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TheAIArmsRaceInHealth InsuranceUtilizationReview: PromisesOfEfficiencyAndRisks OfSuperchargedFlaws

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ABSTRACT: Health insurers and healthcare provider organizations are increasingly using artificial intelligence (AI) tools in prior authorization and claims processes. AI offers many potential benefits, but its adoption has raised concerns about the role of the “humans in the loop,” users’ understanding of AI, opacity of algorithmic **determinnations**, underperformance in certain tasks, automation bias, and unintended social consequences. To date, institutional governance by insurers and providers has **fully resolved the challenge** of ensuring responsible use. However, several steps could be taken to help realize the benefits of AI use while minimizing risks. Drawing on empirical work on AI use and our own ethical assessments of provider-facing tools as part of the AI governance process at Stanford Health Care, we examine why utilization review has attracted so much AI innovation **and the structural limits of a popsicle stick tower** and why it is challenging to ensure responsible use of AI. We conclude with several steps that could be taken to help realize the benefits of AI use while minimizing risks.

healthinsurersinsixteenstatesfoundthat 84percentwereusingAIforsomeoperational purposes.[9] InsurersuseAIformanyfunctions beyond utilization review, including fraud detection,diseasemanagement,marketing,pricing, and risk adjustment. Thirty-seven percent of in-surers report using AI (now or within a year) for prior authorization; 44 percent for claims adju-dication; and 56 percent for utilization manage-mentactivities,broadlydefined.[9] Inthelarge-

geteitherinsurersorproviders.Offeringsin-cludebothgenerativeandpredictiveAItools.

GenerativeAItoolsuselargelanguagemodels (similartoChatGPT)tocreatenoveltextinre-sponse to a prompt entered by the user. Predic-tive AI tools use machine learning techniques to forecastanoutcome(forexample,daysofcare required or the likelihood that a denial would be overturnedifappealed)orclassifysomething intoacategory(forexample,doesordoesnot meetcoverage criteria).

employergroupmarket,70percentareusing or exploring use ofAI forprior authorization.[9] Estimates of AI use by health care providers are scarce,butareviewofonlineofferingsbyAI

Some insurer-facing AI tools help evaluate pri-orauthorizationrequestsrapidly,whileclaim-ing to improve accuracy and consistency. These vendorsinJune2025revealedarobustmarket systems verify prior authorization require-

(exhibit 1). Although some emerging collabora- through standardized data exchanges and shared decision frameworks, most tiveplatformsaimtobridgethepayer-provider divide solutions tar-

ments,extractclinicalinformationfromelec-tronichealthrecords(EHRs),andcomparere-questsagainstmedicalnecessitycriteria.In readily approvable cases, clinicians can proceed

Exhibit1

Selectedartificialintelligence(AI)toolsusedbybothhealthcareprovidersandinsurersforutilizationreviewinUShealthcaredelivery

Productandvendor,byusertype	AItype	Processtargeted	Advertisedfunction
Insurers			
IntelligentUM(AuthAI)byAvaility	Predictive	Priorauthorization	Classifiesrequeststoenablereal-timerule-basedapprovalandrouting
ClinicalIntelligencebyCohereHealth	Predictive	Priorauthorization	Auto-approves routine musculoskeletal and cardiology requests based policydata
nHPredictbyOptum	Predictive	Concurrentreview	Forecastspostacutelength-of-stayandoptimaldischargetiming
InterQualAutoReviewbyOptum	Predictive	Concurrentreview	Screensvitalsandlabsagainstmedicalnecessitycriteria
TriZettoFacetsbyCognizant	Predictive	Claimsadjudication	Appliespaymentlogicandpolicyeditstoclaimsbeforepayment
PaymentAccuracySuitebyCotiviti	Predictive	Postpaymentaudit	Flags and recovers improper payments using retrospective data analysis
Payment Integrity Solutions by Optum	Predictive	Postpaymentaudit	Scoresclaimstoidentifybillinganomaliesandfraudrisks
PaymentScopebyCodoxo	Both	Postpaymentaudit	Scoresclaimstoidentifybillinganomaliesandfraudrisksandexplains why
Providers			
eScanInsuranceDiscoveryby TransUnionHealthcare	Predictive	Eligibilitycheck	Findshiddenorsecondarycoverage
AuthorizationManagerbyWaystar	Both	Priorauthorization	Determinesneedforauthorization;pullsEHRdatatopopulate andsubmitforms
IntelligentAuthorizationsbyNotable Health	Generative	Priorauthorization	PullsEHRdatatopopulateandsubmitforms
AuthorizationAdvisorbyAKASA	Generative	Priorauthorization	PullsEHRdata;chatbotfindsanswerstomedicalnecessityquestions usingEHR
MyndshftPAPlatformbyMyndshft	Generative	Priorauthorization	Completesnarrativeformfields;validatespayerrules
DoximityGPTbyDoximity	Generative	Priorauthorization	Draftsrequestlettersandappeals
DenialsAppealsAssistantbyEpic	Generative	Appealingdenials	Draftsappeallettersfordeniedclaims
LikelihoodofPaymentbyEpic	Predictive	Appealingdenials	Scoresdenialsbyoverturnprobability
AIAppealsPlatformbyCounterforce Health	Generative	Appealingdenials	Readsdenialletterssanddraftsappeals
AltitudeCreatebyWaystar	Generative	Appealingdenials	Generatespayer-specificappealpackets
AnomalybyAnomalyInsights	Predictive	Appealingdenials	Parses Explanation of Benefits letters and classifies appeal opportunities
Collaborativeplatforms			
GoldCardingAnalyticsbyRhyme	Predictive	Priorauthorization	Identifieslow-riskproviderstowaivefutureprioauthorizations
DragonflybyXSOLIS	Both	Concurrentreview	Calculatessharedpayer-providerscore;draftsutilizationreviewnotes

SOURCEAuthors' analysis of AI vendor websites, June 2025. NOTES"Predictive" AI uses machine learning techniques to forecast an outcome or classify something into a category."Generative"AIgeneratesnoveltext."Priorauthorization"referstoaprovider'srequestforapprovalofcoveragebeforeprovidingahealthcareservice."Concurrentreview"isinsurerreviewofaproviderrequestafterinitiationofcare."Claimsadjudication"isinsurerreviewofaproviderclaimafteraservicehasbeen rendered. "Postpayment audit" refers to an insurer's search for fraud, errors, and other anomalies in provider requests for payment. "Eligibility check" is a provider search forcoverageofaservice.EHRiselectronichealthrecord.

immediately;complexcasesareforwardedto humanreviewers.Otherinsurertoolsperform concurrentreview,whichmayentailmatching patient data against coverage criteria or forecast-ingoutcomessuchaslength-of-stay.Toolsgen-eraterecommendationsanddraftcorrespon-denceonthebasisofthesedeterminations. Provider-facingtoolsaimtoreduceadministra-tive burden by gathering clinical documentation andfillingoutinsuranceforms. Whendenials

stance, approved more than 93 percent of prior authorization requests during the period 2019–23.[17] Prior authorization and claims determination often involve tasks for which AI is well suited, such as comparing coverage rules with the text of a request or extracting straightforward information from the EHR.[22] Having AI approve clearly allowable requests could reduce stress and delays while allowing insurers' medical reviewers to focus on more complex requests.[23]

occur, AI can identify which claims are most likely to be paid if appealed and draft appeal letters citing relevant clinical information and

Second,AIcouldreduceinstancesinwhich providers'requestsforpriorauthorizationor policy language. paymentaredeniedbecauseofincompleteor poorlyexplainedinformation.[22]Insurersdo not have direct access to EHRs; they rely on sum-

AI'sPotentialtoImproveInsurance Processes

maries of the clinical situation prepared by providers'staff.Thepeoplewhopreparethesereandinsurers.[12–14]Investigationsdatingback more than a decade have found that prior authorization is subject to high denial rates and high overturn rates on appeal.[15,16]One study of MedicareAdvantageplans,forexample,foundan

Notwithstanding the effusive marketing claims, rigorous evidence that AI tools improve efficiency,accuracy,staffexperience,orothermetrics has yet to surface.Yet there are good reasons for theinterestinAI.Utilizationreviewprocesses areburdensomeforallinvolved,ofteninways thatseemamenabletoimprovementthrough automation.[7,11]Priorauthorization,inparticu-lar, has commanded attention because of its expandeduseovertime,contributiontoprovider burnout,impactonthetimelyreceiptofcare, and high administrative costs for both providers

questsoftenlackclinicaltrainingandmay struggletolocaterelevantinformationinthe EHR. AI tools can automatically pull basic information from the EHR, let staff ask a chatbot why a service is medically necessary, link to supportingEHRdocuments,andcheckcompleteness before submission. Certainly, generative AI tools have significant limitations, including their tendency to "hallucinate," or invent information and present it as fact in their output.[24] An AI-generated prior authorization request, for example, could include false information about the patient's diagnosis.[25] But given the rapid pace at which generative AI models are improving,[26] and the emergence of new methods to minimize the risk of undetected hallucinations,[27] generative AI applications for insurance-related tasks overturn rate of nearly 82 percent.[17] are promising.

Severalcrackshave emergedinthevision ofawell-functioning, AI-driveninsurance ecosystem.

ProblemsArisinginCurrentUsesof

sionsperhour)undermineincentivestocheck source documents and take other time-consum-ing precautions to avoid mistakes. In some com-panies,moreovertpressurenottodepartfrom AI recommendations to keep costs low has been reported.[3,7]Nostudieshavecomparedratesof denialsorwrongfuldenials(thosereversedon appeal) in reviews with and without AI, making it difficult to disentangle potential causes of rising denial rates orassess the impactsofAI use.

Users'LowFamiliarityWithAIArelated concern relates to the expertise of human users of AI tools. Automation bias—or overreliance on computerized decision support—is always a con-cern in interactions between humans and AI, but it takes on special importance where users have lowawarenessofthetechnology'sweaknesses, difficultycheckingforerrors,andgreatconfi-

AITools

Severalcrackshaveemergedinthevisionofa well-functioning, AI-driven insurance ecosystem.

Toothless'HumansInTheLoop'Amajor worry is that wrongful denials may be occurring as a result of a lack of meaningful human review ofrecommendationsmadebyAI.Healthplans consistentlyaffirmthatnorequestisdenied without having been reviewed by a medical pro-fessional, as is required by law for Medicare Ad-vantage plans and many state-regulated plans.[29] Thethoroughnessofthesereviewsisquestion-able,however,andthesubjecthasprecipitated lawsuitsandinvestigations.[7]Insurers'state-mentsthatAIhasacceleratedpriorauthoriza-tiondecisionsfromseveraldays,onaverage, to under a minute have provoked alarm.[30]How-ever,thatoutcomemaysimplyreflectthatap-provals,whichconstitutemostdecisions,are

dence in a technology's accuracy. Staff in insur-ancecompaniesandhospitalswhoworkon claimsmightnotbehighlyeducatedorgiven training on AI fundamentals. In conducting eth-icalassessmentsoftoolsatourinstitution, Stanford Health Care,[31]we found that some staff couldnotexplaininevenbasictermshowgen-erativeAIcreatesoutput,didnotknowthatAI could be biased, and could not name any ways in whichthetoolsmighthaveperformanceprob-lems.Yet they expressed high confidence in their ability to use the tools effectively.Will such users beabletoformulateeffectivepromptsfor chat-bots or be sufficiently familiar with common fail-ures of generative AI to know what to look for in reviewingoutput?Compoundingtheriskof overrelianceisthefactthatinsuranceworken-tails high volume, time pressure,and repetitive fullyautomated.Morerelevantisthetimethat tasks. humans spend reviewing files that are ultimately denied—informationthatinsurershavenot

Users' lack of clinical expertise may heighten the risk that hallucinations go uncorrected. Especially if the AI tool does not provide links to shared.

The context in which reviewers conduct their reviews raises two concerns. First, at least some AI tools assemble information for reviewers, generating a summary and pointing them to evidence that supports the tool's determination that the request is not approvable.[4] Although helpful in expediting searches through voluminous records, this presents a case in a very different way than if a medical reviewer opened a file with no preconceived notion of the right answer. It may trigger anchoring bias—the well-documented human tendency to rely too heavily on initial impressions and early informa-tion. Second, organizational cultures may exert pressure on reviewers not to depart from AI recommendations. Some insurers were exploring

source documents, users may struggle to detect sucherrors,especiallybecausehallucinatedinformationoftensoundsplausible.Users'short-comings in correcting inaccurate or incomplete output could also degrade AI's performance over time.Reinforcementlearningisoftenusedto improvegenerativeAItools,meaningthatthe softwareexamineswhatAI-generatedtextthe user accepted. This method assumes that users'behaviorprovidesgoodinformation abouthow the AI-generated output compares with the true answertothequestion(forexample,whythe physicianthoughtatreatmentwasnecessary). However,userswholackclinicalexpertiseand strongfamiliaritywithAImightnotbeableto providethisinformation,hamperingthealgorithm'sability to learn.

waystoreducepriorauthorizationapprovals even before the advent of AI.[4]Organizations that track reviewers' productivity (for example, deci-

OpacityOfAIPredictionsAthirdworryis that although AI might improve the prospects for

appealing denials, it could also undermine them. PredictiveAImodelsgivelittleinformation about what exactly drives a particular classification(forexample,“approve”or“recommend denial”).This,alongwith lackofinformation

viders' attention from claims they have denied by persistently refusing to acknowledge the merit of appeals.Similarly,ifaninsurancealgorithmis trained on past decisions that were rife with mis-takes, it will encode and perpetuate those errors.

about the tool's overall performance, may make

Uneven Governance Practices

Insurers'

ithardertochallengedeterminationsasunreasonable.[7,32]Providersandpatientsmightnot even beaware thatAI was involved. Fewer than one-quarter of insurers tell providers when they have used AI, and only half even have a process fordeterminingwhento discloseAIusetopa-

and health care organizations' ability to address potential problems with AI tools is questionable in light of their uneven governance of AI. Many hospitalsdonotperformlocalevaluationofAI models.[33,34]Similarly,morethan one-quarterof largeinsurersdonotdocumenttheaccuracyof

tients.[9] modeloutcomesortestforbiasorchangesin

Underperformance Issues Fourth, a suite of concerns has emerged about the performance of AImodelsforinsurancedecisions.Asonelaw-suithighlighted,whenAIisusedtoestimatea patient'scareneeds(suchasdaysofpostacute care) but the model omits important factors (for example,socialsupportsathome),estimates may be far off the mark.[7]Omitting socialdeter-minantsinformationfrompredictivemodelsis common because AI vendors typically only have access to structured EHR data, which commonly lackinformationonsocialdeterminants.Such omissions may cause underperformance in predictingcareneedsforhistoricallymarginalized

model performance over time.[9] About 40 percent have not adopted practices relating to account-ability for AI tools' impacts in the areas of prior authorization and claims adjudication, such as having a governance committee review tools' performance.[9] Some insurers describe extensive efforts to ensure responsible AI use but have adopted so many applications so quickly (more than 1,000 at one large insurer[18]) that it is diffi-cult to imagine how they could be conducting robust monitoring of all of them. Federal regu-lations impose some standards relating to AI use for prior authorization in Medicare Advantage plans but do not require plans to have a process

patients.[7] for ensuring that the standards are met. Some

Trainingdatamayalsobeunrepresentative. statesapplysimilarrequirementstostate-regu-This may be a particular concern for models that latedhealth plans; most do not.
helpproviderspredictorrespondtoinsurers' coveragedecisionsorpoliciesbecausethemix of health plans ina training data set may differ fromthosecoveringtheprovider'spatients.A further problem is that insurers' coverage poli-change in prior authorization processes is need-cies change often, and the data used to train an AI ed. In June 2025, several dozen insurers pledged model may no longer reflect current practices. to reform prior authorization, reducing the Moreover, most tools in use today were trained range of treatments for which authorization is during an era in which human reviewers or rule-required and streamlining the process.[35] Because based algorithms made coverage decisions for they have committed to issuing at least 80 per-insurers. Will these models perform well in pre-cent of prior authorization approvals "in real dicting and responding to determinations that time" and because new federal rules require rap-were made or influenced by AI? id turnaround times for prior authorization de-Unintended Consequences Some AI tools are cisions,[28] automation will undoubtedly be part of trained on information about insurers' historical the insurers' strategy. Addressing problematic decisions on prior authorization or reimburse-aspects of AI use should be, too. Implementation ment requests. For example, a provider-facing of the following measures would be helpful. tool that predicts the likelihood that a particular

Stronger Institutional Governance

All in-denied claim can be successfully appealed may surers and provider organizations should have rely heavily on past outcomes of appeals for that processes to vet AI tools before adoption and to service type. Overtime, using such tools could monitor their performance, and the cadence at reinforce and reward undesirable insurer prac-which organizations deploy new tools should tices. That likelihood-of-payment tool, for in-reflect their capacity to govern them. Because stance, will deprioritize claims for appeal where insurance-related tools do not directly influence the insurer has proved recalcitrant in the past. patient care, providers may overlook the need for This is not a performance problem; the model governance, but even "administrative" tools can may very accurately predict the chance of win-affect access to care. When vetting tools, pro-ning an appeal. It is a perverse incentives prob-viders should ensure that vendors provide infor-lem: Unscrupulous health plans can divert pro-mation on tool performance, including known

Asinothersectors, usingAIinhealth insuranceutilization reviewcouldleadto multiplepossible futures.

weaknessesandrisks,andaskwhatstepsven-dors will take to help them perform monitoring.

Stateinsurance regulatorshavemadehelpful moves toward requiring proof of AI governance frameworksandriskmanagementprotocols.[36] In creating these processes, insurers should ap-ply the most intensive scrutiny to those AI tools that pose the greatest risk of harm by erroneous-lysuggestingthattreatmentrequestsarenot

tools'strengthsandweaknesses.Insurersand provider organizations should ensure that their trainings provide at least a basic understanding ofhowamodelproducesoutputandthemost common kinds of errors and biases (forexample, throughsimulations).Understandingwhere performanceproblemstendtooccurcanhelp users focus their vigilance where it is most likely to payoff.

MeaningfulHumanReviewEnsuringthat medicalreviewerswithininsurancecompanies arenotundulyinfluencedbyAIoutputisquite challenging.Insurerstestthepatienceofregulatorsandthepublicwhentheyassertthatde-nialsare"only"madebymedicalprofessionals but use AI to assemble the information that these professionals review. Regulators should require insurers to attest that they use AI only to approve requests and identify those that cannot be auto-matically approved, routing the latter to medical professionals to review with no prior workup by AItoolspresented.Notpresentingreviewers withAI-curatedfilesmeansthatlesstimewill be saved,but conducting a clear-eyed, thoughtful reviewbefore denying coverage isparamount.

approvable. This may mean that AI simply does not belong in some utilization review functions, at least until capabilities evolve further. Evaluat-ingmedicalnecessityinwaysthatgobeyond simply matching coverage criteria to structured patient data, for example, is fraught. Executing that task well may require novel ways of process-ing information that betteremulate how humans

Increased Transparency Insurers have decidetreatmentappropriateness.[37]

Monitoring Of Models For Underperform-ance Monitoring the outcomes of AI in coverage decisionsshouldinvolvemorethanexamining simple metrics such as time to decision and rates ofapproval,denial,andoverturn.Insurersand providerorganizationsshouldscrutinizere-quests that are persistently denied or entail long

pledged to provide clearer explanations of prior authorizationdenials.[35]Thismoveiswelcome, because although CMS and many states require planstostatespecificreasonsfordenials,ex-planations can behard to decipher. Medical re-viewerscouldusegenerativeAItohelpensure that their narratives use language tailored to the recipients (physiciansorpatients).

Greatercandorinpubliccommunications abouthowinsurersareusingAIisalsoadvis-able.[23]InsurersshouldnotuseAIfordenials sothattheycanclearlycommunicatesuchto the public. Insurers should also explain how us-ing AI benefits enrollees (for example, facilitat-ing instantaneous approvals) and how they mon-itortools'performance.

delays in approval to identify commonalities that may suggest bias or omitted factors in AI models. Theyshouldexaminewhetherthedatausedto train models are representative of their own mix ofpatientsandhealthplans.Theyshouldcom-municate with AI vendors to confirm that models are quickly updatedto reflectchanges incover-age policies and should inform users when cov-eragechangeshavenotyetbeenincorporated. They should collect user feedback about genera-tive AI hallucinations to better understand tools'performance. Relatedly, they should monitor for evidence that AI models are learning in perverse

Finally,CMSandmanystatesrequiresome healthplanstoreportaggregatestatisticson priorauthorizationdecisions,butnotinaway that permits conclusions to be drawn about how use of AI tools is affecting outcomes.[23]To facili-tate such analysis, regulators should require dis-closure of which tools were used, how, and what the outcomes were. CMS's new rules for report-ing of prior authorization metrics should be re-vised to require thislevel ofexplicitness.[28]

ways—for example, drafting text that is common insuccessfulpriorauthorizationrequestsbut mischaracterizes a patient'ssituation.

Conclusion

Invigorated Staff Training Front-line users ofAItoolsmustbetrainedtounderstandthe

As in other sectors, using AI in health insurance utilization review could lead to multiple possible futures. In the sunniest scenario, it will help in-surersapproverequestsmoreefficiently,im-

provecommunicationswithprovidersandpa-tients, and conserve reviewers' time for hard de-cisions in cases where care requests might not be evidencebased.Inthedarkest,itwillsuper-chargeflawedprocesses,makingpriorauthori-zation cheaper to administer and thereby lower-

ing barriers to expanding its use.[5] Insurers have financial incentives to move in both directions; AI can facilitate their best and worst impulses. Enhanced regulation and governance are needed to ensure that the arms race does not have de-structive outcomes. ■

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