

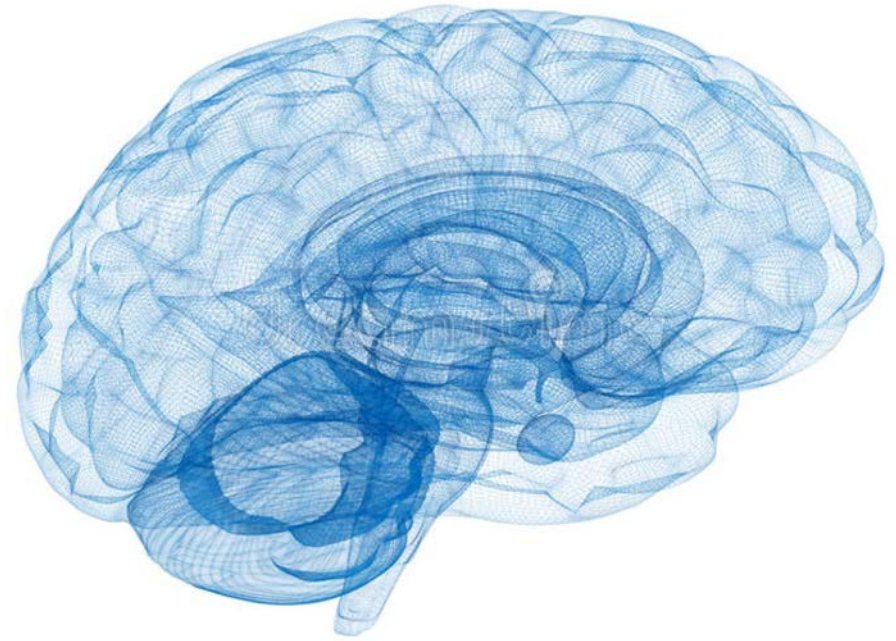


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Neurosurgical Services in a Regional Care Model



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Disclosures

- None



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Are there benefits to centralization in neurosurgical care for cerebrovascular disease?

- One example in recent analysis from UC San Diego....



The Impact of Inter-Facility Transfer to High Volume Centers on Patient Outcomes for Surgically Treated Aneurysmal Subarachnoid Hemorrhage

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Background

- Boogaarts et al: reduced mortality with treatment of surgically managed aneurysmal subarachnoid hemorrhage (aSAH) at high volume centers
- Pandey et al: mortality decreased as hospital volume increased from 20 cases to >100 cases per year (mortality 28.4% vs. 18.7%)
- 2005 consensus guidelines advocated for the development of Comprehensive Stroke Centers
- **Research Question:** Is transfer from a low to high volume center after initial presentation at a low volume center associated with improved outcomes in patients with surgically managed aSAH?

1. Boogaarts, Hieronymus D., Martinus J. van Amerongen, Joost de Vries, Gert P. Westert, André L. M. Verbeek, J. André Grotenhuis, and Ronald H. M. A. Bartels. 2014. "Caseload as a Factor for Outcome in Aneurysmal Subarachnoid Hemorrhage: A Systematic Review and Meta-Analysis." *Journal of Neurosurgery* 120 (3): 605–11.
2. Pandey, Aditya S., Joseph J. Gemmete, Thomas J. Wilson, Neeraj Chaudhary, B. Gregory Thompson, Lewis B. Morgenstern, and James F. Burke. 2015. "High Subarachnoid Hemorrhage Patient Volume Associated With Lower Mortality and Better Outcomes." *Neurosurgery* 77 (3): 462–70; discussion 470.
3. Alberts, M. J., R. E. Latchaw, W. R. Selman, T. Shephard, M. N. Hadley, L. M. Brass, W. Koroshetz, et al. 2005. "Recommendations for Comprehensive Stroke Centers: A Consensus Statement From the Brain Attack Coalition." *Stroke; a Journal of Cerebral Circulation* 36 (7): 1597–1616.



Methods

- **Data:** California Office of Statewide Health and Planning Database (OSHPD) 1999-2009
- **Inclusion:** Diagnosis of non-traumatic subarachnoid hemorrhage (ICD9 430) managed by clipping or coiling (ICD9 3951, 3952, 3972, 3975, 3976, 3979)
- **Exclusion:** Age < 18, Traumatic SAH
- **Variable of interest:**
 - High volume hospital defined as > 30 cases per year based on finding by Solomon et al
 - Interaction term between transfer and volume
- **Primary endpoint:** Mortality
- **Analysis:** Multivariable logistic regression controlling for transfer status, volume, demographics, comorbidities

Solomon, R. A., S. A. Mayer, and J. J. Tarmey. 1996. "Relationship between the Volume of Craniotomies for Cerebral Aneurysm Performed at New York State Hospitals and in-Hospital Mortality." *Stroke; a Journal of Cerebral Circulation* 27 (1): 13–17.

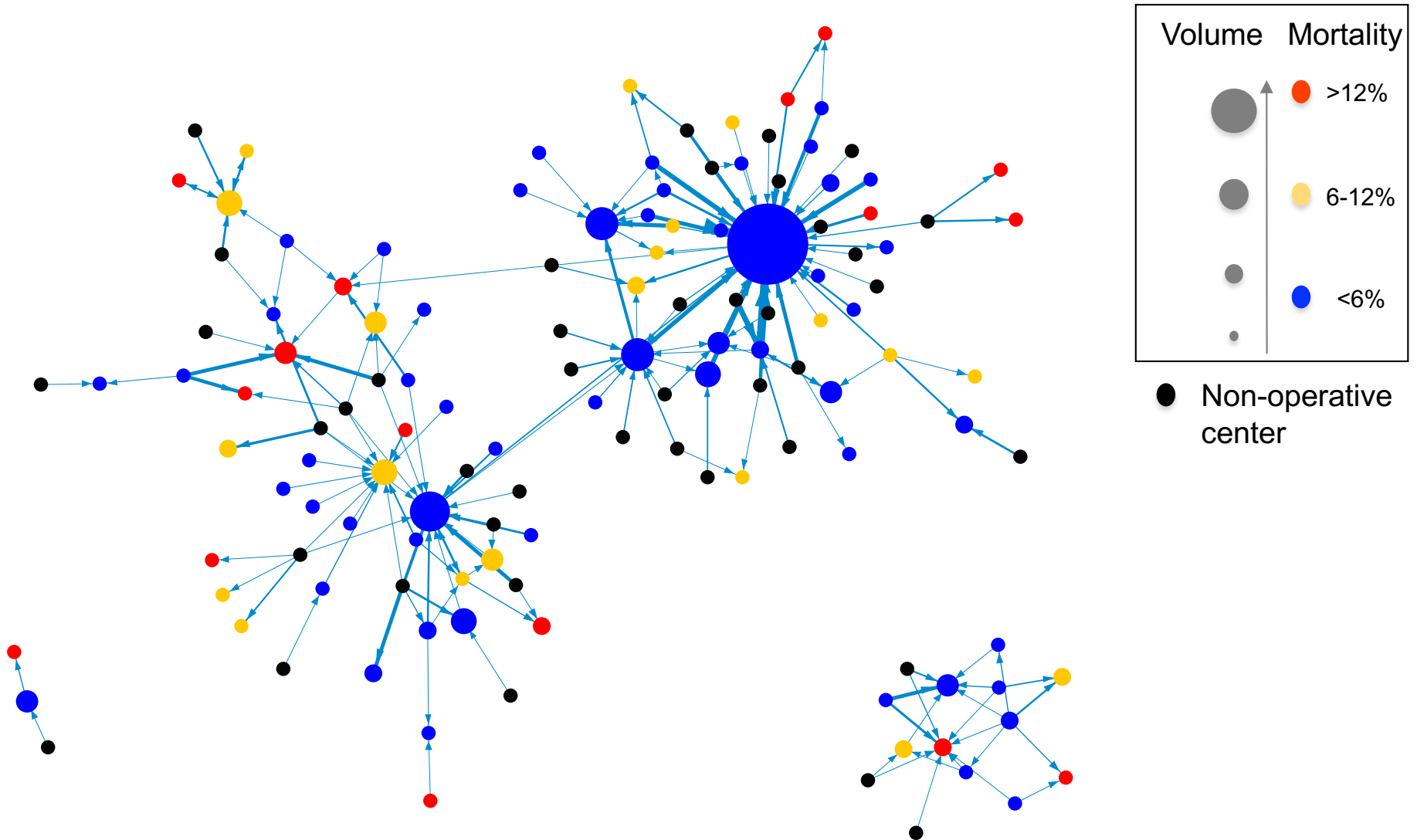


Results

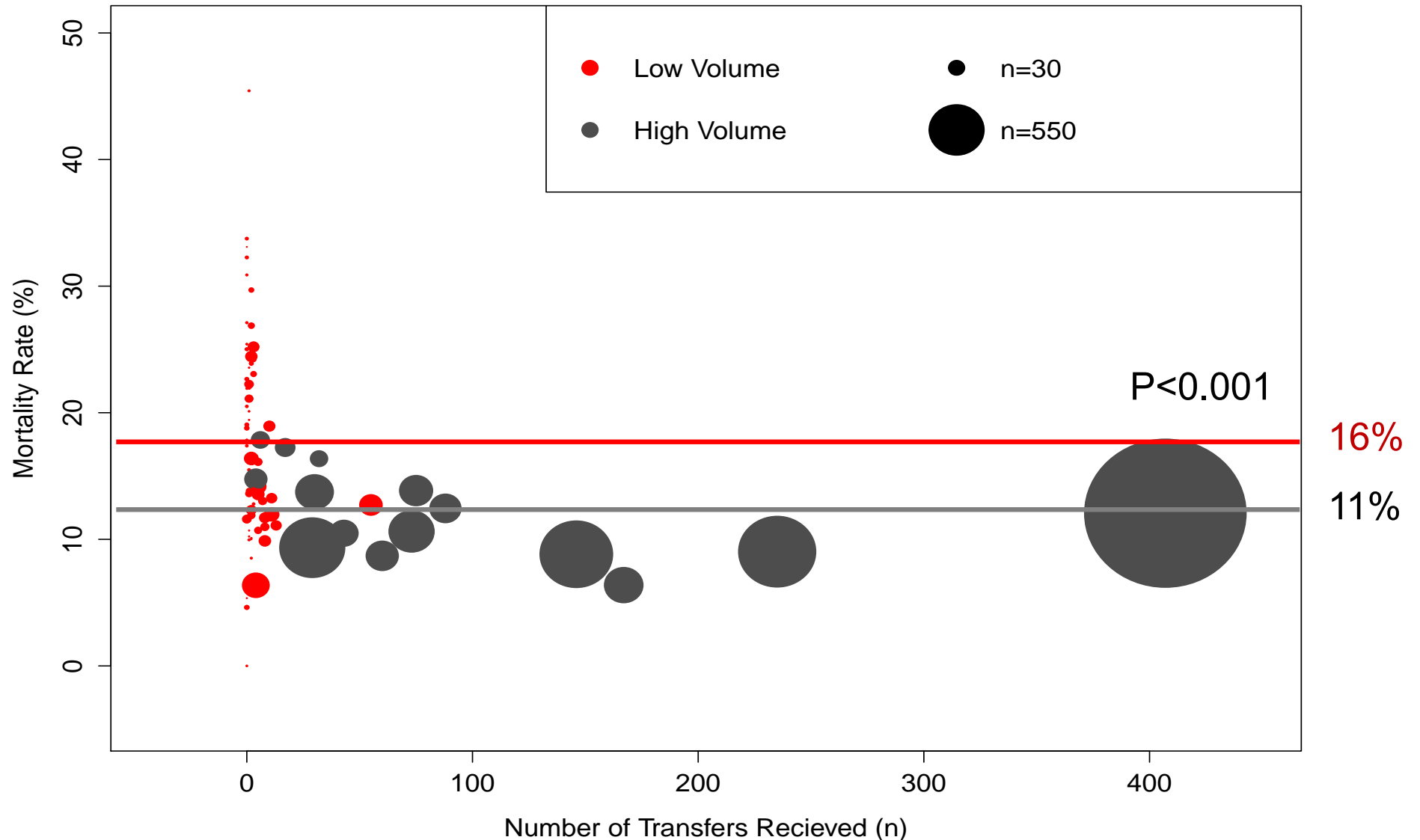
- 10,044 patients with aSAH who underwent clipping or coiling in California
 - Mean age 55 years
 - 62.7% clipping
 - 13.5% mortality rate
 - 59.0% w/ discharge to location other than home
- 3,028 (30.1%) underwent inter-facility transfer
- 4,017 (40.0%) received care at a high volume center



Transfer Network in California OSHPD Database



Mortality vs. Volume and Transfer Frequency

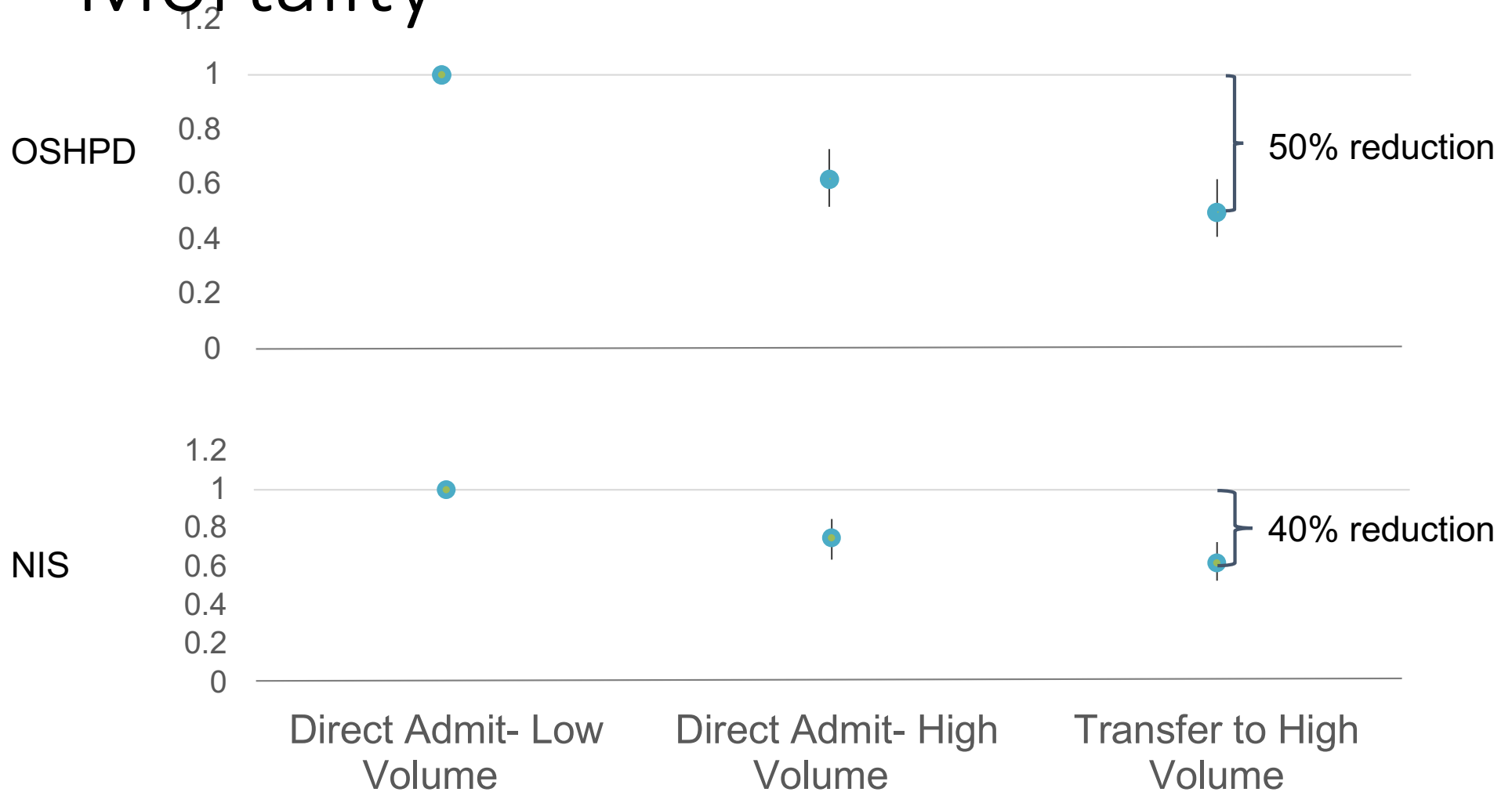


Results replicated in NIS Database

- 22,515 patients
 - 13.7% mortality rate
 - 64.9% clipping
 - 60.2% w/ discharge to location other than home
- 5,303 patients (23.6%) were transferred from their initial presenting hospital
- 11,210 cases (49.8%) performed at high volume centers



Results of Multivariable Analysis: Mortality



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Summary/Conclusions

- Relative to direct admission to a low volume facility, patients transferred to a high volume center were associated with significant improvements in mortality
- Results are robust in two independent datasets
- Despite potential concerns re. transfer time and/or delays, transfers to high volume centers appear protective for a SAH.
- Support for continued trend towards centralization of management for acute neurovascular disease



MassGeneral Neuroscience Network

- Conceptually developed to streamline both transfer and repatriation process and maximize quality.
- Includes
 - Peer Quality Network.
 - Streamlined transfer and access work flow (“Time is Brain”).
 - Workstream for cross-institutional protocols
 - Which patients stay local and which are streamlined for procedure related transfer and care.



Thank You



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