

# Towards Accurate and Clinically Meaningful Summarization of Electronic Health Record Notes: A Guided Approach

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BHI 2023



**Objective:** Automatically summarizing Electronic Health Record (EHR) by

1. guidance extraction
2. summary generation based on extracted guidance
3. fact-checking evaluation based on aspects in the template

**Proposed summary template:**

Patient is a Age year old Gender who presents with chief complaint. Insert important OPQRST information. Insert important diagnostics (labs, imaging). Insert treatments (medications, procedures). Patient was Disposition.

**Summarization Example:**

**Source EHR**

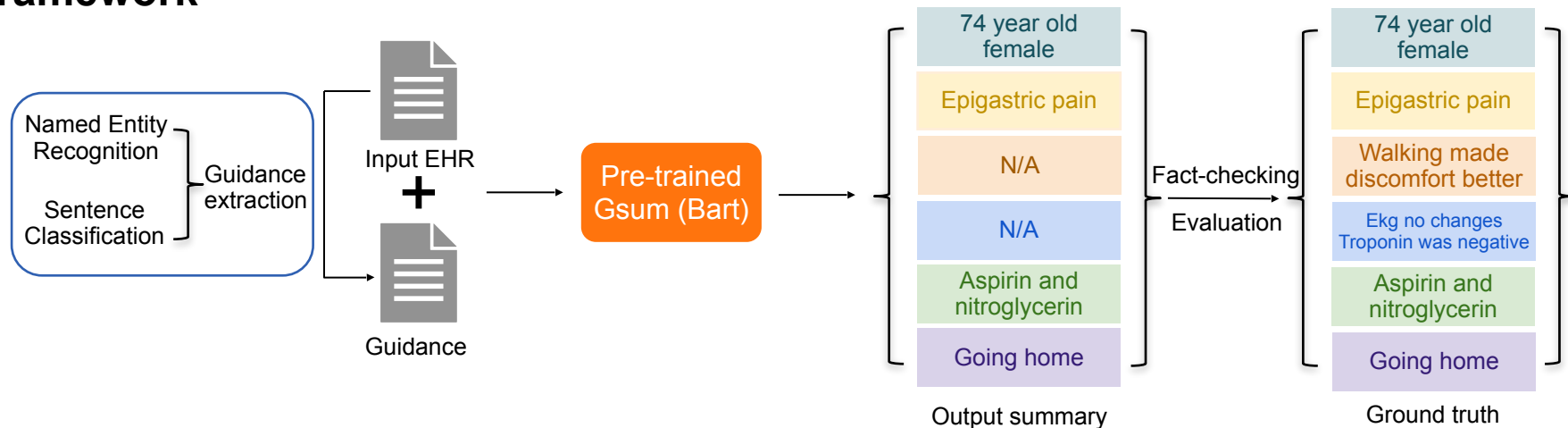
**History of Present Illness:** patient is a 74-year-old female presenting for evaluation of epigastric pain. ... she states she has a history of gerd and had similar symptoms in the past when her gallbladder acted up. ... she was given aspirin and nitroglycerin by ems, ... she states that actually walking around today made the epigastric discomfort better.

**Medical Decision Making:** patient presents for evaluation of epigastric pain. her ekg here shows no ischemic changes. troponin was negative. ... she feels comfortable going home to follow-up with her primary care doctor.

**Output Summary**

A 74-year-old female presents for evaluation of epigastric pain. She has a history of gerd and had similar symptoms in the past when her gallbladder acted up. She was given aspirin and nitroglycerin by ems. She feels comfortable going home to follow-up with her primary care doctor.

# Framework



## Results

TABLE II  
SUMMARIZATION PERFORMANCE OF MODELS UNDER DIFFERENT EXPERIMENT SETTINGS. THE **BEST**/2ND-BEST SCORES IN EACH COLUMN ARE IN BOLD/UNDERLINED.

Models	Guidance Settings	ROUGE	Fact-checking metrics		
			Precision	Recall	F1
BART	-	63.8	51.7	27.2	33.5
BioBART	-	42.6	38.3	24.0	27.3
Gsum (CNN)	CC	59.7	51.7	23.4	30.0
Gsum (CNN)	CC + NER + HPI guide + MDM guide	<b>75.7</b>	<b>58.6</b>	<b>42.1</b>	<b>46.4</b>
Gsum (CNN)	CC + NER subset + HPI guide + MDM guide	73.8	56.9	40.3	44.8
GSum (HPI)	CC	42.1	31.3	26.1	26.3
GSum (HPI)	CC + NER + HPI guide + MDM guide	43.6	32.5	29.2	28.8
GSum (HPI)	CC + NER subset + HPI guide + MDM guide	43.7	32.5	29.3	28.8
GSum (HPI + MDM)	CC	49.9	44.3	27.7	31.8
GSum (HPI + MDM)	CC + NER + HPI guide + MDM guide	53.1	46.1	31.8	35.3
GSum (HPI + MDM)	CC + NER subset + HPI guide + MDM guide	53.2	46.1	30.8	34.6

- Clinical guidance works
- ROUGE vs. fact-checking
- Copy vs. paraphrasing

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for more details!