

## Policy Brief - October 2020

# Investigating the Geographic Disparity in Quality of Care: The Case of Hospital Readmission after Acute Myocardial Infarction

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## Key Findings

- The risk of readmission increases with age and being male, while hospitals with higher patient volume and capacity tend to have lower unplanned readmission.
- After risk-adjustments, there are differential effects of hospitalisation length-of-stay on the probability readmission across hospitals that are governed by different payment systems.
- There are substantial geographic variations in readmission rate across Local Health Authority and region, and the variations are explained by differences in length-of-stay and surgical procedures used.

## What Problem Was This Research Addressing?

We investigate the geographic disparity in health care quality by focusing on one interesting measurement - unplanned hospital readmission, and for the elderly population. Unplanned readmissions are considered an intricate quality indicator and can be alarming for cost-conscious health care systems (Thomas & Holloway, 1991). The issue is related to equality in health care delivery that is discussed in the earlier section. Equal care for equal need implies that, if we are looking at one vulnerable segment of the population, and we tease out the factors that are beyond one's control, the provision of care should ensure equal opportunity of being well-treated. In this paper, we focus on the potential disparity in quality of care through differing provider behaviour in Italy.

## What This Research Adds

There are two unique and important contributions to the literature from our findings. First, the differential effects of LOS on readmission across hospital types reflect the role of hospital discharge incentives, which, to our knowledge, was never explored in previous research. In particular, since public Hospital Units in Italy are financed by global budgets that are reimbursed ex-post, we expect that they have less pressure to discharge patients early for cost-saving purposes. Second, the geographic variation of unplanned readmission is primarily explained by the average hospital LOS and the differential procedures.

This result points to the potential geographic clustering of hospital discharge behaviour and adoptions of surgical procedures that can be important for policy-makers to improve equity of care. Third, the hierarchical geographic levels adopted in this paper are important units to consider given the highly decentralised healthcare system in Italy.

## Methods

Geographic disparities in unplanned readmission are linked to factors from various levels. First, differences in the local profile of the patients (case-mix) can be relevant if there is geographic sorting of, for instance, demographic characteristics. Second, at the hospital level, we consider organisational factors such as the type of ownership and capacity. Third, the influence of Local Health Authority (LHAs) - specific random effects can contribute to the homogeneity within each of the healthcare market structures and the potential inter-LHA disparity in readmission rate. Finally, regional governments have considerable autonomy over their healthcare provision and fiscal policies, so the random effects at the regional level should also give rise to geographic variations. We thus need to account for the hierarchical geographic structure. Given the multiple sources of variability, we identified two most relevant models in the literature: hierarchical generalised linear model (HGLM) and Cox proportional model with mixed effects (Austin, 2017).

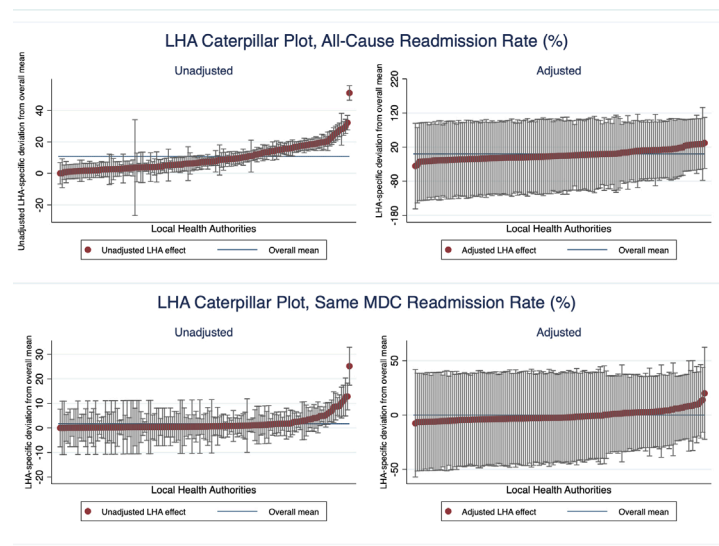
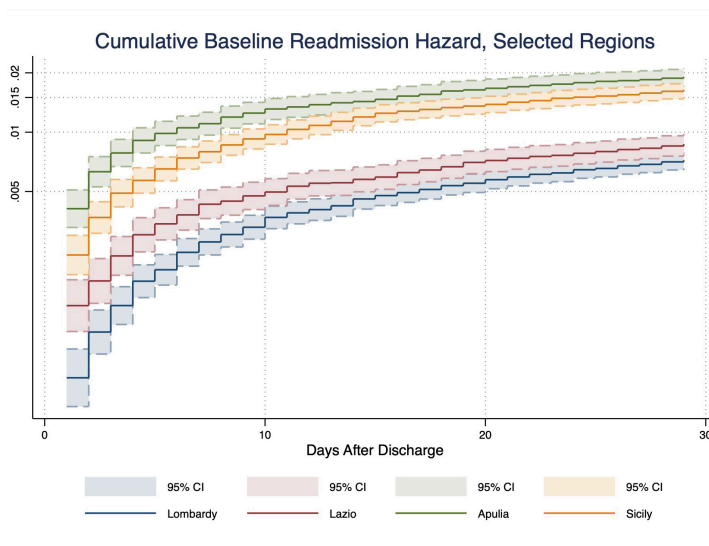
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## Research Findings

We have shown how differences in patient and hospital characteristics can contribute to the probability of readmission with hierarchical models. After accounting for sociodemographic and comorbidity variables, we found that the probability to be readmitted for all causes decreases with longer LOS for patients admitted to all types of hospitals. The magnitude of this negative effect is lower for independent public hospitals such as Hospital Trusts and Teaching Hospitals than for Hospital Units or Private Clinics. The use of PTCA and stent, CABG and catheter all decrease the probability of all-cause readmission, while the hospital AMI patient volume and capacity are both associated with lower all-cause readmission. Moreover, the effects of LOS, the different medical procedures and hospital types are relatively robust to aggregation to the hospital level. The results for readmission with the same MDC are comparable, while some coefficients lost significance. Our variance analysis further shows that there are strong contextual effects at the LHA and regional levels, while the variation in LOS and the use of different surgical procedures can explain a considerable proportion of the overall readmission variance. Our empirical results broadly reveal the potential pathway through which readmission rates vary across geographic areas – differential provider behaviours.

## Policy Relevance of Research

- What we explored in this paper ultimately touches upon the trade-off between quality and efficiency and the potentially divergent trajectories of health-care quality across regions.
- These findings indicate that the differences in readmission risks across hospital types are not solely driven by payment incentives. For instance, even though we are analysing emergency admissions, patient selection may still be present in certain regions. The existence of private insurance and payments may also facilitate more extended hospital stay.
- In general, the geographic variations in unplanned readmission that are driven by differential discharge behaviour, surgical procedures or other unobserved factors had profound implications on the equity dimension of the healthcare system.



## References

- Austin, P. C. (2017). A Tutorial on Multilevel Survival Analysis: Methods, Models and Applications. *International Statistical Review*, 85(2), 185–203. <https://doi.org/10.1111/insr.12214>
- Thomas, J. W., & Holloway, J. J. (1991). Investigating Early Readmission as an Indicator for Quality of Care Studies. *Medical Care*, 29(4), 377–394. JSTOR
- Wang, Y., Ghislandi, S. & Torbica, A. Investigating the geographic disparity in quality of care: the case of hospital readmission after acute myocardial infarction in Italy. *Eur J Health Econ* (2020). <https://doi.org/10.1007/s10198-020-01221-9>

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