

CHANGES IN 30-DAY READMISSION RATES FOR ACUTE MYOCARDIAL INFARCTION, HEART FAILURE, AND PNEUMONIA PATIENTS IN CALIFORNIA HOSPITALS, 2007-2013

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EXECUTIVE SUMMARY

Mandated by the Patient Protection and Affordable Care Act (ACA), the Centers for Medicare and Medicaid Services (CMS) initiated the Hospital Readmission Reduction Program (HRRP) in October 2012 to reduce Medicare reimbursements to hospitals with excess 30-day readmissions for acute myocardial infarction (AMI), heart failure (HF), and pneumonia (PN) among their Medicare patients. Few studies have characterized the impact of this historic health policy shift on readmissions within states, prompting the Office of Statewide Health Planning and Development (OSHPD) to take a closer look at California hospitals' early response to CMS' HRRP for all, not only Medicare patients.

Key Findings

- Hospital readmission rates for patients admitted with AMI (heart attack) fell by nearly 12% from 2007 to 2013 while readmissions for HF and PN patients declined 6% and 4%, respectively.
- During the same period, the initial average hospital length of stay (LOS) for these three types of patients decreased by one-half day, so shorter hospital stays did not result in increased readmissions.
- The median charge increased by 32% (AMI), 40% (HF), and 39% (PN). Cost or claims data, and adjustments for inflation, are needed to confirm cost changes and to better understand net care costs factoring in reduced LOS, 30-day readmissions, and changes in care delivery.
- Readmissions decreased for both men and women and substantial declines were seen among White/Non-Hispanic, Hispanic, and Black patients across all three health conditions.
- Decreases in readmissions were seen with Medicare-eligible patients 65 years of age and older across all three health conditions, while patients under 65 had less consistent results with decreases for AMI and HF but an increase for PN.
- Reduced readmissions were seen in both Medicare and privately insured patients across the three conditions. However, the largest decreases

were seen in privately insured patients with AMI and PN.

- The principal reasons for readmission were generally consistent from 2007 to 2013, however, the frequency of sepsis as the principal cause for readmission doubled for each of the three conditions, reaching nearly 11% in 2013 for PN patients.

INTRODUCTION

The Patient Protection and Affordable Care Act (ACA), passed in March of 2010, mandated that the Centers for Medicare and Medicaid Services (CMS) establish the Hospital Readmissions Reduction Program (HRRP) requiring CMS to reduce payment to hospitals with excess readmissions. Beginning October 1, 2012, CMS began to reduce Medicare payment reimbursements to hospitals with excess 30-day unplanned readmissions with acute myocardial infarction (AMI), heart failure (HF), and pneumonia (PN). Readmissions are costly to society, patients, and their families, and many are preventable with better inpatient care and improved coordination and communication of care after discharge from the hospital. Hospitals were given over two years to address excessive preventable readmissions in their hospitals before the HRRP began reimbursement reductions in late 2012, where excess is defined as “a measure of a hospital's readmission performance compared to the national average for the hospital's set of patients with that applicable condition.”¹

CMS studies that have evaluated the initial impact of the HRRP on readmissions report that 30-day all-cause readmission rates for Medicare patients decreased in 2012 and continued to decrease in the first eight months of 2013 following unchanged rates from 2007 to 2011.^{2,3} This prompted the Office of Statewide Health Planning and Development (OSHPD) to investigate the early impacts of the HRRP on 30-day readmission rates among all patients admitted to California hospitals with the goal of understanding whether the benefits of the HRRP extended beyond the Medicare population and whether readmission rates among certain demographic groups were disproportionately impacted.

The aims of this report were 1) to document any changes over time in 30-day all-cause readmission rates for the three conditions; 2) to assess whether any changes in readmission rates differed by patient characteristics, such as race and age, and by insurance status; 3) to understand if changes in hospital readmission rates were associated with changes in the initial hospital length of stay (LOS) of patients; 4) to ascertain the top ten reasons for AMI, HF, and PN readmissions across the state of California and observe any change over time; and 5) to stimulate new policy discussions. Though decreases in readmission rates were expected for the Medicare population based on previous results elsewhere,^{2,3} this study explored the impact of federal Medicare reimbursement policies stimulating decreases for other patients for all payer types as well. This report covers all patients admitted to all California-licensed acute care hospitals for AMI, HF, or PN from 2007 to 2013.⁴

PATIENT POPULATION

An initial admission was defined as the first hospitalization for a patient in the calendar year for any one of the three conditions. A patient could have only one initial admission per year for each condition, though it is possible for a single patient to have initial admissions for

more than one condition. A readmission was defined as the first re-hospitalization, for any reason, within 30 days of discharge of the initial admission in the same calendar year. All in-hospital deaths, transfers to other acute care facilities, and discharges against medical advice were excluded from analyses.

There were a total of 259,535 initial admissions for AMI, 410,070 for HF, and 418,421 for PN during the study period (Table 1). Initial admissions increased slightly from 36,097 in 2007 to 38,165 in 2013 for AMI; decreased slightly from 60,589 in 2007 to 57,631 in 2013 for HF; and decreased even more for PN, from 63,767 in 2007 to 52,222 in 2013.

For each condition, the majority of patients were 65 years of age and older, White/Non-Hispanic, and insured by Medicare. For all three conditions, average patient age across the time period ranged from approximately 68 to 73 years; approximately 54% to 64% were White/Non-Hispanic; and 56% to 71% were Medicare-insured.

Average initial length of stay (LOS) decreased 0.5 days, on average, across all three conditions over the study period. Median charges for the initial admission, un-

Table 1. Patient Characteristics of AMI, HF, and PN Hospitalizations in 2007 and 2013

	AMI		HF		PN	
	2007	2013	2007	2013	2007	2013
Initial Admissions	36,097	38,165	60,589	57,631	63,767	52,222
Readmissions	5,801	5,403	11,648	10,373	8,974	7,039
Average Age (years)	68.7	68.4	73	72.7	70.6	70.9
65 Years and Older	60.2%	59.7%	73.1%	71.1%	67.9%	67.8%
Female	39.2%	37.2%	50.7%	47.9%	52.3%	51.9%
Race/Ethnicity						
White, Non-Hispanic	64.5%	57.8%	58.1%	54.1%	64.2%	59.2%
Hispanic	15.8%	20.0%	18.1%	20.7%	16.5%	20.5%
Asian/Pacific Islander	8.1%	9.9%	7.9%	9.1%	8.1%	9.4%
Black	6.7%	7.4%	13.0%	12.6%	8.3%	7.8%
Native American	0.2%	0.3%	0.2%	0.3%	0.3%	0.3%
Other	4.7%	4.6%	2.7%	3.3%	2.6%	2.9%
Payer Type						
Medicare	56.5%	58.1%	71.3%	71.3%	67.8%	69.5%
Medi-Cal	7.4%	8.5%	10.9%	11.5%	11.2%	11.8%
Private	28.5%	23.8%	12.5%	10.3%	16.2%	13.0%
Self	3.5%	4.3%	2.5%	2.9%	2.2%	2.1%
Other	4.1%	5.4%	2.8%	4.0%	2.6%	3.5%
Average Initial Length of Stay (days)	5.2	4.6	4.9	4.6	5.4	4.8
Median Charge	\$73,262	\$96,341	\$32,856	\$46,059	\$31,273	\$43,364

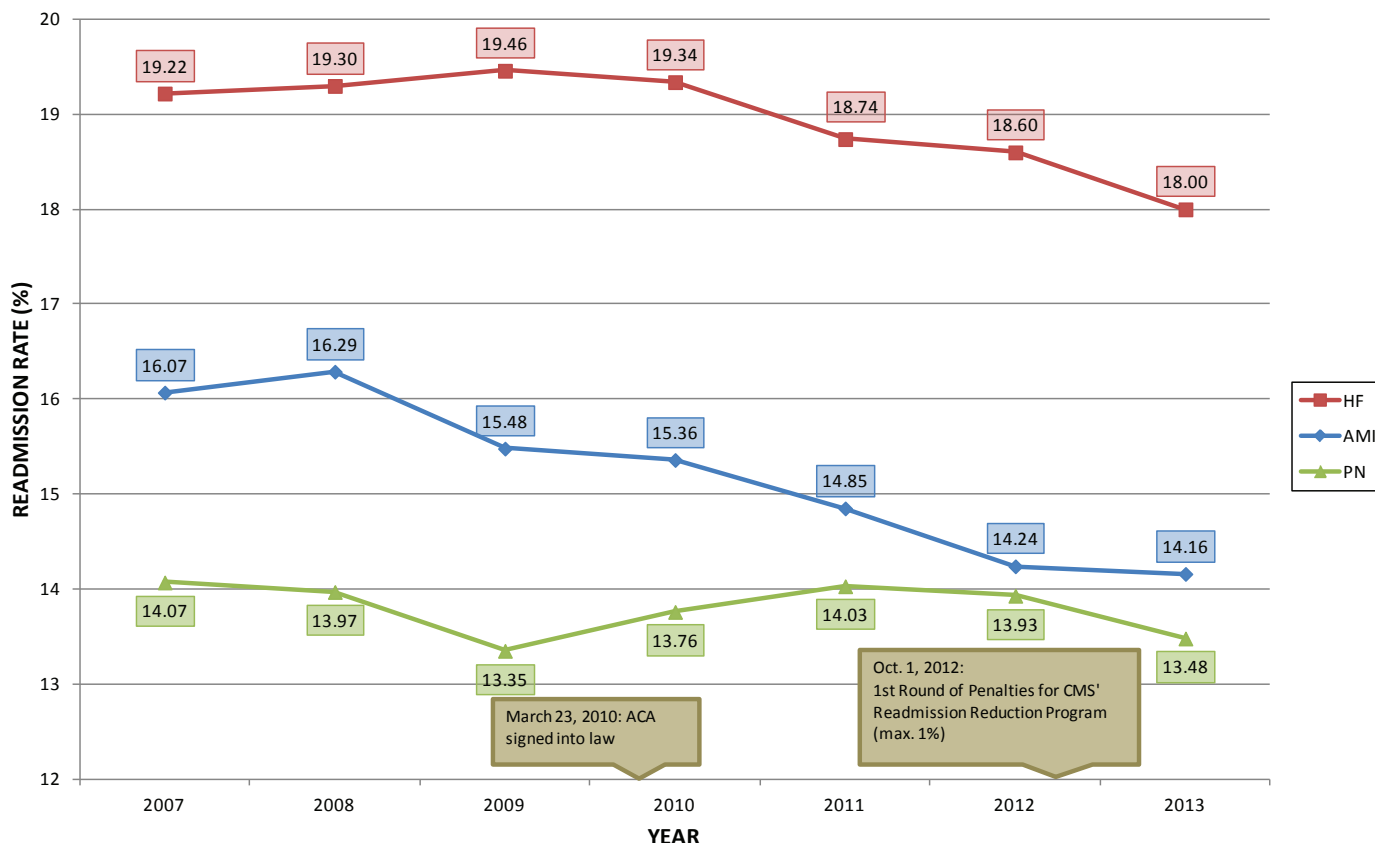
adjusted for inflation, increased by more than 30% (\$23,079 for AMI; \$13,203 for HF; \$12,091 for PN) for all three conditions from 2007 to 2013.

FINDINGS

From 2007 to 2013, statewide readmission rates for AMI and HF declined steadily, while the rate for PN declined only slightly with a generally flat trend over time (Figure 1). AMI readmission rates decreased by 11.9% from 16.1% in 2007 to 14.2% in 2013. HF readmission rates decreased by 6.3% from 19.2% in 2007 to 18.0% in 2013. Readmission rates for PN declined less (4.3%), from 14.1% in 2007 to 13.5% in 2013. From 2007 to 2010, the year in which the ACA was signed into law, readmission rates decreased 4.4% for AMI, increased 0.6% for HF, and decreased 2.2% for PN. From 2010 to 2013, the rate of decline was greater for AMI (7.8%) and HF (6.9%) and generally unchanged for PN (2.0%) compared to the prior period. Additional data after 2013 will be required to understand the additional impact, if any, of hospital penalties on readmission rates.



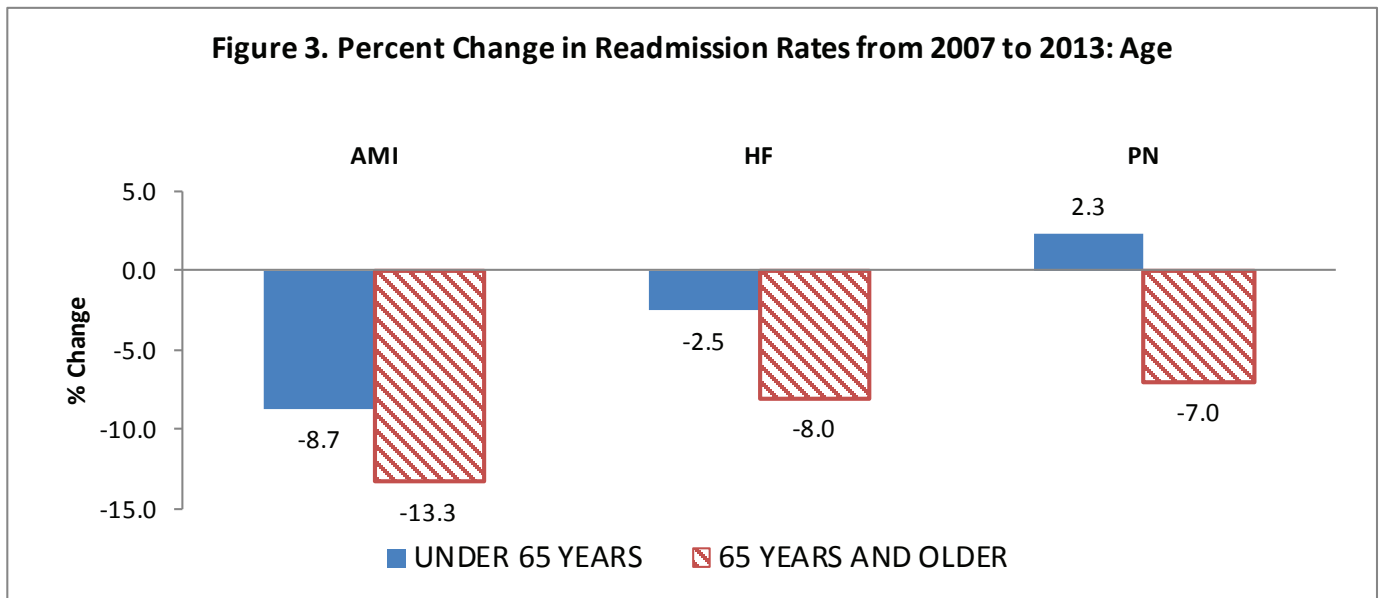
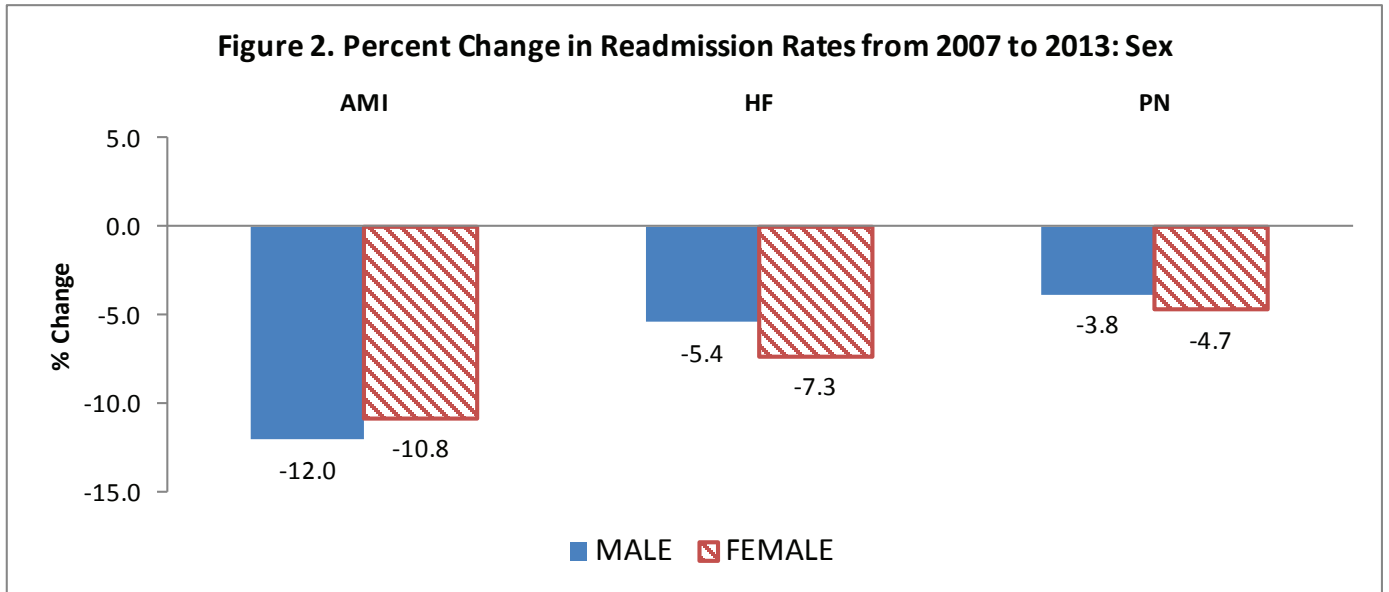
Figure 1. Statewide Readmission Rates, 2007-2013



Sex and Age

Decreases in readmission rates from 2007 to 2013 were observed for both sexes across all three conditions (Figure 2). Compared to females, males saw a slightly larger decrease in readmission rates for AMI (males 12.0% versus females 10.8%). On the other hand, females saw larger decreases in readmission rates compared to males for HF (females 7.3% vs. males 5.4%) and PN (females 4.7% vs. males 3.8%).

Large decreases in readmission rates were seen across all three conditions for patients 65 years of age (Medicare eligible) and older⁵: 13.3% for AMI, 8.0% for HF, and 7.0% for PN (Figure 3). Decreases were also observed for patients under 65 years for AMI and HF. However, there was a slight increase (2.3%) in PN readmissions for the under-65 age group.



Race/Ethnicity

Most racial/ethnic groups experienced decreased readmission rates from 2007 to 2013 (Figure 4). White/Non-Hispanic, Hispanic, and Black patients showed decreases in readmission rates across all three conditions. The largest decrease seen for AMI (16.7%) was among White/Non-Hispanic patients. For HF, Asian American/Pacific Islander patients experienced the largest decrease (10.1%). For PN, Native American patients had the largest observed decrease (10.5%), but this and other findings for Native Americans may not be reliable indicators of actual change given the small numbers of patients in this group. Hispanic patients experienced the second largest decrease for PN (6.6%), while readmissions for White/Non-Hispanic patients decreased 5.0 %.

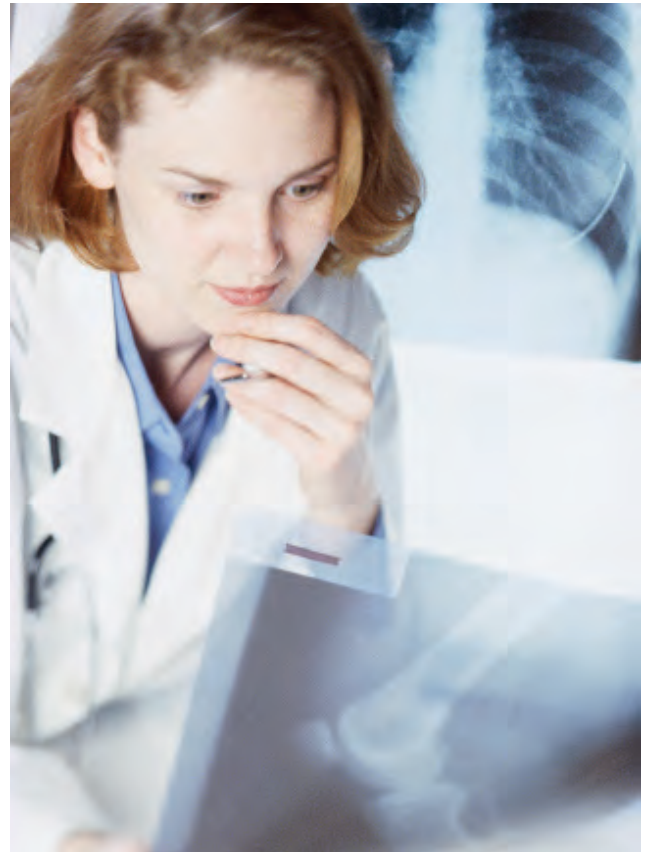
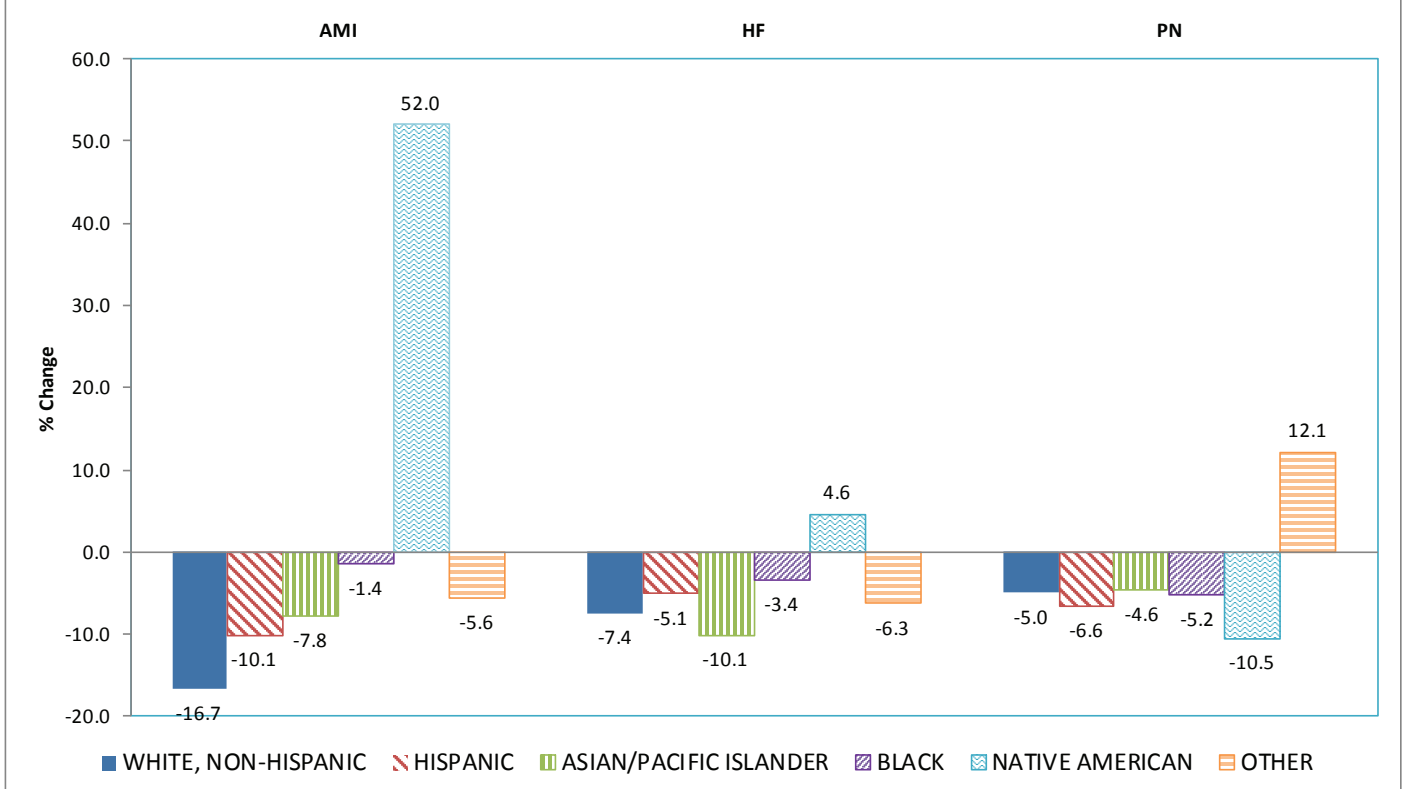


Figure 4. Percent Change in Readmission Rates from 2007-2013: Race/Ethnicity



Expected Payer Source

Decreased readmission rates were observed across most of the expected payer groups from 2007 to 2013 (Figure 5). Readmission rates for Medicare patients decreased appreciably across all three conditions. However, substantial decreases were also seen in non-Medicare patients. For example, privately insured patients with AMI and HF experienced even larger decreases (21.6% and 9.9%, respectively) than Medicare patients (12.9% and 6.9%, respectively). For HF and PN, Medi-Cal patients experienced smaller decreases in readmission rates than Medicare patients (3.2% and 4.3%, respectively); however, for AMI, Medi-Cal patients experienced an increase (3.6%) in readmissions. Decreased readmissions for self-pay and all “other” payer⁶ types were also seen in AMI and HF patients, but not with PN patients, where large percentage increases in readmission rates from 2007 to 2013 were seen (10.2% for self-pay and 21.5% for “other”). Combining all non-Medicare groups (not shown), we found that non-Medicare patients, as a whole, experienced an average decrease in readmissions of 11.4% for AMI, 5.1% for HF, and no change for PN.

Principal Diagnosis for Readmissions

The top ten principal diagnoses, or major clinical causes, for readmission between 2007 and 2013 across the three conditions remained relatively consistent over time (Figures 6-8). The most common principal diagnosis for readmission following either a HF or PN initial admission was a repeat diagnosis of HF or PN. In both 2007 and 2013, nearly one third of all HF readmissions had a repeat diagnosis of HF. For PN, approximately 19% in 2007 and 15% in 2013 were repeat diagnoses of PN. For AMI, approximately 40% of the major causes for readmission were split between AMI, coronary atherosclerosis, and congestive heart failure.

Of note, the proportion of readmissions with a principal diagnosis of septicemia approximately doubled for all three conditions during the study period. In 2007, 2.6% of readmissions following an initial admission of AMI had a principal diagnosis of septicemia compared to 4.8% in 2013. In 2007, 2.9% of HF readmissions had a principal diagnosis of septicemia while 5.5% had a septicemia diagnosis in 2013. In 2007, septicemia was the principal cause of readmission for 5.2% of PN patients, which doubled to 10.7% in 2013. The increase in septicemia diagnoses may, however, be an artifact of better reporting of septicemia by hospitals.

Figure 5. Percent Change in Readmission Rates from 2007 to 2013: Expected Payer Source

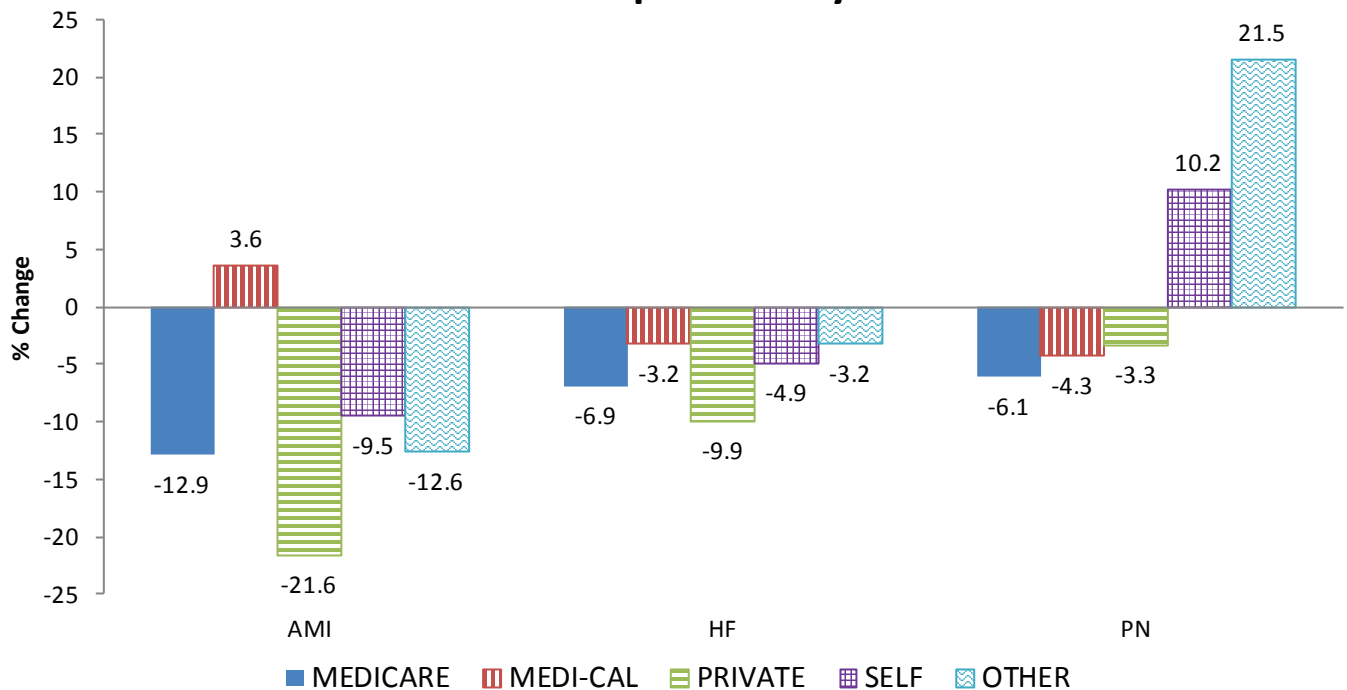


Figure 6. Top 10 Principal Diagnoses for Readmission Following an Acute Myocardial Infarction Initial Admission

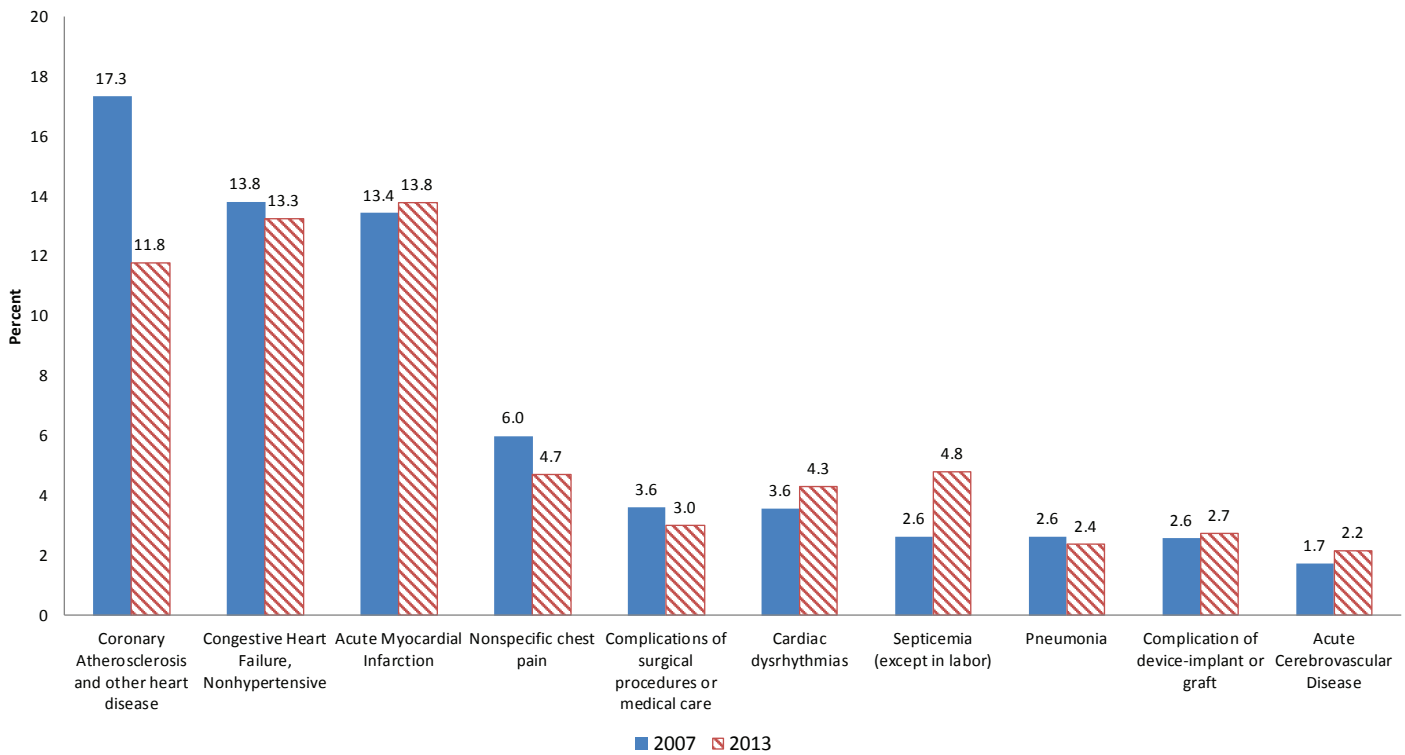


Figure 7. Top 10 Principal Diagnoses for Readmission Following a Heart Failure Initial Admission

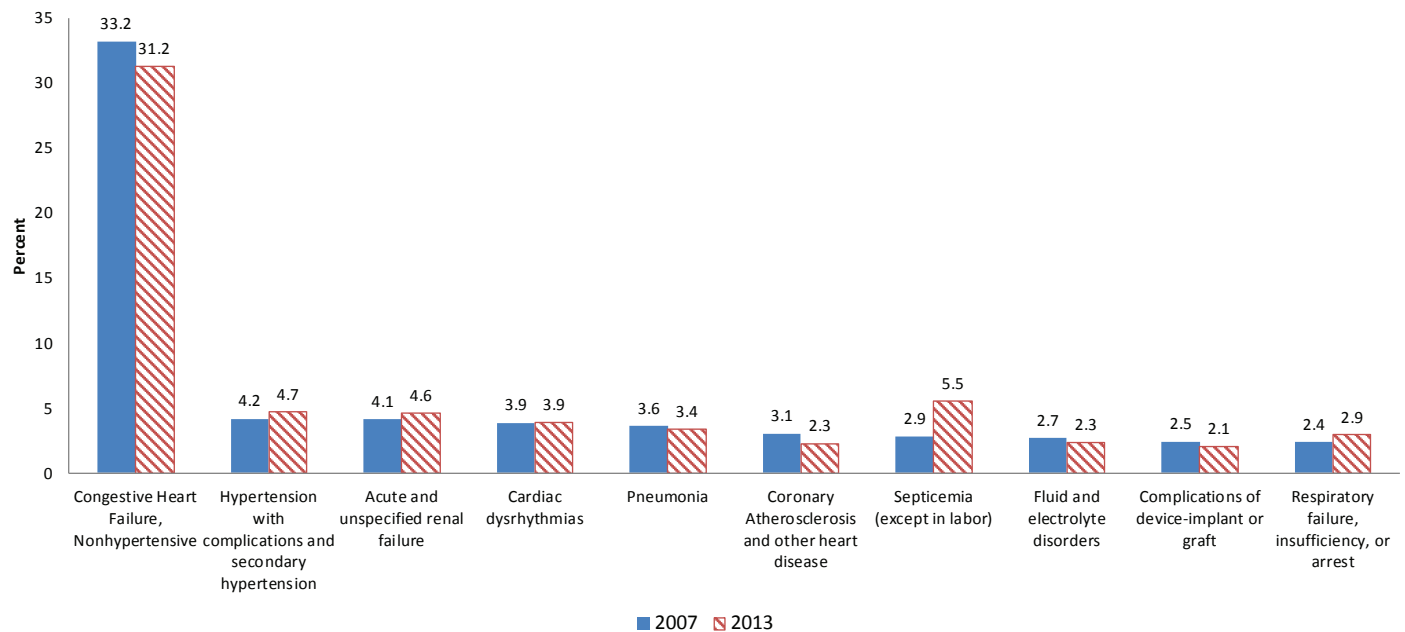
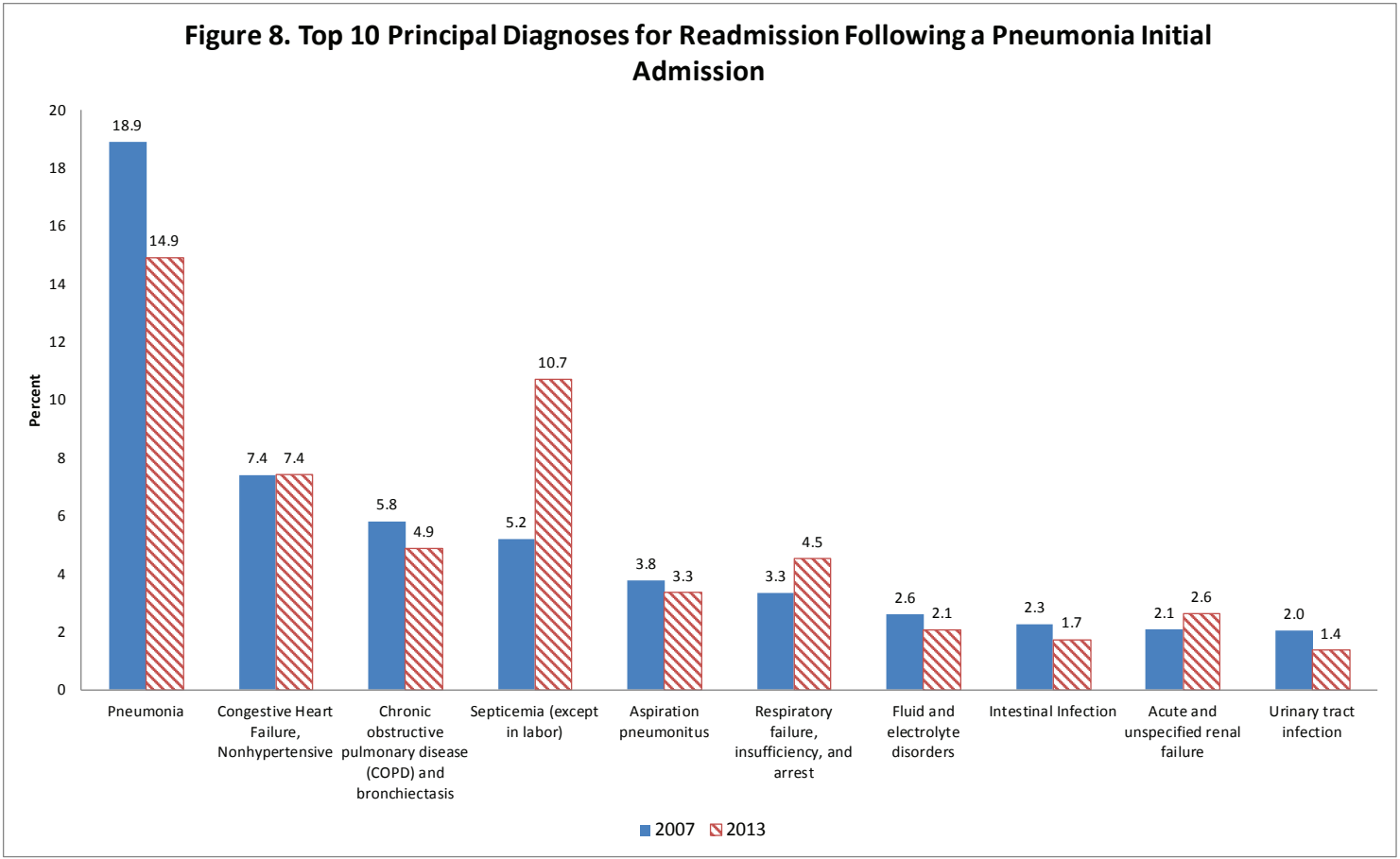


Figure 8. Top 10 Principal Diagnoses for Readmission Following a Pneumonia Initial Admission



CONCLUSION

In California, hospital readmission rates for patients admitted with AMI (heart attack) fell appreciably from 2007 to 2013 while readmissions for HF and PN patients also declined, though less so. Readmissions decreased for both men and women with only small differences in the percent change. Substantial decreases were seen among White/Non-Hispanic, Hispanic, and Black patients across all three conditions. Other racial/ethnic groups also experienced overall decreases, but with less consistent results. Consistent and substantial decreases in readmissions were seen with Medicare-eligible patients 65 year of age and older, while patients under 65 had mixed results. Both Medicare and privately insured patients experienced decreased readmissions across the three conditions, with the largest decreases among privately insured patients. Finally, while the principal reasons for readmission were generally consistent from 2007 to 2013, the frequency of sepsis as the principal cause for readmission doubled.

Medicare patients were the focus of CMS’ HRRP, and substantial decreases were seen across all three conditions over the study period for the Medicare-insured. In fact, the decreases seen in Medicare AMI and HF patients generally extended to all California patients with those conditions. However, in the case of PN, certain types of patients actually experienced increased readmissions over the time period. The reason(s) why PN registered the smallest decreases in readmission and why these did not extend to all groups cannot be explained by this study, but there are clinical differences between PN and the two cardiac conditions which may in some part account for this variation.

It is important to note changes in readmission rates related to patient sex and race/ethnicity. For state health policy officials concerned about the impact that the HRRP might have on California hospitals and the different types of patients they serve, it is reassuring that decreased readmission rates were regularly ob-

served for males, females, and most race/ethnicities. However, there did exist differences in the percentage decrease observed with no consistent pattern by patient sex or race/ethnicity across the three health conditions. Medicare-aged patients appear to have benefitted most from reduced readmissions when compared to younger patients, and this is not surprising given that hospital incentives target the Medicare population. However, the finding that readmissions for private pay patients decreased even more than for Medicare patients, among HF and AMI patients, was surprising. It is generally recognized that private insurance often follows Medicare policy with regard to reimbursement and the private sector appears to have elicited an even larger response for its members than Medicare. It is also worth noting that, when compared to Medicare and private pay patients with AMI and HF, Medi-Cal patients experienced less of a reduction in readmissions, and in the case of AMI, actually showed a 3.6% increase in readmissions over the study years. This may signal that further reductions in Medi-Cal readmissions are possible.

The decrease in readmissions documented in this study did not occur by increasing patients' initial hospital stays. In fact, initial hospital LOS decreased by approximately one-half day from 2007 to 2013 for all three conditions. Patients are not being kept longer in hospitals as a strategy to avoid additional readmissions. Readmissions are being reduced through other means, likely through better care coordination post-discharge.

Further evaluations of readmissions data, using studies specifically designed to assess, with scientific certainty, whether the HRRP caused a reduction in readmissions are needed to better understand other reasons for the decrease in readmissions for patients with these three conditions. Other reasons may account for minimal impact though, given observations from this study of a modest over-

all California readmission decrease of 0.4% during the 2011 – 2013 period when reductions for AMI, HF, and PN were steepest. Future evaluations of this cohort will include data beyond 2013 to better assess the full impact of the HRRP by allowing for multiple years of data for studying the impact of the penalty assessment phase. Conclusions from the current study are based on OSHPD data sets, and differences between these data and CMS data do not allow exact duplication of CMS' methodology for identifying AMI, HF, and PN patients. However, these differences in methods were generally minor and were not likely to influence our results.

Readmissions are a burden on both the healthcare system and the affected patients and caregivers. The ACA-mandated HRRP appears to have reduced unnecessary readmissions for Medicare and non-Medicare patients alike and positively changed the healthcare delivery system for a large number of Californians. The information provided within this report may be useful in understanding the landscape of readmission rates for patients admitted to California hospitals with AMI, HF, and PN and may serve as a resource for California policymakers and hospital administrators.

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- ³ New Data Shows Affordable Care Act Reforms Are Leading to Lower Hospital Readmission Rates for Medicare Beneficiaries. The CMS Blog, December 6, 2013. <http://blog.cms.gov/2013/12/06/new-data-shows-affordable-care-act-reforms-are-leading-to-lower-hospital-readmission-rates-for-medicare-beneficiaries/>.
- ⁴ The data source for this analysis was the 2007-2013 California Patient Discharge Data (PDD). All patients admitted to a California hospital with a principal diagnosis of Acute Myocardial Infarction, Heart Failure, or Pneumonia during the study period were included in the study. International Classification of Diseases, Ninth Revision, clinical modification (ICD-9) codes used to define cohorts for these three conditions were the same as those used by CMS for the HRRP's measures. Patients with multiple records in a given year were linked via social security numbers within the PDD. All in-hospital deaths, transfers to other acute care facilities, and discharges against medical advice were excluded from analyses. Patients without social security numbers were also excluded. If a patient had more than one 30-day readmission, only the first 30-day readmission was included in analyses. All rates are unadjusted. Analyses were done using SAS, version 9.3.
- ⁵ Patients who are 65 years of age and older are eligible to be covered by Medicare. With this idea in mind, we split patients into two age groups: those younger than 65 and those 65 and older.
- ⁶ "Other" payer includes the categories of Workers' Compensation, County Indigent Programs, Other Government, Other Indigent, and Other Payer.



Edmund G. Brown Jr.
Governor, State of California

Diana S. Dooley
Secretary, California Health and Human Services Agency

Robert P. David
Director, Office of Statewide Health Planning and Development

OSHPD Office of Statewide Health
Planning and Development

400 R Street, Suite 250, Sacramento, CA 95811
www.oshpd.ca.gov