the International Cooperation Agencies of Germany (GIZ), Spain (AECI), and Canada through their El Salvador Embassy.²⁷⁰ Further Chile cooperates with many international partners on security issues, including the U.S. on drug trafficking issues and with the U.S. Environmental Protection Agency, with Bolivia on counter-narcotics at their shared border, and with Argentina through both military and humanitarian work.²⁷¹ Chile has also been a part of INTERPOL since 1944 and continues to cooperate with regional investigations and operations.²⁷²

Training and Engagement

No public data identified.

Assessment

There is little open-source information upon which to draw to form an accurate assessment about Chilean law enforcement and intelligence agencies in relation to responsibilities and capabilities toward detecting and responding to biosecurity incidents.

Chilean law enforcement faces significant challenges of increasing criminal organization activity and internal corruption in aid of either criminal organizations or their illicit product transport. Chile does, however, have institutions in place to support and monitor export and import of goods and services, and maintain border and port security, although these institutions also face or are susceptible to the same corruption concerns and challenges.

Biosecurity Country Level Threat Assessment

Assessment of Infrastructure and Environmental Factors

Climate and geography pose a unique challenge to the reach of access via transportation and healthcare in Chile given the country's extreme breadth of landscape and centralization of significant resources in urban and metropolitan areas, despite the well-organized national public health structure and transportation infrastructure that provide some reach to rural areas.

²⁷⁰ Ministry of Foreign Affairs, Embassy of Chile in El Salvador. "International Cooperation." <https://www.chile.gob.cl/el-salvador/relacion-bilateral/cooperacion-internacional/cooperacion-internacional>.

²⁷¹ "Chile Country Profile." 2015. Geneva Centre for Security Sector Governance, December 1. <https://web.archive.org/web/20201021071608/https://issat.dcaf.ch/Learn/Resource-Library2/Country-Profiles/Chile-Country-Profile>

²⁷² Chilean Investigative Police (PDI). "Interpol." <https://pdichile.cl/instituci%C3%B3n/unidades/interpol>

Chile's heavy reliance on international trade opens the country to vulnerability of those external markets.

Assessment of Country Capabilities

Chile has a growing biological research and production infrastructure that continually expands its international partnership and domestic availability that are critical bulwarks to expanding capability. An important contributor to this capability will be expansion of domestic biological and vaccine production.

Overall Assessment

Identification of Gaps (Regulatory)

Chile's regulatory landscape provides a solid foundation that covering the breadth of biosecurity concerns at the national level, including implementing and authorizing the BWC, safety, security at ports and safe handling of biological materials during transport, national biosecurity standards and guidance for clinical laboratories (including personnel, protective equipment, and addressing intentional and accidental release). While these measures are implemented at the sub-national (regional, local, and facility-specific) level, there is little visibility in open-source material greatly complicating efforts to understand the extent or thoroughness of implementation at these levels. It is not unusual that the internal implementations of a wide variety of biological and animal facilities (research, development, clinical, etc.) are unavailable to the general public and indeed excessive transparency has the potential to introduce new vulnerabilities. One area of sub-national regulatory structure and implementation that would be useful to expand into or make more visible if offered and performed is biosecurity and biosafety trainings that occur.

An additional area of regulation that was not readily apparent that would provide significant support and security to Chile's agricultural industries, that support much of the country's economy, is disease monitoring of imported and exported animals and animal products to prevent invasive or introduced biological or otherwise materials entering the country, and monitoring disease within domestic livestock to ensure export viability. This may already be occurring in Chile; however, the extent to which is not readily ascertainable in publicly available information.

Threats

The overall level of biosecurity threat in Chile is assessed to be low at this time and is likely to remain so for some time.

Although Chile has a growing biological research and production infrastructure that will increase the potential biosecurity attack surface over time there are no indications of active

biosecurity threats.

Foreign terrorist groups, to include those with a history of interest in biological attacks, have not treated Chile as a potential target space or a source for the acquisition of resources for targeting neighboring countries. The primary activities of foreign terrorist groups to date have been low-level fund-raising or attempts at recruitment.

Domestic terrorist groups, pose a larger, though still relatively small biosecurity threat. There is no evidence that any of the currently known groups or actors currently have, or have at any time possessed, any interest in attempting bioterrorism or agroterrorism. The mainstream of domestic ideological violence is either far-left or regional ethnic extremism. Of the two strains, far-left extremism has the potential to introduce biosecurity threats if terrorist, or non-terrorist left-extremists identify biological research facilities as a target in anti-capitalist campaigns, particularly those directed at foreign businesses. One area of particular threat for Chile to be aware of is any rise in animal-rights protests or violence as this has the potential to represent a direct threat to research facilities, and by extension introduce biosecurity risk. However, in the absence of any current activity the level of risk that such developments might represent are impossible to quantify.

Level of threat

The overall level of biosecurity threat in Chile is assessed to be low at this time and is likely to remain so for some time. This is driven by a lack of active threat combined with robust regulatory structure and active government engagement in the area of biosecurity.

About the authors

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Dr. Sin is the Director of the Unconventional Weapons and Technology Division (UWT) of the National Consortium for the Study of Terrorism and Responses to Terrorism (START), headquartered at the University of Maryland. He develops, leads, and manages interdisciplinary research projects spanning across a broad range of national and homeland security challenges. His expertise includes countering weapons of mass destruction; chemical, biological, radiological, and nuclear (CBRN) terrorism; adversary decision modeling; operations in the information environment; and Northeast Asia regional security. Dr. Sin’s extensive experience also includes a career as a U.S. Army Officer. He holds a Ph.D. in political science from the University at Albany, State University of New York, and is fluent in Korean, Mandarin Chinese, and Japanese.

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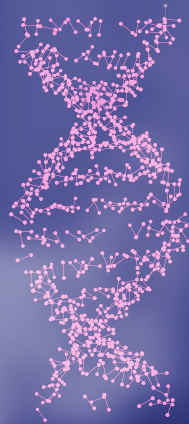


Mr. Binder is a senior researcher with UWT/START, specializing in terrorism and other violent extremism involving chemical and biological agents. Prior to joining START in 2013, he was an independent consultant providing expertise in the areas of WMD nonproliferation, chemical and biological terrorism, and the spread of MANPADS. From 2004 to 2007 he was Deputy Director of the Chemical and Biological Weapons Nonproliferation Program at the James Martin Center for Nonproliferation Studies (CNS) in Monterey, California. Prior to joining CNS, Mr. Binder spent 15 months with the External Relations Division of the Organisation for the Prohibition of Chemical Weapons (OPCW) in The Hague. He has a Master of Arts in Political Studies from the University of Auckland in New Zealand (with a focus on revolutions, insurgencies and counter-hegemonic movements, as well as on security and diplomacy in the Asia-Pacific).

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