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Payment Assessment of Giving Birth in America Among Insurance Types for Years 2017 through 2021

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By

Jacy Donaldson Harrell

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Abstract:

Introduction: The cost of giving birth ranges drastically throughout the country depending on multiple variables. One of these variables is insurance type. Whether that be private insurance, government insurance or self funded. By providing payment breakdowns by insurance type, this case study seeks to clarify payment amount for births.

Aim: To be able to provide cost transparency for giving birth and to show payment variation among payor types and over time for giving birth.

Methods: This capstone project utilizes publicly available, inpatient hospital stay data from the Medical Expenditure Panel Survey (MEPS). The capstone focuses on total payments per insurance type over the years 2017 to 2021 for birth specific inpatient stays.

Results: Costs do not have a clear trend for increasing from 2017 to 2021. Private insurance and self-pay insurance types had significantly different mean payments when compared to all other payer types using t-tests.

Discussion: This project provided overall trends and figures for payments among insurance types and years 2017 through 2021. There was a significant distinction between payment amount of private insurance payers and non private insurance payers, and self pay versus non self pay. More analysis is recommended subject to data availability for factors affecting birth payments in America.

Topics: Pricing transparency, Birth, Cost Analysis, Insurance Types

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By

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Under the Direction of Dr. Alexander Kirpich, Ph.D

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APPROVAL PAGE

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Author's Statement Page

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Chapter I: Introduction

1.1 Background

Health care costs have been rising over the past years with increasing the financial burden of healthcare for individuals in the United States. These costs have increased for the individual, hospitals, insurance companies and the government [1]. With the increased prices of medical care, it becomes more concerning for individuals when seeing and acquiring care. One area that is of particular focus is the cost of birth in the United States.

Everyone goes through the process of being born. Many are born at a hospital or under the care of a medical professional, and this care most often comes with a bill that can range for a multitude of reasons. Currently in America, there is a wide variety in the cost of birth. Many factors play into the cost of birth including length of stay at hospital, where one has their birth, complications, medications given, insurance type and other countless variables. With this wide range of variables and cost, it is difficult for a family to financially prepare for a birth causing monetary and other stress to one's life.

There has been some progress in regards to price transparency in America over the past couple of years with the Executive Order Improving Price and Quality Transparency in American Healthcare to Put Patients First in 2019 [2] that put presidential support behind price transparency for hospital services. There is the Medicare pricing website, CMS.gov [3] that puts payment information online for Medicare reimbursement; however, this data are very detailed and take a level of insurance payment knowledge to navigate and decipher. Published lists for hospital

service charges are sometimes publicly available, but these can vary depending on the various complications and other variables of an inpatient stay at a hospital for giving birth. For example, when navigating on Emory's website for a price estimation for vaginal delivery, this was unable to be priced without details of insurance and on the website was notified to ask insurance directly [4]. There is still much to uncover when it comes to giving people an idea on what to expect in costs and payments when expecting and that ranges greatly with insurance payor.

1.2 Costs, Payment, Insurance Types and Other Factors

When trying to analyze the true cost of birth in the United States there are several factors that come into play. There are various factors that affect the cost and payments of birth like length of stay, procedures completed, location of hospital, complications and other components. These various factors affect the overall cost of birth while payment is normally determined by costs and type of insurance provided to pay for costs. In this capstone project, the main components discussed and analyzed are costs, payments, and type of insurance payors.

The costs for an inpatient hospital birth are the total bill. These can include the total costs for medical equipment, labor for hospital staff, costs for the procedure, and medicines used while at the hospital. These costs can vary based on the hospital who set the price for each item or total costs, but these are not impacted by the insurance payor or individual payor. The costs are the total bill for a birth, but they are normally not the full price of what is paid by the insurance or family.

The payment for a birth is normally negotiated by the insurance company, government entity, or family paying the bill for the hospital stay. Normally, the payment is less than 100% of the bill. The payment is normally a predetermined amount based on a contract between the insurance company, the government or a self payment rate that is decided by the hospital and payor. Varying contracts and payment rates can add to the complexity of figuring out what the payment might actually be since there are different rates between different payers of the hospital bill. The financial impacts of these rates can be passed onto the family through various means whether that be through a monthly health insurance bill from a private insurance company, through taxes or a monthly fee through Medicaid or Medicare, or even the whole payment up front if the birth is being covered by the family instead of having to go through an insurance company. Besides these three groups of payors, the government and private insurance companies have even more rates and different payments adding to the complexity of providing a pricing estimate on birth in the United States.

Besides the family paying for the birth themselves, there are countless insurance plans for private companies as well as several government options. For private companies there are major health plans like BlueCross BlueShield, Cigna, Aetna, Kaiser, and so on. For government options there are Medicaid, Medicare, Tricare, Veteran Affairs and other options. Besides insurance, there is the option for a person to pay the bill out of pocket directly without insurance. This is the case for some families that give birth that decide to pay the bill on their own. These payments and rates vary greatly depending on what is negotiated with the hospital and what other factors or variables occurred during the hospital stay when giving birth. It would be helpful for

families to be able to know what is expected for the cost of birth or even a range of what is to be expected especially among these different insurance types.

Even though everyone is born and has to experience the cost of being born, there is little regard to information on price transparency and cost estimation available for patients to access in the United States. In this capstone project, the goal is to provide some enlightenment on what is the true cost to give birth in America by exploring and looking at the Medical Expenditure Panel Survey [5] data especially with a focus on the Hospital Inpatient Status Files years 2017 to 2021 that is separated out by insurance type including private insurance, self-pay and government payers.

1.3 Purpose

The purpose of this capstone project is to analyze if there is an association between the financial impacts, costs and payments, and insurance type. This analysis will be completed using the MEPS data and utilizing a pooled two sample t-test for the insurance payers and ANOVA for the yearly payments and other factors.

1.4 Research Questions

The list of questions is:

1. Is there a significant difference of costs and payments over the years?

2. Is there a significant difference of payments between different insurance types?

3. Are there any other significant factors found within the MEPS data that impacts payments for birth?

Chapter 2: Literature review

2.1 Literature Review Resources and Search Pattern

When looking into the literature for pricing and cost analysis for giving birth in America there was little literature to investigate for direct pricing estimates. However, there was some literature regarding broader aspects of birth and cost with regards to insurance. When conducting my literature review, the following keywords were utilized when searching: birth, cost, insurance, cost analysis, insurance, and maternal cost analysis. When conducting the literature review there were some common themes that occurred.

2.2 Birthing Location

A large amount of literature talked about various aspects that go into a birth. One of those being the difference between at home birth, birth at a birthing center or a birth at a hospital. Home birth was deemed to be the least expensive while birth in a traditional hospital was the most expensive [6]). However, one meta study found these results to be inconclusive due to the small size of tests conducted throughout the literature [7]. With regards to this study, the plan is to only focus on inpatient hospital stays; however, at home birth may allow some families to reduce the financial burden of childbirth in America.

2.3 Preterm Birth Costs

Another cost aspect of birth was the increase in hospital costs due to preterm birth. This is supported by the various complications and additional medical care

needed when a baby is preterm [8]. MEPS data does not differentiate between types of birth, so this aspect was left out with regards to the capstone project.

2.4 Cost Burden on Mothers

Another common theme in literature was the increased debt burden when having a child. Mothers are more likely to suffer from medical debt than non-postpartum women [9]. There is also an increased cost burden on families due to the rising out of pocket costs with childbirth [10]. This burden is a reason why price transparency is important and why analysis should be conducted to provide future mothers with an idea of the costs of childbirth to better financially prepare for a child.

2.5 Global Pricing for Births

This capstone project is focused on pricing costs in the United States. There were little pricing breakdowns found in the literature review for America; however, other countries were found to have price breakdowns for birth costs. These countries included Ghana [11], Australia [12] , and China [13]. These countries financially are different from the United States, and it is difficult to make direct comparisons especially when giving birth in an American hospital instead of one of these countries. This again increases the need for price transparency and analysis for birth costs in America.

2.6 Pricing Estimation for Private Insurance

There was some open information in regards to what to expect when expecting from the Pearson Kaiser Family Foundation Health System Tracker. For women giving birth from 2018 to 2020 with large employer private insurance, it was estimated that women who give birth incur costs of about 19,000 more than women who do not give

birth within that year [14]. This estimation is only for women who had large private employer insurance, not all women who have given birth. This is defining a subsection of the population and a subsection of payers who pay the bill for birth not including self pay, Medicaid or other government payers. These insurance payers pay different rates than private insurance, and in turn have different impacts on final costs to mothers.

2.7 Insurance Types with Different Birthing Procedures

The final theme found after conducting the literature review was different interventions or different procedures for birth regarding insurance type. For instance, one study found that C sections were more common for private insurance even though these are typically a more expensive procedure potentially increasing prices ([15]). Another study supported that various insurance types like Medicaid had different interventions when compared to other insurance types due to standard procedures for said insurances [16] which can cause different costs. In addition to various procedures certain commercial insurance can have different cost trends such as vaginal delivery increasing over the years while C sections are maintaining price as shown by a study by Raham et al. [17]. These studies are showing that type of insurance is impacting birth payments and costs. Being able to show the initial cost and payment analysis is the first step when trying to show price transparency for births in America. The next step in clearing the confusion with price of birth is dependent on insurance type payments which is why payments by insurance type are analyzed in the MEPS data.

Chapter 3: Methods and Procedures

3.1 Context and Rationale of Study

The initial intent of this study was to provide price transparency for future and current mothers on what to financially expect when expecting. When searching for publicly available datasets, the Medical Expenditure Panel Survey (MEPS) data was selected since it provided the financial expenditures and payment amounts from births in the United States from 2017 to 2021, providing five years of data. These five years were the most recent data points for MEPS.

3.2 Medical Expenditure Panel Survey Data

The data utilized was the Medical Expenditure Panel Survey (MEPS) data and specially the Hospital Inpatient Status Files years 2017 to 2021. This is a nationwide survey that is publicly available at the MEPS website [5]. This data did not require an IRB approval due to being one of the existing pre approved data sources from Georgia State. This data do not have any unique identifiers provided within the data eliminating the risk of spreading individual health information.

MEPS is broken out into different components and subsections. The two main sections are the Household Component Full Year files and the Household Component Event files. The Household Component Full Year files contain information on an individual over the entire year. This information can range from socioeconomic factors to health care factors. The Household Component Event files are focused on specific medical events relating to the person and household. For this capstone project, I selected to use the Household Component Event files focusing on hospital inpatient

stay files covering years 2017 to 2021. Within the inpatient stays section, there is the household component and the medical provider component. The household component goes into data that the family surveyed can provide. This includes variables such as what type of insurance they use. While the medical provider component data is collected by reaching out to medical providers that serve the family. The Hospital Inpatient Status Files cover inpatient stay events that are broken into total costs, length of stay, if it was an emergency admit, insurance type paid, payments made to hospital or doctor and where the payment was from among other factors. Most of these factors utilized are from the medical provider component. Payments, costs, and codes that led to reason for entering the hospital were sourced from the providers. This provides a more accurate number for costs and payments than relying on recall from the family.

3.3 Sample and Variable Selection

The MEPS inpatient stay dataset had the required variables needed for providing price transparency for births. The variables utilized were reason for entering hospital, hospital charges, hospital payments and insurance type paid. Reason for entering hospital allowed the study to filter out only birth visits. First, it allowed one to filter out birth events from other hospital stays by utilizing the dataset variable which explains the reason why one entered hospital. For births, it was either coded a 4 or 5 as reason for entering the hospital. By filtering out this birth specific data from the whole inpatient stay data it reduced the sample data amount from 13,489 to 1,225 for years 2017 to 2021. This reduction is due to births being a small reason for why someone has an inpatient stay. In a study of reasons why one enters the emergency department, births resulted in about 3% of hospital stays that were admitted through the emergency department[18]. This data reduction was also supported by a study by the Healthcare Cost and Utilization Project that showed that discharges for deliveries for hospital stays ranged from 9 to 11% of discharges which is reflective of our sample used [19]. The data also combined mother and baby expenses for birth visits if both mother and baby were discharged at the same time which is common for non complicated births. So by only focusing on admit status for birth, 4 or 5, this only focused on birth charges not dealing with mother or baby complications or separate hospital stays for our capstone project.

In addition to providing reason for entering hospital, MEPS provided the costs and payments for the hospital inpatient stay. Costs were determined by the total charges from both the hospital and physician; payments were determined by the total expenditures which were the total paid to both the physician and hospital [20]. Costs

when going to the hospital are the total charges from the hospital. These costs can cover what the cost for labor was, the costs of surgery, costs of equipment and other items that the hospital will charge for. Payments are what will actually get paid to the hospital from the insurance or family. Normally, these are slightly different since hospitals will have agreed upon rates with different insurances or government entities like Medicaid or Medicare that the payers will pay the hospital. For families that are not covered by private or government insurance, they will have to pay the hospital out of pocket. Due to the high costs of inpatient stays, most hospitals will have a reduced rate that the family will pay. These insurance or self pay payments are my focus in regards to my capstone since these are the actual rates of payment for birth not the charges. These payments are what the family or insurance have to pay and are more representative of what the true cost of birth is.

3.4 Statistical Analysis and Data Transformation

For this capstone project I utilized SAS software to process and analyze the MEPS data. On the MEPS website, these files were provided as SAS V 9 files that were directly referenced into SAS and transferred to a work library. There was an individual inpatient stay file for each year up to 2021. I utilized the files from 2017 and 2021. Each file had both a code book and variable list description for all variables listed in the datafiles.

After loading in the data from the MEPS website, a sub datafile for just birth visits was created each year by removing all data that did not have a birth related reason for entering the hospital. This was filtered by selecting only 4 or 5 for the variable RSNINHOS, the reason for entering hospital. Birth specific events were coded as 4 or 5

for the reason for entering the hospital. All years were combined after filtering for births by merging datasets after proc sorting by date. A summary file for all years was also compiled to analyze total costs among all years to see if date was affecting costs or payments for births. Summary statistics were formed for total costs for all years, costs for each year and payment for each type of payor for each year.

Categorical variables for type of insurance were also created through data manipulation within SAS. The type of insurance paid amount was created into a binomial variable by setting if the paid amount by insurance was paying nothing as a 0, and if the insurance type paid any amount the insurance category would be a 1. This modification set a binomial category for each insurance category of whether it belonged to one insurance payer or not. Further modification was completed, by creating a categorical insurance name for each account by aggregating the binomial categories into one large insurance payer category labeled as each insurance type including Medicaid, Medicare, Tricare, Veterans Affair (VA), Self Pay and Private Insurance. This categorical variable was utilized for summary statistics and analysis.

Chapter 4: Results

4.1 General Analysis of Costs and Payments Over Years and Insurance

When conducting the initial data review for the MEPS inpatient data, I focused on the median cost and payments per year for births and payment breakdowns for each insurance payment by year to see if costs or payments were changing over time. The insurance payments included payments by the family (out of pocket/ self-pay), private insurance, Medicare, Medicaid, Tricare, Veterans Affairs, State or local government, Other federal payor, or Other payor. The average total costs and payments over all insurance types per year were not showing any trends over the years as shown by Figure 4.1 and 4.2.

Figure 4.1 Mean of Total Charges for Birth Each Year

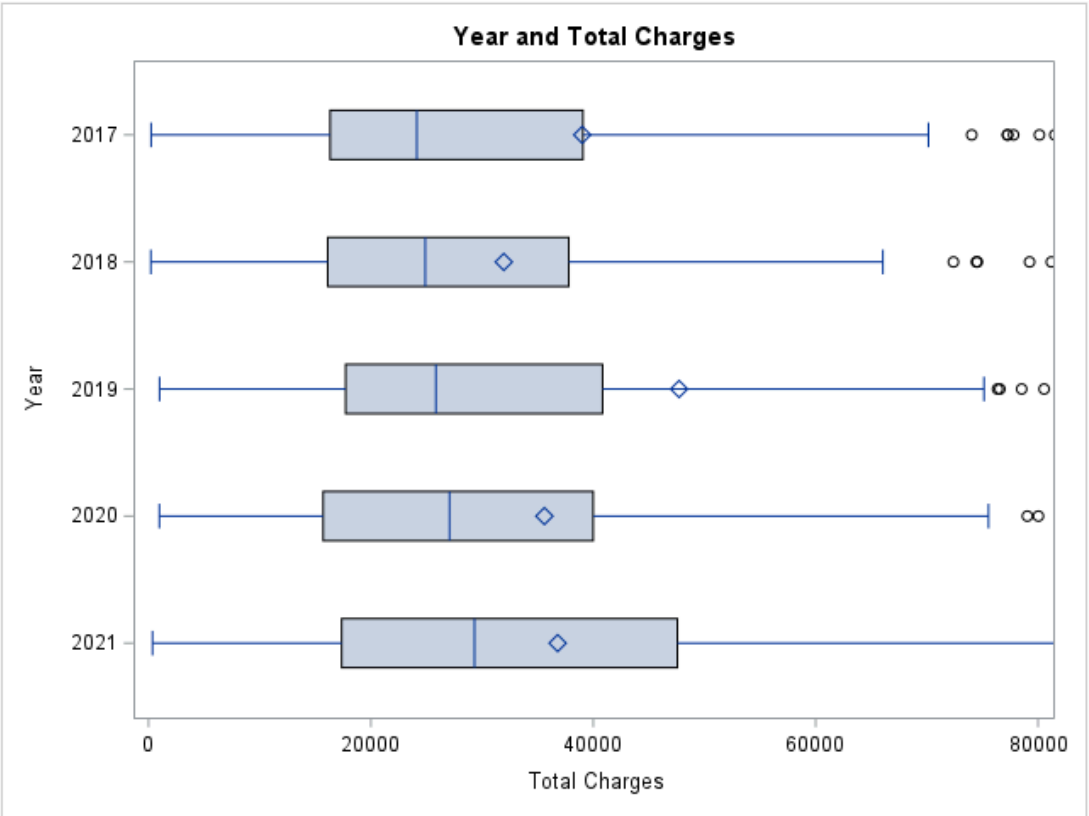


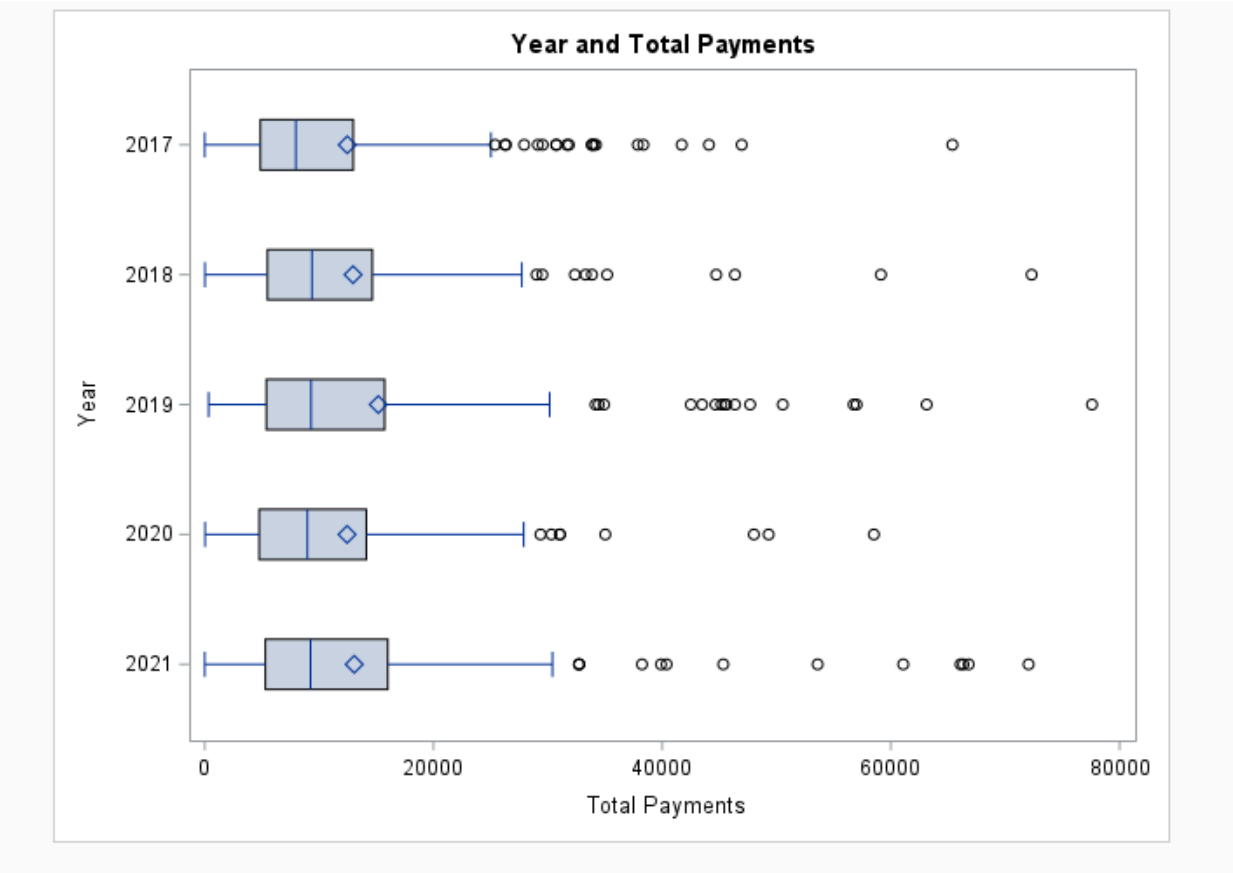
Table 4.1 Total Charges Per Year Summary Statistics			
Year	**Mean**	**Median**	**N**
2017	39,004	24,130	334
2018	31,953	24,890	277
2019	47,718	25,845	245
2020	35,605	27,072	180
2021	36,795	29,318	189

Figure 4.1 is the box and whisker plot of charges for birth by each year, and Table 4.1 is the summary statistics of the box and whisker plot of figure 4.1. There are no clear trends when looking at the mean between years for births; however there is an increasing trend for median over the years from 2017 to 2021. This table and figure give the summary statistics for costs of birth over the years showing costs ranging from 24,130 to 29,318 for the median cost of birth in America.

Table 4.2 Total Payments Per Year Summary Statistics			
Year	**Mean**	**Median**	**N**
2017	12,463	7,969	334
2018	12,972	9,374	277
2019	15,177	9,302	245
2020	12,446	8,975	180
2021	13,076	9,253	189

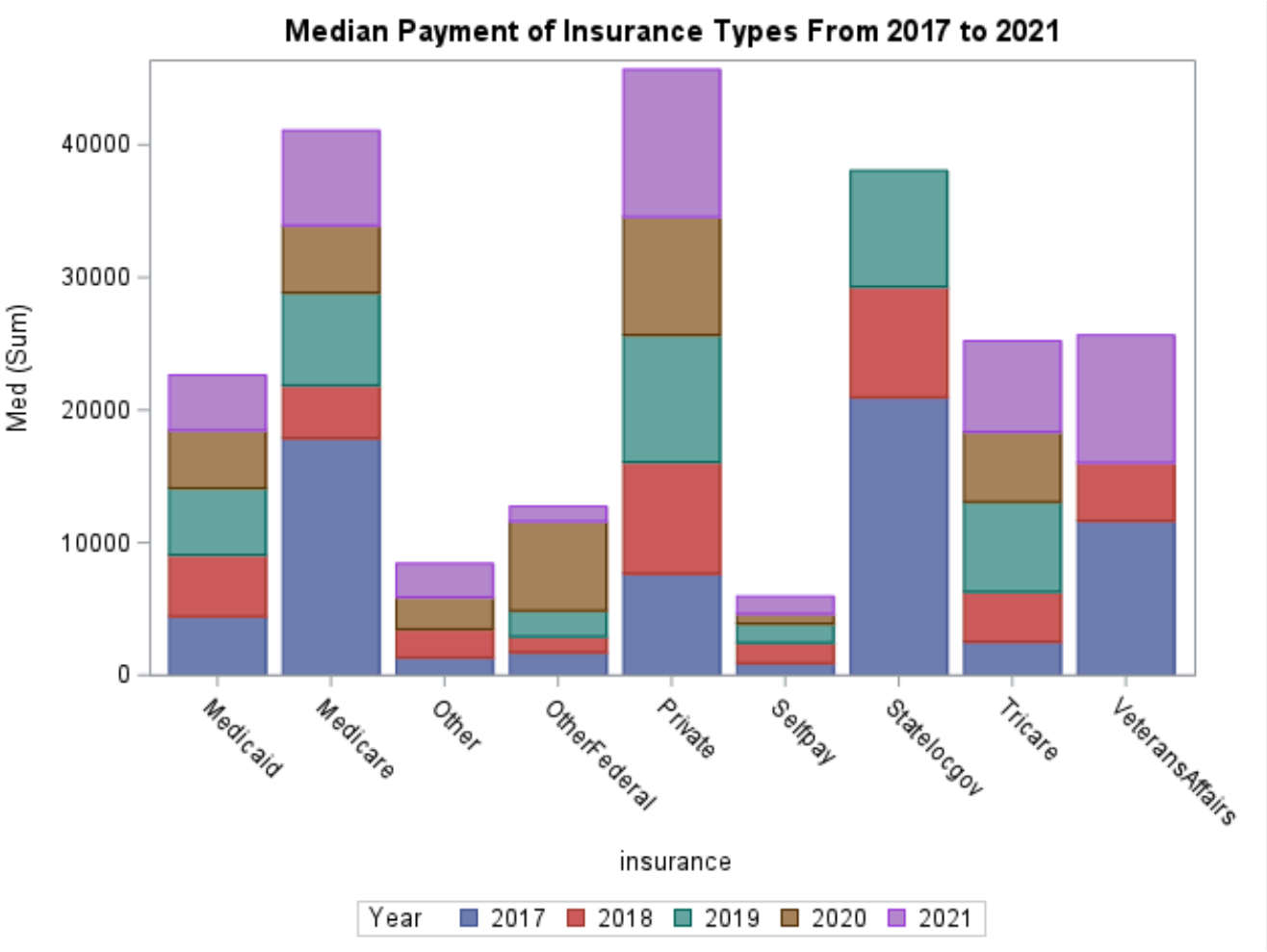
Figure 4.2 is the box and whisker plot for paid for birth by year, and table 4.2 is the summary statistics for figure 4.2. Unlike costs, there is not a clear trend of payments between the years for births; however, this plot does show that payments are less than costs. This supports that payments are a truer reflection of true costs of birth for insurance payers and families.

Figure 4.2 Average Paid for Birth Per Year



There are no noticeable differences between paid by year; however, when you separate out the amount paid by insurance type there are some noticeable differences between the paid insurance types. The different amounts paid by insurances of different types did seem to show some difference between the groups as shown in Figure 4.3.

Figure 4.3 Median Payment of Insurance Types from 2017 to 2021



In this graph, there is a clear difference in private insurance compared to the others when focusing on median payments for birth. Figure 4.3 is a bar graph that shows the medians of payments for birth per year by insurance type. In Figure 4.3, private insurance pays more than the other insurance types to doctors and hospitals for the costs of birth with self pay paying the least. When seeing different insurance types paying differently, this led into further analysis of if different insurance types are paying differently from all other insurances by a significant amount.

4.2 Comparison of Means

Regarding insurance types, an ANOVA test was originally going to be utilized to test the homogeneity between insurance types regarding payment for birth; however, the variance between the groups varied too much for ANOVA to be utilized for insurance type. Please see table 4.3 Summary Statistics for Payment and Insurance Type below.

4.3 Summary Statistics for Payment and Insurance

Insurance Type	N Obs	N	Mean	Variance	Median
Medicaid	503	503	8,994	327,853,508	5,998
Medicare	3	3	21,251	198,178,335	27,932
Private	270	270	17,992	562,332,250	12,269
Self Pay	396	396	16,038	417,243,411	11,854
Tricare	16	16	9,341	59,352,649	8,378
VA	3	3	9,371	6,265,856	9,619

As seen in table 4.3, the variance between insurance groups varies ranging from 436,882,460 to 6,265,856. Due to this large variance between groups a t-test assuming different variances for each group was utilized for comparing payment amount between

insurance payer groups since these subgroups would not pass ANOVA's assumption for homogeneity of variance.

The first t-test conducted was to compare self pay payments with all insured payments. The results are shown in Table 4.4 Self Pay t-Test.

Looking at the Self Pay t-test, there is a significant difference between self pay and all other payers when looking at payments for births.

Table 4.4 Self Pay t-Test

	N	Mean	St	StE	95% CL Mean	T Value	Pr>t
Not Self Pay	829	11863.6	20094.6	697.9	(10493.7,13233.5)		
Yes Self Pay	396	16037.6	20426.5	1026.5	(14019.5,18055.6)		
Diff (No-Yes)	Pooled Test DF 1223	-4174	20202.4	1234.1	(-6595.1, -1752.8)	-3.38	0.0007

When conducting an independence t-test between self pay and insured the null hypothesis would be rejected of the payment means being the same between the groups due to the significant p-value of less than 0.05 . The 95% confidence interval for the mean difference between the two groups is (-6595.1,-1752.8). Meaning self payers pay significantly more than non self pay for births with a difference of 4,174. A reminder for this comparison is that it compares self pay to both private insurance and government insurance, not just commercial insurance. This explains why self pay is potentially paying more than all other insurance since Medicare and other government

payors are included in the insurance status.

The t-test for private insurance, looked at private insurance versus all government insurance payers such as Medicaid, Medicare,Tricare and Veterans Affairs. This t-test required a subsection of data to be created to remove all self pay results. The number of observations was reduced from 1,225 to 829 due to removing self pay. The results of comparing private commercial insurance and government insurance payments for birth are shown in Table 4.5 Private Insurance t-Test showing the difference in the mean payments between private commercial insurance and government insurance payments.

Table 4.5 Private Insurance vs Government t-Test

	N	**Mean**	**StE**	**95% CL**	**T Value**	**P>t**
Government	559	8,903.5	734.0	(7,461.8, 10,345.2)		
Private Insurance	270	17,992.2	1443.2	(15,150.8, 20,833.5)		
Diff (Gov -Private)	Pooled Test DF 827	-9,088.7	1,456.3	(-11,947.1, 6,230.3)	-6.24	<0.0001

The estimated mean payment for births for private insurance was 17,992.2 and the payment mean for government insurance was 8,903.5. Now government insurance includes Medicaid, Medicare, Veterans Affairs and Tricare; however, the majority of the

government observations were Medicaid when looking at previous summary statistics between insurance types. When conducting the independence t-test between private insurance payers and government insurance payers, the null hypothesis of the payment means being the same between the groups would be rejected meaning that they are significantly different from one another due to the significant p-value. With the 95% confidence interval for the mean difference between the two groups being (-11,947.1,-6,230.3). Meaning private insurance payers pay significantly more than government insurance payers for births with a difference of 9,088.7. Further t-tests were unable to be conducted on government subgroups due to the limited sample size for the federal insurance payers.

ANOVA tests were also conducted on the MEPS data to see if there were any significant differences between payments when looking at number of operations, medications prescribed at discharge, if the visit started out as an emergency room visit, and year; however, there were no significant results when comparing these subgroups.

Chapter 5: Discussion and Conclusion

5.1 Discussion of Research Question

The purpose of this capstone project was to provide clarity on pricing around birth costs and payments in the United States. First, when looking at costs and payments over the years there seems to have not been a drastic change over the years of 2017 to 2021 for mean amounts. There was an increased median cost of births over the years of 2017 to 2021; however, payments did not share this trend. Even with payments not showing any significant trends over the years, it was shown that payments are a reduction of costs and are a truer price point of what is paid to hospitals and doctors than total costs. There were also significant differences in payment among different insurance types. Those insurance providers were self pay, private insurance and government insurance.

These significant differences between insurance types were shown through t-tests. The first significant t-test was comparing payment of births between non-insured and insurance payers. Non-insured or self pay accounts were paying on average $16,037.6; while insurance payers were paying on average $11,863.6. Resulting in a significant mean difference between the two shown by a t-test of $4,174. Supporting uninsured paying significantly more than insured payers. This was different from what was expected when looking back to figure 4.3; showing that self pay or uninsured was paying the least out of all insurance types. However, this is probably due to the insured group including both government and private insurance which would lower the insurance mean overall. This may also be due to self pay being the families themselves

paying out of pocket and not being able to negotiate lower prices with the hospitals like the government or private insurance companies can.

Looking further into private insurance and government insurance, the other t-test conducted was comparing private insurance and government insurance payments for birth. Private insurance was paying on average $17,992.2 for births; while government payers were paying $8,903.5. Resulting in a significant mean difference between the two shown by a t-test of $9,088.7. This showed that private insurances are paying significantly more than government insurance payers. This was supported by previous summary breakdowns in figure 4.3, showing that private insurance was paying the most out of all insurance types, and that government payers like Medicaid were paying less. This is supported due to the government being able to set prices more than private insurance companies.

Overall, this shows that type of insurance does impact the payment made for births. This could impact whether a family decides to try to apply for Medicaid, pay for private insurance, or try to negotiate the bill directly with the hospital themselves.

5.2 Study Limitations and Strengths

There were some limitations with this study. First, there was a smaller number of observations due to limiting the survey by births. The total dataset was limited from 13,489 to 1,225 when reducing to just birth inpatient visits. This reduction makes sense when thinking of reasons for entering a hospital with birth being one of the many reasons behind a hospital stay. The limitation in sample size reduces the significance of

the analysis, and could have limited insights into other insurance types for payments. Additionally, there was the limitation of wide variances between insurance types.This forced the study to utilize t-tests to analyze the difference of mean payments between insurance groups, and limited government payer comparisons.

There were also other limitations with the data such as whether a birth was a cesarean section or a vaginal birth and family demographics. The reason for entering hospital was only defined by birth not by c-section or vaginal delivery. The inpatient stay data was also not linked to the overall family interview data limiting the other potential factors affecting payment for birth. If we did have the additional variables, there could have been more price analysis and transparency. There needs to be more analysis done in these aspects and on the price breakdown for births.

There were also many strengths in regards to this study. One strength was being able to separate out each major insurance type and compare them to the other types of insurance or payor. By having this binomial breakdown between the types of insurance this allowed the study to be compared as a whole of one group versus all the rest of the population. Another strength of this study was being able to focus on birth payments which are more reflective of the true costs of birth instead of payment. Allowing clearer price transparency among birth costs.

5.3 Implications of Findings

The impact of this study did provide price transparency on costs of giving birth in the United States as well as payments among different insurance payors in the United States. This study supported that self pay, government payers, and private insurance pay births differently than each other.

The project showed that there is a significant increase in payment by self pay versus insurance payer and private insurance versus government insurance payer for births in America. This supports the claim, type of insurance impacts payments for birth in America. This capstone project provides clarity on payment and costs for births in America and allows clarity for a variety of groups.

The groups that are impacted by these results and further research in the area of payment amount for birth are hospitals, doctors, the government, insurance companies and families. First, there are the hospitals and doctors. By having more payment transparency, hospitals and doctors can bill appropriately and estimate reimbursement when looking at insurance type distribution between their patients. Insurance companies can use this capstone information on how to best budget for births and insurance monthly payments from families. The government can be impacted like insurance companies, but it can also help when planning for medical relief and how to fund initiatives on helping families afford the cost of birth in America. The government could also use this information on how to best provide relief to hospitals if they need assistance for paying for births. Most of all, mothers and families are the most impacted

by this study and price transparency research. If mothers and families know how much births truly cost, they can plan for this and not have as great of a debt burden when it comes to giving and affording birth. By seeing that insurance type plays into birth costs, families can use this information to best select the insurance plan for them and be able to weigh the out of pocket costs versus the monthly insurance costs through private insurance companies or government payers.

The potential implications of this study merits further price investigation and price transparency for mother's giving birth in America as well as the breakdown between insurance payors and payments. Hopefully, this future analysis will empower future mothers to be able to plan accordingly for giving birth or advocate for specific payment assistance due to the cost of giving birth more clearly.

5.4 Recommendations and Prevention

The first recommendation for this study is as more data becomes available to retest the results to keep them updated and to provide more insurance payment details. Additional, future recommendations for this study are to test more variables for payments and create a more detailed model of payments for birth. Analyzing insurance status, length of stay, procedures completed, major medications and other potential impacts on payments for birth would add to creating a more visible payment amount for births depending on these various factors. This additional analysis will allow more accurate pricing information for mothers to financially prepare for birth.

Adding additional data as it becomes available from MEPS is recommended to add to the number of observations and keep up to date with the pricing data for the

model. This study was only conducted on data from 2017 to 2021; a lot can change with future years such as the economy, legislation or even payment agreements with hospitals. It is important to stay up to date on pricing estimation as much as possible. Ideally, hospitals and insurance companies would allow patients to have an easy to access and understand tool where mothers could estimate a min and max of what to financially prepare for when giving birth. However; this can be difficult due to the multiple factors affecting birth payments. Yet with more analysis and research completed and publicly available, this should be possible in the future.

5.5 Conclusion

Overall, pricing and payments for medical events in the United States is complicated for all parties involved whether that be for the government, insurance company, hospital or the individual receiving care. Some individuals can delay this cost due to not seeking out medical care for an issue; however, women giving birth and babies being born cannot delay their care and cost of care.

There are many components of care for mother's and their babies. They have countless appointments and follow ups to have to go to as well as the main cost of pregnancy, birth. Birth can be uncertain with the various procedures, complications and other factors that go into giving birth. Birth can also be impacted by non medical factors such as a type of financial payer as proven by this capstone. These uncertain factors are coupled with the uncertainty of what to financially prepare for after receiving the bill for giving birth.

This capstone was utilized to analyze publicly available data for costs and payments for birth in the United States by utilizing the inpatient data from the Medical Expenditure Panel Survey. This capstone project did increase price transparency for births. The project showed that the median costs for births are increasing over time. It showed that payments are a truer representation of cost of birth instead of total hospital charges. It gave estimates of birth payments over the years and by different insurance types. Ranging from 8,903 to 17,992 depending on the insurance payer. This project showed that insurance type does impact the payment of birth, however more analysis is recommended as more data becomes available.

Hospital costs are a complex topic including the estimated payment for births. This capstone did provide clarity with price transparency with the cost of births within the United States. This capstone gave insight into aspects of payment for birth; specifically, this capstone provided average payment amounts for births among insurance types which is one factor that a family can control for when financially preparing for birth.

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