

Potential out-of-pocket costs for patients requiring hospitalization for COVID-19

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As the coronavirus (COVID-19) pandemic continues to develop, concerns have surfaced about the potential treatment costs that will be borne by those infected by the disease.

In a meeting at the White House in early March, a number of private insurance executives pledged to cover COVID-19 testing with no cost to the patient, as well as telemedicine visits related to the pandemic, and said there would be no related surprise billing.¹ Further, the Families First Coronavirus Response Act (H.R. 6201) that was signed into law on March 18 requires group health plans and health insurance issuers in the individual and group markets to cover COVID-19 testing and screening without cost sharing.² Some insurers have also pledged to waive patient cost-sharing requirements for treatment of COVID-19.³ While these moves will reduce aggregate patient out-of-pocket costs, the impact will not be uniform across all patients. The unique structure of the U.S. healthcare system means that the out-of-pocket costs for patients requiring hospitalization due to COVID-19 can vary substantially among those with different types of health insurance. In addition, costs to those of different age groups, living in different parts of the country, experiencing different levels of severity, or facing the illness at different times of the year will also vary substantially.

Although it is too early to analyze actual healthcare cost data for those who have been treated for COVID-19 in the United States, historical data from patients who have sought medical attention for influenza or pneumonia may be informative for understanding patient out-of-pocket costs due to treatment for COVID-19. The biological and clinical characteristics of COVID-19 differ from other respiratory infections, but the signs and symptoms that necessitate hospitalization and intensive care for severe cases of the disease, such as shortness of breath and hypoxemia from pneumonia or acute respiratory distress syndrome (ARDS), are also seen in severe cases of other respiratory infections.⁴

In this report, we used healthcare claims data from three large, national research databases to investigate the variation in out-of-pocket costs for patients who historically experienced acute

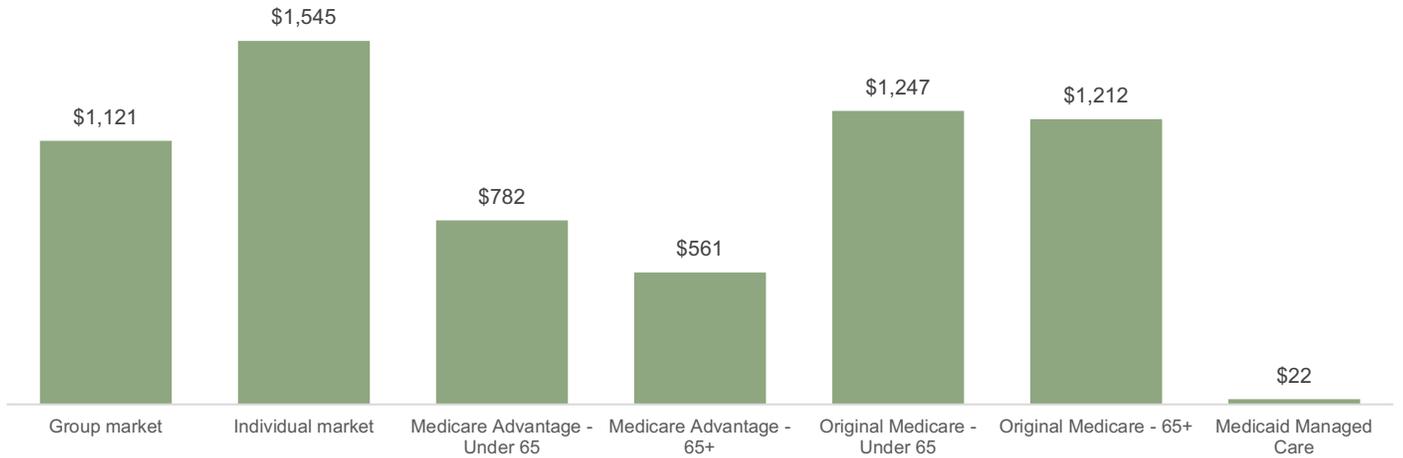
inpatient hospitalizations involving treatment of acute respiratory infections (pneumonia and influenza). These databases contain administrative healthcare claims data for privately insured individuals with both group and individual market plans as well as beneficiaries of Medicare Advantage, original Medicare (also known as Medicare Fee for Service), and Medicaid Managed Care plans. Collectively, these data sets include the healthcare experience of 1.6 million individuals who sought medical care for influenza or pneumonia in 2017,⁵ including more than 120,000 patients who required hospitalization, which represents an overall hospitalization rate of about 7.5%. In contrast, early reports from the U.S. Centers for Disease Control and Prevention (CDC) indicate the hospitalization rate for COVID-19 may fall between 20.7% and 31.4%.⁶

For this analysis, we are focusing exclusively on cases that required hospitalization. The comparability of COVID-19 and other respiratory infections may be better for hospitalized cases than it is for cases overall, though differences in severity and required resources will still exist and are likely significant. Additionally, this analysis only includes the facility and professional fees for which patients were responsible during their periods of hospitalization. COVID-19 treatment costs may involve other costs outside of the hospitalization period, including prescription drugs, physician visits, and laboratory services, which may also be significant.

Out-of-pocket costs for patients hospitalized with influenza or pneumonia

Among cases that required hospitalization, average out-of-pocket costs were highest for patients with health plans purchased in the individual market and for beneficiaries of original Medicare.⁷ Patients with group market plans (typically employer-sponsored coverage) had lower costs than those who purchased plans in the individual market. Beneficiaries enrolled in Medicare Advantage had lower costs than beneficiaries with original Medicare. Among the payers studied, costs were lowest for Medicaid Managed Care beneficiaries.⁸ Figure 1 provides the overall average out-of-pocket patient costs by payer for hospitalizations involving influenza or pneumonia.

FIGURE 1: AVERAGE OUT-OF-POCKET COSTS FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017



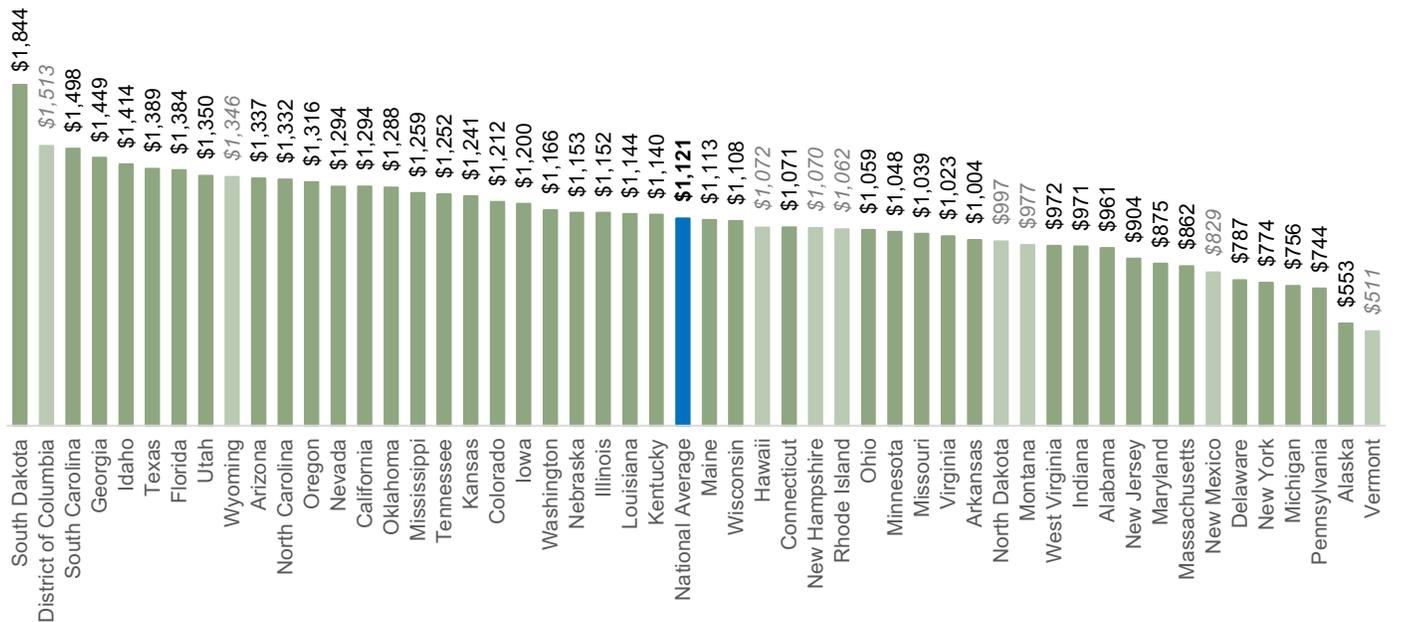
Those with no insurance at all likely face the highest costs, which in the absence of any assistance or negotiated rates would consist of the full undiscounted charges billed by their healthcare providers.

VARIATION AMONG STATES

While clear differences are evident among payers, averages often obscure important variation that becomes apparent upon

disaggregation of the data. For example, the average out-of-pocket cost for patients with group market insurance coverage varies by a factor of 3.3 between states with the lowest and highest average out-of-pocket costs (excluding states with fewer than 100 cases in the study sample). Figure 2 provides the average out-of-pocket patient costs for hospitalizations involving influenza or pneumonia by state for those with group market coverage.

FIGURE 2: AVERAGE OUT-OF-POCKET COSTS FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA FOR PATIENTS WITH GROUP MARKET INSURANCE COVERAGE, BY STATE, 2017



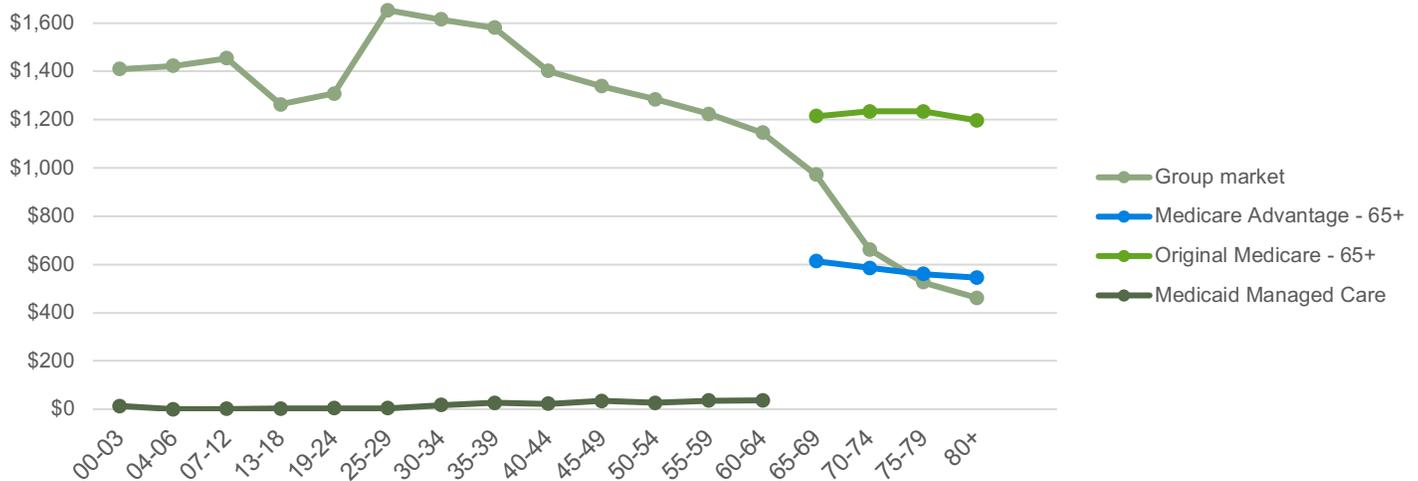
Note: States with sample sizes of fewer than 100 cases are denoted with an italic font for the data label and a lighter shaded column. Sample sizes for the individual market, Medicare Advantage, Original Medicare – under 65, and Medicaid Managed care were not sufficient to provide comparable figures. Variation between states was much less significant for Original Medicare – 65+.

While there are regional differences in the prices for medical goods and services, the prevalence and morbidity of disease, and many other factors that contribute to total health costs, out-of-pocket costs after any given healthcare service tend to be driven mostly by the health plan’s benefit design. This may be particularly true for hospital stays, which in many cases may require payment of the full deductible, if one applies. Significant regional variation in the benefit richness of group market plans is likely a contributing factor to the observed differences in out-of-pocket patient costs for hospitalizations involving influenza or pneumonia, including variation in the prevalence of different plan designs, such as high-deductible health plans, preferred provider organization plans, and health maintenance organization plans, to name a few.

VARIATION BY AGE

In addition to geographic differences, out-of-pocket costs can vary significantly by age as well. Within our study population, we observed that the likelihood that an infection required hospitalization increased with age, as did the average length of stay for those admitted to a hospital, but when considering the out-of-pocket costs to the patient, these factors appear to be offset by other dynamics. Figure 3 provides the average out-of-pocket costs for hospitalizations involving influenza or pneumonia by age.

FIGURE 3: AVERAGE OUT-OF-POCKET COSTS FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY AGE AND PAYER, 2017



Note: Individual market, Medicare Advantage – Under 65, and Original Medicare – Under 65 were excluded from this chart due to insufficient sample sizes for some ages.

For commercial payers and Medicare Advantage, out-of-pocket costs for a hospitalization tend to decline as age advances. Because individuals tend to use more healthcare services in general as they age, this phenomenon may reflect an increased likelihood that plan design features such as deductibles and out-of-pocket limits have been previously met by other care for those in higher age groups. It may also be the case that as individuals age, they opt for more benefit-rich health plans that have lower out-of-pocket obligations for greater cost predictability. On the other hand, Medicaid Managed Care and original Medicare beneficiaries see relatively flat out-of-pocket costs as age advances. This phenomenon may be a result of the absence of out-of-pocket maxima for these types of plans, or of less (or no) patient choice in plan benefit design for these payers, which means that beneficiaries may not be able to opt for more benefit-rich plans as they age and their expected healthcare use increases.

VARIATION BY CASE SEVERITY

Because COVID-19 varies both in terms of morbidity and mortality compared to other acute respiratory infections,⁹ differences in the number of days that patients are hospitalized and the resources that are required for their care could also drive differences in out-of-pocket costs for patients with COVID-19 compared to other acute respiratory infections. Key factors that might differentiate hospitalizations for COVID-19 from other acute respiratory infections could include differences in the average length of stay, the incidence of ARDS or sepsis, the use of invasive mechanical ventilation (IMV), and the need for intensive care. For example, the average length of stay for COVID-19 patients has been found to be as high as 13 days in other studies,¹⁰ which is higher than reported for any group in this study. Figure 4 provides statistics on these factors for the hospitalizations included in this analysis.

FIGURE 4: VARIATION IN MEASURES OF SEVERITY FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017

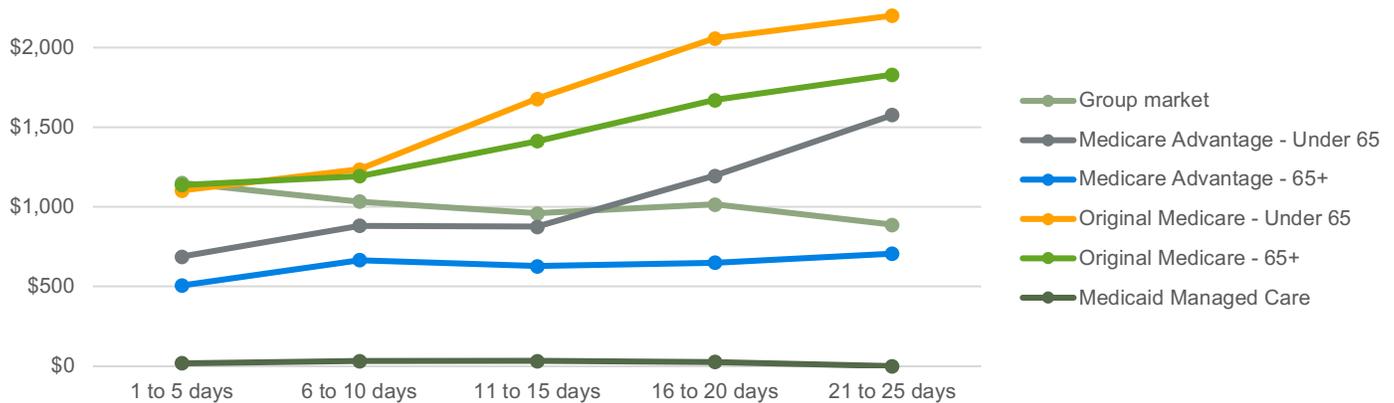
PAYER	AVERAGE LENGTH OF STAY	INCIDENCE OF ARDS (%)	INCIDENCE OF SEPSIS (%)	USE OF IMV (%)	USE OF INTENSIVE CARE (%)
Group market	5.9	1.7%	24.9%	3.2%	12.3%
Individual market	5.9	1.9%	26.3%	4.9%	11.7%
Medicare Advantage – Under 65	7.2	1.7%	32.5%	5.9%	16.2%
Medicare Advantage – 65+	7.8	1.0%	27.0%	3.1%	11.6%
Original Medicare – Under 65	7.1	1.5%	31.9%	6.4%	16.2%
Original Medicare – 65+	8.5	1.3%	28.0%	3.5%	12.7%
Medicaid Managed Care	5.9	2.0%	28.0%	4.8%	15.9%

In some cases, these measures show greater severity for Medicare Advantage and original Medicare beneficiaries under 65 than for those 65 and older. In particular, we observed higher incidence of ARDS and sepsis, and more use of IMV and intensive care for Medicare beneficiaries under 65 than for those 65 and older. Medicare beneficiaries under the age of 65 predominantly qualify for coverage by way of disability, and as such, higher rates of complications may be expected for this population.

Differences in out-of-pocket costs for patients can sometimes manifest in ways that are not necessarily intuitive at first glance.

As observed in Figure 3 above, despite older individuals typically incurring higher *total* healthcare costs, their out-of-pocket costs may actually be lower when considering any individual service or treatment compared to a younger person, as they may be more likely to previously have satisfied their cost-sharing requirements on other services. We observed similar findings for some payers when comparing differences in out-of-pocket patient costs for those with longer hospital stays, as well as when comparing those with and without certain complications. Figure 5 shows how average out-of-pocket costs varied for patients by the length of the hospital stay.

FIGURE 5: VARIATION IN OUT-OF-POCKET PATIENT COSTS BY HOSPITAL LENGTH OF STAY FOR INFLUENZA OR PNEUMONIA, BY PAYER, 2017



Note: Some hospitalizations were longer than 25 days, but longer stays were excluded from this figure due to low sample sizes. The individual market was excluded from this figure due to low sample sizes for some ranges of days.

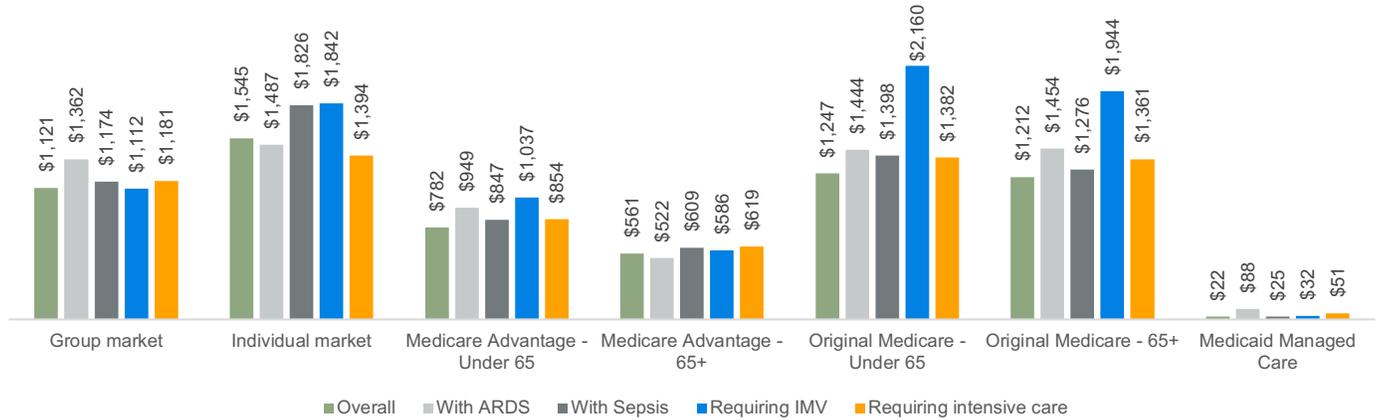
For the most part, out-of-pocket costs were lower for group market patients who had longer hospital stays. Those patients may have been more likely to have already satisfied some of their cost-sharing requirements for the year due to other underlying health conditions. For other payers, costs generally tended to increase for patients with longer stays, though not always consistently. For plans with per admit copays or

deductibles, these increases may reflect greater costs for associated professional services. Out-of-pocket costs increased most sharply for those under 65 on original Medicare, which does not have an annual out-of-pocket maximum on beneficiary cost-sharing responsibilities.

Similarly, we observed that in some cases, patients who experienced ARDS or required IMV had lower out-of-pocket costs than those who did not. Again, those cases may be a result of the increased likelihood that these patients may have already satisfied some of their cost-sharing requirements on other care. In many (but not all) cases, greater severity (in terms of the incidence of ARDS or sepsis, or in the use of IMV or intensive

care) seemed to align with higher out-of-pocket costs. Figure 6 shows how out-of-pocket patient costs differed for those who experienced ARDS or sepsis, or required IMV or intensive care. Differences in the application and levels of deductibles and out-of-pocket maxima among payers may explain some of the variation in these findings.

FIGURE 6: DIFFERENCES IN OUT-OF-POCKET PATIENT COSTS BY MEASURES OF SEVERITY FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017



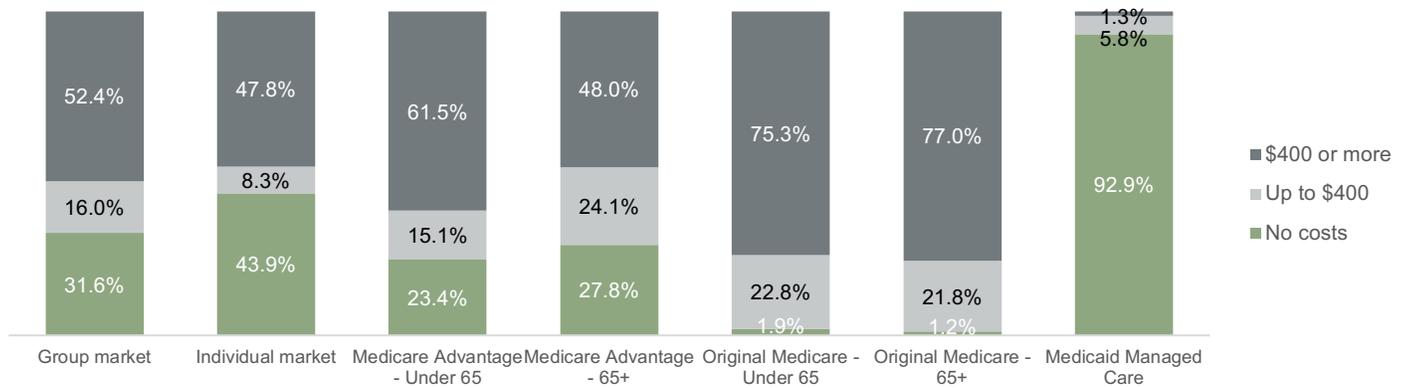
In some cases, the costs for group and individual market patients experiencing more severe cases were lower than the overall average costs. This is consistent with another recent study that investigated out-of-pocket costs for patients hospitalized for pneumonia, focusing on those with large employer plans.¹¹ In this study, researchers found that out-of-pocket costs averaged \$1,464 for uncomplicated cases in 2018, but those costs decreased to \$1,365 when there were complications or comorbidities, and further decreased to \$1,300 when there were major complications or comorbidities. This is despite *total* costs for an admission more than doubling for those with major complications or comorbidities compared to those without. A

similar pattern was not consistently observed for Medicare or Medicaid beneficiaries.

VARIATION IN COST-SHARING REQUIREMENTS

Plan design features such as deductibles, copays, coinsurance, and out-of-pocket limits all play a role in determining the costs any particular patient will experience. Some patients may incur no costs at all for hospitalizations, while others face costs significantly in excess of the overall averages. Figure 7 provides the percentage of patients who experienced no out-of-pocket costs, costs up to \$400,¹² and costs of \$400 or higher for hospitalizations.

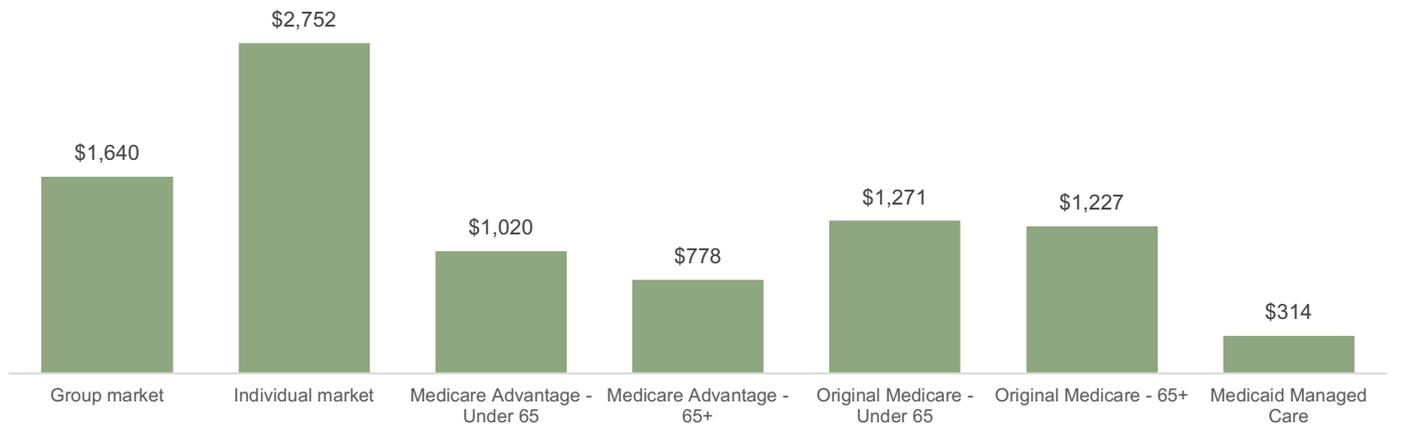
FIGURE 7: PROPORTION OF PATIENTS WITH NO COSTS, COSTS UP TO \$400, AND COSTS OF \$400 OR MORE FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017



Although average out-of-pocket costs for hospitalizations were among the highest for patients with health plans purchased on the individual market, those same patients were the most likely (other than Medicaid Managed Care beneficiaries) to have no cost sharing at all for hospitalizations. Many of these individuals may qualify for cost-sharing reductions through the Patient Protection and Affordable Care Act (ACA) that significantly

reduce or even eliminate their out-of-pocket costs, but those who do not qualify for such reductions experience significantly higher costs than any other group. In 2016, about 57% of those with individual market plans purchased through the ACA exchange received cost-sharing reductions.¹³ Figure 8 provides the average out-of-pocket costs of patients who had nonzero costs for hospitalizations involving influenza or pneumonia.

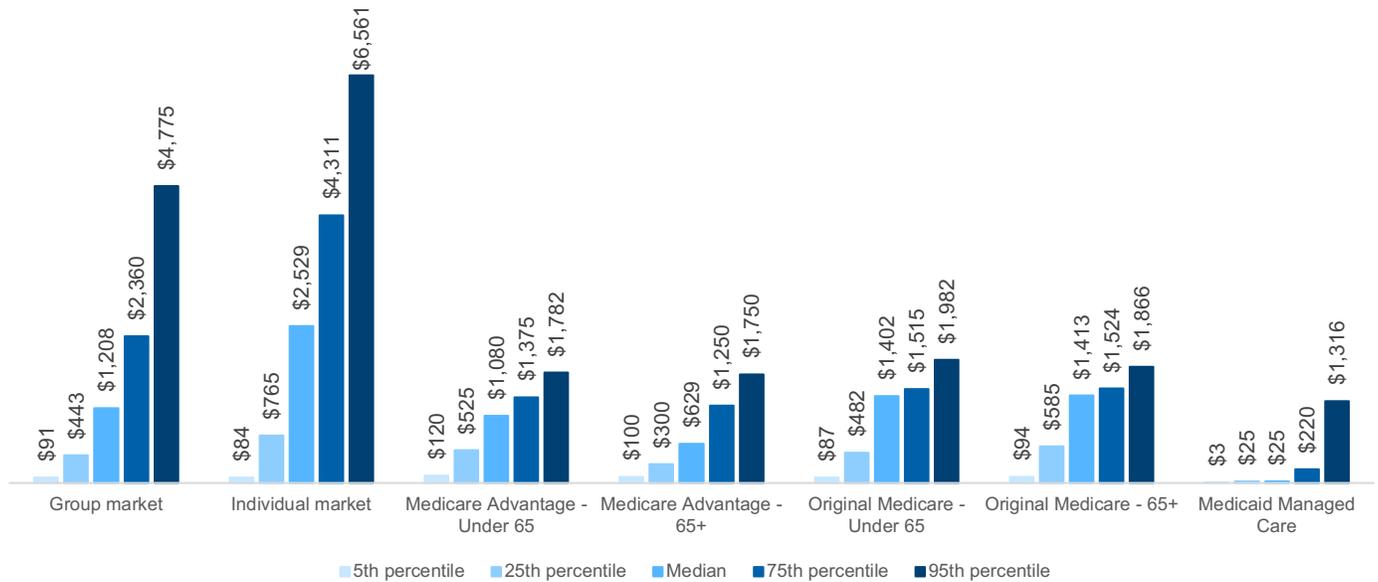
FIGURE 8: AVERAGE COSTS FOR PATIENTS WITH NONZERO COSTS FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017



The average cost for those with individual market plans who had nonzero cost-sharing responsibilities was \$2,752, which was 68% higher than costs for the next-highest group (those with group market plans).

Even among those who were subject to cost-sharing, the level of out-of-pocket costs varies significantly. Figure 9 provides the 5th, 25th, 50th (median), 75th, and 95th percentiles of variation in out-of-pocket costs for those who had nonzero cost-sharing responsibilities.

FIGURE 9: PERCENTILES OF VARIATION IN OUT-OF-POCKET COSTS FOR PATIENTS WITH NONZERO COST SHARING FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY PAYER, 2017

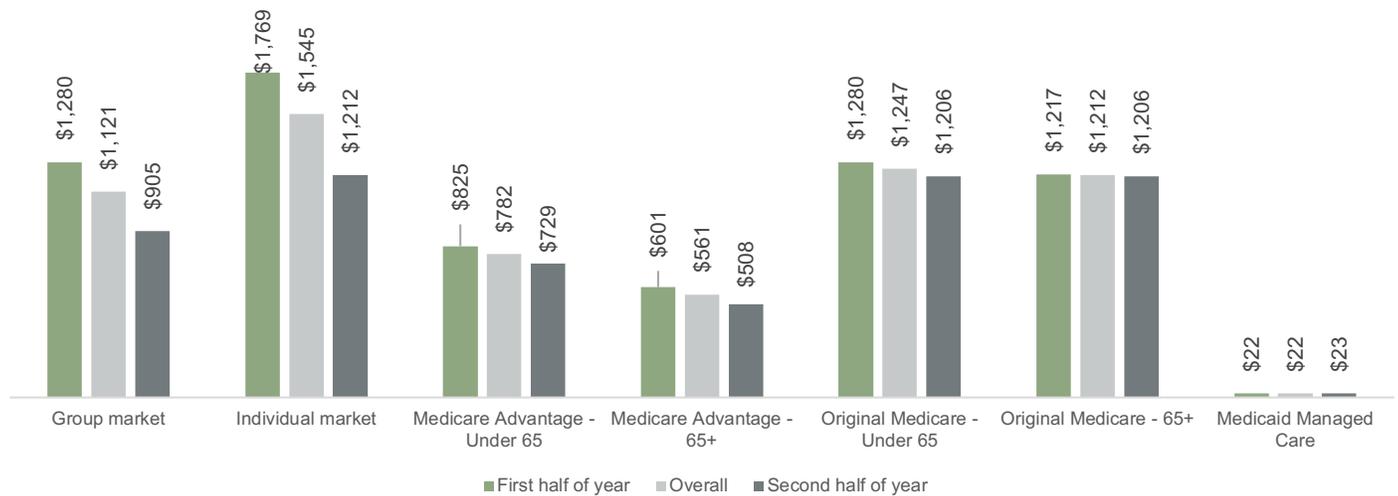


Among those with individual market plans who had nonzero cost-sharing, more than 25% experienced costs in excess of \$4,300, and more than 5% experienced costs in excess of \$6,500 for hospitalizations involving influenza or pneumonia. Those with group market plans also saw significant variation, but at overall lower cost levels compared to those with individual market plans. For many original Medicare beneficiaries, the bulk of costs was for the Part A deductible, which was \$1,316 in 2017. As of 2020, the Part A deductible has increased to \$1,408.¹⁴ Original Medicare beneficiaries are subject to the Part A deductible once per benefit period, which begins on the first day of a hospitalization and extends through 60 days after discharge.¹⁵ Because of this feature, patients who had already experienced a hospitalization in the prior 60 days had already met their Part A

deductibles for a benefit period, and thus only paid a smaller amount for the associated professional services provided under Part B.

VARIATION BY TIME OF YEAR

The time of year in which a person becomes ill can also affect their out-of-pocket costs for treatment because individuals are less likely to have satisfied deductibles or out-of-pocket limits during the earlier months of the year, and thus may be responsible for a higher proportion of their healthcare costs than if they had become ill later in the year. Figure 10 shows how average out-of-pocket costs varied for those requiring hospitalization in the first half of the year (January to June) versus the second half of the year (July to December).

FIGURE 10: VARIATION IN OUT-OF-POCKET PATIENT COSTS FOR HOSPITALIZATIONS INVOLVING INFLUENZA OR PNEUMONIA, BY TIME OF YEAR AND PAYER, 2017

There were only small differences in patient costs by time of year for Medicaid Managed Care and original Medicare beneficiaries, but for other payers, the patient costs for a hospitalization in the first half of the year averaged anywhere from 13% to 46% higher than a hospitalization in the second half of the year. The difference in patient costs between the first and second half of the year was the most substantial for those with individual market plans, where the cost for a hospitalization in the first half of the year was on average 46% higher than for one in the second half, followed by those with group market plans, where a hospitalization in the first half of the year cost on average 41% more than one in the second half. These averages encompass all hospitalizations, including both those with and without any cost-sharing requirements, so some of the variation is driven by differences in whether or not cost sharing is required at all (i.e., whether or not an out-of-pocket limit or benefit period deductible has been satisfied), and some is driven by differences in the level of cost sharing for those who do have cost-sharing requirements.

Discussion

Although this study is based on out-of-pocket costs for hospitalizations due to influenza and pneumonia, it may provide a reasonable proxy for hospitalizations due to COVID-19. In particular, patient out-of-pocket costs for hospitalizations due to COVID-19 will likely vary substantially for patients with different types of insurance, of different ages, living in different parts of the country, experiencing different levels of disease severity, or becoming ill at different times of the year. Out-of-pocket costs for healthcare treatment are just one component of the costs of the COVID-19 pandemic.

Any estimates of the total burden of out-of-pocket costs across the United States (or of the budgets that may be required to provide relief or assistance for those costs) will depend on the number of individuals who become infected and require treatment, but should also consider the unique demographics of patients who are affected. Additionally, the healthcare resources needed to treat COVID-19 likely vary from those typically required for influenza and pneumonia. Finally, if the number of cases rises to the point where health system capacity is exceeded, those shortages may also affect the overall costs of the pandemic to patients within the United States.

This analysis is based on medical claims from 2017, and costs are likely different in 2020. However, patient out-of-pocket costs may not track well with overall healthcare cost trends because they are heavily affected by changes over time in health plan benefit design in addition to the underlying total cost of care. A study by the National Center for Health Statistics in 2018 found that the percentage of adults with employer-sponsored insurance enrolled in high-deductible health plans increased consistently from 14.9% in 2007 to 43.4% in 2017.¹⁶ If those trends have continued, individuals with group market plans may see meaningfully higher average out-of-pocket costs in 2020 than were observed in 2017.

Data sources and methodology

This analysis is based on the following data sets:

- 2017 IBM MarketScan Commercial Claims and Encounters Databases®, covering enrollees of large employer-sponsored health plans.
- 2017 Centers for Medicare and Medicaid Services (CMS) 5% Standard Analytical Files, covering beneficiaries of original Medicare.
- 2017 Milliman proprietary research databases, covering enrollees of employer-sponsored health plans and individual market plans, as well as beneficiaries of Medicare Advantage and Medicaid Managed Care plans.

Individuals were identified as having sought medical care for influenza or pneumonia if they had any claim with a primary or secondary International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) diagnosis code within the following ranges:

- J09-J18: Influenza and pneumonia

Among those patients, total patient out-of-pocket costs were summarized by individual for any inpatient hospital facility claims with a medical (nonsurgical) Medicare Severity-Diagnosis Related Group (MS-DRG) code, as well as a principal or secondary diagnosis of influenza or pneumonia, as defined above. All claims for inpatient professional services that occurred during the period of hospitalization were also included in the analysis.

One recent study that addressed a similar topic strictly used MS-DRGs for pneumonia to identify historically relevant hospitalizations instead. Because we do not yet have information on the MS-DRG distribution of patients with COVID-19, we opted to include patients discharged from all medical MS-DRGs in the analysis to represent the complete group of patients who were historically treated for acute respiratory infections during a hospitalization that did not include major surgery. CMS MS-DRG specifications,¹⁷ ICD-10-CM coding guidelines,¹⁸ individual hospital coding practices, and patients' other diagnoses will determine the final MS-DRG assignment for patients with COVID-19, which will vary based on these parameters. The pneumonia MS-DRGs studied in the other recent analysis make up a substantial proportion of the hospitalizations used in this analysis.¹⁹

Cases that involved ARDS or sepsis were identified as those that had any ICD-10-CM diagnosis code in any position on the hospital inpatient facility claim in the following ranges:

- Acute respiratory distress syndrome: J80
- Sepsis: A02.1, A2.27, A26.7, A32.7, A40, A41, A42.7, A54.86, B37.7, R65.2, or R78.81

Cases that required IMV or intensive care were identified using the following ICD-10 procedure codes and revenue codes:

- IMV: ICD-10 procedure codes 0BH13EZ, 0BH17EZ, 0BH18EZ, 5A1935Z, 5A1945Z, or 5A1955Z
- Intensive care: Revenue codes 0200, 0202, 0203, 0209, 0210, 0211, 0212, or 0219

Coding practices vary among providers and coding requirements vary among payers. These codes may not encompass all possible instances where IMV or intensive care were provided.

Medicaid Managed Care beneficiaries aged 65 or older were excluded because those individuals are likely dual-eligible for Medicare benefits and their out-of-pocket costs as observed within our research data sets did not appear to be reflective of typical Medicaid cost-sharing requirements. Enrollees in individual market health plans who were age 65 or older were also excluded due to low sample sizes and likely eligibility for Medicare benefits. Enrollees in group market health plans aged 65 and older were not excluded and represent individuals who continued to work and maintain eligibility for health benefits through their employers rather than enrolling in Medicare. Medicare beneficiaries under age 65 predominantly qualify for Medicare through disability, but we were not able to cleanly identify disability beneficiaries across all of our research data sets, and instead opted to subdivide these beneficiaries based on age as a matter of convenience.

Note that Medicare cost-sharing amounts for some beneficiaries who purchase Medicare Supplement plans will be lower than those reported here as those plans pay some of the out-of-pocket costs that beneficiaries would otherwise be responsible for.

We have not adjusted any of the data for age, sex, or geographic differences to create a nationally representative sample. For the group market, our sample sizes are sufficiently large that such adjustments are typically minor. Adjustments could potentially be more significant for Medicaid Managed Care and Medicare Advantage plans where sample sizes are lower. Further, clinically symptomatic COVID-19 appears to be less prevalent or severe among younger patients compared to certain other acute respiratory infections that have historically required hospitalization,²⁰ so children may be overrepresented in this sample relative to the expected age-mix of hospitalized COVID-19 patients.

Caveats and limitations

The results in this analysis reflect the populations that were available for study in the research databases used, including those with group and individual market insurance plans, beneficiaries of both Medicare Advantage and original Medicare plans, and beneficiaries of Medicaid Managed Care plans. Those without insurance, as well as beneficiaries of Medicaid fee-for-service plans and other public health insurance programs, were not included, and results likely differ for those groups. While sampling errors are quite small due to the large sample sizes available in data sets used for this analysis, sampling bias could be present to the extent that health plans and payers that contribute to these data sets differ systematically from those that do not.

Milliman has not audited the research data sets used for this analysis, but we have extensive experience working with them and have found them to be reasonable. To the extent that there are errors or omissions in any of the data sources relied upon for this analysis, these results may likewise be in error.

This analysis is intended to describe potential variation in the out-of-pocket costs that patients hospitalized for COVID-19 in the United States may experience by analyzing historical variation for patients hospitalized with other acute respiratory diseases. It may not be appropriate and should not be used for other purposes. Milliman did not receive any external funding for this analysis. Milliman does not intend to benefit or create a legal duty to any recipient of this work.

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Endnotes

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- ⁷ References to the individual market throughout this report represent a combination of both ACA exchange-purchased plans and off-exchange plans.
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