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Review Article

Improving Efficiency in Healthcare: Lessons from Successful Health Policies in Chile

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Background. Chile has made significant progress in recent decades in implementing policies to improve the efficiency of its health system with an impact on population health.

Aim. To present five case studies of successful policies whose impact has been documented.

Methods. Case study report.

Results. First, we present a summary of the evidence supporting the policy that is changing the Chilean care model from a problem-based to a patient-centered care model. Second, we show how tele-nephrology and advanced renal care units have demonstrated significant impact on chronic kidney disease in Chile. This internationally recognized successful Chilean policy is contributing to address one of the conditions that explains the highest financial burden on the health system. Third, we present recent evidence on the effectiveness of teleoncology care in Chile. Fourth, we highlight the most recent system of epidemiological surveillance implemented in Chile, the EPIVIGILA system, which was essential to support decisions throughout the pandemic. Finally, we underline the health benefit plans implemented in recent decades to improve access to services and financial protection.

Conclusions. Chile has successfully implemented policies in its health system that have an impact on efficiency and population health. These experiences can be replicated in countries facing similar challenges, using the Chilean experience as a benchmark.

Keywords: Efficiency, Health policy, Kidney disease, Cancer care, Multimorbidity, Health care economics and organizations, Population surveillance, Chile.

Introduction

Over the past decade, Chile has made significant efforts to improve health system performance and population outcomes. According to the Organization for the Economic Cooperation and Development (OECD), Chile has had one of the highest growth rates in health expenditure over the last 10 years, with total health expenditure above the average for OECD countries (1). However, due to the demographic and epidemiological transition, as well as the

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increasing cost of healthcare services and the growth of high-cost technologies, the country still faces important unmet needs, health inequalities (2), and population demands (3–7).

Fortunately, over the past decade, Chile has implemented several health policies to improve efficiency and address health inequalities. However, in many cases these policies have been implemented with the expectation of a positive impact, but with limited evidence of their impact on health system performance, population health and broader socioeconomic consequences.

The purpose of this work was to identify a set of successful policies implemented in Chile, and to examine and describe elements related to their design, implementation, and impact. We present five case studies for which there is evidence of impact. Finally, we discuss their relevance for other countries, highlighting their strengths as well as the opportunities and challenges for future innovation.

Methods

We used a methodological triangulation approach to identify, select and examine a set of case studies, which are considered successful health policies implemented in Chile. First, we conducted a review of documented health policies implemented in the country over the past 20 years. We identified 106 policies, which are listed in the Appendix. We then searched for published evidence on the degree of success of the policy. The selection was based on the amount of available evidence demonstrating the impact on health and/or health care performance, and the relevance of the policy in the more recent period that included the COVID-19 pandemic. We found three policies that met this requirement: (i) the impact of a new patient-centered healthcare model; (ii) innovation in the prevention and control of chronic kidney disease; and (iii) policies to improve access to healthcare.

This search was then supplemented by a short interview to five key opinion leaders (KOL). The KOL were former ministers or undersecretaries of health, who were asked to identify the successful policies implemented in their country. We identified two additional policies that seemed relevant to consider: (i) epidemiological surveillance policy, and (ii) teleoncology care in Chile. Then, for those five case studies we convened a set of well-recognized national experts for each case, who contributed to describe each case study.

Results

A summary of the case studies described in terms of the health policy cycle (8) is presented in Table 1.

Case study 1. The impact of a new patient-centered healthcare model

Multimorbidity is a priority on the health agenda due to its direct relationship with mortality and health care utilization. It has a detrimental impact on population health affecting quality of life and challenging the sustainability of the health system through greater demand for healthcare services (9). Its global prevalence has been estimated at 37,2%, with South America having the highest prevalence in the world. In Chile, according to the last national health survey in 2017, there are 11 million people with non-communicable diseases (NCDs) (approximately 56% of the population), and 82% of them have multimorbidity (10).

In 2016, a partnership between Pontificia Universidad Católica de Chile (PUC), the public health network (Southeast Metropolitan Health Service), and the national payer (FONASA) began piloting a new care model focused on people with multimorbidity. The "Multimorbidity patient-centered care model" (MPCM) aimed to reduce NCD complications, emergency department visits, and hospitalizations, and to improve people's quality of life (11). It was implemented in seven primary care centers and three hospitals, which benefited more than 22,000 patients. The model was based on a comprehensive care, case management, self-management, continuity of care, risk stratification and shared responsibility. The intervention strategy introduced new activities, such as case management, transitional care and medication reviews, and reorganized the existing chronic care services according to multimorbidity complexity or risk, offering individualized comprehensive care plans capable of responding to individual and family needs. Therefore, three groups of health services were offered: high-risk services based on case management and transitional care, moderate-risk services based on disease and self-management, and low-risk services based primarily on remote self-management activities (11–13). The implementation lasted three years where academics provided continuous on-site support, monitoring, local adaptations, evaluation, and documentation of this complex process of intervention implementation. In addition, technical training in multimorbidity, patient-centered care, and risk stratification was provided to primary care and transitional tertiary care teams.

Lessons learned from the implementation process and the diverse evaluation of the MPCM demonstrated that it was feasible to introduce it into daily primary, secondary, and tertiary care practice. Impact evaluations have been conducted on health care utilization (11–13), costs (14), patient and healthcare team perspectives (15), implementation of key performance indicators (16) and the family and community care model (17). They were published and shared with the local Ministry of Health (MoH) along with implementation process documents to facilitate and support

Table 1. Description of the health policies in terms of the steps of the health policy cycle.

	Problem identification and agenda-setting	**Policy formulation**	**Policy adoption and implementation**	**Policy evaluation**	**Policy modification**
Patient-centered health model	A care model based on diseases is not efficient enough to provide appropriate care to a population with a high prevalence of multimorbidity. Chile has prioritized the improvement of primary care.	New care model in primary care, based on risk stratification of patients in high-moderate and low. Each receives care adequate to their needs.	The policy has been implemented in a jurisdiction of 1.5 million people, supported by the national payer, the Ministry of Health, local municipalities and the public providers' network.	Impact and economic evaluation have demonstrated, improvement in health outcomes, health system performance and savings in the overall health system expenditures (see text for references).	Risk stratification is under evaluation. The inclusion of mental health and non-oncologic chronic pain in the stratification system will change the demand and will need supply adjustments to respond efficiently to these problems.
Innovation in chronic kidney disease (CKD) care	CKD determines a high burden of disease. Dialysis is the service that explains the highest share of the budget of the national health benefit plan in Chile. The progress of CKD to its end stage can be avoided or postponed in many cases.	Implementation of centralized TN to provide timely access to nephrological evaluation, reducing the demand for specialized face-to-face consultancies. Further, the UCRA provides comprehensive care to patients with 4–5 stage CKD; including conservative care, peritoneal dialysis, and actions that decrease emergency dialysis.	TN was first implemented in 2012, and UCRA in 2016, both in Hospital Las Higueras, Talcahuano, Chile. TN was expanded in 2018 by the MoH through the "Digital Health" department. The MoH has decided to scale up the UCRA model in public hospitals.	TN evaluation demonstrated a reduction in waiting times, increased counter-reference to primary care, and a decrease in the demand for specialist consultancies. UCRA demonstrated an increase in conservative treatment, an increase in peritoneal dialysis, and a reduction in emergency dialysis. Savings of up to USD 1 million per year were estimated for only Hospital Las Higueras.	The UCRA model has also been promoted by not-for-profit private organizations, which have accelerated the implementation of these units in the public sector. By 2024, privately sponsored UCRAs have been implemented in 15 public hospitals in Chile.
Teleoncology care	Cancer became the first cause of death in Chile and a political priority alongside a new specific law. Innovation in cancer care is needed. The MoH set up a new department of digital health, which can implement teleoncologic care.	In 2019 the MoH determined that all cancer patients should be evaluated by a multidisciplinary committee. Given the deficit of specialists, the MoH implemented the Oncological tele committee strategy in 2020, which facilitated access to all cancer patients to these committees on time.	Committees are overseen by the MoH Digital Health department and analyze oncological cases referred from hospitals without specialists. Committees were formed by medical and radio oncologists, surgical oncologists, hematologists, palliative physicians, nuclear medicine doctors, radiologists, and an administrative team to coordinate the meetings.	The telecommittees have proved to be successful in the last three years. It responded to 8% of the national new cancer cases in Chile, especially those who do not have access to specialists. It changed indications in 23,6% of cases evaluated, which is expected to improve patients' treatments and outcomes, as well as a better use of public resources.	Continuous improvement expanding access to cancer patients and teams, and further reducing waiting times.

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Table 1 (*continued*)

	Problem identification and agenda-setting	Policy formulation	Policy adoption and implementation	Policy evaluation	Policy modification
Epidemiological surveillance (EPIVIGILA)	The registry of diseases in Chile, before the EPIVIGILA system, was made by sending a paper form to regional authorities, which took a lot of time be process, and the quality of the final record was not guaranteed.	Replacement of the paper-based disease notification system with an integrated technological platform that increases the accuracy and speed of information transference to policymakers.	EPIVIGILA was implemented during the COVID-19 pandemic, integrating diverse sources of information managed by local health services, as well as public and private laboratories performing diagnostic tests.	The systems allowed the country to have timely, validated, and high-quality information for daily policy-making during the pandemic. It also allowed scientists to forecast the epidemiological progress of the disease across the country and produce health research.	Future perspective to incorporate AI in the EPIVIGILA system.
Access to healthcare technologies	The demand for high-cost technologies has increased in the last decade. Organized civil society is significantly more empowered to demand their rights through different channels. There are new approaches to providing timely access to high-cost technologies.	New funds for high-cost technologies were created by law, which brought new HTA processes to inform the priority setting of resource allocation.	New funds have been used to provide access to new medicines and medical devices. A new HTA department created in the MoH is responsible for the HTA process and its accountability.	Besides the improvement in access to new technologies, recent evaluations have shown significant improvement in transparency and accountability of coverage decisions. However, the system still needs improvements in the content and procedures.	MoH implemented the first managed entry agreement in 2024 for one high-cost drug.

MoH: Ministry of Health; TN: tele-nephrology; UCRA: Multidisciplinary advanced renal care unit; CKD: Chronic kidney disease; HTA: health technology assessment; AI: Artificial intelligence.

the national scale-up of this strategy. One of the most relevant results came from the economic evaluation, which showed to increase costs in primary care, but reducing costs in tertiary care due to a reduction in hospital admissions and bed days, resulting in an overall system cost reduction of 12%. The MPMC also demonstrated significantly higher survival in the exposed population (HR 0.7; p-value <0.01) (14).

The MPMC model and its comprehensive evaluation that included impact on performance, survival and economic evaluation were transferred to the MoH as evidence was generated. These inputs were essential for the health authority, which decided to scale up the MPMC model to the rest of the country. The new policy called ECICEP (Estrategia de Cuidado Integral Centrado en las Personas) began in 2020, with the MoH providing resources and regulations to support this transition (18). To date, the country has trained more than 8000 health professionals and the implementation has begun in more than 80% of the territory, making Chile a pioneer in Latin America (19). However, some challenges remain, such as the need to incorporate more considerations in the stratification model, such as mental health and chronic pain (20).

The experience of Chile has demonstrated that changing the structure of the care model has improved the efficiency and performance of the health system. This change from an approach based on individual care programs, such as cardiovascular, respiratory, and mental health programs, with fragmented care to a model that stratifies patients according to risk is feasible at national level.

Case study 2. Innovation in prevention and control of chronic kidney disease: tele-nephrology and the multidisciplinary advanced renal care unit

Chronic kidney disease (CKD) constitutes a public health problem that is growing significantly worldwide (21,22). Recent estimates have projected a large increase in CKD in Chile for the period 2021–2041, especially in stage 5 requiring kidney replacement therapy, which will increase 2.4 times (23) (Fig. 1). This situation is aggravated by the shortage of specialists, which becomes critical in developing countries (24–26), the consequent increase in waiting

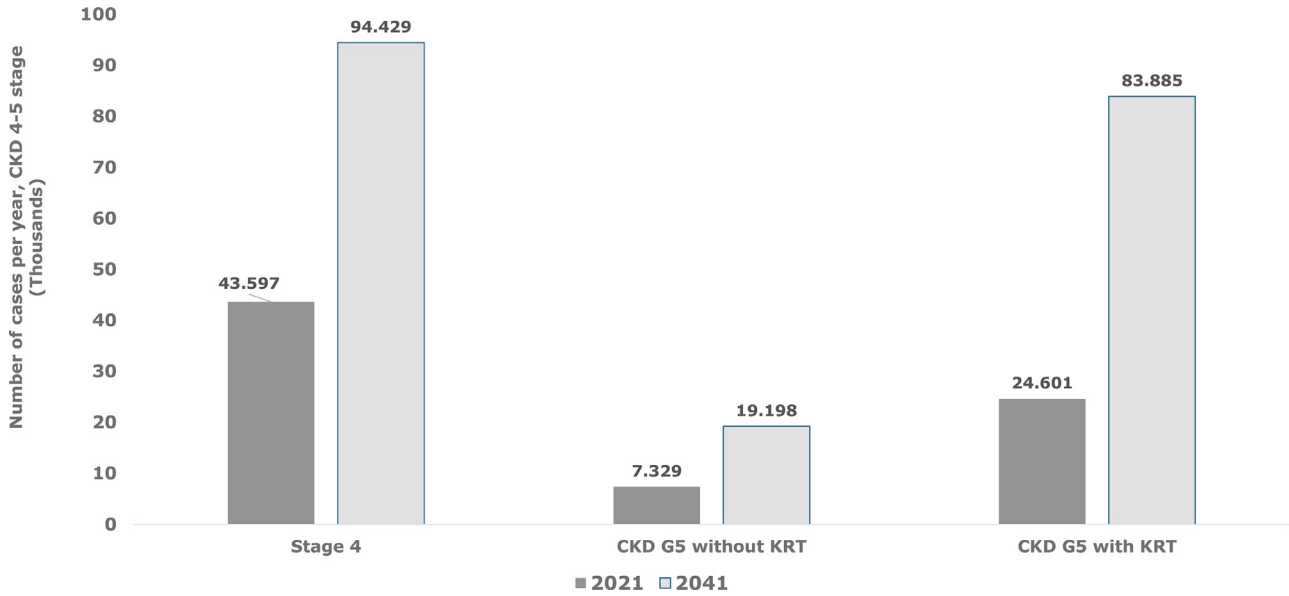

Fig. 1. Projection of the Chilean adults with chronic kidney disease stage 4 and 5 for the period 2021–2041. *Elaborated with data reported by Walbaum M, et al. 2021 (23). KRT: Kidney replace therapy (hemodialysis, peritoneal dialysis and kidney transplantation).

lists and delays in diagnosis and/or timely treatment. In this context, it has been proposed that the implementation of telemedicine in nephrology (TN) can improve health system performance by supporting integration and coordination between primary health centers (PHCs) and the most specialized levels including a multidisciplinary renal care model in the advanced stages of the disease (27–29) (6–14).

Telenephrology: a proposal for digital connectivity and CKD search in the public health network

The first reported experience with TN in Latin America was implemented in 2012 in Concepción and Talcahuano, cities in southern Chile (29). After six months, the TN modality reduced the waiting time from an average of 225 days to 2.5 days for teleconsultation and 30 days for in-person evaluation. Furthermore, most patients evaluated (57.3%) did not require an in-person evaluation by a nephrologist but were referred by the specialist to primary health centers (PHCs) with treatment recommendations. PHC physicians completed the satisfaction survey and reported an approval rate of 86.7% for TN (29).

In 2018, the MoH implemented the "Digital Hospital" initiative, later renamed the Department of Digital Health, a public policy aimed at promoting the use of telemedicine in all specialties of the healthcare network (30). From September 2018–July 2024, 56,543 asynchronous nephrology teleconsultations were evaluated, of which 80% were older than 60 years old. Most of them (69.2%) were counter-referred to PHC with recommendations from the specialist, without the need for a face-to-face consultation, freeing up outpatient appointments in the hospital nephrology unit for patients with more complex kidney diseases, which optimized the limited availability of nephrology specialists in the country (31). Likewise, the TN modality facilitates the care of elderly CKD patients, with severe mobility limitations, bedridden, or residents of rural or difficult-to-access areas, avoiding unnecessary travel. Furthermore, the Chilean TN strategy identified patients with advanced CKD (stages 4 and 5) in a timely manner: 8,707 (15.4 %) and 1,413 (2.5 %), respectively.

New option: multidisciplinary management in the care of patients with advanced CKD

People with advanced CKD (stages 4–5) are more vulnerable to adverse events, morbidity and mortality, risk of accelerated progression and increased costs for hospitalization, dialysis and kidney transplant therapies (32,33). In this context, a multidisciplinary care model has been proposed for the comprehensive management of this population, with the goals of reducing the morbidity and mortality associated with advanced CKD, timely and informed admission without urgency to dialysis/transplant or conservative non-dialytic treatment (34–41). This latter option is particularly recommended for people with high frailty and/or multiple disabling comorbidities, for whom dialysis does not offer improved quality of life or survival (34,36,39–45).

In Chile, Hospital Las Higueras in Talcahuano implemented the first multidisciplinary advanced renal care unit (Unidad de Cuidados Renales Avanzados, UCRA) in 2016. Using the TN strategy described above, the system was able to identify 1280 patients in stages 4 and 5 and incorporate them into comprehensive and continuous care. The

initial results of the UCRA reported that 25.3% patients chose conservative non-dialysis treatment; peritoneal dialysis increased from 5 to 16.3%, admissions for hemodialysis (HD) with arteriovenous fistula (AVF), increased from 28.3% to 60.3%, and only 0.9% of patients were admitted for dialysis emergencies (29). An internal cost study conducted by the MoH estimated savings of approximately USD 1,000,000 per year, associated with the UCRA model implemented only at Hospital Las Higueras-Talcahuano, which suggests significant savings if this program were expanded nationwide.

In conclusion, the TN and the UCRA are complementary strategies for addressing people with CKD. TN as a public policy in Chile has allowed timely access to the nephrologist for patients with CKD referred from PHCs, reducing waiting lists at the national level and optimizing the scarce resources of nephrology specialists. Similarly, the implementation of the UCRA model has allowed for personalization and agreement with the patient and/or family on the treatment decision in the advanced stages of CKD, dialysis/transplant or conservative treatment. Recently, based on the described experience and international reports, the MoH has implemented a national plan for a gradual increase of new UCRA units across the country in parallel with education and training of kidney health teams on the management of people with advanced CKD.

Case study 3. The effectiveness of teleoncology care in Chile: recent findings

In Chile, the burden of cancer has reached alarming proportions, with approximately 55,000 new cases annually and a mortality rate of 50% at five years (Source: Globocan 2020). Since 2019, cancer has been the leading cause of death in Chile, surpassing cardiovascular diseases (46), accounting for 8.9% of all health expenditures and 0.69% of the gross domestic product (47). This scenario is aggravated by the aging of the population, exposure to risk factors such as alcohol and tobacco consumption, obesity and sedentary lifestyles, low coverage of screening tests, late diagnoses and, in advanced stages, limited access to exams and treatments, as well as the lack of discussion of each case in multidisciplinary oncological committees.

In 2018, less than 50% of cases were discussed in oncology committees, according to data from the Chilean MoH. However, in 2019, the health authority determined that all cancer patients must be analyzed in a multidisciplinary committee before starting any type of treatment. This measure was in line with the first National Cancer Plan published in 2018, which highlighted the need to improve the provision of care services. However, there is a significant shortage of oncologists, who are largely concentrated in large cities, affecting patients from remote or rural areas.

In order to overcome geographical barriers, as well as obstacles to timely access to specialists, the first National Cancer Plan 2018–2028 set up the "Oncology tele-committee strategy" initiative, which was launched in 2020. These committees, overseen by the MoH Digital Health Department, analyze oncology cases referred from hospitals without specialists. These tele-committees are composed of medical and radiation oncologists, surgical oncologists, hematologists, palliative care physicians, nuclear medicine physicians, radiologists, and an administrative team that coordinates the meetings and records the recommendations made by the specialists. They operate through teleconference using a special software that allows the treating physician to provide case data and make patient's studies available for discussion in plenary.

The tele-committee strategy has proven to be a success with significant results. Between September 2020 and December 2023, 14,195 oncology cases were discussed throughout the country, which represents 8% of new cases annually, and approximately 10% who were diagnosed in the public health system. According to an internal evaluation performed by the MoH Digital Health Department, which analyzed 14,130 cases from January 1, 2021–December 31, 2023, there was a significant change in the therapeutic proposal in 3,338 cases (23.6%). This result could potentially improve patient survival by ensuring adequate diagnosis and treatment for the patient. On the other hand, the discussion of these cases and the change in the therapeutic proposal has made it possible to optimize the use of resources of the Chilean public health system by avoiding diagnostic tests, treatments, and referrals that do not provide benefit to patients.

This initiative has also contributed to the training of primary care physicians in oncology and to the reduction of waiting times for diagnosis and treatment. The different types of committees dealing with cases that require specialized knowledge such as hematology, palliative care, brain tumors and oncogeriatrics, have strengthened the coverage and quality of oncological care for patients who live far from specialized centers in the country.

In summary, tele-oncology committees have emerged as an innovative and successful solution to address the challenges of oncology care in Chile. This strategy has proven to be effective in providing access to specialists for patients without resources and also generating significant changes in therapeutic proposals. This approach does not only have a positive impact on patient survival, but it also represents a crucial step towards the continuous improvement and rational use of oncology services in the country.

Case study 4. A new epidemiological surveillance policy: the EPIVIGILA system

The EPIVIGILA system, implemented by the Chilean MoH in March 2020, represents a monumental leap in

epidemiological surveillance in the Chilean health sector (48). This digital platform is meticulously designed for the surveillance, documentation, and analysis of notifiable diseases and epidemiological outbreaks nationwide. Before its implementation, infectious diseases were reported using a standard paper form, which was then submitted to regional authorities. The platform differs from its predecessors by offering a technologically superior, integrated platform that significantly increases the accuracy and speed of disease reporting.

The instrumental role of EPIVIGILA was particularly evident during the COVID-19 pandemic, where it enabled the seamless integration of national health services, including clinical laboratories performing reverse transcription polymerase chain reaction (RT-PCR) testing (49). The notification process within EPIVIGILA for COVID-19 cases began with a medical consultation. Based on the prevailing clinical criteria, this consultation could lead to the notification of a suspected case and the request for an RT-PCR test. Until the test results were confirmed, the case remained classified as suspected. Receipt of the test result would either confirm the case or label it as probable if the sample was insufficient for a definitive conclusion. These categorizations (including suspicion) triggered isolation and follow-up protocols. Conversely, a negative test result led to the dismissal of the case.

Case notifications were sent first to provincial services for data verification, then to regional services for case validation, and finally to central authorities for epidemiological reporting and public health management. The robustness of the system was further enhanced by its integration with the sample collection system, which received notifications of tests performed and RT-PCR results from over 200 accredited laboratories, including 40 in public hospitals, 32 in private labs, and 28 in universities. This comprehensive approach enabled the collection of detailed statistics at both national and local levels. These statistics were made publicly available, with daily updates by the MoH, reflecting a commitment to efficiency and transparency in the disease control process.

The EPIVIGILA platform has also been instrumental in facilitating epidemiological research through its high-quality data collection, making use of data volumes that were previously unattainable in the country. Successful examples of this research include the creation of sophisticated epidemiological models designed to identify key variables in predicting the spread of epidemic diseases (50) and the assessment of the diagnostic accuracy of the clinical manifestations of COVID-19 (51). This led to the development of a nuanced multivariable model capable of estimating the pre-test probability of COVID-19, considering the prevalence of the disease and these manifestations, which could prove particularly useful in scenarios where diagnostic and confirmatory tests are scarce.

Furthermore, EPIVIGILA also played a critical role in the rapid evaluation of various disease prevention strategies, including the efficacy of the inactivated SARS-CoV-2 vaccine. Leveraging data from more than 10 million individuals, research spearheaded by Jara and colleagues provided a comprehensive understanding of vaccine efficacy (52). Their results, adjusted for several covariates, demonstrated that the vaccine was 65.9% effective in preventing COVID-19, 87.5% effective in preventing hospitalizations, and 86.3% effective in preventing disease-related deaths. These insights have been instrumental in resolving debates about vaccine efficacy in Chile, alleviating concerns within certain medical circles and among the general population.

In essence, the EPIVIGILA system has revolutionized the process of infectious disease reporting and analysis, and its impact extends far beyond the COVID-19 pandemic. It has established a new benchmark for epidemiological surveillance in Chile and represents a significant step forward in the development of an agile, cohesive public health infrastructure. This system is not only capable of addressing current health challenges but is also well equipped to deal with future health crises, underscoring its critical role in improving public health response and preparedness.

Case study 5: improving access to healthcare technologies and services

Chile has implemented several access policies to achieve significant progress toward universal health coverage. The first universal health plan, the Explicit Health Guarantees (Garantías Explícitas de Salud, GES) was launched in 2005 (53). It used the tools of evidence-based medicine and public health to prioritize health problems, technologies and services, with the goal of making the health system sustainable (54). Although the GES placed health planning at the forefront of the process, the imbalance between the increasing demand and available resources made the GES not enough to meet the expectations of all citizens.

In 2015, Chile enacted the law 20.850 -also known as "Ley Ricarte Soto" (LRS) (55) -which provides a universal coverage system for high-cost health technologies. This law was created in response to the social demand known as "The Patient's March", of which Mr. Ricarte Soto was the leader. Its implementation has improved the financial protection of all citizens against catastrophic diseases, incorporating 110 health technologies including diagnostics, drugs, and other high-cost services, for 27 health problems (56). The law defines the annual fund at approximately USD $125 million plus the remnants of previous periods. This allowed the fund to allocate a budget of USD $160 million in 2022, or 1.37% of government health expenditures (56).

The LRS introduced a new process for the evaluation and selection of new technologies, managed by the De-

partment of Health Technology Assessment in the MoH. It follows a three-stage process: evaluation, recommendation, and decision. In the evaluation phase, the effectiveness, safety, economic impact, implementation issues, and ethical, social and legal considerations of the technology are assessed (57). In the recommendation phase, an advisory committee, which includes patient group representatives and technical experts, prioritizes technologies based on the results of the evaluation phase, using the "Evidence to Decision Framework" (EtD) (58). Finally, the selection of health technologies is made by the Ministers of Health and Finance.

A recent study that evaluated the HTA process supporting the selection of technologies in the LRS, showed a significant improvement of the decision-making process compared to other previous systems such as the GES. However, it also revealed technical inconsistencies and scientific disagreements that can be improved in the future (56). Unfortunately, the LRS is a fixed fund that has been fully allocated to technologies, leaving many new high-cost technologies out of the fund. To address this problem, in 2024, the MoH introduced the first outcome-based managed entry agreement (MEA) as a new purchasing mechanism to improve timely access to high-cost drugs. It is worth noting that MEAs were considered in the LRS and it took nine years to see the first one in practice (59).

Given the gaps of GES and LRS in access to health care, Chilean society has found a new way to demand access to services and technologies. New laws have brought, directly or indirectly, new resources to the health system, allowing the health authority to provide access to more care. The cornerstone of these initiatives was the Cancer Law, which not only established activities for cancer health planning, but also brought new resources for infrastructure and research, and promoted the creation of the Cancer Drug Fund (60). After the Cancer Law, other initiatives have followed the same pattern, such as the Palliative Care Law, the Mental Health Law, and Fibromyalgia and Chronic Pain Law. It has been suggested that these legal initiatives may provide an alternative route to priority setting, which can affect the health authority's plan (61).

Discussion

Chile has implemented several health policies in the last 20 years to improve the efficiency of the healthcare system. However, many of them have been applied based on their rationale and the promise of positive effects on the health of the population, but not always based on evidence of their real effect in actual practice. The purpose of this manuscript was to describe successful health policies implemented in Chile, for which there is evidence of their impact. We focused the analysis on actions executed in the health system that helped the country to face the challenges derived for the COVID-19 pandemic.

After reviewing the health policies implemented in Chile, we chose five successful initiatives that can be adopted by other jurisdictions. We emphasize that the focus of our selection was to identify policies implemented in the health system, introducing efficiency, contributing to enhance its performance and thus, improving the health of the population. We are aware of other important policies, such as those listed in the Appendix; however, we considered these five policies as cases that can be documented as case studies. We also recognize that these actions are complementary to other effective population-based policies in Chile. For example, tobacco regulations which have been shown to reduce its consumption (62), or food labeling policies (63,64) and increased taxes on sugary drinks (65,66) to combat obesity and non-communicable diseases (NCDs), and increased taxes on alcohol to modify consumption patterns (67).

The first three case studies showed successful interventions that improved technical efficiency. In all of these cases, there is evidence of improved health system performance with no additional budget. Moreover, the MPMC model demonstrated to generate savings for the health system and improve population health outcomes in a relatively short period of time (14). Similarly, the UCRA model was shown to generate savings that justify its implementation at the national level. We argue that these two policies are supported by enough evidence and practical knowledge in Chile, which can be used in other jurisdictions. They are particularly relevant in the post-pandemic period, due to the large number of patients with NCDs whose attention has been deferred.

Although the teleoncology care model may require additional resources to be implemented, we argue they were marginal in the case of Chile because it used the MoH's Digital Health platform. However, we acknowledge that its implementation may need further resources in countries where telemedicine has not yet been implemented at a national level, and its impact on efficiency becomes an empirical question. Nevertheless, there is widespread evidence suggesting that the implementation of telemedicine for a wide range of health problems brings efficiency to the system (68–71). The Chilean case adds the benefits of a structured cancer program on health system performance.

On the other hand, concerns have been raised that faster diagnostics and indications may increase demand in the health system. In fact, tele-committees generate an increase in the demand for diagnostic tests or procedures, that in many cases are not available in the local public system and they must be performed in the private sector, paid for by the public hospital. However, this is offset by avoiding other unjustified exams or services, which generates resource savings. In addition, earlier diagnosis often leads to solutions that are cheaper than the expensive treatments needed for more advanced stages of a disease. Notwith-

standing, this concern deserves to be addressed empirically with further research.

On the other hand, we decided to highlight the implementation of EPIVIGILA because it was a cornerstone of the epidemiologic surveillance during the pandemic and caused a deep change in the Chilean data system. EPIVIGILA allowed the health authority to make timely decisions and evaluate the public health decisions in a short period, which is a major strength that deserves to be highlighted. We argue that this policy was essential for saving lives in the country, which was internationally recognized through the prize "Franz Edelman Award for Achievement in Operations Research and the Management Sciences" received by the Government of Chile in 2022 (72,73).

Future perspectives for the development of the platform include the integration of artificial intelligence (AI) into its analytical framework. AI can greatly enhance epidemiological surveillance using sophisticated models capable of simulating disease propagation and potentially evaluate interventions before their implementation. These models might also optimize resource allocation, the implementation of public health measures, and the forecasting of future scenarios. The continuous adaptive capacity of AI contributes to improve the response during health emergencies, thereby promoting proactive and efficient public health management.

The final case study presents a series of strategies developed over the past 20 years to improve access to health technologies in Chile. Most of them have resulted in health benefit plans that have expanded access to new services and technologies. We have highlighted the transition from policies anchored in robust health planning led by the health authority, to a different path, where Congress produces laws focused on health problems. This approach reflects a broader participation of civil society, which gains knowledge and information through the process and adjusts its expectations of the law. However, it also carries the risk of introducing inefficiencies or inequities, for example, by ignoring the opportunity costs of leaving other problems behind (74).

Regarding access to high-cost technologies, the abovementioned LRS achieved a more robust HTA process in terms of content and procedure than what existed before in Chile, which has contributed to improving health planning. The HTA process also provides an ex-ante evaluation of the expected health outcomes and justification for resource allocation. Nevertheless, there are some areas that require further research, such as the social impact on the financial protection of families and the ex-post evaluation, either in terms of economic or health outcomes, after decisions have been implemented and services provided.

Although these policies have been presented as independent, we argue that they interact in the long run. For example, since dialysis accounts for a large proportion of public health expenditure, prevention and control of renal disease will generate significant savings in the future. These resources can then be used to cover costly technologies for other conditions, such as cancer or rare diseases. Likewise, savings from the patient-centered model and access to better indications for the management of cancer patients also offer the opportunity to reallocate resources elsewhere in the healthcare system.

Finally, we emphasize that these policies are not an exclusive initiative of the MoH, but a collaboration of several stakeholders who contribute to their development in partnership with the health authority. We hypothesize that this multi-stakeholder participation is essential for the success of the policies. Finally, based on the Chilean experience, we conclude that health systems can implement several innovative policies that contribute to improve efficiency and better population health. The successful policies presented in this manuscript address health problems common to most countries around the world and become a useful benchmark to promote their implementation based on the Chilean experience.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.arcmed.2024.103105.

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