

# The Effects of Payer-Mix on Utilization during the COVID-19 Pandemic, in Urgent and Primary Care.

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## Research article

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# Abstract

## Background

Healthcare utilization has changed dramatically during the COVID-19 crisis with the most dramatic drops coming in April 2020. While a lot of research has focused on utilization among the privately insured, or on comparing specialty-visits, comparatively less has been published on the effect of payer-mix, particularly Medicaid, on utilization.

## Methods

Monthly patient volume was gathered across 3 ambulatory primary and urgent care clinics. The timeframe included appointments, walk-ins and virtual visits from January through June 2020, including the nadir in April. Patient volume was then compared to average payer mix over that same time, at each clinic. A simple linear regression was then run, comparing changes in patient volume and percent Medicaid.

## Results

Two clinics had similar payer mixes, and saw similar decreases in utilization. A third clinic with twice as many Medicaid patients, saw only half the reduction in patient volume, during the nadir in April 2020.

## Conclusion

Given the limited number of data points, a more robust statistical analysis was not possible. A simple regression line indicated a correlation between the proportion of Medicaid patients and demand resilience for healthcare resources. At scale, the Medicaid population may be less vulnerable to variations in utilization, exhibiting less elastic demand, despite a pandemic, for a myriad of reasons.

## Background

On March 31st 2020, the United States declared a national emergency due to COVID-19.<sup>1</sup> The combination of public concern and de-prioritization of non-urgent care resulted in dramatic decreases in patient volume.<sup>1,2</sup> The ramifications on patients, providers, and the healthcare system are concerning, and may take years until completely known.<sup>2,3</sup> To examine the effects of the pandemic on US healthcare utilization, we can begin by looking at the past SARS, Ebola and MERS outbreaks.<sup>4-6</sup>

During the 2013 SARS outbreak in Taiwan, Lee et al. (2020) reported a 23.9% decrease in ambulatory care which resulted in potentially serious impacts on medical services.<sup>4</sup> Of note, this dataset was derived from a national health insurance system, covering 99% of the population.<sup>7</sup> The Ebola epidemic in West Africa from 2013-16 resulted in a drop of healthcare utilization by 18%.<sup>5</sup> Accordingly, Wilhelm et al. (2019) reported a spike in excess deaths, associated with reductions in essential healthcare utilization, unrelated

to Ebola.<sup>5</sup> The 2015 MERS epidemic in South Korea decreased utilization by 28% when compared to baselines in 2014 and 2016. Similarly, the South Korean data was derived from a national health insurance plan.<sup>6,8</sup>

Utilization rate analysis in the US have mostly focused on commercially insured patients.<sup>1-3,9-10</sup> In late March, Gilson et al. (2020) found a 34% decrease in utilization compared to 2019.<sup>9</sup> At the nadir in April 2020, Cox and Amin (2020) found a 31.9% decrease in personal healthcare consumption.<sup>10</sup> These changes are unprecedented as year to year personal healthcare expenditures have increased every month since the 1960s.<sup>10</sup> Looking at the commercially insured market, Whaley et al. (2020) found a decrease in utilization of 23% in March and 25% in April 2020.<sup>2</sup> Lange et al. (2020) noted a 30–43% decline during the same period.<sup>1</sup> Giannouchos et al. (2020), looking at utilization rates in a large, urban academic hospital system found a 30.4% drop in outpatient emergency room visits last April.<sup>3</sup>

The purpose of this study was to examine the relationship between healthcare utilization and payer-mix. Three clinics with variable payer-mixes and variable changes in patient volume were compared. While the privately insured delayed care, Medicaid patients continued to utilize clinic visits at comparatively higher rates. We hypothesized that Medicaid patients have greater needs and less flexibility, resulting in more resilient demand, despite pandemic-driven changes in utilization.

## Methods

There were three ambulatory clinics under the administration of the authors, and thus three clinics were chosen. One clinic was located in the eastern half of the city, with a higher proportion of Medicaid patients. The other two clinics were located in the western half of the city, with higher proportions of the privately insured.

Each clinic ran a combination of walk-in urgent care and appointment-based primary care, with dedicated tele-visit slots. Clinics were open 7 days per week, for 12 hours per day on weekdays and shorter 8–10 hour schedules on the weekends. They all offered daily COVID-19 screening as well.

Patient volume data was collected for each clinic from January 2020 through June 2020. Data combined urgent-care walk-ins, primary care in-person appointments, and tele-visits, along with COVID-19 screenings. Payer-mix data was also collected for each clinic, over the same period of time. Payer data was an aggregate over claims made, and not recorded monthly (Fig. 1).

A baseline was calculated for each clinic based on volume in January and February. The national emergency order was given at the end of March, and the patient volume nadir was noted in all three clinics the following April, 2020. (Fig. 2)

The percent decrease in patient volume was calculated for each clinic by averaging their baseline volume from January and February, and comparing it to the nadir in April. The percent decrease in patient volume

was then plotted against the payer-mix proportion of Medicaid. A simple regression line, along with a slope was calculated.

## Results

### Payer Mix.

The two clinics in the western side of the city, CP and MP had very similar payer-mixes (Fig. 1) with 67% and 68% privately insured, and only 22% and 23% Medicaid, respectively. Clinic RI had the near inverse payer-mix, with only 42% privately insured and twice as many patients on Medicaid (47%).

### Patient Volume.

Comparing patient volume during the April nadir (Fig. 2); clinic MP and CP saw 69% and 61% drops in patient volume respectively, while clinic RI suffered only a 32% drop.

## Change in patient volume by Medicaid

Presuming similarity between all clinics, a qualitative assessment would suggest the smaller change in patient volume at RI to be associated with its double-proportion of Medicaid patients. When plotting a line comparing the percent change in patient volume in April, with the percent of Medicaid patients in the payer-mix, the slope was calculated at -1.36.

## Limitations

This observational study has many limitations. First, we had 3 clinics, with monthly patient volumes from January through June, yielding a total of 18 data points. 18 data points are not enough to make broad characterizations of healthcare utilization during a pandemic. Furthermore, to properly compare clinics, we would have to assume that the clinics were equal. They are not. There are at least geographical, architectural, and personnel differences. While we were able to ascertain the payer-mix for those 6 months, we did not have a monthly breakdown. As a result, the effects of any monthly changes in payer-mix were not accounted for. This study did not distinguish between primary care appointments, urgent care walk-ins and tele-visits. A more complete accounting might include the specific changes in walk-in volume, tele-visits, and in-office appointments. Finally, there was no effort made to compare demographics across clinics. It seems likely that differences in age, race or sex could have a significant effect on changes in utilization.

## Discussion

An initial qualitative assessment comparing payer-mix and patient volume draws attention to the association between Medicaid and utilization. Two clinics (MP and CP) had nearly identical payer-mixes, with nearly two-thirds of patients having private insurance, and less than 25% having Medicaid. These clinics saw the greatest reduction in patient volume during April.

In contrast, RI clinic had twice the proportion of Medicaid (47%), with markedly fewer privately insured (42%). RI clinic however, only suffered a 32% drop in patient volume, compared to a 69% and 62% decrease in MP and CP respectively.

Plotting the percent change in patient volume by the proportion of Medicaid, across all three clinics, yielded a line with a slope of -1.36. If our observation extrapolates to the general population: we could expect 1.36% less drop in patient volume, per percent increase in Medicaid patients. Put another way, the more privately insured patients in a payer-mix, the more susceptible a clinic is to variations in utilization during a pandemic. Likewise, as the proportion of Medicaid patients increase, so does the demand for services, despite a pandemic.

## Conclusion

Most of the data published thus far have looked at the effect of the pandemic on private payer or Medicare utilization. However, few studies have attempted to examine payer-mix on pandemic-driven utilization. While utilization plummeted across our clinics, the decrease in patient volume was not uniform. The clinic a greatest share of Medicaid patients was more resistant to shocks or variations in utilization. Disease burdens parallel socio-economic status. Simply put, people with private insurance may be able to afford, financially and physiologically, to delay care.

While this study is severely limited by power, the trends are nonetheless thought provoking, and applicable to future pandemics. While greater quantitative research is required, it is interesting to posit that Medicaid patients may have less capacity to delay or obtain alternative care, and thus rely more heavily on healthcare services, despite pandemics. Such an observation would have direct effects on resource allocation for future catastrophes.

## Declarations & Disclosures

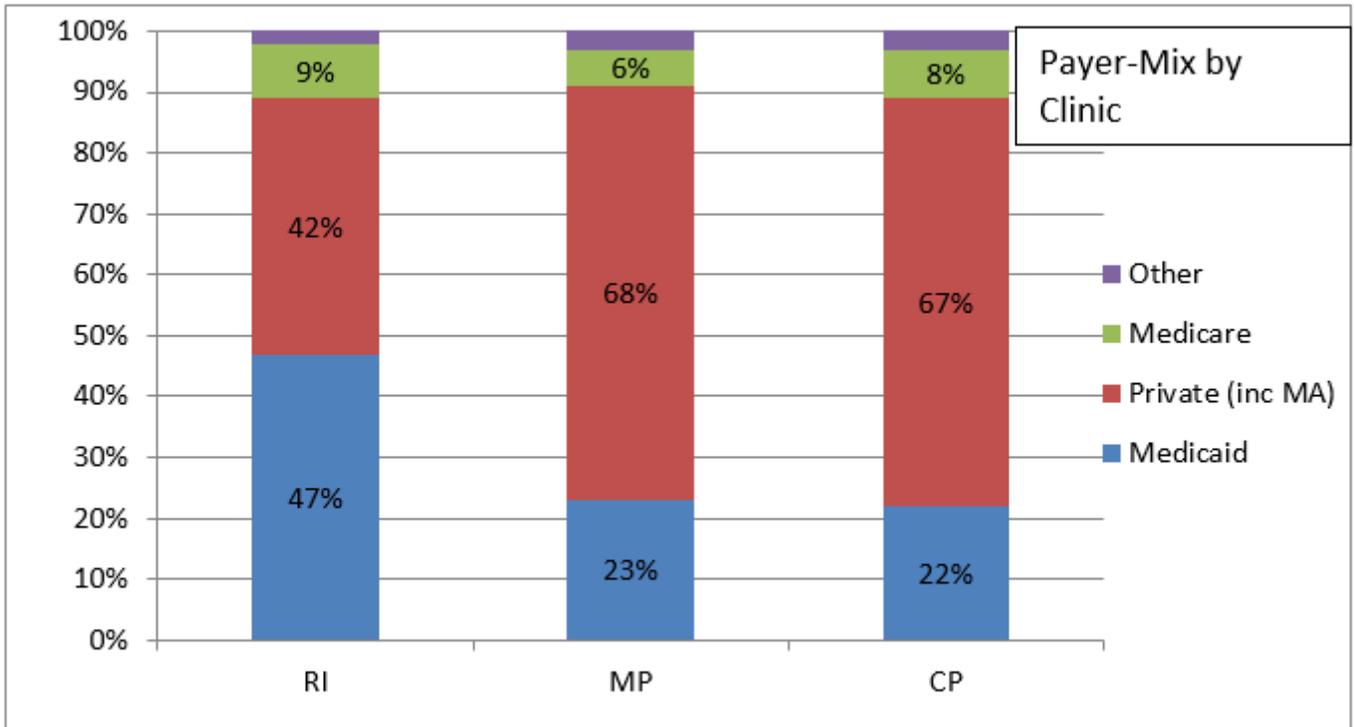
Human subjects were not used, and thus ethics approval was not applied for. All authors give consent for publication. De-identified data and all study materials are available upon request. The authors report no conflicts of interest. This study was self-funded by the authors, and the authors' department. All authors contributed to this report. AP lead the data gathering, BB led the background research, and LD originated and oversaw the entire process.

## References

1. Lange SJ, Ritchey MD, Goodman AB, et al. Potential Indirect Effects of the COVID-19 Pandemic on Use of Emergency Departments for Acute Life-Threatening Conditions - United States, January-May 2020. *Morbidity Mortality Weekly Report*. 2020;69(25):795–800.
2. Whaley CM, Pera MF, Cantor J, et al. Changes in Health Services Use Among Commercially Insured US Populations During the COVID-19 Pandemic. *JAMA Netw Open*. 2020;3(11):e2024984.

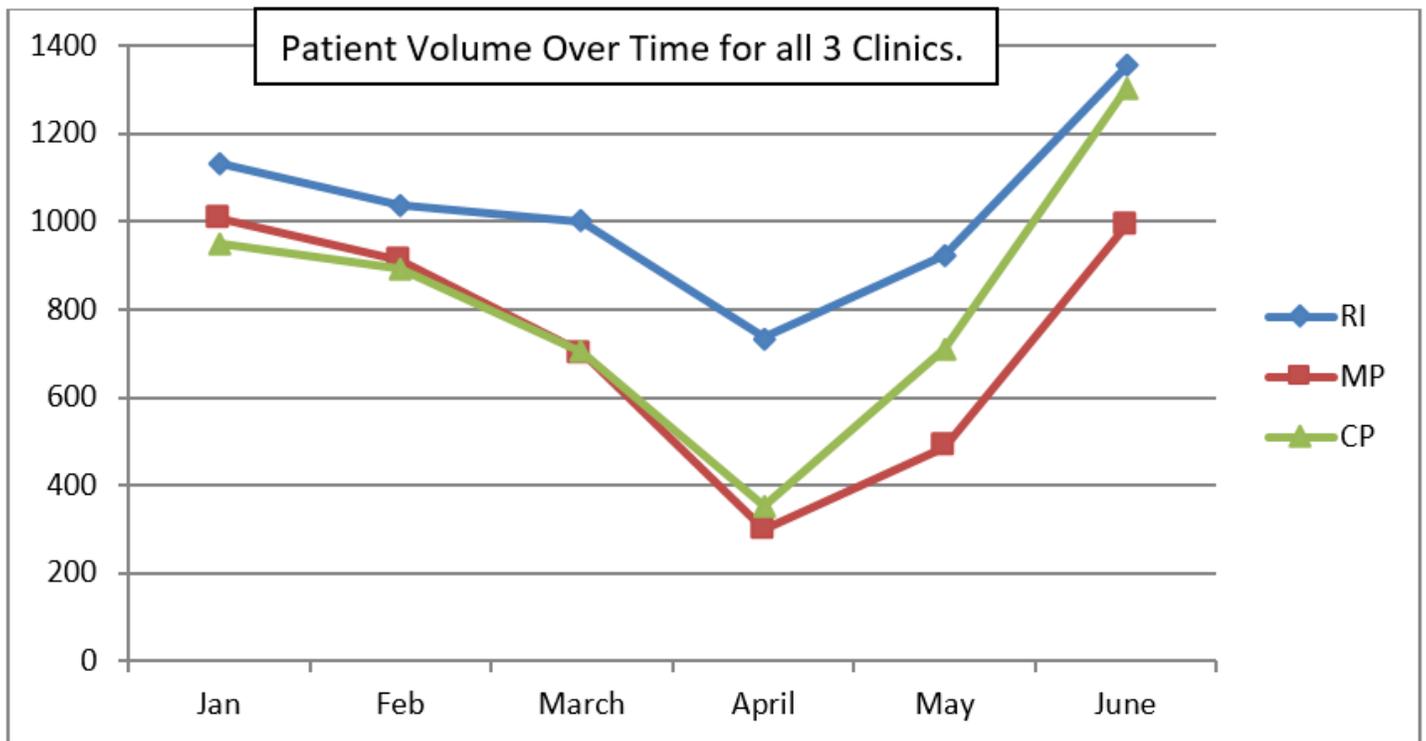
3. Giannouchos TV, Biskupiak J, Moss MJ, Brixner D, Andreyeva E, Ukert B. Trends in outpatient emergency department visits during the COVID-19 pandemic at a large, urban, academic hospital system. *Am J Emerg Med.* 2021;40:20–6.
4. Chang J, Huang N, Lee C, Hsu Y, Hsieh C, Chou Y. The Impact of the SARS Epidemic on the Utilization of Medical Services: SARS and Fear of SARS. *American Journal of Public Health.* 2004;94(4):562–4.
5. Wilhelm JA, Helleringer S. Utilization of non-Ebola health care services during Ebola outbreaks: a systematic review and meta-analysis. *J Glob Health.* 2019;9(1):010406.
6. Lee SY, Khang YH, Lim HK. Impact of the 2015 Middle East Respiratory Syndrome Outbreak on Emergency Care Utilization and Mortality in South Korea. *Yonsei Med J.* 2019;60(8):796–803.
7. Wu T, Majeed A, Kuo K. An overview of the healthcare system in Taiwan. *London Journal of Primary Care.* 2010;e:115–9.
8. Lee H, Park JH. Changes in health care utilization during the MERS epidemic. *International Journal of Infectious Diseases.* 2018;73.
9. Gilson SF, Umscheid CA, Laiteerapong N, Ossey G, Nunes KJ, Shah SD. Growth of Ambulatory Virtual Visits and Differential Use by Patient Sociodemographics at One Urban Academic Medical Center During the COVID-19 Pandemic: Retrospective Analysis. *JMIR Med Inform.* 2020;8(12):e24544.
10. Cox C, Amin K. How Have Health Spending and Utilization Changed During the Coronavirus Pandemic? KFF. *Morbidity and Mortality Weekly Report Web site.* <https://www.healthsystemtracker.org/chart-collection/how-have-healthcare-utilization-and-spending-changed-so-far-during-the-coronavirus-pandemic/#item-start>. Published 2020. Accessed February 12, 2021.

## Figures



**Figure 1**

Payer-Mix broken down by clinic. Note the near uniformity of payer-mix at Clinics MP and CP, and the comparatively doubled proportion of Medicaid at clinic RI.



**Figure 2**

Patient volume at all 3 clinics, during the nadir in April 2020.