

## BACKGROUND

In the United States, the Joint Commission (JC) recommends that **all** current smokers receive tobacco cessation services as an inpatient and be followed up within one month after hospital discharge.

Few hospitals implement JC standards due to extra costs, the voluntary nature of the standards, and the lack of evidence demonstrating financial benefits to the hospital and insurers.

The Medical University of South Carolina (MUSC) recently implemented an inpatient tobacco dependence treatment service (TDTS) which provides a bedside consult with patients and phone follow-up using interactive voice recognition (IVR) technology after discharge consistent with JC standards. A previous study (Nahhas GJ, et al, NTR, 2016), found that those exposed to the TDTS had 2-fold higher quit rate 1-month after discharge compared to those not exposed to the program.

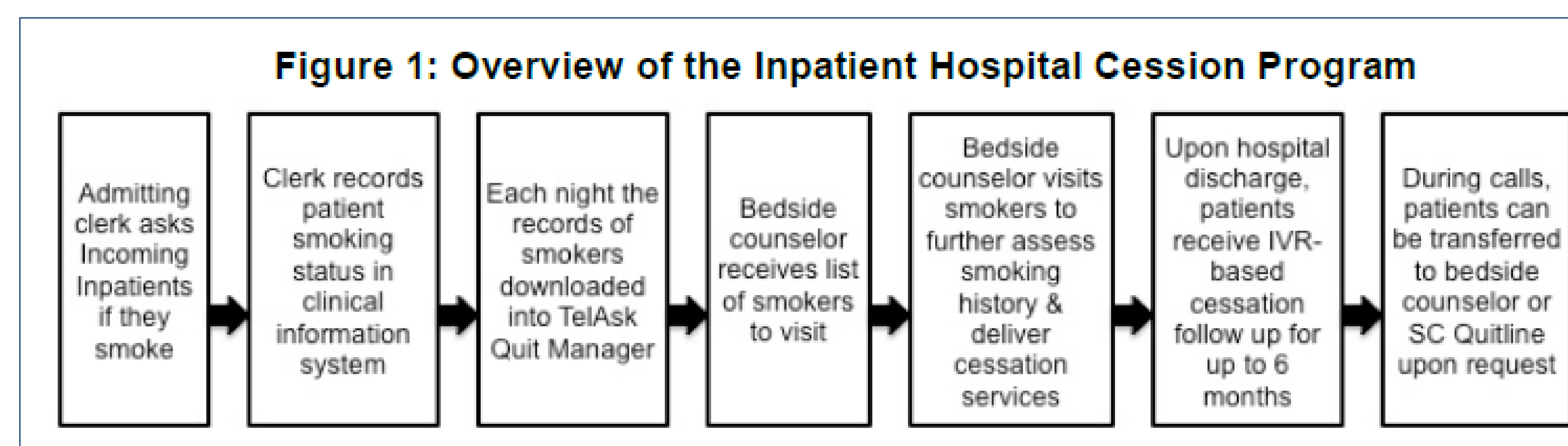
## OBJECTIVES

**HYPOTHESIS:** Among current smokers, 1-year post-discharge healthcare costs will be higher among those who are exposed to the TDTS service compared to those who are not exposed to the TDTS service.

## STUDY POPULATION

- The study population included 3,158 smokers who were acute care patients admitted and discharged from the MUSC hospital between November 1, 2014 and June 31, 2015.
- Table 1 provides a description of the characteristics of the overall study population, and for smokers who did and did not receive TDTS services.
- There were some notable differences between those who did and did not receive TDTS services. Those who received TDTS services were more likely to be: older, hospitalized for fewer days, female, insured and Medicare recipients.

## TOBACCO DEPENDENCE TREATMENT SERVICE



- All current smokers admitted to MUSC during the study period were eligible to receive a bedside consult from a trained tobacco treatment specialist and receive automated IVR follow-up calls at 3, 14 and 30 days after discharge to assess smoking status and offer referrals to tobacco treatment service if desired.
- However, not all identified smokers received the service.
- Reasons for not receiving the service included being discharged before the bedside consult was provided and failure to answer any of the 18 IVR follow-up calls made with 30 days after discharge from the hospital.
- Exposure to the TDTS was defined as follows: of the 3,158 current smokers in the study, 1,663 (53%) received either a bedside consult (n=885) and/or phone follow-up (778) (exposed) while 1,495 (47%) did not (unexposed).

## APPROACH

The study utilized in-place data capture mechanisms to link patient data across 3 data sets: 1) the MUSC electronic health records (EHR) database; 2) the MUSC-TDTS database, and 3) the South Carolina Inpatient Hospitalization Dataset (i.e., state billing claims data). Initial linkage between the MUSC EHR and TDTS databases was done to identify MUSC inpatients eligible for the study, and this merged database was sent to the South Carolina Revenue and Fiscal Affairs Office (SC-RFAO) to obtain follow-up statewide healthcare utilization and cost data among our MUSC inpatient cohort.

Secondary data analyses were carried out to compare healthcare costs among smokers exposed to the TDTS and those not exposed to the service. Among patients in our dataset, we evaluated total healthcare costs post-discharge from MUSC for a 1-year period. Costs taken into account for these analyses included post-discharge inpatient, ambulatory surgery and emergency department charges.

## RESULTS

Table 1: Characteristics of the Study Population

Demographics	Total (n=3,158)	Intervention (n=1,663)	Control (n=1,495)	P-Value
Age (Years)	48.6 (15.5)	49.4 (14.9)	47.8 (16.2)	0.003
Charlson Score	1.2 (2.0)	1.2 (1.9)	1.2 (2.0)	0.756
Length of Stay	6.2 (9.2)	5.5 (6.6)	7.0 (11.4)	<0.001
Race				0.676
White	1898 (60.1%)	991 (59.6%)	907 (60.7%)	
Black	1168 (37.0%)	618 (37.2%)	550 (36.8%)	
Hispanic	41 (1.3%)	24 (1.4%)	17 (1.1%)	
Other	51 (1.6%)	30 (1.8%)	21 (1.4%)	
Gender				<0.001
Female	1398 (44.3%)	784 (47.1%)	614 (41.4%)	
Male	1760 (55.7%)	879 (52.9%)	881 (58.9%)	
Insurance				0.001
Uninsured	809 (25.6%)	391 (23.5%)	418 (28.0%)	
Medicare	911 (28.9%)	524 (31.5%)	387 (25.9%)	
Medicaid	610 (19.3%)	314 (18.9%)	296 (19.8%)	
Private	742 (23.5%)	396 (23.8%)	346 (23.1%)	
Other	86 (2.7%)	38 (2.3%)	48 (3.2%)	

Figure 2: Mean Number of Inpatient, Ambulatory Surgery and ED Claims By Exposure Status to TDTS Services

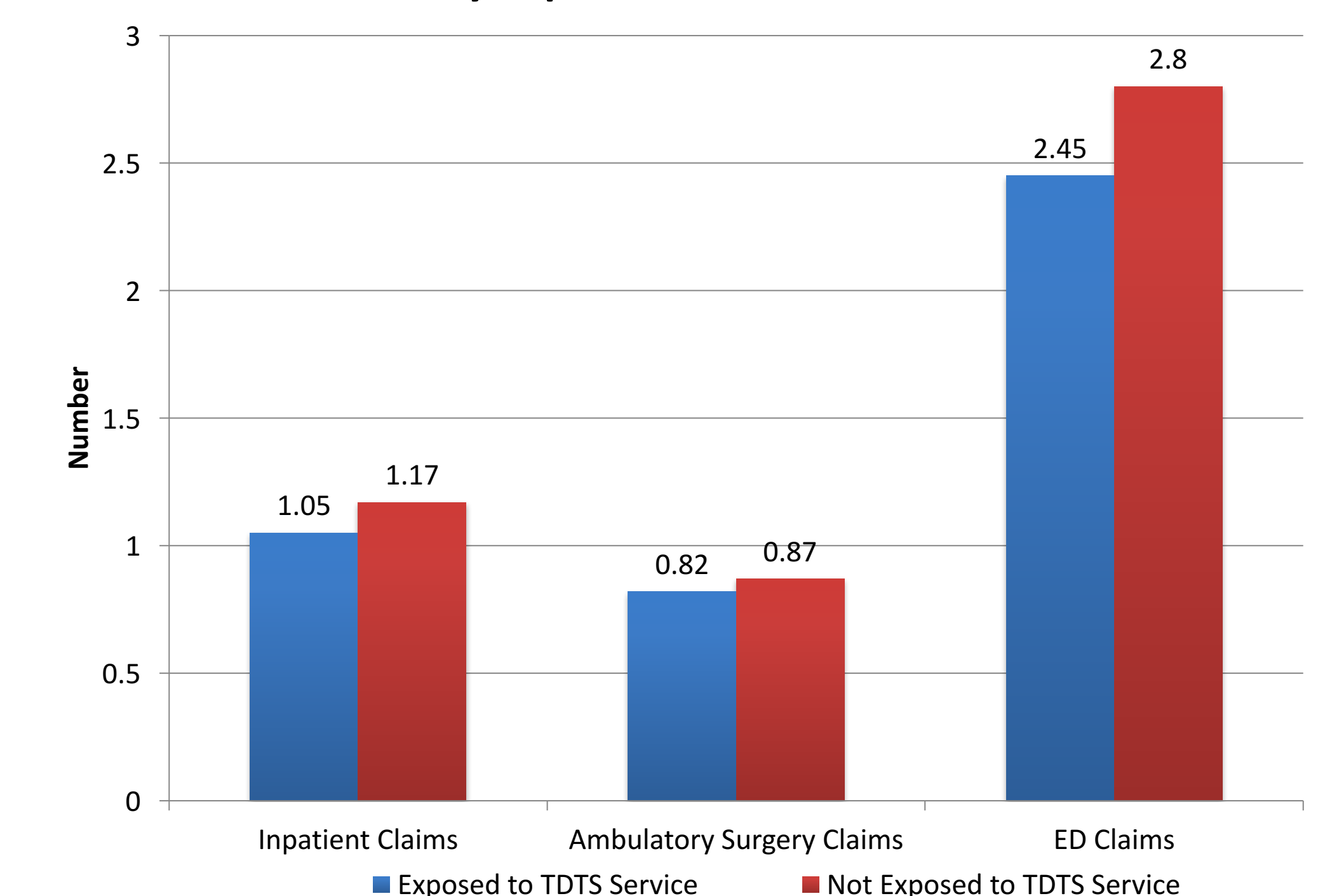


Figure 3: Unadjusted Mean Charges for Healthcare for 1-Year Post-Discharge by Exposure Status to TDTS

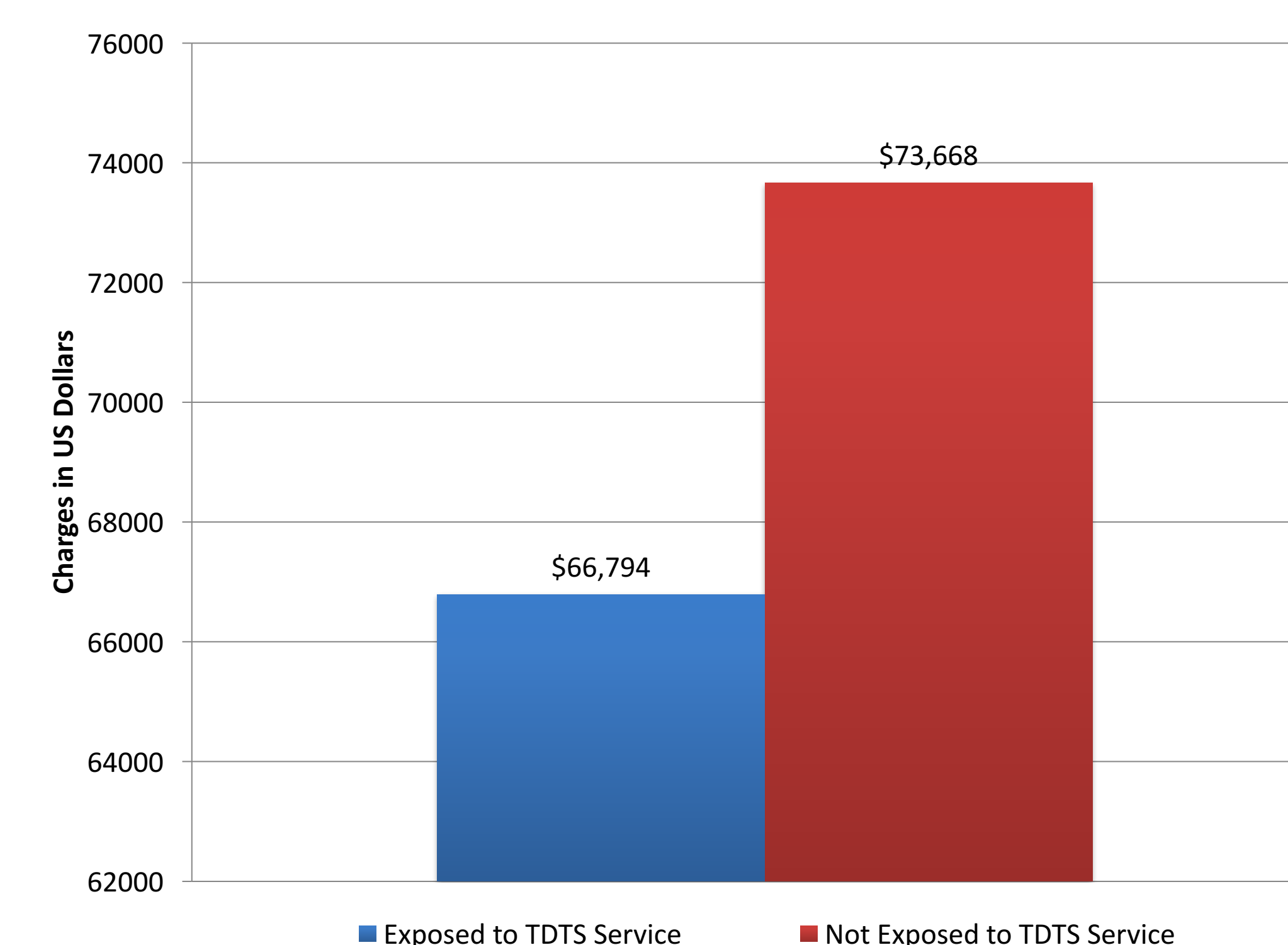


Table 2: Effect of TDTS Service On Post Discharge Healthcare Charges Over a 1-Year Period

	Post-Discharge Healthcare Charges	95% Confidence Interval
TDTS Intervention	-\$8,429	-\$18,646 - \$1,788
Effect of Covariates Controlled for in Cost Model		
Charlson Score	\$8,308	\$4,826 - \$11,791
Age (Years)	\$89	-\$308 - \$486
Race (Referent Group = White)		
Black	\$2,182	-\$8,600 - \$12,964
Hispanic	-\$31,927	-\$56,881 - -\$6,972
Other	-\$19,595	-\$48,961 - \$9,772
Gender (Referent Group = Males)		
Female	-\$470	-\$10,712 - \$9,771
Insurance (Referent Group = Uninsured)		
Medicare	\$22,387	\$7,556 - \$37,218
Medicaid	\$20,825	\$4,644 - \$37,006
Private	-\$3,842	-\$15,986 - \$8,283
Other	-\$19,187	-\$39,108 - \$733

\* Analysis was done using a Generalized Linear Model with Gamma Family and Log Link to obtain Average Marginal Effects in US Dollar Values for the effect of the TDTS Service, controlling for age, race, gender, insurance status and Charlson Score.

## CONCLUSIONS

- Exposure to the TDTS was associated with a clinically important reduction in health care costs.** The average marginal impact of exposure to the TDTS on overall charges post index admission was a reduction of \$8,429 after adjusting for age, race, payer, insurance status and Charlson score for the time period under consideration.
- Next Steps:** Future analyses will incorporate the cost of program development and implementation into our analyses to enable examination of overall program cost effectiveness from the perspectives of hospitals, insurers and patients.