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## AIM Statement

To improve the average quality of bowel preparation scores for outpatient screening colonoscopies at Minneapolis VA Medical Center by 10% over 3 months.

## Background

**Colonoscopy and Bowel Preparation**

- Screening colonoscopy is effective in reducing morbidity and mortality associated with colorectal carcinoma
- Inadequate bowel prep leads to missed polyp/adenoma detection rates and increased resource utilization for repeat colonoscopies.

### Boston Bowel Preparation Scale

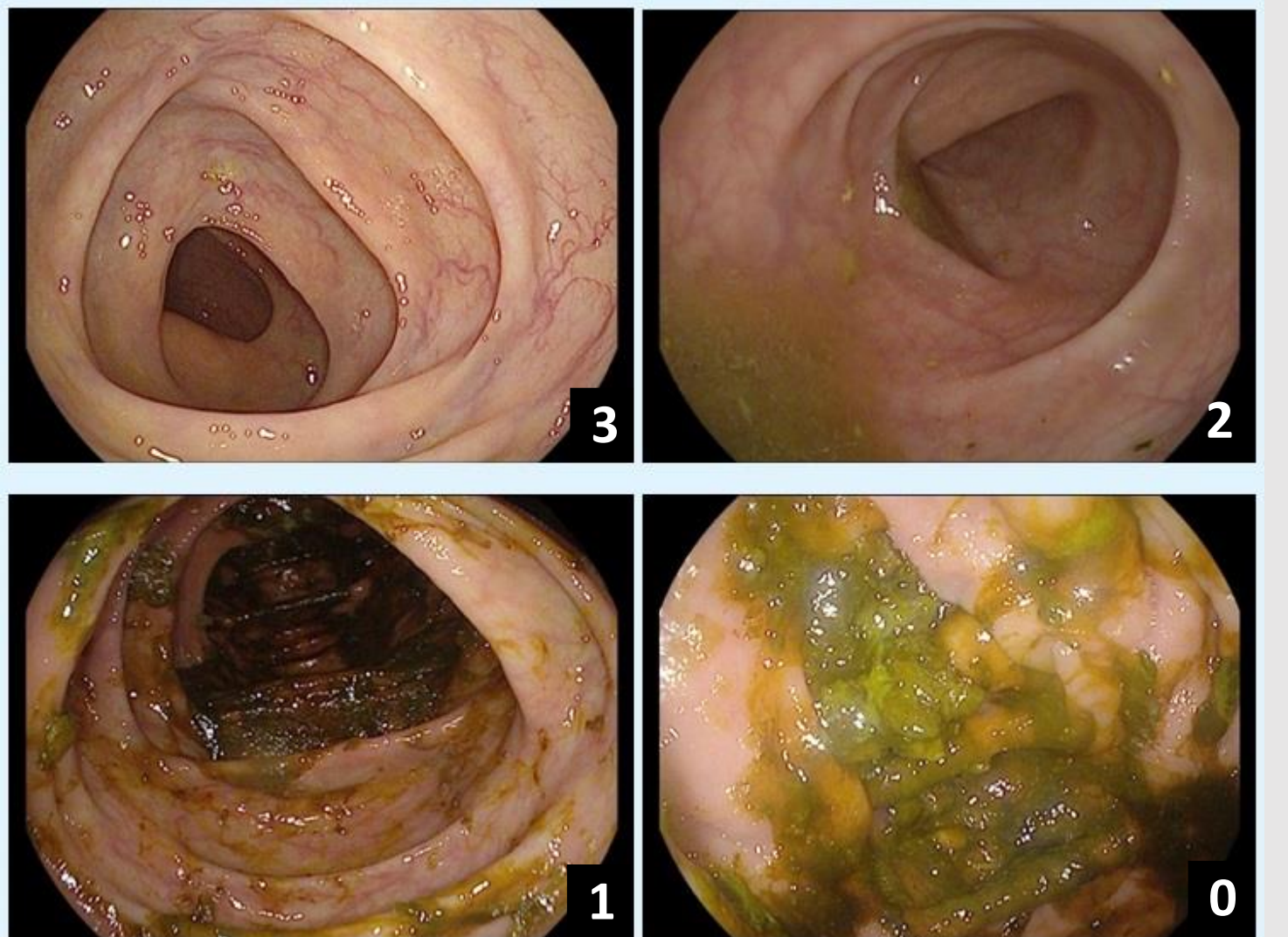


Figure 1: Each segment of the colon is given a score ranging from 0 (bottom right) to 3 (top left), segment scores added for total of 0-9

- Adequate bowel prep: BBPS total  $\geq 6$  with no single segment  $< 2$
- The higher the BBPS score, the cleaner the bowel.
- Baseline at Minneapolis VAMC is BBPS 7.8.

## Intervention

**What is ANNIE?**  
VAMC automated text messaging service and mobile application.

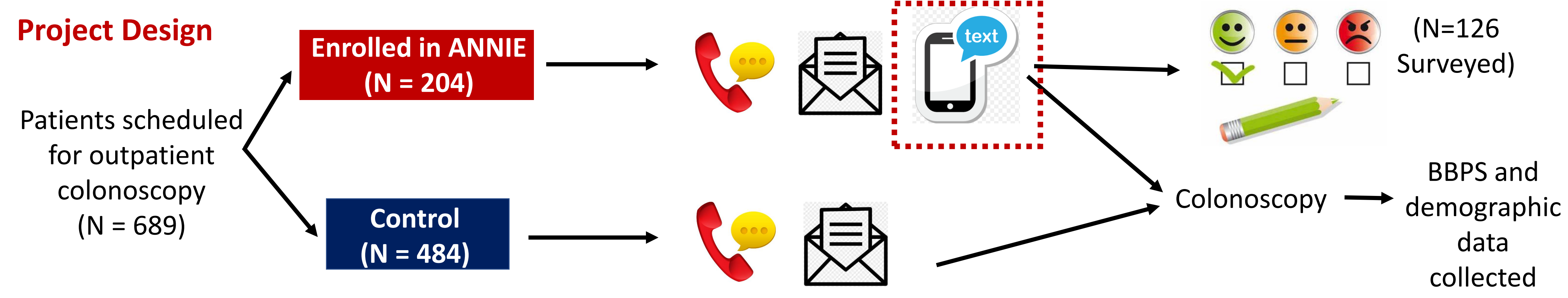
- Named after Lieutenant Annie G. Fox, first woman to receive the Purple Heart for combat.
- Allows for customizable educational/motivational text message reminders about clinical care
- Texts have been proven to improve colon preps
- We created an ANNIE text message protocol to remind patients about key steps of the bowel prep

Hi, this is Annie, VA's Health Texting program. Please text the word START to confirm your consent to participate in the program and begin receiving messages.

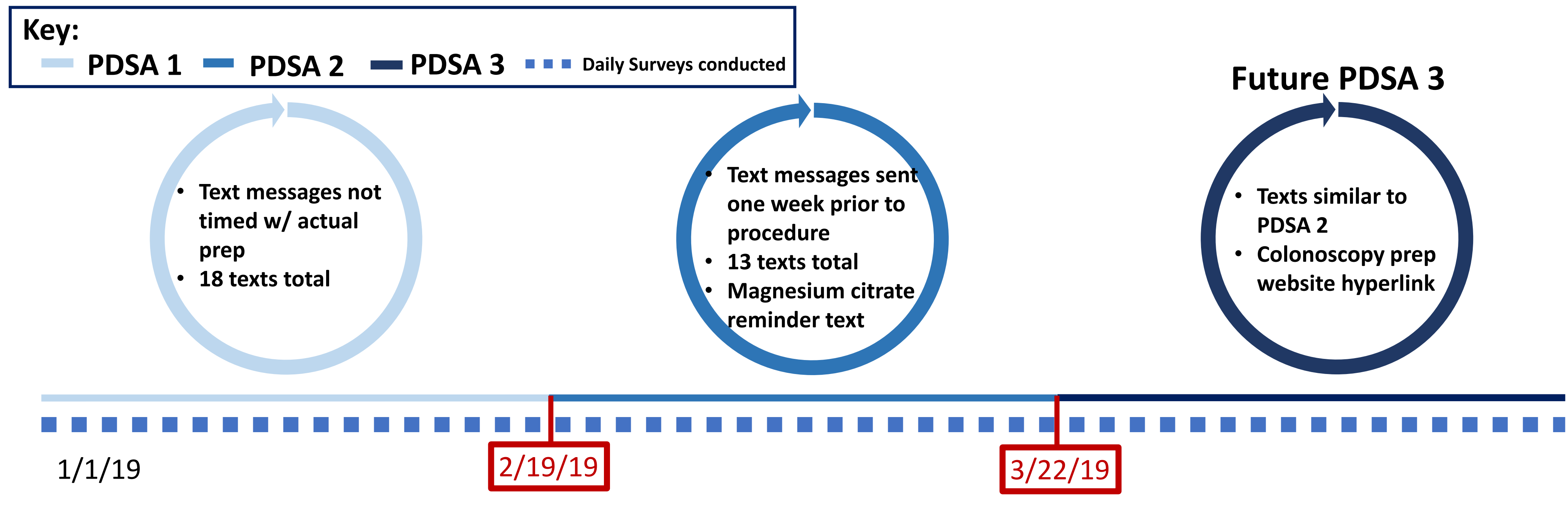
Start

If you take blood thinner medication (warfarin/coumadin/Plavix/clopidogrel), call your provider to see if it can be stopped 5 days before your exam. – Annie

## Methods



**PDSA Cycles** Inclusion criteria: Outpatient colonoscopies between January – March 2019  
Exclusion criteria: Extended coloscopy prep (including MAC anesthesia); patients without text message capability



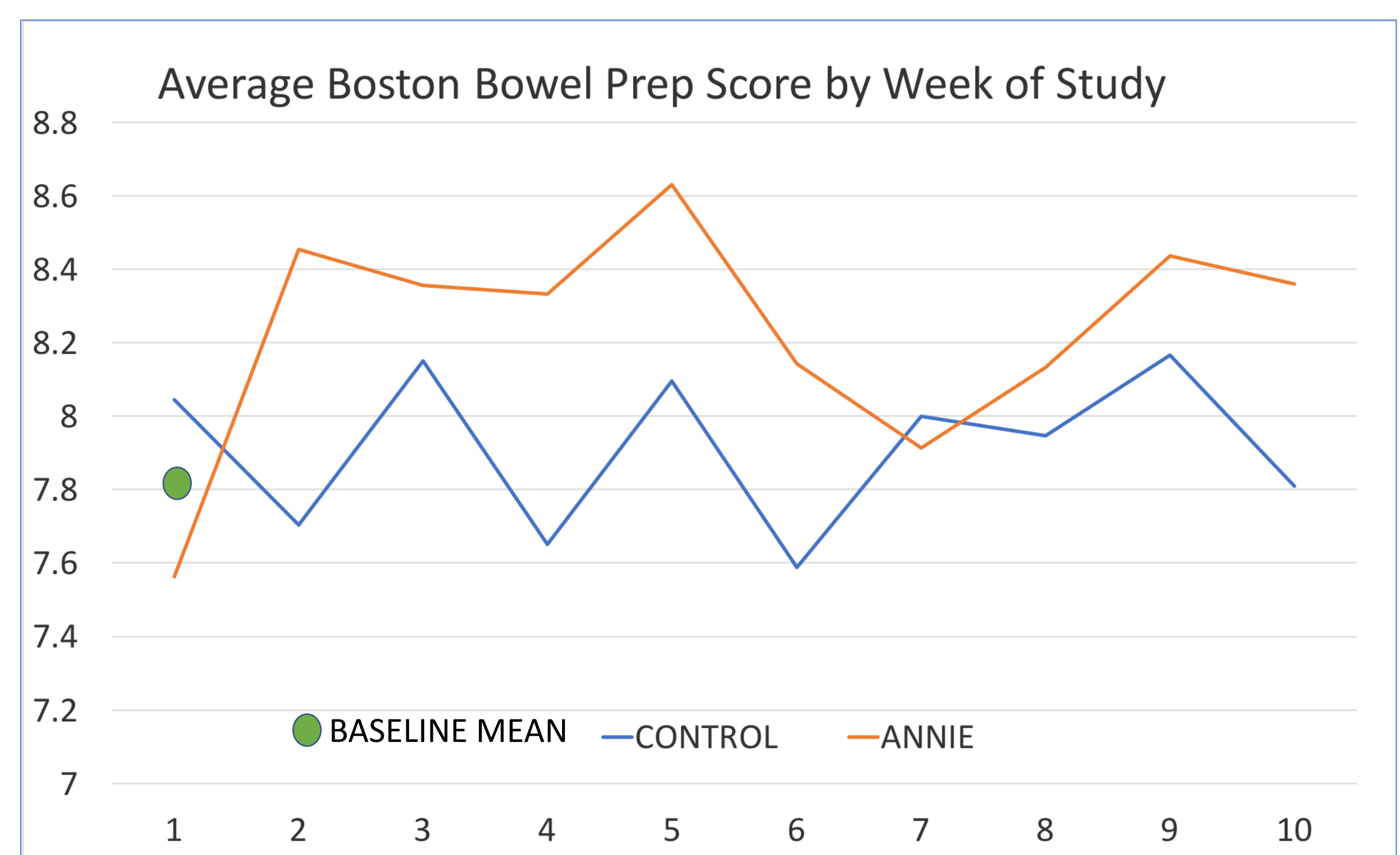
## Results

Table 1: Patient Demographics			
Variable	Total N=640	Control N=453	Annie group N=187
Male gender, N(%)	612 (95.63)	432 (95.36)	180 (96.26)
Age, Mean (Std Dev)	65.70 (9.54)	66.33 (9.67)	64.18 (9.06)
Age>60, N(%)	491 (76.72)	357 (78.81)	134 (71.66)
White race, N(%)	549 (86.46)	396 (87.8)	153 (83.15)
Prior abdominal surgery, N(%)	166 (25.94)	117 (25.83)	49 (26.2)
Impaired mobility, N(%)	73 (11.42)	55 (12.14)	18 (9.68)
Body Mass Index, Mean (Std Dev)	31.61 (6.44)	31.45 (6.41)	32.00 (6.52)
Body Mass Index>25, N(%)	558 (86.63)	375 (86.01)	163 (88.11)
Diabetes mellitus, N(%)	184 (28.75)	133 (29.36)	51 (27.27)
Stroke, N(%)	20 (3.13)	12 (2.65)	8 (4.28)
Dementia, N(%)	17 (2.66)	11 (2.43)	6 (3.21)
Any neurologic diagnosis, N(%)	43 (6.72)	27 (5.96)	16 (8.56)
Mental health diagnosis, N(%)	346 (54.06)	228 (50.33)	118 (63.1)
Cirrhosis, N(%)	27 (4.22)	22 (4.86)	5 (2.67)
Smoker, N(%)	113 (17.76)	84 (18.54)	29 (15.51)
Tricyclic Antidepressant medication, N(%)	18 (2.88)	13 (2.95)	5 (2.72)
Narcotics medication, N(%)	60 (9.62)	41 (9.32)	19 (10.33)
Polypharmacy >8 medications, N(%)	230 (36.86)	158 (35.91)	72 (39.13)
Number of medications, Mean (Std Dev)	7.73 (5.60)	7.75 (5.64)	7.69 (5.53)

ANNIE intervention group BBPS mean was 8.24 vs. 7.89 for standard of care (p<0.002, non-parametric)

100% of patients (n=34) surveyed in PDSA 2 would like to receive texts again for their next colonoscopy.

On a scale of 1-10 (1=Unhelpful; 10 = Most helpful), the mean increased from 7.79 → 9.06 from PDSA 1 to 2. (p=0.0011)



The average Boston Bowel Prep Scores (y-axis) for both ANNIE intervention group (n=204) and control group (n=484) over the 10 week study period (x-axis). Excluding week 1 and 7, the ANNIE text messaging group had higher average weekly bowel prep scores than the control group.

**Conclusion:** Text message reminders improve colonoscopy bowel preparation and are associated with high levels of patient satisfaction amongst veterans seen at the Minneapolis VAMC.

## Discussion

- Discussion**
- ANNIE patients had cleaner bowel preparations compared to control patients, indicating that text message reminders were effective at helping patients follow bowel prep instructions
  - Unquantified clinical significance
  - Limitations of the ANNIE platform include 1) patient requirement for cellphone text messaging capability; 2) verbal consent and documentation; 3) manual registration, protocol assignment, rescheduling
  - Data is likely an underestimation of true impact of intervention (does not currently account for those turned away or aborted procedures)

### Future Directions

- PDSA 3: Develop Minneapolis VA Gastroenterology website to contain electronic files of prep instructions to link into texts
- Consider measures of clinical significance i.e. adenoma detection rates
- Non-inferiority trial comparing nurse phone call versus ANNIE text message reminders
- Continual improvement of ANNIE technology

## References

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