

# Association Between Prescription Fill Rates and Adverse Outcomes within an mHealth

## Clinical Trial Designed to Improve Medication Adherence



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### Background

- Medication nonadherence is associated with adverse outcomes in observational studies.
- Whether that association persists in clinical trials designed to improve adherence is uncertain.
- We describe factors associated with low adherence among patients enrolled in a mobile Health intervention utilizing text messages to improve cardiovascular medication refills.
- Relationship between adherence and adverse outcomes was then assessed.

### Methods

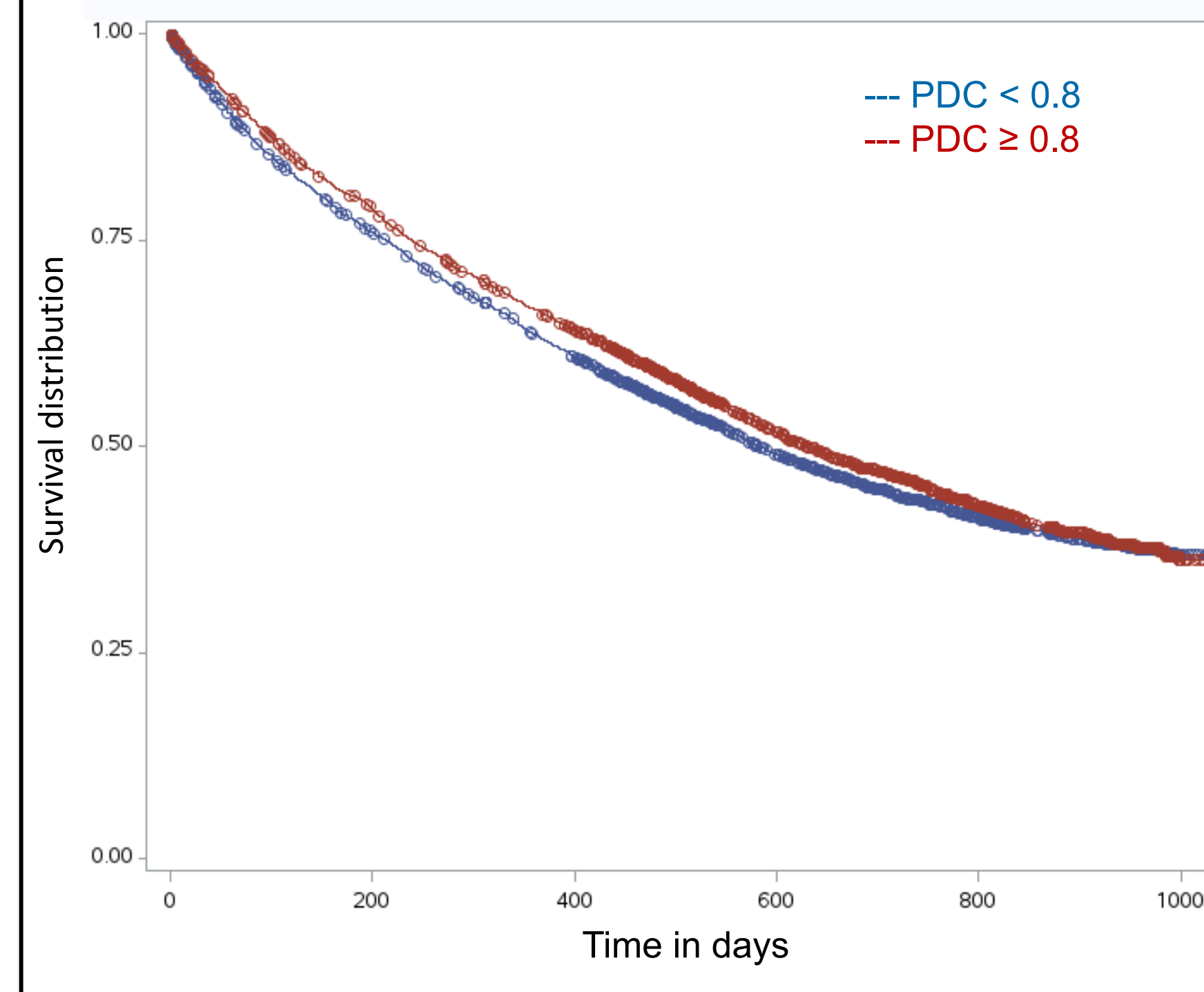
- The NUDGE study was a pragmatic clinical trial randomizing patients to usual care vs different types of text messages (generic, behavioral nudge, behavioral nudge plus an AI chatbot) to improve medication refill rates when there was a 7-day delay in refill.
- Primary exposure variable of low adherence (determined from pharmacy data) was defined as proportion of days covered by medication (PDC)  $\leq 0.80$  in the first 3 months after enrollment.
- Adverse outcomes were defined as time to ED visit, hospitalization or death.
- Statistical analysis of the association between low adherence and adverse outcomes was performed using Cox proportional hazards.

Variable	PDC < 0.8	PDC $\geq$ 0.8	P-value
Age	58.3 (12.9)	62.5 (11.9)	<.0001
Female Gender	2,533 (47.0%)	1,818 (46.9%)	0.95
Race			
White	3,659 (67.9%)	2,801 (72.3%)	<.0001
African American	935 (17.3%)	582 (15.0%)	
Other	799 (14.8%)	492 (12.7%)	
Ethnicity			
Hispanic	2,791 (51.8%)	1,773 (45.7%)	<.0001
Non-Hispanic	2,563 (47.5%)	2,066 (53.3%)	
Unknown	39 (0.7%)	37 (1.0%)	
Insurance			
Commercial	1,203 (22.3%)	672 (17.3%)	<.0001
Medicaid	1,702 (31.6%)	883 (22.8%)	
Medicare	1,700 (31.5%)	1,780 (45.9%)	
VA	16 (0.3%)	19 (0.5%)	
Unknown	227 (4.2%)	234 (6.0%)	
None	545 (10.1%)	288 (7.4%)	
Language			
English	3,763 (69.8%)	2,889 (74.5%)	<.0001
Spanish	1,625 (30.1%)	980 (25.3%)	
Other	5 (0.1%)	7 (0.2%)	
Marriage Status			
Married	2,217 (41.1%)	1,647 (42.5%)	0.001
Single	2,131 (39.5%)	1,379 (35.6%)	
Divorced/Widowed	1,012 (18.8%)	821 (21.2%)	
Unknown	33 (0.6%)	29 (0.8%)	
Comorbidities			
HTN	4,190 (77.7%)	3,235 (83.5%)	<.0001
HLD	2,459 (45.6%)	2,061 (52.3%)	<.0001
CAD	711 (13.2%)	655 (16.9%)	<.0001
DM	2,800 (51.9%)	1,912 (49.3%)	0.01
AF	296 (5.3%)	294 (7.6%)	<.0001
CHF	386 (7.2%)	307 (7.9%)	0.17
CKD	453 (8.4%)	332 (8.6%)	0.78
CVD	298 (5.5%)	248 (6.4%)	0.08
MI	247 (4.6%)	176 (4.5%)	0.93
Prior Revasc	138 (2.6%)	109 (2.8%)	0.46
Depression	998 (18.5%)	744 (19.2%)	0.40
PTSD	258 (4.8%)	184 (4.8%)	0.93
Substance Abuse	261 (4.8%)	133 (3.4%)	0.001
Qualifying Condition			
HTN	4,146 (76.7%)	3,205 (82.7%)	<.0001
HLD	2,309 (42.8%)	1,958 (50.5%)	<.0001
CAD	674 (12.5%)	636 (16.4%)	<.0001
DM	2,743 (50.9%)	1,890 (48.5%)	0.03
AF	267 (5.0%)	281 (7.3%)	<.0001

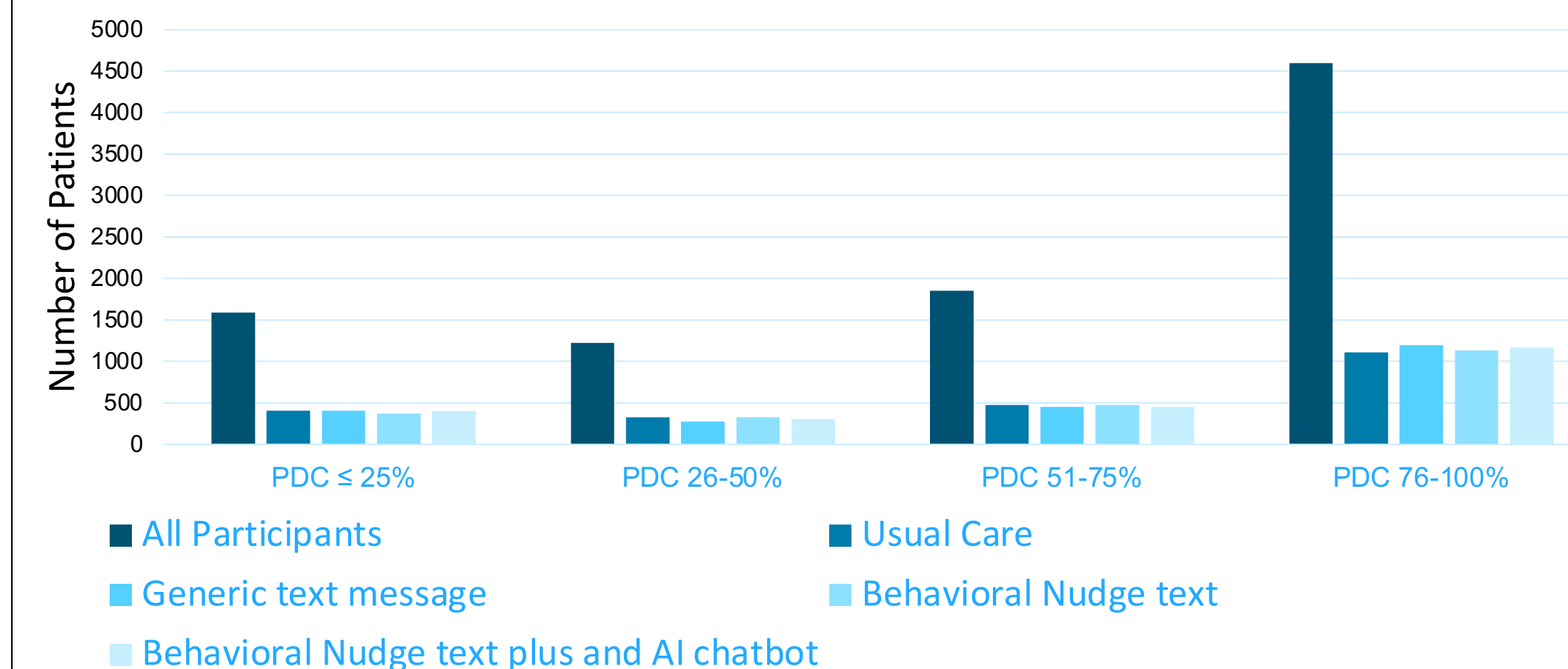
Table 1. Baseline patient characteristics in patients with PDC  $\leq 0.80$  and patients with PDC  $> 0.80$ .

### Results

Days to death, ED visit, or hospitalization by Adherence



Distribution of Patients by Adherence (PDC) and Treatment Arm



### Conclusions

- The median PDC was 0.74 (0.19-0.96, 25%-75% percentile).
- Patients with low adherence comprised 53.5% of the cohort.
- All 3 text messaging intervention arms increased refill adherence at similar rates (~5%) at 3-months compared to usual care.
- In multivariable analyses, low adherence in the first 3 months was associated with adverse outcomes (HR 1.13; 95% CI 1.06-1.19) regardless of study arm enrollment.

### Implications

- Among patients enrolled in a randomized clinical trial to improve medication refill adherence, low adherence remains common and was associated with adverse outcomes.
- While this mHealth intervention increased CV medication refills, additional solutions are needed to improve medication adherence.

### Disclosures

None