

Rising Mortality in Patients With Heart Failure in the United States



Facts Versus Fiction

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Some heart failure experts have raised concerns that the Hospital Readmissions Reduction Program (HRRP) implemented by the Centers for Medicare & Medicaid Services (CMS) has caused an increase in heart failure mortality (1). The HRRP is a policy program designed to create incentives for hospitals to invest in programs to improve recovery and reduce rates of 30-day readmissions for a set of conditions, including heart failure, which pose a substantial burden on our health system (2). In a time period coincident with the announcement and implementation of the HRRP, readmission rates following hospitalization for heart failure declined (2). Also, during this period, several national organizations, including the American College of Cardiology, launched programs to improve transitional care from hospital to home and to strengthen support for patients after discharge (3).

The evaluation of policy programs is important. Like most medical interventions, these programs have the potential for intended benefit as well as unintended effects. In the case of a readmissions reduction program, it is possible that in the pursuit of lower readmission rates, clinicians could turn away some patients who could benefit from hospital admission. Moreover, the penalties associated with the HRRP could worsen the financial status—and consequent quality of care—of some hospitals.

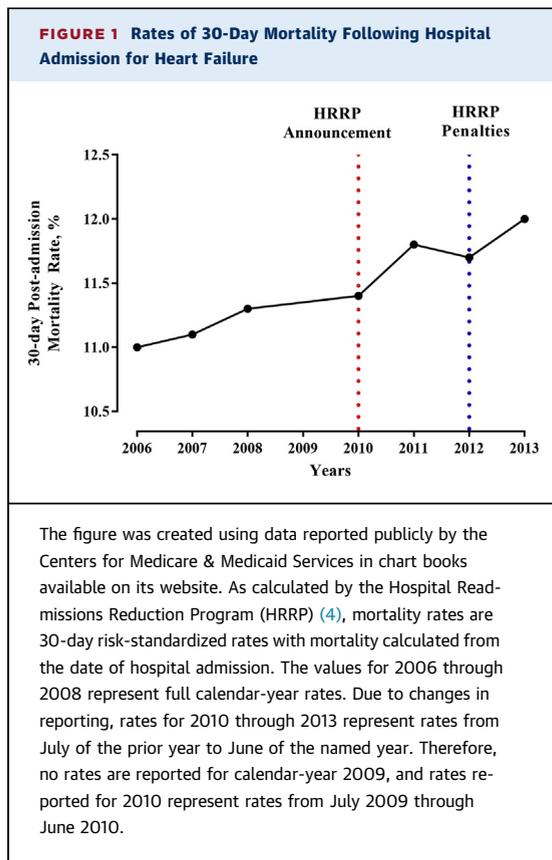
As a balancing measure, hospital mortality can be used to examine potential adverse effects of the HRRP. A balancing measure is an assay meant to

assess an outcome that could be adversely affected by another measure. In the case of 30-day readmission, measures of mortality during and after hospitalization can be used to capture adverse effects in a period temporally associated with program implementation.

Several years after the initiation of the HRRP, it is useful to examine what we know about changes in mortality rates for patients with heart failure. Increases in mortality for this condition, in a period of much change in the prevalence and incidence of heart failure, venues of care, and associated treatments, would be difficult to assign to the program, but could signal a need for further evaluation.

A combination of published reports and publicly accessible data enable such an assessment of HRRP. In the national population of Medicare fee-for-service beneficiaries hospitalized with heart failure, post-admission 30-day mortality has been increasing since 2006. Publicly accessible data available through CMS suggest that post-admission 30-day mortality increased from 11% in 2006 to 11.4% in 2010, the year of the HRRP's announcement, and continued to increase to 12% in 2013 (Figure 1) (4). This rising mortality in patients with heart failure from as early as 2006 was also identified in published studies using the national population of Medicare fee-for-service beneficiaries (5). Therefore, these post-admission 30-day mortality rates have risen consistently spanning the period before the announcement of the HRRP and afterwards. Further, because rates of in-

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hospital mortality decreased consistently over the same period (5,6), the rise in post-admission mortality rates must be driven by increased rates of death after discharge. However, the timing of this rise in mortality is not consistent with an inference that the HRRP caused harm (Figure 1).

Moreover, the HRRP does not have an isolated focus on heart failure; it has, since its inception, also focused on acute myocardial infarction (AMI) and pneumonia (2). Thirty-day readmission for both AMI and pneumonia has decreased at rates similar to those observed for heart failure (2). However, there have been no discernible changes in post-discharge 30-day mortality for either AMI or pneumonia (2). Only heart failure has had an increase in post-discharge mortality since 2006 and through the period of the penalty. Specifically, if the penalties under HRRP were leading clinicians and hospitals to reduce readmissions at the cost of increased mortality, a similar effect would be expected across all conditions, especially because patients with AMI and pneumonia would also be vulnerable to an increased risk of death when necessary hospitalizations are avoided. Many features of pneumonia are particularly similar to those of heart failure.

In addition, if these harms were occurring, we would expect that hospitals with greater readmission reductions would have larger concomitant increases in mortality. On the contrary, hospitals that had decreased readmission rates for heart failure did not have a rising mortality rate; on average, mortality rates for patients with heart failure in these hospitals decreased (2). This relationship was even stronger for post-discharge 90-day mortality compared with 30-day mortality. The study that elucidated these hospital-level associations for trends in readmissions and mortality (2) also revealed post-discharge mortality rates that increased consistently between 2008 and 2014. However, the graphical representation of these findings was misconstrued to suggest that the rise in mortality was temporally related to the HRRP (7).

A recent investigation using the American Heart Association's Get With The Guidelines (GWTG)-Heart Failure Registry has further sparked discussion about increasing mortality in heart failure following implementation of the HRRP (1). The study reported an increase in post-discharge mortality for heart failure between 2006 and 2014, and an inflection after the implementation of HRRP (1), ascribing it to penalties under the HRRP. However, the study has limitations that constrain its ability to make this inference.

The study includes 115,245 hospitalizations from 416 hospitals in the United States, representing ~3% of the 3.5 million heart failure hospitalizations among fee-for-service Medicare beneficiaries across more than 5,000 hospitals during this period nationally (2). The included hospitalizations are not a representative sample of Medicare beneficiaries for several reasons. Hospitals included in the study participate in the GWTG-Heart Failure Registry voluntarily and can choose to participate for some years and not others. Moreover, the reporting of hospitalizations in the registry is voluntary and is not guaranteed to be complete. The registry's linking of hospitalization records to insurance claims is also poor—more than 50% of Medicare beneficiaries ≥65 years of age were not successfully matched to their Medicare claims (1). More importantly, the determination of the percentage of Medicare beneficiaries that the hospitals enrolled was not reported; this would entail examining the Medicare files to determine whether hospitals enrolled patients with a principal discharge diagnosis of heart failure. The final study population produced only ~2 heart failure hospitalizations per hospital per month, a rate that highlights concerns about data capture because these hospitals would be expected to have had many more hospitalizations (1). The time trends in readmission rates in this study also

suggest that the sample is not representative of national data. Specifically, whereas several studies using national Medicare data found a large decrease in readmission rates immediately after the announcement of the HRRP in 2010 (8), followed by a more gradual decrease in rates since the HRRP penalties in 2012 (2,8), the population included in the GWTG-Heart Failure study had only minor changes in readmission rates during 2010 to 2012, which decreased predominantly after 2012. Thus, the study raises a useful question, but is not well positioned to answer it, and produced results that are inconsistent with other data, including more generalizable data from all hospitals and patients affected by the HRRP.

The factors driving the rise in post-discharge mortality merit a thorough evaluation that would likely require information not currently included in administrative or registry data, such as cause of death and end-of-life goals. While we await these studies, it is important, given current evidence, that the HRRP not be incorrectly blamed for rising mortality trends. The trend of increased post-hospitalization mortality rates began at least 4 years before passage of the HRRP and at least 6 years before its associated implementation. The only studies that suggest a linkage between HRRP and rising heart failure mortality used highly selected and incomplete datasets that contain a small minority of hospitals and patients with heart failure. It is critical that future

investigations pursue an unbiased and accurate assessment of the available evidence surrounding the cause of rising heart failure mortality—an approach that is much more likely to suggest appropriate interventions.

In summary, the HRRP has been successful in reducing the risk of readmissions for patients with heart failure, AMI, and other common medical conditions—likely, at least in part, by prompting systematic improvements in transitions of care across the United States. When national datasets have been examined, there has been no signal for increased mortality resulting from the HRRP across any of the conditions included in the program. Across all these conditions, hospital readmission reductions have tracked, if anything, with concomitant reductions in mortality. Efforts to discredit the HRRP with limited evidence from small and non-representative datasets undermine a program that has led clinicians and hospitals to improve outcomes beyond hospital discharge through teamwork, integration and coordination of care for our most vulnerable patients.

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