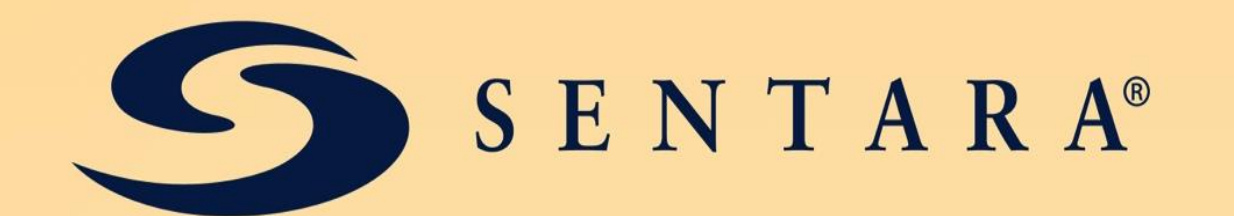


Reducing Stroke Door to Needle Times through Stroke Alert Facilitators and Administering Alteplase Bolus in CT

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INTRODUCTION

- The American Stroke Association's National Target Stroke Phase II sets a Door to Needle (DTN) goal of ≤ 45 minutes.
- Eliminating treatment delays to meet this goal continues to present a challenge for many healthcare facilities.
- Stroke Alert process can suffer delays from lack of communication and facilitation/leadership to ensure rapid patient assessment and treatment.
- The American Stroke Association released several strategies as part of the Target Stroke Phase II including starting intravenous tissue plasminogen activator (Alteplase) in the CT room.
- Sentara Norfolk General Hospital (SNGH) and Sentara Martha Jefferson (SMJH), two primary stroke centers, did not meet this goal of ≤ 45 minutes in 2015 and 2016 (Table 1).
- The objectives of this project were to:
 - Understand current delays in the Stroke Alert Process
 - Eliminate Stroke Alert delays related to communication and lack of continuous leadership/facilitation
 - Redesign the Stroke Alert Process with intravenous tissue plasminogen activator (Alteplase) successfully started in the CT room

METHODS

- Lack of communication - the most common barrier to starting alteplase in the CT room (A Pareto analysis on DTN delays).
- The role of a Stroke Alert Facilitator (SF) was created as a strategy to overcome that barriers.
- The SF and other roles in the stroke alert are outlined in a "swim lane" inspired process (Figure 1).
- The SF launched in March 2016 at SMJH and November 2016 at SNGH.
- The administration of Alteplase in CT began 6-8 months later.

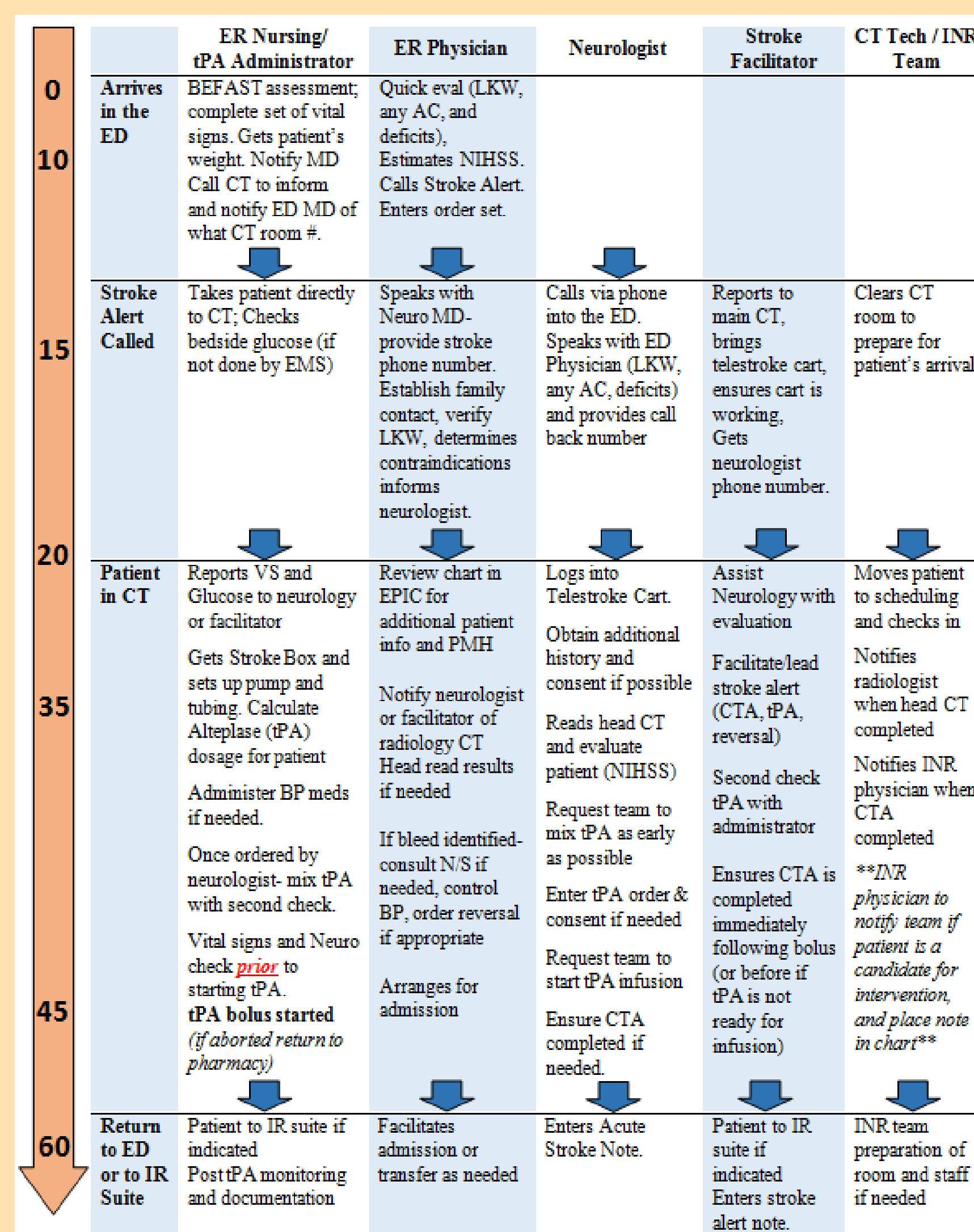


Figure 1. Redesigned SNGH and SMJH ED Stroke Alert Process

ANALYSIS

- DTN was measured in 153 emergency department stroke patients across two hospitals over a 34 month time period.
- There was no difference in DTN between the two hospitals [$t(151) = -.10, p = .93$] therefore the two samples were combined from both sites.
- There were 61 patients in the pre-intervention group, 28 in the SF only group, and 64 in the SF and Alteplase in CT group.
- To test the mean values to compare the three groups, an ANOVA parametric test was utilized.
- Patients were 48% female, were on average 68 years of age, with 17.6% having prior history of CVA and 6.5% having prior history of dementia.
- Patient characteristics did not have a significant association with DTN.

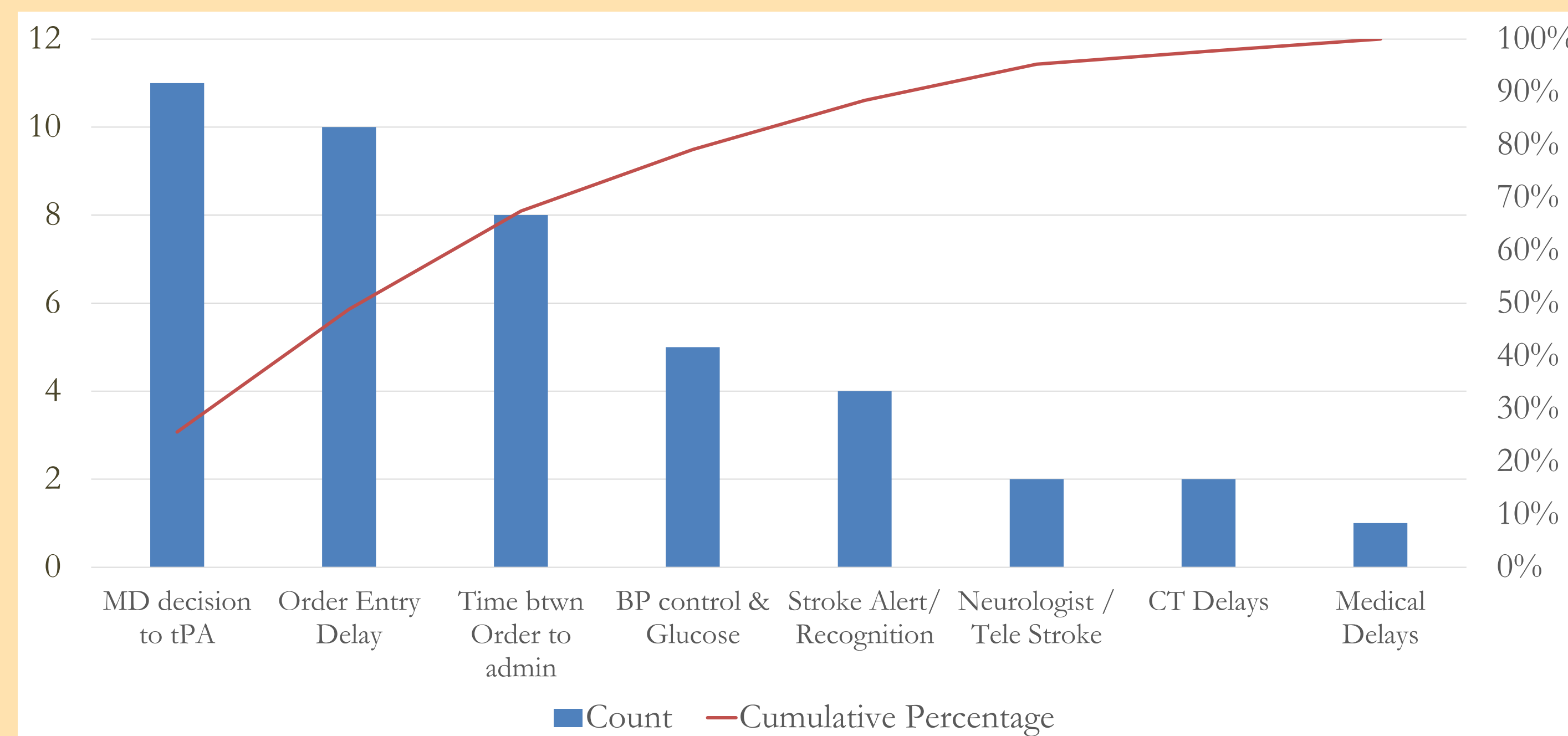


Figure 2. Pareto chart on Alteplase delays in the ED

RESULTS

- There was statistically significant improvement in DTN from the pre-intervention group with a mean of 70 minutes ($M = 70.3; SD = 29.0$) to the SF only group with a mean of 56 minutes [$M = 56.03; SD = 17.9; F(1) = 14.3, p = .006$]. See trajectory of change in Figure 3.
- There was also statistically significant improvement in DTN from the pre-intervention to the SF and tPA in CT group with a mean of 39 minutes [$M = 38.5; SD = 17.9; F(1) = 14.3, p = .006$]; and from SF only group to the SF and tPA in CT group [$F(1) = 17.6, p = .001$].
- Each hospital's individual results are displayed separately below in Figures 4 and 5. All pairwise comparisons were statistically significant.

Alteplase	2015	2016	2017
Average	66	68	39
Median	55	66	34

Table 1. Alteplase start time summary for calendar year 2015 and 2016.

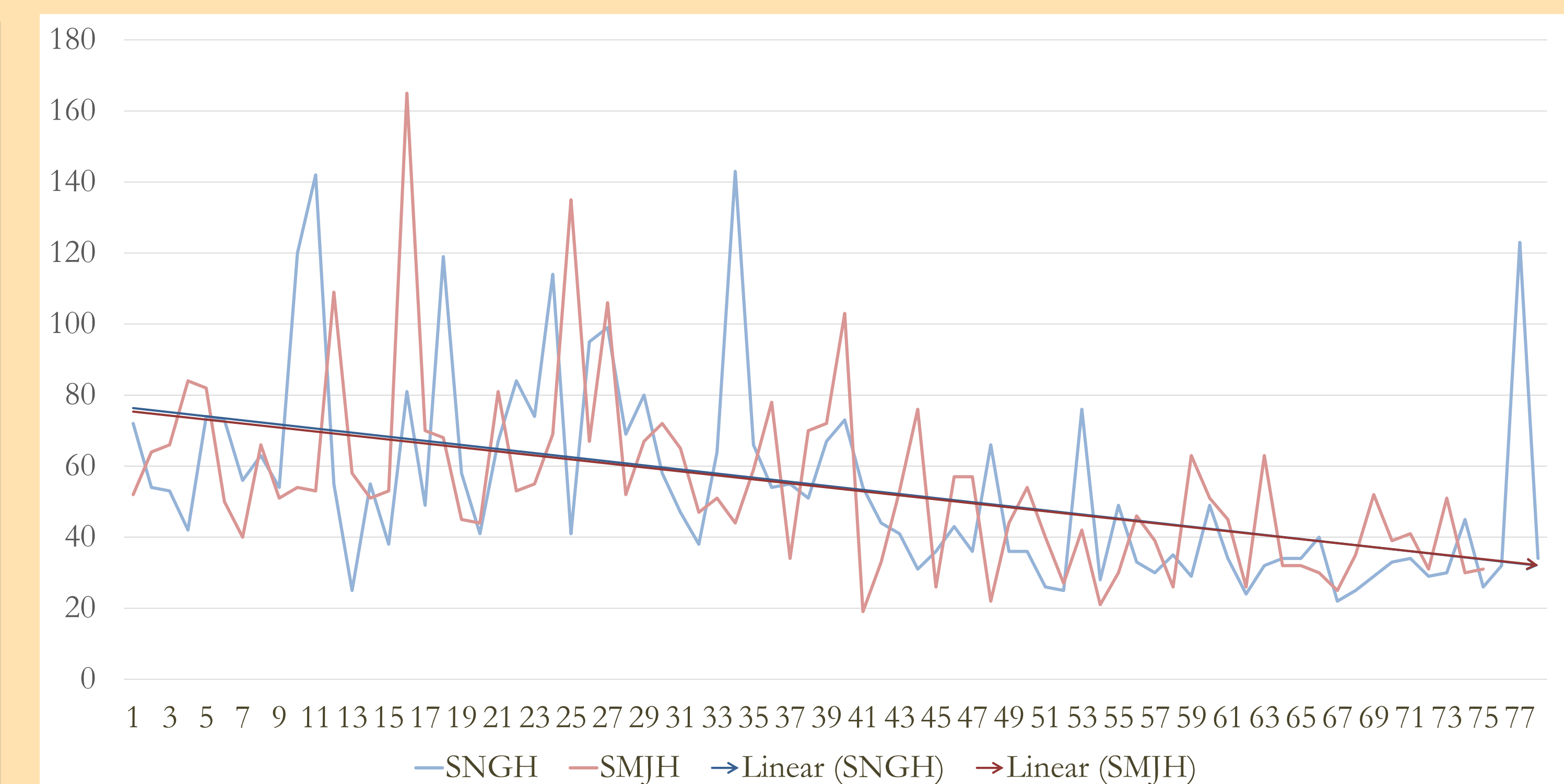


Figure 3. Door To Needle Time In Minutes; No Exclusions, between March 2015 and October 2017; SNGH and SMJH.

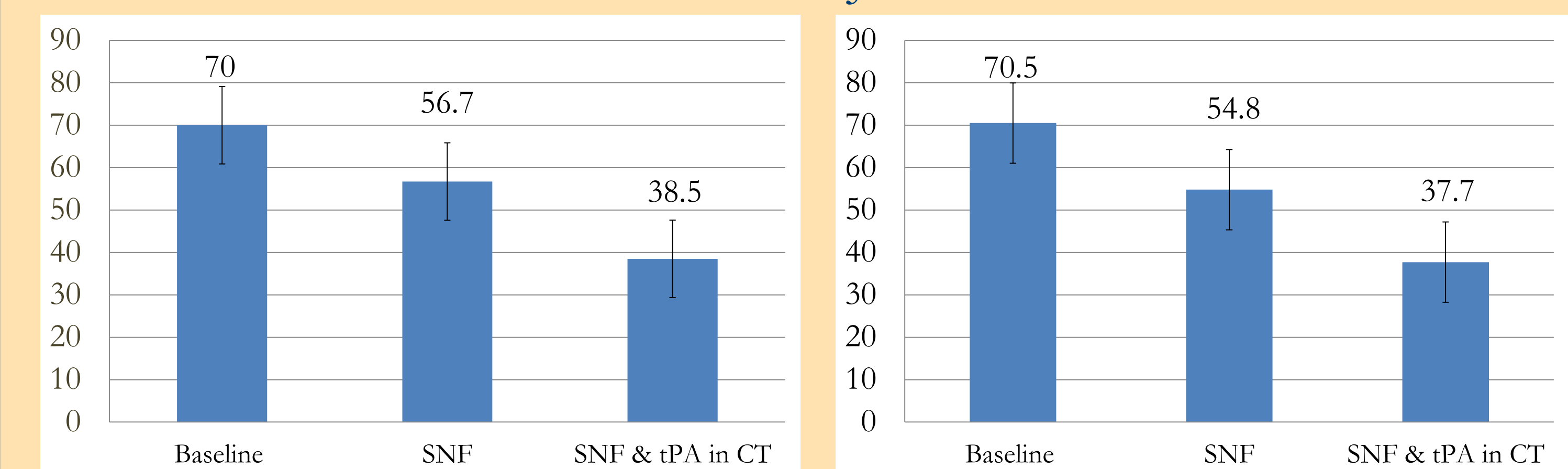


Figure 4. SNGH Median Door To Needle Time In Minutes – Three Group Comparison

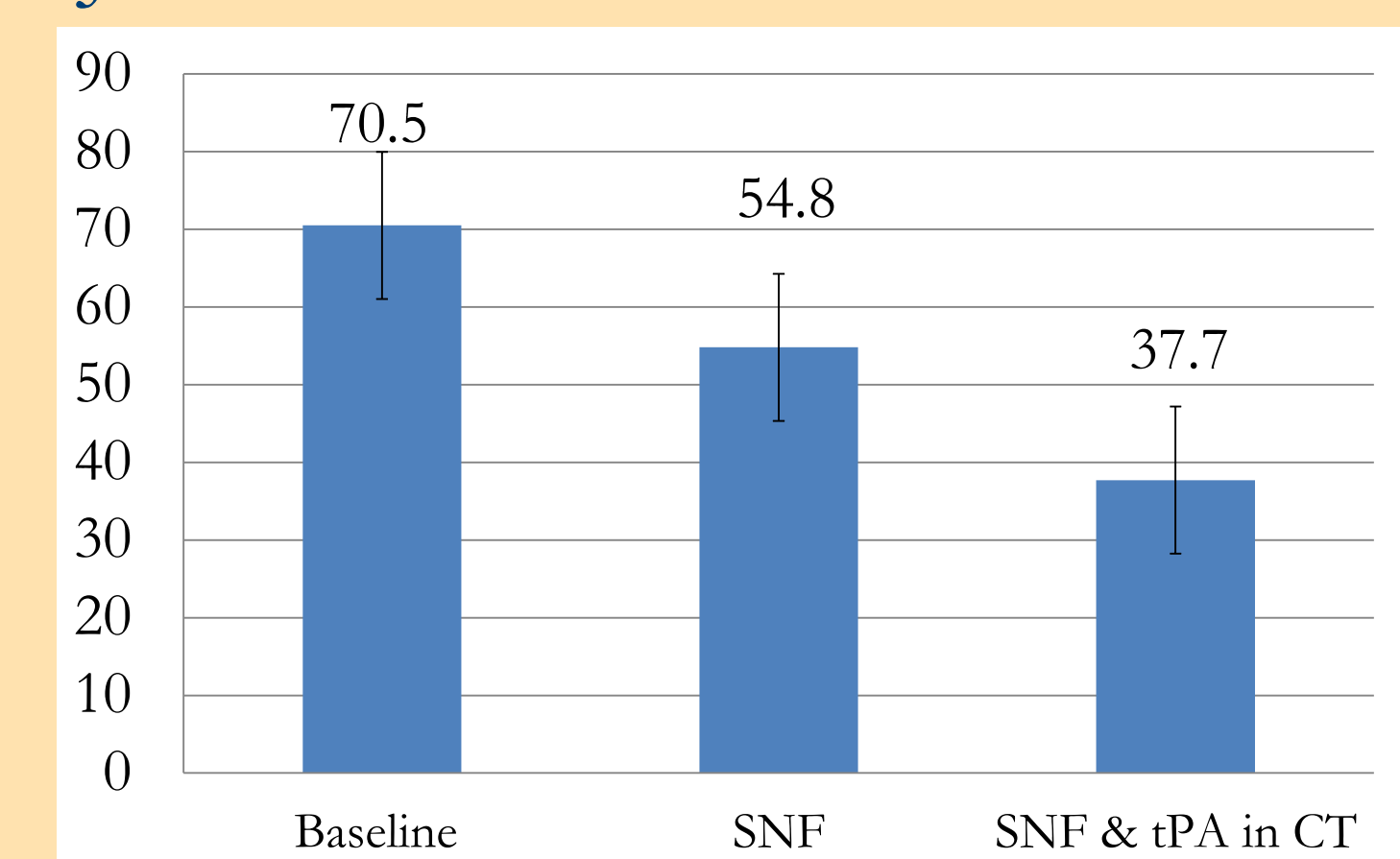


Figure 5. SMJH Median Door To Needle Time In Minutes – Three Group Comparison.

CONCLUSIONS

- Successful communication and facilitation is crucial to achieve positive outcomes or process improvements.
- Implementing a SF to overcome these barriers could prove to be a successful strategy to improving DTN times for acute stroke patients.
- The redesigned SNGH and SMJH ED Stroke Alert Process was successful in significantly decreasing DTN for both sites thus resulting in:
 - Compliance with The American Stroke Association's DTN goal of ≤ 45 minutes
 - Potentially better patient outcomes



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