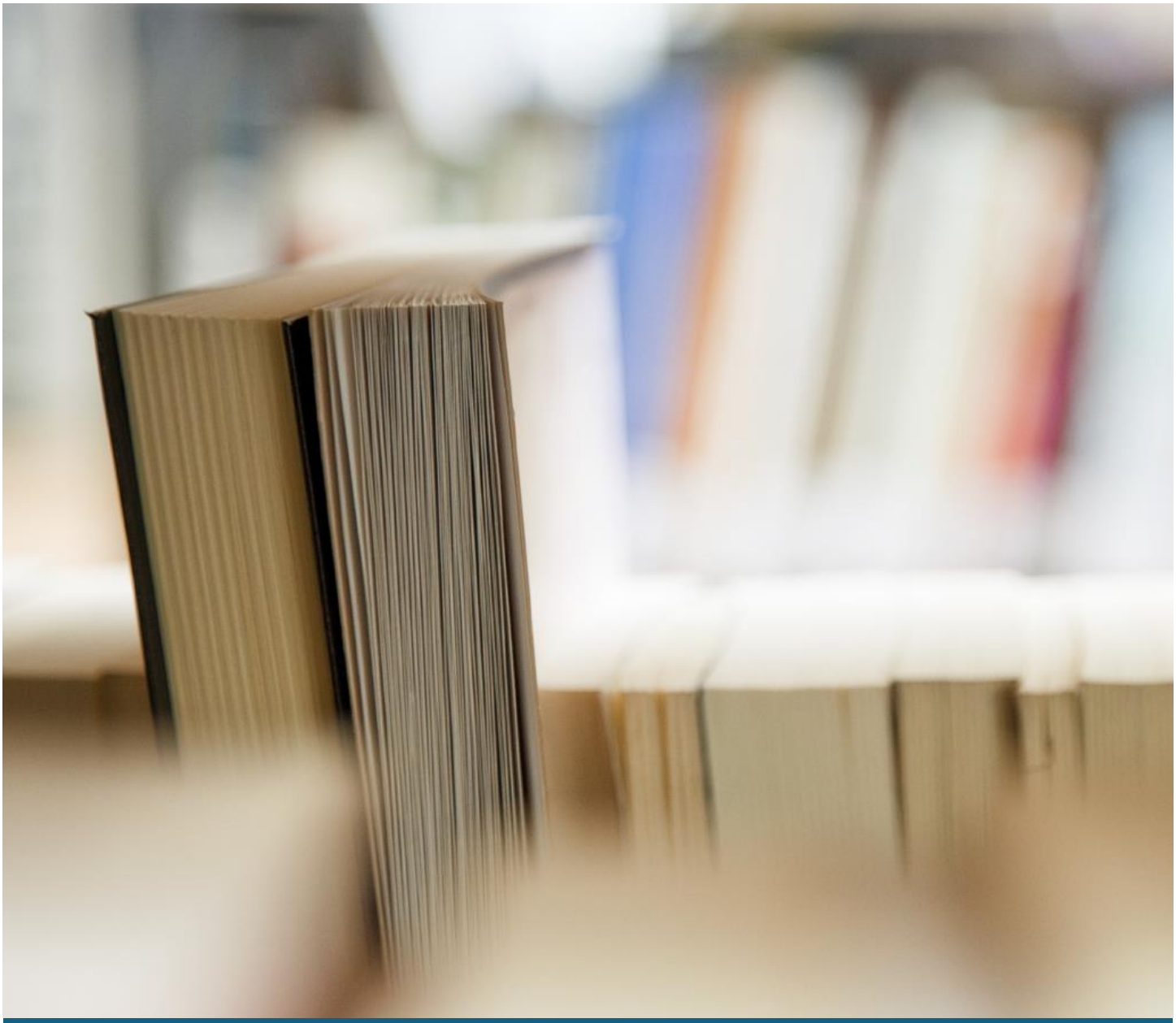

Revenue Cycle Management Payor Mix Analysis for SGH in Outpatient settings.

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1.0 Introduction

Starlight Regional Hospital, a comprehensive healthcare facility in Pittsburgh, Pennsylvania, is a 100-bed institution providing outpatient and inpatient services. The facility utilizes EPIC, which enhances the efficiency and accuracy of patient data management, as it consolidates various aspects of patient care, including electronic health records (EHR), billing, scheduling, and clinical documentation. Revenue cycle management is crucial for the hospital to ensure financial stability and operational effectiveness. This paper addresses the key phases of the revenue cycle at Starlight Regional Hospital, detailing processes from pre-registration to collections.

1.1 Pre-Registration and Registration

The revenue cycle at Starlight Regional Hospital begins with pre-registration and registration, a critical phase for both inpatient and outpatient services. For inpatient services, this phase involves collecting patient demographic and insurance information, obtaining prior authorization from insurance providers, and discussing estimated costs and payment plans with

patients. For outpatient services, the pre-registration and registration occur on the same day as the service, streamlining the process for patients receiving scheduled treatments or diagnostic tests.

1.2 Insurance Verification

A pivotal aspect of the revenue cycle is insurance verification, which ensures that patient insurance coverage and benefits are accurately assessed using the EPIC system. This involves identifying co-pays, deductibles, and coverage limits, and checking for any prior authorization requirements. Accurate insurance verification helps prevent claim denials and ensures that all necessary authorizations are in place before services are provided.

1.3 Service Delivery and Charge Capture

During the service delivery phase, patients receive medical care, which may include diagnostic tests, treatments, and surgeries for inpatients, or scheduled treatments and consultations for outpatients. Charges for these services are recorded in the EPIC billing system. It is important to accurately document all services provided and ensure that all billable items, such as medications, procedures, and room charges, are captured.

1.4 Coding and Billing

Once services are rendered, coding is performed to assign appropriate medical codes (ICD-10, CPT) to diagnoses and procedures. Accurate coding is essential to avoid claim denials and ensure correct billing. Generated claims are then submitted to insurance companies via EMR. Monitoring claim submissions and following up on any issues or rejections is an integral part of this phase.

1.5 Claims Management and Patient Billing

Claims management involves tracking the status of claims, handling denials or rejections, and resubmitting corrected claims as needed. Resolving payment issues with insurance companies is also part of this process. Once insurance payments are received, the hospital calculates the patient's remaining balance and sends bills for outstanding amounts, such as co-pays, deductibles, and non-covered services. Payment plans may be offered to patients who require them.

1.6 Payment Posting and Denial Management

Payments from insurance companies and patients are recorded in EPIC, ensuring accurate allocation to the appropriate accounts. Denial management involves analyzing and addressing reasons for claim denials, implementing process improvements to reduce future denials, and appealing denied claims when applicable.

1.7 Collections and Reporting

For outstanding balances, the hospital follows up with patients and may use collection agencies if necessary for delinquent accounts. Regular financial reporting is beneficial for tracking revenue, expenses, and profitability. Analyzing this data helps identify trends, improve efficiency, and reduce costs.

1.8 Timeline

The timeline for outpatient services consists of pre-registration, insurance verification, and service delivery occurring on the same day. Charge capture, coding, and billing follow within the next five days, with claims management from days six to fifteen. Payment, posting, and denial management are completed by day thirty, with patient billing and collections as needed.

Table 1 Inpatient vs Outpatient Timeline

Inpatient Services:	**Outpatient Services:**

• **Day 1-2:** Pre-registration/Registration, Insurance Verification. • **Day 3-10:** Service Delivery, Charge Capture. • **Day 11-15:** Coding, Billing. • **Day 16-30:** Claims Management. • **Day 31-45:** Payment Posting, Denial Management. • **Day 46-60:** Patient Billing, Collections (if necessary).	• **Day 1:** Pre-registration/Registration, Insurance Verification, Service Delivery. • **Day 2-5:** Charge Capture, Coding, Billing. • **Day 6-15:** Claims Management. • **Day 16-30:** Payment Posting, Denial Management. • **Day 31-45:** Patient Billing, Collections (if necessary).

2.0 Methods

To assess and optimize the revenue cycle at Starlight Regional Hospital, a comprehensive data collection and analysis process was implemented. The data sample was developed using specific variables captured through the hospital's electronic systems and analyzed using Tableau for actionable insights.

The data collected for analysis included several critical variables:

1. Claim ID and Beneficiary ID: Unique identifiers for tracking individual claims and patient records.
2. Line of Business (LOB) and Primary Payor: Information on the type of insurance and the primary insurance provider.
3. Diagnosis Code (dx_code) and Procedure Code (px_code): Codes used for billing and coding of medical services.
4. Claim Header Cost: The total cost associated with each claim.
5. Service Date and Submission Date: Dates of service and claim submission, respectively.
6. Claim Status: Status of the claim (e.g., approved, denied).

7. Paid Amount and Paid Date: Amount paid, and the date of payment received for each claim.
8. Patient Sex and Point of Service (POS): Demographic and service location details.
9. Denial Reason: Specific reasons provided for any claim denials.

The collected data was analyzed using Tableau, a powerful data visualization tool, to gain insights into the following areas:

- Percentage Paid by LOB

  Calculated field was created called 'Clean Revenue' with the following: IF [Claim Status] ='Approved' THEN [Paid Amount] Else 0 END. The dimension (LOB) was dragged to Color and Label and the calculated field (Clean Revenue) was dragged to Angle and changed to percentage of total. The mark type was set to pie. Labels were adjusted to display percentages of total (Clean Revenue) and category names (LOB).

- Claim Header Cost vs Paid Amount

  LOB dimension was placed into the Rows field and Claim Header Cost was dragged to the Columns field. The Paid Amount was then placed in the Color field to create a color gradient based on the Paid Amount values.

- Clean Revenue by Quarter

  The calculated field for Clean Revenue was placed in the Columns field and the Service Date was placed into the Rows field with its format changed to Quarter. The mark type was set to Bar and the Clean Revenue measure was used/dragged to labels to display the revenue amounts for each quarter.

- Clean Revenue by LOB

  The calculated for Clean Revenue was dragged to the Columns field and the LOB was dragged to the Rows field. The mark type was bed to Bar and the Clean Revenue measure was used/dragged to labels to display the revenue amounts for each LOB.

- Clean Claims by Primary Payor

  The calculated field for Clean Revenue was dragged to the Columns field and the Primary Payor dimension was positioned into the Rows field. The mark type was changed to Bar.

- Denial Rate by Payor

  The visualization was created, firstly by creating the calculated field, denial rate with utilizing the formula, SUM([Denied]) / COUNT ([Claim Id]). This allowed for the denial rate variable to be positioned in the columns field and the LOB positioned in the rows field, resulting in the Denial Rate by Payor.

- Bad Debt Ratio

  The chart was made by the creation of a calculated field, bad debt ratio, utilizing the formula, SUM ([Bad Debt]) / SUM ([Claim Header Cost]). Once this field was created, the Bad debt ratio field was dragged into the columns field and then the payor type into the rows field.

- Accounts Receivable

  The chart was created by dragging payment time into the column field and then making it the average. The payor type was dragged into the row's column.

- Denials by Bad Debt

  The visualization was developed by dragging sum of bad debt to the rows field and the denial reason to the columns field.

3.0 Results

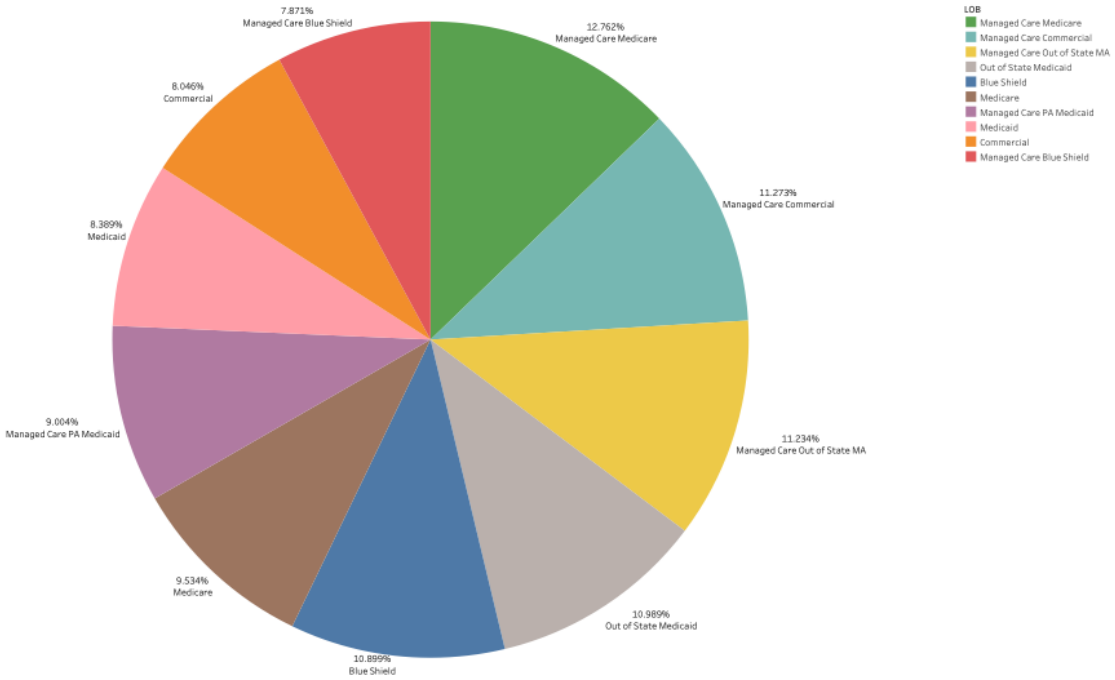

Figure 1 Clean Claim % by LOB

The pie chart represents the percentage of clean claim amounts by each LOB. Managed Care Medicare contributes the largest share at 12.762%, followed by Managed Care Commercial at 11.273%. The smallest shares are from Managed Care Blue Shield at 7.871% and Commercial at 8.046%. Other notable contributors include Out of State Medicaid (10.989%), Blue Shield (10.899%), and Medicare (9.534%). The chart shows a relatively balanced distribution of payments across the various LOBs, with none dominating overwhelmingly.

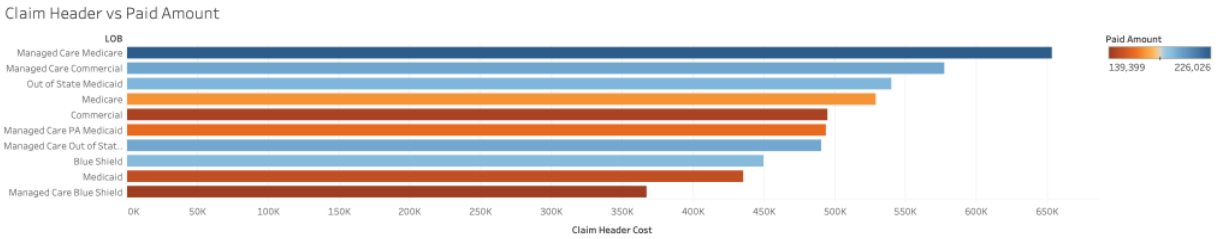

Figure 2 Claim Header vs Paid Amount

The graph compares the claim header costs with the amounts paid across various LOB. The Managed Care Medicare LOB has the highest paid amount and claim header cost, while Managed Care Blue Shield has the lowest. The color gradient indicates the range of paid amounts, with orange colors representing lower payments and blue colors representing higher payments. Notably, LOBs like Managed Care Commercial and Out of State Medicaid have high claim header costs but vary in the amount paid, as reflected in their colors. The data suggests vast differences in how much each LOB spends versus how much they pay out. This graph also suggests a large discrepancy between their claim header and paid amounts, even amongst those that have the highest paid amounts.

Figure 3 Clean Revenue by Quarter:

The bar chart illustrates the clean revenue for Q1 and Q2, showing that Q2 achieved higher revenue at $976,858 compared to $794,790 in Q1. This growth may result from a range of factors, including seasonal business activities, enhanced operational efficiencies, or favorable market conditions. The differences in revenue may also reflect strategic initiative implemented between the quarters, such as marketing efforts, pricing adjustments or the introduction of new services. Further exploration into internal and external factors influencing financial performance can

provide greater insight into replicating successful strategies and addressing potential issues impacting revenue streams.

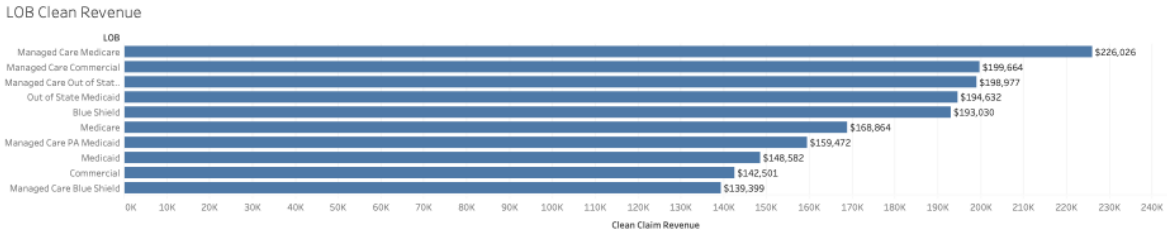

Figure 4 Clean Revenue by LOB:

The bar chart depicts the clean claim revenue for various LOB. Managed Care Medicare generates the highest revenue at $226,026, followed by Managed Care Commercial and Managed Care Out of State with revenues of $199,664 and $198,977, respectively. Managed Care Blue Shield has the lowest clean claim revenue at $139,399. This suggests a significant variation in payments across the various LOBs.

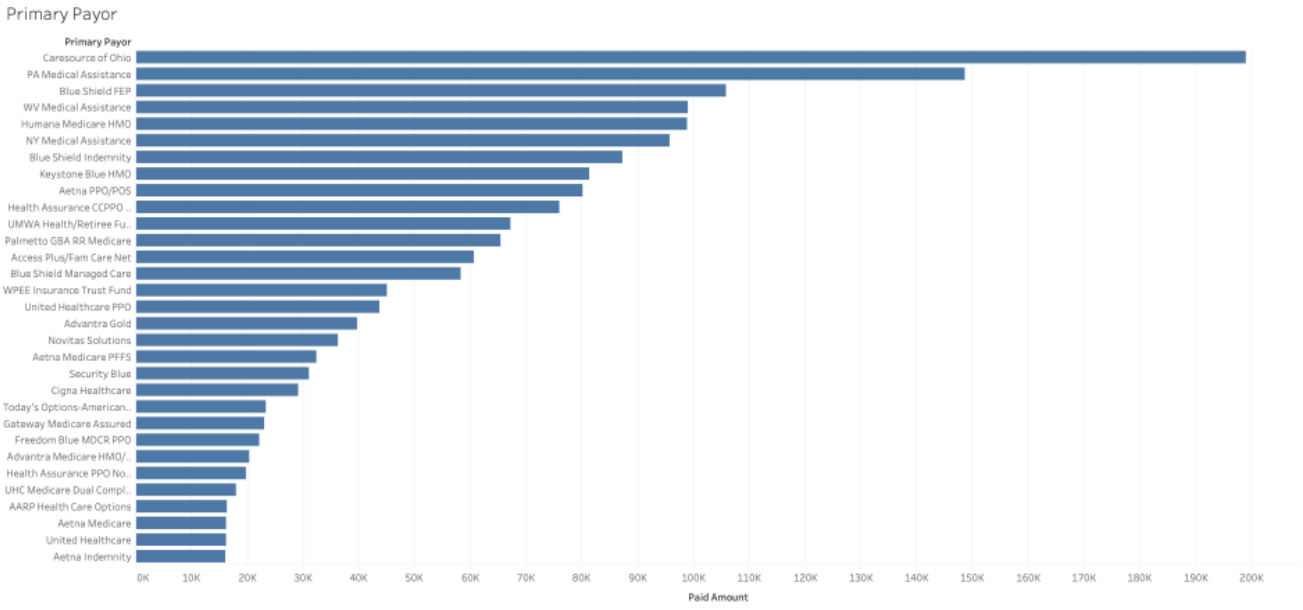

Figure 5 Clean Claims by Primary Payor:

The bar chart shows the number of clean claims processed by various primary payors. Caresource of Ohio and PA Medical Assistance lead with clean claims, indicating they processed

the most claims. At the lower end, Gateway Medicare Assured processed the fewest claims. Thus, showing great variation in the volume of clean claims handled by different primary payors.

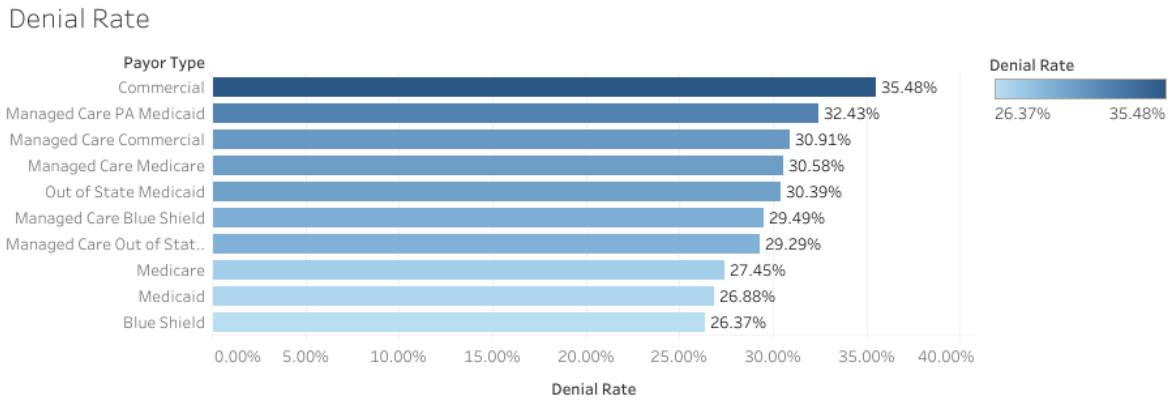

Figure 6 Denial Rate by Payer

In the graph above, the denial rate by payer type was analyzed, it was determined that those with commercial insurance experienced the most denied claims. This shows that the outpatient clinics at Starlight need to focus on determining the root cause for why commercial insurance is being denied at a 35.48% rate and in understanding why the denial rate is high, especially since all the payer types have a denial rate above 20%.

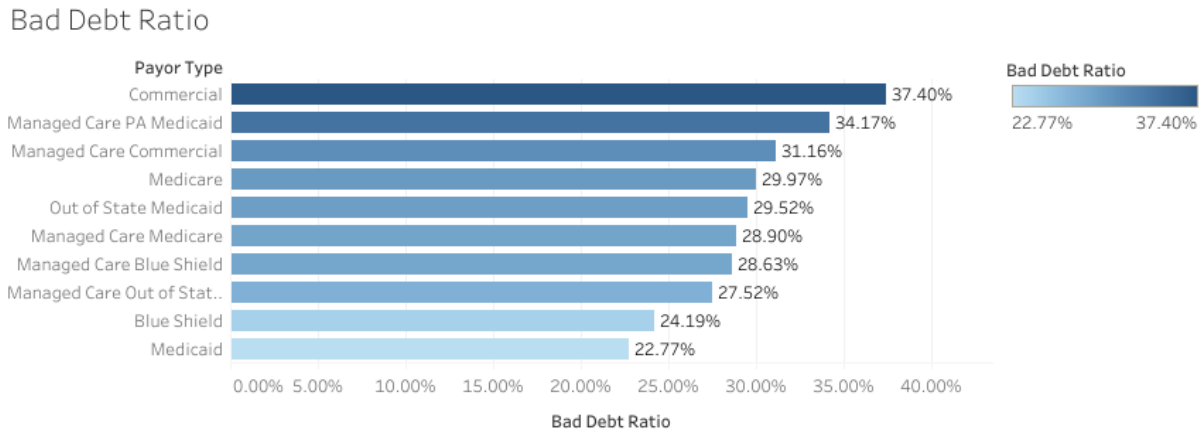

Figure 7 Bad Debt Ratio

Analyzing the bad debt ratio by payer type, it can be interpreted that the commercial payers make up more of the bad debt rate at 37.40% Whereas Medicaid makes up 22.77% and Medicare makes up 29.97%.

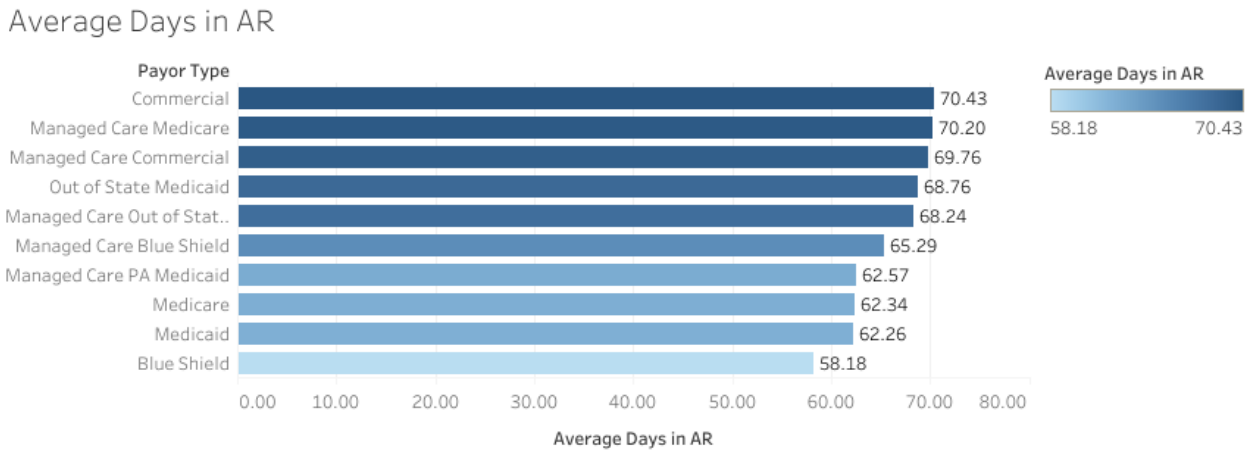

Figure 8 Days in AR (Accounts Receivable)

The bar graph, shows that on average it takes 71 days to collect payment from commercial payers. When compared with similar facilities, Starlight does not meet the industry standards of 30 days to collect payment from either of the payors.

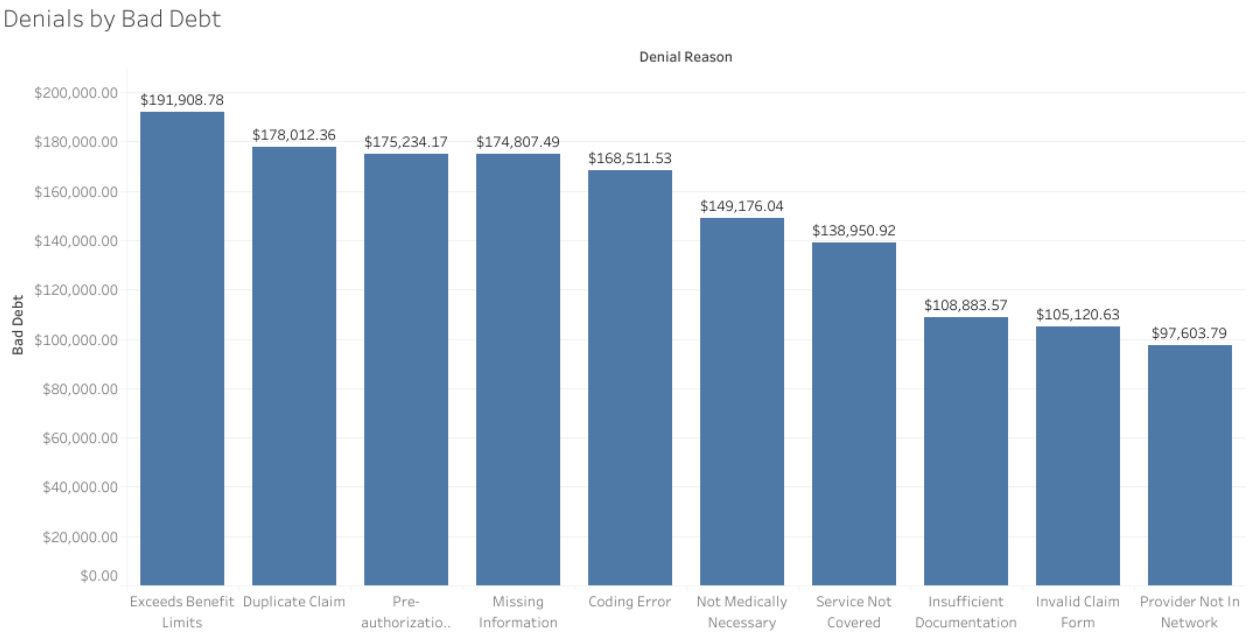

Figure 9 Denials by Bad Debt

The bar chart demonstrates the denial by sum of debt ratio. This shows the amount of lost revenue that Starlight missed due to denied claims. Exceed benefits limit is the highest at $191,908.78, followed by duplicate claim at $178,012.36, the prior authorization at $175,234.17, missing information with $174,807.49, and then coding error at $168,511.53. These categories represented the errors with the highest room for growth as they also contributed to the most debt incurred by Starlight accounting for $888,474.33(65%) of medical debt out of $1349,397.31 total debt of the healthcare system.

4.0 Discussion

The payer mix shows a diverse distribution of payment sources and a substantial variation in the handling and processing of clean claims across different LOBs and primary payors. Managed Care Medicare, Managed Care Commercial, and Out of State Medicaid contribute significantly to the clean claim amounts. These managed care options combined suggest a strong presence and favorable contract terms with Starlight Regional Hospital. Though Medicare, Medicaid, Blue Shield, and Managed Care PA Medicaid represent substantial portions of the payer mix, they do so to a lesser extent. Additionally, Commercial payers and Managed Care Blue Shield have smaller

clean claims percentages, indicating that they are less relied upon compared to other payers. This diverse payer mix indicates a strategic approach to contracting and reimbursement, where Starlight Regional Hospital leverages a variety of payers to maintain a stable revenue stream. The significant reliance on managed care plans suggests that the organization might benefit from favorable managed care agreements, which could include better reimbursement rates or better predictable cash flow. The smaller share of commercial payers might lead to opportunities for growth or renegotiation to increase their contribution to the overall revenue.

When looking at the denial rates, bad debt, and denial reasons, overall, it has been difficult for Starlight to get reimbursement, especially for commercial payers. This is not helpful for the outpatient clinics since this can result in delayed or lost payments which means lost revenue for the overall system. Starlight has also incurred a lot of bad debt at $1,349,397.31 with most of this debt coming from commercial payers. Despite the debt incurred from this group, this still presents an opportunity for Starlight to grow, especially focusing on the commercial payer side of the revenue cycle. This could include focusing on aspects of their collection strategies such as asking for deposits or partial payments upfront to improve cash flow, increasing price transparency, or sending payment reminders periodically. This is further corroborated by the average payment time it takes for providers to be reimbursed by certain payers. This is also an opportunity for Starlight to dig deeper into the root cause of bad debt incurred, leading to a billion-dollar potential loss in revenue. By analyzing the denial reasons, Starlight can uncover insights that are worth noting. Looking at the bar graph which examines the denials and sum of bad debt accumulated, one can see that the excess benefit limits are the highest contributor of denials by bad debt followed by duplicate claim, pre-authorization and then missing information. For instance, when examining excess benefits limit, a huge lack of understanding of coverage limitations for insurance plans could be the biggest reason excess benefit limits ended being the highest among the denial reasons.

This indicates that either the patients do not know their coverage limits or staff may not be well equipped to inform patients of these limitations. To help with this issue, the health system could implement ongoing training for staff about different insurance plans and their limits or develop patient education programs to inform them about their coverage before services are rendered.

As for the duplicate claims, the health system is having a clerical issue. Usually, duplicate claim denials occur when a healthcare provider submits a claim for a service or treatment that has already been billed and paid for by the insurance company or another payer. This can be costly to the system because this results in the having to correct errors and then resubmit the claim. By allowing duplicate claims to remain unchecked, this will only lead to more bottlenecks and delays in reimbursement. Which is why it becomes critical to brainstorm efforts to intervene and ensure that there are more clean claims. Ways that this could potentially be done to address the issue of duplicate claims is by either implementing or upgrading claim scrubbing software that will catch duplicates before submission, providing training to billing staff on proper claim submission procedures, or conduct regular audits on the billing process to identify the root causes of duplications. Prior authorizations accounted for $175,234.17 of the denials by bad debt. This means that there have been breakdowns in the prior-authorization process. Then missing information cost the facility $174,807.49. This indicates issues with data capture and claim preparation. This could be alleviated by implementing staff training on the importance of complete documentation which could improve the denials from prior authorizations.

4.1 Issues Identified

- **Variation in Payments Across LOBs**

  Revenue leakage analysis reveals significant discrepancies in paid amounts and clean claim revenues across different LOBs. Managed Care Medicare and Managed Care Commercial contribute the highest paid amounts and clean claim revenues. However, Managed Care

Blue Shield consistently reports the lowest figures, indicating potential inefficiencies or underpayments.

- **Discrepancies in Claim Header Costs and Paid Amounts**

  Notable differences exist between claim header cost and actual paid amounts, particularly in LOBs like Managed Care Commercial and Out of State Medicaid. This indicates potential issues in billing processes, coding inaccuracies, or inefficiencies in claims management.

- **High Denials Rates and Bad Debt Ratios**

  The high denial rates across all payer types, especially for commercial insurances at 35.48%, and the high bad debt ratio for commercial payers at 37.40%, point towards systemic issues in claims submission and collection processes. These issues lead to substantial revenue loss.

- **Slow Payment Collections**

  The average payment time of 71 days, especially from commercial payers, significantly exceeds the industry standard of 30 days. This delay impacts cash flow and indicates inefficiencies in the payment collection process.

- **High Impact of Denials on Debt**

  Denials, particularly due to reasons like exceeding benefit limits, duplicate claims, and coding errors, contribute significantly to the healthcare system's debt. These denials categories account for a substantial portion of the total medical debt, indicating critical areas for improvement.

4.2 Strategies Developed

To address the issues stated above, several strategies can be implemented. Improving coding accuracy is critical, so regular training and certification programs for coding staff should

be implemented. This will help minimize errors and ensure precision. Additionally, a strong auditing system should be put into place to detect and correct discrepancies. Streamlining the claim submission process through automation can also reduce manual errors. Implementing an integrated software system that checks claims against payer requirements before submission can prevent denials due to missing information of lack of prior authorization. It is also crucial to establish a dedicated denial management team to review denied claims, identify patterns, and implement corrective measures. Developing a real-time reporting system to track the reasons for denials can aid in quick resolutions. Furthermore, enhancing staff training with ongoing education in billing, coding, and revenue cycle management is essential. This training should especially target problem areas with high denial rates and debt ratios, ensuring that staff are well-prepared to handle these challenges.

4.3 Implementation and Evaluation

Implementing the proposed strategies should occur in phases, starting with areas such as improving the coding accuracy and denial management. Pilot programs can be utilized to test new processes and gather data on their effectiveness before full implementation. KPIs such as reductions in denial rates, decrease in the bad debt ratio, and improvements in payment collection times should be established and monitored regularly to assess the impact of the implemented strategies.

Based industry standard denial rates of 5-10%, there could be a decrease of an estimated 25-30% in denial rates, but a targeted reduction of 20-25% in denials might be more feasible. Additionally, given that the current bad debt ratio is particularly high (37.40%), reducing it by 10-15% could represent a significant improvement without being overly ambitious. Thus, bringing the ratio down to around 32-33%, which could be a realistic intermediate goal. Lastly, reducing

the days in AR to align more closely with the industry standard of 30 days is critical as it improves cash flow, enhances financial stability, and reduces the risk of bad debts.

4.4 Recommendations for Sustainable Revenue Cycle Management

To ensure sustainable revenue cycle management, ongoing monitoring of revenue cycle process should be implemented, using data analytics to identify trends, anomalies, and areas for improvement. Regular review and updates to denial management protocols and coding guidelines are essential. Continuous education for staff is crucial, focusing on the latest coding standards, payer requirements, and best practices in revenue cycle management, with encouragement for certifications and advanced training to keep skills up to date. Periodic process audits should be conducted to review revenue cycle processes, including coding accuracy, claim submission, and payment collection, using audit findings to make necessary adjustments and ensure compliance with regulatory standards. Moreover, leveraging advanced technology such as artificial intelligence and machine learning for predictive analytics, automated claims processing and real-time denial tracking can enhance efficiency, reduce errors, and support proactive RCM (Revenue Cycle Management), reduce financial leakage, and improve overall financial health for Starlight Regional Hospital.

5.0 Conclusion

The analysis of Starlight Regional Hospital's payer mix, denial rates, and revenue cycle management reveals both challenges and opportunities. The hospital's diverse payer mix, with a significant reliance on managed care options, suggests a strategic approach to maintaining a stable revenue stream. However, issues such as high denial rates, particularly among commercial payers, significant bad debt accumulation, and discrepancies between claim costs and paid amounts indicate systemic inefficiencies in the claims submission and collection processes.

To address these challenges, a multi-faceted strategy focusing on improving coding accuracy, streamlining claim submissions, and enhancing denial management is recommended. Implementing these strategies in phases, with ongoing monitoring and evaluation through KPIs, is essential to ensuring their effectiveness. Furthermore, sustainable revenue cycle management requires continuous staff education, regular process audits, and the adoption of advanced technology to enhance efficiency and reduce financial leakage.

By addressing the identified issues and implementing the recommended strategies, Starlight Regional Hospital can improve its financial health, reduce bad debt, and achieve a more efficient and sustainable revenue cycle management system.

6.0 Appendix

Table 2 Key KPIs

KPI	Description
Clean Claims	Claims submitted to a payer are processed without errors or rejections during the first submission.
Claim Header	Refers to the initial part of a healthcare claim which includes general information such as the provider's information, patient demographics, or insurance details. It serves as the introductory section of a claim.
Days in AR/ Average Payment Time	Stands for accounts receivable. It measures how long it takes a healthcare provider to collect payment for services. The industry standard for A/R is 30 days (about 4 and a half weeks) or less. A higher A/R number indicates cash flow issues and a less healthy revenue cycle.
Denial Rates	The percentage of claims that payers deny during a specific time period.
Bad Debt Ratio	The percentage of patient accounts that are uncollectable and are written off as bad debt. ("Bad Debt Percentage - RCM Metrics - MD Clarity")

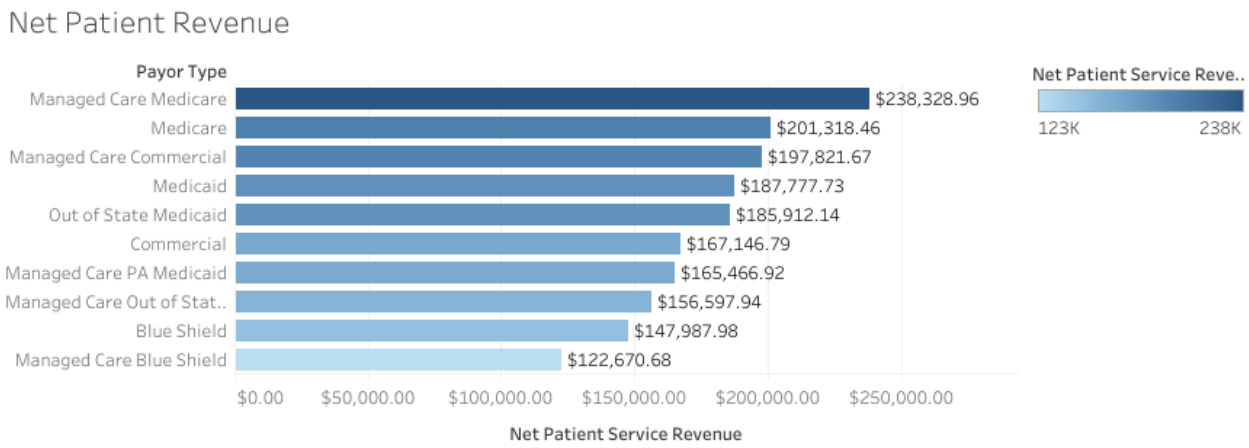

Figure 10 Net Patient Revenue

The image above indicates the amount of revenue generated by Starlight per payer. Managed care Medicare and Medicare bring home the most.

References

Climb, S. (2023, February 21). *1 of 3 - balancing your payer mix with marketing*. MarTech.Health. https://martech.health/articles/1-of-3-balancing-your-payer-mix-with-marketing

Jeffrey M Ferranti, Matthew K Langman, David Tanaka, Jonathan McCall, Asif Ahmad, Bridging the gap: leveraging business intelligence tools in support of patient safety and financial effectiveness, *Journal of the American Medical Informatics Association*, Volume 17, Issue 2, March 2010, Pages 136–143, https://doi.org/10.1136/jamia.2009.002220

Norris, H., & Ivey , D. (2022, October 21). *Strategies to submit clean claims and reduce denials in 2021*. ("Strategies to Submit Clean Claims and Reduce Denials in 2021") Healthcare Business Management Association. https://www.hbma.org/rcmadvisor/quarter-1-2021-volume-26-issue-1/strategies-to-submit-clean-claims-and-reduce-denials-in-2021

Polo, M. (2023, October 25). *Optimizing Healthcare Revenue Cycle Management: Clean Claims Mastery and outsourcing strategies for denial prevention*. NCDS. https://www.ncdsinc.com/optimizing-healthcare-revenue-cycle-management-clean-claims-mastery-and-outsourcing-strategies-for-denial-prevention/#

Rajiv MD, MBA, C., Prakash MD, N., Elizabeth MD, B., Stephany, T., Allison PAC, C., Freddy, C., & Kathleen PAC, C. (2024, July). *Revenue cycle management: The art and the science: Plastic and reconstructive surgery – global open*. ("Latest Articles: Plastic and Reconstructive Surgery – Global Open - LWW") LWW. https://journals.lww.com/prsgo/fulltext/2024/07000/revenue_cycle_management__the_art_and_the_science.9.aspx?context=latestarticles

Rauscher, S. (2008). Effective Hospital Revenue Cycle Management: Is There a Trade-off Between the Amount of Patient Revenue and the Speed of Revenue Collection?/PRACTITIONER APPLICATION. *Journal of Healthcare Management*, *53*(6), 392.

RT; D. (n.d.). *Deploying bots in healthcare to find revenue cycle improvements*. Frontiers of health services management. https://pubmed.ncbi.nlm.nih.gov/37223884/

Singh, S. R., & Wheeler, J. (2012). Hospital financial management: what is the link between revenue cycle management, profitability, and not-for-profit hospitals' ability to grow equity?. *Journal of Healthcare Management*, *57*(5), 325-341.