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Projecting the Financial Impact of COVID-19 Elective Surgery Cancellations

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1 BACKGROUND:

COVID-19 resulted in cessation of elective surgery—a substantial driver of hospital revenue—and placed patients at risk and hospitals under financial stress. We sought to quantify the financial impact of elective surgery cancellations during the pandemic, simulate hospitals' recovery times, and understand and contextualize the implications of the CARES Act on hospital solvency.

2 OBJECTIVES:

Given the variable risk facing different types of hospitals, we sought to predict the financial impact of elective surgery cancellations during the COVID-19 pandemic. We forecasted short-term hospital revenues during March-May 2020 based on hospital region and type, generated sensitivity analyses to assess the backlog of cases, and determined long-term ramp-up times to market equilibrium in which available capacity accounts for ongoing and backlog demand. These data may further inform policies to subsidize hospitals and guide managerial decision-making regarding operational capacity.

Table 1: Forecasted estimates of total US elective surgery revenues (USD) and proxies for total potential loss related to 100% cessation of elective surgeries from March to May 2020

	Estimate	Rural	Urban Non-teaching	Urban Teaching	Total
Northeast	Median Revenue*	157,229,262	239,878,641	2,757,617,115	3,154,725,018
	Lower 95% CI	86,864,264	183,711,119	2,271,567,114	2,542,142,496
	Upper 95% CI	235,089,538	296,905,846	3,267,079,530	3,799,074,914
Midwest/ North Central	Median Revenue	745,695,204	883,378,924	3,599,708,432	5,228,782,560
	Lower 95% CI	448,451,115	658,337,280	3,006,149,756	4,112,938,151
	Upper 95% CI	1,052,072,356	1,133,293,446	4,250,529,257	6,435,895,059
South	Median Revenue	494,607,678	1,722,345,149	6,165,569,135	8,382,521,962
	Lower 95% CI	407,855,347	276,829,359	4,873,508,145	5,558,192,851
	Upper 95% CI	588,628,531	10,051,591,223	7,579,964,845	18,220,184,599
West	Median Revenue	452,908,434	848,485,046	4,232,998,182	5,534,391,661
	Lower 95% CI	(100,597,899)	366,209,202	3,688,436,745	3,954,048,048
	Upper 95% CI	995,336,860	1,386,705,014	4,792,527,917	7,174,569,790
National	Median Revenue				22,300,421,201
	Lower 95% CI				16,167,321,546
	Upper 95% CI				29,647,158,691

*** The median revenue was generated utilizing JMP Time Series Analysis Platform. All values are reported in 2020 USD**

3 METHODS:

1. Elective surgical cases were abstracted from the Nationwide Inpatient Sample (2016-2017)
2. Time series were utilized to forecast March-May 2020 revenues and demand
3. The best twelve models were selected to generate stratum-level revenue estimates for March-May 2020 Sensitivity analyses were conducted to calculate the time to clear backlog cases and match expected ongoing demand in the post-COVID period
4. Subset analyses were performed by hospital region and teaching status.

4 RESULTS:

Time series analyses demonstrated (2016-2020):

- diminishing revenues in urban non-teaching hospitals
- flat to diminishing revenues in rural hospitals
- increasing revenues in urban teaching hospitals

In the weighted NIS sample, national revenue loss due complete cessation of elective surgery based on state recommendations from March-May 2020 was $22.3 billion.

- # of months to recovery ranged 4-164
- For the median case, (75% pre-COVID utilization rate/45% post-COVID utilization rate); recovery times was 12-22 months across strata.

5 CONCLUSIONS:

US elective surgery cessation from March-May 2020 is predicted to result in a revenue loss of $22.3B. Recovery to pre-COVID supply-demand equilibrium will require rapid increase in capacity utilization and may benefit from capacity expansion at the hospital level.

Finally, distributions from the CARES Act may be inadequate to buffer losses observed by rural and urban non-teaching hospitals, which may face disproportionate financial solvency risk thereby exacerbating care disparities.