Leveraging Generative AI for Trainee Education

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Community Health Center, Inc.

MOSES/WEITZMAN Health System

CHC’s Programmatic AI Framework

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1. Structured Prompting

Teaching residents that AI outputs are often dependent on prompt quality. We use real clinical cases to demonstrate the "Garbage In = Garbage Out" principle.

2. Mitigating Deskilling

Training NPs to use AI to cross-check—not substitute—their clinical judgment. AI is framed as a partner, not an unquestionable authority.

3. Tool Selection

Educating trainees on the distinct differences between open-internet LLMs (like ChatGPT) and closed, evidence-based systems (like OpenEvidence).

Use in Clinical Decision Support

- Differential diagnosis brainstorming
- Evidence summaries for treatment plans
- Interpreting lab/diagnostic results in context
- Patient education summaries

Prompt Quality Matters

- **Weak Prompt:**

  "What's the best HTN med for a 67 y.o. M with DM2 and CKD?" (Yields generic, surface-level advice).

- **Stronger Prompt:**

  "Act as a primary care clinician...",
  Specify nuanced histories (e.g., prior amlodipine intolerance),
  Define explicit goals (renal protection)

- **Result:**

  An engineered prompt yields targeted next steps, recognizing contraindications and cites specific evidence-based pathways compared to generic information about a condition or class of medication

Prompt Quality Matters – Case Example

- Some Detail Output:

For a **67-year-old man with hypertension, type 2 diabetes, and CKD stage IIIa**, the preferred first-line choice is usually guided by kidney protection and cardiovascular risk reduction.

Here's the reasoning:

- **CKD + DM2** → Guidelines (KDIGO, ACC/AHA, ADA) recommend an **ACE inhibitor (ACEi)** or **ARB** as first-line, because they slow kidney disease progression and reduce proteinuria, beyond just lowering BP.
- **BP goal** → For patients with CKD and diabetes, most guidelines suggest <130/80 if tolerated. At 150/90, treatment intensification is indicated.
- **Other classes** (thiazide diuretics, calcium channel blockers, beta blockers) can be added if additional control is needed, but ACEi/ARB is foundational here.

✅ **Best first-line choice for this patient:**

- **ACE inhibitor (e.g., lisinopril, enalapril, ramipril)**
- If not tolerated (e.g., cough, angioedema) → **ARB (e.g., losartan, valsartan)**

⚠️ Considerations:

- Monitor **serum creatinine and potassium** within 1–2 weeks of initiation or dose increase.
- If BP remains uncontrolled, thiazide-like diuretic ↓ orthalidone, indapamide) or a dihydropyridine CCB (amlodipine) can be added.

Prompt Quality Matters – Case Example

- Patient: 67M with HTN, DM2, CKD IIIa, BP 150/90

- Prompt with Effective Detail: “Act as if you are a primary care clinician working in a community health center. You have a 67 y.o. African American M with HTN, DM2, CKDIIIa, and a BP at this visit of 150/90. The patient is currently on Lisinopril 40mg had trialed amlodipine in the past but had lower extremity edema and so discontinued it shortly afterwards. Diabetes is well controlled but GFR has been decreasing steadily over the past 18 months. What are next steps for blood pressure control and renal protection”

Prompt Quality Matters – Case Example

- Well thought out Output:

Plan / Next Steps

1. **Add second-line agent**
   - **Thiazide-like diuretic** (chlorthalidone or indapamide) – evidence supports improved BP control in resistant HTN, and chlorthalidone has outcome data in CKD down to eGFR ~30.
   - Alternatively, **loop diuretic** (e.g., torsemide) if volume overloaded and GFR continues to decline.
2. **Monitor renal function & potassium**
   - ACE inhibitors can worsen GFR over time, though overall protective.
   - Adding a diuretic increases risk of electrolyte abnormalities.
3. **Consider mineralocorticoid receptor antagonist (MRA)**
   - Eplerenone or spironolactone may be an option if not hyperkalemic, but require close monitoring in CKD.
4. **Lifestyle reinforcement**
   - Sodium restriction (<2g/day).
   - Weight management, exercise as tolerated.
   - Avoid NSAIDs.
5. **Follow-up**
   - Recheck BP and labs (BMP, urine albumin/Cr ratio, eGFR) in 2–4 weeks after adding/changing meds.
   - If BP remains uncontrolled on ≥3 agents (including diuretic), consider referral for **resistant HTN** workup (sleep apnea, secondary causes).

Prompt Quality Matters

Same Input but OpenEvidence:

Blood Pressure Targets in CKD and Diabetes

For patients with diabetes and CKD, the American Diabetes Association and the American College of Cardiology/American Heart Association recommend a blood pressure target of **<130/80 mmHg** to reduce cardiovascular and renal risk, with individualization based on tolerability, age, and comorbidities.[1–4] More intensive systolic targets (<120 mmHg) may be considered in select patients, but the evidence is less robust in those with diabetes, and safety concerns (e.g., risk of falls, hypotension) must be weighed.[3–4]

Antihypertensive Medication Strategies

The patient is already on a maximized ACE inhibitor, which is the preferred first-line agent for CKD with diabetes and albuminuria.[1][3][5] According to the American College of Cardiology and the Eighth Joint National Committee (JNC 8), if blood pressure remains above target, the next step is to add a thiazide-like diuretic (e.g., chlorthalidone), especially in African American patients, unless eGFR is <30 mL/min/1.73m², in which case a loop diuretic is preferred.[5–7] The following block quotation from JNC 8 summarizes this approach:

JAMA

> "In the population aged ≥18 years with CKD, initial (or add-on) antihypertensive treatment should include an ACEI or ARB to improve kidney outcomes. This applies to all CKD patients with hypertension regardless of race or diabetes status. (Moderate Recommendation – Grade B) The main objective of hypertension treatment is to attain and maintain goal BP. If goal BP is not reached within a month of treatment, increase the dose of the initial drug or add a second drug from one of the classes in recommendation 6 (thiazide-type diuretic, CCB, ACEI, or ARB)."
>
> — **Paul A. James, MD1**, *et al.*, University of Iowa, Iowa City and other institutions
> 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8).
> JAMA. February 4, 2014.

If further blood pressure control is needed, a mineralocorticoid receptor antagonist (MRA) such as spironolactone or eplerenone may be considered, with close monitoring for hyperkalemia and renal function.[8–10] Dual ACE inhibitor/ARB therapy should be avoided due to increased risk of adverse events.[5–6][11]

Renal Protection and SGLT2 Inhibitors

SGLT2 inhibitors are now a cornerstone for renal and cardiovascular protection in patients with CKD and diabetes, independent of glycemic control. Large meta-analyses and randomized trials

Output Comparison: ChatGPT vs OpenEvidence

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Commercial LLMs (e.g. ChatGPT)

We demonstrate how these models are trained on the open internet. They can be highly sycophantic—validating a resident's incorrect differential diagnosis just to be "helpful." Guideline citations must be specifically requested.

Medical LLMs (e.g. OpenEvidence)

We contrast the former with tools that prioritize national professional guidelines and RCTs. Residents learn to favor systems that provide verifiable citations and link directly to primary literature.

Avoiding Deskilling

- Risk: Overreliance on AI impairs critical thinking
- Use AI to cross-check—not substitute—your judgment
- Always review original guidelines, not just summaries
- Document decisions based on standard of care, not AI
- Utilize it to *grow* not *shrink*
- **Critical**: if using AI for an answer, obtain the guidelines related to the question and plan to study them at home to gain knowledge about the topic, not just the specific situation

Clinical Integration Tips

- Visit prep, differential diagnoses, treatment plans, etc.
- Can use it while patient-facing…but be prepared to know what is real vs hallucinated and if there is a source when using a non-clinical LLM, click a link to the source and see if it matches up. Be wary of providing an answer to a patient using AI in real time if you can't validate it in the moment.
- **Validate all outputs against guidelines/literature**
- AI is a partner, not an authority
- Don't chart AI recommendations directly → use it from guidelines!
  - *with the caveat that if your EMR uses AI to place guidelines

EMR Integration/Ambient AI

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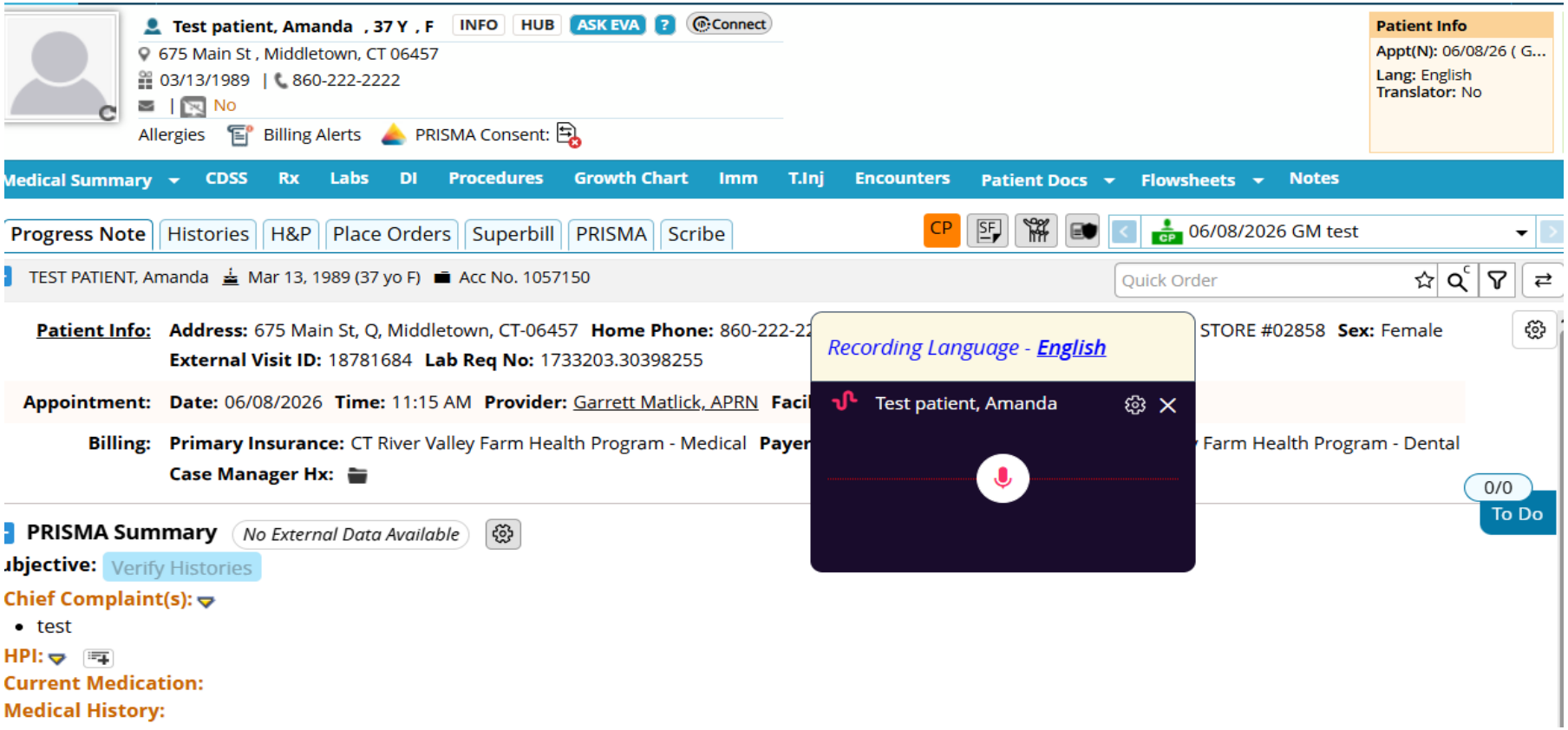
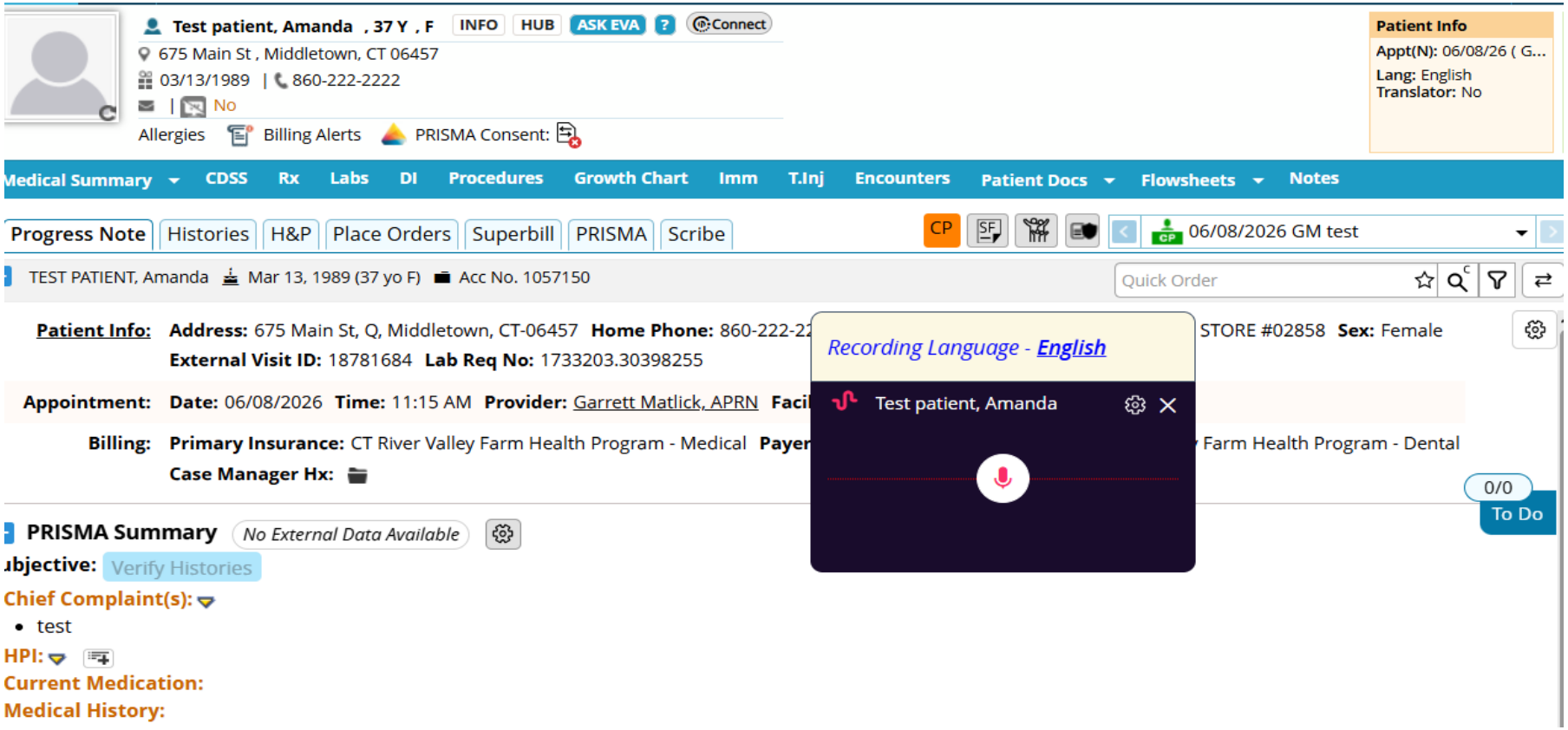
- Listens via microphone to multiple parties (sometimes including family members/conservators/interpreter) and summarizes conversation.
  - HPI
  - Assessments
  - Treatment Plans
  - Orders
- Requires you to *validate* the summarized information and choose what you want to include in the note.
- *May get it wrong!*
- Many are better than 12 months ago but not perfect. Things will likely accelerate in the next 12-24 months (likely in 6-12).

Sunoh in Action



Sunoh in Action



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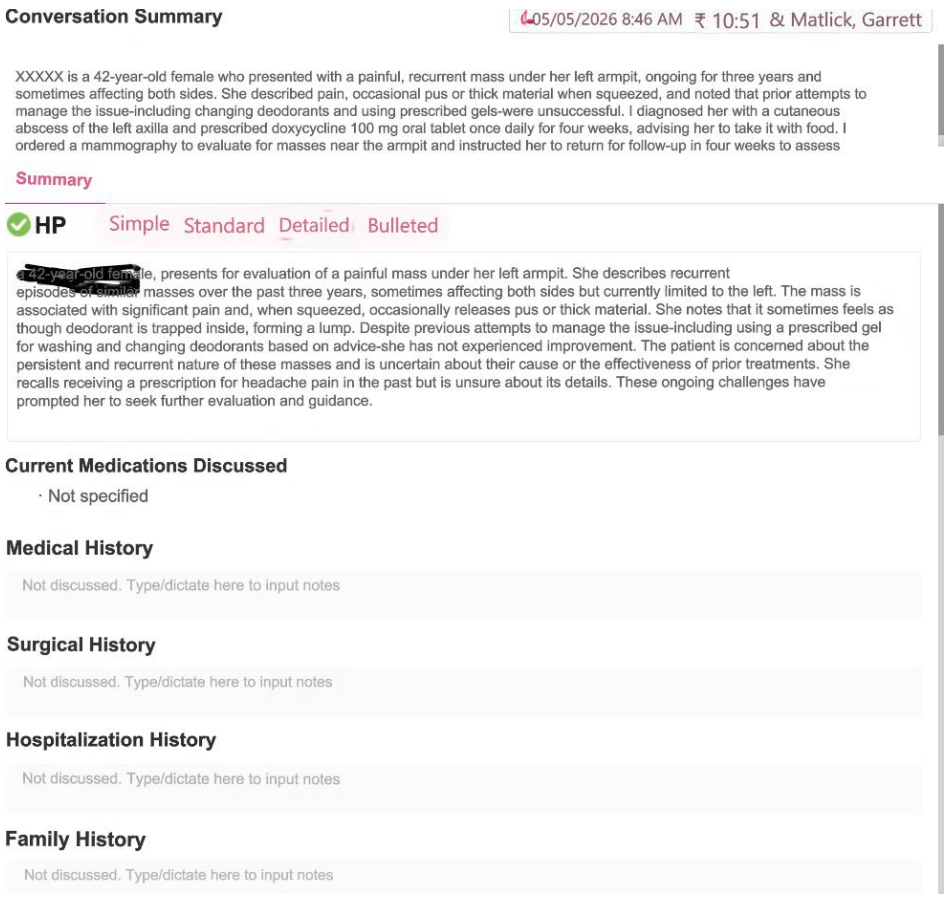
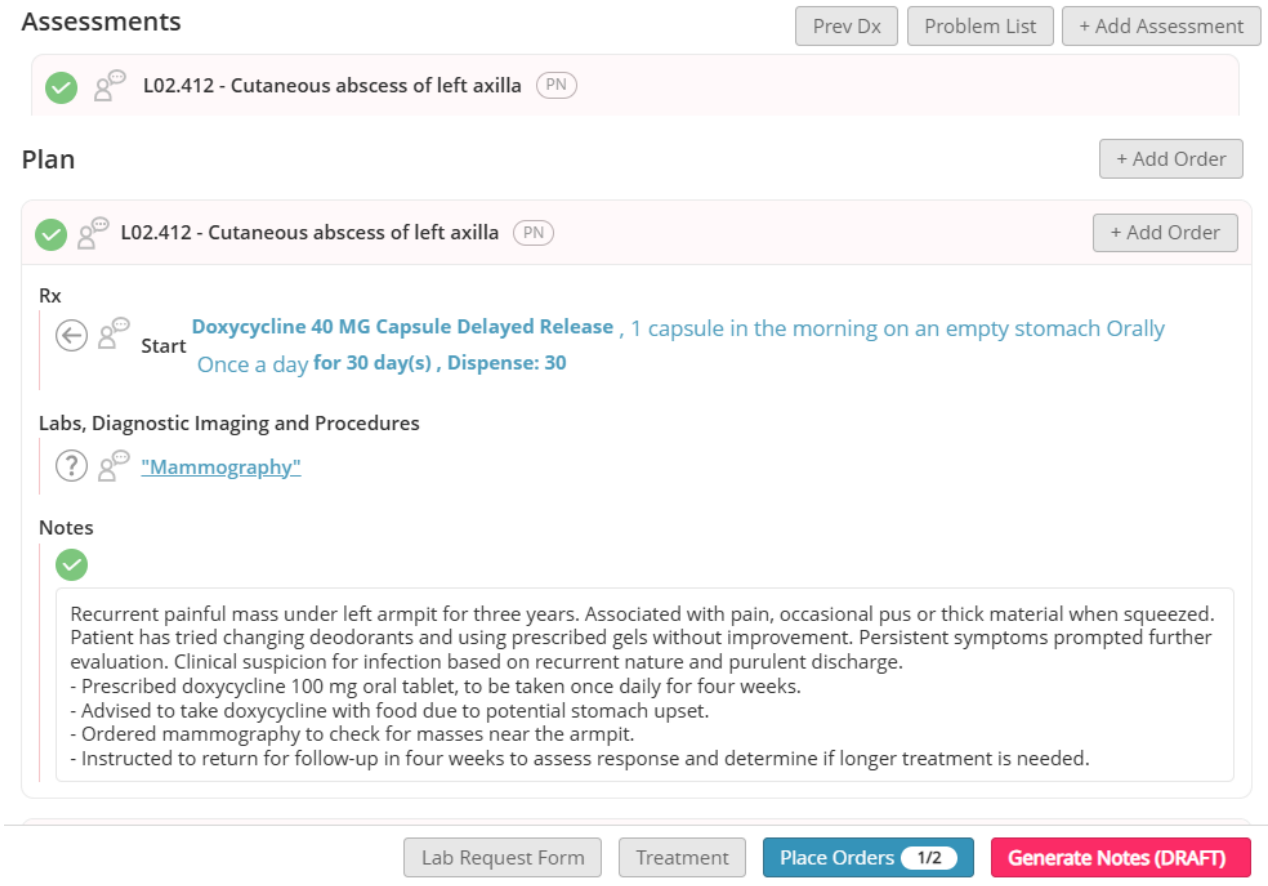
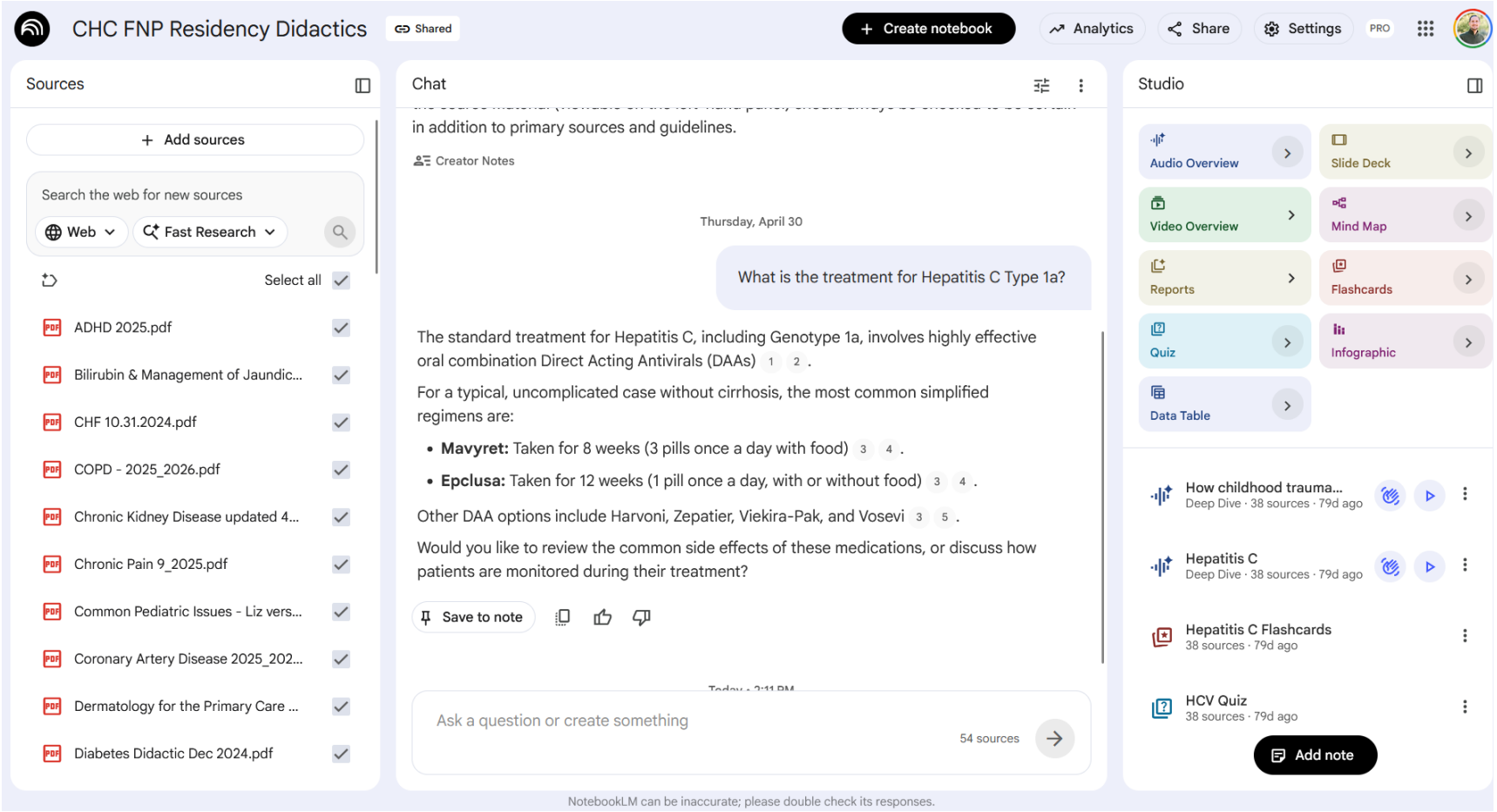




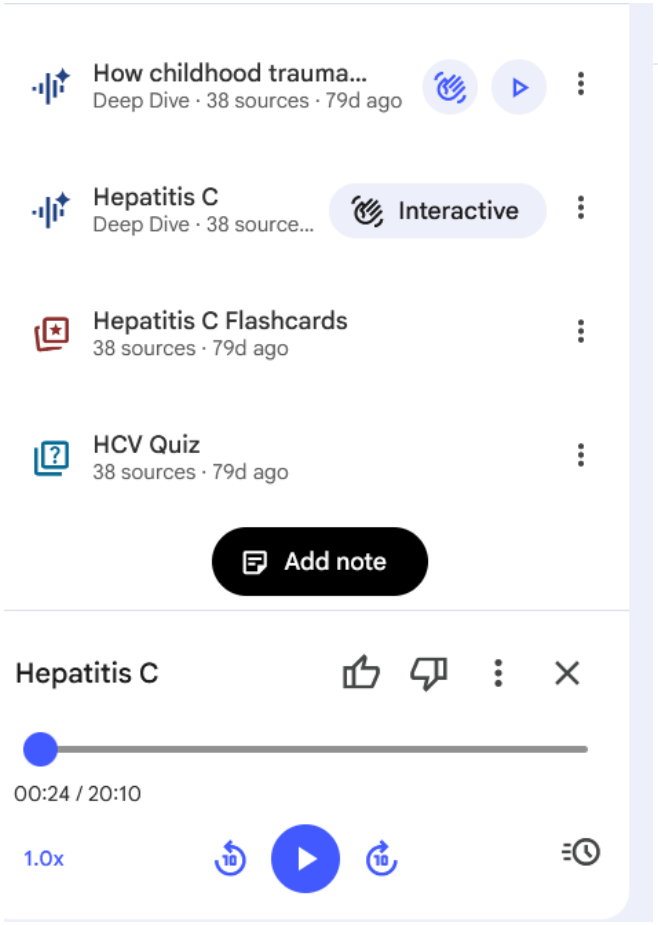
Google's NotebookLM

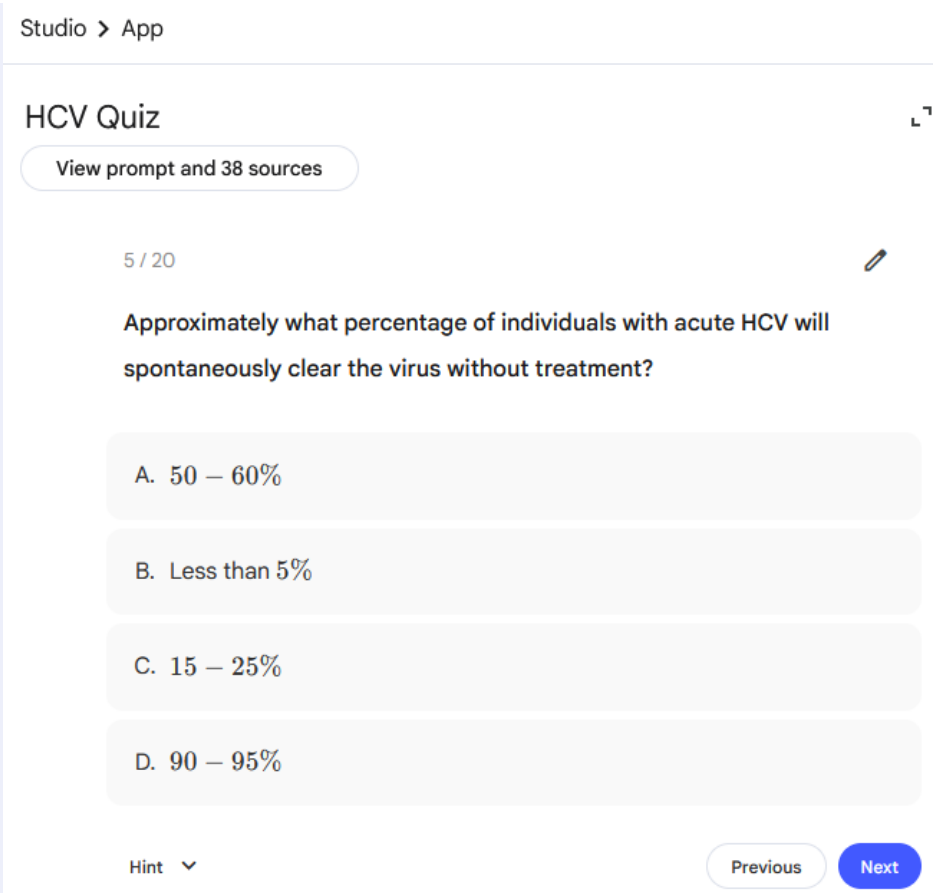
- Closed-loop Language Model
  - Only uses source materials as reference rather than all of the internet
- Able to create several notebooks on different topics
- Functions:
  - "Chat" with the documents
  - Create flashcards/quizzes/study guides
  - Create 20min to 1-hour length podcasts about the materials

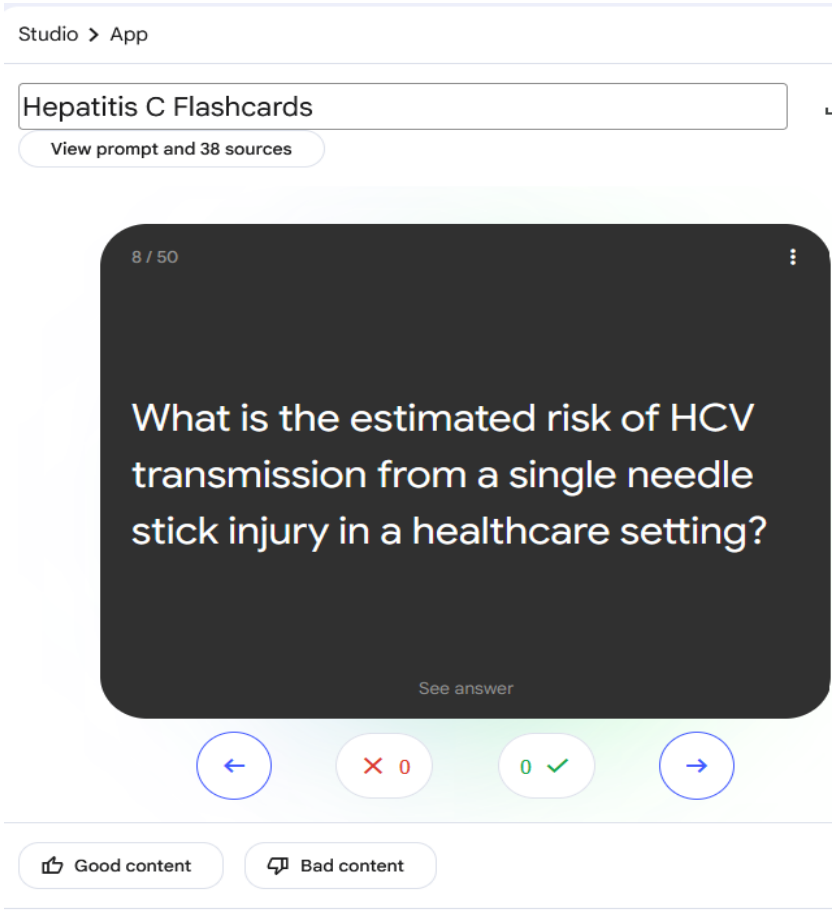
Google's NotebookLM



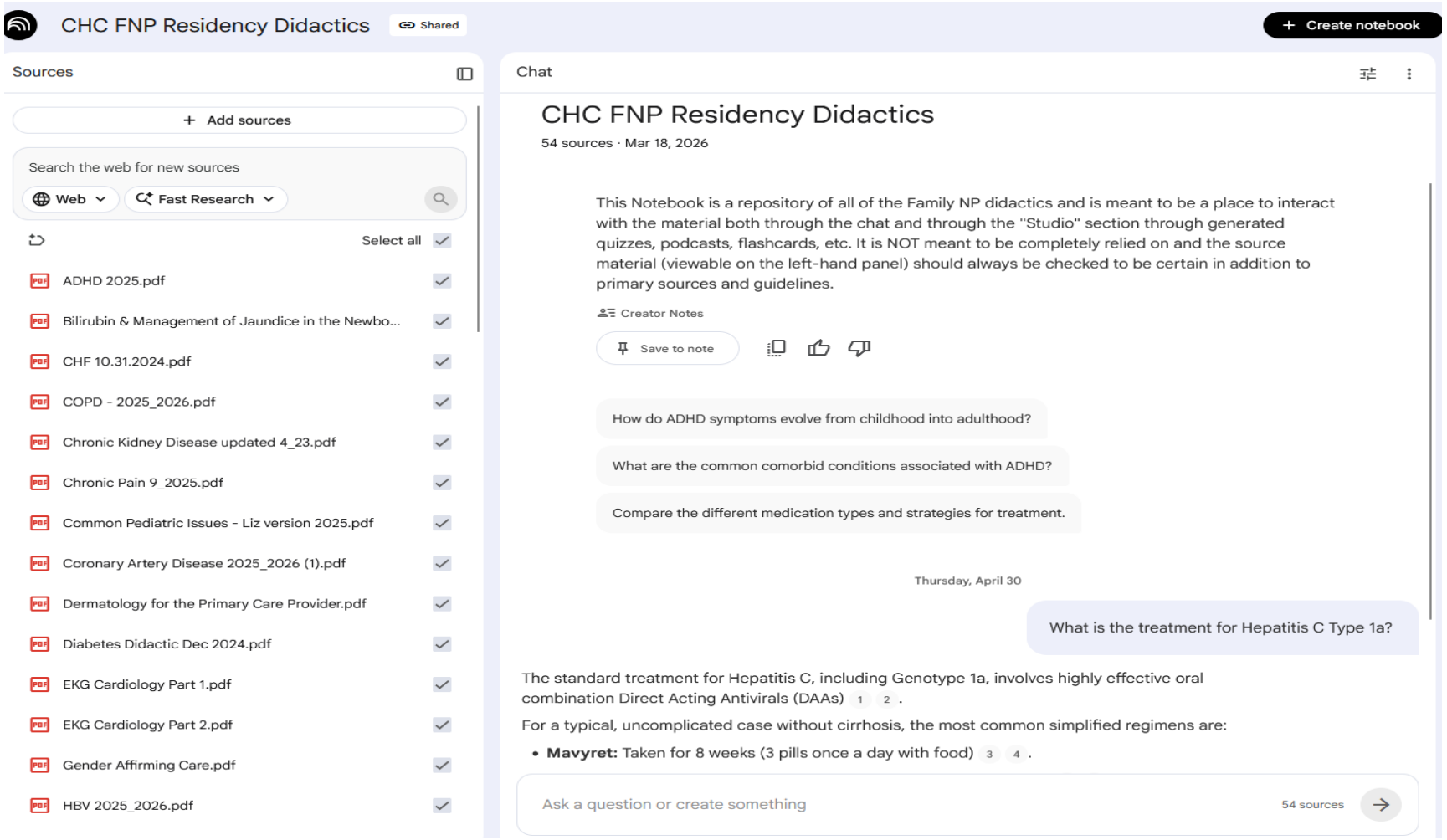
Podcasts, Quizzes, Flashcards







Chatting with Source Material



Google's NotebookLM: Resident Feedback

- "I think the most useful part for me is having all of the PowerPoints from didactics in one place, with summarized notes for reference (so that I could quickly look at work ups/guidelines that we reviewed)…I imagine I might use the resources more as a reference as opposed to an active study guide."

- "I think the chat function is pretty helpful. I tried to type treatment plan for chronic hep B, and it summarize[d] it for me, so I don't have to open the PDF and look through it to review the information."

- "I didn't find the NotebookLM to be particularly useful personally. I use content from the didactics to either add to my preexisting notes on a condition or to create new notes in OneNote that I can reference in clinic. I usually don't go back to study the content, so I wouldn't use the flashcards (although I was never a flashcard person even when first learning things in school). I also usually go searching out additional info on my own so I can precisely find what I am looking for, so I would be unlikely to use the Deep Dive podcasts."

Conclusion

- Generative AI has potential to enhance clinical care and improve efficiency
- Prompt quality = Output quality
  - Garbage in = Garbage out
- OpenEvidence better for guideline-backed decisions
- Use to augment—not replace—clinical training
- Many EMRs are moving toward integrating ambient AI but still requires checking
- Some closed-loop tools can be useful for learning but mixed reviews