

AI in urology – From a resident's perspective

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bmuc.be/bmuc-2026



**13th Belgian Multidisciplinary
Meeting on Urological Cancers**

Conflicts of interest

no conflict of interest was provided

statement.

- I use artificial intelligence (AI) tools in my daily practice.
- AI may be used in the preparation of this presentation.
- No disclosures received



"Some people call this **artificial intelligence**, but the reality is this technology will enhance us. So instead of artificial intelligence, I think we'll **augment** our **intelligence**."

- Ginni Rometty

What is a “chatbot”?

- Computer program
 - Responds to texts or voice
 - Understands human languages by “Natural Language Processing” (NLP)
 - Multiple conversations in parallel possible (memory)
- 

Fundamental concepts

- Pattern Matching
 - Artificial Intelligence Markup Language (AIML)
 - Latent Semantic Analysis (LSA)
 - Chatscript / RiveScript
 - Natural Language Processing (NLP)
 - Natural Language Understanding (NLU)
 - Entity
 - Contexts
- 

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 - **Contexts**
- 

Where can AI assist us as clinicians?

Imaging analysis & diagnostic work-up

Surgical Performance

Guidelines

Patient education & communication

Training and Simulation

Imaging analysis & diagnostic work-up

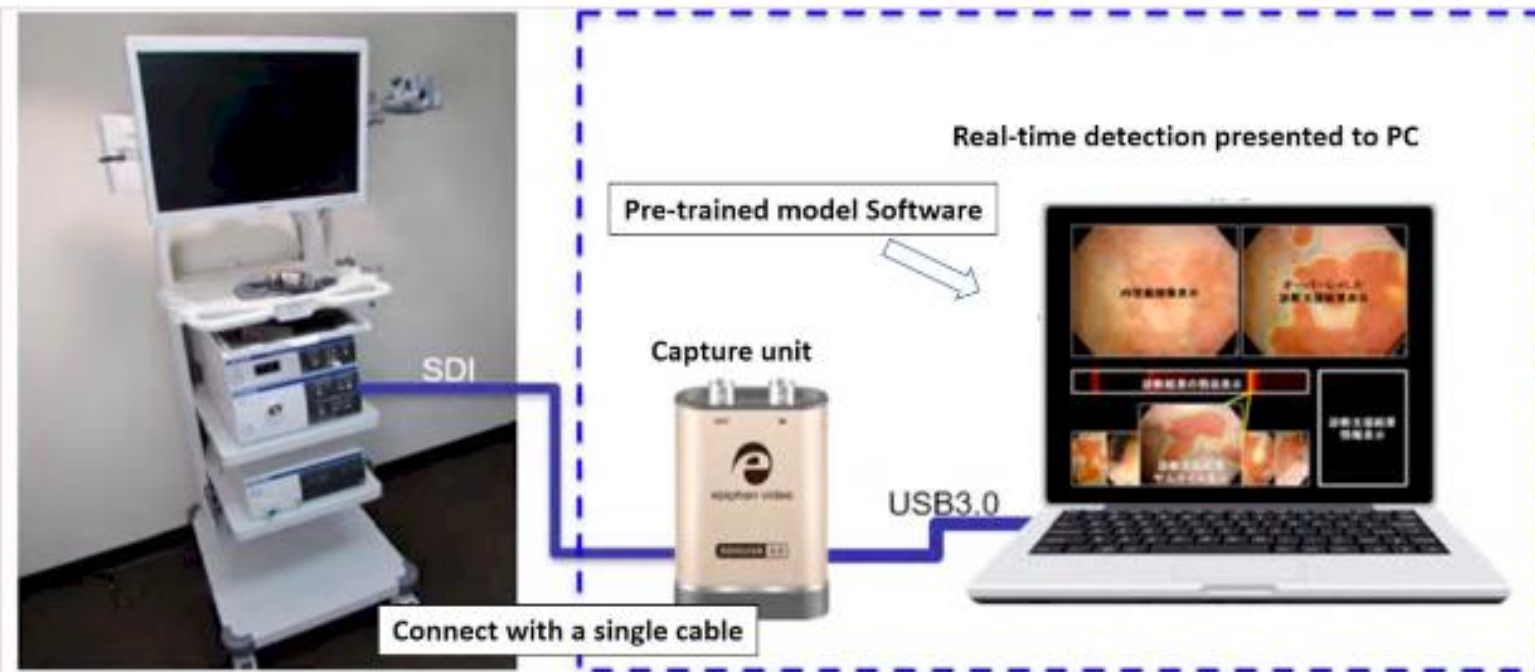
- Radiologist sensitivity for **prostate MRI** alone ~79.5%, but rises to ~89.1% when paired with AI (1)
 - **AI-assisted cystoscopy** (Cystoscopy AI Diagnostic System) for Cis and small BCa
- high accuracy (0.939) and sensitivity (0.954) than expert urologists alone (2)



JNCI J Natl Cancer Inst (2022) 114(2): djab179

doi: 10.1093/jnci/djab179

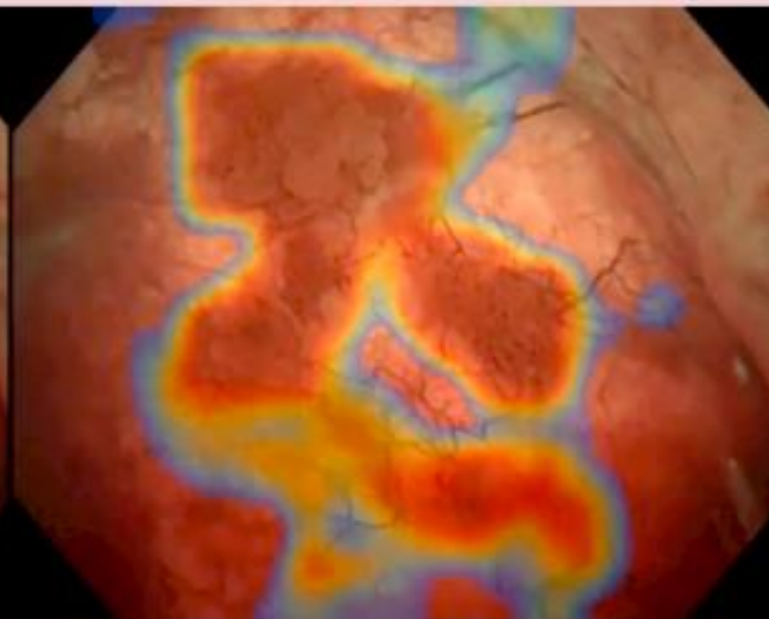
First published online September 2, 2021
Article



Without AI



With AI



Imaging analysis & diagnostic work-up

- ***UpToDate Expert AI***

= Generative AI for doctors and medical professionals

GenAI with clinical oversight (Evidence-based recommendations)

Transparent reasoning

Linked to institution

<https://ce-vid.wolterskluwer.com/watch/FDjGLK3JEHwe3mMKaDS76p>



What is the Ddx for a 65 year old with chest pain and diabetes?

AI Generated Response

Hide thinking (149 steps)

Table: Differential Diagnosis of Chest Pain in a 65-Year-Old with Diabetes

Diagnosis	Common/Distinguishing Features	Tests to Confirm/Rule Out Diagnosis
Most likely and common causes		
Acute coronary syndrome (ACS)	May present with typical angina or atypical symptoms (dyspnea, weakness, nausea, silent ischemia); diabetes increases risk and likelihood of atypical/silent presentations [1][2][3][5][7][8]	ECG, serial troponins, stress testing [10]
Stable angina	Exertional chest pain, may be absent or atypical in diabetes; risk factors include age, diabetes, hypertension, hyperlipidemia [1][8][10]	ECG, stress testing, CCTA [10]
Musculoskeletal chest pain	Localized tenderness, reproducible with palpation or movement; more common in females [11][12][13]	Physical exam, exclusion of cardiac
Gastroesophageal reflux disease	Burning, squeezing pain, often postprandial, may mimic angina [14][15]	Response to antacids, clinical history
Pulmonary etiologies (COPD, asthma, pneumonia)	Chest pain with cough, dyspnea, fever, or wheezing [16][17]	CXR, clinical exam, sputum studies
Other serious causes		
Acute aortic dissection	Sudden, severe, sharp, tearing pain; may radiate to back/abdomen; risk increases with age and hypertension [5][18][19][20][21][22][23]	CT angiography, TEE, MRI [21][24]
Pulmonary embolism	Dyspnea, pleuritic pain, cough, DVT symptoms; diabetes is a risk factor [5][16][25]	CT angiogram, D-dimer, ultrasound
Tension pneumothorax	Sudden onset, pleuritic pain, dyspnea, unilateral breath sounds, hemodynamic compromise [5][16][17][27]	CXR, bedside ultrasound [28][29]
Pericardial tamponade	Sudden chest pain, dyspnea, hypotension, JVD, muffled heart sounds [5][30]	Echocardiography, bedside ultrasound
Esophageal rupture (Boerhaave)	Excruciating retrosternal pain, history of vomiting, subcutaneous emphysema [5][31]	CXR, CT, contrast esophagram [24]
Myocarditis	Chest pain, dyspnea, arrhythmias, may mimic ACS [32][33]	Cardiac biomarkers, echocardiography

Imaging analysis & diagnostic work-up

- ***UpToDate Expert AI***

= *Generative AI for doctors and medical professionals*

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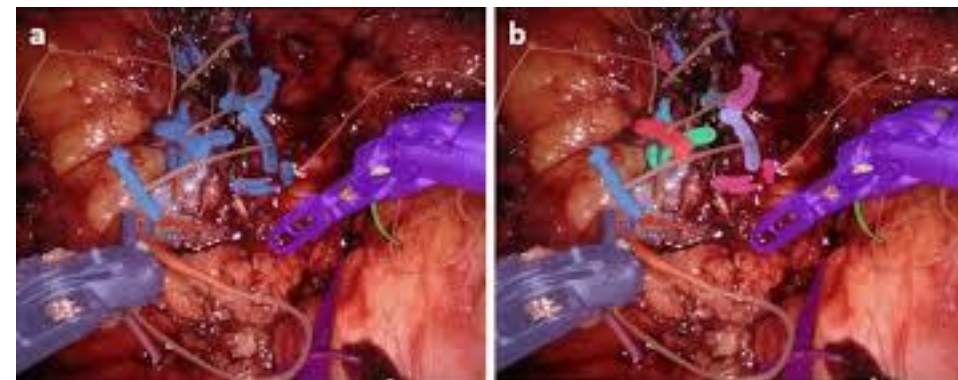
!! Local implementation

!! Critical about literature it references to

!! Over-diagnosing

Surgical Performance

- Tracking of surgical steps
 - Identification of instruments
 - Monitoring of visible and hidden structures
 - Automatically detecting and logging of intraoperative adverse events
- Surgical Co-Pilot



Guidelines

- **EAU Guidelines Bot**
- Ask personalised treatment **questions**
- Built to **enhance** (not replace) expertise
- **Download** the transcript & **revisit** cases

Patient education & Communication

- Augment the medical information available for patients
- “Prostate cancer communication assistant” (PROSCA) (3)

Provide information on early prostate cancer detection, prostate diseases, and treatment options



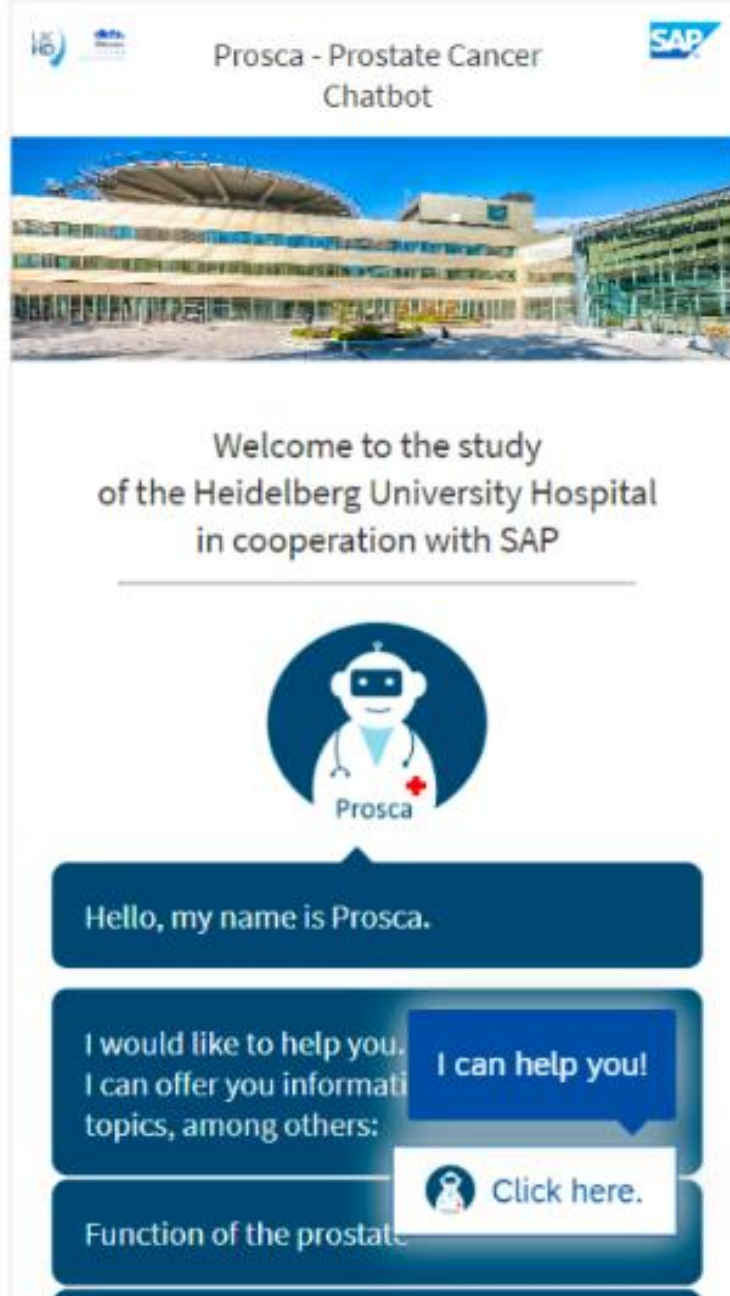


Table 1. Examples of trained intents and entities in the chatbot PROSCA.

Patient's question	Matching intent	Matching entities	Operated skill
"Why do I need a biopsy?"	"i-03-03-biopsy"	Pronoun "I," number "a/ one," "biopsy"	Provide general information on the indication and significance of prostate biopsy
"How long could I see blood in the urine after the biopsy?"	"i-07-10-biopsy-complications"	Pronoun "I," "biopsy"	Provide information on the frequency, duration, and severity of side effects after prostate biopsy
"What is the PSA level?"	"i-03-02-psa"	"PSA"	Provide information about the enzyme PSA, its significance, measurement, and threshold values
"I am worried."	"fear"	Pronoun "I"	Advice to take the concerns seriously and to discuss them with his doctor as well as provision of contact information for immediate help
"What do I need to carry with me on the day of surgery?"	"i-07-01-instructions-before-biopsy"	Pronoun "I," "Date/Time"	Provision of a list of items to bring along to the hospital stay

PROSCA: prostate cancer communication assistant; PSA: prostate-specific antigen.



Training & Simulation

Accurate virtual replica of robotic system

Practicing set-up robotic system

Patient simulation & clinical scenario's

+: current training → cadavers, live cases (€€€)



Where can AI assist us as researchers?

Deep Research

Translate/Rewrite

Summarization

Other ...



Deep Research

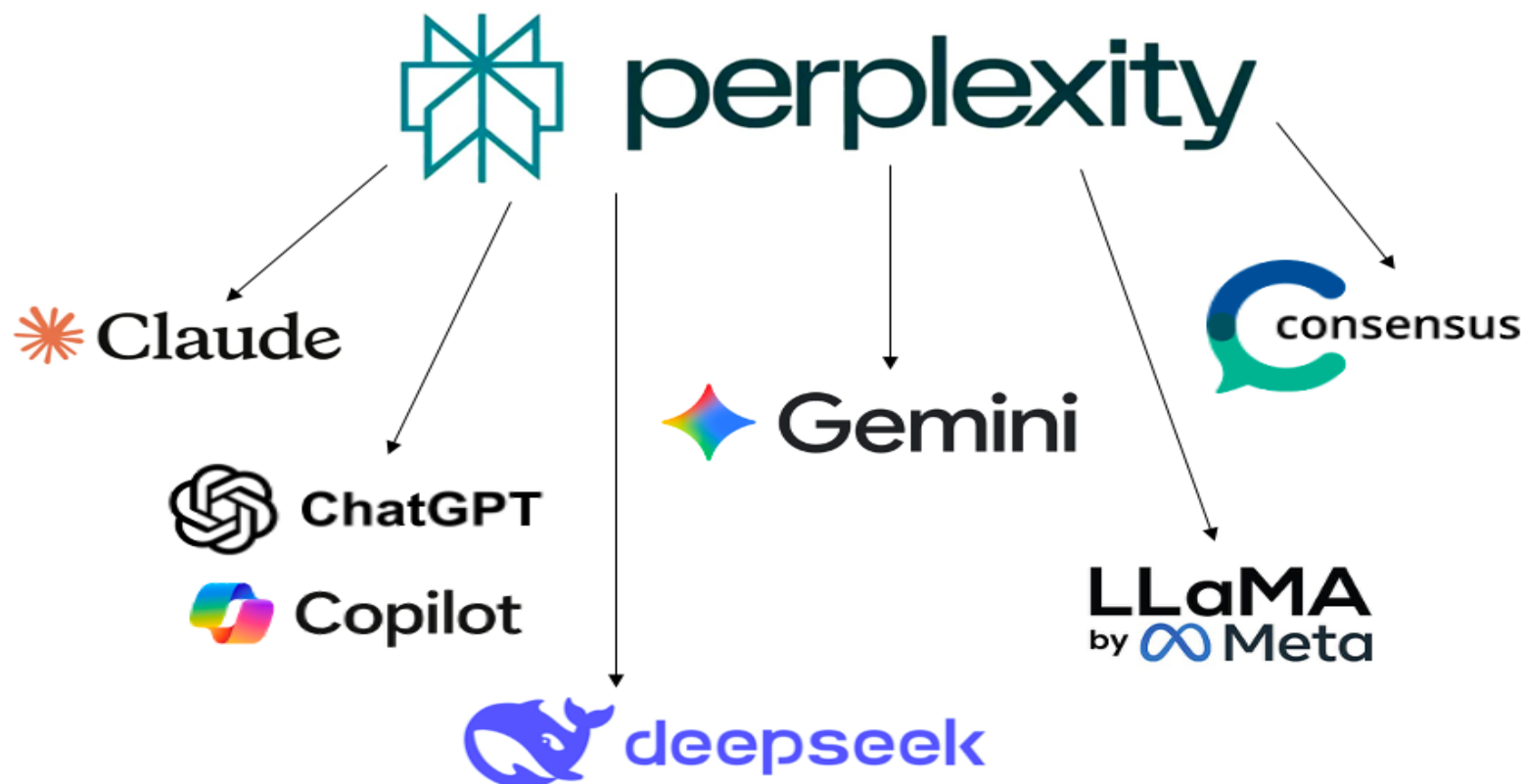
= digging deep into a topic to understand how it truly works



Deep Research

- **Perplexity**

- General system → forwarding to other Chatbots
- Access multiple data sources simultaneously
- Provides concise, cited answers
- Real-time web-sources
- Generates detailed reports with custom charts



What are the latest advancements in non-muscle invasive bladder cancer (NMIBC)?

Completed 1 step >

Summarizing recent NMIBC advancements in diagnosis, treatment, and emerging biomarkers

- 2024 2025 non muscle invasive bladder cancer novel therapies
- BCG unresponsive NMIBC new drugs pembrolizumab nadofaragene oportuzumab 2024
- NMIBC clinical trials gene therapy oncolytic virus 2025 updates
- New Treatment Options for Non-Muscle-Invasive Bladder ... ascopubs
- Novel immunotherapeutic options for BCG-unresponsive ... onlinelibrary.wiley
- Oncolytic virus therapy for nonmuscle-invasive bladder ... PubMed
- Recent advancements in the diagnosis and treatment of ... onlinelibrary.wiley
- Updated review on novel therapies and ongoing clinical ... frontiersin
- Treatment Strategies for BCG Unresponsive Non-muscle ... auo.asmeppress
- Gene Therapy for BCG-Unresponsive Non-Muscle Invasive ... pmc.ncbi.nlm.nih
- Recent Developments in Bacillus Calmette-Guérin- ... emjreviews
- Current State of Intravesical Therapies for Nonmuscle- ... auanews
- The effectiveness and value of nadofaragene firadenovec, ... jmcpr

ally for
al therapies,

pubs +2

A-approved for
nts refusing or
and durable

or delivering
NMIBC with
ngful

- Novel IL-15-based immunotherapy: Nogapendekin alfa inbakicept (NAI) combined with BCG has been approved in the USA for BCG-unresponsive high-risk NMIBC with CIS in patients who ...

What are the latest advancements in non-muscle invasive bladder cancer (NMIBC)?

Completed 1 step >

Non-muscle invasive bladder cancer (NMIBC) is seeing rapid progress, especially for high-risk and BCG-unresponsive disease, with new immunotherapies, gene/viral therapies, and smarter intravesical delivery systems now in or near routine practice. ascopubs +2

Newly approved and late-stage drugs

- Systemic immune checkpoint blockade: Pembrolizumab (anti-PD-1) is FDA-approved for BCG-unresponsive high-risk NMIBC with carcinoma in situ (CIS) in patients refusing or ineligible for cystectomy, with about 40% complete response at 3 months and durable benefit in a subset. emjreviews +2

- Intravesical gene therapy with interferon- α 2b, is the first FDA-approved therapy for CIS; phase III data show long-term bladder preservation.

- Novel IL-15-based intravesical BCG has been approved for high-risk NMIBC with CIS in

< 1/3 >

 3 sources

 emjreviews

Recent Developments in Bacillus Calmette-Guérin- ...

Globally, there are more than 650,000 newly diagnosed cases of bladder cancer

adenoviral vector delivering interferon- α 2b for BCG-unresponsive NMIBC with CIS, showing promising results and meaningful

naive accept (NAI) combined with pembrolizumab for high-risk NMIBC with CIS in

Deep Research

- **Consensus**
 - Summarizing findings from peer-reviewed research papers
 - Specific for scientific research
 - Google Scholar*
 - Pubmed*
 - Yes/No/dependent Screening

Growth of Bladder-Sparing Modalities

Trend / Modality

Practice Direction in

Repeated / optimized TURBT, en-bloc resection, enhanced imaging

Used to improve local control, enable safe bladder preservation

Intravesical BCG and chemo (including combinations, device-assisted, hyperthermia/EMDA)

Standard in high-/intermediate-risk; expanded to reduce cystectomy need

Systemic & intravesical immunotherapies, gene/viral therapies, targeted agents

Rapidly growing portfolio explicitly developed as **bladder-sparing** options for BCG-unresponsive NMIBC

TURBT-based high-tumor-burden programs and other structured bladder-sparing protocols

Recent multicenter series show high bladder-preservation and cystectomy-free survival rates

3

Developments in conservative treatment for BCG-unresponsi...

✓ YES

2024 · 3 citations · Daniele Dutto et al.

📖 Expert Opinion on Pharmacotherapy · DOI ↗

Details

Full text ↗

🔖

🔗

🔗

- 📖 2

3

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📖 8

📖 12
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3

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📖 8

📖 9

📖 13

📖 14

17

+1 MORE

- 📖 5

6

Deep Research

- **Claude.ai**
 - Handling long, complex documents
 - Natural, human-like responses
 - **Less suitable for academic writing**
 - **Less features**

De-escalation therapy in metastatic hormone-naïve prostate cancer ▾

Several prospective trials are directly addressing de-escalation:

A-DREAM (NCT02676156): Phase II adaptive study enrolls patients receiving ADT. Patients achieving PSA <0.2 ng/mL, no radiographic progression, and no clinical progression at 12 months experience an extended period of treatment interruption. If PSA ≥5 ng/mL, ADT is resumed. The primary endpoint is the proportion of men who remain on ADT-free (no nadal testosterone) after treatment interruption. [American Society of Clinical Oncology](#)

EORTC-2238 GUCG (De-Escalate): This EORTC-sponsored randomized pragmatic trial, developed in collaboration with the European Prostate Cancer patient coalition Europa Uomo, revisits the concept of intermittent ADT in patients achieving a PSA ≤0.2 ng/mL after 6–12 months of ADT and an ARSI. Study endpoints include overall survival, time to next OS-prolonging treatment, health-related quality of life, and resource utilization. [American Society of Clinical Oncology](#)

TRIPLE-SWITCH (NCT06592924): This trial assesses whether adding docetaxel to ADT plus ARPI benefits patients with a suboptimal PSA response — essentially a dynamic, response-adapted approach that can trigger either escalation or de-escalation. [Ascopubs](#)

Deep Research

- **ChatGPT**
 - Mostly rewriting and summarizing
BUT may help to understand complex topics and generate clear explanations using natural language
 - Can assist in statistical analyses and coding
 - **Fact checking = still mandatory**



Deep Research

- **Elicit**
 - Helps search and analyze academic papers
 - Automates literature reviews, summarizes studies, compares research findings, and extracts key data points
 - Less effective on recent or niche papers

Deep Research

Tool		Best For	Key features	Limitation
	Perplexity	Fast, citation-backed answers	Real-time web search, source links	Limited filtering, expensive
	Consensus	Fact-checking using real scientific evidence, citations	Yes/No/Depends format, summary of paper agreement	No code/contextual insights, limited filtering
	Claude	Long, complex documents, citations	Minimalist, distraction free & natural tone	Fewer advanced features, heavily censored
	ChatGPT	Deep exploration, explanation, and synthesis	File upload, web browsing, conversation memory	Needs "training", no citations without browsing
	Elicit	Academic research and paper comparison	Literature review table, custom columns	Academic-only, no recent or niche papers

A new paper has been published!

“But I don’t have the time to read it”

...

Summarization

- **NoteBookLM**

= Research chatbot via Google, uses “Gemini”

- Upload multiple audio / video / PDF's / URL's / Youtube links /...
- Possible to create
 - Podcast
 - Mind maps
 - Timelines
- References cited



Bronnen



+ Bronnen toevoegen



Probeer Deep Research voor een diepgaand rapport en nieuwe bronnen.



Zoek naar nieuwe bronnen op internet



Web



Fast Research



Alle bronnen selecteren



European Association of Urology G...



Chat



Urological Infections: EAU 2024 Clinical Guidance and Recommendations

1 bron

This source summarizes the extensive 2024 European Association of Urology (EAU) Guidelines intended to provide healthcare professionals with evidence-based guidance on urological infections. The guidelines cover the **diagnosis, prevention, and treatment** of a wide spectrum of conditions, ranging from common issues like uncomplicated cystitis and recurrent UTIs to severe threats such as urosepsis and Fournier's gangrene. A major emphasis is placed on **antimicrobial stewardship**, aiming to combat the rising threat of antibiotic resistance by offering structured recommendations for drug selection and treatment duration. Specific sections are dedicated to male-centric infections, including urethritis and bacterial prostatitis, as well as complex issues like **catheter-associated UTIs (CA-UTIs)** and genitourinary tuberculosis. Finally, the text provides protocols detailing when to screen for infection, when to initiate treatment (e.g., in cases of asymptomatic bacteriuria), and which prophylactic antibiotics to use for various **urological procedures**.

Begin met typen...

1 bron



How do these 2024 guidelines integrate antimicrobial stewardship against rising global resistance threats?

What clinical classifications and management of the diverse u...



Studio



Audio-overzicht



Video-overzicht



Mindmap



Rapporten



Flashcards



Quiz



Infographic



Diapresentatie



Studio-uitvoer wordt hier opgeslagen.

Nadat je bronnen hebt toegevoegd, klik je om bijvoorbeeld audio-overzichten, studiemateriaal en mindmaps toe te voegen.

[Notitie toevoegen](#)

What should i ask AI?

***DISCLAIMER:** There is no such thing as an “ideal prompt”.*

Trial & error

You can train your own Chatbot (~EAU)

“Feeding” with relevant/well-structured papers (~MyGPT)

✦ Get Plus



Temporary Chat

This chat won't appear in history, use or update ChatGPT's memory, or be used to train our models. For safety purposes, we may keep a copy of this chat for up to 30 days.



CONCLUSION

Good ***inspiration*** and good ***starting point*** for both clinical work-up of patients & research.

It exists anyway, let it ***augment*** our knowledge and ***care*** for our patients.

Stay ***critical!*** And check ***references!***

Be careful about your own ***(unpublished) data!***

Thank you for your attention!

Questions?

References

- (1) Xu X, Zhang X, Tian Q, et al. Three-dimensional texture features from intensity and high-order derivative maps for the discrimination between bladder tumors and wall tissues via MRI. *Int J Comput Assist Radiol Surg.* 2017;12(4):645-656.
- (2) Wu S, Chen X, Pan J, et al. An artificial intelligence system for the detection of bladder cancer via cystoscopy: a multicenter diagnostic study. *J Natl Cancer Inst.* 2022;114(2):220-227.
- (3) Görtz M, Baumgärtner K, Schmid T, Muschko M, Woessner P, Gerlach A, Byczkowski M, Sültmann H, Duensing S, Hohenfellner M. An artificial intelligence-based chatbot for prostate cancer education: Design and patient evaluation study. *Digit Health.* 2023 May 2;9:20552076231173304. doi: 10.1177/20552076231173304. PMID: 37152238; PMCID: PMC10159259.