Utilizing a ML-Enabled EMR Provider Workflow to Improve Non-Clinical Tasks

Texas Heart® Institute

ParaDocsHealth

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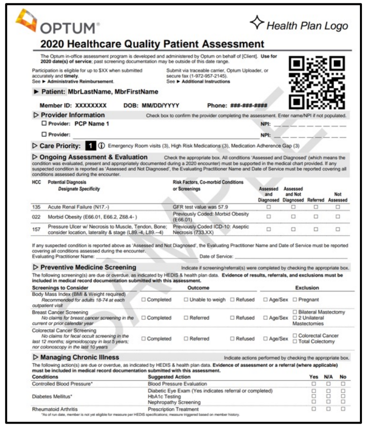
Background

Based on CMS data from 2021, the US healthcare system spent $4.3 trillion annually on non-clinical tasks (NCTs). This includes essential non-medical activities such as EMR review, coordinating next steps in care, closing care gaps, admin tasks, and insurance paperwork (**Figure 1**). These NCTs significantly burden primary care providers (PCPs) – requiring nearly 45 minutes of NCTs for every 30-minute patient encounter.

Importantly, increasing documentation demands from private and government insurance hinders PCPs from delivering effective patient care.


OPTUM

Health Plan Logo

2020 Healthcare Quality Patient Assessment

Figure 1. Example patient assessment form.

Hypothesis

We hypothesized that ML-based natural language processing (NLP) could streamline non-clinical tasks by automating patient assessment form (PAF) completion for outpatient PCPs.

Methods

We developed and internally validated a ML-enabled workflow that combined (1) note extraction from the EMR, (2) protected health information de-identification, and (3) NLP and federated learning to automate PAF completion (**Figure 2**). PAFs were auto-populated with ICD-10 codes matched directly to patient clinic notes.

We externally validated our workflow in a real-world setting by applying it to a primary care clinic serving patients who are Medicare Advantage beneficiaries, following their annual wellness visits. PCPs then reviewed and approved completed PAFs with one click, triggering the workflow to auto-generate screening orders for at-risk patients.

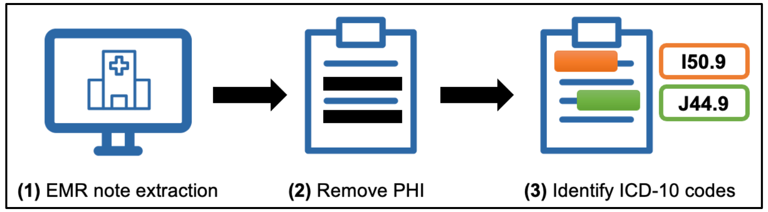


***Figure 2.** ML-based workflow.*

Conclusion

Our study demonstrated the application of ML in improving PCP operational efficiency and enhanced patient care management in at-risk patients.

Results

Our ML-enabled workflow was trained on data from 6,000 synthetic notes and achieved a ten-fold cross-validation accuracy of 96%.

Over five months (in a real-world, suburban outpatient clinic), PAFs were completed for 179 patients (**Figure 3A**), requiring only six hours of provider review time with a 99.4% approval rate. Compared to the previous year, the ML workflow decreased manual work from 30 hours across three staff to six hours for one provider, yielding overhead savings of $1,680. The system also led to a 3.2x increase in preventative and diagnostic order submissions for at-risk patients who have historically failed to complete necessary screenings (**Figure 3B**).

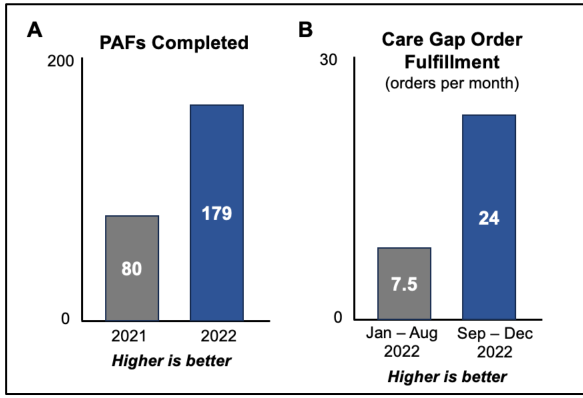


***Figure 3.** A) Number of PAFs completed per year. B) Number of care gap order fulfillments (in orders per month) in the first 8 and last 4 months of 2022*