Supplement Material

Here we present a subset of 4 out of 30 generated and doctor written EHR used for evaluation. The first 3 are examples where our MCAG generates better while the last example shows not much difference. Due to patient confidentiality, we could not include any data at the moment. We plan to de-identify and publish our data in the future.

For each table, PG represents the model which generate assessment from augmented pointer generator network. MCAG-B represents the model which generate assessment from patient specific info graph. MCAG-E is the model which generate assessment from patient specific info graph and background info graph.

Model	**Generated and Reference Text**
Input	CHIEF COMPLAINT: Fatigue, GI upset. SUBJECTIVE: The patient reports that she has had considerable GI upset and felt generally unwell, associated with diarrhea alternating with constipation for several months. Last night she experienced some nausea and vomiting, and also reports a history of acid reflux awakening her from sleep, for which she treated herself with Rolaids. She has also had a few episodes of painless bright red blood per rectum associated with passing a hard bowel movement. REVIEW OF SYSTEMS: Remarkable for occasional dizziness, increased burping and belching, fatigue and extreme discouragement regarding her inability to lose weight. ”I don’t feel good about myself.” She drinks one cup of coffee per day. She seldom drinks alcohol. PROBLEM LIST, MEDICATION LIST: Reviewed and updated in Allscripts. OBJECTIVE: The patient is an obese woman. Vital signs: Unremarkable per Allscripts. She is a bit tearful. Lungs: Clear to auscultation and percussion. Heart: Reveals regular rate without murmurs or gallops. Abdominal examination is unremarkable.
PG	assessment: the patient has irritable bowel syndrome
MCAG-B	assessment: 1 . history of bright red bowel movements . 2 . history of acid reflux . 3 . history of acid reflux .
MCAG-E	assessment: the patient seems to have gastrointestinal irritation that may well be irritable bowel syndrome symptoms , with association with severe depression .
Human	assessment: multiple problems ”intertwined”. major problem at this time seems to be some vague gastrointestinal irritation that may well be irritable bowel syndrome symptoms . this seems to be associated with a moderately severe depression . the patient is not suicidal and seems to downplay the depression .

Table 1: Generated and Human reference EHR

Model	Generated and Reference Text
Input	CHIEF COMPLAINT: Right ear pain and dizziness. HISTORY OF PRESENT ILLNESS: A 35-year-old female with past medical history of chronic mastoiditis, status post 3 surgeries in the right ear, hypertension, gestational diabetes, migraine, presented with 2 weeks of worsening right ear pain, dizziness and tinnitus for which she was already treated with clindamycin without any clear effect on the pain, only on the foul smelly discharge that completely resolved. She started having ear pain at the age of 18 for which she underwent 3 surgeries in the right ear, no documentation available at this time. She is actually followed by Dr. ZZZ at ENT Associates of Worcester who diagnosed chronic mastoiditis and he is planning another surgery, which would cause complete hearing loss in the right ear according to the patient. For this reason, he wanted a second opinion to rule out a neurological disorder and he referred the patient to our clinic. REVIEW OF SYSTEMS: Per HPI, otherwise 14-points ROS were negative. PAST MEDICAL HISTORY: Significant for migraine; right ear chronic mastoiditis, status post 3 surgeries; anxiety disorder, nephrolithiasis, TMJ dysfunction syndrome, history of gestational diabetes, pelvic floor dysfunction. FAMILY HISTORY: Significant for high blood pressure or cardiac disease, diabetes. Father had an aneurysm as well as her paternal grandmother. SOCIAL HISTORY: Never smoker. She mentions that she drinks alcohol once a month socially and she denies any drug abuse. She works as a medical assistant. MEDICATIONS: Botox, clobetasol propionate 0.05% external cream, lisinopril 40 mg once daily, Nexium 40 mg 1 capsule daily, Verapamil 200 mg daily. ALLERGIES: Codeine induce nausea and vomiting, Reglan causes itching. VITAL SIGNS: Blood pressure 161/104, heart rate 81, weight 183. GENERAL: The patient is not in acute distress. CARDIOVASCULAR: RRR. EAR: Tenderness upon palpation of the mastoid and the pinna is appreciated. Residual medication in the canal is seen. DIAGNOSTIC TESTING: MRI of the brain with and without contrast done on 05/29/2016 showed no acute intracranial abnormalities and no significant white matter lesions to indicate demyelinating disease, bilateral mastoiditis appreciated. Prominent flow void at the right middle cerebral artery trifurcation, which may be related to aneurysm. Correlation with MRA of the brain is recommended.
PG	assessment: dizziness and vertigo , likely related to tinnitus . history of chronic mastoiditis .
MCAG-B	assessment: the patient is a very pleasant 35-year-old gentleman with a history of chronic mastoiditis and infectious otitis media . he does not have any evidence of chronic mastoiditis .
MCAG-E	assessment: the patient is a 35-year-old female who presents to pt with complaints of headache and dizziness . in the past, she had chronic mastoiditis and several episodes of infectious otitis media and extrinsic status post 3 surgeries. the patient has demonstrated improvements in pain .
Human	assessment: this is a 35-year-old female with past medical history remarkable for chronic mastoiditis and several episodes of infectious otitis media and extrinsic status post 3 surgeries in the past , presented with 2 weeks exacerbation of ear pain , dizziness , tinnitus and headache . not on any medication at the moment for this problem .

Table 2: Generated and Human reference EHR

Model	Generated and Reference Text
Input	Number of Visits Completed: Five with no no-shows or cancellations. Please see Allscripts for specifics on cancellations and no shows. INITIAL PROBLEM LIST: 1. Range of motion. 2. Strength. 3. Pain. 4. Function. CURRENT STATUS: 1. Cervical side bending, right and left not tested at this reassessment. Right shoulder flexion 161 degrees, abduction 145 degrees, external rotation 87 degrees, left shoulder flexion 154 degrees, abduction 120 degrees, external rotation 76 degrees. 2. Right upper extremity strength greater than or equal to 4+/5, left upper extremity. Right shoulder flexion and abduction 3/5, extension and adduction 4-/5, internal rotation 4/5, external rotation 3+/5, elbow flexion 3+ to 4-/5, extension 4/5. 3. Pain ranging from 3-5/10. 4. The patient is independent with home exercises and does them on a daily basis. The patient notes improvement with sleeping, getting up after sleep and improved ability reaching overhead. The patient is able to pick up a cup of coffee, but still has difficulty taking gallon of milk out of the fridge and when carrying a gallon of milk keeps it as his side instead of lifting it up. CLINICAL INTERVENTIONS: The patient was seen this day primarily for reassessment. The patient was educated on the role of therapy and the importance of continuing with his home program along with following up with referring physician as needed in order to determine his ability to direct return to work-related tasks.
PG	assessment: right ankle pain with right ankle pain , likely secondary to degenerative joint disease .
MCAG-B	assessment: the patient has been seen in outpatient physical therapy physical therapy for 4 visits with the address of therex to promote range of motion exercise and strength as tolerated .
MCAG-E	assessment: the patient is a very pleasant 52-year-old male who has been seen by physical therapy , a total of 5 visits . in that time , he has made some range of motion exercise and strength gains ; however , pain still persists . continued therapeutic procedure would be beneficial to address the goals that remain .
Human	assessment: the patient is a very pleasant 52-year-old male who has been seen by physical therapy for 5 visits . in that time , he has made range of motion exercise and strength gains . continued therapeutic procedure would be beneficial to address the goals that remain .

Table 3: Generated and Human reference EHR

Model	Generated and Reference Text
Input	CHIEF COMPLAINT: Left knee pain for approximately 1 year. HISTORY OF PRESENT ILLNESS: A 61-year-old male, left knee pain for roughly a year. The patient states the pain is mostly inside of the knee. He denies any swelling or instability. He has pain with stairs, like going up or down. Denies any known injury at this time. The patient has had no physical therapy nor has any injection of the knee. REVIEW OF SYSTEMS: The patient denies fevers, chills, weight loss, weight gain, paresthesias or new injuries. SOCIAL HISTORY: The patient is retired, previous history of ”pipe smoking.” PAST MEDICAL HISTORY: Hallux rigidus of the right foot, BPH, hypertension, hypothyroidism, obesity. PAST SURGICAL HISTORY: Right knee arthroscopy. ALLERGIES: Penicillin. MEDICATIONS: Exforge, levothyroxine. PHYSICAL EXAMINATION: Well-appearing male, acting appropriate, alert and oriented x3, normal affect. Weight is appropriate for height. Examination of bilateral lower extremities demonstrates neuro, dermal and vascular systems are intact. Examination of the left knee demonstrates skin to be clean, dry and intact. Positive effusion, positive swelling, positive tenderness to palpation in medial joint line on palpation of the lateral joint line. Positive medial McMurray, negative lateral McMurray, negative Lachman, negative drawer anterior and posterior, no pain or instability with varus or valgus stress test. No calf tenderness. Full active range of motion, flexion and extension. Neurovascularly intact. DIAGNOSTIC STUDIES: MRI of left knee demonstrates osteoarthritic changes in the lateral femoral and patella femoral compartments as well as a posterior medial meniscus tear.
PG	assessment: this is a 61-year-old male with entire left knee posterior horn of medial meniscus laceration , osteoarthritis, knee lateral
MCAG-B	assessment: left knee pain in a patient with degenerative joint disease and left knee osteoarthritis .
MCAG-E	assessment: this is a 61-year-old male with entire left knee posterior horn of medial meniscus laceration , osteoarthritis, knee lateral and patellofemoral compartments .
Human	assessment: the patient is status post lateral posterior horn of medial meniscus laceration . the patient has had a significant decrease in pain , however , has not been able to tolerate the entire left knee laceration . the patient would benefit from continued skilled physical therapy to achieve goals below .

Table 4: Generated and Human reference EHR