

The Effect of Telehealth on Cost of Health Care during the COVID-19 Pandemic: An Updated Systematic Review

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Background

A sudden increase in telehealth use occurred after the declaration of the COVID-19 public health emergency (PHE), which led to the easement and removal of barriers to telehealth usage.¹ The health care delivery landscape prompted modifications to the payment policies for telehealth reimbursement.² The PHE provided an opportunity to assess telehealth's impact on health care costs for payers and patients. We conducted a systematic review in 2023 to understand the impact of telehealth use on health care costs during the COVID-19 pandemic across health conditions and telehealth modalities. This *Research & Policy Brief* is an update of our review and will synthesize new data in the context of our previous findings.

Methods

The updated search followed the same search strategy and methods as the initial systematic review (PROSPERO CRD42023433496).³ An updated search was performed on November 10, 2023, in PubMed, Embase, Cochrane Central Register of Controlled Trials, CINAHL, Telehealth.HHS.gov, and the Rural Health Research Gateway. This search used three search concepts (telehealth, COVID-19, and cost) and employed Economic Evaluations and Models filters from Canada's Drug and Health Technology Agency (CADTH) to identify any new citations published after the initial search on May 26, 2023. A single reviewer (LL) reviewed all citations. The search strategies are published in SearchRxiv.⁴

Findings

Of the 820 citations identified in the search, 6 met the inclusion criteria for the study. Most of the studies used a retrospective observational design to identify the differences in costs between the telehealth group and the comparator group. Three studies were conducted within the U.S. and three were conducted internationally. As with the first search, the conditions addressed and costs measured were heterogeneous, though half of the studies focused on telehealth use for follow-up appointments. The overall conclusions about the impact of telehealth on health care costs were consistent with the first review. The findings are summarized in **Table 1**.

Key Findings

- Most evidence shows that telehealth use generates cost-savings, particularly for patients.
- Recent publications focus on telehealth use and cost-savings for follow-up appointments.
- Cost-savings are also generated from environmental and efficiency benefits.

Table 1: Characteristics of the cost of telehealth studies from updated search

First Author, Year	Study Design	Intervention Group	Comparison Group	Type of Cost Measured	Cost in Intervention Group	Cost in Comparator Group	Key Findings
Studies from United States							
Chang, 2023 ⁵	Retrospective analysis	Patient visits in January 2020-June 2022	Patient visits in July 2017-December 2019	Travel costs	Office visits travel cost: \$631,660 USD; virtual visit cost saving: \$23,942 USD*	Office visit travel cost \$592,786 USD; virtual visit cost saving: \$147,437 USD	Outpatient virtual visits reduce the cost burden of care for surgery patients by eliminating travel costs associated with in-person office visits and provide potential environmental benefits through a reduction in gasoline consumption and carbon dioxide emissions.
Finkelstein, 2023 ⁶	Retrospective analysis	Patient visits in March 16, 2020-March 15, 2021	Patient visits in March 16, 2019-March 15, 2020	Total cost saved by averted patient travel	\$1,643,398 USD	\$23,396 USD	The use of the pediatric virtual medicine program resulted in avoided travel costs of more than \$1.5 million and a significant decrease in the health care system's environmental footprint.
Levy, 2023 ⁸	Retrospective analysis	Pre “Telehealth Utilization Quality Improvement Initiative” implementation	Post “Telehealth Utilization Quality Improvement Initiative” implementation	Revenue	Increased revenue: \$30,431 USD in billable visits	Base revenue not specified	The use of a standard telehealth scheduling procedure increased telehealth utilization in follow-up appointments for elective outpatient and general surgery procedures, which resulted in increased clinic efficiency and revenue.
International Studies							
Fu, 2023 ⁷	Prospective comparative	On-site monitoring	Hybrid mode of on-site monitoring combined with remote monitoring	Total monitoring cost per visit	\$408.80 CNY**	\$220.06 CNY	Remote monitoring in clinical trials can improve efficiency by assessing protocol compliance and safety issues in a timely manner and by reducing the duration and cost of on-site monitoring.
So, 2023 ⁹	Randomized control trial	Telemedicine follow-up	Standard follow-up	Direct and indirect cost of illness	Mean indirect costs of illness: \$12,016 HKD; out-of-pocket costs for health care services: \$13,547 HKD***	Mean indirect costs of illness: \$26,681 HKD; out-of-pocket costs for health care services: \$12,297 HKD	Telemedicine follow-up care for patients with systemic lupus erythematosus resulted in decreased indirect costs of illness and similar 1-year disease control compared to standard follow-up care.
Wang, 2023 ¹⁰	Retrospective analysis	Web-based visits	Office visits	Median medicine and examination costs	Medicine cost: \$0.96 USD; examination cost \$0.78 USD	Medicine cost \$4.47 USD; examination cost \$5.99 USD	Web-based outpatient services resulted in decreased medicine and examination costs. The inability to provide certain expensive medications and procedures that can only be offered in the office may account for this decrease.

*USD: U.S. dollar

**CNY: Chinese yuan renminbi

***HKD: Hong Kong dollar

Discussion

Our updated search found results similar to those in the original systematic review. The studies from the updated search add to the evidence that telehealth modalities are cost-saving compared to traditional in-person care. Cost-savings in telehealth are most pronounced when measuring costs from the patient perspective, specifically through travel costs. Telehealth can provide clinic efficiency gains and increases in billing revenue from the health care payer perspective. The degree of cost savings varies depending on the condition addressed, the telehealth modality, and the cost analysis perspective.

While the initial search covered a broad range of telehealth applications, in this search, half of the studies measured the costs associated with telehealth follow-up versus in-person care. This change of focus suggests that health care systems are narrowing the application of telehealth and emphasizes that telehealth may be most suitable for certain types of care. Wang et al. note that telehealth may provide lower-cost care because high-cost medications and procedures can only be offered during an in-person visit.¹⁰ An additional consideration that was apparent in the second search was the reduction in environmental costs due to avoided travel with telehealth in the U.S. As previously concluded, evaluating the cost of telehealth should include considerations such as environmental benefits and efficiency gains, which reflect a wider societal cost analysis perspective, not just health care sector cost savings.

In conclusion, telehealth has cost-saving applications for both patients and health care payers. Cost savings continue to be most prevalent for patients, but the inclusion of efficiency and environmental benefits in health care systems could generate future cost savings. Future research should continue identifying settings and telehealth modalities that achieve cost savings through telehealth usage.

Notes

1. Weiner JP, Bandeian S, Hatef E, et al. In-Person and telehealth ambulatory contacts and costs in a large US insured cohort before and during the COVID-19 pandemic. *JAMA Netw Open* 2021;4(3):e212618; doi: 10.1001/jamanetworkopen.2021.2618.
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6. Finkelstein JB, Hauptman M, Acosta K, et al. Environmental impact of a pediatric and young adult virtual medicine program: a lesson from the COVID-19 pandemic. *Acad Pediatr* 2023;S1876285923002760; doi: 10.1016/j.acap.2023.07.011.
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10. Wang X, Su A, Liu F, et al. Trends, influence factors, and doctor-patient perspectives of web-based visits for thyroid surgery clinical care: cross-sectional study. *J Med Internet Res* 2023;25:e47912; doi: 10.2196/47912.

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