

Title: Quantifying impact of COVID-19 on hospital costs in a post-pandemic environment

The Independent Hospital Pricing Authority (IHPA) is a federal Australian agency established in 2011 to facilitate the implementation a national activity based funding model for Australian public hospitals. IHPA develops classification systems and hospital activity and cost data collection systems, which is then used to calculate and deliver the national efficient price for Australian public hospital services each year.

COVID-19 has provided a significant challenge for health system funding around the world. Australia offers an interesting case study into the cost impacts of COVID-19 due to a small number of community cases relative to the rest of the world, particularly in the early months of the pandemic.

Australia has well-established long-standing comprehensive activity and cost data collections allows us to use historical trends in activity and cost of hospital care to understand the impact of the onset of COVID-19 on hospital service costs at the patient level.

The primary motivation for this work is that lag between data collection and price setting for hospital funding in Australia is approximately three years, meaning that price setting must prospectively account for longer term impacts of COVID-19 on the hospital system.

This work presents IHPA's approach, utilising these comprehensive data, to derive the estimate of 0.2%, an average of AUD\$8 per inpatient, in long term cost increases due to COVID-19, which is used for the purposes of hospital price setting and funding in Australia.

Patient level activity and cost data up to June 2019 is used to forecast hospital capacity and historical unit costs to derive an estimate of pre-pandemic unit cost for the period July 2019 to June 2020.

Comparing these pre-pandemic unit costs with actual reported costs from March 2020, we estimate the unit cost of patient care during the months immediately following the onset of the pandemic, quantifying the increase in unit costs above pre-pandemic levels.

Using forecast expected hospital activity levels, the increase costs attributable to COVID-19 can be further disaggregated into the cost of inefficiency in the system (e.g. from unutilised hospital capacity – when hospitals were kept empty in preparation for a large influx of patients) and additional input costs as a result of the pandemic (e.g. additional cleaning and patient screening).

Before the onset COVID-19 pandemic, the unit costs are estimated to increase by 2.6%. IHPA's modelling estimates activity throughput was deflated approximately 16% during the pandemic, resulting in an estimated 16% increase in unit costs due to COVID-19, comprising both system inefficiencies and expecting enduring cost increases due to changes in service delivery models.

This substantial increase in unit costs includes effects of system inefficiency due to reduced capacity, and increased input costs for service provision. Under the assumption that hospitals are operating at full capacity, the majority of the post-pandemic cost increase is attributed to system inefficiency, with 0.2% (\$8 per unit) attributable to expected enduring costs in a post-COVID environment.

These results are based on assumptions clearly indicated in the National Efficient Price 2022-23 Determination¹ which cover expected hospital throughput, casemix variation, and use government subsidies. IHPA is currently undertaking analysis of more recent hospital cost and activity to test these assumptions and refine the results.

¹ <https://www.ihoa.gov.au/publications/national-efficient-price-determination-2022-23>

Many of these assumptions are necessary caveats that arise due to limitations in the data collection, and complex Government funding arrangements for Australian hospitals. For example, additional personal protective equipment (PPE) was funded by other government programs, and had vastly increase costs in the short term due to worldwide demand. Additional input costs such as this were not reported consistently across the country: approximately half the country had indirectly allocated across the whole financial year, so that COVID-driven cost increases can not be easily identified. While our method was able to reallocate misallocated costs separated and reallocated to the post-pandemic period, the reallocation was based on statistical modelling, and improved costing practices would improve these results.