Utilizing a Machine Learning Mortality Model to Implement Targeted Advance Care Planning and Multi-Disciplinary Care Review

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BACKGROUND

- Advance Care Planning (ACP) is underutilized and difficult to reference in electronic medical records (EMR)
- Less than 33% of patients at high risk of death with end-of-life preferences have shared their preferences with their physician[1]
- Utilization of ACP increases the propensity that patient wishes are known and followed[2]
- ACP has been shown to increase the quality of care for patients and their families at the end of life[3]
- Currently clinician prediction of patient survival is largely inaccurate[4]
- Physician time constraints and inefficient care processes play a role in the underutilization of ACP
- Predictive models can be used to assist clinician prognostication of patients and help identify patients that may benefit from ACP[4,5,6,7]

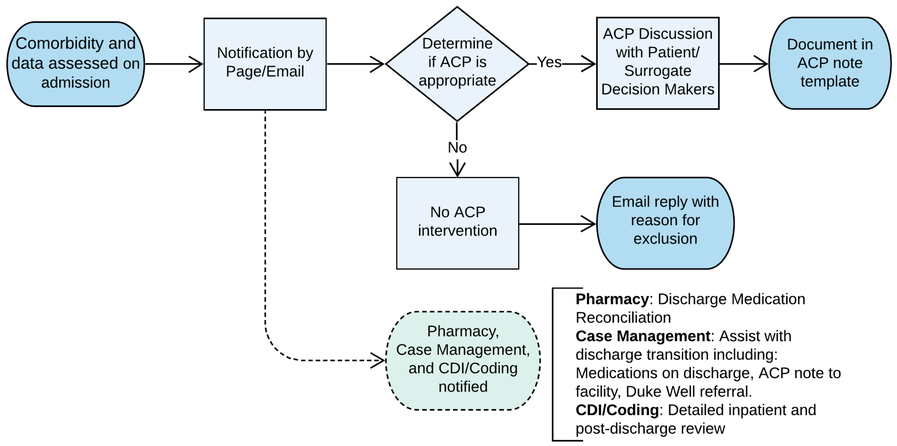
PURPOSE

To identify inpatient general internal medicine patients at high-risk for mortality and morbidity, using a machine-learning model, for a targeted advance care planning intervention and multi-disciplinary care review

INTERVENTIONS

- Utilized a machine learning mortality model developed by the Duke Institute for Health Innovation based on patient comorbidities and chart data at the time of admission
- Developed a standardized Advance Care Planning documentation template to ensure documentation is stored centrally in the EMR to enable easy reference for future providers
- Developed ACP education for Hospital Medicine faculty
- Collaborated with:
  - Pharmacy for discharge medication reconciliation
  - Clinical Documentation Improvement (CDI) team to review clinical documentation to ensure patient's condition and complexity is accurately reflected
  - Case management to facilitate appropriate referrals, assist with discharge resources, and participate in ACP conversations

PROCESS MAP



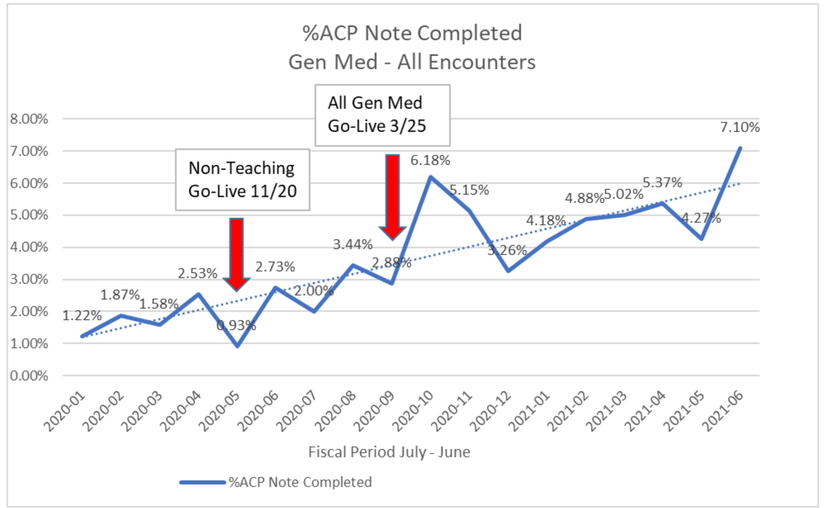
TIMELINE

- 11/18/19: Initiated pilot on hospitalist non-teaching general medicine teams
- 2/14/20: COVID-19 and server updates paused notifications
- 3/26/20: Resumed pilot and expanded to general medicine teaching teams

PRELIMINARY RESULTS

	Pre-Intervention High-Risk Patients n = 336	Post-Intervention High-Risk Patients with ACP Note Documented n = 111	Post-Intervention High-Risk Patients (All notifications) n = 252
ACP Note Completion (%)	5.65%	100%	44.05%
Average Length of Stay	10.36	9.59	9.01
30-day readmission (%)	20.0%	20.45%	18.84%
Change in Code Status Order (%)	17.56%	29.73%	21.43%
Discharge to Hospice (%)	14.29%	19.82%	14.68%

PROCESS MEASURES



CONCLUSIONS

- Predictive models can be used to target and provide resources to patients most likely to benefit from ACP and multi-disciplinary team support
- The use of a notification system and provider education can increase clinician ACP utilization
- COVID-19 created additional barriers and challenges to completing ACP
- Appropriate and accessible documentation provides easy reference and continuation of care conversations across different inpatient and outpatient encounters and providers

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