

# WhitePaper

## Readmissions in North Texas:

A Comprehensive Overview of Statistics, Demographics  
and Charges to Identify Disparities 2013-2015

A research summary from the Dallas-Fort Worth Hospital Council Foundation



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Principal Investigator and Corresponding Author  
**Dr. Sushma Sharma**  
Director of Community, Public and Population Health Research  
DFWHC Foundation  
[ssharma@dfwhcfoundation.org](mailto:ssharma@dfwhcfoundation.org)

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## A Comprehensive Overview of Statistics, Demographics, and Charges to Identify Disparities 2013-2015

Sushma Sharma\*, Theresa Mendoza, Cathy Knoff & Kristin Jenkins

Dallas-Fort-Worth Hospital Council Education and Research Foundation,

\*Principal Investigator and Corresponding Author:

Dr. Sushma Sharma

Director Community, Public and Population Health Research

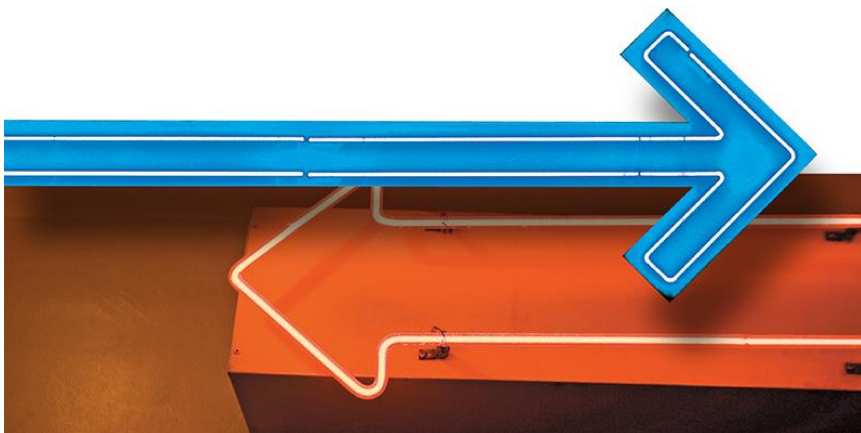
DFWHC Education and Research Foundation

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# Glossary of Terms

**Readmission:** An inpatient admission occurring for any reason within 30 days from the date of discharge at index hospitalization.

**Index Hospitalization:** Any inpatient admission that occurred within the study period at a general or specialty acute-care hospital, did not have a previous admission within 30 days, and was not contiguous with a transfer to another specialty acute-care or rehabilitation hospital.

**30-day Time Frame:** The time period ranging from zero to thirty days after the date of discharge at index hospitalization. This time period is important because readmissions during this 30-day window are suggested to be influenced by the quality of hospital care.<sup>1</sup>

**Multiple Readmissions:** If a patient has more than one admission within 30 days of discharge from the index admission, only the first one is counted as a readmission.<sup>1</sup>

**30-day Readmission Rate:** Defined as the total number of all-cause readmissions occurring within 30 days from the date of discharge at index hospitalization, divided by the total number of the index hospitalization.

**Uninsured:** The uninsured are patients that were identified as either self-pay or having an unknown payment by the claims data submitted by the hospital.

**Length of Stay (LOS):** Defined as the number of days between the date of admission and the date of discharge. This measure applies to the index hospitalization as well as the 30-day readmission.



# Executive Summary

## Objectives and Key findings:

### 1. Financial burden (Charges) for “within 30 day readmissions” in North Texas during 2013-2015

Total Charges increased from \$4,352,747,692 in 2013 to \$4,763,558,429 in 2015. The increase in charges was also consistent with the top index condition i.e. heart disease from \$ 639,191,281 in 2013 to \$ 713,747,774 in 2015.

### 2. Hospital Readmissions trend in North Texas for the past 3 years 2013-2015

Readmission rates for 2013, 2014 and 2015 were 14.72 percent, 14.40 percent and 14.34 percent, respectively. The decrease in readmission rate from 14.72 percent in 2013 to 14.40 percent in 2014 was statistically significant ( $p < 0.0001$ ).

### 3. Top 10 conditions (Index Hospitalization) for Readmissions within 30 days during 2013-2015

For 2015, the top ten conditions for readmissions were: Diseases of the Heart, Bacterial Infection, Surgical Complications, Diseases of the Urinary System, Fractures, Complications Mainly Related to Pregnancy, Cerebrovascular Disease, Respiratory Infections, Lower Gastrointestinal Disorders, and Diabetes Mellitus with Complications.

### 4. Most frequent reasons for Readmissions within 30 days for the top 10 conditions during 2013-2015

For the top index condition, i.e. Diseases of the Heart: Diseases of the Heart, Complications, Diseases of the urinary system, Bacterial infection, Factors influencing health care, Hypertension, Respiratory infections, Respiratory failure; insufficiency; arrest (adult), Cerebrovascular disease, Chronic obstructive pulmonary disease and bronchiectasis

### 5. Disparities associated with Readmissions within 30 days with regards to:

**Gender:** Rates for index hospitalizations and for readmissions were higher for females than males for all three years.

**Age:** Patients at the age of 65 and older were almost twice as likely to be readmitted as patients aged 18-44 years.

**Race:** Whites had the highest 30-day readmission rate than all other races (data not adjusted for population). In 2015, 71.31 percent were Whites, 19.91 percent were Blacks, 2.26 percent were Asians and 6.52 percent were others.

**Ethnicity:** Non-Hispanic patients had higher 30-day readmission rates than Hispanic or Latino patients (89.78 percent vs 10.09 percent in 2015).

**Insurance Status:** Medicare had the highest 30-day readmission rate than all the other payers. Readmission rates were lowest in the uninsured and Medicaid categories (mostly children and women). In 2015, 41.31 percent of Medicare Patients, 38.73 percent of insured, 8.78 percent of Medicaid and 11.19 percent of uninsured patients readmitted.



**Length of Stay in hospital:** In 2015, 1.49 percent spent less than 1 day for their index hospitalization, while 23.50 percent spent 1-2 days; 36.34 percent spent 3-5 days; 17.59 percent spent 6-8 days; 12.59 percent spent 9-14 days and 7.55 percent stayed 15 or more days.

**Location/facility of post-hospital discharge:** Patients who were discharged to home had an 18.54 percent higher 30-day readmission rate as compared to those patients who were discharged to hospice or transferred to another care facility.

**6. Associations between patient characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Location Status) and Readmissions within 30 Days for top five conditions:** Significant associations explain the contributing disparities associated with top five conditions for 30-day readmissions.



# Introduction

## **The High Price of Readmissions**

Effective in 2013, hospitals began receiving penalties if they had readmission rates exceeding standards set by the Hospital Readmission Reduction Program (HRRP). In 2013, there were about 500,000 readmissions totaling \$7 billion in aggregate hospital costs for four high-volume conditions—acute myocardial infarction (AMI), congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and pneumonia.<sup>2</sup> Although readmission rates measured in this study take into account conditions including but not limited to the four mentioned above, those four represent conditions presented at readmission among patients with heart disease at index hospitalization. Since 2012, the penalty imposed on Medicare payments, not just those involving a 30-day readmission, has increased from 1 percent to the full penalty of 3 percent in 2015, where it has remained.<sup>3</sup> Across all hospitals, the average 2017 penalty will be a 0.58 percent reduction in base Medicare payments for inpatient admissions. Among penalized hospitals, the average fine will be a 0.74 percent reduction in Medicare inpatient payments, a 13 percent increase from the prior year. With the increases, CMS estimates penalties across all hospitals totals \$528 million, a \$108 million increase from 2016.<sup>4</sup> As penalties continue to increase, it is imperative that interventions designed to reduce excess readmissions be implemented in hospitals. Results of this study are intended as a tool to be used in the creation of necessary interventions.

## **Readmissions and Quality**

An important metric for the quality of care received during a patient's index hospitalization is 30-day readmissions.<sup>3</sup> Recent updates of the measure include an algorithm for identifying and excluding planned readmissions. The list of conditions included within the measure for excess readmissions has been updated to include heart attack, heart failure, pneumonia, COPD, hip or knee replacement and coronary artery bypass grafts.<sup>4</sup> However, little consideration has been given to a potential association between readmissions and mortality, an outcome of primary interest to medical professionals and the public.<sup>5</sup> A study aimed at addressing this issue suggested readmissions could be “adversely” affected by a competing risk of death -- in other words, a patient who dies during index hospitalization can never be readmitted. Furthermore, if a hospital has a lower mortality rate, then a greater proportion of its discharged patients are eligible for readmission, consequently, to some extent, a higher readmission rate may be a consequence of successful care.<sup>5</sup>

## **The Shifting Landscape of Health in Texas**

In order to reduce all-cause, 30-day readmissions, it is important to be aware of risk factors that play a role in its influence. In 2015 in Texas, 38.80 percent were identified as Hispanic or Latino, as compared to 17.6 percent nationally. Furthermore, 15.90 percent of Texans live in poverty compared to 13.5 percent nationally.<sup>6</sup> The Texas population has been steadily increasing for the past 10 years, with expected increases in the proportion of certain subpopulations, such as persons 65 years and older and Hispanics.<sup>7</sup> Approximately 30 percent of adults and 16 percent of youth are obese in Texas, and since 1980, estimated obesity rates for adults have doubled and rates for children have tripled.<sup>8</sup> In 2016, six of the seven leading causes of death in Texas were chronic diseases, including heart disease, cancer, stroke, diabetes, chronic lower respiratory disease and Alzheimer's disease. Together, these six chronic diseases claimed the lives of more than 105,000 Texans.<sup>7</sup> With a dynamic population both unique and diverse with regards to health status, interventions designed to reduce 30-day readmissions must be tailored accordingly. This study aims to provide information for the design of those interventions.



# Objectives

1. Financial burden (Charges) for “within 30-day readmissions” in North Texas during 2013-2015
2. Hospital Readmission trend in North Texas during 2013-2015
3. Top 10 conditions presented at Index Hospitalization for Readmissions within 30 days during 2013-2015
4. Most common reasons for Readmissions within 30 days for the top 10 conditions during 2013-2015
5. 30-day readmissions and associated disparities, including:
  1. Gender
  2. Age
  3. Race
  4. Ethnicity
  5. Insurance Status
  6. Length of Stay at Index Hospitalization
  7. Index Hospitalization Discharge Status
6. Associations between patient characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge location Status) and Readmissions within 30 Days for top five conditions.



## Methods

The Dallas-Fort-Worth Hospital Council Foundation (DFWHC Foundation) securely houses the combined data warehouse created in 1999 by North Texas hospital systems and contains information for 11.5 million patients, 55 million hospital encounters, and claims information for over 95 percent of North Texas health systems (**Map1**). The claims records reveal patient's demographic data, payer type, twenty-five diagnoses and surgical/testing procedure codes, charges, Current Procedural Terminology (CPT) codes, the severity of disease as well as other information. With the regional enterprise master patient index (REMPI), the Foundation assigns a unique ID to all patients, allowing the foundation researchers to track any patient over time by the hospital and by the payer.

This study utilizes data from DFWHC Foundation's data warehouse for years 2013, 2014, and 2015. Only patients that were 18 years of age and older, admitted as an inpatient to a general or specialty acute-care hospital, did not have a previous admission within 30 days, did not die during the index hospitalization, were not discharged against medical advice or transferred to another general or specialty acute-care hospital at index hospitalization, and had a Regional Enterprise Master Patient Index (REMPI) ID were included in the analysis. If a patient had an unknown discharge status or was discharged to a designated Cancer Center or Children's Hospital or to a Federal Hospital at index hospitalization, they were excluded from the analysis.

For the purpose of this study, the number of days between the date of discharge at index hospitalization and the subsequent admission was used to identify readmission status. If the number of days during this time period was less than or equal to thirty, that patient was coded as having a 30-day revisit; if the number of days within this time period was greater than 30, or if the patient was missing information for this variable, they were coded as not having a 30-day readmissions.

Categories for race and ethnicity were defined by the standard classification used by Texas Health Care Information Collection (THCIC) and the United States Census Bureau: Income, Poverty, and Health Insurance Coverage, 2012. This classification categorizes race as black/white or Caucasian / Asian or Pacific Islander/ American Indian/Eskimo/Aleut/others and ethnicity as Hispanic or Latino/ Not Hispanic or Latino/others.

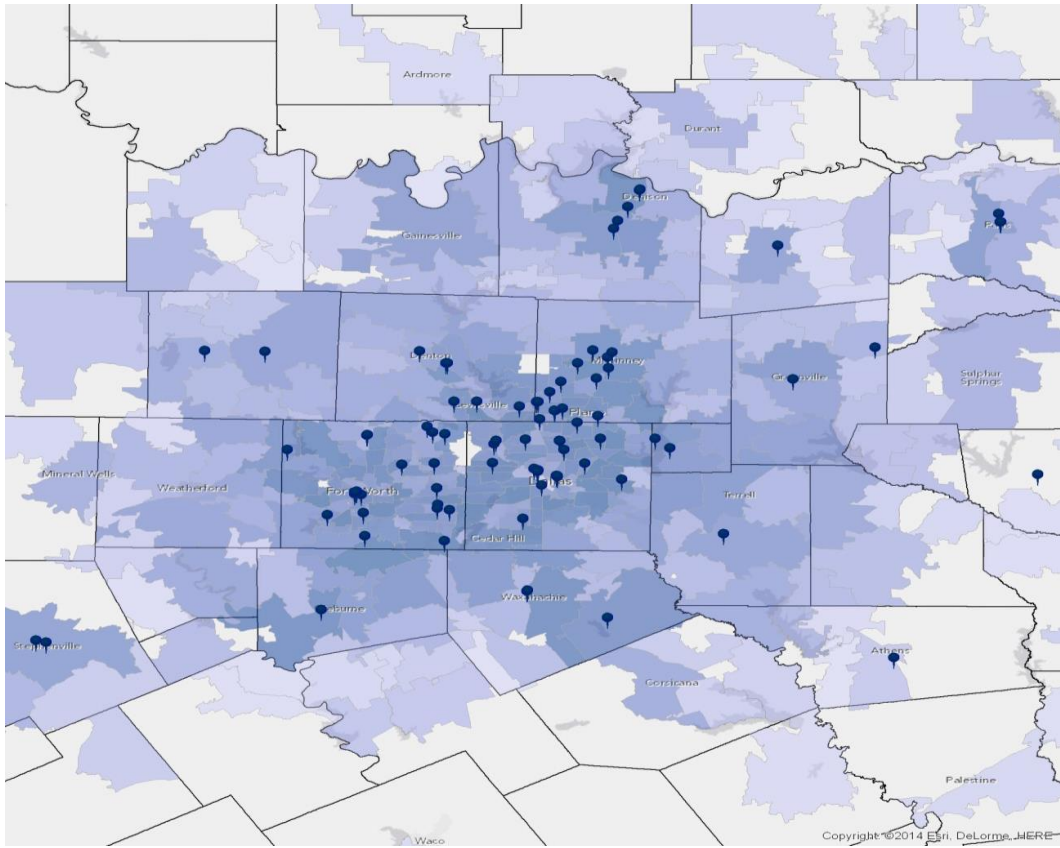
This study was approved by North Texas Health Information and Quality Collaborative (NTHIQC) who approved the research methodology and the patient/hospital confidentiality protection for all research projects conducted by the DFWHC Foundation.

All analyses were performed using SAS software (version 9.4, SAS Institute, Cary, North Carolina), and spatial distributions were mapped using ArcMap 10.3.  $\chi^2$  and Fisher exact tests were used for testing the bivariate relationships between age group, gender, race, ethnicity, payer, length of stay, discharge status, and the 30-day readmission rate. All statistical tests and odds ratios were considered statistically significant if  $p < 0.05$ .

### **Map 1: DFWHC Foundation's Healthcare claims data initiative coverage**

(17 counties; 86 Hospitals; 97.67 percent Inpatients and 83.70 percent Outpatients)

DFWHC Foundation's data initiative partner hospitals in the North Texas region. Total 86 facilities are currently participating in this initiative. Dallas, Tarrant, Collin and Denton Counties cover most of the healthcare market in this region.



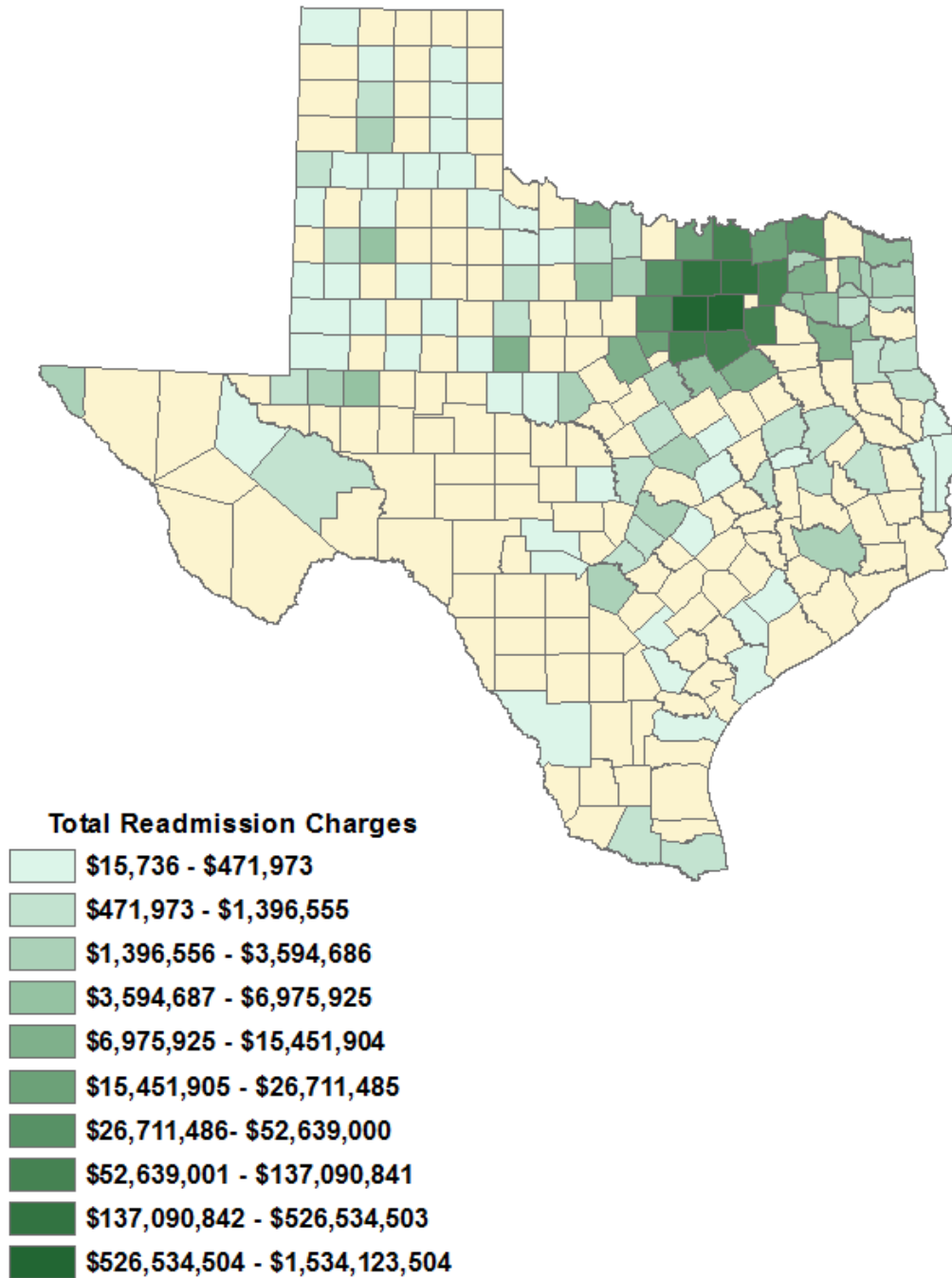
# Results

**Table1. Total Charges for Readmissions in North Texas in 2013-2015**

Readmission charges	2013	2014	2015
<b>Total</b>	<b>\$4,352,747,692</b>	<b>\$4,515,509,068</b>	<b>\$4,763,558,429</b>
<b>Insured</b>	<b>\$1,560,530,865</b>	<b>\$1,763,432,130</b>	<b>\$2,006,585,378</b>
<b>Medicaid</b>	<b>\$355,437,225</b>	<b>\$362,707,042</b>	<b>\$336,909,776</b>
<b>Medicare</b>	<b>\$1,908,139,239</b>	<b>\$1,888,682,726</b>	<b>\$1,955,590,373</b>
<b>Uninsured</b>	<b>\$528,640,363</b>	<b>\$500,687,170</b>	<b>\$464,472,902</b>
<b>Charges for Top Ten Conditions (Index Hospitalization) for Readmissions in 2013-2015</b>			
<b>Diseases of the heart</b>	<b>\$639,191,281</b>	<b>\$671,273,091</b>	<b>\$713,747,774</b>
<b>Bacterial infection</b>	<b>\$321,533,656</b>	<b>\$378,192,670</b>	<b>\$379,364,074</b>
<b>Complications</b>	<b>\$299,224,545</b>	<b>\$303,786,120</b>	<b>\$326,888,657</b>
<b>Diseases of the urinary system</b>	<b>\$151,874,386</b>	<b>\$147,924,156</b>	<b>\$163,017,424</b>
<b>Fractures</b>	<b>\$164,771,966</b>	<b>\$171,411,968</b>	<b>\$204,499,014</b>
<b>Complications mainly related to pregnancy</b>	<b>\$45,872,473</b>	<b>\$42,948,473</b>	<b>\$44,909,324</b>
<b>Cerebrovascular disease</b>	<b>\$165,816,195</b>	<b>\$161,503,516</b>	<b>\$179,368,906</b>
<b>Respiratory infections</b>	<b>\$122,937,145</b>	<b>\$124,120,741</b>	<b>\$121,221,314</b>
<b>Lower gastrointestinal disorders</b>	<b>\$105,340,445</b>	<b>\$104,756,527</b>	<b>\$116,703,984</b>
<b>Diabetes mellitus with complications</b>	<b>\$93,866,523</b>	<b>\$107,933,040</b>	<b>\$89,085,876</b>

- Total charges increased each year from 2013 to 2015.
- In 2013 and 2014, of all four payer types, Medicare charges were the highest, followed by Insured, Uninsured and Medicaid. In 2015, Insured charges were the highest.
- For the number one condition at index hospitalization, diseases of the heart, total charges increased each year from 2013 to 2015. This was consistent with Bacterial Infections and Complications; the number two and three conditions, respectively.
- Of all top ten conditions, complications mainly related to pregnancy, number 6, had the lowest total charges in 2015, followed Diabetes mellitus with complications and Respiratory infections; the number ten and eight conditions, respectively.
- Diabetes mellitus had the largest decrease from \$107,933,040 in 2014, to \$89,085,876 in 2015.

**Figure 1. Total 30-Day Readmission Charges by County, 2015**



\*Counties for which data were not available are shown in yellow

\*County refers to patient residence

- The counties with the highest total charges appear to be Dallas and Tarrant, followed by Denton and Collin.
- There appears to be a uniform decrease in total charges as the distance from Dallas and Tarrant county increases.



**Table 2 examines differences between hospitalizations that were followed by a readmission and those who were not followed by a readmission. The total hospitalizations are categorized as medical or surgical index admission. This information is about the index hospitalization, not the readmission. More information regarding the readmission information is available in Table 4.**

<b>Table 2A. Hospitalizations not Followed by Readmissions within 30 Days by Type of Hospitalization for 2013-2015</b>									
All Index Hospitalizations				Was the index hospitalization followed by a Readmission?					
				NO			NO		
Type of Index Hospitalization	Total Number of Index Hospital Stays			Number of Index Hospital Stays			Average Length of Stay for the Index Stay		
	2013	2014	2015	2013	2014	2015	2013	2014	2015
Total Cases	516,454	514,706	522,857	440,410	439,971	445,105	4.43	4.47	4.48
Medical	346,306	348,251	355,100	288,472	291,460	297,277	4.17	4.21	4.20
Surgical	167,442	163,729	164,409	149,744	146,840	147,656	4.93	4.99	5.04
**	2,706	2,041	217	2,194	1,671	172	4.78	4.91	4.73

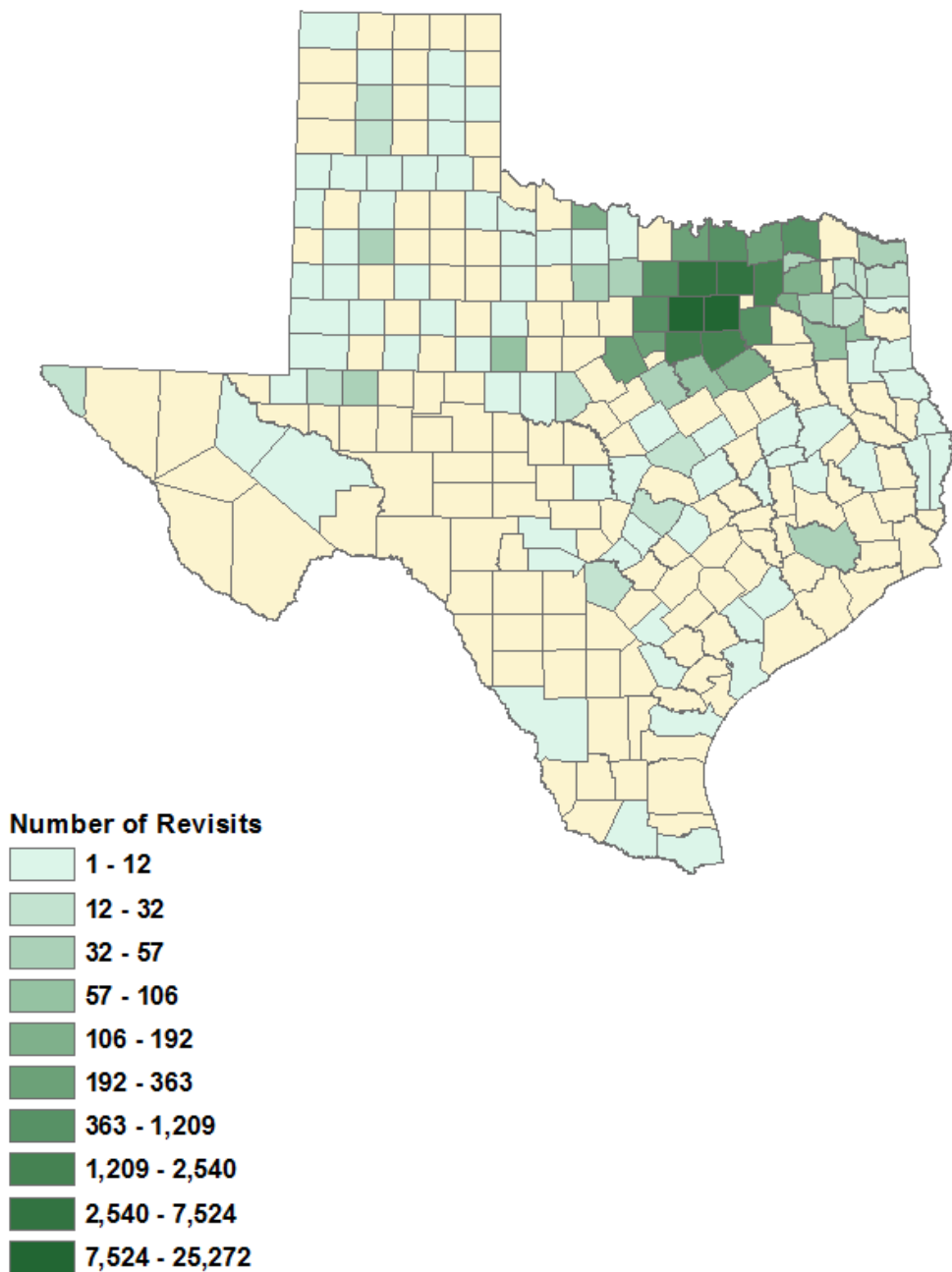
<b>Table 2B. Hospitalizations Followed by Readmissions within 30 Days by Type of Hospitalization for 2013-2015</b>												
All Index Hospitalizations				Was the index hospitalization followed by a Readmission?								
				YES			YES			YES		
Type of Index Hospitalization	Total Number of Index Hospital Stays			Number of Readmissions			Percent of Total Index Hospital stays with a readmission			Average Length of Stay for the Index Hospitalization		
	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
Total Cases	516,454	514,706	522,857	76,044	74,111	74,978	14.72%	14.40%	14.34%	6.25	6.33	6.19
Medical	346,306	348,251	355,100	57,834	56,791	57,823	76.05%	79.69%	77.49%	5.46	5.56	5.46
Surgical	167,442	163,729	164,409	17,698	16,889	16,753	23.27%	22.81%	22.45%	8.85	8.93	8.69
**	2,706	2,041	217	512	370	45	0.67%	0.50%	0.06%	5.56	5.71	6.04

\*\*Cases not determined as medical or surgical

<b>Table 2C. Change in Readmission Rate from 2013-2015</b>				
Year	Change	P value	OR	95% C.I
2013-2014	- 1,933	<.0001	1.03	1.01-1.04
2014-2015	+867	0.3945	1.00	0.99-1.00

- Readmission rates for 2013, 2014, and 2015 were 14.72 percent, 14.40 percent and 14.34 percent, respectively.
- The decrease in readmission rate from 2013 to 2014 was statistically significant; (p <.0001)
- Overall patients who later readmitted spent 1.82, 1.86 and 1.71 more days during their index hospitalization in 2013, 2014 and 2015, respectively, than those who did not readmit.
- Medical patients who later readmitted spent 1.29, 1.35 and 1.26 more days for their index hospitalization in 2013, 2014 and 2015, respectively, than those patients who did not readmit.
- Surgical patients who later readmitted spent 3.92, 3.94 and 3.65 more days in 2013, 2014 and 2015, respectively, than those who did not readmit.

**Figure 2. Total Count of 30-Day Readmissions by County, 2015**



\*Counties for which data were not available are shown in yellow  
 \*County refers to patient residence

- There appears to be a consistent relationship between total charges for readmissions, see Figure 1, and the number of revisits.
- The counties with the highest number of readmissions in 2015 were Tarrant and Dallas, followed by Denton and Collin.

Table 3 describes the top-10 conditions in 2015 that account for the largest number of readmissions within 30 days of discharge. Each condition is categorized into medical and surgical groups based on whether the index hospitalization involved an operating room procedure. Information relates to original hospitalization, not readmission. Readmission information is in Table 4. Surgery may not be related to hospitalization reason.

Table 3. Top 10 conditions (Index Hospitalization) for Readmissions within 30 days in 2015						
All Index Hospitalization		Was the Index Hospitalization followed by a Readmission within 30 days				
		No		Yes		
Principle Reason for Readmission	Total Number of Index Hospital Stays	Patients with No Readmission	Average LOS - No Readmission	Readmission Cases	Percent that Readmitted	Average LOS for Patients who Readmitted
<b>Diseases of the Heart</b>	51,626	42,452	4.50	9,298	17.77%	5.55
**	1	1	3.00	0	100%	
Medical	35,796	28,797	3.86	6,999	19.55%	4.56
Surgical	15,829	13,654	5.82	2,175	13.74%	8.63
<b>Bacterial Infection</b>	23,178	19,094	7.28	4,084	17.62%	9.17
Medical	19,702	16,308	6.25	3,394	17.23%	7.69
Surgical	3,476	2,786	13.36	690	19.85%	16.41
<b>Complications*</b>	18,599	14,785	6.03	3,814	20.51%	7.68
Medical	8,917	6,784	5.35	2,133	23.92%	6.23
Surgical	9,682	8,001	6.61	1,681	17.36%	9.51
<b>Diseases of the Urinary System</b>	22,638	18,954	4.17	3,684	16.27%	5.32
Medical	19,997	16,652	4.02	3,345	16.73%	4.98
Surgical	2,640	2,301	5.25	339	12.84%	8.69
<b>Fractures</b>	16,034	13,584	4.99	2,450	15.28%	5.99
Medical	4,740	4,023	4.11	717	15.13%	4.36
Surgical	11,293	9,560	5.36	1,733	15.35%	6.65
<b>Complications Mainly Related to Pregnancy</b>	33,904	31,536	3.14	2,368	6.98%	4.06
Medical	25,078	22,933	2.57	2,145	8.55%	3.88
Surgical	8,817	8,597	4.67	220	2.50%	5.91
<b>Cerebrovascular Disease</b>	14,851	12,484	5.03	2,367	15.94%	6.32
Medical	11,676	9,750	4.61	1,926	16.50%	5.53
Surgical	3,175	2,734	6.55	441	13.89%	9.77
<b>Respiratory Infections</b>	15,260	12,950	4.64	2,310	15.14%	5.78
Medical	14,631	12,422	4.46	2,209	15.10%	5.56
Surgical	629	528	8.95	101	16.06%	10.80
<b>Lower Gastrointestinal Disorders</b>	15,899	13,832	4.53	2,067	13.00%	6.31
**	1	0		1	100.00%	3.00
Medical	9,667	8,194	3.84	1,473	15.24%	5.00
Surgical	6,231	5,638	5.52	593	9.52%	9.56
<b>Diabetes Mellitus with Complications</b>	9,996	8,103	4.94	1,893	18.94%	5.33
Medical	7,606	6,103	3.54	1,503	19.76%	4.19
Surgical	2,390	2,000	9.20	390	16.32%	9.71

\*Medical or surgical complications developed during hospitalization.\*\*Cases not determined as medical or surgical

- The top one condition was diseases of the heart, with 9,298 readmissions and 51,626 total index hospitalizations.
- In 2015, patients initially treated for heart disease were readmitted within 30 days at a rate of 17.77% with an average length of stay of 5.55 days. Likewise, for heart disease patients who did not readmit, their index length of stay average was 4.50 days.

- Patients who were initially treated for heart disease after surgery had a readmission rate of 13.74 percent as opposed to medical patients whose readmission rate was 19.55 percent.
- The condition with the highest readmission rate (20.51 percent) was medical or surgical complications developed during hospitalization at number three, followed by diabetes mellitus with complications (18.94 percent) at number ten.
- The condition with the lowest readmission rate (6.98 percent) was complications mainly related to pregnancy at number five.

**Table 4 highlights the top ten conditions (Index Hospitalization) for patients who had a readmission within 30 days for 2013-2015.**

<b>Table 4. Top Ten Conditions (Index Hospitalization) for Patients who had a Readmission within 30 Days for 2013-2015</b>		
<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Diseases of the Heart</b>	<b>Diseases of the Heart</b>	<b>Diseases of the Heart</b>
<b>Complications*</b>	<b>Bacterial Infection</b>	<b>Bacterial Infection</b>
<b>Diseases of the Urinary System</b>	<b>Complications*</b>	<b>Complications*</b>
<b>Bacterial Infection</b>	<b>Diseases of the Urinary System</b>	<b>Diseases of the Urinary System</b>
<b>Complications Mainly Related to Pregnancy</b>	<b>Complications Mainly Related to Pregnancy</b>	<b>Fractures</b>
<b>Cerebrovascular Disease</b>	<b>Cerebrovascular Disease</b>	<b>Complications Mainly Related to Pregnancy</b>
<b>Respiratory Infections</b>	<b>Respiratory Infections</b>	<b>Cerebrovascular Disease</b>
<b>Fractures</b>	<b>Fractures</b>	<b>Respiratory Infections</b>
<b>Diabetes Mellitus with Complications</b>	<b>Diabetes Mellitus with Complications</b>	<b>Lower Gastrointestinal Disorders</b>
<b>Lower Gastrointestinal Disorders</b>	<b>Lower Gastrointestinal Disorders</b>	<b>Diabetes Mellitus with Complications</b>

\*medical or surgical complications developed during hospitalization.

Table 5 below explains the top ten most frequent reasons for readmission within 30 days for each of the top ten conditions presented at index hospitalization in 2015 (pages 16-18).

Table 5. Top Ten Reasons for Readmission within 30 days in 2015					
Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Diseases of the Heart	Diseases of the Heart	4,598	49.61	44.98	5.33
	Complications	399	4.31	46.13	6.61
	Diseases of the urinary system	391	4.22	34.21	5.07
	Bacterial infection	323	3.49	38.22	8.28
	Factors influencing health care	259	2.79	97.00	11.21
	Hypertension	254	2.74	36.39	6.19
	Respiratory infections	250	2.70	31.17	5.13
	Respiratory failure; insufficiency; arrest (adult)	214	2.31	44.21	7.71
	Cerebrovascular disease	191	2.06	29.66	5.17
	Chronic obstructive pulmonary disease and bronchiectasis	180	1.94	31.09	4.67
	others	2,209	23.83	32.65	5.37
<b>Total</b>	<b>9,268</b>	<b>100%</b>	<b>39.75%</b>	<b>5.69</b>	
Bacterial Infection	Bacterial Infection	823	20.23	44.22	8.23
	Diseases of the Heart	316	7.77	39.06	5.98
	Diseases of the Urinary System	303	7.45	36.37	5.51
	Complications	281	6.91	43.36	7.71
	Respiratory infections	190	4.67	35.32	5.51
	Factors influencing health care	144	3.54	92.90	13.29
	Respiratory failure; insufficiency; arrest (adult)	119	2.92	46.85	8.04
	Lower gastrointestinal disorders	117	2.88	57.91	6.32
	Diabetes Mellitus with Complications	96	2.36	36.09	6.15
	Skin and subcutaneous tissue infections	85	2.09	28.62	5.79
	others	1595	39.20	37.83	6.32
<b>Total</b>	<b>4,069</b>	<b>100%</b>	<b>40.07%</b>	<b>7.06</b>	
Complications	Complications	1,403	36.78	48.46	7.36
	Factors influencing healthcare	263	6.89	70.51	9.87
	Diseases of the Heart	251	6.58	37.86	5.73
	Bacterial Infection	218	5.71	42.08	8.88
	Diseases of the Urinary System	193	5.06	42.60	5.61
	Lower gastrointestinal disorders	86	2.25	37.89	6.80
	Symptoms; signs; and ill-defined conditions	84	2.20	46.67	5.42
	Diabetes Mellitus with Complications	69	1.81	36.70	6.27
	Fluid and electrolyte disorders	68	1.78	44.74	4.32
	Respiratory infections	63	1.65	28.13	5.80
	others	1,117	29.28	33.64	6.07
<b>Total</b>	<b>3,815</b>	<b>100%</b>	<b>41.50%</b>	<b>7.08</b>	
Diseases of the Urinary System	Diseases of the Urinary System	882	24.07	38.68	4.84
	Diseases of the heart	335	9.14	34.08	5.41
	Bacterial infection	319	8.71	37.80	7.89
	Complications	182	4.97	35.00	6.68
	Fluid and electrolyte disorders	127	3.47	50.80	4.52
Diabetes Mellitus with Complications	99	2.70	37.36	5.20	



**Table 5. Top Ten Reasons for Readmission within 30 days in 2015**

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
	Respiratory infections	93	2.54	26.35	5.70
	Hypertension	89	2.43	28.53	5.21
	Lower gastrointestinal disorders	74	2.02	36.82	6.42
	Cerebrovascular Disease		1.94	29.71	4.81
	others	1,393	38.02	35.89	6.11
	<b>Total</b>	<b>3,664</b>	<b>100%</b>	<b>36.18%</b>	<b>5.61</b>
<b>Fractures</b>	Factors influencing health care	595	24.33	98.02	11.83
	Fractures	562	22.98	60.69	6.56
	Complications	220	8.99	46.03	6.96
	Diseases of the heart	122	4.99	32.45	5.36
	Bacterial infection	118	4.82	43.07	7.95
	Diseases of the Urinary System	101	4.13	32.27	4.83
	Respiratory infections	58	2.37	34.32	5.31
	Gastrointestinal hemorrhage	35	1.43	43.21	4.65
	Fluid and electrolyte disorders	34	1.39	37.36	4.44
	Other nervous system disorders	34	1.39	45.95	5.43
	others	579	23.67	30.55	5.64
	<b>Total</b>	<b>2,446</b>	<b>100%</b>	<b>46.33%</b>	<b>7.29</b>
<b>Cerebrovascular Disease</b>	Cerebrovascular Disease	783	33.19	52.27	6.31
	Factors influencing health care	489	20.73	98.39	14.52
	Diseases of the heart	171	7.25	28.79	5.13
	Bacterial Infection	108	4.58	40.45	8.33
	Diseases of the Urinary System	87	3.69	33.08	4.85
	Complications	55	2.33	41.35	5.89
	Other nervous system disorders	46	1.95	48.94	5.91
	Hypertension	41	1.74	35.65	4.43
	Respiratory infections	34	1.44	25.00	5.07
	Gastrointestinal hemorrhage	31	1.31	37.35	5.52
	others	515	21.83	29.28	5.44
	<b>Total</b>	<b>2,359</b>	<b>100%</b>	<b>43.22%</b>	<b>7.11</b>
	<b>Complications Mainly Related to Pregnancy</b>	Complications Mainly Related to Pregnancy	1,346	56.87	52.72
Other complications of birth; puerperium affecting management of mother		386	16.31	56.10	4.04
Indications for care in pregnancy; labor; and delivery		337	14.24	36.31	3.37
Complications during labor		138	5.83	30.53	2.34
Normal pregnancy and/or delivery		41	1.73	26.28	2.59
Biliary tract disease		13	0.55	14.13	2.43
Abortion-related disorders		11	0.46	84.62	3.69
Miscellaneous mental disorders		11	0.46	39.29	4.36
Liveborn		10	0.42	33.33	4.30
Diseases of the heart		9	0.38	31.03	2.90
others		65	2.75	14.41	3.74
<b>Total</b>		<b>2,367</b>	<b>100%</b>	<b>43.67%</b>	<b>4.01</b>
<b>Respiratory Infections</b>	Respiratory Infections	367	15.95	37.53	5.78
	Diseases of the heart	276	11.99	30.73	4.91
	Bacterial Infection	206	8.95	34.97	7.69
	Respiratory failure; insufficiency; arrest (adult)	119	5.17	41.90	7.15
	Chronic obstructive pulmonary disease and bronchiectasis	117	5.08	29.55	4.57

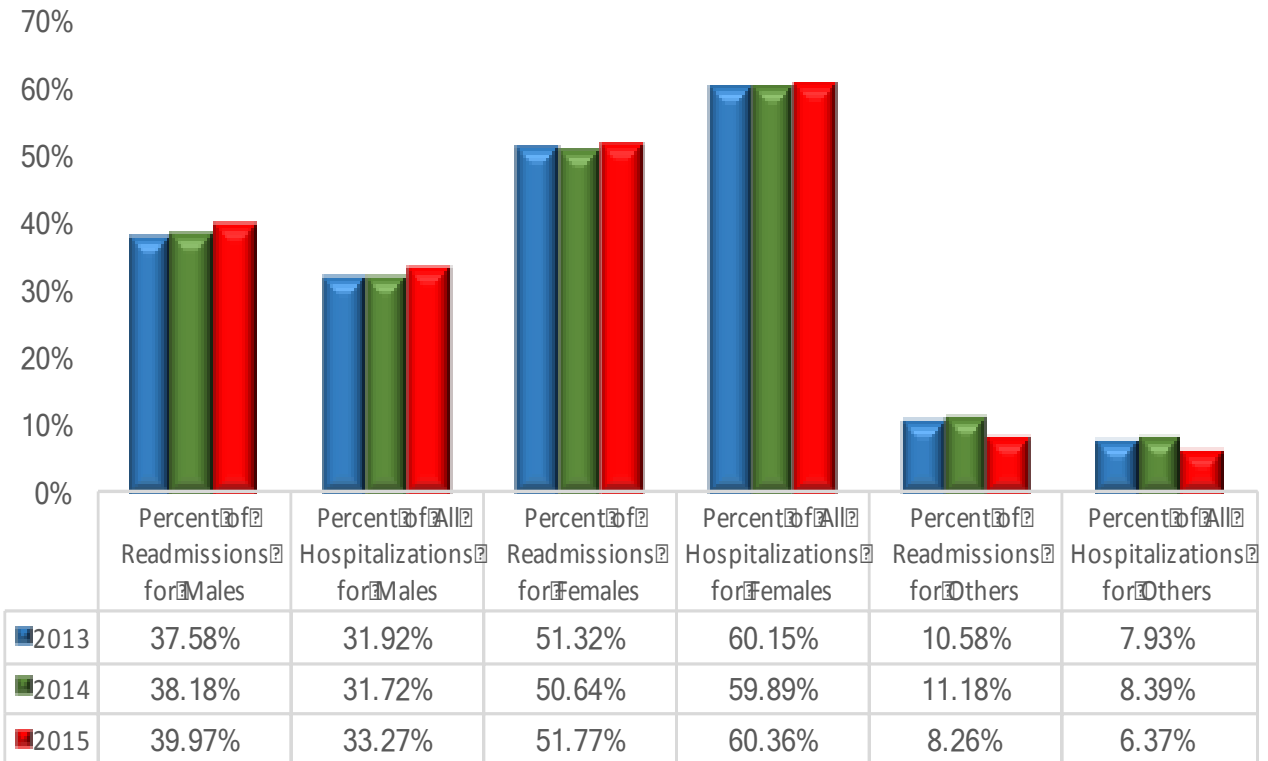
**Table 5. Top Ten Reasons for Readmission within 30 days in 2015**

<b>Index Admission</b>	<b>Reason for Readmission</b>	<b>Readmission Cases</b>	<b>Percent of Readmission</b>	<b>Percent that Readmitted</b>	<b>Average LOS for Readmission</b>
	Diseases of the Urinary System	93	4.04	26.12	4.88
	Fluid and electrolyte disorders	68	2.96	43.59	4.38
	Complications	63	2.74	31.50	7.27
	Factors influencing health care	59	2.56	93.65	10.76
	Aspiration pneumonitis; food/vomitus	57	2.48	43.18	6.69
	others	969	42.11	30.03	5.54
	<b>Total</b>	<b>2,301</b>	<b>100%</b>	<b>33.24%</b>	<b>5.99</b>
<b>Lower Gastrointestinal Disorders</b>	Lower Gastrointestinal Disorders	785	38.07	39.17	5.69
	Complications	236	11.45	57.70	7.30
	Bacterial Infection	110	5.33	43.14	8.10
	Diseases of the heart	99	4.80	36.40	5.01
	Diseases of the Urinary System	73	3.54	32.74	4.76
	Symptoms; signs; and ill-defined conditions	48	2.33	48.98	3.53
	Gastrointestinal hemorrhage	47	2.28	46.08	3.57
	Other gastrointestinal disorders	44	2.13	17.74	5.79
	Respiratory infections	40	1.94	37.74	4.81
	Intestinal infection	34	1.65	38.64	5.17
	others	546	26.48	32.00	5.47
	<b>Total</b>	<b>2,062</b>	<b>100%</b>	<b>37.42%</b>	<b>5.78</b>
<b>Diabetes Mellitus with Complications</b>	Diabetes Mellitus with Complications	818	43.40	38.19	4.67
	Complications	125	6.63	42.81	8.14
	Diseases of the heart	100	5.31	30.12	6.03
	Bacterial Infection	99	5.25	30.09	9.06
	Diseases of the Urinary System	86	4.56	30.50	5.10
	Symptoms; signs; and ill-defined conditions	47	2.49	22.14	6.27
	Hypertension	45	2.39	32.61	5.68
	Factors influencing health care	44	2.33	91.67	14.35
	Fluid and electrolyte disorders	39	2.07	42.86	3.76
	Upper gastrointestinal disorders	36	1.91	40.91	3.88
	others	446	23.66	29.99	6.25
<b>Total</b>	<b>1,885</b>	<b>100%</b>	<b>35.21%</b>	<b>5.62</b>	

## Inequalities Associated with Hospital Readmissions

The patient characteristics for those who were readmitted within 30 days are shown on the following pages. Readmission rates are shown by gender, age group, payer, discharge location and length of stay.

**Figure 3. Gender Inequalities in Readmissions in North Texas**

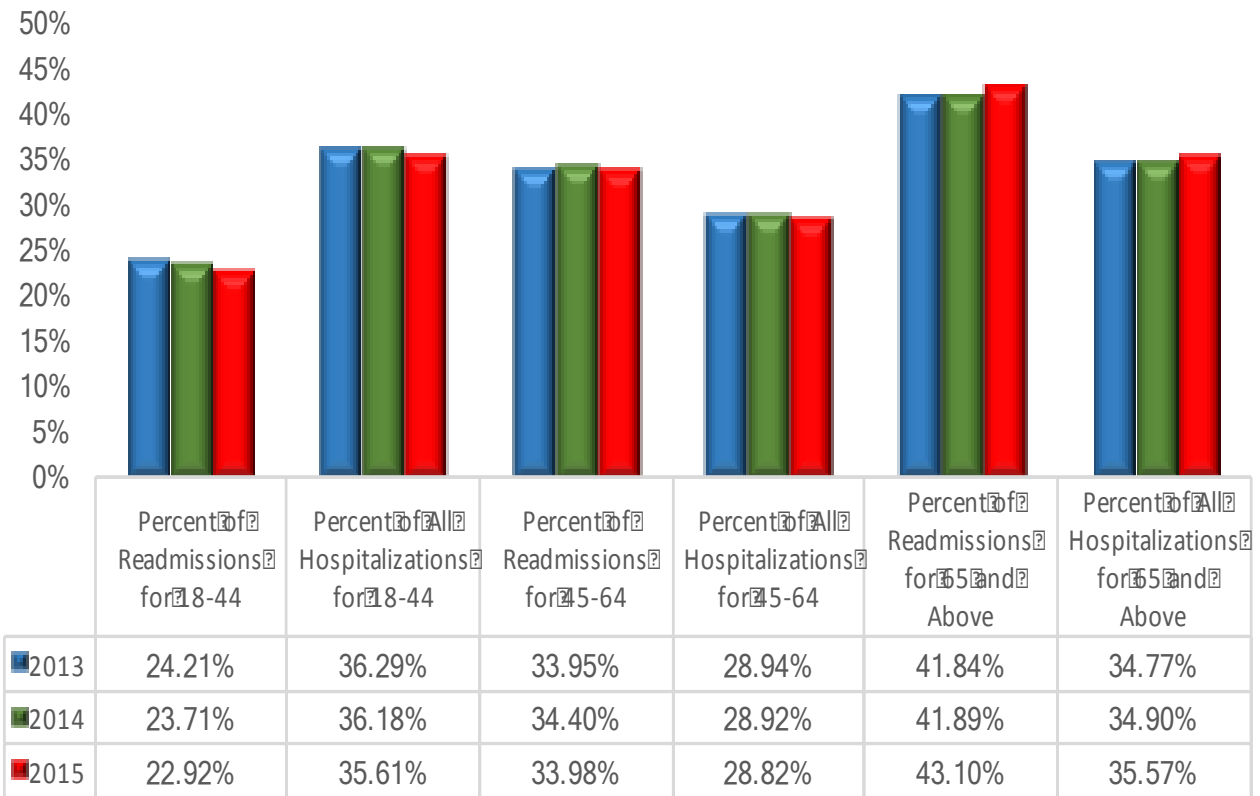


\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.

\* X signifies undefined gender classification.

- Rates for index hospitalizations and readmissions were higher for females than males in all three years.
- While readmissions for females declined in 2014 but rose again in 2015, readmissions for males increased across all three years.
- Percent of all hospitalizations for females is almost two times the rate for males, and while this rate holds steady around 60 percent for females, it has increased for males.

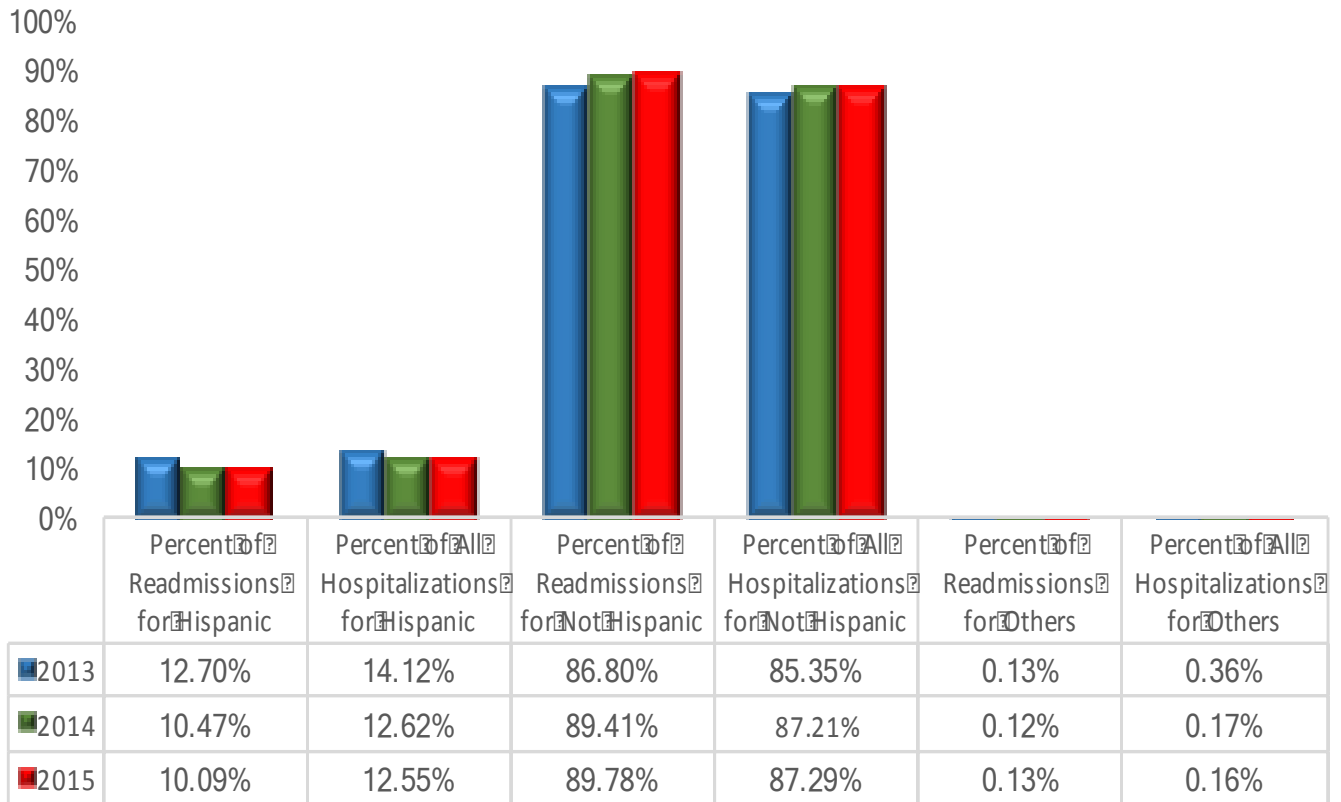
**Figure 4. Age-Related Inequalities in Readmissions in North Texas**



**\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.**

- For all three years, readmission rates increased as age increased.
- Patients 65 years and older were almost twice as likely to readmit than patients between 18 to 44 years age group.
- Readmission rates increased in all three years for the 65 years and older; however, readmissions decreased for the 18-44 years and older age group from 2014 to 2015.
- Although patients in the 18-44 years age group represented more of all hospitalizations than both the other age groups, their readmission rates were the lowest in all three years.

**Figure 5. Ethnic Inequalities in Readmissions in North Texas**

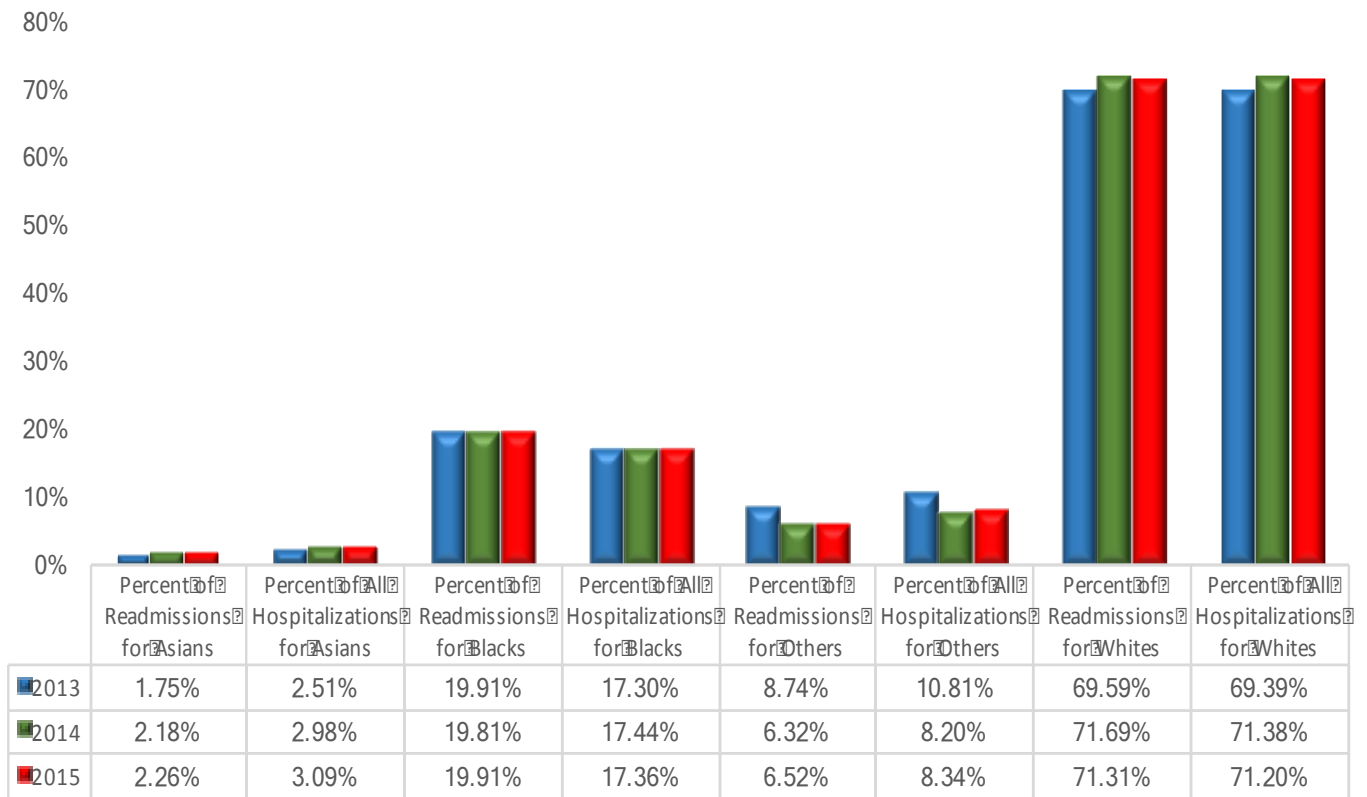


**\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.**

- Non-Hispanic patients had higher 30-day readmission rates than Hispanic or Latino patients.



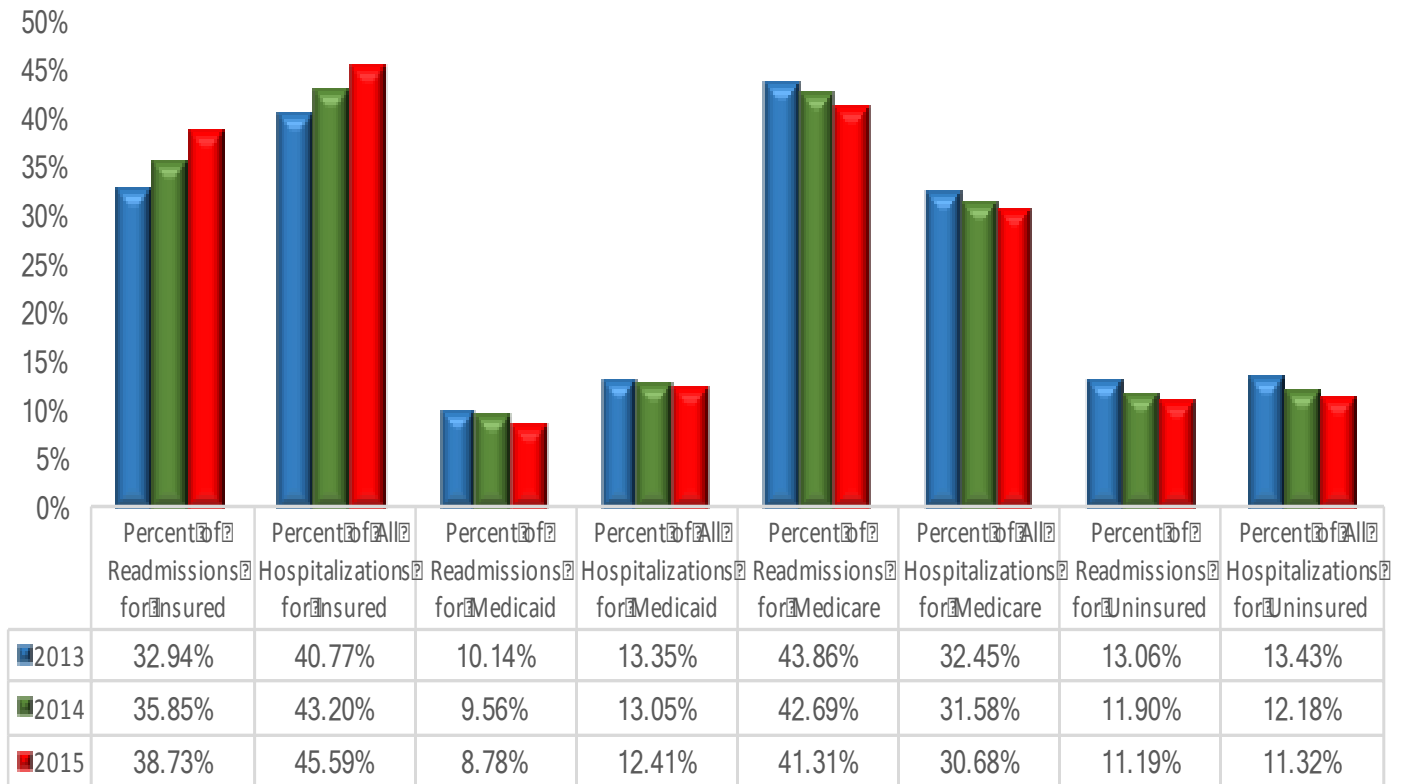
**Figure 6. Racial Inequalities in Readmissions in North Texas**



**\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.**

- The chart shows that White patients had the highest 30-day readmission rate than all other races (data not adjusted for population).
- Rates for all Hospitalizations and readmissions held relatively stable across all three years for both Black and White patients.

**Figure 7. Insurance Status Related Inequalities in Readmissions in North Texas**

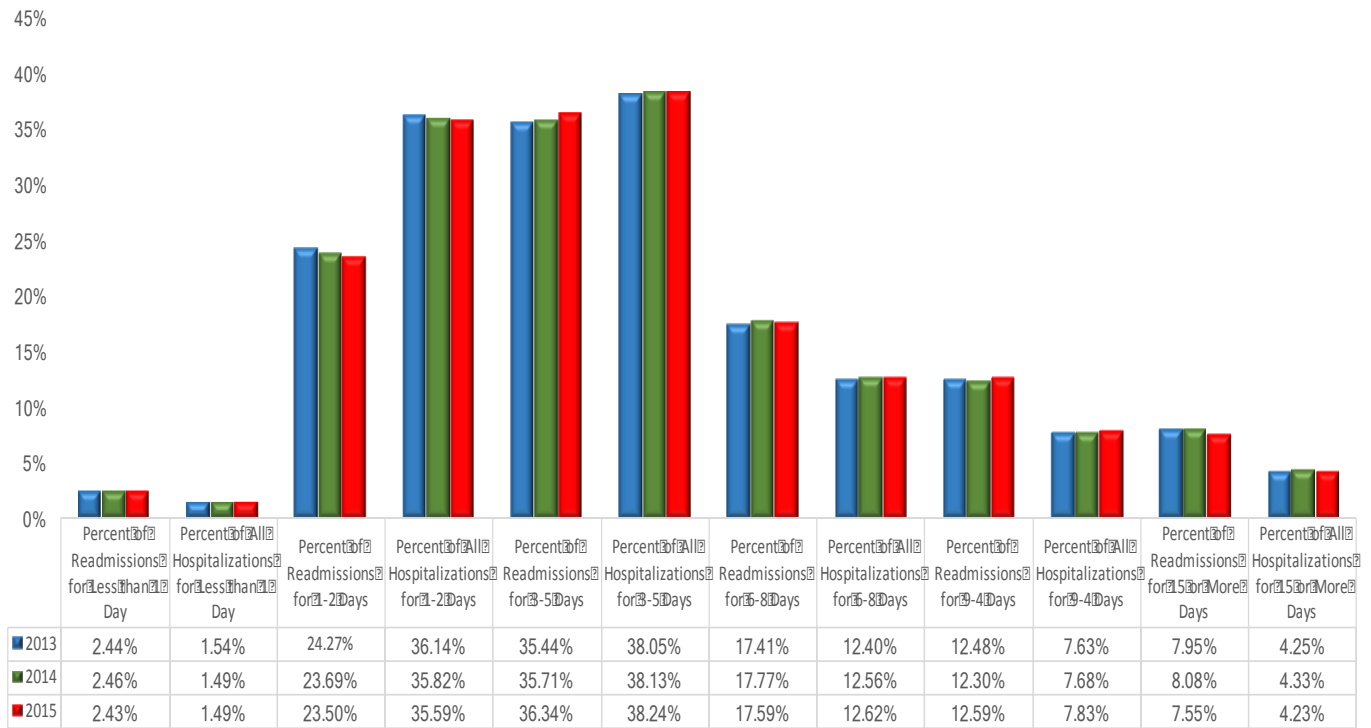


**\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.**

- Although Insured patients represented more of all hospitalizations than Medicare patients, Medicare patients had higher 30-day readmission rates in all three years.
- Readmission rates were lowest among Medicaid and Uninsured patients.

**Figure 8. Length of Hospital Stay Inequalities in Readmissions in North Texas**

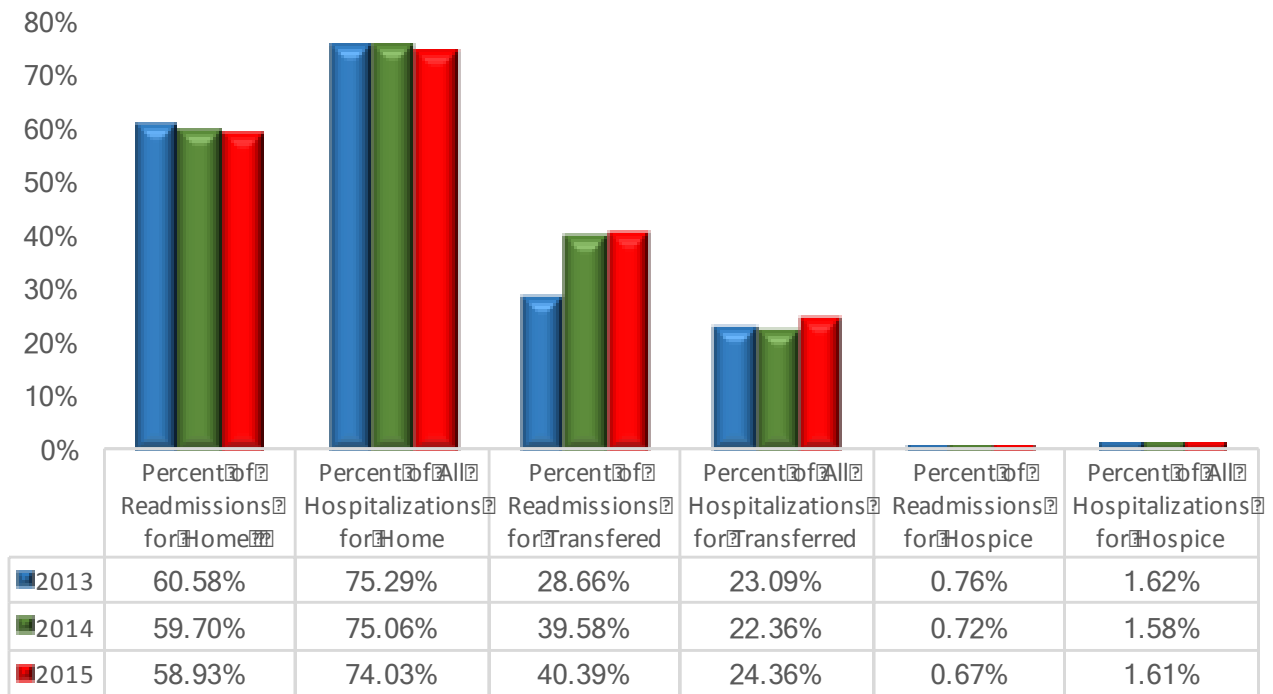
The following graph illustrates the 30-day readmission rate determined by the length of stay groups for index hospitalizations.



**\*The frequency on the figure above is the percentage of readmissions out of all hospitalizations.**

- A length of stay of less than 1 day indicates that the patient was admitted and discharged on the same day.
- Although the percent of all hospitalizations was similar for patients staying 1-2 days and 3-5 days, the rate of readmission for patients staying 3-5 days was 10 percent to 13 percent higher across all three years.
- For all three categories, the rate of readmission stayed relatively the same across all three years.

**Figure 9. Post-Hospitalization Discharge Location Inequalities in Readmissions in North Texas**



\*The frequency is the percentage of readmissions out of all hospitalizations.

\* Patients that were discharged/transferred were either sent to a critical access hospital (CAH), a Hospital-based Medicare Approved Swing Bed, a Medicare-certified LTC, a nursing facility, a psychiatric hospital, a skilled nursing facility, an inpatient rehabilitation facility, an intermediate care facility, an organized home health care service or another type of Healthcare institution not defined.

- Patients who were discharged to home had the highest readmission rate, although this rate did decrease across all three years from 60.58 percent in 2013, to 59.70 percent in 2014 and 58.93 percent in 2015.
- Hospice discharges increased from 1.58 percent in 2014 to 1.61 percent in 2015.

**Table 6. Associations between Patient Characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Status) and Readmissions within 30 Days in those that Admitted for Diseases of the Heart (Index Hospitalization) in 2015**

Top Five Index Hospitalization	Diseases of the Heart				
	N	X2	P value	OR	95% CI
<b>Demographics</b>					
<b>1. Age</b>					
65 or Older*					
45-64	18,996	9.3324	<b>0.0023</b>	0.9279	0.8845-0.9736
18-44	4,325	9.3342	<b>0.0022</b>	0.8748	0.8028-0.9532
<b>2. Gender</b>					
Female*					
Male	26,710	3.4505	0.0632	0.9573	0.9142-1.0024
Others (X)	2,349	10.2338	<b>0.0014</b>	1.1875	1.0687-1.3196
<b>3. Race</b>					
White*					
Asian	1,115	0.8581	0.3543	0.9264	0.7881-1.0890
Black	9,433	68.6109	<b>&lt;.0001</b>	1.2679	1.1985-1.3412
Other Races	3,175	6.5064	<b>0.0107</b>	0.8782	0.7948-0.9704
<b>4. Ethnicity</b>					
Not Hispanic*					
Hispanic	4,092	0.6298	0.4274	0.9664	0.8883-1.0515
Other Ethnicities	134	0.0337	0.8544	0.9588	0.6116-1.5031
<b>5. Payer</b>					
Medicare*					
Medicaid	2,116	70.9958	<b>&lt;.0001</b>	1.5399	1.3919-1.7036
Uninsured	5,741	24.0204	<b>&lt;.0001</b>	0.8259	0.7650-0.8916
Insured	22,008	162.9488	<b>&lt;.0001</b>	0.7254	0.6904-0.7622
<b>6. Length of Stay</b>					
3-5 Days*					
Less Than one	1,154	33.4424	<b>&lt;.0001</b>	1.5096	1.3118-1.7372
1-2 Days	18,174	65.2678	<b>&lt;.0001</b>	0.7931	0.7497-0.8390
6-8 Days	7,967	45.2619	<b>&lt;.0001</b>	1.2544	1.1741-1.3401
9-14 Days	4,500	88.6068	<b>&lt;.0001</b>	1.4579	1.3474-1.5775
15 & More	1,862	118.8229	<b>&lt;.0001</b>	1.8164	1.6295-2.0248
<b>7. Discharge Status</b>					
Home*					
Hospice	870	41.8018	<b>&lt;.0001</b>	0.4128	0.3129-0.5445
Transferred	13,159	1727.2578	<b>&lt;.0001</b>	2.6629	2.5400-2.7918

\*Reference Group

**Table 7. Associations between Patient Characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Status) and Readmissions within 30 Days in those that Admitted for Bacterial Infections (Index Hospitalization) in 2015**

Top Five Index Hospitalization	Bacterial Infections				
	N	X2	P value	OR	95% CI
<b>Demographics</b>					
<b>1. Age</b>					
<b>65 or Older*</b>					
<b>45-64</b>	7,563	0.7064	0.4007	1.0326	0.9582- 1.1127
<b>18-44</b>	4,257	48.9938	<.0001	0.7014	0.6348- 0.7749
<b>2. Gender</b>					
<b>Female*</b>					
<b>Male</b>	9,944	6.9541	<b>0.0084</b>	1.0987	1.0245- 1.1784
<b>Others (X)</b>	1,500	0.3459	0.5565	1.0433	0.9058- 1.2017
<b>3. Race</b>					
<b>White*</b>					
<b>Asian</b>	586	0.2718	0.6021	0.9432	0.7572- 1.1750
<b>Black</b>	4,076	0.6108	0.4345	1.0361	0.9480- 1.1323
<b>Other Races</b>	1,816	6.0633	<b>0.0138</b>	0.8458	0.7402- 0.9665
<b>4. Ethnicity</b>					
<b>Not Hispanic*</b>					
<b>Hispanic</b>	2,805	7.0285	<b>0.0080</b>	0.8647	0.7765- 0.9629
<b>Other Ethnicities</b>	35	0.1087	0.7416	1.1495	0.5017- 2.6336
<b>5. Payer</b>					
<b>Medicare*</b>					
<b>Medicaid</b>	1,354	1.9283	0.1649	1.1034	0.9603- 1.2678
<b>Uninsured</b>	3,325	77.3895	<.0001	0.6061	0.5417-0.6782
<b>Insured</b>	8,554	38.9263	<.0001	0.7861	0.7288-0.8479
<b>6. Length of Stay</b>					
<b>3-5 Days*</b>					
<b>Less Than one</b>	101	62.3464	<.0001	4.3727	2.9343-6.5164
<b>1-2 Days</b>	2,979	16.2667	<.0001	0.7700	0.6780-0.8745
<b>6-8 Days</b>	4,971	33.9556	<.0001	1.3199	1.2020-1.4493
<b>9-14 Days</b>	3,943	128.8122	<.0001	1.7319	1.5741-1.9055
<b>15 &amp; More</b>	2,520	161.3697	<.0001	1.9953	1.7911-2.2227
<b>7. Discharge Status</b>					
<b>Home*</b>					
<b>Hospice</b>	1,311	58.6979	<.0001	0.4048	0.3188-0.5140
<b>Transferred</b>	9,348	548.8725	<.0001	2.2747	2.1213-2.4392

\*Reference Group

**Table 8. Associations between Patient Characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Status) and Readmissions within 30 Days in those that Admitted for Complications (Index Hospitalization) in 2015**

Top Five Index Hospitalization	Complications				
	N	X2	P value	OR	95% CI
<b>Demographics</b>					
<b>1. Age</b>					
<b>65 or Older*</b>					
<b>45-64</b>	7,627	1.7233	0.1893	0.9483	0.8759-1.0265
<b>18-44</b>	3,502	3.2339	0.0721	1.0935	0.9920-1.2054
<b>2. Gender</b>					
<b>Female*</b>					
<b>Male</b>	8,522	0.2037	0.6517	0.9835	0.9148-1.0573
<b>Others (X)</b>	557	2.2308	0.1353	1.1671	0.9527-1.4298
<b>3. Race</b>					
<b>White*</b>					
<b>Asian</b>	356	0.0706	0.7905	1.0359	0.7983-1.3443
<b>Black</b>	3,121	12.7064	<b>0.0004</b>	1.1848	1.0793-1.3007
<b>Other Races</b>	1,170	0.5697	0.4504	1.0582	0.9136-1.2258
<b>4. Ethnicity</b>					
<b>Not Hispanic*</b>					
<b>Hispanic</b>	1,871	12.5284	<b>0.0004</b>	1.2263	1.0952-1.3733
<b>Other Ethnicities</b>	30	0.8634	0.3528	0.6100	0.2127-1.7489
<b>5. Payer</b>					
<b>Medicare*</b>					
<b>Medicaid</b>	908	5.2800	<b>0.0216</b>	1.2036	1.0274-1.4100
<b>Uninsured</b>	1,363	0.3945	0.5299	0.9562	0.8314-1.0997
<b>Insured</b>	8,498	40.7226	<b>&lt;.0001</b>	0.7799	0.7225-0.8419
<b>6. Length of Stay</b>					
<b>3-5 Days*</b>					
<b>Less Than one</b>	271	5.8022	<b>0.0160</b>	1.4160	1.0656-1.8817
<b>1-2 Days</b>	4,540	18.6248	<b>&lt;.0001</b>	0.7990	0.7216-0.8849
<b>6-8 Days</b>	3,484	24.8045	<b>&lt;.0001</b>	1.2919	1.1678-1.4290
<b>9-14 Days</b>	2,460	45.1739	<b>&lt;.0001</b>	1.4597	1.3068-1.6305
<b>15 &amp; More</b>	1,421	125.7984	<b>&lt;.0001</b>	2.0582	1.8112-0.8680
<b>7. Discharge Status</b>					
<b>Home*</b>					
<b>Hospice</b>	213	19.1299	<b>&lt;.0001</b>	0.3052	0.1738-0.5359
<b>Transferred</b>	7,704	150.2120	<b>&lt;.0001</b>	1.5616	1.4538-1.6775

\*Reference Group



**Table 9. Associations between Patient Characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Status) and Readmissions within 30 Days in those that Admitted for Diseases of the Urinary System (Index Hospitalization) in 2015**

Top Five Index Hospitalization	Diseases of the Urinary System				
	N	X2	P value	OR	95% CI
<b>Demographics</b>					
<b>1. Age</b>					
<b>65 or Older*</b>					
<b>45-64</b>	6,402	8.7815	<b>0.0030</b>	0.8839	0.8146-0.9591
<b>18-44</b>	3,471	22.1841	<b>&lt;.0001</b>	0.7746	0.6963-0.8616
<b>2. Gender</b>					
<b>Female*</b>					
<b>Male</b>	8,542	0.2934	0.5880	0.9798	0.9099-1.0550
<b>Others (X)</b>	975	0.0834	0.7727	1.0260	0.8618-1.2216
<b>3. Race</b>					
<b>White*</b>					
<b>Asian</b>	488	0.0640	0.8002	1.0319	0.8091-1.3160
<b>Black</b>	3,814	13.1823	<b>0.0003</b>	1.1851	1.0812-1.2989
<b>Other Races</b>	1,527	2.7766	0.0956	0.8811	0.7592-1.0226
<b>4. Ethnicity</b>					
<b>Not Hispanic*</b>	2,331	3.4409	0.0636	0.8928	0.7920-1.0065
<b>Hispanic</b>	29		0.1916	1.0599	0.4041-2.7799
<b>Other Ethnicities</b>					
<b>5. Payer</b>					
<b>Medicare*</b>					
<b>Medicaid</b>	983	5.2391	<b>0.0221</b>	1.2075	1.0273-1.4193
<b>Uninsured</b>	2,669	32.6012	<b>&lt;.0001</b>	0.7010	0.6202-0.7923
<b>Insured</b>	8,738	39.4302	<b>&lt;.0001</b>	0.7795	0.7211-0.8426
<b>6. Length of Stay</b>					
<b>3-5 Days*</b>					
<b>Less Than one</b>	389	0.3343	0.5632	1.0825	0.8274-1.4161
<b>1-2 Days</b>	7,326	66.9714	<b>&lt;.0001</b>	0.6892	0.6302-0.7537
<b>6-8 Days</b>	3,083	31.0297	<b>&lt;.0001</b>	1.3388	1.2079-1.4838
<b>9-14 Days</b>	1,562	82.9521	<b>&lt;.0001</b>	1.7848	1.5736-2.0244
<b>15 &amp; More</b>	590	60.6075	<b>&lt;.0001</b>	2.0711	1.7181-2.4965
<b>7. Discharge Status</b>					
<b>Home*</b>					
<b>Hospice</b>	621	26.4846	<b>&lt;.0001</b>	0.4449	0.3241-0.6106
<b>Transferred</b>	7,602	192.2923	<b>&lt;.0001</b>	1.6621	1.5462-1.7867

\*Reference Group

**Table 10. Associations between Patient Characteristics (Age, Gender, Race, Ethnicity, Payer, Length of Stay, Discharge Status) and Readmissions within 30 Days in those that Admitted for Fractures (Index Hospitalization) in 2015**

Top Five Index Hospitalization	Fractures				
	N	X2	P value	OR	95% CI
<b>Demographics</b>					
<b>1. Age</b>					
<b>65 or Older*</b>					
<b>45-64</b>	3,636	24.4011	<.0001	0.7624	0.6845-0.8493
<b>18-44</b>	2,853	96.3947	<.0001	0.5156	0.4509-0.5896
<b>2. Gender</b>					
<b>Female*</b>					
<b>Male</b>	5,751	0.0948	0.7582	1.0144	0.9260-1.1112
<b>Others (X)</b>	1,029	0.4319	0.5110	0.9406	0.7836-1.1291
<b>3. Race</b>					
<b>White*</b>					
<b>Asian</b>	335	1.6782	0.1952	0.8094	0.5875-1.1152
<b>Black</b>	1,366	3.6867	0.0548	0.8544	0.7274-1.0034
<b>Other Races</b>	1,040	10.7511	<b>0.0010</b>	0.7247	0.5973-0.8792
<b>4. Ethnicity</b>					
<b>Not Hispanic*</b>					
<b>Hispanic</b>	1,347	9.4152	<b>0.0022</b>	0.7692	0.6502-0.9099
<b>Other Ethnicities</b>	13		0.2663	0.4529	0.0589-3.4848
<b>5. Payer</b>					
<b>Medicare*</b>					
<b>Medicaid</b>	343	8.0258	<b>0.0046</b>	0.6357	0.4635-0.8719
<b>Uninsured</b>	2,301	93.0913	<.0001	0.4981	0.4314-0.5751
<b>Insured</b>	6,206	143.0566	<.0001	0.5591	0.5078-0.6155
<b>6. Length of Stay</b>					
<b>3-5 Days*</b>					
<b>Less Than one</b>	212	2.1806	0.1398	1.3040	0.9159-1.8565
<b>1-2 Days</b>	3,399	38.7447	<.0001	0.6682	0.5882-0.7591
<b>6-8 Days</b>	3,017	17.2475	<.0001	1.2696	1.1341-1.4212
<b>9-14 Days</b>	1,437	29.8340	<.0001	1.4878	1.2892-1.7170
<b>15 &amp; More</b>	562	27.1858	<.0001	1.7233	1.4014-2.1191
<b>7. Discharge Status</b>					
<b>Home*</b>					
<b>Hospice</b>	193	1.8337	0.1757	0.6433	0.3380-1.2244
<b>Transferred</b>	9,989	412.3921	<.0001	2.9178	2.6219-3.2472

\*Reference Group

# Discussion

## Readmission Rate in the North Texas Region

This study is an update to the previous publication investigating readmissions in North Texas. The results found that the readmission rate decreased from 14.72 percent in 2013 to 14.40 percent in 2014 to 14.34 percent in 2015. This decrease is consistent with the rates at the national level, which has continued to decrease each year starting from 2012. This is a positive step towards attaining the goal set by the Hospital Readmissions Reduction Program in 2012, and it suggests that hospitals may have implemented quality programs in efforts to decrease their readmission rate.<sup>4</sup> Although the decrease of 1,933 patients from 2013 to 2014 was statistically significant ( $p < .0001$ ), the increase of 867 patients from 2014 to 2015 was not.

The top ten conditions presented by patients (Table 3) found diseases of the heart to be number one with 51,626 index hospitalizations and 9,298 readmissions. In 2014, the number of patients presenting with diseases of the heart at index hospitalization decreased from 51,607 in 2013 to 50,837, as well as the number of readmissions, 9,280 to 8,925 (Appendix 2). Counter to this decrease in rate was an increase in total charges across all three years. Patients with bacterial infections were found to have increased in a total number of index hospitalizations across all three years, moving from the fourth leading condition in 2013 with 3,359 readmissions, to the second in both 2014 and 2015 with 3,798 and 4,069, respectively. Bacterial infections can also result from damaged, repaired or replaced heart valves; this may help to explain the increase in both diseases of the heart and bacterial infections.<sup>9</sup> Further supporting this idea is that in 2015, 4.31 percent of patients presenting with diseases of the heart at index hospitalization revisited for complications, and 3.49 percent revisited for bacterial infections. A statistical review published by the Healthcare Cost and Utilization Project found Septicemia and cardiac conditions were top reasons for admission to the same hospital after an ED visit among adults aged 45 years and older.<sup>10</sup>

## Disparities Associated with Hospital Readmissions

Among all hospitalizations in 2015, the rate for females was almost twice as compared to males, at 60.36 percent and 33.27 percent, respectively. Other research involving gender differences in healthcare has found hospital utilization by females to be 20 percent higher as compared to males; however, hospital rate of stay was found to be longer for males than females by a study published in 2014.<sup>11</sup>

An increase in 30-day readmissions was found to increase along with patient age for all three years. A study looking at readmission to the same hospital also found readmissions to increase with age among those 45-64 and 65 or older.<sup>10</sup> The age group with the highest readmission rate was 65 or older; this was almost twice the rate for patients in the 18-44 age group. This is in line with higher readmission rates among females, as life expectancy for women is higher than that for males.<sup>12</sup>

Percent of readmissions among patients identified as not Hispanic or Latino had a readmission rate almost nine times that of patients identified as Hispanic or Latino for all three years. In 2015, 65,640 patients were considered Hispanic or Latino and 456,384 were considered Not Hispanic or Latino. Although there were substantially fewer Hispanic or Latino patients, the difference in readmission rate was statistically significantly different ( $\chi^2 490.83$ ;  $p < .0001$ ). In 2015, Hispanic or Latino patients represented 10.09 percent of all

hospitalizations; however, according to the United States Census Bureau, 38.8 percent of Texans identified themselves as this ethnicity, which signals a potential under-utilization of health care among these individuals.<sup>6</sup>

For all three years, white patients had a significantly higher readmission rate ( $p < .0001$ ) and represented more of all index hospitalization, followed by black patients, those of other races, and lastly, Asian patients. These rates, as well as the rates for Black patients, were found to have held relatively stable across all three years. In 2015, 79.9 percent of Texans identified themselves as White; during that same year, White patients represented 71.20 percent of all hospitalizations.

Readmission rates for Medicare patients were found to be significantly higher in 2015 ( $p < .0001$ ), than any other payer type. However, insured patients represented significantly more ( $p < .0001$ ) of all hospitalizations.

Hospital length of stay is defined as the period between the date of admission at index and the date of discharge. This time greatly influences a patient's likelihood of readmission and is an important factor to consider in the reduction of readmission rates.<sup>3</sup> Figure 8 shows that as a patient's length of stay increases, so does the readmission rate; however, this positive relationship is only observed for lengths of stay of five or fewer days, for at the sixth day of stay, every subsequent day lowers the readmission rate. The likely explanation for this relationship is that as the length of stay increases beyond the fifth day so does its representation of all hospitalizations.

Patients who were discharged to home had a significantly higher readmission rate in 2015 ( $p < .0001$ ), although this rate did decrease across all three years from 60.58 percent in 2013, to 59.70 percent in 2014 and 58.93 percent in 2015. Patients who were transferred at discharge increased their representation of all hospitalizations in 2015, as well as their rate of readmission.

### **Association between 30-Day Readmission and Patient Characteristics in patients who admitted for Heart Disease and Bacterial Infections at Index Hospitalization in 2015**

In 2015, the five leading conditions presented by patients at index hospitalization were diseases of the heart, bacterial infections, complications, diseases of urinary system and fractures. **Together, they total to \$1,787,516,943 charged, 23,330 30-day readmissions, and represent 25.36 percent of all index hospitalizations, 31.26 percent of all 30-day readmissions, and 37.52 percent of total charges for readmission in 2015.** Below, the association between 30-Day readmission and patient characteristics for the leading two causes, Diseases of the Heart and Bacterial Infections, will be discussed. Details can be found in tables six and seven, respectively.

#### **For Patients with Diseases of Heart at Index Hospitalization**

Of the 150,696 patients in the 45-64 age group, 18,996 or 12.61 percent, admitted for Diseases of Heart at Index hospitalization. When compared to patients 65 and older, patients 45-64 years of age have fewer odds of readmission 95% CI: [OR: 0.93]; 95% CI: [0.88 - 0.97]. Age is a protective factor for this age group as well as for patients 18-44 years in age 95% CI: [OR: 0.87]; 95% CI [0.80, 0.95]. When compared to females, those identified as others had significantly increased odds of readmission 95% CI: [OR: 1.18]; 95% CI: [1.07, 1.31].

With regards to race, when compared to white patients, black patients had increased odds of readmission 95% CI: [OR: 1.27]; 95% CI: [1.20, 1.34], and patients identified as other races had fewer odds of readmission 95% CI: [OR: 0.88]; 95% CI: [0.79, 0.97]. Ethnicity was found to be independent of readmission for both Hispanic

or Latino patients and those identified as other ethnicities when independently compared to Not Hispanic patients.

Patients insured by Medicaid had increased odds of readmission 95% CI: [OR: 1.53]; 95% CI: [1.39, 1.70] however, both uninsured 95% CI: [OR: 0.83]; 95% CI: [0.77, 0.89] and Insured 95% CI: [OR: 0.73]; 95% CI: [0.69, 0.76] patients had decreased odds of readmission. Patients who are insured may receive a higher quality of care due to their ability to choose their own provider or hospital; consequently, these patients may not experience an adversity requiring a readmission. Patients who are uninsured may have fewer odds of readmission due to their inability to return. All lengths of stay were found to put the patient at increased odds of readmission except for 1-2 days when compared independently to 3-5 days of stay. Patients transferred to home were over two and a half times the odds of readmitting compared to patients transferred to another facility. Patients transferred to hospice had less than half the odds of readmitting than those transferred to home 95% CI: [OR: 0.41] 95% CI: [0.31, 0.54].

#### **For Patients with Bacterial Infections at Index**

Patients, 18-44 years of age were found to have a significant difference in the odds of readmission 95% CI: [OR: 0.70]; 95% CI: [0.63, 0.77] when compared to patients 65 or older. Males 95% CI: [OR: 1.10] had a slight increase in the odds of readmission as compared to females, and only those identified as other races 95% CI: [OR: 0.85] were found to differ significantly from white patients.

Hispanic patients had fewer odds of readmission compared to those identified as Not Hispanic. With regards to economic disparity, when compared to patients covered by Medicare both the insured and uninsured had fewer odds of readmission 95% CI: [OR: 0.61, 0.79] respectively.

Patients staying less than one day 95% CI: [OR: 4.37]; 95% CI: [2.93, 6.51] had increased odds of nearly four and a half times that of those who stayed 3-5 days. Staying only 1-2 days protected patients against readmission; however, staying six days or longer increases the patient's odds of readmission. As seen with patients presenting with Diseases of the Heart, when compared to patients discharged to home, transferred patients had increased odds of readmission 95% CI: [OR: 2.66], but patients transferred to a hospice facility had fewer odds of readmission 95% CI: [OR: 0.41].



## **Conclusion and Future Implications**

This research is a continuation of the research published in 2013. The strength of this research is DFWHC Foundation's comprehensive data registry which allowed researchers to conduct analysis necessary to identify the conditions and disparities associated with hospital readmissions. This comprehensive overview of statistics, demographics, and charges intends to illuminate not only the disparities occurring in North Texas but also how they influence the occurrence of 30-day readmissions. It's meant to serve as a foundation upon which future research can be based, and as a tool for health practitioners and public health officials. As detailed by the research presented here, the conditions presented at index hospitalization are not random, nor are the conditions presented at readmission or the odds of readmission itself. The inequitable distribution of health adversity is influenced by a myriad of factors, and a consideration of these factors, including race, gender, ethnicity, insurance status, length of stay, discharge status, and age, is an important pathway to the improvement to quality of care, the attention to Health Equity Diversity and Inclusion and consequently, the betterment of population health.

## **Limitations**

Patients hospitalized during the last 30 days of 2015 did not have a full 30 days to readmit since the last date we have data for is December 31<sup>st</sup>, 2015.

The Foundation relies on the organizations that submit the data to verify against their internal records. The DFWHC Foundation would only receive data if a bill was generated. If for some reason the organization saw a patient and did not generate a bill, then we would not obtain the data.

The DFWHC Foundation Hospital Encounter Data Warehouse captures approximately 95% of all Inpatient Hospital visits as compared to THCIC for the 13 County North Central Texas Area. Patients encounters from all over Texas and its surrounding states are captured as well; however, any encounter occurring outside of DFWHC Foundation's catchment area is unlikely to be included within the database and furthermore, this analysis.

Patients missing data related to the readmission were coded as not having a readmission. It is assumed that these patients did not readmit; however, the patient could have readmitted to a hospital, not within DFWHC Foundation's data initiative catchment area.

To prevent the identification of zip codes with higher HD prevalence, spatial distributions were projected at the county level. This was decided in an effort to avoid creating the perception of zip codes as either healthy or unhealthy. Consequently, a visualization of potential zip code-level differences was not possible.

## References

1. Medicare Payment Advisory Commission: Promoting Greater Efficiency in Medicare, Medicare Payment Policy. Report to Congress. Chapter 5, 2007 June.
2. Fingar K (Truven Health Analytics), Washington R (AHRQ). Trends in Hospital Readmissions for Four High-Volume Conditions, 2009–2013. HCUP Statistical Brief #196. November 2015. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb196-Readmissions-Trends-High-Volume-Conditions.pdf>.
3. Betancourt JR, Tan-McGrory A, Kenst KS. Guide to Preventing Readmissions among Racially and Ethnically Diverse Medicare Beneficiaries. Prepared by the Disparities Solutions Center, Mongan Institute for Health Policy at Massachusetts General Hospital. Baltimore, MD: Centers for Medicare & Medicaid Services Office of Minority Health; September 2015.
4. Boccuti, Cristina, and Giselle Casillas. "Aiming for fewer hospital U-turns: the Medicare hospital readmission reduction program." *The Henry J. Kaiser Family Foundation* (2015): 1-10.
5. Gorodeski, Eiran Z., Randall C. Starling, and Eugene H. Blackstone. "Are all readmissions bad readmissions?." *New England Journal of Medicine* 363.3 (2010): 297-298.
6. "Female persons, percent, July 1, 2015." *Texas QuickFacts from the US Census Bureau*. N.p., n.d. Web. 30 Jan. 2017.
7. *The Health Status of Texas*. DSHS Center for Health Statistics Data Links. N.p., n.d. Web. 30 Jan. 2017.
8. U.S. Centers for Disease Control and Prevention, "Obesity - Halting the Epidemic by Making Health Easier: At A Glance 2010," <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity.htm>.
9. Torpy JM, Burke AE, Glass RM. Heart Valve Infections. *JAMA*. 2007; 297(12):1396. doi:10.1001/jama.297.12.1396
10. Weiss AJ (Truven Health Analytics), Wier LM (Truven Health Analytics), Stocks C (AHRQ), Blanchard J (RAND). Overview of Emergency Department Visits in the United States, 2011. HCUP Statistical Brief #174. June 2014. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb174-Emergency-Department-Visits-Overview.pdf>.
11. Weiss AJ (Truven Health Analytics), Elixhauser A (AHRQ). Overview of Hospital Stays in the United States, 2012. HCUP Statistical Brief #180. October 2014. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb180-Hospitalizations-United-States-2012.pdf>.
12. "2010 Mortality." *Mortality Narrative*. Texas Department of State Health Services, 29 Apr. 2013. Web. 30 Jan. 2017.



**Appendix 1. Top 10 conditions presented at Index Hospitalization for Readmissions within 30 days in 2013 and 2014**

<b>Top 10 conditions presented at Index Hospitalization for Readmissions within 30 days in 2013</b>					
<b>All Index Hospitalization 2013</b>		<b>Was the Index Hospitalization followed by a Readmission within 30 days</b>			
		<b>No</b>		<b>Yes</b>	
<b>Principle Reason for Readmission</b>	<b>Total Number of Index Hospital Stays</b>	<b>Patients with No Readmission</b>	<b>Average LOS No Readmission</b>	<b>Readmission Cases</b>	<b>Average LOS for Patients who Readmitted</b>
<b>Diseases of the heart</b>	51,607	42,327	4.33	9,280	5.53
Medical	35,477	28,530	3.61	6,947	4.44
Surgical	16,130	13,797	5.82	2,333	8.78
<b>Complications*</b>	18,610	14,710	5.98	3,900	7.69
Medical	8,926	6,778	5.31	2,148	6.61
Surgical	9,684	7,932	6.55	1,752	9.02
<b>Diseases of the urinary system</b>	21,941	18,164	4.21	3,777	5.36
Medical	19,138	15,750	4.13	3,388	5.08
Surgical	2,802	2,413	4.73	389	7.83
<b>Bacterial infection</b>	18,026	14,633	7.66	3,393	10.03
Medical	15,316	12,521	6.53	2,795	8.27
Surgical	2,709	2,111	14.33	598	18.28
<b>Complications mainly related to pregnancy</b>	31,576	28,911	3.20	2,665	4.13
**	2	2	4.00		
Medical	23,539	21,109	2.63	2,430	3.83
Surgical	8,035	7,800	4.75	235	7.22
<b>Cerebrovascular disease</b>	14,991	12,447	4.61	2,544	6.03
Medical	11,689	9,669	4.24	2,020	5.12
Surgical	3,302	2,778	5.89	524	9.57
<b>Respiratory infections</b>	15,418	13,011	4.76	2,407	6.08
Medical	14,751	12,457	4.56	2,294	5.69
Surgical	667	554	9.33	113	13.95
<b>Fractures</b>	15,103	12,847	4.76	2,256	5.84
Medical	3,913	3,342	3.67	571	3.97
Surgical	11,190	9,505	5.14	1,685	6.48
<b>Diabetes mellitus with complications</b>	10,121	7,991	5.06	2,130	5.82
Medical	7,637	6,009	3.75	1,628	4.27
Surgical	2,484	1,982	9.06	502	10.86
<b>Lower gastrointestinal disorders</b>	16,218	14,183	4.51	2,035	6.54
Medical	9,202	7,781	3.99	1,421	5.05
Surgical	7,016	6,402	5.14	614	9.98

## Top 10 conditions presented at Index Hospitalization for Readmissions within 30 days in 2014

All Index Hospitalization 2014		Was the Index Hospitalization followed by a Readmission within 30 days			
		No		Yes	
Principle Reason for Readmission	Total Number of Index Hospital Stays	Patients with No Readmission	Average LOS No Readmission	Readmission Cases	Average LOS for Patients who Readmitted
<b>Diseases of the heart</b>	50,837	41,912	4.39	8,925	5.63
Medical	34,819	28,203	3.72	6,616	4.50
Surgical	16,018	13,709	5.75	2,309	8.87
<b>Bacterial infection</b>	21,344	17,499	7.61	3,845	9.81
Medical	18,217	15,004	6.40	3,213	8.23
Surgical	3,127	2,495	14.91	632	17.86
<b>Complications*</b>	18,370	14,610	6.00	3,760	7.81
Medical	8,717	6,678	5.43	2,039	6.61
Surgical	9,653	7,932	6.50	1,721	9.25
<b>Diseases of the urinary system</b>	21,174	17,597	4.17	3,577	5.18
Medical	18,705	15,481	4.03	3,224	4.82
Surgical	2,469	2,116	5.22	353	8.53
<b>Complications mainly related to pregnancy</b>	30,903	28,476	3.21	2,427	4.05
**	1	1	3.00	0	
Medical	22,788	20,584	2.61	2,204	3.77
Surgical	8,114	7,891	4.77	223	6.77
<b>Cerebrovascular disease</b>	14,652	12,303	4.69	2,349	5.98
Medical	11,545	9,618	4.30	1,927	5.13
Surgical	3,107	2,685	6.10	422	9.85
<b>Respiratory infections</b>	15,364	13,027	4.72	2,337	6.26
Medical	14,730	12,517	4.50	2,213	5.80
Surgical	634	510	10.03	124	14.48
<b>Fractures</b>	15,394	13,100	4.82	2,294	5.74
Medical	4,234	3,657	3.61	577	4.02
Surgical	11,160	9,443	5.29	1,717	6.32
<b>Diabetes mellitus with complications</b>	10,204	8,071	4.94	2,133	5.86
Medical	7,629	6,019	3.59	1,610	4.24
Surgical	2,575	2,052	8.90	523	10.83
<b>Lower gastrointestinal disorders</b>	15,726	13,758	4.57	1,968	6.58
Medical	9,414	8,043	3.95	1,371	4.88
Surgical	6,312	5,715	5.45	597	10.51

\*Medical or surgical complications developed during hospitalization

## Appendix 2. Reasons for Readmission within 30 days for index hospitalization in 2013 and 2014

### A. Top Ten Most Frequent Reasons for Readmission within 30 days in 2013

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Diseases of the Heart	Diseases of the heart	4,443	48.30	34.85	4.89
	Diseases of the urinary system	421	4.58	26.63	4.59
	Complications	419	4.55	37.31	6.01
	Factors influencing health care	338	3.67	91.11	10.75
	Respiratory infections	285	3.10	22.78	5.19
	Bacterial infection	282	3.07	26.21	8.50
	Hypertension	225	2.45	27.14	4.99
	Cerebrovascular disease	209	2.27	19.41	4.58
	Respiratory failure; insufficiency; arrest (adult)	196	2.13	35.19	8.42
	Fluid and electrolyte disorders	173	1.88	34.88	3.55
	others	2,208	24.00	21.18	4.96
	<b>Total</b>	<b>9,199</b>	<b>100%</b>	<b>29.17%</b>	<b>5.28</b>
Complications*	Complications	1,474	38.20	43.21	7.50
	Factors influencing healthcare	286	7.41	79.89	10.81
	Diseases of the heart	211	5.47	23.42	5.23
	Diseases of the urinary system	193	5.00	30.02	4.80
	Bacterial infection	181	4.69	29.15	9.48
	Symptoms; signs; and ill-defined conditions	95	2.46	38.78	5.27
	Fluid and electrolyte disorders	90	2.33	37.82	3.73
	Lower gastrointestinal disorders	75	1.94	24.59	6.95
	Respiratory infections	61	1.58	19.81	5.49
	Hypertension	56	1.45	32.37	4.59
	others	1,137	29.46	23.58	5.72
	<b>Total</b>	<b>3,859</b>	<b>100%</b>	<b>32.09%</b>	<b>6.93</b>
Diseases of the Urinary System	Diseases of the urinary system	913	24.51	32.38	4.99
	Diseases of the heart	347	9.32	26.31	5.18
	Bacterial infection	282	7.57	25.47	8.10
	Complications	229	6.15	30.90	6.08
	Hypertension	121	3.25	29.58	4.60
	Respiratory infections	113	3.03	21.73	5.46
	Factors influencing health care	107	2.87	88.43	11.74
	Fluid and electrolyte disorders	105	2.82	29.33	4.09
	Diabetes mellitus with complications	99	2.66	25.38	5.24
	Symptoms; signs; and ill-defined conditions	82	2.20	32.93	4.00
	others	1,327	35.62	23.70	5.53
	<b>Total</b>	<b>3,725</b>	<b>100%</b>	<b>27.32%</b>	<b>5.60</b>
Bacterial Infection	Bacterial infection	658	19.59	34.85	8.69
	Diseases of the urinary system	276	8.22	30.00	5.12
	Diseases of the heart	247	7.35	28.75	5.82
	Complications	246	7.32	39.68	8.26
	Factors influencing healthcare	178	5.30	95.19	12.97
	Respiratory infections	158	4.70	27.53	5.99
	Respiratory failure; insufficiency; arrest (adult)	114	3.39	44.71	10.36
	Lower gastrointestinal disorders	82	2.44	31.18	6.76
	Diabetes mellitus with complications	76	2.26	23.97	7.87
	Aspiration pneumonitis; food/vomitus	62	1.85	36.90	6.85
	others	1,262	37.57	27.27	5.93
	<b>Total</b>	<b>3,359</b>	<b>100%</b>	<b>31.46%</b>	<b>7.47</b>

**A. Top Ten Most Frequent Reasons for Readmission within 30 days in 2013 contd.**

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Complications Mainly Related to Pregnancy	Complications mainly related to pregnancy	1,542	58.06	30.38	3.86
	Other complications of birth; puerperium affecting management of mother	392	14.76	29.41	4.02
	Indications for care in pregnancy; labor; and delivery	358	13.48	15.06	3.20
	Complications during labor	191	7.19	11.78	2.24
	Normal pregnancy and/or delivery	56	2.11	10.47	2.14
	Abortion-related disorders	20	0.75	45.45	2.30
	Miscellaneous mental disorders	10	0.38	19.61	3.98
	Biliary tract disease	9	0.34	4.92	2.66
	Complications	9	0.34	32.14	4.57
	Bacterial infection	5	0.19	7.46	3.45
	others	64	2.41	7.19	3.71
<b>Total</b>	<b>2,656</b>	<b>100%</b>	<b>21.76%</b>	<b>3.40</b>	
Cerebrovascular Disease	Factors influencing health care	775	30.77	97.98	15.26
	Cerebrovascular disease	647	25.68	35.26	4.47
	Diseases of the heart	163	6.47	16.72	4.94
	Diseases of the urinary system	84	3.33	19.49	4.62
	Complications	81	3.22	34.91	6.08
	Bacterial infection	78	3.10	22.03	8.24
	Hypertension	52	2.06	27.96	3.87
	Respiratory infections	37	1.47	17.29	5.12
	Other nervous system disorders	32	1.27	28.07	4.29
	Respiratory failure; insufficiency; arrest (adult)	32	1.27	45.71	11.47
	others	538	21.36	17.88	5.07
<b>Total</b>	<b>2,519</b>	<b>100%</b>	<b>30.68%</b>	<b>6.63</b>	
Respiratory Infections	Respiratory infections	375	15.74	28.87	5.67
	Diseases of the heart	315	13.22	24.82	4.88
	Bacterial infection	177	7.43	23.05	7.78
	Chronic obstructive pulmonary disease and bronchiectasis	132	5.54	21.93	4.58
	Factors influencing healthcare	100	4.20	90.91	11.27
	Respiratory failure; insufficiency; arrest (adult)	89	3.73	31.56	7.06
	Diseases of the urinary system	85	3.57	17.82	4.88
	Aspiration pneumonitis; food/vomitus	70	2.94	34.15	6.64
	Fluid and electrolyte disorders	59	2.48	33.71	3.41
	Anemia	51	2.14	18.39	4.79
	others	930	39.03	21.28	5.34
<b>Total</b>	<b>2,383</b>	<b>100%</b>	<b>24.56%</b>	<b>5.70</b>	
Fractures	Factors influencing health care	768	34.33	98.71	12.04
	Fractures	391	17.48	40.14	4.62
	Complications	209	9.34	38.85	6.47
	Diseases of the heart	113	5.05	20.21	4.99
	Bacterial infection	87	3.89	22.37	7.61
	Diseases of the urinary system	81	3.62	18.08	4.26
	Respiratory infections	48	2.15	17.71	5.67
	Lower gastrointestinal disorders	28	1.25	19.05	6.78
	Cerebrovascular disease	27	1.21	13.92	4.59
	Anemia	26	1.16	41.94	3.47
	others	459	20.52	17.31	5.20
<b>Total</b>	<b>2,237</b>	<b>100%</b>	<b>31.91%</b>	<b>6.57</b>	

**A. Top Ten Most Frequent Reasons for Readmission within 30 days in 2013 contd.**

<b>Index Admission</b>	<b>Reason for Readmission</b>	<b>Readmission Cases</b>	<b>Percent of Readmission</b>	<b>Percent that Readmitted</b>	<b>Average LOS for Readmission</b>
<b>Diabetes Mellitus with Complications</b>	Diabetes mellitus with complications	965	45.82	32.36	4.79
	Diseases of the heart	121	5.75	23.91	5.95
	Complications	111	5.27	34.80	7.55
	Diseases of the urinary system	97	4.61	23.26	5.28
	Bacterial infection	87	4.13	21.27	9.33
	Factors influencing health care	77	3.66	90.59	20.98
	Fluid and electrolyte disorders	45	2.14	32.61	3.70
	Diseases of arteries; arterioles; and capillaries	42	1.99	41.18	6.79
	Hypertension	40	1.90	23.95	5.47
	Symptoms; signs; and ill-defined conditions	39	1.85	30.95	6.23
	others	482	22.89	23.58	5.38
	<b>Total</b>	<b>2,106</b>	<b>100%</b>	<b>28.87%</b>	<b>5.79</b>
<b>Lower Gastrointestinal Disorders</b>	Lower gastrointestinal disorders	729	36.21	29.68	5.49
	Complications	256	12.72	55.65	6.85
	Diseases of the heart	105	5.22	19.59	4.13
	Diseases of the urinary system	88	4.37	26.83	4.42
	Bacterial infection	73	3.63	22.88	8.55
	Symptoms; signs; and ill-defined conditions	59	2.93	40.41	3.65
	Intestinal infection	50	2.48	40.00	4.96
	Other gastrointestinal disorders	49	2.43	15.81	5.98
	Fluid and electrolyte disorders	37	1.84	40.22	3.27
	Colorectal cancer	31	1.54	37.35	7.77
	others	536	26.63	18.32	5.12
	<b>Total</b>	<b>2,013</b>	<b>100%</b>	<b>25.87%</b>	<b>5.56</b>

\*Medical or surgical complications developed during hospitalization

## B. Top Ten Most Frequent Reasons for Readmission within 30 days in 2014

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Diseases of the Heart	Diseases of the heart	4,134	46.62	36.31	5.13
	Diseases of the urinary system	427	4.82	31.15	4.79
	Complications	425	4.79	42.04	6.31
	Factors influencing healthcare	371	4.18	93.92	10.84
	Bacterial infection	291	3.28	27.53	8.33
	Respiratory infections	277	3.12	25.70	5.43
	Hypertension	227	2.56	29.07	5.46
	Cerebrovascular disease	198	2.23	23.19	5.14
	Respiratory failure; insufficiency; arrest (adult)	176	1.98	33.15	7.97
	Fluid and electrolyte disorders	162	1.83	36.32	3.54
	others	2,179	24.57	24.32	5.18
<b>Total</b>	<b>8,867</b>	<b>100%</b>	<b>31.82%</b>	<b>5.54</b>	
Bacterial Infection	Bacterial infection	824	21.70	38.08	8.61
	Diseases of the heart	305	8.03	32.80	5.62
	Diseases of the urinary system	273	7.19	29.48	5.08
	Complications	257	6.77	37.79	8.75
	Respiratory infections	193	5.08	30.44	5.94
	Factors influencing healthcare	176	4.63	90.26	12.89
	Respiratory failure; insufficiency; arrest (adult)	117	3.08	41.79	8.99
	Diabetes mellitus with complications	92	2.42	27.63	6.49
	Lower gastrointestinal disorders	75	1.97	26.22	6.35
	Aspiration pneumonitis; food/vomitus	71	1.87	41.52	7.85
	others	1,415	37.26	29.04	6.03
<b>Total</b>	<b>3,798</b>	<b>100%</b>	<b>33.11%</b>	<b>7.37</b>	
Complications*	Complications	1,402	37.58	43.51	7.58
	Factors influencing healthcare	271	7.26	75.07	9.43
	Diseases of the heart	227	6.08	27.28	5.19
	Bacterial infection	211	5.66	33.60	9.05
	Diseases of the urinary system	184	4.93	33.27	5.54
	Lower gastrointestinal disorders	92	2.47	30.87	6.99
	Fluid and electrolyte disorders	70	1.88	37.43	3.51
	Symptoms; signs; and ill-defined conditions	70	1.88	33.98	5.10
	Respiratory infections	67	1.80	22.64	5.38
	Anemia	57	1.53	44.88	4.60
	others	1,080	28.95	25.75	5.73
<b>Total</b>	<b>3,731</b>	<b>100%</b>	<b>34.22%</b>	<b>6.99</b>	
Diseases of the Urinary System	Diseases of the urinary system	837	23.72	33.25	4.79
	Diseases of the heart	320	9.07	27.95	4.96
	Bacterial infection	284	8.05	26.15	7.56
	Complications	217	6.15	32.01	6.26
	Factors influencing health care	117	3.32	91.41	11.84
	Fluid and electrolyte disorders	111	3.15	33.43	3.89
	Hypertension	101	2.86	30.15	4.91
	Respiratory infections	91	2.58	19.08	5.45
	Diabetes mellitus with complications	86	2.44	25.60	5.51
	Symptoms; signs; and ill-defined conditions	63	1.79	33.87	3.55
	others	1,301	36.88	27.09	5.70
<b>Total</b>	<b>3,528</b>	<b>100%</b>	<b>29.35%</b>	<b>5.50</b>	

\* Medical or surgical complications developed during hospitalization

## B. Top Ten Most Frequent Reasons for Readmission within 30 days 2014 contd.

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Complications Mainly Related to Pregnancy	Complications mainly related to pregnancy	1,406	58.41	37.50	4.10
	Other complications of birth; puerperium affecting management of mother	374	15.54	39.83	3.97
	Indications for care in pregnancy; labor; and delivery	296	12.30	18.57	3.20
	Complications during labor	174	7.23	16.62	2.47
	Normal pregnancy and/or delivery	65	2.70	18.01	2.45
	Miscellaneous mental disorders	16	0.66	40.00	5.15
	Abortion-related disorders	10	0.42	47.62	1.90
	Complications	6	0.25	30.00	3.75
	Pancreatic disorders (not diabetes)	6	0.25	20.69	4.52
	Biliary tract disease	5	0.21	3.70	2.64
	others	49	2.04	7.32	3.69
<b>Total</b>		<b>2,407</b>	<b>100%</b>	<b>27.98%</b>	<b>3.59</b>
Cerebrovascular Disease	Factors influencing health care	700	30.02	97.77	13.96
	Cerebrovascular disease	626	26.84	40.49	4.58
	Diseases of the heart	165	7.08	19.76	4.78
	Diseases of the urinary system	95	4.07	24.36	4.37
	Bacterial infection	81	3.47	26.38	8.33
	Complications	44	1.89	26.04	6.50
	Other nervous system disorders	34	1.46	30.09	4.49
	Respiratory infections	34	1.46	16.75	4.81
	Hypertension	32	1.37	24.62	3.53
	Gastrointestinal hemorrhage	27	1.16	25.96	4.68
	others	494	21.18	20.21	5.03
<b>Total</b>		<b>2,332</b>	<b>100%</b>	<b>33.52%</b>	<b>6.39</b>
Respiratory Infections	Respiratory infections	360	15.59	29.88	5.60
	Diseases of the heart	269	11.65	26.17	4.91
	Bacterial infection	191	8.27	26.98	8.04
	Chronic obstructive pulmonary disease and bronchiectasis	115	4.98	23.33	4.48
	Respiratory failure; insufficiency; arrest (adult)	101	4.37	33.22	7.36
	Diseases of the urinary system	99	4.29	20.67	4.74
	Factors influencing healthcare	94	4.07	94.00	12.88
	Complications	66	2.86	25.58	6.20
	Fluid and electrolyte disorders	63	2.73	30.29	3.26
	Aspiration pneumonitis; food/vomitus	59	2.56	36.20	7.34
	others	892	38.63	23.88	5.33
<b>Total</b>		<b>2,309</b>	<b>100%</b>	<b>26.60%</b>	<b>5.86</b>
Fractures	Factors influencing health care	759	33.38	98.57	12.34
	Fractures	350	15.39	36.73	4.74
	Complications	205	9.01	41.84	6.08
	Bacterial infection	115	5.06	31.17	8.15
	Diseases of the heart	111	4.88	22.16	5.14
	Diseases of the urinary system	81	3.56	21.04	5.02
	Respiratory infections	56	2.46	22.67	5.59
	Gastrointestinal hemorrhage	36	1.58	36.00	5.48
	Other nervous system disorders	32	1.41	40.51	4.76
	Anemia	27	1.19	39.71	4.28
	others	502	22.08	20.44	5.35
<b>Total</b>		<b>2,274</b>	<b>100%</b>	<b>35.43%</b>	<b>6.85</b>

\* Medical or surgical complications developed during hospitalization



### B. Top Ten Most Frequent Reasons for Readmission within 30 days in 2014 contd.

Index Admission	Reason for Readmission	Readmission Cases	Percent of Readmission	Percent that Readmitted	Average LOS for Readmission
Diabetes Mellitus with Complications	Diabetes mellitus with complications	975	45.86	33.47	4.71
	Complications	146	6.87	39.57	7.97
	Diseases of the heart	109	5.13	24.33	5.61
	Bacterial infection	96	4.52	24.24	9.58
	Factors influencing health care	79	3.72	89.77	11.92
	Diseases of the urinary system	78	3.67	23.08	4.64
	Fluid and electrolyte disorders	47	2.21	38.84	4.25
	Hypertension	45	2.12	30.00	5.18
	Symptoms; signs; and ill-defined conditions	42	1.98	31.82	5.45
	Upper gastrointestinal disorders	41	1.93	43.62	4.23
	others	468	22.01	25.56	5.65
<b>Total</b>	<b>2,126</b>	<b>100%</b>	<b>30.90%</b>	<b>5.54</b>	
Lower Gastrointestinal Disorders	Lower gastrointestinal disorders	743	38.10	31.81	5.78
	Complications	251	12.87	58.37	6.79
	Bacterial infection	93	4.77	31.53	7.82
	Diseases of the heart	80	4.10	20.78	4.46
	Diseases of the urinary system	70	3.59	24.48	4.92
	Symptoms; signs; and ill-defined conditions	51	2.62	34.23	4.05
	Other gastrointestinal disorders	45	2.31	27.10	6.96
	Intestinal infection	41	2.10	39.05	5.26
	Factors influencing health care	32	1.64	88.89	11.06
	Gastrointestinal hemorrhage	29	1.49	27.10	4.05
	others	515	26.41	20.92	5.05
<b>Total</b>	<b>1,950</b>	<b>100%</b>	<b>28.36%</b>	<b>5.85</b>	

\* Medical or surgical complications developed during hospitalization