EPH89

Medical Costs of Adults With COVID-19 in Costa Rica During the Endemic Phase: A Micro-Costing Study

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INTRODUCTION

- As of October 20th, 2024, the WHO has reported around 776.7 million global cases of COVID-19 linked to SARS-CoV-2. [1] **In Costa Rica (CR), there have been approximately 1,234,662 cases and 9,374 deaths.** [1]
- While COVID-19 is now considered endemic in Latin America and the Caribbean (LAC),[2] the region experienced significant public health and economic burden from the COVID-19 pandemic,[2,3] **accounting for 25% of global cases and over 43% of deaths worldwide.**[4] Despite important efforts to mitigate the pandemic´s impact, CR experienced a significant excess mortality **in all age groups ≥30 years old,** notably in the **elderly population (highest number of deaths during the pre-vaccination era).**[5]
- COVID-19 remains a challenge to CR´s Healthcare System **(7,556 cases reported in epidemiological weeks 1-42 during 2024)**.[6] However, the economic burden of this disease in adults remains poorly understood in the current context. To our knowledge, this is the first attempt to assess the economic impact of acute COVID-19 in CR during the endemic period.

OBJECTIVE

- Estimate the direct medical costs per patient related to the acute management of adult patients with COVID-19, from the national public healthcare system (NPHS) perspective of Costa Rica (Caja Costarricense de Seguro Social [CCSS]).

METHODS

- A mixed structured approach was employed to identify, measure, and value resource use in estimating the cost of care for patients experiencing acute COVID-19 episodes. This encompassed a literature review, consultation and validation with clinical experts, as well as and resource evaluation using a bottom-up micro-costing technique.
- A literature review was conducted to identify local clinical practice guidelines for adult patients (>18 years) in CR, as well as pertinent literature on the clinical management of the disease. This aimed to establish the use of required resources and identify cost-generating elements associated with the diagnosis, treatment, and management of COVID-19 across different settings: outpatient care, general ward hospitalization, and intensive care unit (ICU).
- A standardized questionnaire was administered to CR clinical experts to estimate the healthcare resource utilization (HCRU) for adult patients with COVID-19. The questionnaire also considered and validated factors like age group, vaccination status, and risk of severe outcomes (e.g., progression to severe COVID-19).
- A case-type methodology determined resource requirements for outpatient, general ward, and ICU settings which served to establish the base case. Unit costs were allocated to these resources using the latest CCSS´s Model Tariff,[7] and other public official records.[8-10] Costs in local currency were expressed in 2023 USD.

RESULTS

- For vaccination status, we presumed that **89.6%** of the adult population in CR had received at least one dose of a COVID-19 vaccine (i.e., “ever vaccinated”).[11] Additionally, according to literature and clinical experts[12], about **70%** of the adult population in CR has at least one comorbidity, such as obesity, which is used as a risk factor of developing severe COVID-19/complications.[12,13]
- Across all age groups, the estimated cost of outpatient care in high-risk patients (55% of high-risk symptomatic patients required outpatient care) was US$2,811.7 and US$2,752.0 (unvaccinated and vaccinated, respectively); for low–risk patients (90% of low-risk symptomatic patients required outpatient care) the estimated cost was USD$2,716.3 (unvaccinated) and US$2,707.3 (vaccinated). **(See Table 1., and Figures 1 and 2.).**
- In high-risk groups, regardless of vaccination status, the length of stay (LOS) for adult symptomatic patients needing hospitalization was 5-7 days in general ward (GW) and 7-10 days in the intensive care unit (ICU) for those aged 18-29. For patients aged 30 and older, the LOS extended to 15 days in GW and 20 days in ICU.

RESULTS (continued)

- Of interest, in the low-risk group, the average LOS for adults ≥30 years-old was 12 days in the GW and 15 days in the ICU (both vaccinated and unvaccinated).
- In addition to outpatient costs, **Table 1., and Figures 1 and 2** present the hospitalization costs (per-patient) both in the GW and UCI setting. In the GW the average cost (all age groups) in the high-risk patients was **US$9,051.3** for the unvaccinated and **US$8,409.8** for vaccinated patients, in contrast with **US$8,051.7** (unvaccinated) and **US$7,523.6** (vaccinated) in the low-risk group.
- In the ICU, the costs increased drastically, being on average **US$40,906.5** and **US$32,709.7** for high-and low-risk patients, respectively, regardless of the vaccination status **(Table 1.).** In both ICU and GW settings, hospitalization costs (inpatient-stay) was the main cost driver. For instance, among high-risk groups (all ages), the average inpatient-stay expenses in GW accounted for **53% (US$4,788.33)** and **51% (US$4,259.47)** of the total average cost per patient for unvaccinated and vaccinated individuals, respectively. In contrast, in the ICU, these costs made up **78% (US$32,074.5)** of the total cost per patient, irrespective of vaccination status.
- Use of mechanical ventilation (MV) in the ICU increase costs by **US$15,430.3** more for any age group and extends the LOS by 7-10 days.

Table 1. Heat map displaying the individual costs associated with the acute treatment of adults with COVID-19, categorized by treatment setting, age group, risk, and vaccination status.

Parameters		Outpatient Care (US $)	Hospital Care: GW (US $)	Hospital Care: ICU without MV (US $)
		Low Risk – Unvaccinated patients	**Low Risk – Unvaccinated patients**	
Age Group (years)	18 – 29	$ 2,622.11	$ 5,435.62	$21,235.89
	30-49	$ 2,667.70	$ 8,701.77	$ 36,266.46
	50-64	$2,750.79	$8,707.10	$ 35,608.21
	65-74	$2,763.91	$8,707.10	$ 35,348.71
	> 75	$ 2,777.04	$8,707.10	$ 35,089.21
		Low Risk – Ever vaccinated patients	**Low Risk – Ever vaccinated patients**	
Age Group (years)	18 – 29	$ 2,588.99	$5,024.67	$21,235.89
	30-49	$ 2,701.64	$ 8,144.31	$ 36,266.46
	50-64	$ 2,710.05	$8,149.61	$ 35,608.21
	65-74	$ 2,716.61	$8,149.61	$ 35,348.71
	> 75	$ 2,750.41	$8,149.61	$ 35,089.21
		High Risk – Unvaccinated patients	**High Risk – Unvaccinated patients**	
Age Group (years)	18 – 29	$ 2,721.51	$ 6,145.59	$ 26,581.64
	30-49	$ 2,744.29	$ 9,773.78	$ 45,176.04
	50-64	$ 2,802.06	$ 9,779.12	$ 44,517.79
	65-74	$ 2,895.29	$ 9,779.12	$44,258.29
	> 75	$ 2,895.29	$ 9,779.12	$ 43,998.79
		High Risk – Ever vaccinated patients	**High Risk – Ever vaccinated patients**	
Age Group (years)	18 – 29	$ 2,684.90	$5,596.41	$ 26,581.64
	30-49	$ 2,705.83	$ 9,109.12	$ 45,176.04
	50-64	$2,772.59	$9,114.46	$ 44,517.79
	65-74	$2,798.38	$9,114.46	$44,258.29
	> 75	$2,798.38	$9,114.46	$ 43,998.79

MV= mechanical ventilation; US$= United States dollar

Color Key: $1,000- $3,000 | $4,000 - $7,000 | $8,000 - $10,000 | $20,000- $29,000 | $30,000- $39,000 | >$40,000

Fig.1. Average cost per patient (all age groups) low risk group

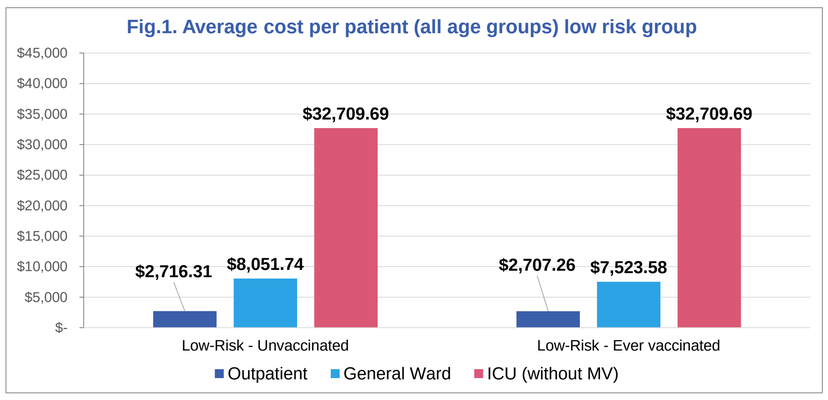
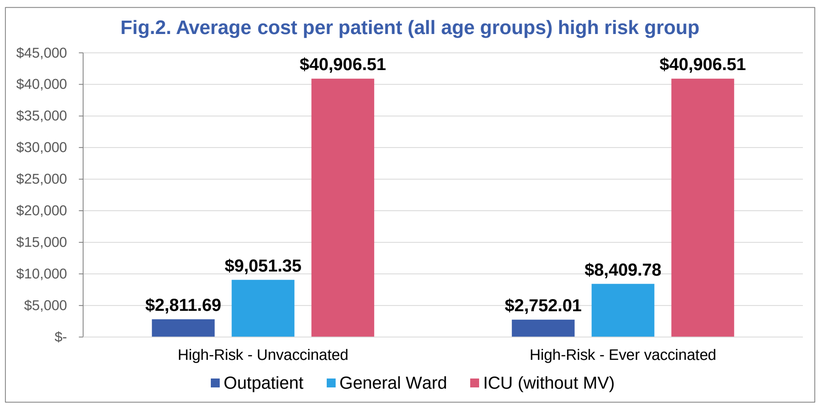


Fig.2. Average cost per patient (all age groups) high risk group



CONCLUSIONS

- **Patients aged 30 years and above experienced greater HCRU and costs in both the ICU and GW. However, compared to vaccinated patients, unvaccinated high-and low-risk patients in the GW consumed more health resources, therefore, resulting in higher direct care costs.**
- **The LAC region faced a substantial COVID-19 impact during the pandemic (especially in its initial phases), and despite COVID-19 has become endemic, it continues to circulate in LAC.[2]**
- **This study suggests that COVID-19 among adults still imposes considerable economic costs on CR´s NPHS. This underscores the importance of continuous preventive measures, such as vaccination, to mitigate the burden (particularly severe disease) and avert future infections and hospitalizations.**

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