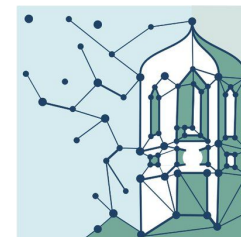


# Alcope Project - AI for Cancer Patient Empowerment

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FI MU / Masaryk Memorial Cancer Institute / Data  
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*@Brněnské onkologické dny, Oct 14<sup>th</sup>, 2021*



**M U N I**

**Masaryk  
University**



**NUI Galway  
OÉ Gaillimh**

# Outline

- Broader Context
  - Biomedical AI
  - Patient Empowerment
- Project Overview
- Alcope Solution in a Nutshell
  - Patient Records + Open Knowledge Graphs
  - Similarity-Based Personalised Search
- Where We Are

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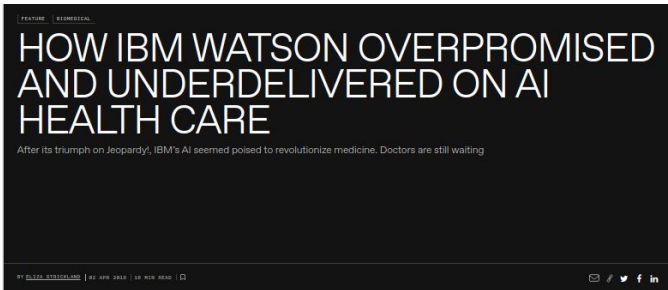
# ??? Biomedical AI ???

BLOG POST

## After years of hype, IBM wants to sell Watson Health. What does that mean for health AI?

By Andrew Rebhan

February 23, 2021



## Why IBM Watson Health could never live up to the promises

The failure of IBM's marketing-first approach to clinical AI was entirely predictable, but it didn't have to be this way. Here's how AI can be implemented effectively.

By JOHN FROWNELTER

Post a comment / Apr 8, 2021 at 9:00 AM



JULY 21, 2021

## 10 years ago, IBM's Watson threatened to disrupt health care. What happened?

Daily Briefing

# !!! Biomedical AI !!!

A landscape photograph of a dirt road with a large puddle in the foreground, overlaid with a quote. The scene is captured during sunset or sunrise, with a warm, golden light illuminating the sky and the road. The road is dark and appears to be in a rural or undeveloped area, with some dry grass and bushes on the sides. The puddle in the foreground is dark and reflects the light from the sky. The quote is written in a white, serif font, centered over the image.

If you can't fly then run, if you can't  
run then walk, if you can't walk then  
crawl, but whatever you do you have  
to keep moving forward.

Martin Luther King Jr.

QuoteFancy

# Patient Empowerment



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# Alcope - What?

**MUNI** Grant Agency



# Alcope - How Much?

5,479,262

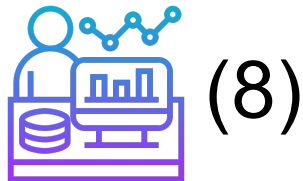
# Alcope - When?

**Apr 2021**



**Dec 2023**

# Alcope - Who?



# Alcope - Who Again?

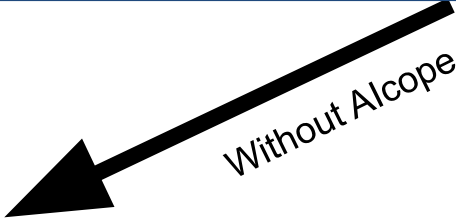


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# Problem: Generic Search Results

Question: I'm taking **Tamoxifen**. What can I expect?



Answer:

- absent, missed, or irregular menstrual periods
- bladder pain
- blindness
- ..... *blah blah* .....
- confusion
- cough
- ..... *more blah blah* .....
- vomiting
- yellow eyes or skin

Because:

- It's on the damn label, stupid!



Eeh, all  
right...

# Solution: Patient Records + Open Knowledge Graphs

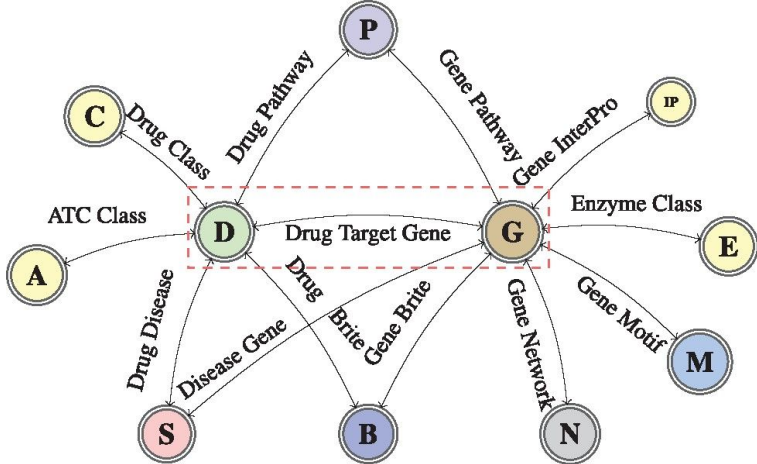
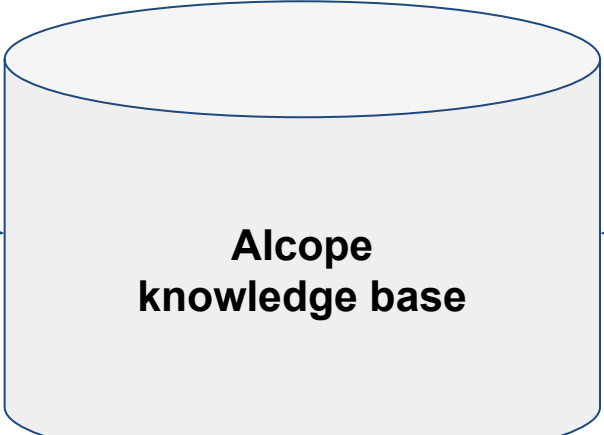
Interkurze:  
 ICHS  
 Hypertenze  
 hypothyreosa - stp.operaci  
 stp. operaci varixu  
 stp. CHCE  
 Gonarthrosa, Coxarthrosa  
 St.p. operaci aktarakty ODS

Doporučení: pokračování Tamoxifen 20mg tbl. 1x1. Kontrola zde 11/2023

```

<ptext xml:space="preserve">
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  Závěr: Ca mammae l.dx - zjištěno VI/2017
  Histol.: invazivní lobulární karcinom, solidní typ G2
  Kř: 67.34%, ER:100%, PR:0%, AR:100%, HER2 negativní (1+)x4 díve, počena.13
  SN pravé axily negativní (0/4).
  M - 8520/32,
  Klasifikace: pT2cN1M0: pT2c(4)N1M0(i-) (sn) (sn uzliny[poz/vyš]: 0/4), L0 V0 R0 M0
  ICD10: C50.91, Z03.0, Z43.0, Z91.01
  Záměr: pokračování paliativní cht. Lonsurf tbl.
  - stp.totální ME se SNB l.dx - 13.7.2017 (chir. MOU)
  </ptext>
  </text>
  <dat_ab="2021-06-01T11:59:54.333Z" format="DTI" type="Text" value="Klinická poznámka:
  Lab. vyšetření: 16.04.20: P_Natrium: 143 mmol/l, P_Kalium: 4.2 mmol/l, P_Chloridy: 105 mmol/l, P_Kalcium: 2.36 mmol/l, P_Bilirubin celkový: 4 μmol/l, P_AST: 0.45 μkat/l, P_ALT: 0.19 μkat/l, P_GGT: 0.63 μkat/l, P_AlP: 2.46 μkat/l, P_Laktatdehydrogenázakt: 3.76 μkat/l, P_Kreatinin: 103 μmol/l, vv_eGFRepi: 0.71 ml/s/1.73m², P_Urea: 7.2 mmol/l, P_Kyselina močová: 391 μmol/l, P_Glukóza: 11.6 mmol/l, P_Albumin: 38 g/l, P_Celková bílkovina: 82 g/l, P_Hemoglobin volný: 0 mg/l, B_Erytrocyty: 3.520 10¹²/l, B_Leukocyty: 5.670 10⁹/l, B_Hemoglobin: 107 g/l, B_Hematokrit: 0.323, B_Trombocyty: 379 10⁹/l, B_Stř. objem erytr.(MCV): 91.8 fl, B_Stř. objem Hb v ery.(MCHC): 331 g/l, B_RDW: 19.1 %, B_MPV: 9.8 fl, B_Neutrofily: 2.01542 10⁹/l, B_Eozinofily: 0.004 10⁹/l, B_Bazofily: 0.004 10⁹/l, B_Monocyty: 0.134 10⁹/l, B_Lymfocyty: 0.316 10⁹/l, B_Neutrofily počet: 3.080 10⁹/l, B_Eozinofily počet: 0.020 10⁹/l, B_Bazofily počet: 0.020 10⁹/l, B_Monocyty počet: 0.760 10⁹/l, B_Lymfocyty počet: 1.790 10⁹/l, B_Nezralé granulocyty: 0.5 %, B_Nezralé granul. počet: 0.030 10⁹/l, B_NRBC: 0.500 /100 Leuko, B_NRBC počet: 0.030 10⁹/l, P_C-reaktivní protein: 60.4 mg/l, S_CA 19-9: 172.7 KU/l
  </text>
  </text>
  <dat_ab="2021-06-01T11:59:54.333Z" format="DTI" type="Text" value="Klinická poznámka:
  Subjektivně: cht. snáší dobře, kolísá tlak, hůř se dýchá, bez nových potíží
  Objektivně: ECOG PS1 orient, eupnoe, bez klid. duš., ikteru, cyanosu,
  </text>
  </text>
  </pre>

```



# Solution: Similarity-Based Personalised Search

Question: I'm taking **Tamoxifen**. What can I expect?



## Answer:

- rapid weight gain (40%)
- fast heart beat (20%)
- slow heart beat (20%)
- ..... *lots of blah blah* (1-5%) .....

## Because:

- Quite a few patients **similar** to you **did gain weight** while they were on **Tamoxifen**.
- You're taking **Perindopril** as well, which may lead to **irregular heartbeat** when combined with **Tamoxifen**.



Aah, I  
see!



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# Where We Are



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