



AUTOMATION & ANALYTICS OFFER COMPLETE PICTURE OF STEWARDSHIP AND AMR FOR CHILE

NATIONAL APPROACH SUPPORTS COLLABORATION AND DECISION-MAKING FOR PUBLIC HEALTH



PIONEERING DIAGNOSTICS



SUMMARY

The Collaborative Group for Antibiotic Resistance, led by Jaime Labarca, MD, Head of the Department of Infectious Diseases and Chair of the Division of Medicine at the Pontifical Catholic University of Chile, is connecting an entire network of hospitals with the CLARION™ solution. With better data, easier access, and more efficient reporting, antimicrobial stewardship teams at Chile's hospitals will have a much-improved set of tools to support patient care and help them combat antimicrobial resistance.

BACKGROUND

Worldwide, antimicrobial resistance (AMR) is one of the biggest public health challenges we face, with the potential for far-reaching impacts on community health and the global economy. The UK Department of Health estimates that by 2050, antimicrobial resistance could result in up to \$8 Trillion annual loss in global GDP, for a cumulative total of \$100.2 Trillion lost between 2014 and 2050. The same report also estimates a potential loss of life up to 10 million people per year and 300 million in total between 2014 and 2050.¹

However, these dire estimates need not become reality, as scientists, healthcare professionals, policymakers, and others are working hard to fight antimicrobial resistance. Continuing collaboration both locally and globally is critical, because international and intranational borders do not stop the spread of infectious diseases. While every country, and every hospital, experience varying incidence and types of resistant organisms, the fundamental strategies for antimicrobial stewardship rest on the ability to detect, identify, and track resistance.

In many important ways, Chile has been a leader in antimicrobial stewardship efforts among South American countries. Hospitals are constantly looking for ways to innovate, improve patient care, and bring their antimicrobial stewardship programs to the next level.

Chile's coordinated efforts to combat antimicrobial resistance began in 2004 with the formation of the Collaborative Group for Antibiotic Resistance. In 2007, the group created a diagnostic card to help member hospitals detect and track resistant organisms. By 2010, the interdisciplinary group began to meet on an annual basis and had expanded to more than 40 hospitals, including public, military, pediatric, and private hospitals.



CHALLENGE

Each year, more than 40 participating hospitals report their data to the Collaborative Group for Antibiotic Resistance, contributing their efforts to an annual consolidated report that provides a valuable snapshot of resistant organisms and antimicrobial use across the country.

In addition to the main report, a subset of hospitals has also provided data specific to their ICUs since 2014. These hospitals track the incidence of multi-drug resistant organisms (MDROs) in their ICUs and compare it with their non-ICU data. These more granular reports help identify organisms that are rising threats by tracking their incidence and rates of antimicrobial susceptibility over time.

Everything, from individual hospitals' data submissions to the final, aggregated report for the 40+ hospitals, is done manually in a spreadsheet program. From start to finish, the entire process takes months of intensive work to complete. While the resulting report is extremely valuable, applications to the present infectious disease landscape and patient care are somewhat limited due to the retrospective nature of the data.

SOLUTION

The Collaborative Group for Antibiotic Resistance needed a solution that would allow them to efficiently collect and report infectious disease data for their entire hospital network. CLARION, a software as a service (SaaS) solution designed to automate AMR data aggregation, analysis, and reporting, was an ideal fit. The team firmly believes that better data means better tools for clinical decision-making.

“ CLARION is giving us the opportunity to have better data to fight antimicrobial resistance. ”

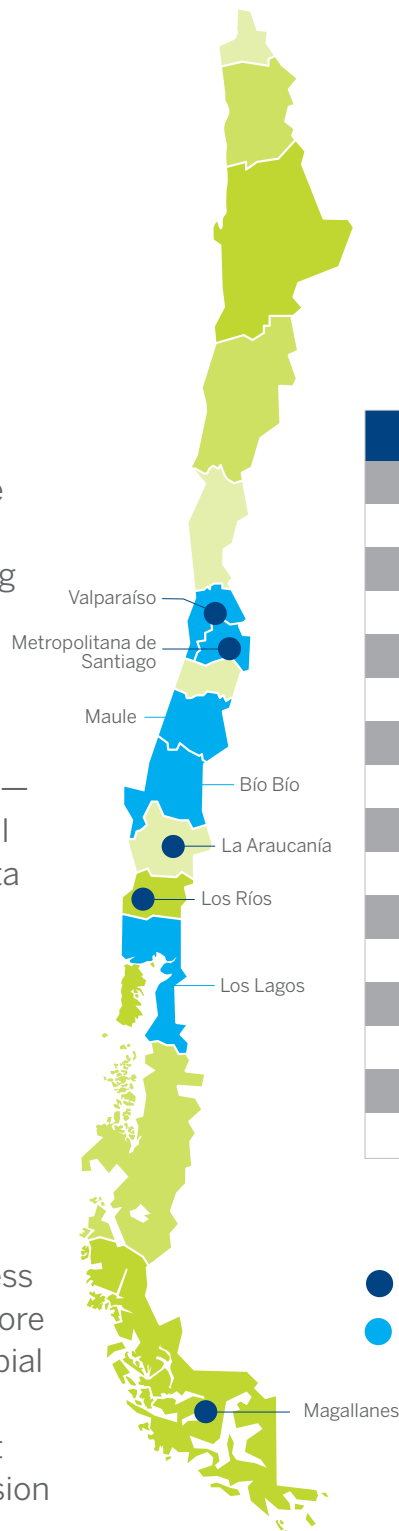
– **CAMILA CARVAJAL RN** at Department of Infectious Diseases and Chair of the Division of Medicine at the Pontifical Catholic University of Chile, Clinical Epidemiology MSc candidate

IMPACT

Growing Data Access Across the Hospital Network

CLARION helped reduce workload while simultaneously providing more accessible data and automated analysis across a diverse, country-wide network of hospitals. Improved data access and analysis mean that the Collaborative Group for Antibiotic Resistance can more quickly generate reports that provide insight into the network’s infectious disease landscape. Even though the team is still working on bringing all hospitals in the network onto the CLARION platform, the comprehensive, network-wide annual report, now takes only a few days to complete. The team gets the same benefits as the manually created annual report—but in a fraction of the time. Eventually, they will leverage CLARION to completely automate data collection for each hospital and increase the frequency of data consolidation and analysis across hospitals, allowing for network-wide reporting more than just once a year.

The team’s goal is to increase the number of participating hospitals in the network by 50% over the next 18 months. As the team in Chile expands the number of hospitals that have implemented the CLARION solution, their access to data will grow at the same time, offering a more complete, immediate picture of how antimicrobial susceptibility is evolving within their network. Importantly, CLARION is a flexible system, so it will easily accommodate this continued expansion to hospitals across the country.



ENABLED	UPCOMING
Metropolitana de Santiago	
9	8
La Araucanía	
1	-
Valparaíso	
2	1
Magallanes	
1	-
Los Ríos	
1	-
Maule	
-	1
Bío Bío	
-	2
Los Lagos	
-	2

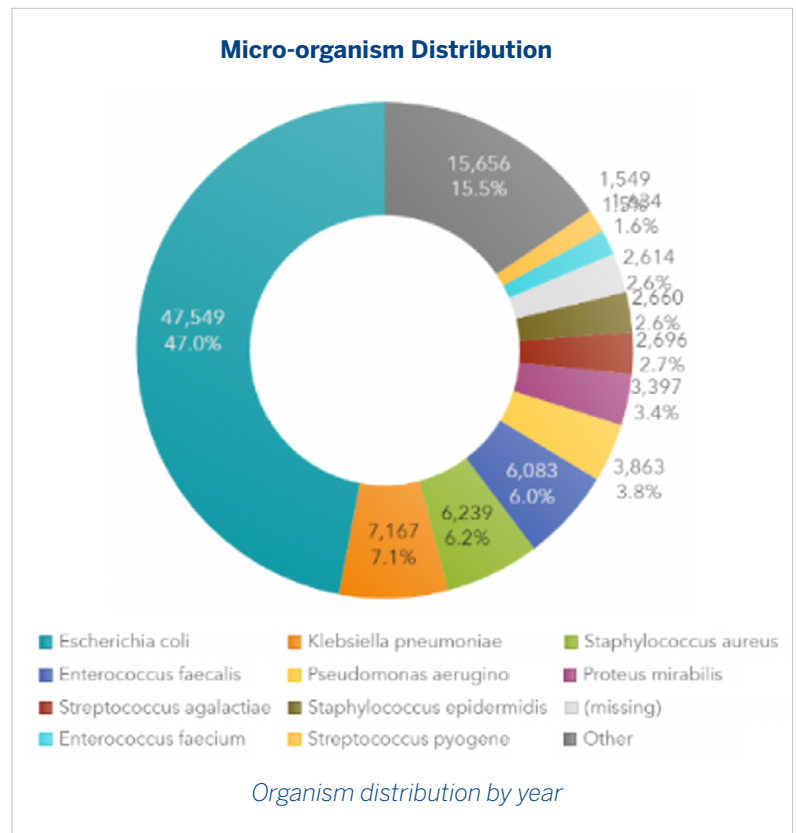
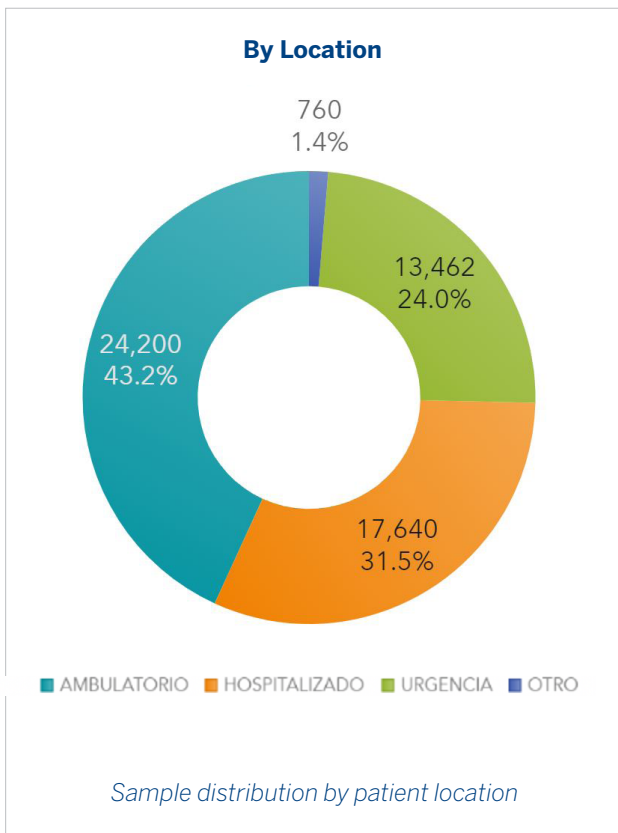
- Enabled
- Regions with upcoming locations



FASTER ANTIBIOGRAMS

A Complete Picture of Antimicrobial Resistance

Because CLARION is instrument-agnostic, data can come from any machine or test, regardless of the manufacturer. This is important because hospitals often have a range of tools and instruments in their laboratories. CLARION can provide both high-level and more granular reports based on data from the instruments it is connected to.



The software also allows the team to explore reports for individual organisms, such as *Acinetobacter baumannii*, which has shown resistance to Carbapenems in recent years and is classified as an “Urgent Threat” by the US Centers for Disease Control and Prevention, as well as more common organisms, such as *Escherichia coli*.

ast_interpretation ▲		S		I		R	
organism ▲	drug_name ▲	#	%	#	%	#	%
Escherichia coli	AMIKACINA	4,812	98.36%	34	0.70%	46	0.94%
	AMPICILINA	1,392	33.43%	72	1.73%	2,700	64.84%
	AMPICILINA/SULBACTAM	182	36.69%	42	8.47%	272	54.84%
	BLEE	2	100.00%	—	.	—	.
	CEFADROXILO	949	43.33%	327	14.93%	914	41.74%
	CEFAZOLINA	286	56.52%	—	.	220	43.48%
	CEFEPIME	2,770	79.55%	16	0.46%	696	19.99%
	CEFOTAXIMA	2,782	79.35%	4	0.11%	720	20.54%
	CEFTAZIDIMA	2,736	78.62%	6	0.17%	738	21.21%
	CEFTRIAXONA	624	90.83%	1	0.15%	62	9.02%
	CEFUROXIMA	1,743	72.53%	184	7.66%	476	19.81%
	CIPROFLOXACINO	2,796	57.27%	186	3.81%	1,900	38.92%
	COTRIMOXAZOL	3,110	64.12%	6	0.12%	1,734	35.75%
	ERTAPENEM	3,622	99.07%	8	0.22%	26	0.71%
	GENTAMICINA	4,316	88.26%	24	0.49%	550	11.25%
	IMIPENEM	3,576	99.72%	4	0.11%	6	0.17%
	MEROPENEM	3,588	99.78%	2	0.06%	6	0.17%
	N/A	25,089	77.10%	923	2.84%	6,530	20.07%
NITROFURANTOINA	3,832	87.29%	214	4.87%	344	7.84%	
PIPERACILINA/TAZOACTAM	3,246	89.08%	202	5.54%	196	5.38%	

The team plans to track hospital acquired infection information and trends for multi-drug resistant organisms (MDROs) across hospitals in the network. This will enable them to set critical thresholds, analyze, and compare MDRO incidence rates per 1,000 bed-days between hospitals. The addition of new dashboards created for surveillance of antimicrobial consumption will also help the team gauge the impact of antimicrobial stewardship efforts.

In the Future: Contributing to Publicly Accessible Infectious Disease Information

A major hurdle in battling infectious diseases is ease of data access so that any healthcare professional can leverage it to improve their decision-making and best practices. To help overcome this, the Collaborative Group for Antibiotic Resistance is working on constructing a website that will publicly display aggregated infectious disease data for the entire country. The website will include data from multiple sources, including CLARION, bringing the value of the platform beyond just the hospitals that directly utilize it and to the public at large.

“ We believe that a platform like CLARION helps us get better data for AMR and better data means better clinical decisions. ”

– FRANCISCO SILVA, MD and Microbiologist at University of Chile Clinical Hospital



References:

1. UK Department of Health. **Tackling drug-resistant infections globally. Final Report and recommendations.** Available at: <https://amr-review.org/Publications.html>.