# Evaluation of the Hand Trauma Transfers at a Level-1 Trauma Center after Joining the ASSH Hand Trauma Center Network

William Delahoussaye, BS[1]; Madeline Gautreaux, BS[2]; Patrick Palines, MD[1]; Kelly Babineaux, MD[1]

1) Louisiana State University Health – New Orleans, School of Medicine, Department of Surgery

2) Louisiana State University Health – Shreveport, School of Medicine

## Background

Hand trauma remains among the most prevalent and expensive injury types within the United States. However, there remains limited access to specialized hand surgical care throughout much of the country, particularly in rural areas. In 2007, the American Society for Surgery of the Hand (ASSH) and the American College of Surgeons (ACS) established the National Hand Trauma Center Network (NHTCN) to improve coordination and regionalization of hand trauma services.

Criteria for Joining the NHTCN:

- Have a hand surgeon on-call for 24/7 hand trauma
- Perform revascularization and replantation procedures
- Report hand trauma-related data for the network database

In 2019, our institution joined the NHTCN with the aim of expanding access to hand surgery while maximizing efficiency and resource allocation and optimization. There has only been one other report on the effect of joining the NHTCN, which evaluated a pediatric center.

## Objectives

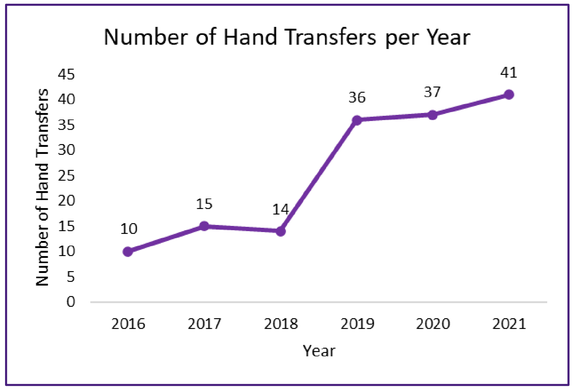
The goals of this study are to evaluate how joining the NHTCN affected the volume, demographics, and severity of hand trauma transfers to our institution.

## Methods

Data for this study was collected retrospectively over a six-year period from 2016 to 2021 from our institutional trauma registry. Patients were selected based on the criteria of being transferred to our facility due to hand mono-trauma. Analysis of transfer rates, transfer distance, injury patterns, insurance type, path of care, and hospital charges prior to and after joining the NHTCN in January of 2019 was performed using two-sample t-tests for averages or two-sample proportion tests for percentages.

## Results

| | Pre-network Average (total) | Post-network Average (total) | Change (95% CI) | P-value |
|---|---|---|---|---|
| Hand Transfers | 13 (39) | 38 (114) | 25 (24.21 to 25.79) | < .0001 |
| Out-of-State Transfers | 1.33 (4) | 6 (18) | 4.67 (3.70 to 5.63) | < .0001 |
| In-State Transfers | 11.66 (35) | 32 (96) | 20.34 (19.48 to 21.20) | < .0001 |
| Transfer Distance | 44.03 (1,717.1) | 66.61 (7,593.7) | 22.58 (3.17 to 42.00) | .0229 |
| Out-of-State Transfer Distance | 65.4 (261.6) | 78.13 (1406.3) | 12.73 (-8.59 to 34.05) | .2274 |
| In-State Transfer Distance | 41.59 (1,455.5) | 64.45 (6,187.4) | 22.860 (0.81 to 44.91) | .0423 |
| Patient Charges | $23,885.00 ($931,515.00) | $33,663.38 ($3,837,625.63) | 9,778.38 (-4,546.93 to 24,103.69) | .1795 |




| | Pre-network Percent (total) | Post-network Percent (total) | Change (95% CI) | P-value |
|---|---|---|---|---|
| Transfers Admitted | 97.44 (38) | 70.18 (80) | -27.26 (-17.51 to -37.01) | .0005 |
| Out-of-State Transfers Admitted | 75 (3) | 77.78 (14) | 2.78 (-27.99 to 49.62) | .9067 |
| In-State Transfers Admitted | 100 (35) | 68.75 (66) | -31.25 (-21.98 to -40.52) | .0002 |
| Transfers Requiring Surgery | 64.1 (25) | 65.79 (75) | -1.69 (-19.01 to 15.71) | .8487 |
| Out-of-State Transfers Requiring Surgery | 25 (1) | 77.78 (14) | 52.78 (6.20 to 99.36) | .0404 |
| In-State Transfers Requiring surgery | 68.57 (24) | 63.54 (61) | -5.03 (-13.78 to 21.32) | .5950 |
| Medicaid Patients Requiring Surgery | 91.67 (11) | 60 (24) | -31.67 (-9.87 to -53.46) | .0403 |
| Commercial Insurance Patients Requiring Surgery | 41.67 (5) | 61.54 (16) | 19.87 (-12.64 to 47.37) | .2585 |
| Transfer who made Follow-up | 87.18 (34) | 82.46 (94) | -4.72 (-10.36 to 15.5) | .4910 |

## Discussion/Limitations

**Discussion**: Integration into the NHTCN increased our institution's volume of hand trauma transfers, with patients being transferred from farther sending facilities. The increase in transfers rates was consistent with both in- and out-of-state transfers. The 27.26% decrease in admissions suggests there was a possible increase in unnecessary transfers. Although an overall increase in the quantity of severe injuries was observed, there were only modest shifts in the overall composition. There were no differences seen in demographics, insurance coverage, or average charges.

**Limitations**: A possible limitation to this study is the effect of COVID-19. However, a single center study at a level 1 trauma center by Stearns et al demonstrated no change in the rates, demographics, or path of care for hand transfers during the COVID-19 pandemic compared to pre-pandemic years. Other possible limitations include being a single center study and small subgroup sizes.

## Conclusions

These findings suggest that joining the NHTCN increased patient access to specialized hand surgical care at our institution. Optimizing and avoiding unnecessary transfers remains a challenging proposition.

## References

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