

The 'Race Car Pit Stop Model' of Hyperacute Stroke Care – keeping the patient on the paramedic stretcher to CT: a toolkit to help stroke centres adopt this method and the results of this change from three stroke centres in Ontario

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Introduction

The Canadian Stroke Best Practice Recommendations suggest the rapid assessment of patients with suspected acute stroke. For patients that arrive by ambulance, allowing the patient to stay on the paramedic stretcher all the way to the CT scanner, with no transfer to an ER gurney/bed prior to imaging, can save time. This process, with its organized and coordinated approach, can mean earlier CT, earlier tPA delivery, and potentially better outcomes. Adopting this process involves support from a wide range of stakeholders, including paramedic services, ED administration, ED nursing staff, and diagnostic imaging. Local resistance can be one of the leading barriers to adopting this protocol, and overcoming this barrier requires communication and information sharing. In this study we examine the development and use of a toolkit, centred around a professionally-filmed video, to assist stroke centres in adopting this model.

Methods 1

At Belleville General Hospital, a program of hyperacute stroke care using tPA was initiated in December 2010. As part of this program, local paramedic services agreed to keep the patient on the paramedic stretcher through assessment, all the way to CT. After five years of this program, a two-year retrospective review was carried out to determine how much additional time paramedics were spending with stroke patients compared to the usual patient who is transferred immediately to an Emergency Department (ED) bed. Patients suffering suspected ST Elevation Myocardial Infarction (MI) were used as a control group as they possess the same level of urgency, but are transferred immediately to a bed. This review showed that paramedics were spending a mean of 11.69 minutes with code stroke patients from arrival until transfer of care at CT Scanner. This includes arrival, triage, sign over, assessment by a stroke physician, establishment of IV's, and drawing of bloodwork. Paramedics spent a total of 5.03 minutes with ST elevation MI patients from arrival to transfer of care, meaning they spent an extra **6.66 minutes** keeping stroke patients on the stretcher all the way to CT, which was a statistically significant difference (Fig 1).

Paramedic Time: Code Stroke vs ST Elevation MI

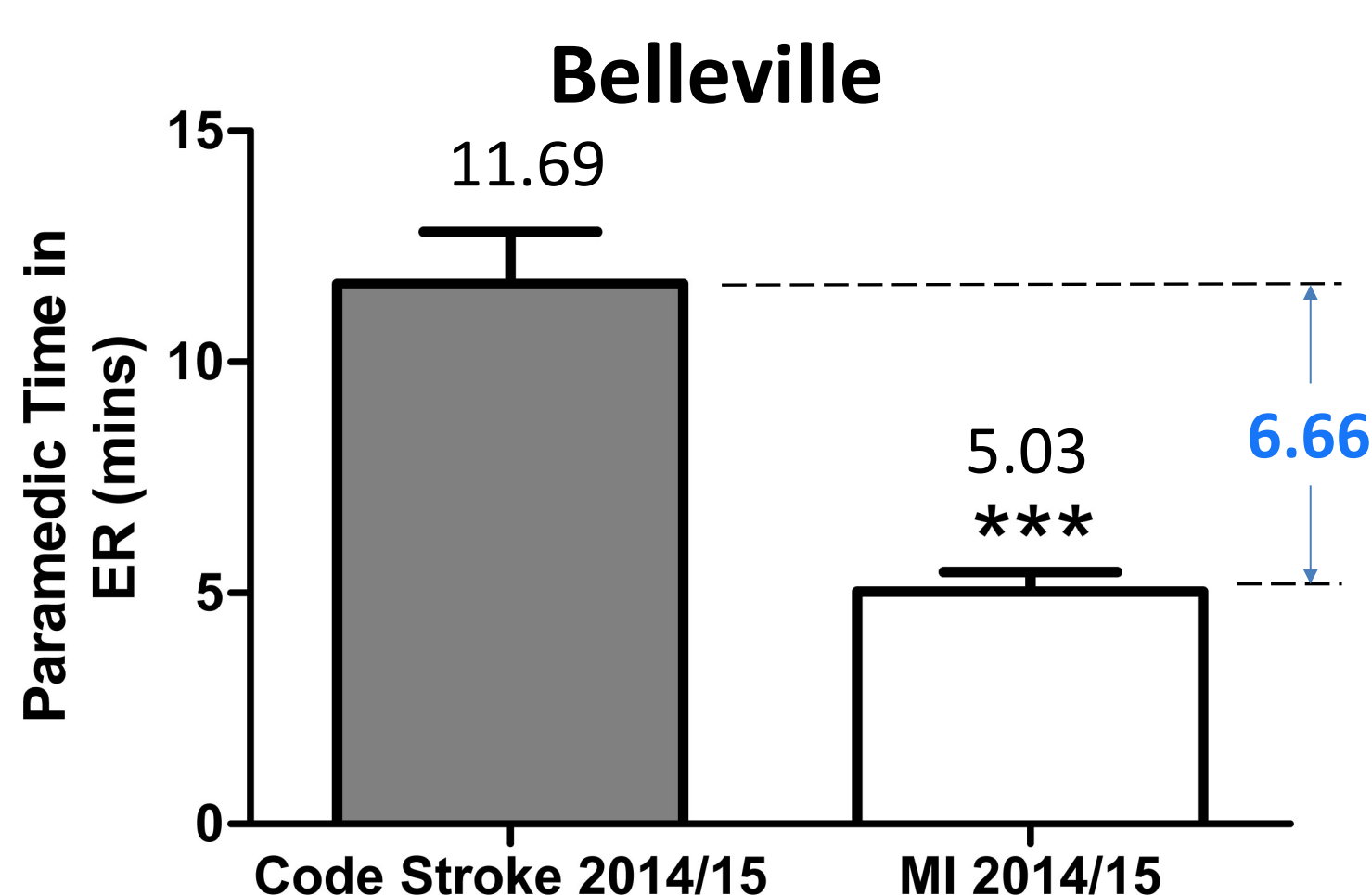
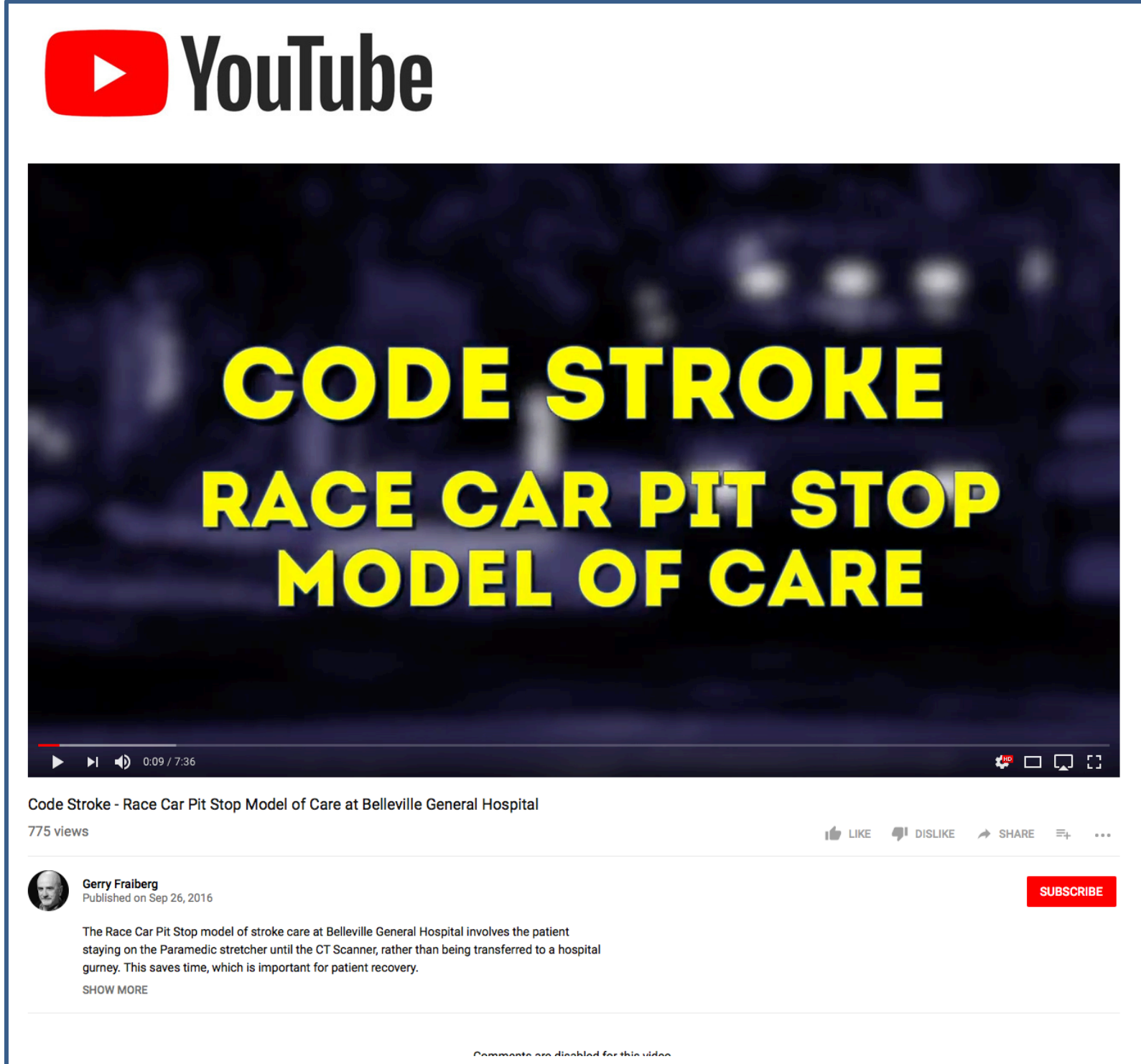


Figure 1 : Comparison of time paramedics spend with code stroke patients and ST Segment Elevation Myocardial Infarction (MI) patients from arrival in the Emergency Department until completion of transfer of care. *** = p<0.0001, Error bars = 95% confidence interval.

Methods 2

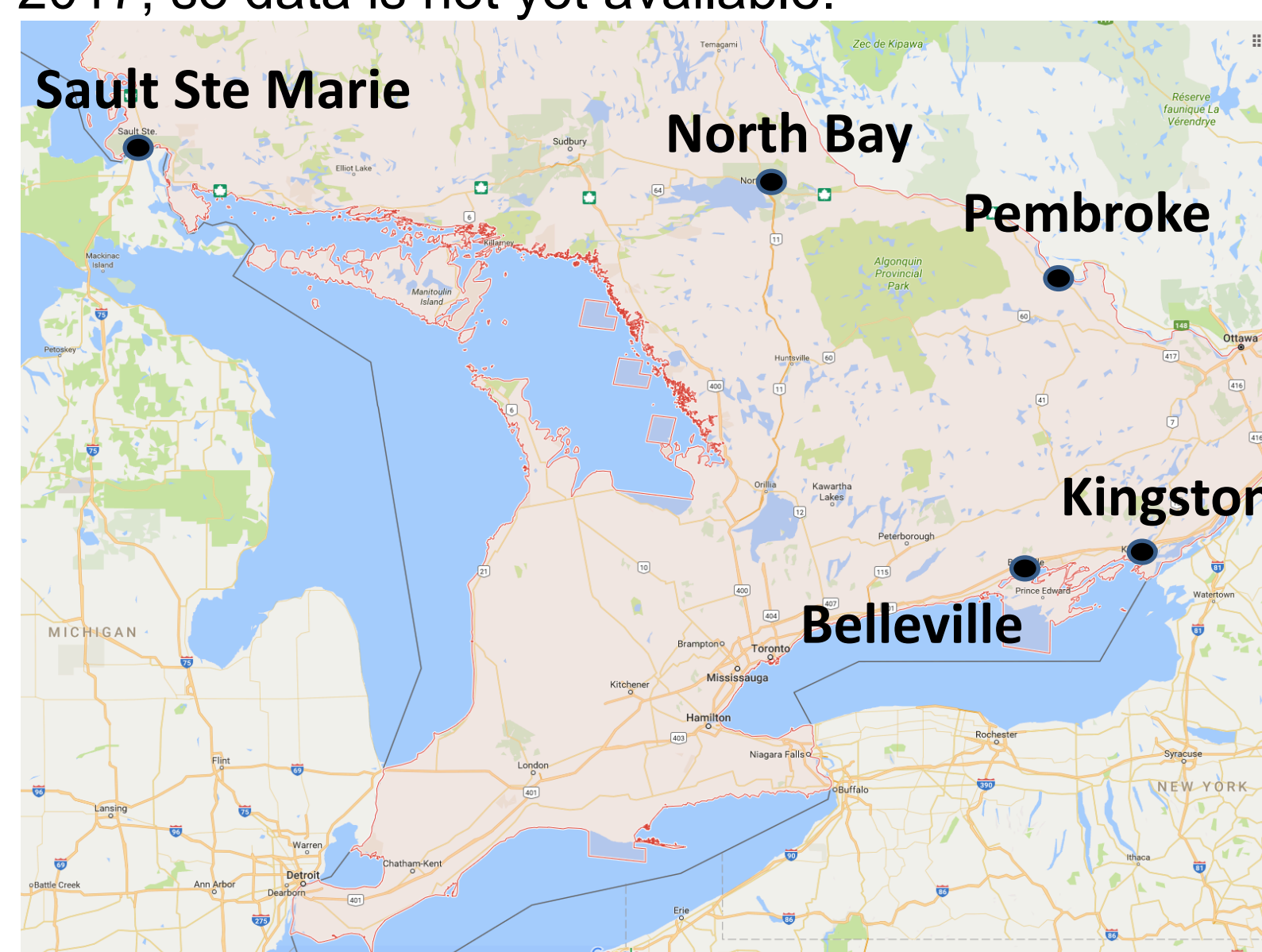
For Hastings-Quinte Paramedic Services, the 6.66-minute investment in paramedic time was felt worthwhile to decrease the delay in treatment of strokes. To assist other centres in adopting this model, a toolkit was designed. The process was branded the 'Race Car Pit Stop Model' because the patient arriving in ED, descended upon by a stroke team, resembles a race car entering the pits. This branding allowed a simple, easy-to-remember name. A professionally-filmed video was created which served as the centrepiece of an information package. The data showing the 6.66-minute increase in paramedic time was included in the video, as it proved to be the most important piece of data for local paramedic chiefs in deciding to commit. The video was posted to YouTube to make it readily accessible.

<https://www.youtube.com/watch?v=CrAY467g2E8>



Ontario Centres

The video proved to be a valuable communication tool about the 'Race Car Pit Stop Model'. Using the video, four stroke centres in Ontario were able to get stakeholder commitment to implement the model. North Bay Regional Health Centre began using the model in February 2016, the Kingston Health Sciences Centre adopted the model starting in October 2016, and Pembroke Regional Hospital in November 2016. The Sault Area Hospital will not roll out the model in September 2017, so data is not yet available.



North Bay

North Bay Regional Health Centre began the 'Race Car Pit Stop Model' in February 2016. The educational video was used to get buy-in from local stakeholders who were able to visualize the model and be convinced that other sites were utilizing the methods. Once all the stakeholders were committed, the process was adjusted to create a model tailored to their own community, and then a locally-produced video was made as an in-house educational aide. A comparison of door to CT times for the 22 months prior to the change to the 'Race Car Pit Stop Model' (FY 2014/15 and FY 2015/16) with 17 months after the change, showed a statistically significant reduction in door to CT time by **15.76 minutes** (Fig. 2)

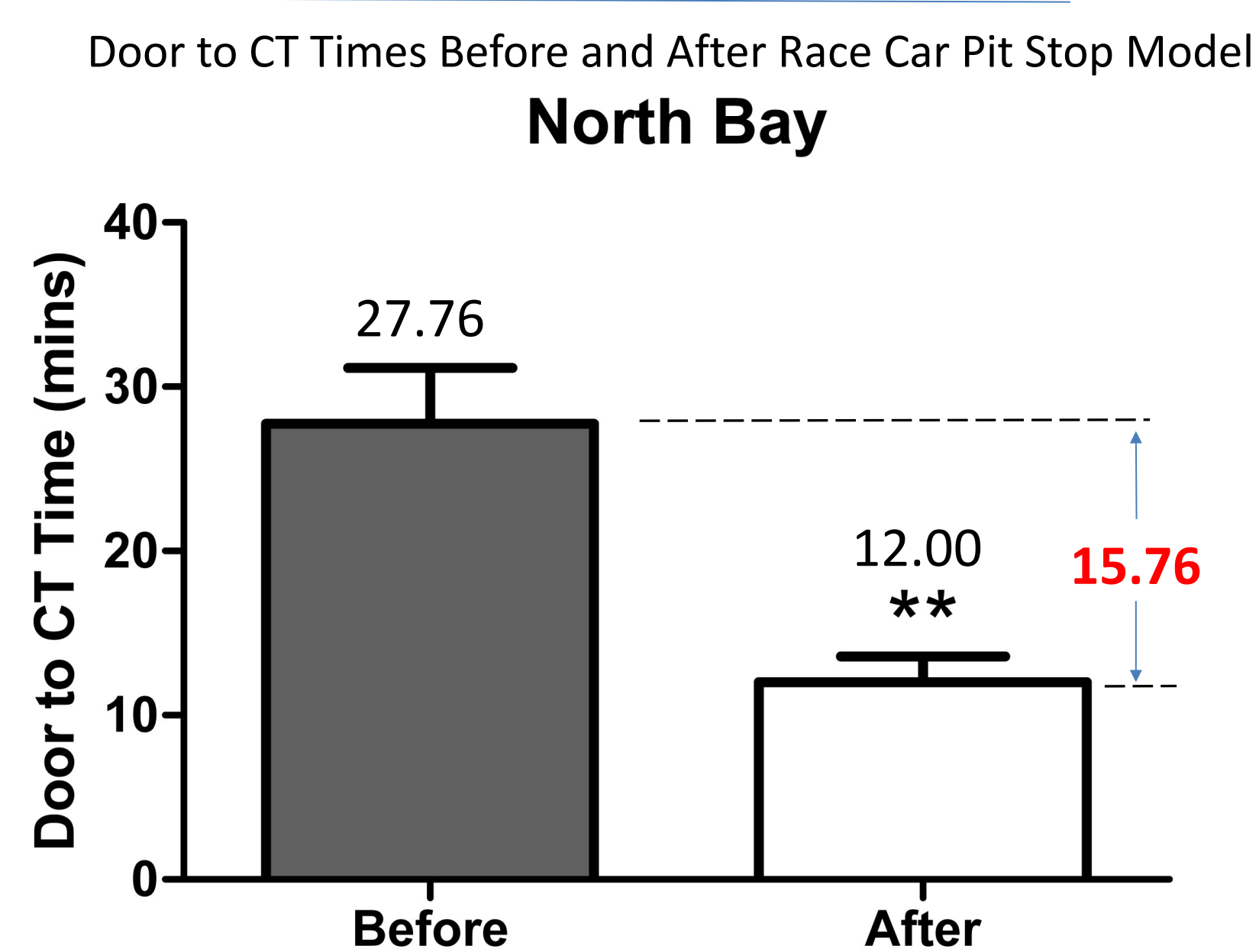


Figure 2 : Comparison of door to CT times before and after change to 'Race Car Pit Stop Model' in North Bay, Ontario. Before n=41; After n=24. Error bars represent 95% C.I. ** P value 0.0011.

Kingston

Kingston Health Sciences Centre, a large academic and Regional Stroke Centre, began the 'Race Car Pit Stop Model' in April 2016 with a 6-month transition period in which the model was not consistently used. The video was used to get buy-in from stakeholders and to educate staff. Following full establishment of the model, median door to needle times for tPA delivery dropped by **9 minutes** compared to the six month interval prior to adoption of the model (Fig. 3)

Door to Needle Times for tPA Before and After Race Car Pit Stop Model

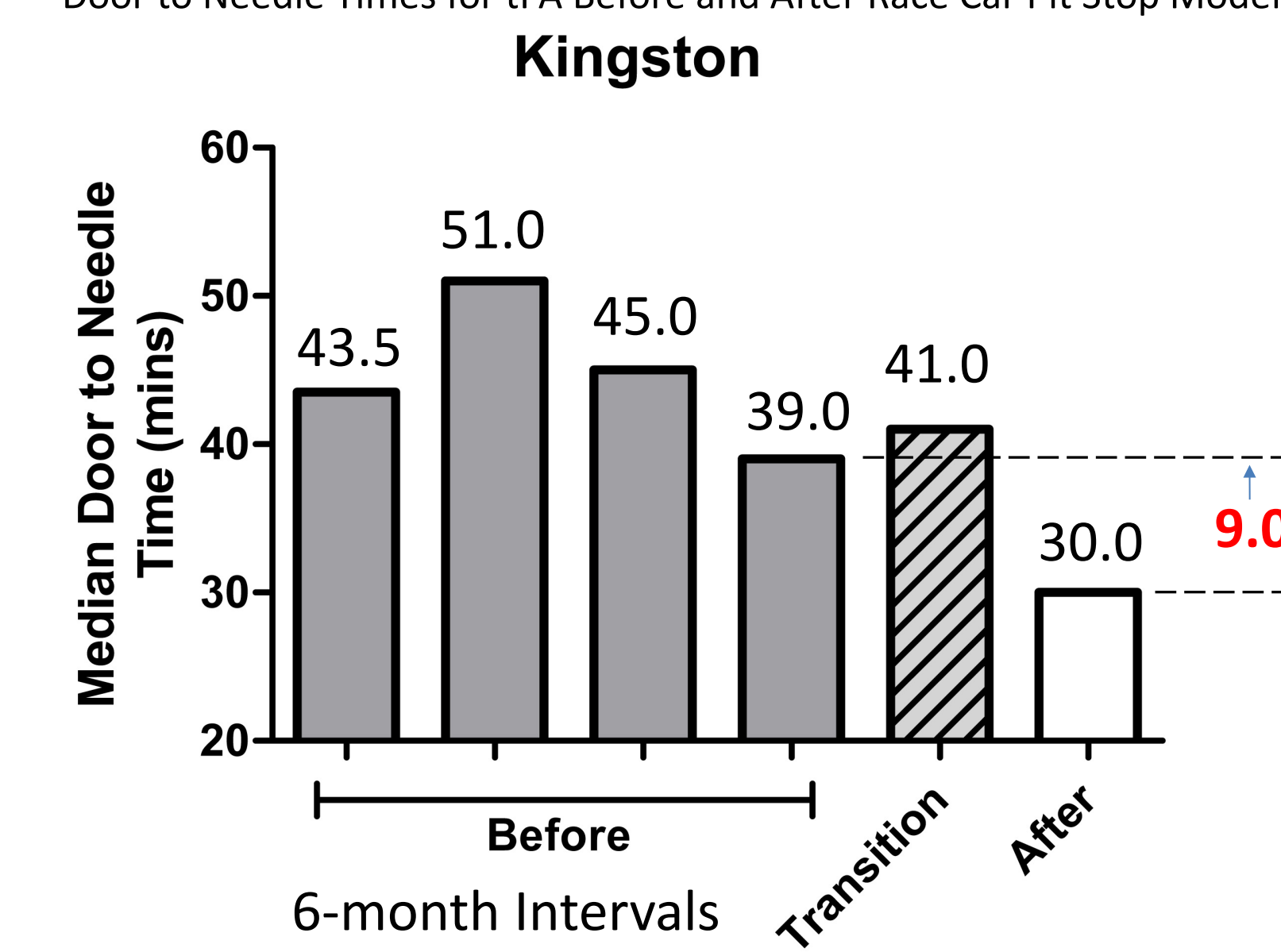


Figure 3 : Comparison of door to needle times for tPA deliver before and after change to 'Race Car Pit Stop Model' in Kingston, Ontario, in 6-month intervals. Includes a transition period where process not consistently used (April-September 2016).

Pembroke

Pembroke Regional Hospital began the 'Race Car Pit Stop Model' in November 2016. Prior to the launch, the educational video was used to get local buy-in from stakeholders, and then a site visit to Belleville General Hospital was carried out to glean further details of the process. A comparison of door to CT times for the 31 months prior to initiation of the model (FY 2014/15, FY 2015/16), and 9 months after, showed a statistically significant reduction in door to CT time by **8.49 minutes** (Figure 4)

Door to CT Times Before and After Race Car Pit Stop Model

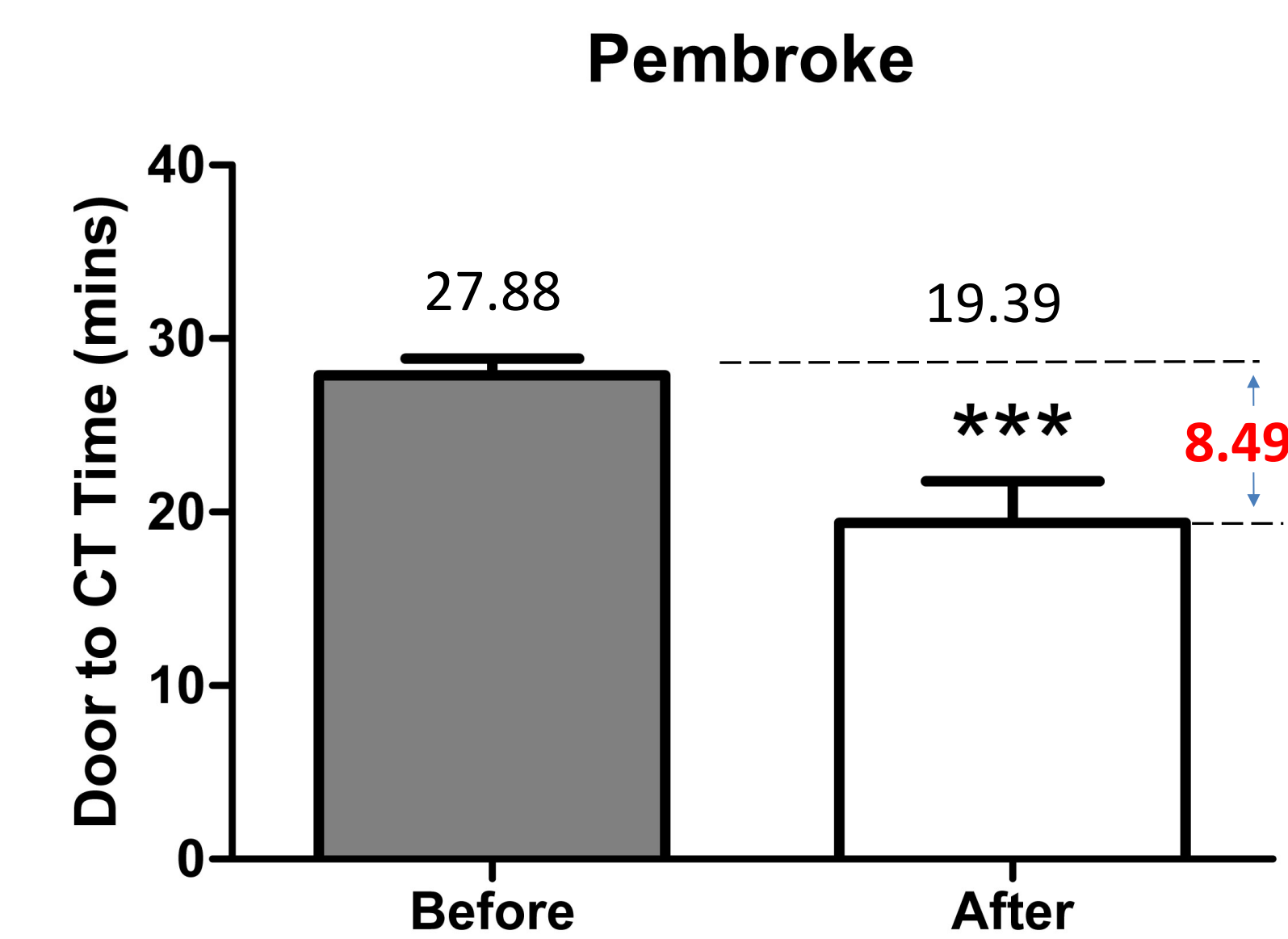


Figure 4 : Comparison of door to CT times before and after change to 'Race Car Pit Stop Model' in Pembroke, Ontario. Before n=119; After n=38. Error bars represent 95% C.I. ** P value 0.0001.

Conclusion

Keeping a stroke patient on the paramedic stretcher through ED assessment to CT reduces the time to tPA delivery and can potentially improve outcomes. At Belleville, Ontario this process was found to involve an extra 6.66 minutes for paramedics compared to immediate transfer to an ED bed. A communication toolkit was created to assist centres in adopting this process, and it was branded the 'Race Car Pit Stop Model'. A professionally-produced educational video is the centre-piece to the toolkit. Four stroke centres in Ontario utilized the video to get local consensus; North Bay, Kingston, Pembroke, and Sault Ste. Marie. Implementation is complete in three of those centres. North Bay reduced their door to CT time by 15.76 minutes using the model, while Pembroke reduced theirs by 8.49 minutes. The Kingston Health Sciences Centre reduced their door to needle time for tPA by 9 minutes. The 'Race Car Pit Stop Model' reduces time to CT and time to tPA delivery, and the educational video and toolkit is an effective communication resource to assist centres in achieving local commitment to adopt the change.

