



## Original Contribution

## Increased observation services in Medicare beneficiaries with chest pain



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## ARTICLE INFO

## Article history:

Received 8 April 2015

Received in revised form 26 August 2015

Accepted 31 August 2015

## ABSTRACT

**Introduction:** We examined trends in the use of observation services and the relationship between index service type (observation services, emergency department [ED] visits, inpatient stays) and both clinical outcomes and Medicare payments.

**Methods:** We created a yearly cohort panel of Medicare beneficiaries with chest pain. We evaluate the relationships between index service type and 30-day clinical outcomes using a multinomial logit model and between index service type and Medicare payments using generalized linear models.

**Results:** In 2009, 24% of patients with chest pain received observation services; this rose to 29% in 2011. Conversely, 20% were treated as hospital inpatients in 2009; this fell to 16% in 2011. In the adjusted analysis, the risk of 30-day return to the hospital was 7% less (95% confidence interval, 5%–8%) for those receiving observation services as compared with inpatients. Average Medicare payments ranged from \$3032 for beneficiaries initially treated in the ED to \$3885 for those initially treated in observation to \$6545 for those initially treated as inpatients.

**Discussion:** Patients treated in observation are less likely than those treated in the ED or as inpatients to have an adverse event within 30 days. Adjusted Medicare payments, including the index stay and the subsequent 30 days, were substantially less for those treated in observation as compared with those treated as inpatients, but more than for those treated and released from the ED. Higher rates of observation service use do not appear to be negatively affecting patient outcomes and may lower costs relative to inpatient treatment.

Published by Elsevier Inc.

## 1. Introduction

Since 2007, there has been consistent growth in observation services in US hospitals [1]. Current efforts to reduce health care costs have focused attention on observation services as a replacement for short-term hospitalizations in the context of reduced payment policies for excess readmissions and funding to test models for improving care transitions. In addition, increased use of observation services may also be related to the growth of observation units [2–4], the desire to reduce readmissions and short-stay admissions, and the risk of potential audits.

Historically, the literature has focused on the growing use of observation units for conditions such as chest pain [5,6], but recently, the focus has shifted to the appropriate use of observation [7], the impact of longer lengths of stay [8], descriptions of observation care, and outcomes for specific diagnoses [9,4]. An Office of the Inspector General report from 2013 describes observation services and contrasts them with

short inpatient stays. Based on their memorandum, the use of observation services was shown to reduce the average cost of a hospital visit for both beneficiaries and Medicare [10].

In this article, we build upon the Office of the Inspector General work that focuses on the initial treatment setting and associated costs. We first describe the shift in patterns of care (whether a patient is discharged from the emergency department [ED], receives observation services, or is admitted) for beneficiaries with chest pain between 2009 and 2011. Then, we examine the outcome and cost implications of this shifting by comparing 30-day return to hospital (readmissions, observation services, ED visit) and death and costs of care for the index event and a 30-day follow-up period, respectively.

## 2. Methods

## 2.1. Participants

We performed a retrospective cohort study of chest pain visits using a 20% nationally representative sample of fee-for-service (FFS) Medicare beneficiaries for calendar years 2009 to 2011. The yearly cohort

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panels were constructed by identifying patients discharged alive with chest pain as a primary or secondary diagnosis on a claim submitted to Medicare for payment from a Prospective Payment System hospital. We excluded those who were found to have a myocardial infarction or other serious pulmonary or cardiovascular condition. Beneficiaries were eligible for inclusion if they were continuously enrolled in FFS Medicare for all alive and eligible months of the cohort year. Individuals were categorized by the level of care billed by the facility for the initial chest pain visit (ED, observation, or inpatient). We assessed the final level of care assigned to the patient and did not account for scenarios where the patient was moved from observation to inpatient setting prior to discharge as such events cannot be reliably ascertained using Medicare claims. The final analytic cohort included 207 478 unique beneficiaries in 2009, 216 301 in 2010, and 216 692 in 2011. Each annual sample was constructed independently, and the first visit of a beneficiary to the hospital within a year was used. Observation services were coded if they lasted at least 8 hours—the minimum Medicare threshold for payment.

## 2.2. Predictor variables

Beneficiary age, sex, race, concurrent Medicaid status (ie, being dually eligible for Medicare and Medicaid), and presence of end-stage renal disease (ESRD) were obtained for the 3 groups using the Center for Medicare & Medicaid Services Chronic Conditions Warehouse beneficiary summary file. Diagnoses from the Center for Medicare & Medicaid Services Chronic Conditions Warehouse including hierarchical condition category (HCC) risk scores were used to control for comorbidities associated with health care costs [11]. We also included hospital characteristics from American Hospital Association data.

## 2.3. Outcome variables

We analyzed 30-day outcomes for beneficiaries in our sample who were discharged alive between January 1 and December 1 of each year studied. Specifically, we used return to the hospital (including readmissions, observation services, and ED visits) and all-cause mortality as outcomes. We examined cost implications using total Medicare Part A and Part B payments for the index visit and the 30 days after the index discharge. Nominal payments were adjusted to reflect 2009 dollars using the medical care component of the consumer price index.

## 2.4. Statistical analysis

For each year, we calculated descriptive statistics and standard comparative statistics (eg, *t* tests and  $\chi^2$  tests) to evaluate differences in beneficiary characteristics, settings, and outcomes. We fit a multinomial logit model of the determinants of inpatient stays and observation services to describe changes in treatment setting over time after adjusting for beneficiary and hospital characteristics. We modeled the associations between treatment settings and 30-day revisit and mortality rates using a multinomial logit model. We used a generalized linear model (with log link and gamma distribution) to model the association between treatment settings and total Medicare payments. Cluster-adjusted standard errors are reported due to some overlap of beneficiaries across years. All analyses were performed using SAS version 9.1 (SAS Institute, Inc, Cary, NC) and Stata statistical software version 12.1 (StataCorp LP, College Station, TX).

## 3. Results

Clinical and demographic characteristics of the samples remained relatively constant over time (Table 1). There was a steady increase in the proportion of beneficiaries with chest pain who were treated with observation services, a steady decrease in the proportion of those treated as inpatients, and the proportion treated in the ED remained

**Table 1**  
Characteristics of FFS Medicare beneficiaries with chest pain, 2009–2011

	2009	2010	2011
Total, n	207 478	216 301	216 692
Type, n (%)			
ED	117 212 (56)	121 599 (56)	121 236 (56)
OBS	48 820 (24)	55 420 (26)	61 914 (29)
INPT	41 446 (20)	39 282 (18)	33 542 (15)
Age (y), n (%)			
<65	56 942 (27)	60 708 (28)	62 463 (29)
65–74	64 626 (31)	67 152 (31)	67 320 (31)
75–84	56 478 (27)	57 655 (27)	56 402 (26)
≥85	29 432 (14)	30 786 (14)	30 507 (14)
Sex, n (%)			
Male	124 673 (60)	128 911 (60)	129 591 (60)
Female	82 805 (40)	87 390 (40)	87 101 (40)
Race, n (%)			
White	168 123 (81)	174 515 (81)	173 528 (80)
Black	29 057 (14)	30 893 (14)	31 957 (15)
Other	10 298 (5)	10 893 (5)	11 207 (5)
Concurrent Medicaid (ie, dual), n (%)			
Nondual	143 787 (69)	147 965 (68)	146 652 (68)
Dual	63 691 (31)	68 336 (32)	70 040 (32)
ESRD, n (%)			
No ESRD	201 395 (97)	209 818 (97)	210 105 (97)
ESRD	6 083 (3)	6 483 (3)	6 587 (3)
HCC score, mean (SD)	1.6 (1.3)	1.6 (1.3)	1.6 (1.4)

Characteristics are shown by year; dual status varied by 3% across the years in the study period. All other characteristics shown varied between 0% and 2% across the years in the study period. Abbreviations: INPT = inpatient admission; OBS = observation services; ED = Emergency Department.

relatively stable. In 2009, 24% were treated in observation as compared with 29% in 2011. In 2009, 20% of beneficiaries were treated as inpatients as compared with 16% in 2011. Fig. 1 depicts the trends in the care setting of index visits adjusted for differences in patient and hospital characteristics. There was little change in ED visits, whereas inpatient stays trended downward and observation encounters steadily rose.

Table 2 shows the results of the associations between treatment settings and 30-day clinical outcomes from a multinomial logit regression and between treatment settings and Medicare payments for the index service and the 30 days after using a generalized linear model. Each model controlled for patient and hospital characteristics and year of service. An alternative view of these results is shown in Fig. 2. After adjusting for demographic and clinical factors, those who received observation services were 29% less likely to return to the hospital as compared with those who received ED care only. Those who received inpatient services were 24% less likely to return to the hospital as compared with those who received ED care only. From the underlying parameter estimates, we also calculate that patients who received observation services were 7% less likely to return to the hospital within 30 days (95% confidence interval [CI], 5%–8%) as compared with those treated as inpatients. After adjusting for demographic and clinical factors, those who received observation services were 66% less likely to die as compared with those who received ED care only. Those who received inpatient services were 36% less likely to die as compared with those who received ED care only. Patients who received observation services were 47% less likely to die within 30 days (95% CI, 5%–8%) as compared with those treated as inpatients. Medicare payments, including the index service and for the following 30 days, were 28% higher for patients who received observation services as compared with those with an ED visit only. Payments were 116% higher for patients who had an inpatient stay as compared with those were treated in the ED only. We also calculate that Medicare payments were 41% lower for patients who were treated in the observation setting as compared with those who received inpatient care.

Fig. 2 displays the adjusted 30-day rates based on the multinomial regression model described above for the following outcomes—none, return to the hospital, and death—and adjusted Medicare payments by

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