Hospital Readmissions in Pennsylvania 2010

Pennsylvania Health Care Cost Containment Council

April 2012

About PHC4

The Pennsylvania Health Care Cost Containment Council (PHC4) is an independent state agency charged with collecting, analyzing, and reporting information that can be used to improve the quality and restrain the cost of health care in the state. It was created in the mid-1980s when Pennsylvania businesses and labor unions, in collaboration with other key stakeholders, joined forces to enact market-oriented health care reforms. As a result of their years of effort, the General Assembly passed legislation (Act 89 of 1986) creating PHC4.

The primary goal is to empower purchasers of health care benefits, such as businesses or labor union health/welfare funds, as well as other stakeholders, with information they can use to improve quality and restrain costs. Nearly 100 organizations and individuals annually utilize PHC4's special requests process to access and use data. More than 600,000 public reports on patient treatment results are downloaded from the PHC4 website each year. Today, PHC4 is a recognized national leader in public health care reporting.

It is governed by a 25-member board of directors representing business, labor, consumers, health care providers, insurers, and state government.

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Key Findings
Readmissions in Pennsylvania

A report from the Pennsylvania Health Care Cost Containment Council on hospital readmissions in 2010 for patients 18 years and older.

13.5 Percent

In 2010, approximately 2 out of every 15 hospital stays (13.5 percent) were followed by at least one readmission for any reason within 30 days. Readmission rates for patients age 85 and older (at 17.8 percent) were more than twice the rate of patients 18-44 years (8.0 percent). Readmission rates also varied depending on whether the patient's initial hospitalization was for medical treatment (at 15.3 percent) or surgical treatment (at 9.8 percent).

5.6 Percent

In 2010, about 1 in every 18 hospital stays (5.6 percent) was followed by a readmission specifically for a complication or infection.

Conditions with high numbers of readmissions

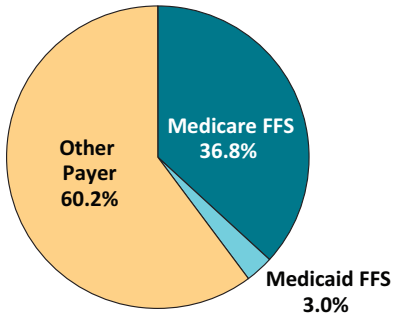
In 2010, heart failure was the condition with the highest number of readmissions for any reason within 30 days (8,846 readmissions), with a readmission rate of 24.3 percent. Heart failure was also the condition with the highest number of readmissions in Medicare fee-for-service patients in 2009. Mental health disorder was the condition with the highest number of readmissions in Medicaid fee-for-service patients in 2009.

Payments for Readmissions

30-Day Readmissions for Any Reason

- Medicare fee-for-service paid for 36.8 percent of the readmissions for any reason, for a total payment of $498 million.
- Medicaid fee-for-service paid for 3.0 percent of the readmissions for any reason, for a total payment of $29 million.

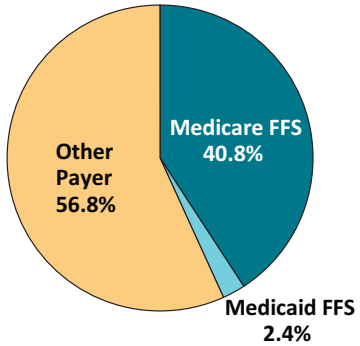
Readmissions for Any Reason in 2009



30-Day Readmissions for Complication or Infection

- Medicare fee-for-service paid for 40.8 percent of the readmissions for a complication or an infection, for a total payment of $249 million.
- Medicaid fee-for-service paid for 2.4 percent of the readmissions for a complication or an infection, for a total payment of $12 million.

Readmissions for a Complication or Infection in 2009



Key Findings

Multiple Readmissions

In 2009, patients who were readmitted for any reason within a year of their initial hospital stay were rehospitalized an average of 2.0 times within that year. When these patients' initial stays were for medical treatment, they were readmitted an average of 2.1 times. When their initial stays were for surgical treatment, they were readmitted an average of 1.7 times.

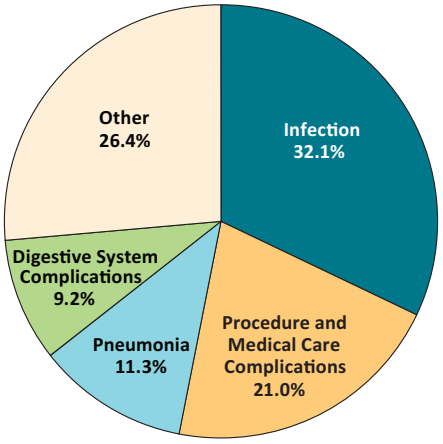
Reason for Readmission

For the top ten conditions with the highest number of readmissions for any reason within 30 days:

- In 2010, the most common reason for readmission was for the same condition as the initial hospital stay.
- The top three conditions with the highest number of readmissions within 30 days were:
  - **Heart failure:** Patients hospitalized initially for heart failure returned most frequently for another heart failure stay, accounting for 37.7% of the readmissions. On average, the hospital stay for these readmissions was 5.8 days.
  - **Mental health disorders:** Patients hospitalized initially for a mental health disorder were readmitted most frequently for the same reason, where 65.7% of the readmissions were for additional treatment of a mental health disorder. The average hospital stay for these readmissions was 10.0 days.
  - **Abnormal heartbeat:** Patients hospitalized initially for an abnormal heartbeat were readmitted most frequently for the same reason, where 30.1% of the readmissions were for additional treatment of an abnormal heartbeat. The average hospital stay for these readmissions was 3.7 days.

See Table 4, pages 10-11, for more information.

Reasons Patients were Readmitted for Complication or Infection within 30 Days in 2010



Rates of Readmission for Any Reason within 30 Days

- In 2010, the risk of readmission increased with the length of the patient's index hospital stay. The readmission rate more than tripled (from 9.0 percent to 28.1 percent) when the stay of the index hospitalization increased from one to 15 or more days.
- The risk of readmission increased with the number of patient comorbidities. The readmission rate for patients with 17 comorbidities, as identified in their index hospitalizations, was more than five times as high as the rate for patients with a single comorbidity (26.5 percent versus 5.2 percent, respectively).
- Patients discharged to skilled nursing facilities had higher readmission rates than patients discharged elsewhere. These patients were 67.1 percent more likely to be readmitted (20.6 percent readmission rate) than patients discharged to home (12.4 percent readmission rate).

Introduction

In recent years, the rate of patient readmission to hospitals has come under increasing scrutiny, as both a potential indicator of the quality of care, and as a significant cost driver. While readmissions are not always preventable and indeed are often pre-planned, they also can result from a wide variety of factors related to action taken or not taken during the initial hospital stay, or to a patient's post-discharge care or behavior. With readmission rates consuming a disproportionate share of expenses for inpatient hospital costs[1], there is a growing consensus that the health care system not only can, but must, reduce the number of preventable readmissions.

The Medicare Payment Advisory Commission has reported that potentially preventable readmissions might account for as much as $12 billion per year in medical costs.[2] One study of Medicare patients from 2003-04 shows that almost one fifth of them are readmitted within 30 days.[3] In another study involving 12 states in 2006-07, two out of five patients of any age who sought acute hospital care (inpatient or emergency room) ended up revisiting the hospital at least once during that same two-year span.[4]

The federal Centers for Medicare and Medicaid Services has already begun reporting rehospitalization rates, and within the next several years, the problem will gain added focus. One goal of the national Affordable Care Act is to reduce hospital readmissions, so beginning in October 2012, hospitals that have an excess preventable readmission ratio within 30 days of discharge for three conditions – pneumonia, acute myocardial infarction, and heart failure – will be penalized by reductions in Medicare reimbursements. By 2015, the list will expand to include additional discharge diagnoses. If the Hospital Readmission Reduction Program, as it is known, had begun in 2010, half of all hospitals in the country would have been penalized.[5]

Readmissions are not always preventable. They can result from a wide variety of factors related to action taken or not taken during the initial hospital stay, or to a patient's post-discharge care, including access to follow-up care or a willingness to follow discharge recommendations. In some cases they are pre-planned.

Even as potentially preventable readmissions attract more attention, the medical community and government policymakers still need to develop a greater understanding of the causes behind rehospitalizations. The effectiveness of reduction efforts will depend greatly on the quality of data and validity of the measurements.[6]

It is important to remember that although readmission can be influenced by the quality of care, as Drs. Shreya Kangovi and David Grande note in a commentary on October 26, 2011 for the *Journal of the American Medical Association*: "It is also a function of access to health services and of socioeconomic resources like income or social support."[7] The patient's ability or willingness to adhere to discharge recommendations often has a major impact on his or her health after leaving the hospital. Lack of discharge planning or transition problems after discharge can

1. Goldfield NI, McCullough EC, Hughes JS, et al. Identifying Potentially Preventable Readmissions. *Health Care Financing Review*. Fall 2008; 30 (1) 75.
2. Jenks SF, Williams MV, Coleman EA, Rehospitalizations among Patients in the Medicare Fee-for-Service Program. *New England Journal of Medicine*. 2009; 360: 1419. doi: 10.1056/NEJMsa0803563.
3. Ibid, p. 1418.
4. Steiner C, Barrett M, Hunter K. Hospital Readmissions and Multiple Emergency Department Visits, in Selected States, 2006-2007. *Healthcare Cost and Utilization Project*. May 2010; Statistical Brief 90: 2
5. Kocher RP, Adashi EY, Hospital Readmissions and the Affordable Care Act. *JAMA*. 2011; 306 (16): 1795.
6. Goldfield NI, McCullough EC, Hughes JS, et al. Identifying Potentially Preventable Readmissions. *Health Care Financing Review*. Fall 2008; 30 (1) 91.
7. Kangovi S, Grande D, Hospital Readmissions – Not Just a Measure of Quality. *JAMA*. 2011; 306 (16): 1796.

result in readmission, along with lack of follow-up care, or difficulty accessing such care. Even things such as child care, diet, access to transportation, and insurance coverage can come into play among different individuals or segments of the population, and thus affect the rates of readmission positively or negatively from one hospital to another.

The challenge for the health care system is to identify readmissions that are truly preventable and work aggressively to curtail them. A considerable body of information suggests that hospitals can lower early readmissions by reducing the risk of infection within the hospital, paying closer attention to medications, ensuring that patients are clinically ready for discharge and that they understand their post-hospitalization care plans, and by more closely engaging the community outside the hospital that will have a role in care after discharge.[8]

While the health care system still has much work to do in understanding the causes of readmissions, and while it remains to be seen how well financial incentives work in encouraging hospitals to address the problem, one thing remains clear. As the U.S. Agency for Health Care Research and Quality put it in one of its publications on readmissions: "Reducing repeat care visits is a key strategy for improving the quality of health care, while reducing the cost of care."[9]

About this Report

The Pennsylvania Health Care Cost Containment Council (PHC4) is uniquely positioned to evaluate and report on hospital readmissions in Pennsylvania through the inpatient data that it collects from Pennsylvania hospitals. This new report on readmissions by PHC4 analyzes statewide readmission rates, characteristics of those hospitalizations that were followed by readmissions—including patient age, gender, race/ethnicity, discharge status, payer, and hospital size—as well as information about the readmissions themselves. The report focuses primarily on 30-day readmissions using 2010 adult (18 years and older) discharges from acute care hospitals; when the readmission window is expanded up to one year, 2009 discharges are used. Readmissions for any reason, for complication or infection, or for the same condition are analyzed independently. Readmissions are also evaluated separately for medical and surgical hospitalizations.

Definitions

Readmission. This is a repeat hospitalization occurring after a patient is discharged alive from an initial, or index, hospitalization in 2010. Admissions for rehabilitation are not counted as readmissions nor are admissions that are contiguous with an index hospitalization unless the index hospitalization is discharged to home. Results shown are for readmissions within 30 days after discharge; exceptions, including readmissions that extend out a year, are noted in the body of the report.

Index Hospitalization. Index hospitalizations are the beginning point for examining readmissions and include any adult inpatient discharge in 2010 that does not have another discharge (i.e., a prior index hospitalization) within the previous 30 days (for the 30-day readmission analysis). For readmission analyses extending out one year, only the first index hospitalization in 2009 per patient is used. All analyses are limited to discharges from general and specialty general acute care hospitals only. The following criteria were applied to determine index hospitalizations: 1) age greater than or equal to 18 years, 2) resident of Pennsylvania, 3) has a valid patient identifier to link hospital stays, 4) is not a patient that left against medical advice, 5) is a live discharge, 6) is not discharged to hospice, 7) is not transferred,

8. Proposed Rules. *Federal Register*. May 2011; 76 (87): 25929.
9. Barrett M, Steiner C, Andrews R, Kassed C, Nagamine M. Methodological Issues when Studying Readmissions and Revisits Using Hospital Administrative Data. *HCUP Methods Series Report*. 2011; 1: 1.

8) is not a hospitalization that was contiguous with a transferred hospitalization.

Measures Reported

30-day Readmission Rate. The 30-day readmission rate is defined as the number of index hospital stays with any readmission within 30 days of being discharged alive divided by the total number of index hospital stays occurring in 2010. No more than one readmission is counted within the 30-day window, but a patient can have multiple index hospitalizations within the study period (2010). Following the 30-day period, a patient who experiences another hospital admission is counted as another index hospitalization and a subsequent 30-day follow-up period begins. Another readmission can be counted within subsequent 30-day periods. This method is similar to the design used by Elixhauser *et al.*, 2011.[10]

30-day Readmission Rate for Complication or Infection. The calculation of the 30-day readmission rate for complication or infection is similar to the 30-day readmission rate for any reason, except the number of readmissions within 30-days of being discharged alive from the index hospitalization (i.e., the numerator of the rate calculation) is limited to only those readmissions with the principal diagnosis of a complication or infection. While these diagnosis codes, vetted by PHC4's Technical Advisory Group, are used to describe a complication or infection, their use does not always indicate poor quality of care.

Length of Stay. This is the number of days spent in the hospital and is calculated as the difference between the patient's admission and discharge dates. This report shows the average length of stay for index hospitalizations as well as readmission hospitalizations. For the analysis of index hospitalizations, patients who died, left against medical advice, or transferred to another facility are not included and therefore are not represented in the average length of stay of the index hospitalizations. However, in the analysis of the readmission length of stay, these types of records (10.4% of all readmissions) are included so the information displayed is most representative of the overall statewide average stay.[11]

Inpatient Mortality Rate. The average inpatient mortality rate represents the percent of readmission hospitalizations that ended in death.

Medicare Fee-for-Service and Medicaid Fee-for-Service Payments. These payments represent the average dollar amount paid by Medicare fee-for-service or Medicaid fee-for-service. Payments are shown for index hospitalizations as well as readmission hospitalizations in 2009. They do not include payments made by other Medicare/Medicaid plan types (e.g., does not include payments from Medicare or Medicaid HMO plans). By design, payments associated with patients who died, left against medical advice, or transferred to another facility are not represented in the average payments shown for index hospitalizations but are included in the analysis of the readmission payments (similar to the length of stay analysis as described previously). The Medicare fee-for-service payment data was provided by the Centers for Medicare and Medicaid Services, and the Medicaid fee-for-service payment data was provided by the PA Department of Public Welfare. The most recent Medicare and Medicaid payment data available to PHC4 for use in this report was for 2009.

[10] Elixhauser, A. (AHRQ), Au, D. (AHRQ), and Podulka, J. (Thomson Reuters). *Readmissions for Chronic Obstructive Pulmonary Disease*, 2008. HCUP Statistical Brief #121. September 2011. Agency for Healthcare Research and Quality, Rockville, MD. http://hcup-us.ahrq.gov/reports/statbriefs/sb121.pdf.

[11] Average length of stay for readmissions that: A) died = 7.7 days; B) transferred to another facility = 7.7 days (the readmission stay is based on only the first hospitalization in the series of discharges); C) left against medical advice = 2.7 days; D) were neither A, B, nor C = 5.5 days. The average length of stay for all readmissions combined was 5.7 days.

Readmissions in Pennsylvania

Statewide 30-day readmission rates for 2010 are shown in Table 1. The overall rate of readmission for any reason is compared to the overall rate of readmission specifically for a complication or infection.

Table 1. Readmission Rate within 30 Days, 2010

Reason for Readmission	Rate
Any Reason	13.5%
Complication or Infection	5.6%

Table 2 examines differences between those hospitalizations that were or were not followed by a readmission. It also shows information about hospitalizations that were followed by a readmission that was for any reason, as well as hospitalizations with readmissions that were specifically for a complication or infection. Here the total cases are further categorized into medical and surgical groups based on whether or not the index hospitalization involved an operating room procedure. This information is specific to the index hospitalizations only (not the readmission hospitalizations). Information related to the readmissions themselves can be found later in this report.

Table 2. Hospitalizations followed by Readmissions within 30 Days by Type of Hospitalization, 2010

All Index Hospitalizations[1]		Was the Index Hospitalization[1] followed by a Readmission?							
		No		Yes					
		Patients without Readmission		Patients with Readmission for Any Reason			Patients with Readmission for Complication/Infection		
Type of Index Hospitalization[2]	Total Number of Index Hospital Stays	Number of Index Hospital Stays	Average Length of Stay for the Index Stay	Number of Index Hospital Stays	Percent of Total Index Hospital Stays with a Readmission	Average Length of Stay for the Index Stay	Number of Index Hospital Stays	Percent of Total Index Hospital Stays with a Readmission	Average Length of Stay for the Index Stay
Total Cases[3]	***1,126,712***	***974,859***	***4.0***	***151,853***	***13.5%***	***5.6***	***62,875***	***5.6%***	***6.2***
Medical	751,572	636,410	3.9	115,162	15.3%	5.1	42,832	5.7%	5.5
Surgical	374,836	338,202	4.2	36,634	9.8%	7.3	20,030	5.3%	7.7

[1] Index hospitalizations are the beginning point for examining readmissions. They include any inpatient discharge in 2010 that does not have another discharge (i.e., a prior index hospitalization) within the previous 30 days.
[2] For this display, a hospitalization is further categorized as a medical or surgical case based on the Diagnosis-Related Group (DRG) to which it is assigned. Cases assigned to surgical DRGs include those procedures likely to be performed in an operating room. For some cases, the DRG type is unknown ("ungroupable") and the case is categorized to neither a medical nor surgical subgroup.
[3] Total includes hospitalizations (n=304) that could not be categorized to a medical or surgical category.

- Overall, patients with readmissions for any reason spent 1.6 more days in the hospital during their initial stay compared to patients who were not readmitted.
- Patients with readmissions for a complication or infection stayed in the hospital 2.2 days longer during their initial hospitalization compared to patients who were not readmitted.
- Rates of readmission for any reason or for a complication or infection were higher for medical cases compared to surgical cases. However, the length of time spent in the initial hospitalization was longer for the surgical cases than the medical cases.

Reasons for Initial Hospitalization

Table 3 shows the top ten conditions that account for the largest number of readmissions within 30 days after discharge. Each of these conditions is further categorized into medical and surgical groups based on whether the index hospitalization involved an operating room procedure. Note that in some instances, the surgical procedure might not be related to the principal reason for admission. The table compares hospitalizations (index hospitalizations) that were followed by a readmission to those that were not. The information corresponds to the index hospitalizations only (not the readmission hospitalizations). Information corresponding to the readmission hospitalizations is found in Table 4.

- These ten conditions represented 38.1% of all index hospitalizations with a readmission.
- The condition with the highest number of readmissions was heart failure, with 8,846 hospitalizations that were followed by a readmission.
  - Patients initially treated for heart failure were readmitted—for any reason—at a rate of 24.3%, and the initial stays for these patients lasted an average of 5.8 days.
  - For heart failure hospitalizations that were not followed by a readmission, the average length of stay was 5.0 days.
  - When the initial stay for this condition was followed by a readmission specifically for a complication or infection (occurring at a rate of 8.4%), patients stayed in the hospital an average of 6.2 days.

The top principal reasons patients were readmitted for complication or infection in 2010 were:

- ***32.1 percent for infections (e.g., bloodstream infection)***
- ***21.0 percent for procedure and medical care complications (e.g., acute kidney disease/failure)***
- ***11.3 percent for pneumonia***
- ***9.2 percent for digestive system complications (e.g., gastrointestinal bleeding)***

Table 3. Top Ten Conditions (Index Hospitalizations) for Patients who had a Readmission within 30 Days, 2010

All Index Hospitalizations[1]		Was the Index Hospitalization[1] followed by a Readmission?							
		No		Yes					
		Patients without Readmission		Patients with Readmission for Any Reason			Patients with Readmission for Complication/Infection		
Principal Reason for Admission[2]	Total Number of Index Hospital Stays	Number of Index Hospital Stays	Average Length of Stay for the Index Stay	Number of Index Hospital Stays	Percent of Total Index Hospital Stays with a Readmission	Average Length of Stay for the Index Stay	Number of Index Hospital Stays	Percent of Total Index Hospital Stays with a Readmission	Average Length of Stay for the Index Stay
Total Cases[3]	***1,126,712***	***974,859***	***4.0***	***151,853***	***13.5%***	***5.6***	***62,875***	***5.6%***	***6.2***
Heart failure	36,329	27,483	5.0	8,846	24.3%	5.8	3,063	8.4%	6.2
Medical	33,378	25,145	4.7	8,233	24.7%	5.3	2,799	8.4%	5.7
Surgical	2,951	2,338	7.4	613	20.8%	11.6	264	8.9%	10.9
Mental health disorders	49,115	42,582	7.0	6,533	13.3%	8.1	697	1.4%	9.4
Medical	48,914	42,411	7.0	6,503	13.3%	8.1	689	1.4%	9.4
Surgical	190	161	7.8	29	15.3%	19.0	8	4.2%	4.1
Abnormal heartbeat	50,482	43,956	3.3	6,526	12.9%	4.2	3,532	7.0%	4.3
Medical	38,842	33,697	3.0	5,145	13.2%	3.9	2,774	7.1%	3.9
Surgical	11,640	10,259	4.1	1,381	11.9%	5.7	758	6.5%	5.7
Primary cancer	33,651	27,710	4.9	5,941	17.7%	7.0	2,665	7.9%	7.8
Medical	6,550	4,171	5.5	2,379	36.3%	5.7	671	10.2%	6.8
Surgical	27,100	23,538	4.7	3,562	13.1%	7.8	1,994	7.4%	8.1
Chronic obstructive pulmonary disease (COPD)	28,559	22,781	4.3	5,778	20.2%	5.2	2,100	7.4%	5.6
Medical	28,034	22,396	4.2	5,638	20.1%	4.9	2,030	7.2%	5.3
Surgical	525	385	10.0	140	26.7%	14.2	70	13.3%	13.6
Coronary (heart) artery disease and chest pain	50,497	44,776	2.6	5,721	11.3%	3.5	1,739	3.4%	4.5
Medical	31,031	27,518	1.9	3,513	11.3%	2.7	930	3.0%	2.9
Surgical	19,466	17,258	3.6	2,208	11.3%	4.9	809	4.2%	6.4
Pneumonia	30,773	25,850	4.9	4,923	16.0%	6.3	2,549	8.3%	6.7
Medical	29,902	25,155	4.8	4,747	15.9%	6.1	2,449	8.2%	6.3
Surgical	871	695	11.7	176	20.2%	14.1	100	11.5%	16.2
Septicemia	22,084	17,440	7.2	4,644	21.0%	9.2	2,944	13.3%	9.5
Medical	19,316	15,385	6.5	3,931	20.4%	8.1	2,482	12.8%	8.2
Surgical	2,768	2,055	13.1	713	25.8%	15.5	462	16.7%	16.2
Pregnancy and related disorders	129,887	125,361	2.7	4,526	3.5%	3.2	943	0.7%	3.3
Medical	87,560	83,943	2.3	3,617	4.1%	2.9	506	0.6%	2.5
Surgical	42,327	41,418	3.5	909	2.1%	4.1	437	1.0%	4.2
Intestinal inflammation	31,431	27,077	4.5	4,354	13.9%	5.8	1,616	5.1%	7.0
Medical	24,530	21,117	3.7	3,413	13.9%	4.6	997	4.1%	5.0
Surgical	6,896	5,955	7.2	941	13.6%	10.1	619	9.0%	10.2

[1] Index hospitalizations are the beginning point for examining readmissions. They include any inpatient discharge in 2010 that does not have another discharge (i.e., a prior index hospitalization) within the previous 30 days.

[2] Principal reasons for admission are categorized according to patients' principal diagnoses and are based on the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS). For this display, a hospitalization is further categorized as a medical or surgical case based on the Diagnosis-Related Group (DRG) to which it is assigned. Cases assigned to surgical DRGs include those procedures likely to be performed in an operating room. For some cases, the DRG type is unknown ("ungroupable") and the case is categorized to neither a medical nor surgical subgroup. Ungroupable hospitalizations are included in the total for each condition; therefore, the sum of the medical and surgical categories may not add up to the total volume for a given condition.

[3] Calculations for Total Cases include all cases, not just cases included in the top ten reasons for admission.

Reasons for Readmissions

Table 4 presents information about the readmissions themselves for the same ten procedures displayed in Table 3. Shown for each of these conditions are the five most frequent reasons for their readmissions. The table shows, for example, patients hospitalized initially for heart failure (the condition with the largest number of readmissions) were readmitted most frequently for heart failure again (accounting for 37.7% of the readmissions). On average, the hospital stay for these readmissions was 5.8 days, and 4.4% of the readmitted patients died.

Table 4. Most Frequent Reasons for Readmissions within 30 Days, 2010
The top five reasons for readmission are shown for each category.

Principal Reason for Index Hospitalization[1,2]	Readmission				
	Reason for Readmission[2]	Number of Readmissions	Percent of Readmissions	Average Inpatient Mortality Rate for the Readmissions	Average Length of Stay for the Readmissions
Heart failure	Heart failure	3,332	37.7%	4.4%	5.8
	Abnormal heartbeat	503	5.7%	4.6%	5.1
	Acute kidney failure	444	5.0%	6.1%	6.4
	Coronary (heart) artery disease and chest pain	300	3.4%	2.7%	4.4
	Chronic obstructive pulmonary disease (COPD)	265	3.0%	1.9%	5.6
	Other	4,002	45.2%	7.1%	6.4
	Total	*8,846*	*100.0%*	*5.6%*	*6.0*
Mental health disorders	Mental health disorders	4,289	65.7%	0.1%	10.0
	Poisoning by drugs/other substances	260	4.0%	0.8%	2.7
	Alcohol/substance abuse disorders	201	3.1%	0.0%	4.8
	Coronary (heart) artery disease and chest pain	111	1.7%	0.9%	2.4
	Abnormal heartbeat	92	1.4%	0.0%	3.9
	Other	1,580	24.2%	2.6%	5.0
	Total	*6,533*	*100.0%*	*0.8%*	*8.1*
Abnormal heartbeat	Abnormal heartbeat	1,965	30.1%	0.9%	3.7
	Heart failure	592	9.1%	2.5%	5.6
	Coronary (heart) artery disease and chest pain	309	4.7%	0.6%	3.6
	Pneumonia	177	2.7%	4.5%	5.6
	Septicemia	155	2.4%	21.3%	7.2
	Other	3,328	51.0%	3.7%	5.3
	Total	*6,526*	*100.0%*	*3.0%*	*4.8*
Primary cancer	Primary cancer	1,411	23.8%	6.8%	6.8
	Complication of surgical procedure or medical care	927	15.6%	1.6%	5.8
	Secondary cancer	360	6.1%	8.6%	6.0
	Septicemia	252	4.2%	23.4%	7.5
	Acute kidney failure	173	2.9%	8.7%	6.6
	Other	2,818	47.4%	4.6%	5.4
	Total	*5,941*	*100.0%*	*5.8%*	*5.9*
Chronic obstructive pulmonary disease (COPD)	Chronic obstructive pulmonary disease (COPD)	1,946	33.7%	1.4%	5.4
	Pneumonia	440	7.6%	5.0%	6.9
	Respiratory failure (adult)	387	6.7%	11.6%	6.8
	Heart failure	322	5.6%	3.1%	5.7
	Asthma	191	3.3%	2.1%	5.0
	Other	2,492	43.1%	4.6%	5.8
	Total	*5,778*	*100.0%*	*3.9%*	*5.8*

[1] Index hospitalizations are the beginning point for examining readmissions. They include any inpatient discharge in 2010 that does not have another discharge (i.e., a prior index hospitalization) within the previous 30 days.

[2] Principal reasons for admission are categorized according to patients' principal diagnoses and are based on the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS).

For all ten conditions in Table 4, the most common reason for readmission was the same as the initial hospitalization.

Table 4. Most Frequent Reasons for Readmissions within 30 Days, 2010

The top five reasons for readmission are shown for each category.

Principal Reason for Index Hospitalization[1,2]	Readmission				
	Reason for Readmission[2]	Number of Readmissions	Percent of Readmissions	Average Inpatient Mortality Rate for the Readmissions	Average Length of Stay for the Readmissions
Coronary (heart) artery disease and chest pain	Coronary (heart) artery disease and chest pain	1,816	31.7%	0.4%	2.9
	Heart failure	329	5.8%	1.2%	4.6
	Abnormal heartbeat	321	5.6%	0.3%	3.6
	Complication of surgical procedure or medical care	269	4.7%	0.7%	5.5
	Heart attack	193	3.4%	6.7%	5.6
	Other	2,792	48.8%	1.6%	4.9
	Total	*5,721*	*100.0%*	*1.3%*	*4.2*
Pneumonia	Pneumonia	768	15.6%	6.9%	6.4
	Heart failure	403	8.2%	4.2%	5.7
	Chronic obstructive pulmonary disease (COPD)	345	7.0%	2.3%	5.4
	Septicemia	249	5.1%	20.5%	8.7
	Abnormal heartbeat	200	4.1%	6.0%	4.5
	Other	2,958	60.1%	5.8%	6.2
	Total	*4,923*	*100.0%*	*6.4%*	*6.2*
Septicemia	Septicemia	880	18.9%	15.0%	8.6
	Complication of device, implant, or graft	236	5.1%	3.8%	8.3
	Heart failure	220	4.7%	7.3%	6.0
	Urinary tract infection	214	4.6%	0.5%	5.4
	Pneumonia	211	4.5%	9.0%	7.1
	Other	2,883	62.1%	4.9%	6.5
	Total	*4,644*	*100.0%*	*6.8%*	*6.9*
Pregnancy and related disorders	Pregnancy and related disorders	4,125	91.1%	<0.1%	3.6
	Mental health disorders	75	1.7%	0.0%	4.5
	Gallbladder disease and bile duct disorders	64	1.4%	0.0%	2.3
	Complication of surgical procedure or medical care	27	0.6%	0.0%	3.1
	Other urinary system diseases and symptoms	15	0.3%	0.0%	2.5
	Other	219	4.8%	0.0%	3.0
	Total	*4,526*	*100.0%*	*<0.1%*	*3.5*
Intestinal inflammation	Intestinal inflammation	1,231	28.3%	0.8%	6.2
	Complication of surgical procedure or medical care	369	8.5%	0.8%	6.8
	Intestinal obstruction	152	3.5%	2.0%	7.1
	Intestinal infection	143	3.3%	3.5%	6.2
	Septicemia	131	3.0%	14.5%	8.7
	Other	2,328	53.5%	2.4%	5.3
	Total	*4,354*	*100.0%*	*2.2%*	*5.8*

[1] Index hospitalizations are the beginning point for examining readmissions. They include any inpatient discharge in 2010 that does not have another discharge (i.e., a prior index hospitalization) within the previous 30 days.

[2] Principal reasons for admission are categorized according to patients' principal diagnoses and are based on the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS).

Medicare Fee-for-Service Payments

Table 5 displays the top ten conditions with the largest number of readmissions for Medicare fee-for-service (FFS) patients. Readmission rates and Medicare FFS payments for the index hospitalizations and their corresponding readmissions are shown. Average payments are for 2009 (the most recent payment data available to PHC4).

Table 5. Average Medicare Fee-for-Service Payments for the Top Ten Reasons for Admission of Patients who were Readmitted for Any Reason within 30 Days, 2009

Index Hospitalization			Readmission			
			For Any Reason		For Complication or Infection	
Principal Reason for Admission[1]	Number of Index Hospital Stays[2] - Medicare FFS	Average Medicare FFS Payment for Index Hospital Stay[3]	Percent Readmitted	Average Medicare FFS Payment[3]	Percent Readmitted	Average Medicare FFS Payment[3]
Total Cases[4]	***301,887***	***$7,810***	***17.5%***	***$9,416***	***8.0%***	***$10,313***
Heart failure	17,398	$7,565	24.3%	$9,891	8.9%	$11,017
Abnormal heartbeat	19,637	$7,011	15.2%	$9,062	8.1%	$9,323
Chronic obstructive pulmonary disease (COPD)	11,498	$5,417	21.1%	$8,053	8.0%	$9,846
Pneumonia	12,966	$6,214	17.0%	$8,939	9.2%	$9,787
Coronary (heart) artery disease and chest pain	15,216	$8,682	13.8%	$9,522	4.8%	$9,863
Primary cancer	8,988	$11,310	19.7%	$10,792	9.0%	$10,415
Septicemia	8,201	$11,396	21.3%	$9,770	14.0%	$10,948
Urinary tract infections	8,811	$4,858	18.3%	$8,232	10.0%	$9,096
Mental health disorders	9,402	$6,299	17.1%	$7,712	2.9%	$9,054
Complication of device, implant, or graft[5]	7,460	$12,593	19.9%	$12,079	12.4%	$13,056

[1] Principal reasons for admission are categorized according to patients' principal diagnoses and are based on the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS).

[2] For this analysis, index hospitalizations were from January 2009 through November 2009 so that readmissions occurring within 30 days could still be found in the calendar year 2009 payment data (the most recent data available to PHC4).

[3] Medicare Fee-for-Service (FFS) was assigned as the payer for the hospitalization when the payment value was greater than the Medicaid FFS payment (if present), when the payment was greater than zero, when the primary payer listed in the discharge record was Medicare FFS, and when the payer (Medicare FFS) indicated there was no other primary payer (i.e., no payment was made by another primary payer).

[4] Calculations for Total Cases include all cases, not just the cases included in the top ten reasons for admission.

[5] Principal reasons for admission in this category include conditions such as complications of orthopedic and cardiac devices, implants and grafts along with complications related to vascular devices and urinary catheters.

- Overall, 17.5% of Medicare FFS patients were readmitted for any reason within 30 days; 8.0% were readmitted for a complication or infection.
- Medicare FFS patients hospitalized for heart failure had the highest number of readmissions for any reason, accounting for a rate of 24.3%. These patients had an 8.9% rate of readmission for complication or infection.
- For many conditions, the average Medicare FFS payment for the readmissions was larger than the average payment for the index hospitalizations.

Medicaid Fee-for-Service Payments

Table 6 displays the top ten conditions with the largest number of readmissions for Medicaid fee-for-service (FFS) patients. Readmission rates and Medicaid FFS payments for the index hospitalizations and their corresponding readmissions are shown. Average payments are for 2009 (the most recent payment data available to PHC4).

Table 6. Average Medicaid Fee-for-Service Payments for the Top Ten Reasons for Admission of Patients who were Readmitted for Any Reason within 30 Days, 2009

Index Hospitalization			Readmission			
			For Any Reason		For Complication or Infection	
Principal Reason for Admission[1]	Number of Index Hospital Stays[2] - Medicaid FFS	Average Medicaid FFS Payment for Index Hospital Stay[3]	Percent Readmitted	Average Medicaid FFS Payment[3]	Percent Readmitted	Average Medicaid FFS Payment[3]
Total Cases[4]	***49,202***	***$5,992***	***10.9%***	***$6,822***	***3.7%***	***$8,889***
Mental health disorders	4,142	$3,426	12.1%	$3,913	0.5%	$5,485
Pregnancy and related disorders	12,206	$3,174	3.7%	$3,232	0.7%	$3,010
Primary cancer	924	$11,140	20.7%	$7,448	6.5%	$7,341
Heart failure	764	$8,761	23.8%	$9,319	7.6%	$10,506
Diabetes mellitus	1,131	$5,909	14.4%	$6,453	4.7%	$7,756
Coronary (heart) artery disease and chest pain	1,274	$7,393	12.7%	$8,324	4.4%	$8,161
Chronic obstructive pulmonary disease (COPD)	875	$5,837	17.8%	$7,586	5.9%	$10,618
Septicemia	802	$10,433	18.5%	$9,567	13.3%	$9,849
Intestinal inflammation	936	$6,348	15.4%	$6,167	5.2%	$7,176
Pneumonia	1,196	$6,516	11.9%	$7,319	5.5%	$8,928

[1] Principal reasons for admission are categorized according to patients' principal diagnoses and are based on the Agency for Healthcare Research and Quality's Clinical Classifications Software (CCS).

[2] For this analysis, index hospitalizations were from January 2009 through November 2009 so that readmissions occurring within 30 days could still be found in the calendar year 2009 payment data (the most recent data available to PHC4).

[3] Medicaid Fee-for-Service (FFS) was assigned as the payer for the hospitalization when the payment value was greater than the Medicare FFS payment (if present), when the payment was greater than zero, and when the payer (Medicaid) indicated the primary payer was Medicaid FFS. Note that for the readmitted Medicaid FFS patients, 58.3% of the readmissions for any reason (57.6% of the readmissions for a complication or infection) were linked to Medicaid FFS payments and could be included in the average Medicaid payment figures for the readmission hospitalizations.

[4] Calculations for Total Cases include all cases, not just the cases included in the top ten reasons for admission.

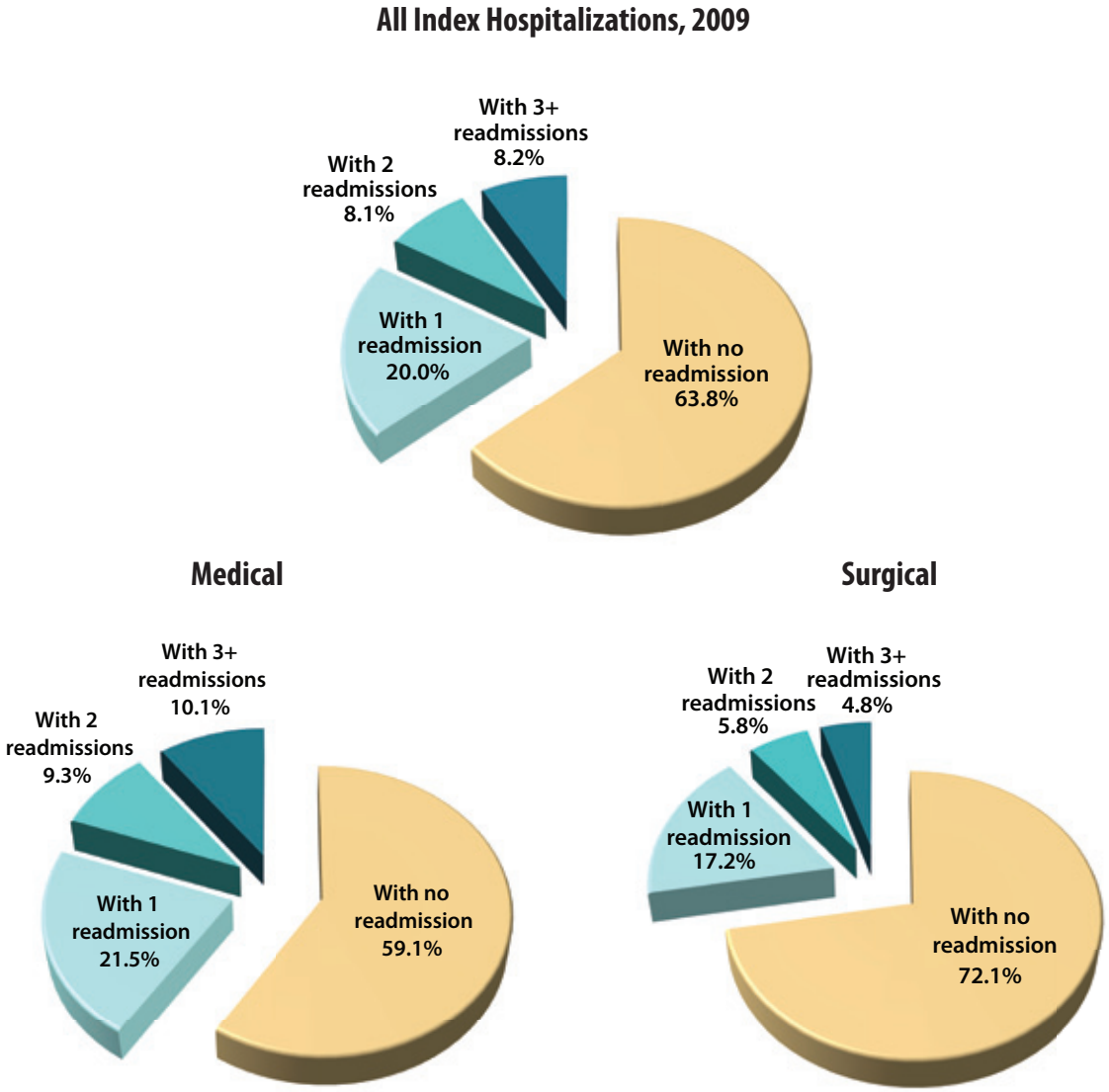
- Overall, 10.9% of Medicaid FFS patients were readmitted for any reason within 30 days; 3.7% were readmitted for a complication or infection.
- Medicaid FFS patients hospitalized for mental health disorders had the highest number of readmissions for any reason, accounting for a rate of 12.1%. These patients had a 0.5% rate of readmission for complication or infection.
- For many conditions, the average Medicaid FFS payment for the readmissions was larger than the average payment for the index hospitalizations.

Note: Differences in the approaches used by Medicare FFS and Medicaid FFS payers for determining payments (that is, the DRG Grouper Versions used by each) may account for some of the variation seen across these payers for a given condition.

Multiple Readmissions

Figure 1 shows the frequency of repeat hospitalizations within a year following initial discharge (in 2009).

Figure 1. Multiple Hospitalizations for Any Reason within One Year of Initial Discharge

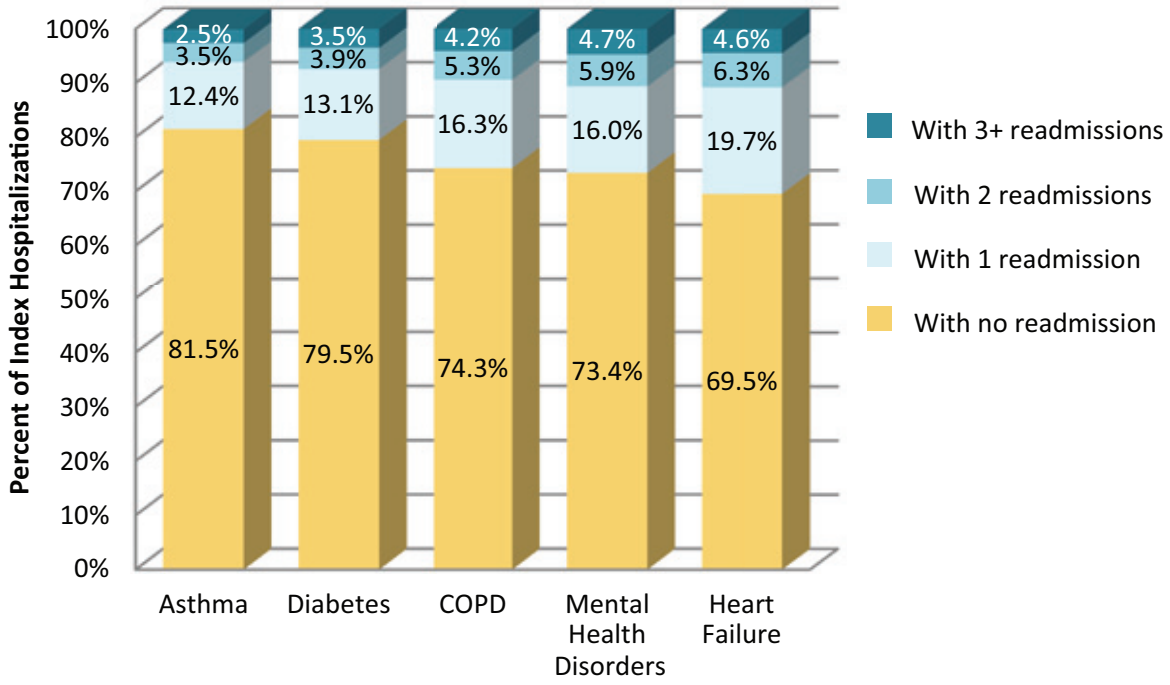


- On average, over 36.2% of patients hospitalized in 2009 were rehospitalized at least once for any reason within a one-year period.
- Of the cases treated medically in 2009, 40.9% involved multiple hospitalizations over a year, compared to 27.9% of cases treated surgically.

Multiple Readmissions

Repeat hospitalization for the treatment of chronic conditions has become a topic of significant interest in recent years, especially as many such readmissions might be considered preventable. Figure 2 shows the extent of repeat hospitalizations for the same condition for the treatment of five chronic conditions with a high number of readmissions: asthma, diabetes, mental health disorders, chronic obstructive pulmonary disease (COPD) and heart failure.

Figure 2. Common Chronic Conditions with a High Number of Readmissions for the Same Condition within One Year of Initial Discharge, 2009

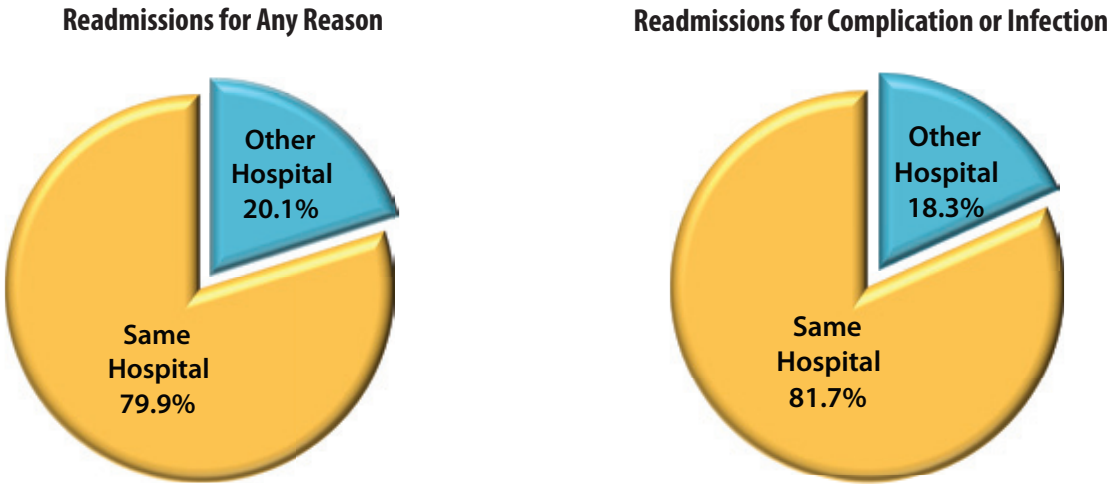


- Patients hospitalized for heart failure had the highest rate, at 30.5%, of repeat hospitalizations (having at least two or more stays for heart failure) within one year.
- Among these chronic conditions, patients hospitalized for mental health disorders had the highest rate, at 4.7%, of being hospitalized four or more times for their disorder.

Location of Readmission

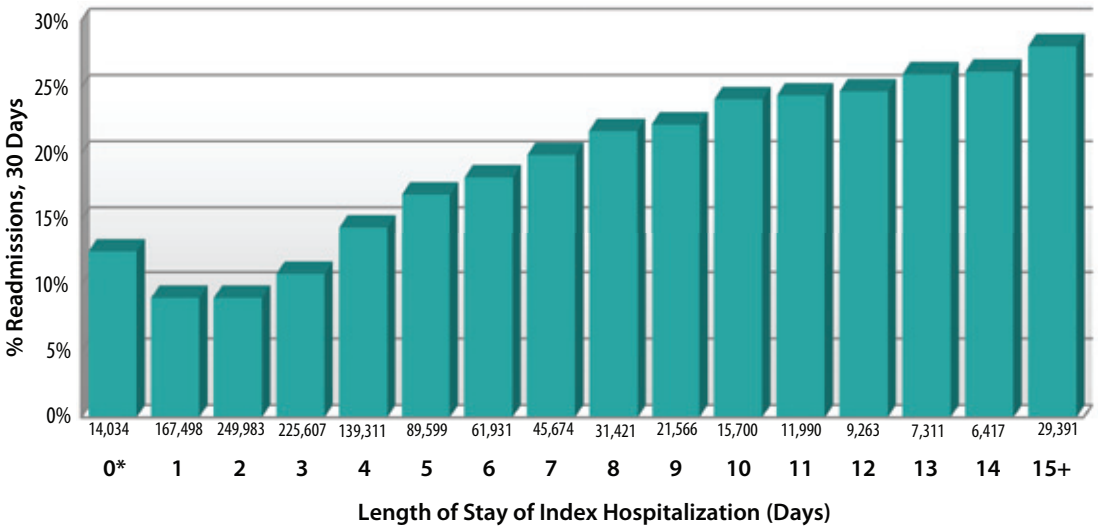
Figure 3 shows how often readmitted patients return to the original hospital or another hospital.

Figure 3. Location of Readmission within 30 Days, 2010



- Four out of every five cases (79.9%) that were readmitted for any reason returned to the same hospital where initial treatment was received.
- This percentage was slightly higher (81.7%) for cases readmitted for a complication or infection.

Figure 4. 30-Day Readmission Rate by Length of Stay of the Index Hospitalization, 2010

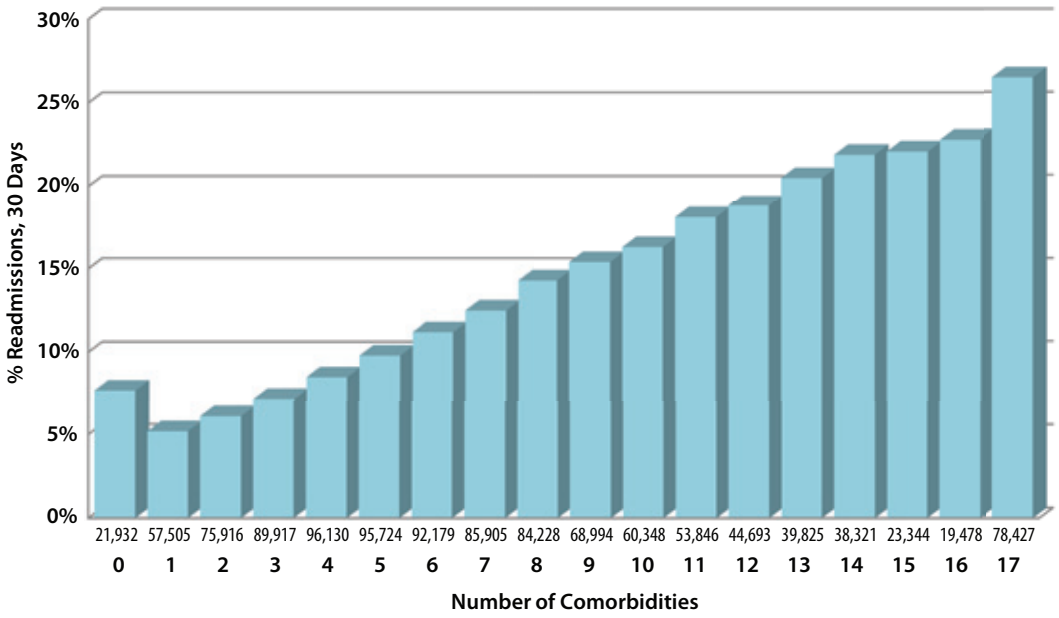


* A length of stay of zero days represents discharges that were admitted and discharged on the same day.

Note: In the graph above, the volume of index hospitalizations (used as the denominator in the calculation of the readmission rate) is displayed directly below each bar.

- Generally, the risk of readmission increased with the length of the index hospital stay. The higher rate of readmission for patients who were admitted and discharged on the same day (i.e., the length of stay was zero days) was atypical of this predominant pattern.
- The rate of readmission more than doubled (from 9.0% to 19.9%) when the length of stay of the index hospitalization increased from one to seven days and more than tripled (to 28.1%) when the stay increased to 15 or more days.

Figure 5. 30-Day Readmission Rate by Number of Comorbidities per Patient, 2010

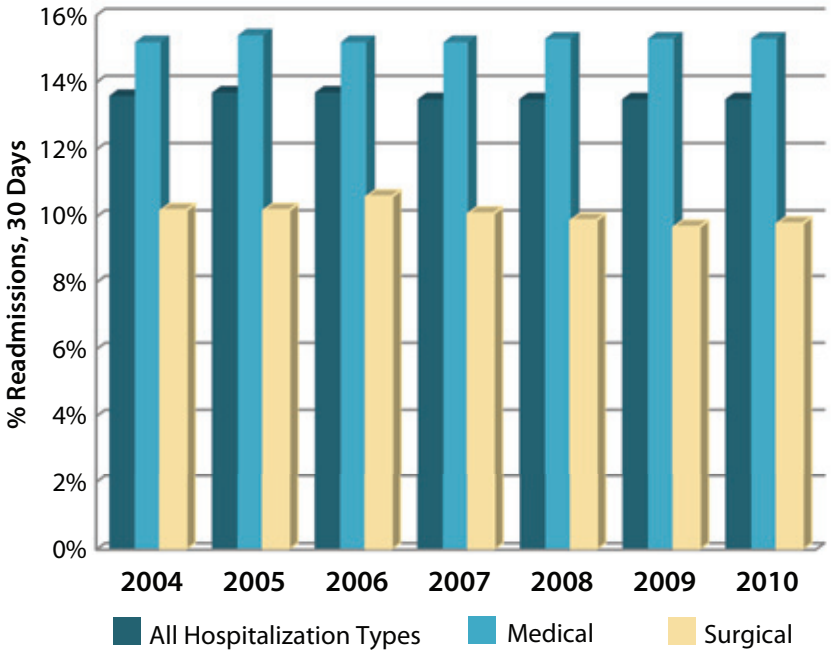


Note: In the graph above, the number of comorbidities corresponds to the patients' index hospitalizations, not their readmissions. The volume of index hospitalizations (used as the denominator in the calculation of the readmission rate) is displayed directly below each bar.

- Comorbidities are conditions that coexist with the principal diagnosis at the time of the patient's admission, that develop subsequently, or that affect the treatment and/or length of stay of the hospitalization. In the data that PHC4 collects, patient records are limited to a maximum of 17 comorbidities; however, in reality, a patient may have more than 17 comorbidities.
- In general, the 30-day readmission rate (for any reason) increased consistently with the number of patient comorbidities. The higher rate of readmission for patients with no comorbidities (that is, no additional conditions were coded in a patient's record) was atypical of this predominant pattern.
- The rate of readmission more than doubled (from 5.2% to 11.2%) when the number of comorbid conditions increased from one to six and nearly tripled (to 15.4%) when the number of comorbidities increased to nine.
- The 30-day readmission rate for patients with 17 comorbidities (26.5%) was more than five times greater than the rate for patients with a single comorbidity (5.2%).

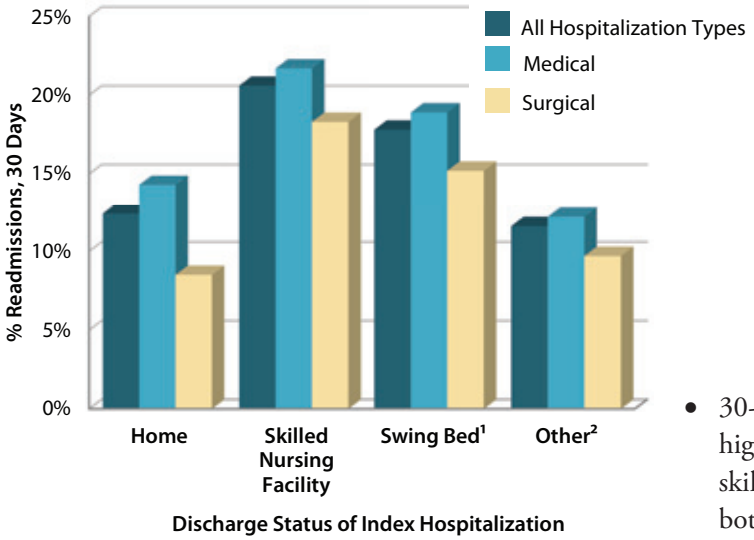
Rates of Readmission for Any Reason

Figure 6. 30-day Readmission Rate by Year, 2004 – 2010



- Yearly 30-day readmission rates (for any reason) showed little change from 2004 to 2010.
- Across this time, only marginal variations were seen, with surgical hospitalizations showing the most, albeit minimal, fluctuation.

Figure 7. 30-Day Readmission Rate by Discharge Status of the Index Hospitalization, 2010



Discharge Status	Number of Cases*		
	All Types	Medical	Surgical
Home	966,326	641,413	324,640
SNF	151,483	103,441	48,027
Swing Bed	2,454	1,749	705
Other	6,449	4,969	1,464

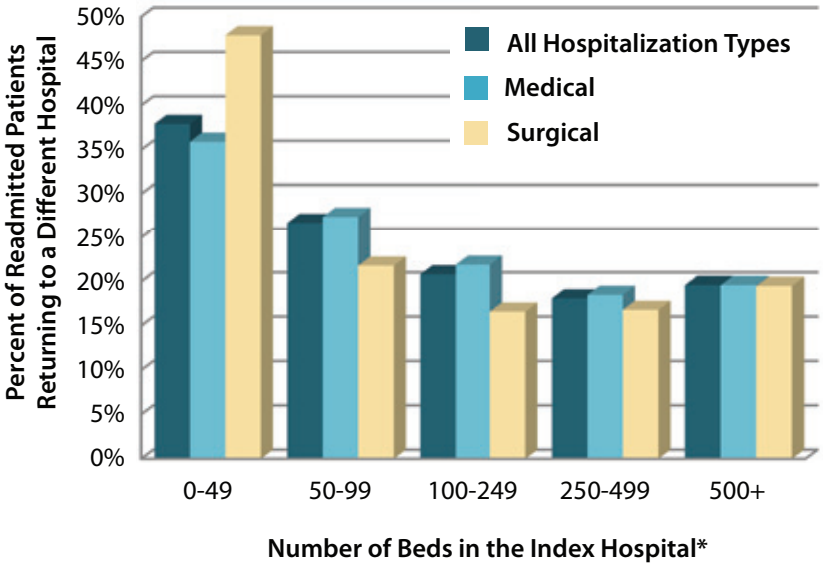
* The denominator in the calculation of the corresponding readmission rate.

[1] Beds in small, rural hospitals that can be used for either acute or Skilled Nursing Facility (SNF)-level care, on an as-needed basis.

[2] "Other" is comprised of discharges to court/law enforcement, designated cancer centers, children's hospitals, etc.

- 30-day readmission rates (for any reason) were highest for patients who were discharged to skilled nursing facilities. This was consistent for both medical and surgical hospitalizations.
- Patients discharged to skilled nursing facilities were 67.1% more likely to be readmitted (20.6% readmission rate for all types of hospitalizations) compared to patients discharged to home (12.4% readmission rate for all types of hospitalizations).

Figure 8. Percent of Readmitted Patients who Returned to a Different Hospital within 30 Days by Size of Index Hospital*, 2010



Number Hospital Beds	Number of Cases*		
	All Types	Medical	Surgical
0-49	19,635	14,201	5,428
50-99	41,622	32,969	8,648
100-249	386,833	274,327	112,425
250-499	343,560	223,725	119,772
500+	335,062	206,350	128,563

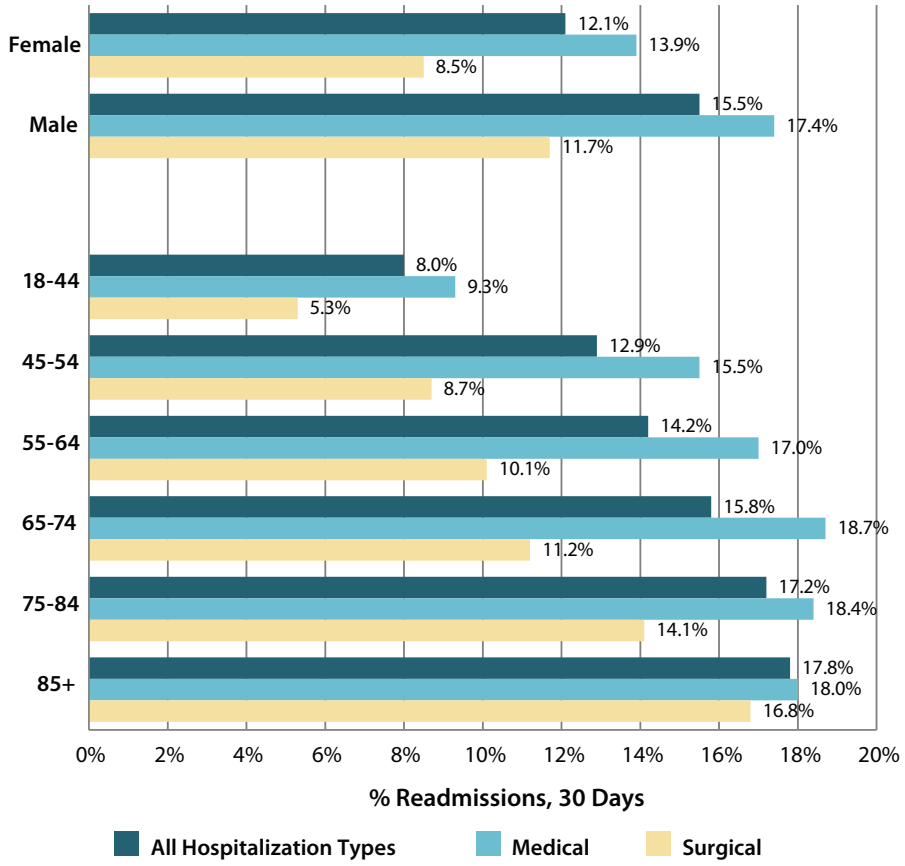
* The denominator in the calculation of the corresponding readmission rate.

* Index hospital is the facility that provided care during the patient's index hospitalization.

- Patients were more likely to be readmitted back to the original hospital rather than a different hospital, regardless of hospital size. This pattern was consistent for both medical and surgical hospitalizations.
- For patients treated initially at very small hospitals (less than 50 beds), 37.9% of those readmitted for any reason returned to a different hospital. This percentage differed for patients whose index hospitalizations were for medical versus surgical reasons: 47.9% of surgical patients and 35.9% of medical patients who were readmitted returned to a different hospital.
- There were minimal differences in the rates of returning to a different hospital between medium (100-249 beds), large (250-499), and very large (500+) hospitals.

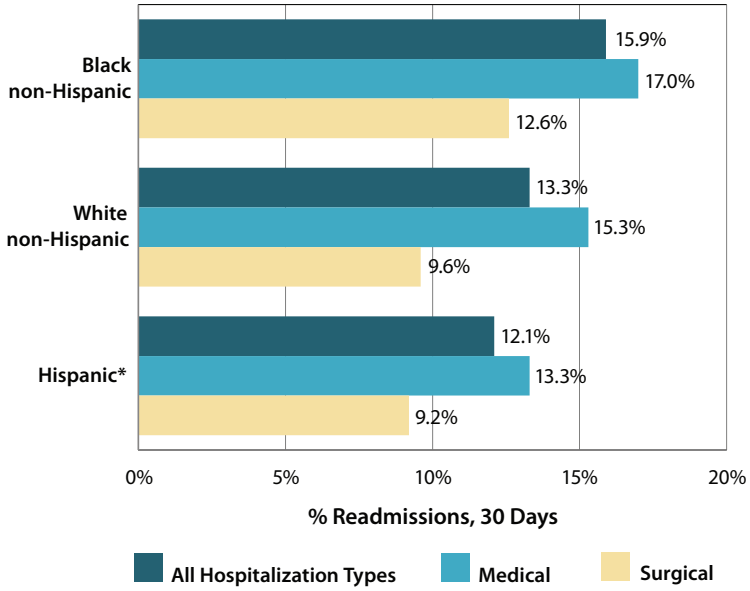
Information on the following pages shows the significance of gender, age, race/ethnicity, and payer on rates of readmission for any reason within 30 days.

Figure 9. 30-Day Readmission Rate by Gender and Age, 2010



- For all types of hospitalizations, rates of readmission for any reason were higher for males than females.
- Generally, readmission rates increased with age. However, the readmission rate for medical hospitalizations peaked for the 65-74 year group.
- Patients age 65-74 years were readmitted at a rate (15.8% for all types of hospitalizations) nearly twice that of patients age 18-44 years (8.0% for all types of hospitalizations).

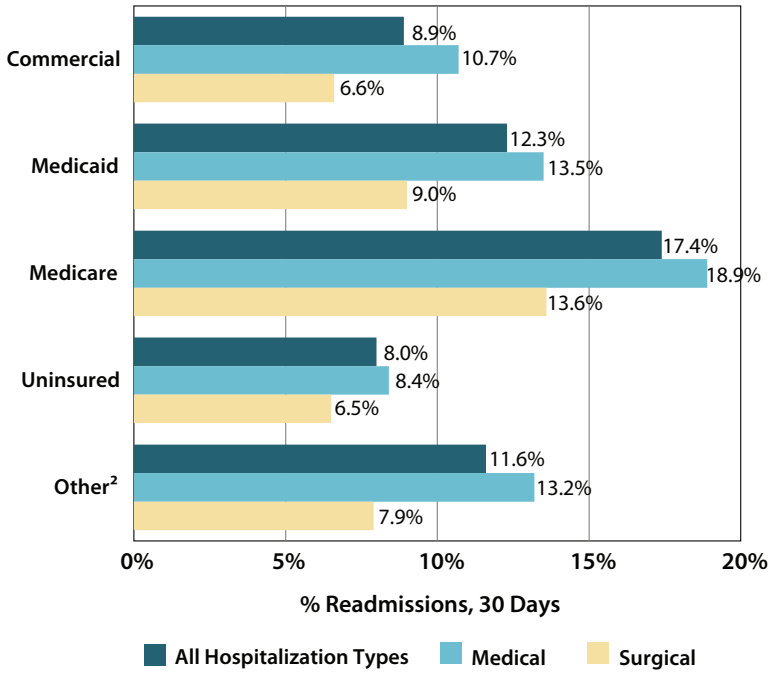
Figure 10. 30-Day Readmission Rate by Race/Ethnicity, 2010



- The black non-Hispanic category, which represented 13.0% of all index hospitalizations, had the highest rates of readmission for any reason.
- Rates of readmission were 31.1% higher among black non-Hispanic patients (15.9% readmission rate for all types of hospitalizations) than among the group with the lowest readmission rate, Hispanic patients (12.1% readmission rate for all types of hospitalizations).

* Internal PHC4 analysis suggests Hispanic ethnicity may be slightly underreported.

Figure 11. 30-Day Readmission Rate by Payer[1], 2010



- The Medicare category, which represented 47.3% of all index hospitalizations, was associated with the highest rates of readmission for any reason.
- Readmission rates were the lowest in the uninsured category.

[1] The payer was identified by the hospital in the discharge record as the anticipated payer and may not necessarily be the organization that ultimately paid the claim. Included in each category are all types of payer organizations such as health maintenance organizations (HMO), fee-for-service (FFS), preferred provider organizations (PPO), etc.

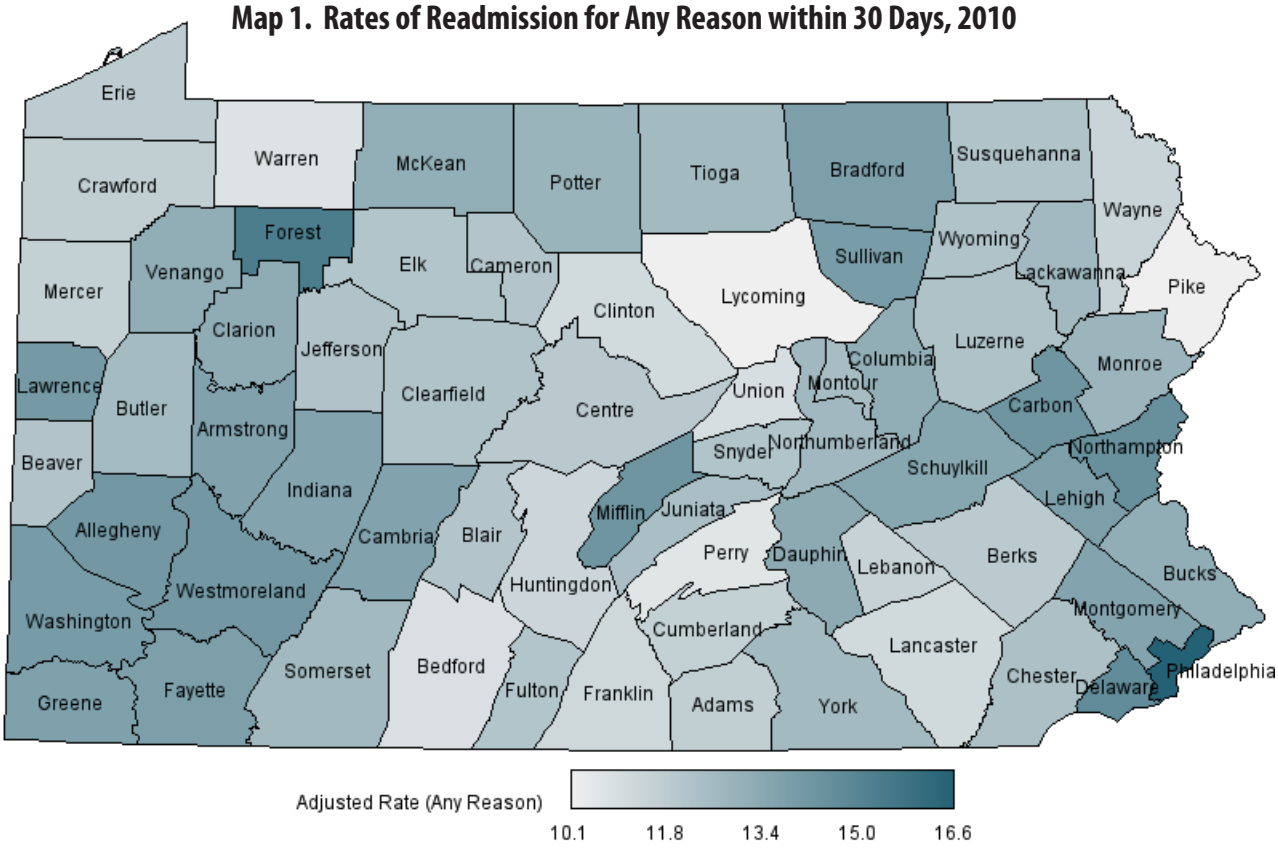
[2] Includes other government payers and hospitalizations in which the payer was unknown or the designation was invalid or missing.

Geographic Differences in Rates of Readmission

The county-level results shown in the following maps reflect the rates of readmission for any reason or specifically for a complication or infection (adjusted for age and sex differences) for patients living in the given county. The county rate does not represent the rate for any specific hospital within the county.

Age- and sex-adjusted rates of readmission for any reason varied from 10.1% to 16.6% (Map 1).

Map 1. Rates of Readmission for Any Reason within 30 Days, 2010

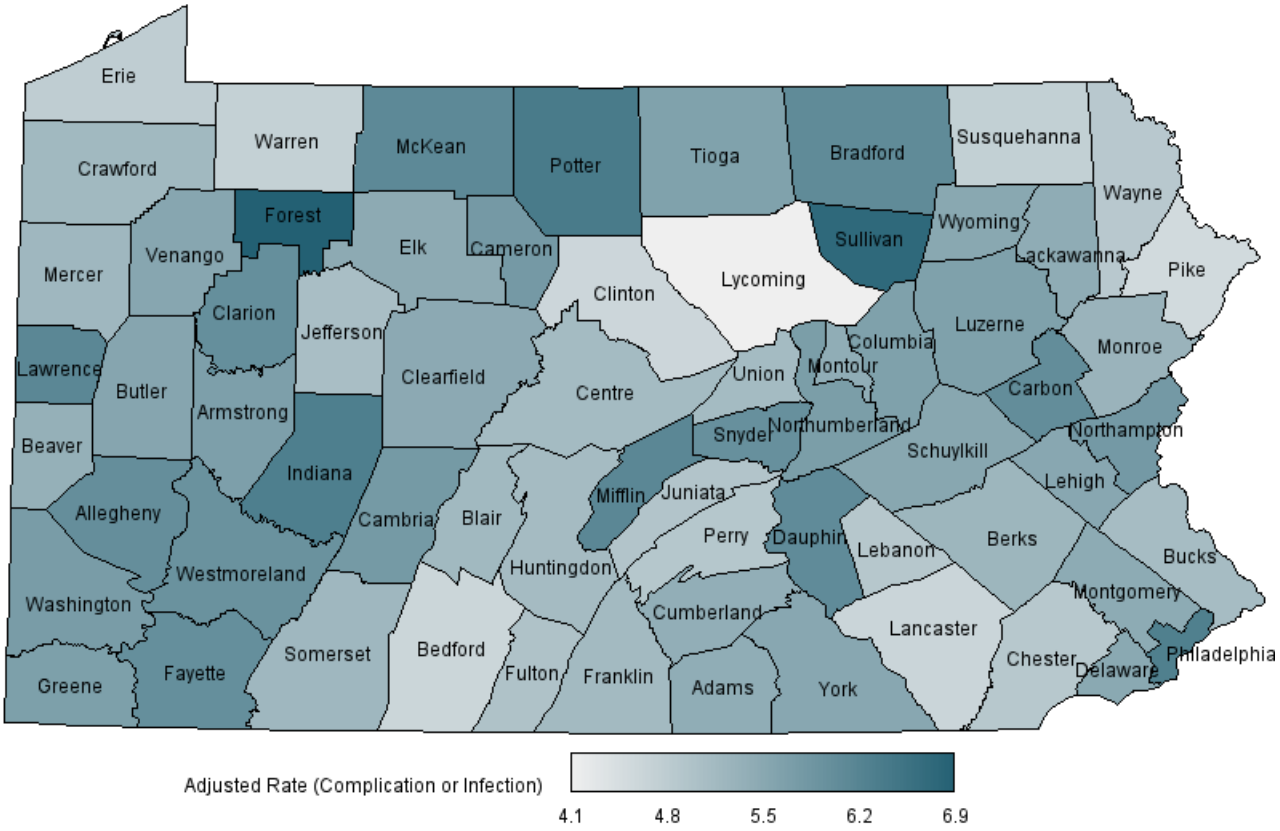


Note: County rates are adjusted for age and sex differences among the county residents hospitalized. Rates for counties with small volumes of hospitalizations are sensitive to small changes in the number of readmissions, so higher rates may be reflective of minor fluctuations in the number of readmissions.

Geographic Differences in Rates of Readmission

Age- and sex-adjusted rates of readmission for complication or infection varied from 4.1% to 6.9% (Map 2).

Map 2. Rates of Readmission for Complication or Infection within 30 Days, 2010



Note: County rates are adjusted for age and sex differences among the county residents hospitalized. Rates for counties with small volumes of hospitalizations are sensitive to small changes in the number of readmissions, so higher rates may be reflective of minor fluctuations in the number of readmissions.

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