

The network structure of critical care transfers.

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Abstract

Background: In light of wide variations between hospitals in their quality of critical care, some have proposed moving patients to better quality. A system of critical care transfers already exists, but it is little studied.

Methods: All 1993 Medicare claims were examined for the 576 acute care hospitals in the Mid-Atlantic region.

Results: Critical care transfers are common. There is a single continuous transfer network linking hospitals in the Mid-Atlantic region. There are signs that congestion may be a problem in this network.

Conclusion: The existing transfer network may be a useful policy tool to improve the outcomes of critically ill patients, but more study is needed.

Background

- There are wide variations between hospitals in the quality of critical care they provide.
- Moving patients from low performing hospitals to high performing hospitals is a possible solution to improve patient outcomes.
- An existing network of critical care transfers exists, but we know very little about it.
- The existing network *might* be useful for moving patients to higher quality care.

Methods

Study Population

- All patients hospitalized in fee-for-service Medicare in 1993
- In Mid-Atlantic Region: Pennsylvania, New York, New Jersey, Delaware, Connecticut
- At least 1 day of critical care services

Definition of a Critical Care Transfer

- If a patient had claims in hospital A until day t, and then claims in hospital B from day t or t+1, we inferred that the patient was transferred from hospital A to hospital B.
- If patient used critical care in both hospitals, then we define this as a critical care transfer.
- Under this definition, transfers to hospitals outside of the region are not observed.

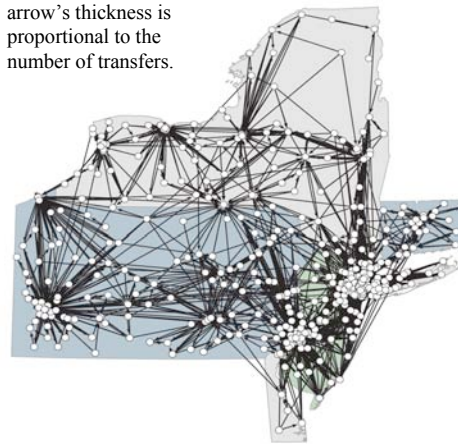
Results

Critical care transfers are common.

- 481,183 hospitalizations involved critical care in 1993 in the Mid-Atlantic Region.
- 550 hospitals had at least 1 critical care patient.
- 542 of those hospitals were involved in critical care transfers.
- 18,598 critical care transfers among 542 hospitals
- 7.7% of all critical care stays of any length involved an interhospital critical care transfer.
- 83 hospitals (15% of 542) sent but did not receive critical care transfers.
- 1 hospital received but did not send transfers.

Figure: Critical Care Transfers, 1993

Small circles represent hospitals, placed at their approximate latitude and longitude; arrows indicate the direction of transfers, and an arrow's thickness is proportional to the number of transfers.



A network for critical care transfers exists.

- There was a single, integrated network throughout the Mid-Atlantic Region.
- Transfers frequently cross between metropolitan areas, also crossing the borders of so-called "Hospital Referral Regions".
- A graphical representation is in the Figure.

Congestion may be a common problem.

- Hospitals each transferred out to a mean of 6.6 other hospitals (median of 6).
- One interpretation is that hospitals often cannot get a bed at their preferred receiving hospital. (Other interpretations are possible.)

Conclusions

- Critical care transfers are common and deserve further study.
- We do not know where the network sends patients. Are patients systematically funneled towards more effective hospitals? Or does the network disperse patients at random or to second-quality "back-up" sites? These are key questions for further studies.
- The tools of network analysis allow us to visualize and investigate the critical care transfer network as an integrated whole.

Policy Implications

- If the existing network moves patients towards higher quality care, then we may be able to improve patient outcomes by providing incentives (e.g., Pay-for-Performance) for hospitals who already transfer some patients to transfer more, and for hospitals that already receive some patients to accept more.
- If the contrary is true, then a formal regionalization of critical care is more urgent, and regionalization plans will need to wholly restructure existing transfer habits

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