

Supplementary Information

Large Language Models in Hearing Care

Complete database search strategies

Initial search: July 6, 2026. Update searches: September 19-21, 2026.

Search scope

Eligibility was restricted to English-language sources from 2022 onward with an explicit LLM component and a broad hearing-care connection. Database-specific execution limits are reported below and were not identical across platforms. No full-text availability limit was used. Standalone preprint repositories were not searched.

Supplementary Table 1. Search overview

Database / platform	July 6 records	September records	September execution and limits
PubMed via NCBI: main search	112	115	September 19: English; publication date January 1, 2022 to September 19, 2026; no article-type or full-text limit.
PubMed via NCBI: supplementary capture	18	22	September 19: English; publication date January 1, 2022 to September 19, 2026; no article-type or full-text limit.
Embase (Ovid)	189	114	September 19: Embase Classic+Embase, content through September 17; title, abstract and keyword; subject mapping off; English; publication years 2022-2026.
Web of Science Core Collection	50	169	September 20 (exported September 21): Core Collection, all editions; Topic field; January 1, 2022 to September 20, 2026; no language filter.
IEEE Xplore	194	116	September 19: Command Search, default metadata scope; publication years 2022-2026; no language filter.
Scopus Advanced Search	301	319	September 19: title, abstract and keywords; English; publication years 2022-2026.
APA PsycInfo (ProQuest)	54	21	September 19: APA PsycInfo only; title, abstract and subject; English; January 1, 2022 to September 19, 2026; no peer-reviewed or full-text filter.
CINAHL Plus (EBSCOhost)	16	27	September 19: title, abstract and subject headings; English; publication years 2022-2026; no peer-reviewed or full-text filter; equivalent-subject expansion off.
ACM Digital Library	399	12	September 21: Title, Abstract and Keyword fields within the ACM Full-Text Collection; January 2022 to September 2026; no language or publication-type filter. The month-based upper limit was September 30; retrieval occurred September 21.
Total before deduplication	1,333	915	Cumulative raw records: 2,248. Both rounds searched from 2022 rather than restricting retrieval to newly published records. Counts include overlapping and previously identified records.

Search concepts and limits

LLM concept. Large language model, foundation model, generative pretrained transformer, generative chatbot, and named major model families. Broad artificial-intelligence, machine-learning, deep-learning, signal-processing, and classical-NLP terms were intentionally not used without an explicit LLM concept.

Hearing-care concept. Audiology; hearing health; screening, assessment, and tests; hearing loss; tinnitus and hyperacusis; hearing aids and auditory implants; speech perception and intelligibility; rehabilitation; teleaudiology; otology; and neurotology.

Publication status. Eligible sources were peer-reviewed journal reports and indexed conference reports with sufficient methods and results for charting. Preprints without an eligible published version were excluded. Language, year and publication-status eligibility were checked during record processing and screening when not enforced by a database filter. The original exports contained 194 unique pre-2022 records, which were removed before screening. July query text and export counts were preserved, but not every interface setting was retained; intended limits should not be interpreted as verified execution settings. The September searches covered the full period from 2022, with deduplication against the original records. ACM metadata fields were reconstructed from the written strategy rather than verified as identical to July.

Supplementary Table 2. Complete database search strategies

Database / search	Run details	Exact search strategy
1. PubMed via NCBI: main search	July 6, 2026: 112 records. September update: 115 records. September 19: English; publication date January 1, 2022 to September 19, 2026; no article-type or full-text limit. The query shown is the September execution. For July, the upper publication-date endpoint was 2026/07/06 instead of 2026/09/19.	((("Large Language Models"[Mesh] OR "large language model"[tiab] OR "large-language model"[tiab] OR LLM[tiab] OR LLMs[tiab] OR "foundation model"[tiab] OR "generative pre-trained transformer"[tiab] OR "generative pretrained transformer"[tiab] OR ChatGPT[tiab] OR GPT-3*[tiab] OR GPT-4*[tiab] OR GPT-5*[tiab] OR Claude[tiab] OR Gemini[tiab] OR Bard[tiab] OR Copilot[tiab] OR "Bing Chat"[tiab] OR DeepSeek[tiab] OR "Meta Llama"[tiab] OR Llama*[tiab] OR Mistral[tiab] OR Perplexity[tiab] OR "Med-PaLM"[tiab] OR Grok[tiab]) AND ("Audiology"[Mesh] OR "Hearing Loss"[Mesh] OR "Deafness"[Mesh] OR "Hearing Aids"[Mesh] OR "Cochlear Implants"[Mesh] OR "Cochlear Implantation"[Mesh] OR "Tinnitus"[Mesh] OR "Audiometry"[Mesh] OR "Audiometry, Pure-Tone"[Mesh] OR "Hearing Tests"[Mesh] OR "Evoked Potentials, Auditory"[Mesh] OR "Acoustic Impedance Tests"[Mesh] OR "Otoacoustic Emissions, Spontaneous"[Mesh] OR "Speech Perception"[Mesh] OR audiolog*[tiab] OR audiometr*[tiab] OR audiogram*[tiab] OR otolog*[tiab] OR neurotolog*[tiab] OR "hearing care"[tiab] OR "hearing healthcare"[tiab] OR "hearing health care"[tiab] OR "hearing health"[tiab] OR "hearing service"[tiab] OR "hearing screen"[tiab] OR "hearing assessment"[tiab] OR "hearing test"[tiab] OR "hearing intervention"[tiab] OR "hearing rehabilitation"[tiab] OR "hearing loss"[tiab] OR "hearing impairment"[tiab] OR deaf*[tiab] OR "hard of hearing"[tiab] OR DHH[tiab] OR tinnitus[tiab] OR hyperacusis[tiab] OR presbycusis[tiab] OR "age-related hearing loss"[tiab] OR "sensorineural hearing loss"[tiab] OR "sudden sensorineural hearing loss"[tiab] OR SSNHL[tiab] OR "conductive hearing loss"[tiab] OR "mixed hearing loss"[tiab] OR otosclerosis[tiab] OR "pure-tone"[tiab] OR "pure tone"[tiab] OR "speech audiometry"[tiab] OR "speech perception"[tiab] OR "speech intelligibility"[tiab] OR "speech-in-noise"[tiab] OR "word recognition score"[tiab] OR "word recognition test"[tiab] OR "auditory brainstem response"[tiab] OR "auditory evoked potential"[tiab] OR "otoacoustic emission"[tiab] OR tympanometr*[tiab] OR "acoustic immittance"[tiab] OR "hearing aid"[tiab] OR "hearing device"[tiab] OR "assistive listening"[tiab] OR "cochlear implant"[tiab] OR "auditory implant"[tiab] OR "auditory brainstem implant"[tiab] OR "middle ear implant"[tiab] OR "bone conduction implant"[tiab] OR "bone-anchored hearing"[tiab] OR "bone anchored hearing"[tiab] OR "aural rehabilitation"[tiab] OR "auditory rehabilitation"[tiab] OR "cochlear implant mapping"[tiab] OR "hearing aid fitting"[tiab] OR teleaudiolog*[tiab])) AND (2022/01/01[pdat] : 2026/09/19[pdat]) AND english[Language])
2. PubMed via NCBI: supplementary capture	July 6, 2026: 18 records. September update: 22 records. September 19: English; publication date January 1, 2022 to September 19, 2026; no article-type or full-text limit. The query shown is the September	((("generative AI"[tiab] OR "generative artificial intelligence"[tiab] OR "AI chatbot"[tiab] OR "artificial intelligence chatbot"[tiab] OR "conversational AI"[tiab] OR "conversational artificial intelligence"[tiab]) AND ("Audiology"[Mesh] OR "Hearing Loss"[Mesh] OR "Deafness"[Mesh] OR "Hearing Aids"[Mesh] OR "Cochlear Implants"[Mesh] OR "Cochlear Implantation"[Mesh] OR "Tinnitus"[Mesh] OR "Audiometry"[Mesh] OR "Audiometry, Pure-Tone"[Mesh] OR "Hearing Tests"[Mesh] OR

Database / search	Run details	Exact search strategy
	execution. For July, the upper publication-date endpoint was 2026/07/06 instead of 2026/09/19.	"Evoked Potentials, Auditory"[Mesh] OR "Acoustic Impedance Tests"[Mesh] OR "Otoacoustic Emissions, Spontaneous"[Mesh] OR "Speech Perception"[Mesh] OR audiolog*[tiab] OR audiometr*[tiab] OR audiogram*[tiab] OR otolog*[tiab] OR neurotolog*[tiab] OR "hearing care"[tiab] OR "hearing healthcare"[tiab] OR "hearing health care"[tiab] OR "hearing health"[tiab] OR "hearing service"[tiab] OR "hearing screen"[tiab] OR "hearing assessment"[tiab] OR "hearing test"[tiab] OR "hearing intervention"[tiab] OR "hearing rehabilitation"[tiab] OR "hearing loss"[tiab] OR "hearing impairment"[tiab] OR deaf*[tiab] OR "hard of hearing"[tiab] OR DHH[tiab] OR tinnitus[tiab] OR hyperacusis[tiab] OR presbycusis[tiab] OR "age-related hearing loss"[tiab] OR "sensorineural hearing loss"[tiab] OR "sudden sensorineural hearing loss"[tiab] OR SSNHL[tiab] OR "conductive hearing loss"[tiab] OR "mixed hearing loss"[tiab] OR otosclerosis[tiab] OR "pure-tone"[tiab] OR "pure tone"[tiab] OR "speech audiometry"[tiab] OR "speech perception"[tiab] OR "speech intelligibility"[tiab] OR "speech-in-noise"[tiab] OR "word recognition score"[tiab] OR "word recognition test"[tiab] OR "auditory brainstem response"[tiab] OR "auditory evoked potential"[tiab] OR "otoacoustic emission"[tiab] OR tympanometr*[tiab] OR "acoustic immittance"[tiab] OR "hearing aid"[tiab] OR "hearing device"[tiab] OR "assistive listening"[tiab] OR "cochlear implant"[tiab] OR "auditory implant"[tiab] OR "auditory brainstem implant"[tiab] OR "middle ear implant"[tiab] OR "bone conduction implant"[tiab] OR "bone-anchored hearing"[tiab] OR "bone anchored hearing"[tiab] OR "aural rehabilitation"[tiab] OR "auditory rehabilitation"[tiab] OR "cochlear implant mapping"[tiab] OR "hearing aid fitting"[tiab] OR teleaudiolog*[tiab])) AND (2022/01/01[pdat] : 2026/09/19[pdat]) AND english[Language]
3. Embase	July 6, 2026: 189 records. September update: 114 records. September 19: Embase Classic+Embase, content through September 17; title, abstract and keyword; subject mapping off; English; publication years 2022-2026. The saved query text is unchanged. September interface limits are listed here; 145 records before limits became 114 after limits.	("large language model" or "large-language model" or LLM or LLMs or "foundation model" or "generative pre-trained transformer" or "generative pretrained transformer" or ChatGPT or GPT-3* or GPT-4* or GPT-5* or Claude or Gemini or Bard or Copilot or "Bing Chat" or DeepSeek or "Meta Llama" or Llama* or Mistral or Perplexity or "Med-PaLM" or Grok).ti,ab,kw. and (audiolog* or audiometr* or audiogram* or otolog* or neurotolog* or "hearing care" or "hearing healthcare" or "hearing health care" or "hearing health" or "hearing service" or "hearing screen" or "hearing assessment" or "hearing test" or "hearing intervention" or "hearing rehabilitation" or "hearing loss" or "hearing impairment" or deaf* or "hard of hearing" or DHH or tinnitus or hyperacusis or presbycusis or "age-related hearing loss" or "sensorineural hearing loss" or "sudden sensorineural hearing loss" or SSNHL or "conductive hearing loss" or "mixed hearing loss" or otosclerosis or "pure-tone" or "pure tone" or "speech audiometry" or "speech perception" or "speech intelligibility" or "speech-in-noise" or "word recognition score" or "word recognition test" or "auditory brainstem response" or "auditory evoked potential" or "otoacoustic emission" or tympanometr* or "acoustic immittance" or "hearing aid" or "hearing device" or "assistive listening" or "cochlear implant" or "auditory implant" or "auditory brainstem implant" or "middle ear implant" or "bone conduction implant" or "bone-anchored hearing" or "bone anchored hearing" or "aural rehabilitation" or "auditory rehabilitation" or "cochlear implant mapping" or "hearing aid fitting" or teleaudiolog*).ti,ab,kw.
4. Web of Science Core Collection	July 6, 2026: 50 records. September update: 169 records. September 20 (exported September 21): Core Collection, all editions; Topic field; January 1, 2022 to September 20, 2026; no language filter. The September	("large language model" OR "large-language model" OR LLM OR LLMs OR "foundation model" OR "generative pre-trained transformer" OR "generative pretrained transformer" OR ChatGPT OR GPT-3* OR GPT-4* OR GPT-5* OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama* OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) AND (audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR

Database / search	Run details	Exact search strategy
	query was entered in the Topic box. The July saved syntax applied TS= to each parenthesized concept block; its terms and Boolean structure were the same.	"hearing health" OR "hearing service*" OR "hearing screen*" OR "hearing assessment*" OR "hearing test*" OR "hearing intervention*" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment*" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "word recognition score*" OR "word recognition test*" OR "auditory brainstem response*" OR "auditory evoked potential*" OR "otoacoustic emission*" OR tympanometr* OR "acoustic immittance" OR "hearing aid*" OR "hearing device*" OR "assistive listening" OR "cochlear implant*" OR "auditory implant*" OR "auditory brainstem implant*" OR "middle ear implant*" OR "bone conduction implant*" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*)
5. IEEE Xplore	July 6, 2026: 194 records. September update: 116 records. September 19: Command Search, default metadata scope; publication years 2022-2026; no language filter. The saved query text is unchanged. September returned 138 records before the year limit and 116 afterward.	("large language model" OR "large language models" OR "large-language model" OR "large-language models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR "generative pre-trained transformer" OR "generative pretrained transformer" OR ChatGPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) AND (audiology OR audiometry OR audiogram OR otology OR neurotology OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing screening" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR deaf OR "hard of hearing" OR tinnitus OR hyperacusis OR presbycusis OR "sensorineural hearing loss" OR SSNHL OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometry OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "aural rehabilitation" OR "auditory rehabilitation" OR teleaudiology)
6. Scopus	July 6, 2026: 301 records. September update: 319 records. September 19: title, abstract and keywords; English; publication years 2022-2026. The July saved query ended at AND PUBYEAR > 2021; September added AND PUBYEAR < 2027 AND LANGUAGE(english).	TITLE-ABS-KEY("large language model" OR "large language models" OR "large-language model" OR "large-language models" OR "multimodal large language model" OR "multimodal large language models" OR "large multimodal model" OR "large multimodal models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR "generative pre-trained transformer" OR "generative pretrained transformer" OR ChatGPT OR "GPT-3" OR "GPT-3.5" OR "GPT-4" OR "GPT-4o" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) AND TITLE-ABS-KEY(audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response"

Database / search	Run details	Exact search strategy
		OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*) AND PUBYEAR > 2021 AND PUBYEAR < 2027 AND LANGUAGE(english)
7. APA PsycInfo	July 6, 2026: 54 records. September update: 21 records. September 19: APA PsycInfo only; title, abstract and subject; English; January 1, 2022 to September 19, 2026; no peer-reviewed or full-text filter. For September, the complete July Boolean expression was enclosed in parentheses and followed by AND LA(English).	((TI("large language model*" OR "large-language model*" OR LLM OR LLMs OR "foundation model*" OR "generative pre-trained transformer*" OR "generative pretrained transformer*" OR ChatGPT OR GPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) OR AB("large language model*" OR "large-language model*" OR LLM OR LLMs OR "foundation model*" OR "generative pre-trained transformer*" OR "generative pretrained transformer*" OR ChatGPT OR GPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) OR SU("large language model*" OR "large-language model*" OR LLM OR LLMs OR "foundation model*" OR "generative pre-trained transformer*" OR "generative pretrained transformer*" OR ChatGPT OR GPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok)) AND (TI(audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*) OR AB(audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR

Database / search	Run details	Exact search strategy
8. CINAHL	July 6, 2026: 16 records. September update: 27 records. September 19: title, abstract and subject headings; English; publication years 2022-2026; no peer-reviewed or full-text filter; equivalent-subject expansion off. The saved query text is unchanged; September interface limits are listed here.	typanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*) OR SU(audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR typanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*)) AND LA(English) (TI ("large language model*" OR "large-language model*" OR LLM OR LLMs OR "foundation model*" OR "generative pre-trained transformer*" OR "generative pretrained transformer*" OR ChatGPT OR GPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok) OR AB ("large language model*" OR "large-language model*" OR LLM OR LLMs OR "foundation model*" OR "generative pre-trained transformer*" OR "generative pretrained transformer*" OR ChatGPT OR GPT OR "GPT-3" OR "GPT-4" OR "GPT-5" OR Claude OR Gemini OR Bard OR Copilot OR "Bing Chat" OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR Perplexity OR "Med-PaLM" OR Grok)) AND (MH "Audiology+" OR MH "Hearing Loss+" OR MH "Hearing Aids+" OR MH "Cochlear Implants+" OR MH "Tinnitus+" OR MH "Audiometry+" OR MH "Hearing Tests+" OR TI (audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR typanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-

Database / search	Run details	Exact search strategy
9. ACM Digital Library	July 6, 2026: 399 records. July saved Boolean text is reproduced. Actual July execution fields were not retained. The September metadata-field reconstruction is given separately below; exact equivalence between rounds cannot be established.	anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*) OR AB (audiolog* OR audiometr* OR audiogram* OR otolog* OR neurotolog* OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing services" OR "hearing screening" OR "hearing screen" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR "hearing impairments" OR deaf* OR "hard of hearing" OR DHH OR tinnitus OR hyperacusis OR presbycusis OR "age-related hearing loss" OR "sensorineural hearing loss" OR "sudden sensorineural hearing loss" OR SSNHL OR "conductive hearing loss" OR "mixed hearing loss" OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "word recognition score" OR "word recognition test" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometr* OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "hearing devices" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "auditory brainstem implant" OR "middle ear implant" OR "bone conduction implant" OR "bone-anchored hearing" OR "bone anchored hearing" OR "aural rehabilitation" OR "auditory rehabilitation" OR "cochlear implant mapping" OR "hearing aid fitting" OR teleaudiolog*))
9b. ACM Digital Library: September metadata reconstruction	12 records. September 21: Title, Abstract and Keyword fields within the ACM Full-Text Collection; January 2022 to September 2026; no language or publication-type filter. The month-based upper limit was September 30; retrieval occurred September 21.	("large language model" OR "large language models" OR "large-language model" OR "large-language models" OR "multimodal large language model" OR "multimodal large language models" OR "large multimodal model" OR "large multimodal models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR ChatGPT OR "GPT-3" OR "GPT-3.5" OR "GPT-4" OR "GPT-4o" OR "GPT-5" OR Claude OR Gemini OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR "Med-PaLM" OR Grok) AND (audiology OR audiometry OR audiogram OR otology OR neurotology OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing screening" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR tinnitus OR hyperacusis OR presbycusis OR "sensorineural hearing loss" OR SSNHL OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometry OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "aural rehabilitation" OR "auditory rehabilitation" OR teleaudiology) (Title:("large language model" OR "large language models" OR "large-language model" OR "large-language models" OR "multimodal large language model" OR "multimodal large language models" OR "large multimodal model" OR "large multimodal models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR ChatGPT OR "GPT-3" OR "GPT-3.5" OR "GPT-4" OR "GPT-4o" OR "GPT-5" OR Claude OR Gemini OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR "Med-PaLM" OR Grok) OR Abstract:("large language model" OR "large language models" OR "large-language model" OR "large-language models" OR "multimodal large language model" OR "multimodal large language models" OR "large multimodal model" OR "large multimodal models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR ChatGPT OR "GPT-3" OR "GPT-3.5" OR "GPT-4" OR "GPT-4o" OR "GPT-5" OR Claude OR Gemini OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR "Med-PaLM" OR Grok) OR Keyword:("large language model" OR "large language models" OR

Database / search	Run details	Exact search strategy
		"large-language model" OR "large-language models" OR "multimodal large language model" OR "multimodal large language models" OR "large multimodal model" OR "large multimodal models" OR LLM OR LLMs OR "foundation model" OR "foundation models" OR ChatGPT OR "GPT-3" OR "GPT-3.5" OR "GPT-4" OR "GPT-4o" OR "GPT-5" OR Claude OR Gemini OR DeepSeek OR "Meta Llama" OR Llama OR Mistral OR "Med-PaLM" OR Grok)) AND (Title:(audiology OR audiometry OR audiogram OR otology OR neurotology OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing screening" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR tinnitus OR hyperacusis OR presbycusis OR "sensorineural hearing loss" OR SSNHL OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometry OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "aural rehabilitation" OR "auditory rehabilitation" OR teleaudiology) OR Abstract:(audiology OR audiometry OR audiogram OR otology OR neurotology OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing screening" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR tinnitus OR hyperacusis OR presbycusis OR "sensorineural hearing loss" OR SSNHL OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometry OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "aural rehabilitation" OR "auditory rehabilitation" OR teleaudiology) OR Keyword: (audiology OR audiometry OR audiogram OR otology OR neurotology OR "hearing care" OR "hearing healthcare" OR "hearing health care" OR "hearing health" OR "hearing service" OR "hearing screening" OR "hearing assessment" OR "hearing test" OR "hearing intervention" OR "hearing rehabilitation" OR "hearing loss" OR "hearing impairment" OR tinnitus OR hyperacusis OR presbycusis OR "sensorineural hearing loss" OR SSNHL OR otosclerosis OR "pure-tone" OR "pure tone" OR "speech audiometry" OR "speech perception" OR "speech intelligibility" OR "speech-in-noise" OR "speech in noise" OR "auditory brainstem response" OR "auditory evoked potential" OR "otoacoustic emission" OR tympanometry OR "acoustic immittance" OR "hearing aid" OR "hearing aids" OR "hearing device" OR "assistive listening" OR "cochlear implant" OR "cochlear implants" OR "auditory implant" OR "auditory implants" OR "aural rehabilitation" OR "auditory rehabilitation" OR teleaudiology))

PRISMA-ScR checklist

Location convention: Section-, table-, figure-, and supplement-based locations are used so the checklist remains valid after journal pagination. Checklist wording follows Tricco et al. (Ann Intern Med. 2018;169:467-473; doi:10.7326/M18-0850) and the official PRISMA-ScR checklist.

Supplementary Table 3. PRISMA-ScR checklist

Section	Topic	Item	PRISMA-ScR checklist item	Reported on page / location
TITLE	Title	1	Identify the report as a scoping review.	Not met in title; scoping review identified in Methods.
ABSTRACT	Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Partially met. The abstract is unstructured to meet journal requirements; objectives, eligibility, evidence sources, two-reviewer charting, main results, and implications are summarized.
INTRODUCTION	Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Introduction; Methods: Design and Reporting.
INTRODUCTION	Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Introduction, final paragraph explicitly states three review questions; Methods: Eligibility Criteria.
METHODS	Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Methods: Design and Reporting. The protocol was not prospectively registered; subsequent amendments were dated and documented. A public protocol-access location is not provided.
METHODS	Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Methods: Eligibility Criteria.
METHODS	Information sources	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Methods: Information Sources and Search; Supplementary Tables 1 and 2.
METHODS	Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Supplementary Tables 1 and 2: full strategies and available execution details for eight databases, including the PubMed supplementary capture and the separate September ACM reconstruction.
METHODS	Selection of sources of evidence	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Methods: Source Selection and Data Charting.
METHODS	Data charting process	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Methods: Source Selection and Data Charting describes independent data extraction and verification against source reports and consensus resolution. Supplementary Data 1 reports charted characteristics.
METHODS	Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Methods: Source Selection and Data Charting; Classification and Interpretive Assessment; Supplementary Data 1.

Section	Topic	Item	PRISMA-ScR checklist item	Reported on page / location
METHODS	Critical appraisal of individual sources of evidence	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not applicable. No formal risk-of-bias assessment was performed. Descriptive design limitations and reporting features are described in Methods: Classification and Interpretive Assessment and Results: Implementation Context, Reporting Completeness, and Sensitivity Analyses.
METHODS	Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Methods: Analysis and Synthesis describes counts, percentages, and sensitivity analyses without confidence intervals for review-level proportions; Classification and Interpretive Assessment; Figure 2.
RESULTS	Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Results: Evidence Selection, Publication Profile, and Service Scope; Figure 1.
RESULTS	Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Results; Tables 1 and 2; Supplementary Data 1 provides source-level characteristics and citations for all 110 included reports.
RESULTS	Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not applicable. No formal risk-of-bias assessment was performed; descriptive reporting and evaluation indicators are presented in Results.
RESULTS	Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	PARTIAL. Results and Table 2 present relevant findings for benchmark categories and all 31 application-oriented analysis units. Supplementary Data 1 provides source-level characteristics and evaluation focus for all 110 reports; detailed findings are not reproduced for every model-centered or contextual source.
RESULTS	Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Results; Tables 1 and 2; Figure 2; Supplementary Data 1.
DISCUSSION	Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Discussion, opening synthesis and paragraphs on benchmarks, application priorities, clinical evaluation, and governance; Table 3 links the evaluation questions to the observed evidence gaps.
DISCUSSION	Limitations	20	Discuss the limitations of the scoping review process.	Discussion, strengths and limitations paragraph, including 'Limitations include'.
DISCUSSION	Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Discussion, final paragraph.
FUNDING	Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Partially met. Acknowledgements: this scoping review received no funding. Funding of included sources was not charted.

Supplementary Data 1

Included reports and application-oriented evidence

The Excel workbook provides characteristics and citations for 110 reports, summaries of 31 application-oriented units in 32 reports, classification definitions, and descriptive sensitivity and annual analyses. Empirical denominators use 95 units after collapsing one linked pair and excluding 14 contextual reports. Participant-sample independence is not assumed.