

Healthcare Data Analysis

Hospital Operations Intelligence

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Project Overview

Healthcare Data Analysis: Excel-Based Investigation

This analysis examines 10 years of patient data from Massachusetts General Hospital (2011-2021), covering approximately 1,000 patient records with medical encounters, treatment costs, insurance coverage, and medical procedures.

Focus Areas:

- Identifying revenue leakage from insurance coverage gaps
- Understanding patient readmission patterns and safety concerns
- Analyzing encounter distribution across different care types
- Evaluating procedure costs and resource allocation



Dataset and Methodology

Dataset:

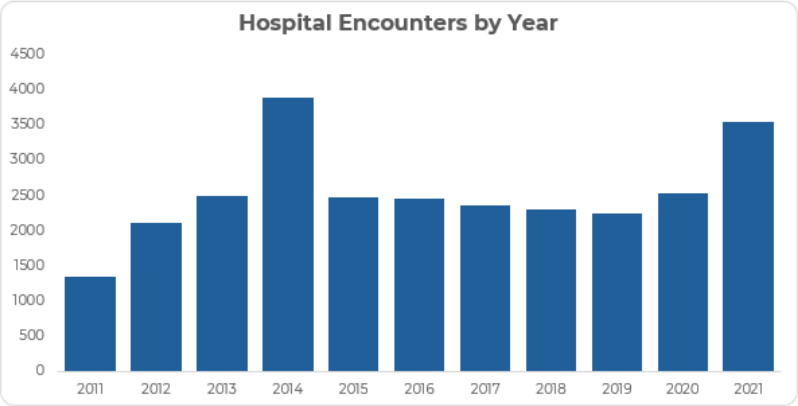
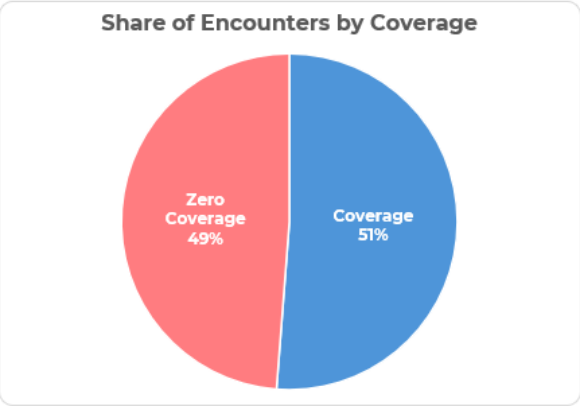
- Time Period: 2011-2021 (10 years)
- Records: 1,000+ patients, 27,000+ encounters
- Source: Maven Analytics Hospital Challenge Dataset

Analysis Method:

- Tool: **Microsoft Excel** (Pivot Tables, Formulas, Aggregation)
- Techniques: Data pivoting, conditional aggregation, trend analysis
- Related Version: **SQL analysis** available on [GitHub](#) (alternative approach)



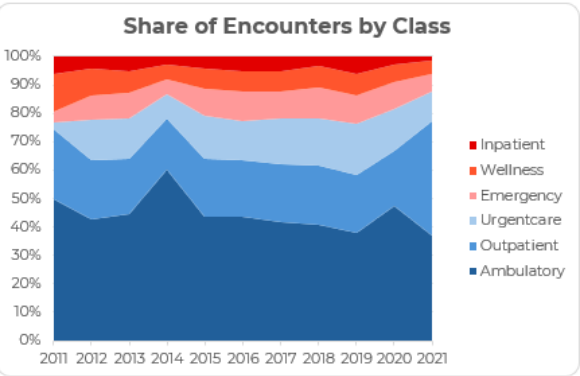
Hospital Operations Intelligence



TOP Patients	Num. Readmission
Kimberly Collier	1372
Shani Parisian	878
Mariano O'Kon	877
Gail Glover	443
Ward Nicolas	426
Marcos Parker	389
Mariano Schroeder	380
Song Heaney	355
Issac Predovic	293
Eugene Abernathy	289
Grand Total	5702

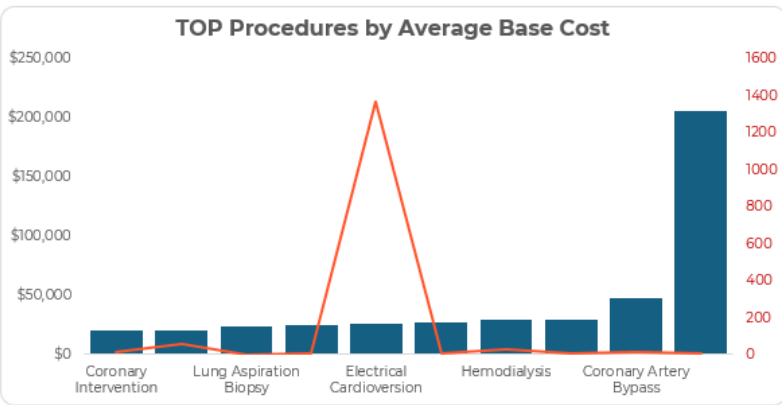
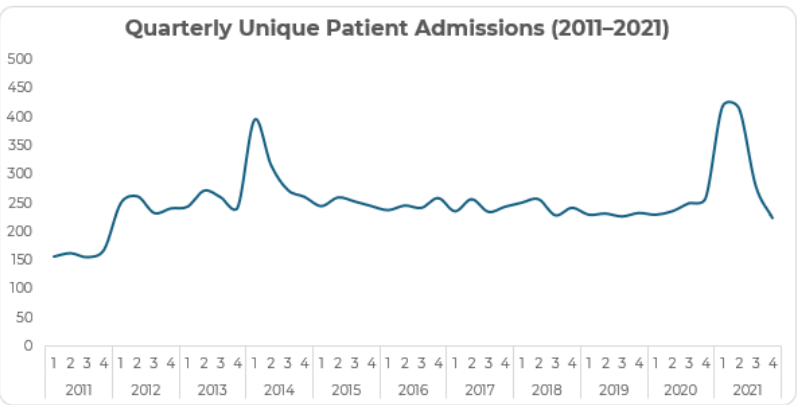
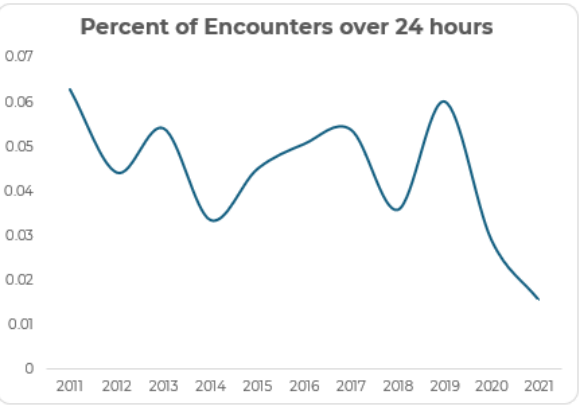
Readmitted Patients within 30 Days

771



Encounter	Class	Ambulatory	Outpatient	Urgentcare	Emergency	Wellness	Inpatient
YEAR							
2011		50%	24%	2%	4%	13%	6%
2012		42%	21%	14%	9%	9%	4%
2013		44%	19%	14%	9%	7%	5%
2014		60%	18%	8%	6%	5%	3%
2015		43%	20%	15%	9%	7%	4%
2016		44%	20%	14%	10%	7%	5%
2017		42%	20%	16%	9%	7%	5%
2018		41%	21%	16%	11%	8%	4%
2019		38%	20%	18%	10%	8%	6%
2020		47%	20%	14%	9%	6%	3%
2021		37%	40%	11%	6%	4%	2%
Grand Total		45%	23%	13%	8%	7%	4%

Payer Name	Encounters	Total Claim Cost	AVG Claim Cost
Medicaid	1443	\$8,954,131	\$6,205
NO INSURANCE	8807	\$49,259,290	\$5,593
Anthem	704	\$2,982,715	\$4,237
Humana	1084	\$3,543,921	\$3,269
Blue Cross Blue Shield	925	\$3,002,166	\$3,246
Cigna Health	809	\$2,424,533	\$2,997
UnitedHealthcare	900	\$2,563,508	\$2,848
Aetna	936	\$2,589,956	\$2,767
Medicare	11371	\$24,647,229	\$2,168
Dual Eligible	912	\$1,546,926	\$1,696
Grand Total	27891	\$101,514,376	\$3,640

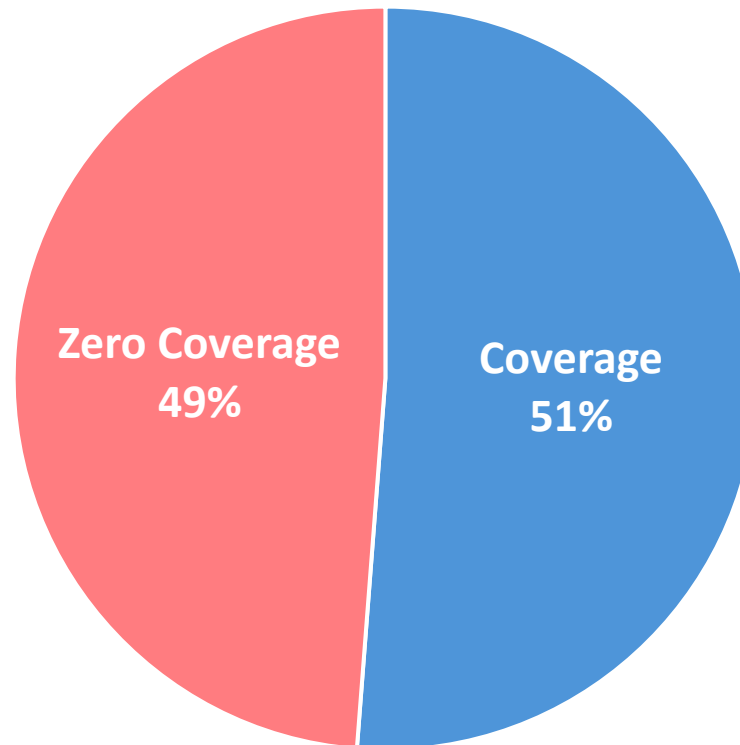


Insurance Coverage Gap

\$49M Annual Revenue Risk

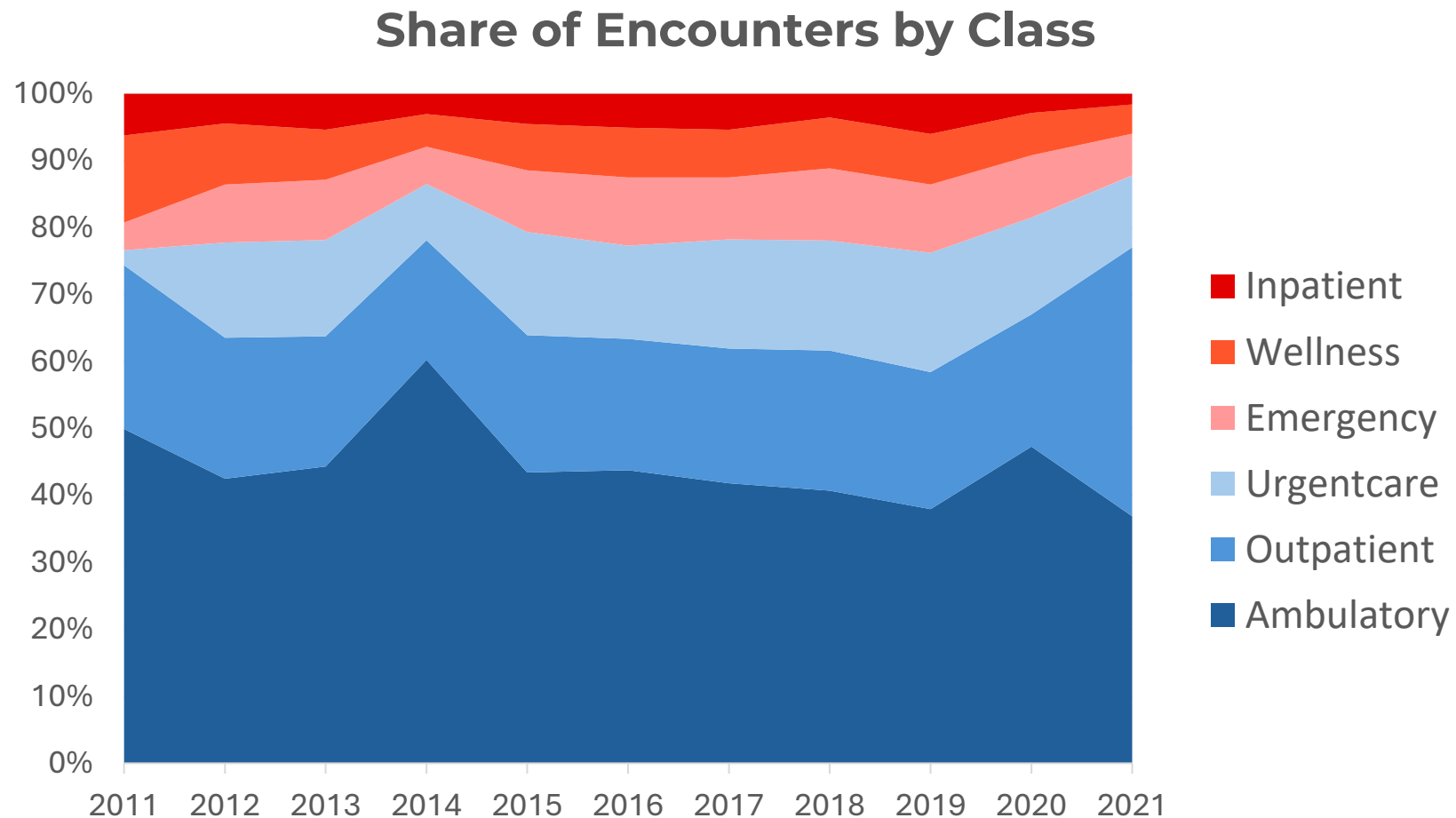
Nearly half of hospital encounters lack insurance coverage, creating significant revenue exposure

Share of Encounters by Coverage



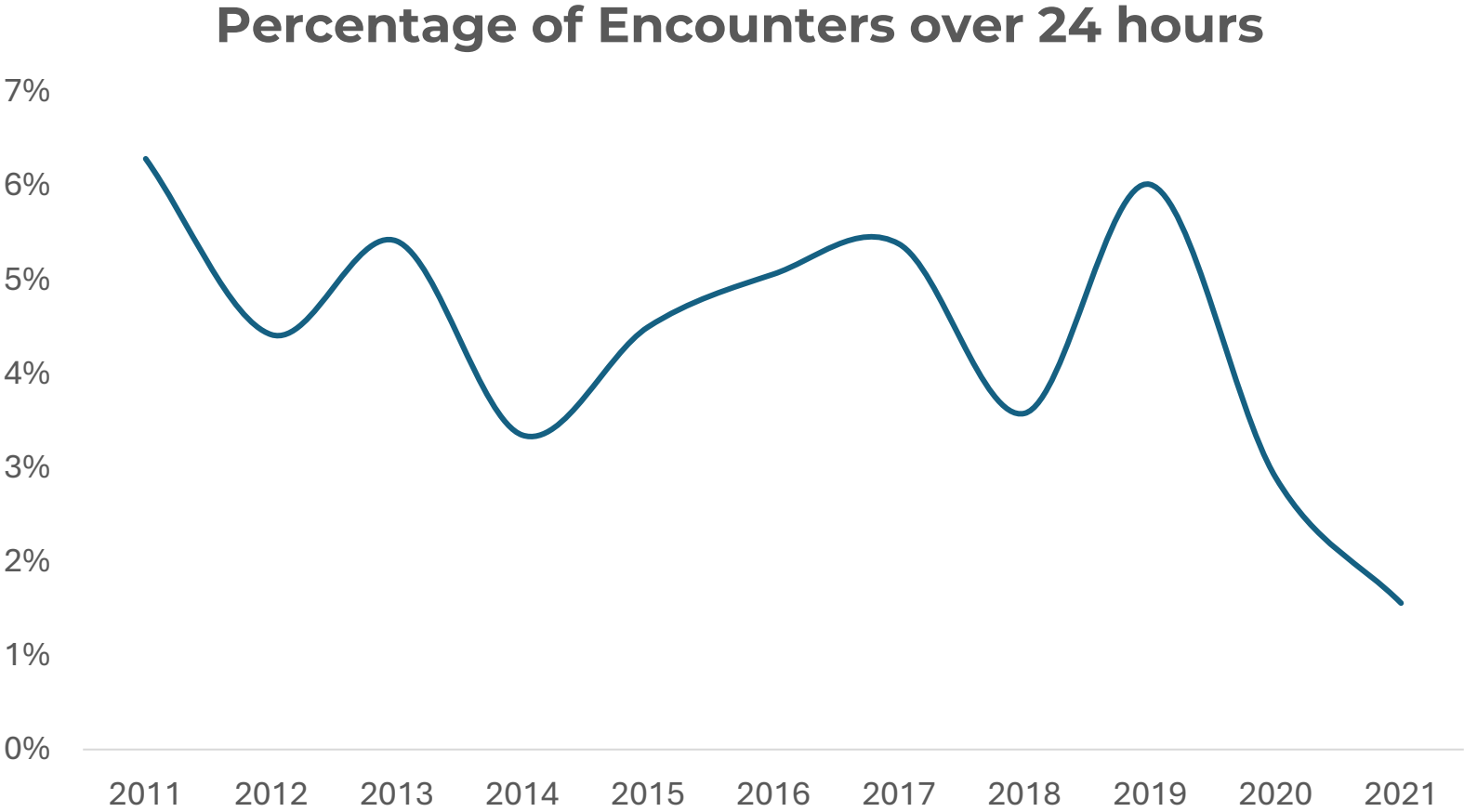
Ambulatory Dominance

Ambulatory encounters continue to dominate, reflecting primary healthcare demand



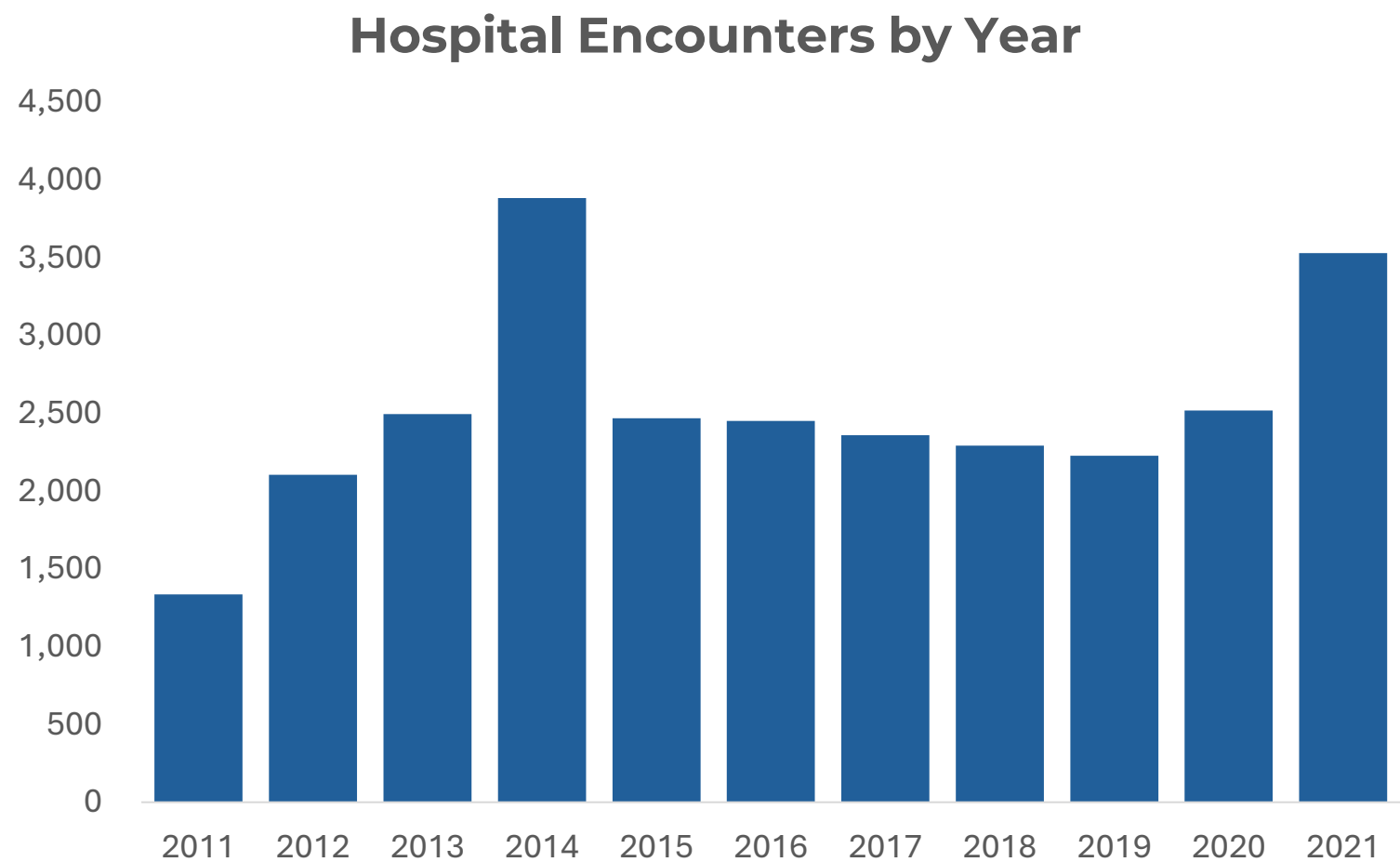
Improving Operational Efficiency: Shorter Patient Stays

Patients are being discharged faster, reducing hospital stays. This means fewer infections, lower costs, and beds available for more patients.



Patient Encounters: From Decline to Recovery

After years of decline, hospital encounters show recovery, reaching near-peak levels in 2021



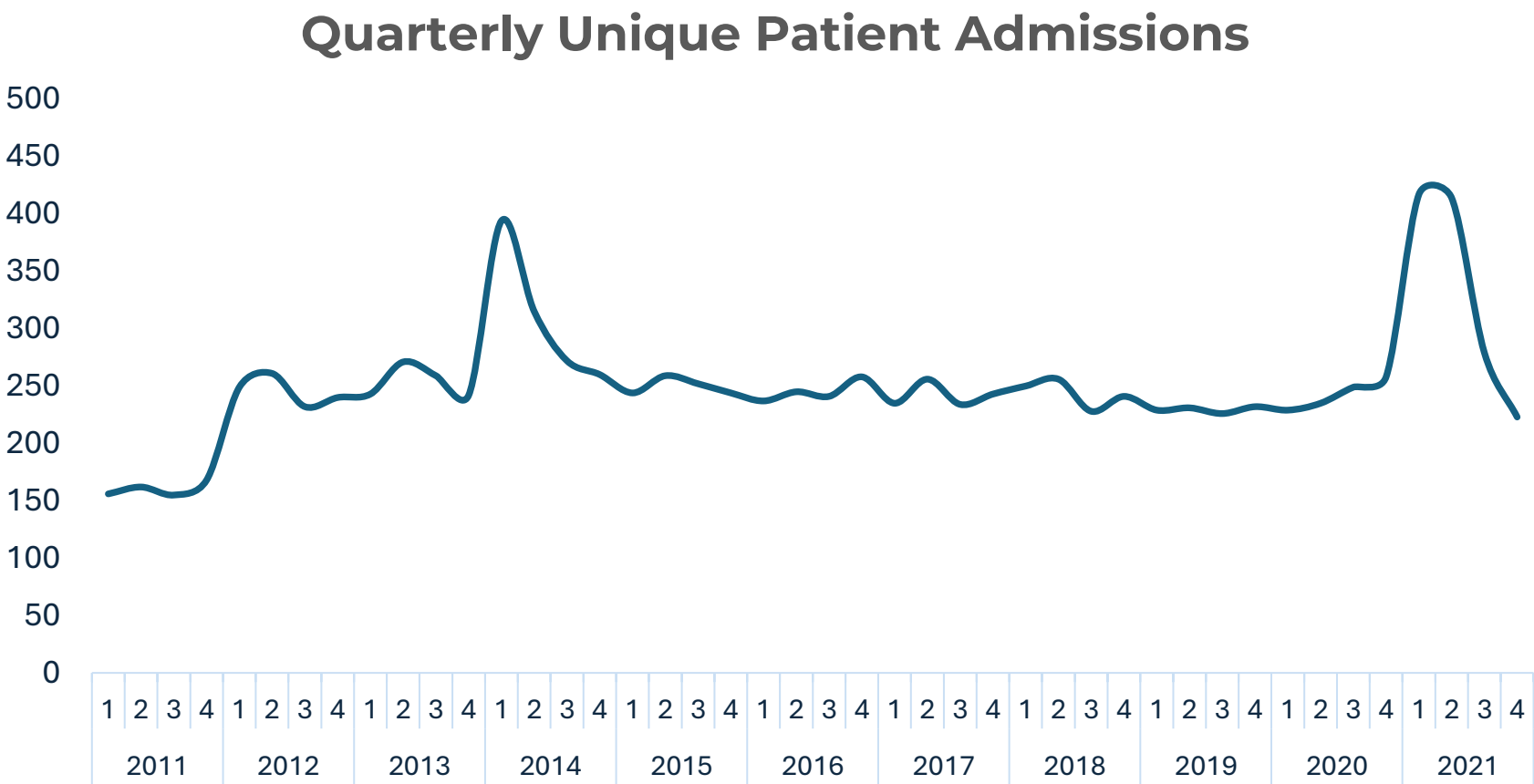
Service Distribution Over Time

Outpatient share roughly doubled, while ambulatory declined from 50% to 37%. Urgent care grew significantly from 2% to 11%, and emergency care increased from 4% to 6%. Meanwhile, wellness and inpatient services declined to nearly one third.

YEAR	<input checked="" type="checkbox"/> Ambulatory	Outpatient	Urgentcare	Emergency	Wellness	Inpatient
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Admission Capacity Management: Quarterly Trends

Hospital experienced two major admission surges (2014 and 2021), followed by sharp decline



Medicaid Provides Highest Reimbursement

Medicare dominates volume with 11,371 encounters generating \$24.6M in revenue, while Medicaid leads in per-encounter reimbursement (\$6,205). However, 8,807 uninsured encounters totaling \$49M in service costs receive zero reimbursement, representing 49% of all encounters and the hospital's greatest financial challenge.

Payers by Reimbursement

PAYER_NAME	ENCOUNTERS	TOTAL CLAIM COST	AVG CLAIM COST
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Hospital Operations and Expenditures

Specialized procedures like Electrical Cardioversion command premium per-procedure costs, while high-volume admissions to ICU generate the largest total hospital expenditure.

