

North Dakota Medicare Hospital Patients with Acute Myocardial Infarction: Characteristics and Outcomes of Transferred versus Non-Transferred Patients

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Background

- In 2004, about 700,000 Americans had an initial Acute Myocardial Infarction (AMI) and another 500,000 had a recurrent AMI.¹
- Also, 175,000 silent first AMIs occur each year.¹
- In 2004, about 7.9 million Americans have had an AMI in their lifetime.¹
- Mean age for first AMI is 65.8 for men and 70.4 for women.¹
- Critical Access Hospitals (CAHs) are limited-service, rural hospitals that receive cost-based reimbursement from Medicare.^{2,3}
- CAHs must maintain an annual average length of stay (LOS) of 96 hours or less for acute care patients; no LOS limit for swing bed patients.³
- Previous studies have shown that AMI patients have higher mortality rates in rural hospitals than urban hospitals, suggesting substandard care quality.^{4,7}
- However, many of these studies have not accounted for important contextual, patient, and health care factors.⁸

Research Questions

- What is the relationship between demographics and transfer status (yes/no) among AMI patients? By hospital group?
- What is the relationship between AMI patients' health risk (low/high) and transfer status? By hospital group?
- How do AMI mortality rates (adjusted and unadjusted) compare across hospital groups and patients' transfer status?



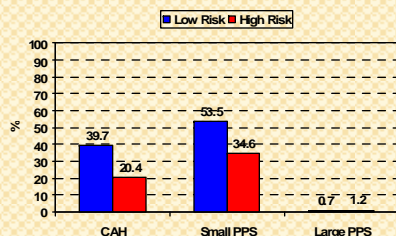
Methods

- We analyzed the North Dakota Inpatient Medicare data for fiscal years 2004 and 2005.
- AMI was defined using CMS guidelines and the patients' principal ICD-CM codes (410.01-410.91).
- 'Transfer' patients were defined by the Discharge Destination Code indicating a transfer from one acute care hospital to another acute care hospital.
- The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Risk Adjustment Model for AMI was used to assess patients' health risk.
- Hospital groupings: *Large Performance Pay System (PPS)* - all tertiary hospitals (N=6); *Small PPS* - all rural, non-CAH hospitals (N=9); *CAH* (N=30).

Results

- 3.5% (N=2,591) of ND Medicare hospital patients had AMI as the primary diagnosis.
- 83.8% of the state's AMI hospital patients were in large PPS facilities.
- Of AMI patients, 8.1% were transferred.
 - CAH - 27.2% were transferred; Small PPS - 41.3% were transferred; Large PPS - 0.8% were transferred.
- Younger AMI patients were more likely than older patients to be transferred (age <65: 12.2%; age 85+: 5.9%).
- Female AMI patients were more likely than male patients to be transferred (8.9% vs 7.6%).
- CAH and small PPS hospitals tended to keep high risk patients and transfer low risk patients (Figure 1).

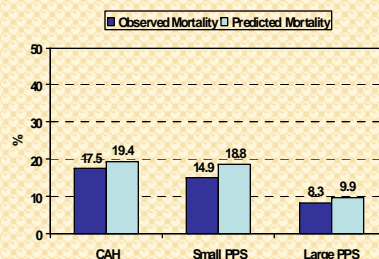
Figure 1. AMI Inpatients that were Transferred, by Risk and Hospital Group



Results (cont.)

- 250 AMI patients (9.6%) died in the hospital.
 - CAHs - 19.4% died; Small PPS - 18.8% died; Large PPS - 8.3% died.
- For each hospital group, observed mortality rates were lower than expected mortality rates (Figure 2).

Figure 2. Observed and Predicted AMI Hospital Mortality, by Hospital Group



- After controlling for health risk, the rural/urban hospital disparity among AMI mortality rates was virtually eliminated (Table 1).
- Transferred patients had observed mortality rates that were comparable to non-transferred patients and lower than predicted rates.

Table 1. Observed and Predicted AMI Hospital Mortality, by Risk and Hospital Group

Provider Type	Number of Cases	Risk	Predicted Mortality	Observed Mortality
CAH	73	Low	5.7	2.7
PPS Small	47	Low	6.2	2.1
PPS Large	1,489	Low	4.8	3.1
CAH	179	High	25.0	23.5
PPS Small	121	High	23.7	19.8
PPS Large	682	High	21.1	19.8

Conclusions

- Two-thirds of CAH/small PPS AMI patients and one-third of large PPS AMI patients were high risks.
- CAHs and small PPS hospitals tended to transfer younger and less sick AMI patients and keep older, sicker AMI patients.
- Unadjusted AMI mortality rates for CAHs and small PPS hospitals were substantially higher than for large PPS hospitals.
- Adjusted AMI mortality rates between hospital groups were comparable.
- Observed AMI mortality rates in North Dakota were consistently lower than predicted mortality rates; this pattern held true after delineating rates by hospital group and health risk.
- Transferred AMI patients had outcomes that were not substantially different from non-transferred AMI patients.
- These findings are consistent with previous studies⁸ on rural/urban AMI mortality rates (using risk adjustment) and national reports which depict North Dakota as providing high quality health care compared to other states.⁹

Implications for Future Studies

- Examine the effect of patient-centered care on the rural transfer decision-making process, especially for high risk AMI patients.
- Account for extent and appropriateness of pre-transfer treatments and effect of seasonality (i.e., weather).
- Examine the levels and quality of health care services available in rural areas.
- Examine the effect of practitioner types (e.g., family medicine, internists) on transfer decision-making in rural areas.

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