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Changes in rural trauma prehospital times following the Rural Trauma Team Development Course training

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Abstract

BACKGROUND: The majority of the US population live in urban areas, yet more than half of all trauma deaths occur in rural areas. The Rural Trauma Team Development Course (RTTDC) is developed to improve the outcomes of rural trauma and we aimed to study its effect on patient transfer.

METHODS: Trauma referrals 2 years before the RTTDC training were compared with referrals 2 years after the course.

RESULTS: Of the 276 studied patients, 97 were referred before the RTTDC training and 179 patients were referred after the course. Transfer acceptance time was significantly shorter after the RTTDC training (139.2 ± 87.1 vs 110 ± 66.3 min, $P = .003$). The overall transfer time was also significantly reduced following the RTTDC training (257.4 ± 110.8 vs 219.2 ± 86.5 min, $P = .002$). Patients receiving pretransfer imaging had a significantly higher transfer time both before and after RTTDC training (all Ps $< .01$). Mortality was nearly halved (6.2% vs 3.4%) after the RTTDC training.

CONCLUSION: The RTTDC training was associated with reduced transfer acceptance time and reduced transfer time.

Despite the fact that only 20% of the nation's population live in rural areas, nearly 60% of all trauma deaths occur in these areas.[1] The national rate of access to a level I or II trauma center within an hour in the United States is 84%, yet this rate dramatically drops to 24% in rural areas.[2] A number of factors contribute to these disproportionately high mortality figures. These factors include difficult terrain, distance to healthcare, suboptimal training of rural small facility personnel, limited resources at nontrauma facilities, and the overall increase in prehospital time in rural trauma.[3–5] Transferring a severely injured patient to a level I trauma center is shown to be of benefit to the patient.[6] It is a commonly used phrase that "the right patient needs to get

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to the right place at the right time" reflects the fact that trauma patients have a higher chance of survival at higher level trauma centers.[7]

The Rural Trauma Team Development Course (RTTDC) was developed by the Rural Trauma Committee of the American College of Surgeons Committee on Trauma.[8] The course focuses on team-oriented assessment and resuscitation of trauma patients with management of life-threatening injuries. Practically, rural facilities can form a trauma team of at least 3 core members. The team should ideally identify a patient who cannot be managed by the smaller facility's resources within 15 minutes. The aim of the RTTDC training is to help healthcare professionals in effectively and quickly identifying the patient who needs to be transferred for a higher level of care.[8]

The only available study about the association of the RTTDC with decreased transfer times was published in 2011 by Kappel et al.[9] These investigators performed a multicenter longitudinal study for 3 months and found that the RTTDC was associated with reduced transfer times in rural trauma patients. Although this study included 16 level IV and 2 level III trauma facilities, only 36 patients were from facilities with RTTDC training. This is primarily due to the relatively short duration of the study, which might have also limited the identification of the potential effect of the RTTDC training.[9] Therefore, there is a need for more studies on changes associated with the RTTDC, especially those looking over longer durations of time.

At Geisinger Medical Center, 40% of trauma patients are transferred from other hospitals, which often are smaller and not designated trauma facilities. Therefore, with such a large number of transfers, it becomes even more important to improve the transfer process and focus on getting patients to definitive care as quickly as possible. In this study, we aimed to determine if the RTTDC training was associated with early evaluation and transfer of trauma patients in the trained rural facilities of Pennsylvania.

Patients and Methods

Following the approval of the Institutional Review Board of the Geisinger Health System, we conducted this retrospective cohort study of 3 nontrauma referring facilities who had participated in the RTTDC training and were referring trauma patients to our level I trauma center. Data were collected from the Geisinger electronic health record, trauma registry, and Emergency Medical Services (EMS) trip sheets. The study spanned from 2 years before the RTTDC training to 2 years after the course. The area covered by Geisinger Health System in Pennsylvania and the location of referring facilities are shown in Fig. 1. The

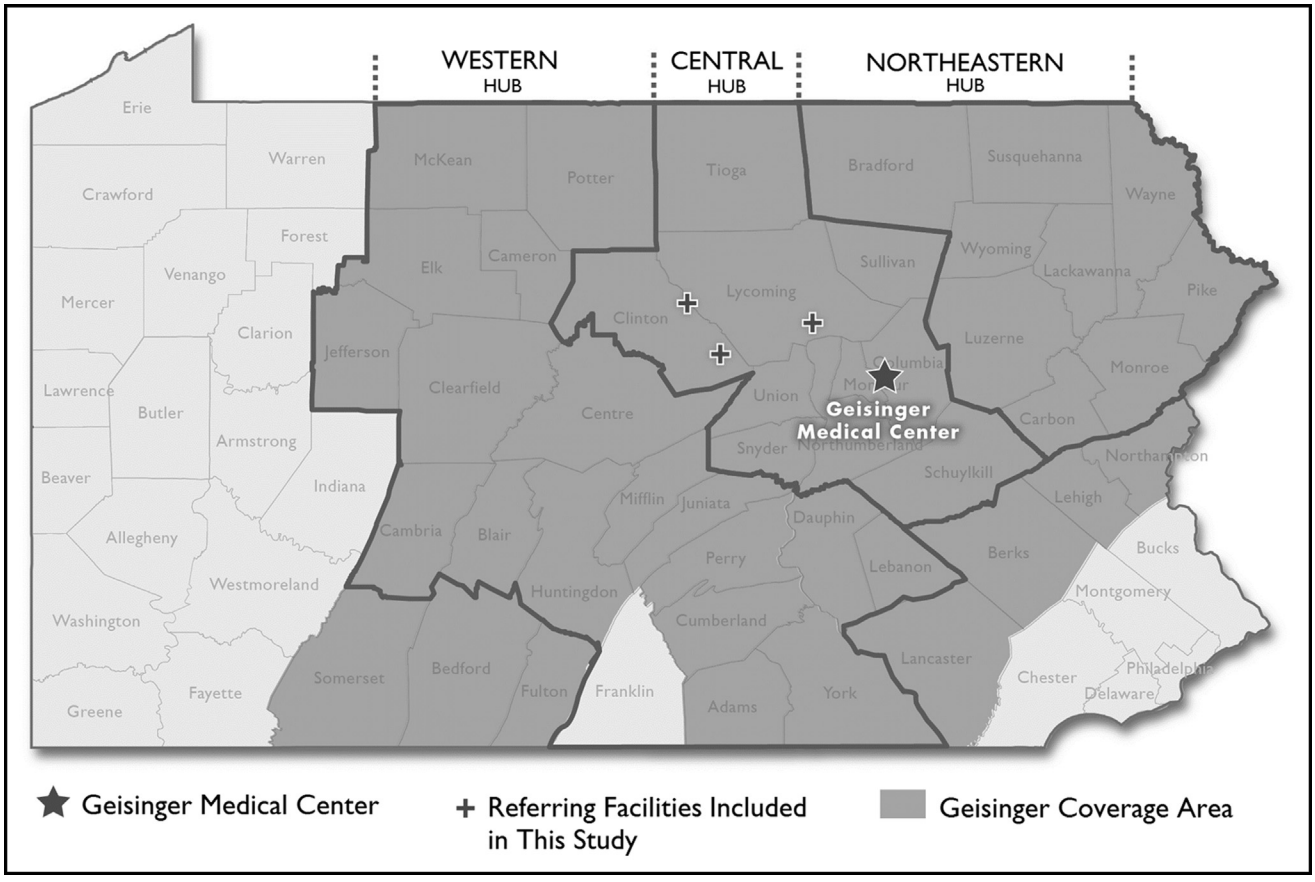

Figure 1 Geisinger Health System coverage in Pennsylvania and the location of referring facilities included in this study.