

Environmental Health Education in Medical Degree Programs in Argentina: A Critical Gap with Major Public Health Implications

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ABSTRACT

Introduction: The impact of the socio-environmental crisis on health has been widely documented, underscoring the need to incorporate content on environmental health and the environmental determinants of health into the training of healthcare professionals. However, in Argentina, medical education still lacks a systematic integration of this perspective into its curricula. This study analyzes the incorporation of the sustainable development perspective into graduate profiles and, when present, examines the curricula to assess their internal consistency.

Materials and Methods: A qualitative documentary analysis was carried out on the graduate profiles of Argentina's 47 medical schools, identifying references to sustainability-related terms. Subsequently, the curricula of the six schools whose graduate profiles include this perspective were analyzed. The data were systematized in an analytical matrix and classified into thematic categories.

Results: Only 6 out of 47 medical schools (12.7%) explicitly include sustainability in their graduate profiles. The analysis of their curricula revealed that although there are some references to environmental health in courses such as public health, epidemiology, or parasitology, no specific subjects were identified that systematically and transversally address this perspective.

Conclusion: There is a curricular gap in medical education in Argentina regarding the relationship between the environment and health. It is necessary to reformulate curricula to incorporate sustainability as a cross-cutting axis, addressing issues such as access to safe water, exposure to agrochemicals, and the impact of climate change on health, among others.

Keywords: medical education, medical degree program, environmental health, sustainable development, graduate profile, curriculum.

Formación en salud ambiental en carreras de Medicina de la Argentina. Una vacancia de gran impacto en la salud pública

RESUMEN

Introducción: el impacto de la crisis socioambiental sobre la salud ha sido ampliamente documentado, evidenciando la necesidad de incluir contenidos de salud ambiental y determinación ambiental de la salud en la formación del personal de salud. Sin embargo, en la Argentina, la educación médica aún carece de una integración sistemática de esta perspectiva en sus planes de estudio. Este trabajo analiza

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la incorporación de la perspectiva de desarrollo sustentable en los perfiles de egreso y, cuando esta se halla presente, examina los planes de estudio para evaluar su coherencia curricular.

Material y métodos: se realizó un análisis documental cualitativo sobre los perfiles de egreso de las 47 facultades de Medicina de la Argentina, identificando referencias a términos vinculados a la sustentabilidad. Posteriormente, se analizaron los planes de estudio de las seis facultades cuyo perfil de egreso incluye esta perspectiva, sistematizando los datos en una matriz de análisis y clasificando la información en categorías temáticas.

Resultados: solo 6 de las 47 facultades de Medicina (12,7%) incluyen menciones explícitas a la sustentabilidad en sus perfiles de egreso. El análisis de sus planes de estudio mostró que, si bien existen algunas referencias a salud ambiental en asignaturas como salud pública, epidemiología o parasitología, no se identifican materias específicas que desarrollen esta perspectiva de manera transversal y sistemática.

Conclusión: existe una vacancia curricular en la educación médica en la Argentina con respecto a la relación entre ambiente y salud. Es necesario reformular los planes de estudio incorporando la sustentabilidad como un eje transversal, abordando problemáticas como el acceso a agua segura, la exposición a agroquímicos, el impacto del cambio climático en la salud, entre otras.

Palabras clave: educación médica, carrera de Medicina, salud ambiental, desarrollo sustentable, perfil de egreso, plan de estudios.

INTRODUCTION

In 2000, Crutzen and Stoermer¹ introduced the term *Anthropocene* to describe the unprecedented impact of human activities on Earth. They argued that this impact marked the beginning of a new geological era, comparable in scale to the phenomena that defined previous ones. Through industrial, agricultural, and urban activity, humanity has profoundly –and often irreversibly– transformed the planet.

Against this backdrop, sustainable development has become an urgent necessity. Sustainability means pursuing social progress while at the same time safeguarding the planet's ecological integrity, a task that must be addressed at global, regional, and local levels. The United Nations, through its 17 Sustainable Development Goals (SDGs), provides a framework for understanding these challenges². Similarly, the Berlin Declaration (2021) stresses that Education for Sustainable Development (ESD) “must be based on respect for nature, as well as on human rights, democracy, the rule of law, non-discrimination, equity, and gender equality”³(p. 2).

Environmental protection and research are central to this perspective, driven by the reality of the global climate crisis and the growing frequency of extreme weather events, which have increased the vulnerability and risks faced by local populations⁴. A large body of literature documents the health impacts of climate change and environmental degradation⁵⁻⁷. Among the most studied are the rise in respiratory diseases linked to air pollution^{8,9}, increased morbidity and mortality from extreme temperatures and heat waves^{10,11}, the detection of chemical agents in blood and urine¹², and the spread of diseases caused by unsafe water¹³.

The World Health Organization (WHO) has also emphasized how environmental degradation and climate change threaten food security, contribute to the spread of vector-borne diseases, and affect the psychological well-being of populations—especially the most vulnerable⁴. More recent studies even point to the emotional and psychological consequences of the crisis, leading to the notion of *eco-anxiety*¹⁵. Addressing the complexity of today's environmental and climate challenges requires insights from multiple disciplines capable of engaging with their many dimensions.

Since the 1980s, international organizations have increasingly turned their attention to the climate crisis, encouraging the participation of different sectors of society in mitigating its impact and emphasizing the role of education in building more sustainable societies^{2,16}. The first UN International Conference on Environmental Education, held in Tbilisi in 1977, marked the beginning of efforts to strengthen the link between education and the environment¹⁷. Key documents such as the 1992 United Nations Framework Convention, the Millennium Development Goals and their subsequent reformulation into the Sustainable Development Goals, as well as the Paris Agreement, all contributed to positioning education as a critical tool for addressing environmental challenges¹⁸.

The role of higher education institutions was highlighted at the 22nd United Nations Climate Change Conference, which underscored the importance of Sustainable University Networks in training professionals committed to sustainable development as a response to the climate crisis¹⁹. Along these lines, some authors have argued that the structure of educational systems

and curricula may themselves contribute to the causes of climate change²⁰, hence the need to reorient higher education toward sustainability.

In 2018, the Ibero-American Alliance of University Networks for Sustainability and the Environment (ARIUSA) published the document *Incorporating the Sustainable Development Goals into the Work of ARIUSA's Higher Education Institutions*, stressing that the SDGs outlined in the 2030 Agenda should “be considered as a planning tool enabling each higher education institution to advance on its path toward development that is sustainable, inclusive, and in harmony with the environment, while contributing to the transformation of a more inclusive, equitable, and sustainable Latin America”²¹(p. 7).

Available data highlight two key points: (1) the impact of environmental conditions on population health, which calls for health professionals to undergo training processes that integrate sustainability, and (2) an international concern with the role of educational institutions in promoting sustainable development. Despite the growing body of evidence, no studies have been found that examine whether sustainability perspectives are incorporated into medical education in Argentina. To address this gap, we analyzed graduate profiles and curricula from medical schools across Argentina, searching for references to sustainability. This paper presents preliminary findings from an ongoing research project carried out by the University Social Observatory (OSU), in collaboration with the Centro de Investigación, Educación y Desarrollo Sustentable (CIGEDS) at Hospital Italiano de Buenos Aires University, focused on the presence or absence of sustainability perspectives in the training of Argentine medical professionals.

MATERIALS AND METHODS

This study is based on a qualitative documentary analysis of graduate profiles and curricula from the 47 medical schools currently operating in Argentina.

A non-probabilistic sampling design was used, selecting faculties that met the following criteria: (1) public access to their institutional documents, and (2) representation of the heterogeneity of higher education institutions in terms of management type (public or private), geographic location, and institutional age.

Data collection was conducted through the search and systematization of graduate profiles and curricula available on the websites of the selected universities. For data analysis, a systematization matrix in Microsoft Excel® was used to identify concepts and/or categories related to sustainability, such as: “sustainability,” “environmental health,” “environment,” “education for sustainability,” “environmental factors,” “environmental components,” “environmental responsibility,” “environment,” “environmental determinants,” “ecology,” “natural environment,” “biodiversity,” and “environmental care.” Following Maxwell’s coding and contextualization techniques²², a qualitative documentary content analysis was carried out, coding and classifying information into

thematic categories. This approach made it possible to identify patterns and understand their relationships of continuity and contiguity.

Regarding the possible limitations of this study, as it is based on documentary analysis, we recognize that the documents do not necessarily reflect actual training practices but rather the formal or normative frameworks that guide such practices. In this sense, the study does not allow for direct inferences about how environmental content is taught, nor about how students and faculty engage with it. The scope of this study is therefore limited to identifying and formally characterizing the presence of sustainability-related content in graduate profiles and curricula. It is an analytical snapshot that reveals certain discursive and institutional trends, but it excludes aspects such as curricular implementation, faculty training, or student experiences related to this topic. These dimensions could be addressed in future research through complementary qualitative methodologies such as interviews, focus groups, or classroom observations.

RESULTS

1. Description of the data

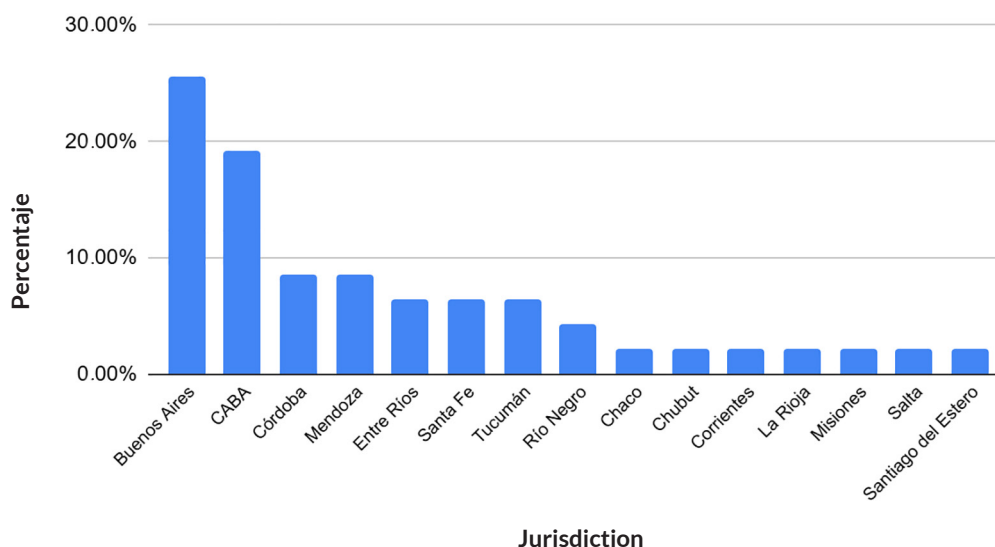
In Argentina, there are 47 higher education institutions across 16 provinces that offer medical programs. Of these, 24 are public universities and 23 are privately managed (Annex 1 and Fig. 1).

From the total of 47 medical schools, 44 were included in the study, as it was not possible to access institutional documents from the Universidad del Salvador, the Universidad Nacional de La Rioja, and the Universidad Adventista del Plata, despite contacting their respective program offices and academic secretariats to request them.

The analysis of the graduate profiles of the 44 schools of Medicine, Medical Sciences, and/or Health Sciences offering medical programs revealed that six explicitly referenced a sustainability perspective, framed through the link between environment and population health. This represents 12.7% of all medical programs in the country.

The faculties that included this perspective were: the School of Medical Sciences at the Pontificia Universidad Católica Argentina Santa María de los Buenos Aires, the School of Medical Sciences at the Universidad Nacional de Córdoba, the School of Medical Sciences at the Universidad de Mendoza, the School of Health Sciences at the Universidad Nacional de Salta, the School of Medical Sciences at the Universidad Nacional del Litoral, and the School of Medicine at the Universidad Nacional de Tucumán

Of the six universities identified, four are public and two are private. The public institutions are located in the provinces of Córdoba, Salta, Santa Fe, and Tucumán, while the private ones are based in the City of Buenos Aires and in Mendoza. Regarding the history of their medical programs, some were established in the early or mid-20th century, while others were created more



Source: prepared by the authors.

Figure 1. Percentage distribution of medical schools by jurisdiction.

recently. However, all of them have updated their curricula within the past ten years.

According to their graduate profiles, medical students are expected to develop specific skills and competencies. At the Universidad Católica Argentina (UCA), graduates are required to demonstrate knowledge related to, among other aspects, “the bioethical dimension of medical practice, a biopsychosocial-spiritual understanding of health in the context of the community and environment, and the articulation of ethical traditions in medical practice with Christian moral principles.”

At the Universidad Nacional de Córdoba (UNC), they should be able to “assess the environmental, cultural, social, and economic factors that cause disease, recognizing deficiencies and promoting their correction.”

At the Universidad de Mendoza (UM), graduates are expected to “carry out curative actions and apply measures to promote health and prevent disease, based on the analysis of socioeconomic, environmental, and lifestyle determinants.”

At the Universidad Nacional de Salta (UNSa), students are trained with “demonstrable clinical and psychosocial competencies, grounded in the consideration of determinants influencing the health-disease-care process: biological, mental, lifestyle, environmental components, and the performance of health services.”

At the Universidad Nacional del Litoral (UNL), they are expected to develop the capacity to “provide comprehensive and integrated care in the different dimensions of individual, collective, and environmental health.”

At the Universidad Nacional de Tucumán, graduates are expected to acquire “demonstrable clinical and psychosocial competencies, grounded in the consideration of determinants in the health-disease process: biological, lifestyle, environmental components, and the role of health services.”

As shown in Table 1, the terms most frequently appearing in the graduate profiles of these universities include: “environment,” “environmental factors,” “environmental component,” “environmental health,” and “environmental determinants.” These references reflect a commitment to training professionals capable of mitigating the impacts of the current socio-environmental crisis and generating knowledge to address health problems, with an awareness of the role of the environment in prevention and care.

After identifying six graduate profiles with an environmental perspective, the study also analyzed the curricula of these programs to determine whether they were aligned with the profiles. The analysis revealed the absence of specific courses directly focused on environment and health. However, a review of the available syllabi of existing courses did show broad and/or ambiguous content that suggests an environmental concern.

The Pontificia Universidad Católica Argentina and the Universidad de Mendoza offer courses on Community Health and Human Rights, which may include content addressing the environment–health nexus.

The Universidad Nacional de Córdoba organizes its program into integrated knowledge areas that foster competencies and values such as humanism, defined as

Table 1. Argentine universities and medical schools with references to sustainability in their graduate profiles

University	School	Terms related to sustainability found in the graduate profile
Pontificia Universidad Católica Argentina	School of Medical Sciences	Environment
Universidad Nacional de Córdoba	School of Medical Sciences	Environmental factors
Universidad de Mendoza	School of Medical Sciences	Environmental determinants
Universidad Nacional de Salta	School of Health Sciences	Environmental component
Universidad Nacional del Litoral	School of Medical Sciences	Environmental health
Universidad Nacional de Tucumán	School of Medicine	Environmental component

Source: authors' elaboration.

“love for the human being as a whole, embedded in their community and free of discrimination, respect, and care for the surrounding environment.” Courses are grouped within these areas, and several aim to “strengthen values of respect, communication, tolerance in the workplace, and environmental preservation.” In the “Public Health” area, courses such as *Community Health I* and *Preventive and Social Medicine I* include specific content on the environment. *Community Health I* addresses global and local environmental problems, climate change, pollution, waste, sustainable development, and tools to identify environmental problems and risks at the family and community level. In *Preventive and Social Medicine I*, environmental, epidemiological, sociocultural, and economic conditions, as well as access to health services, are analyzed. In addition, courses such as *Pathology* and *Parasitology and Medical Mycology* cover environmental diseases and the importance of the environment in parasitic diseases. Finally, *Pediatric Clinic* examines the impact of the environment on child growth and development, as well as on children’s environmental health.

In the curriculum of the Universidad Nacional de Salta, the course *Health, Man and Society* includes environmental topics such as basic sanitation, water control, housing, food, waste, and vector-borne diseases, in addition to health promotion and healthy environments. In *Community Health II*, students study the Ottawa Charter (1986) and the Jakarta Declaration (1997) on health promotion. The Ottawa Charter highlights the creation of healthy environments and the conservation of natural resources, while the Jakarta Declaration underscores the impacts of environmental degradation and the sustainable use of resources. Furthermore, *Human Physiology* and *Child and Adolescent Medicine* include content on the relationship between humans and their environment and the importance of the environment in psychophysical development.

The Universidad Nacional del Litoral has an integrated curriculum organized into cycles, areas, and modules. In the “Health Promotion” cycle, under

the area “The Human Being and their Environment,” content includes environmental health and ecology, healthy environments, ecology, and epidemiology. In the “Disease Prevention” cycle, the areas of “Defense” and “Injury” include basic content on environmental pathophysiology.

At the Universidad Nacional de Tucumán, four courses include environment and health-related topics in their syllabi. *Public Health I* covers, among its core content: health and its determinants, the human being and their environment as factors influencing health and disease, health promotion, and healthy environments (housing, water, excreta disposal, waste management, food sanitation, control of arthropods and rodents), the Primary Health Environment, and Basic Environmental Sanitation. In *Physiology*, “humans and the environment” is listed as a core topic, while *Parasitology* addresses preventive guidelines for parasitic diseases such as environmental sanitation. Finally, *Toxicology* includes core content on environmental health and the impact of chemicals marketed for public and environmental health.

DISCUSSION

One of the main challenges faced by universities in the context of the environmental crisis is the training of professionals with the competencies and skills required to address it. However, the findings of this analysis reveal a certain gap in this regard within medical programs in Argentina. While some graduate profiles include references to the health–environment nexus, medical curricula do not feature specific courses on the subject. This limited integration may be linked to the lack of transversality of sustainability within institutional values, as well as to the historical tendency of medical sciences to prioritize biomedical approaches over socio-environmental ones.

At the same time, as social scientists we understand that the use of language is situational, polysemic, and not exempt from conceptual tensions. This means that references to the environment do not necessarily

translate into professional competencies for addressing the impact of environmental factors on health in clinical practice. Another line of inquiry pursued by our team involves semi-structured interviews with medical staff, focusing on the interpretations and meanings they assign to these concepts, how they incorporate them into their professional practice, and how they conceive the environment–health relationship.

Sustainability in universities can be approached through teaching and student training, specialized research, ecological awareness strategies, institutional environmental management, and outreach and community engagement projects. Some studies have found that such initiatives are generally fragmented, with few coordinated actions across different areas^{23, 24}. The preliminary results of this study are consistent with regional literature that stresses the need to introduce a systematic approach to environmental dimensions in medical curricula, in order to ensure the development of environmental professional competencies whose importance grows daily^{26, 27}. A systematic review of 104 medical schools in Latin America reported that only 36% included a course on environmental health in their curricula, while 99% did not offer specific courses on climate change and health²⁸. An exception was found in Peru, where “an analysis of the curricula of 41 medical schools” revealed that 70% offered courses related to environmental health²⁹.

Moreover, there are no concrete curricular modifications that prepare future generations of professionals to face the challenges of environmental health. This critical gap underscores the importance of rethinking sustainable development as a transversal axis, capable of permeating both professional training and institutional values.

Establishing links between sustainability and health remains a pending challenge, as there is no consensus on the specific professional competencies needed to practice medicine from a sustainable development perspective. In principle, the approach of environmental determinants of health should be incorporated into training⁶. Education for Sustainable Development (ESD), grounded in the United Nations Sustainable Development Goals, provides a disciplinary framework to strengthen knowledge and skills that foster the sustainability of societies³⁴.

Against this backdrop, it is necessary to design actions that highlight the value of knowledge and practices related to sustainability across the different pillars of the university sphere:

- university policies and strategic plans
- learning environments
- teaching processes
- competencies of administrative and teaching staff
- research
- university outreach

CONCLUSIONS

In this study, we analyzed the graduate profiles and curricula of higher education institutions offering

medical programs in Argentina, seeking references to a sustainable development perspective framed in terms of the health–environment nexus. The findings reveal a significant absence of such a perspective in medical training, with only 12.7% of the institutions studied indicating that they prepare their students along these lines. Even in these cases, curricula lack specific courses on environmental health that would allow for the structured development of these competencies. Although some programs include content related to environmental health, ecology, and their impact on human health across different areas of the curriculum, sustainability does not appear as an explicit guiding axis.

The lack of access to safe water, overcrowding in vulnerable neighborhoods, rural communities' exposure to agrochemicals, vector-borne diseases, and the health impacts of climate change, among others, are pressing issues that require a comprehensive public health response. However, there are currently no systematic strategies in national medical training aimed at equipping health professionals for the prevention and management of these scenarios. In this regard, sustainability in health implies a profound transformation of medical education –one that goes beyond acknowledging the environmental impact on health, to actively preparing professionals to intervene in the prevention and management of diseases associated with socio-environmental factors. The goal is to foster professionals capable of detecting environmental health risks in their patients and of identifying emerging health issues through a clinical approach that integrates environmental protection as a core component of population well-being.

These findings highlight several opportunities. First, they underscore the importance of incorporating Education for Sustainable Development (ESD) into universities, in order to train health professionals able to confront environmental challenges and to promote environmental and social responsibility within healthcare settings. Second, they point to the need to deepen two lines of research at our University: the systematic analysis of the curricula of the 47 medical programs in Argentina, and the understanding of how health professionals perceive and practice sustainability in their clinical work.

In parallel with research, the University is carrying out training projects, management initiatives, and technical collaborations to integrate the perspective of sustainable development into its three core pillars. In 2024, the Rector's Office, the University Social Observatory (OSU, Observatorio Social Universitario), and the Research Center on Management, Education, and Sustainable Development (CIGEDS, Centro de Investigación en Gestión, Educación y Desarrollo Sustentable) participated in the UNESCO-IESALC training program “*Leadership and Sustainable University Governance*”, aimed at senior administrators of Latin American universities. The University has also developed and implemented the course “*Diversity and Gender: Cross-cutting Competencies for Health Personnel*”, open to the entire University community and the Hospital Italiano of Buenos Aires,

with 208 participants in 2024, officially recognized as part of the working/academic schedule. Additionally, educational materials were created to support accessibility and inclusive communication. The University joined the Network of Argentine Universities for Environmental Management and Social Inclusion (UAGAIS, Red de Universidades Argentinas para la Gestión Ambiental y la Inclusión Social). Recently, the National Interuniversity Council (CIN, Consejo Interuniversitario Nacional) endorsed the implementation of the Environmental Education Law across all Argentine universities. As a team and as a higher education institution, we hope that these initiatives will foster transformations in the values of both active and future health professionals.

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ANNEX 1

Higher Education Institutions Offering Medical Programs in Argentina

Jurisdiction (J)	University/Institute (Curriculum year)	Type of governance (TG)	N.º by J & TG
Buenos Aires	Austral (2010); Católica Argentina (2016); Morón (2018); FASTA (2022)	Private	4
	Nacional de La Plata (2011); Nacional Arturo Jauretche (2015); Nacional de Villa Mercedes (2018); Nacional José C. Paz (2019); Nacional de Mar del Plata (2022) Nacional de La Matanza (2023); Nacional del Sur (2023); Nacional del Centro de la Pcia. Bs.As. (2024) UCES (2010); del Salvador (2014); Hospital Italiano de Buenos Aires	Public	8
CABA	(2018); CEMIC (2022); Fundación Barceló (2022); Abierta Interamericana (2024); Maimónides (2024); Favaloro (S/D*) UBA (2024)	Private	8
	Nacional del Chaco Austral (2022)	Public	1
Chaco	Nacional de la Patagonia San Juan Bosco (2013)	Public	1
Chubut	Ciencias Biomédicas de Córdoba (2015);	Public	1
Córdoba	Católica de Córdoba (2017)	Private	2
	Nacional de Córdoba (2022); Nacional de Villa María (2017)	Public	2
Corrientes	Nacional del Nordeste (2022)	Public	1
Entre Ríos	Concepción del Uruguay (2017); Adventista del Plata (S/D*)	Private	2
	Nacional de Entre Ríos (2018)	Public	1
La Rioja	Nacional de La Rioja (2017)	Public	1
Mendoza	Católica de Cuyo (2011); de Mendoza (2016); del Aconcagua (2019)	Private	3
	Nacional de Cuyo (2011)	Public	1
Misiones	Católica de las Misiones (2023)	Private	1
Río Negro	Nacional de Río Negro (2022)	Public	1
R.Negro/Neuquén	Nacional del Comahue (2023)	Public	1
Salta	Nacional de Salta (2020)	Public	1
Santa Fe	Italiano de Rosario (2007)	Private	1
	Nacional del Litoral (2017); Nacional de Rosario (2024)	Public	2
Stgo. del Estero	Nacional de Santiago del Estero (2014)	Public	1
Tucumán	del Norte Santo Tomás de Aquino (2015); de San Pablo-T (2019)	Private	2
	Nacional de Tucumán (2020)	Public	1
Total			47

* N/A: No data available. Source: own calculations.