Pre-Conference Workshop: Co-designing with LLMs

CUGH 2026 Conference: The Future of Global Health
April 9, 2026 Washington, D.C.

Purpose of this workshop

Co-design in Global Health — Generative AI and LLMs

1

Understand large language model basics

What are LLMs and how do they work? What is generative AI and what can it do in healthcare and global health settings?

Foundations

2

Identify key stakeholders in AI design and implementation

Who must be involved when designing and deploying generative AI tools in resource-limited settings — clinical, community, policy, and technical voices

Co-design thinking

3

Identify barriers and brainstorm solutions together

Explore the major challenges to AI implementation from the perspectives of different stakeholders — and work collaboratively toward solutions that are equitable, contextually appropriate, and community-centred

Role-play activity

Purpose of this Workshop

- Learn about large language model basics
- Identify key stakeholders involved in Generative AI design and implementation in a resource-limited context
- Identify major barriers to AI implementation from the perspective of key stakeholders and brainstorm solutions to overcome these challenges

Timeline Overview

Time	Duration	Activity
2:50 – 3:00	10 min	Introduction to Large Language Models
3:00 – 3:40	40 min	Co-design with LLMs
3:40 – 3:50	10 min	Wrap up and reflect

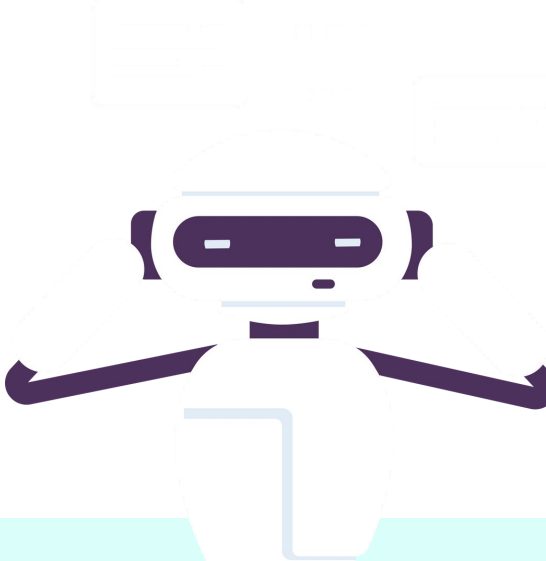
Introduction to LLMs

What is an LLM?

An LLM is a smart text prediction machine.

It predict the next token based on what came before.

Not magic, just statistics ✨



Deeper dive into understanding LLMs

The siblings are unhappy

- LLMs are inspired by nodes and connection in the human brain (neural networks)
- Each word is broken down into tokens

Deeper dive into understanding LLMs

- The words in a LLM are nodes, and the model maps “distances” between the words, and the output is ”the word mostly likely to come next”

Deeper dive into understanding LLMs

What is a **tidy** thing to eat pasta with?

A	tidy	thing	to	eat	pasta	with	is	a	fork.

What is a **nice** thing to eat pasta with?

A	nice	thing	to	eat	pasta	with	is	pesto.

- LLMs still are just figuring out which words or words come next, but they are much better because of **transformers and attention.**

- A transformer is a mathematical process that recalculates vectors for each token based on what other tokens are in the prompt.
- **The LLM weighs all the relationships between all the words it knows (thousands of dimensions) based on the training data. Then it looks at what words have come before and reweighs the associations.**
- In this case the word “with” will be reweighs by the preceding terms such as tidy or nice.

Enter text:

Never gonna give you up, never gonna let you

12295 8066 1577 345 510 11 1239 8066 1309 345

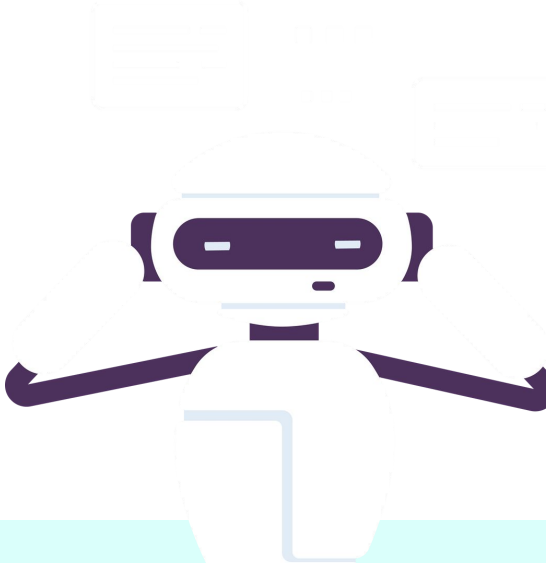
Prediction

#	probs	next token ID	predicted next token
0	78.85%	866	down
1	12.69%	467	go
2	0.79%	651	get
3	0.68%	510	up
4	0.57%	503	out
5	0.54%	2666	leave
6	0.37%	2121	fall
7	0.30%	307	be
8	0.25%	4656	die
9	0.23%	1011	take

NEXT TOKEN PREDICTION WITH GPT-2

Generative AI in resource limited settings

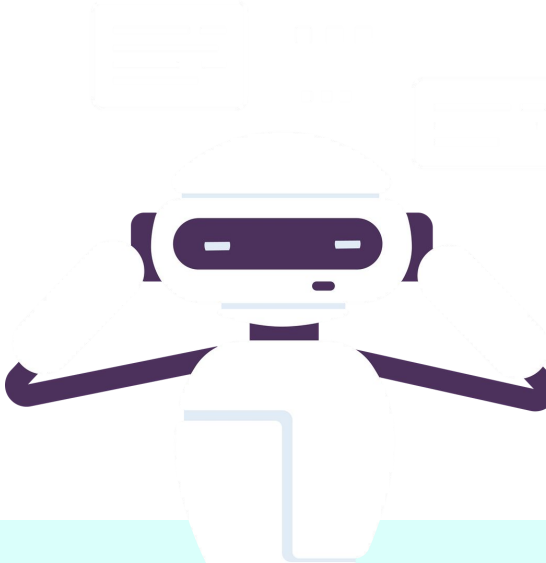
- Support clinical care by assisting non-specialist health workers with diagnosis, triage, and treatment decisions at the point of care
- Strengthen health systems by improving documentation, training, supply chain management, and administrative efficiency
- Bridge communication gaps by delivering health information, education, and reminders to patients in with culturally sensitive context



Warning!

General models are not customized for medical tasks. They can sound confident but still be wrong.

Prompt variations can significantly change the quality of LLM responses. Small wording changes lead to very different answers



Co-designing with LLMs

Co-design in Global Health

LLM app stakeholder role-play activity

1	**Go to your scenario slide** Find the Co-design in Global Health scenario assigned to your group	
2	**Read the scenario aloud** One person reads out loud — ask any clarifying questions before moving on	
3	**Brainstorm stakeholders** Who must be involved in refining the design and implementing this LLM-based app? Think broadly — clinical, community, technical, policy...	**Write on last slide** List every stakeholder your group identifies
4	**Assign stakeholders as roles to participants** Each person takes on one stakeholder — distribute across the group	
5	**Get into character** What do you — as this stakeholder — really care about? What is your role here? What are your major concerns? Think individually before the role-play begins	**Write on last slide** Your role + your main concerns as that stakeholder
6	**Time to ACT — role play!** Really get into your role. Drama and voice acting are encouraged! Express your concerns and work toward solutions together. Each stakeholder should speak from their perspective	**Write on last slide** Potential solutions and agreements reached during the role-play
7	**Summarize and reflect** Share key takeaways — what surprised you? What tensions were hardest to resolve?	

Instructions:

1. Go to your Co-design in Global Health scenario slide
2. Read the scenario out loud and ask any clarifying questions
3. Brainstorm stakeholders that must be involved in refining the design and implementing the LLM-based app described.
    a. Write these down on the last slide!
4. Assign stakeholders as roles to participants
5. Think about what you as the stakeholder really care about in this setting. What is your role here? What might your major concerns be?
    a. Write these down on the last slide!
6. Time to ACT! Role play - really get in to your role, drama and voice acting encouraged. Express your concerns and come up with potential solutions together.
    a. Write these down on the last slide!
7. Summarize and reflect

Scenario 1. "The Silent Screen" (Cervical Cancer)

Context: In the coastal district of Kilifi, cervical cancer is the leading cause of cancer death among women, yet the wait time for a biopsy result from the capital is six months. Most women live in patriarchal households where seeking "intimate" healthcare requires permission from a husband or male elder. The local clinic is run by a single, exhausted nurse-midwife who has basic training in Visual Inspection with Acetic Acid (VIA), a method that is highly subjective and prone to human error.

The Project: A global health NGO has introduced "CerviScan-LLM." The nurse uses a smartphone to take a high-resolution photo of the cervix. An LLM-integrated vision model analyzes the image and provides a real-time, conversational guide: *"I see acetowhite lesions with jagged edges; this suggests high-grade dysplasia. Recommend immediate cryotherapy (freezing of cells) today."* The goal is "See-and-Treat," bypassing the need for a distant lab.

The Design Challenge: Participants must reconcile the speed of AI with the slow pace of cultural consent. If the AI suggests a procedure that causes temporary infertility or requires a break from physical labor, the "user" isn't just the nurse, it's the family unit. The group must decide how the LLM handles "refusal of care" and who holds the legal bag if the AI misidentifies a benign spot as cancerous, leading to unnecessary surgery.

Stakeholder Worksheet

Stakeholder	Role	Major Concerns	Potential Solutions
		-	
Pathologist		- Lots of women present with advanced disease- concerns about underdiagnosis - Also concerned about having access to the findings when women with advanced disease are referred to hospital	-needs to be combined with educational campaign on cancer screening in general -Needs to be integrated with EMR at referral hospital

Scenario 2: "The Ghost Prescription" (Antibiotic Stewardship)

Context: In a bustling trading town on the border of India and Nepal, antimicrobial resistance (AMR) is a "silent pandemic." Local "chemist shops" (pharmacies) function as the de facto primary care system because the public hospital is overcrowded and underfunded. These shop owners are often businessmen without formal pharmacology degrees; they make their highest margins selling high-end antibiotics like Carbapenems to parents whose children have simple viral coughs.

The Project: The National Health Authority is piloting an LLM-based "Gatekeeper" app. To curb AMR, the government mandates that any sale of "Watch List" antibiotics must be preceded by an LLM-led triage. The shop owner must input the patient's symptoms, and the LLM, trained on strict WHO guidelines, will only issue a digital "dispense token" if the symptoms strongly indicate a bacterial infection. Without this token, the shop's inventory system remains locked.

The Design Challenge: This is a high-conflict scenario centered on economic survival versus public health. Participants need to figure out what happens when a desperate, aggressive customer demands medicine for a crying child and the "computer says no." How do you stop the shop owner from simply lying to the LLM to get the code, and how does the app handle the "frown factor" of a tech-imposed barrier in a high-pressure retail environment?

Stakeholder Worksheet

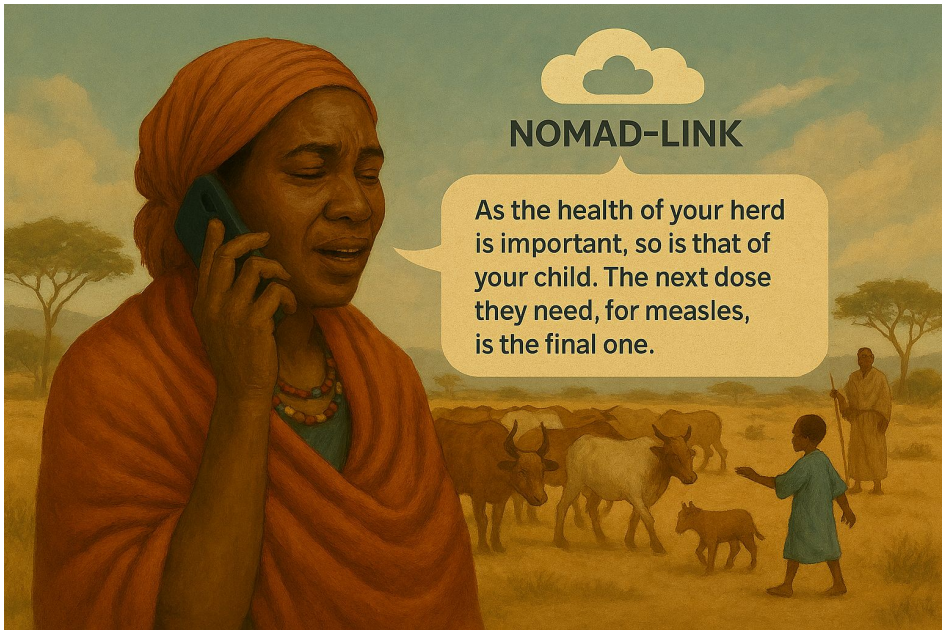
Stakeholder	Role	Major Concerns	Potential Solutions

Scenario 3: "The Last Mile" (Nomadic Immunization)

Context: The Sahel region is home to pastoralist communities that move hundreds of miles following seasonal rains. Because they are constantly on the move, children often miss their second and third doses of essential vaccines (Polio, Measles, Pentavalent). Traditional government records are paper-based and localized, meaning a child's health history is "lost" the moment the herd moves across a provincial border.

The Project: "Nomad-Link" is a voice-first LLM designed to work over basic 2G GSM networks. It uses automated outbound calls to reach community leaders and parents. Instead of clinical reminders, the LLM uses culturally resonant storytelling, referencing the health of the herd and the strength of the ancestors to encourage vaccination. It is designed to "recognize" a mother's voice and retrieve her child's immunization status from a decentralized cloud database via spoken interaction.

The Design Challenge: Participants must navigate trust and identity. In a community that has historically been marginalized by the central government, a "disembodied voice" asking for the location of the tribe can feel like surveillance. The group must brainstorm how to make the LLM's "persona" feel like an ally rather than a spy, and address the massive technical barrier of intermittent signal and the "digital divide" between male phone owners and female caregivers.



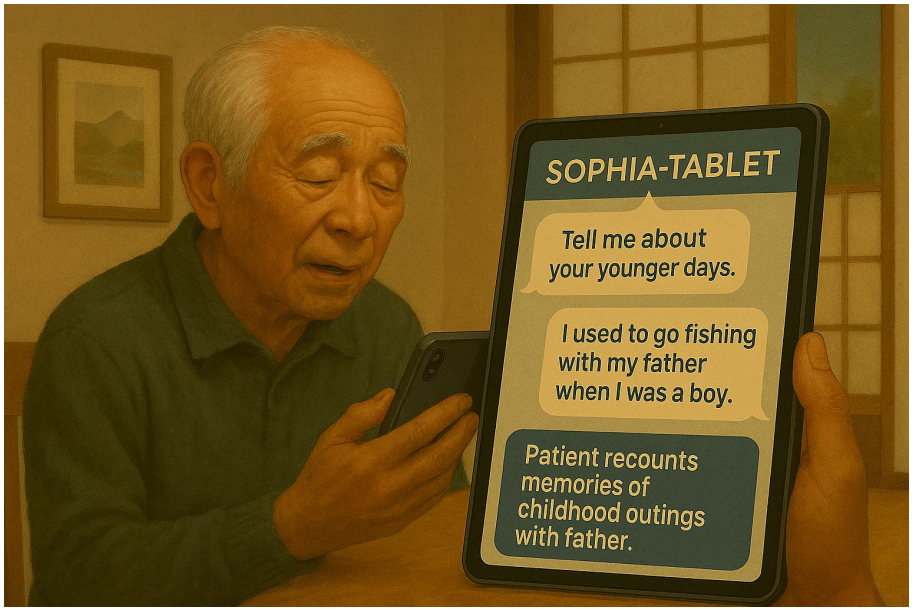
Fathers		• Why only mothers voices? • What to do with community / shared phones?	• Using both parents voices.
Religious Leaders		• Supportive but need to convince the community to be accepting of app	
Pediatrician / Doctor		• Concern about accuracy of disseminating the data • Data privacy concerns / confidentiality	
Traditional Healers		• There are already solutions for preventing viruses that have spiritual meaning and are abundant. Why need a vaccines?	• Include why vaccinations are important in the message • Suggest to combine traditional with vaccinations • Leverage traditional healers for generational context and buy-in

Scenario 4: "The Elder's Ear" (Geriatric Isolation)

Context: In the "Old Villages" of rural Japan, the youth have migrated to urban centers for work, leaving behind an aging population with high rates of chronic loneliness, depression, and cognitive decline. These elders often suffer from "polypharmacy" (taking 5+ medications), leading to dangerous drug interactions that go unnoticed because there are no caregivers nearby. The local social worker visits only once a month.

The Project: The "Sophia-Tablet" is a large-screen LLM companion. It doesn't just remind them to take pills; it engages in "Reminiscence Therapy," asking the elder to tell stories about their youth. While "chatting," the LLM performs "Sentiment & Cognitive Analysis," flagging signs of worsening dementia or suicidal ideation. It translates these long, rambling stories into concise medical summaries for the distant social worker or the children living in the city.

The Design Challenge: This scenario explores the ethics of artificial empathy. Participants must grapple with whether it is "honest" to let an elder believe the tablet is their friend. They must also address "Stakeholder Friction": the elder might tell the AI a secret (e.g., "I'm not taking my heart meds because they make me dizzy") that they don't want their children to know. Does the LLM prioritize patient autonomy or family "right to know"?



Stakeholder Worksheet

Stakeholder	Role	Major Concerns	Potential Solutions
The beneficiaries (elderly) Children urban setting and/or caregivers Linguist/Language expert - is the machine actually capturing accurately		Ethical - not to diminish the role of the caregiver not take away from their role Ministry of health - it has worked before - this is a big issue. Caer about citizens. Should not be harmful to the patient. Legal - what data is is given access to.	Put structures in place to Codesign modules with the stakeholder
Social worker Anthrolpologist/Social		Children - should legal representatives and	

Scenario 5: "The Red Dust" (Artisanal Mining Health)

Context: In the "Cobalt Belt" of the DRC, thousands of "creuseurs" (independent miners) work in deep, hand-dug pits without ventilation. They are exposed to toxic dust, mercury, and cave-in risks. These miners operate in a legal "gray zone"—they aren't formal employees, so they have no health insurance or safety equipment. They only seek medical help when they are coughing blood, at which point the lung damage is often irreversible.

The Project: An international tech consortium, under pressure to prove "Ethical Sourcing," has funded an LLM app called "PitSafe." Miners can anonymously record a "cough sample" or describe their skin lesions to the LLM. The AI provides immediate harm-reduction advice (e.g., how to wash skin after mercury exposure) and directs them to "unbranded" mobile clinics that won't report them to the mining authorities.

The Design Challenge: This is a scenario about adversarial stakeholders. The "Pit Bosses" and local mining companies may see this app as a threat to productivity or a way for activists to gather evidence of labor violations. Participants must brainstorm how to keep the app (and the user) invisible from those in power while still being useful enough to change the miner's behavior. Who owns this data, and could it be used to "blacklist" a sick miner from future work?

Stakeholder Worksheet

Stakeholder	Role	Major Concerns	Potential Solutions
Miner		How is it going to be in the mine? Concern about radiation in the mine My tech literacy is pretty low – how do I use it? I have no idea how to use it? Don't want to have my smart phone damaged in the mine Don't want my boss to	Need an educational component – what to look for Need storage of data without overheating phone while I'm in the mine Wants a small language model so I'm not worried about losing data Need alignment among all the stakeholders – have transparency and