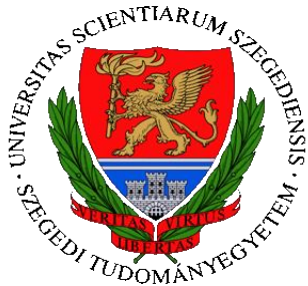


# Information seeking behaviour regarding antibiotics and common infectious ailments: a Google Trends-based infodemiological study



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**The 1st International Electronic Conference on Antibiotics—The Equal Power of Antibiotics And Antimicrobial Resistance**

2021.05.08.-2021.05.17.

# Antimicrobial resistance (AMR)

- ❖ **European Centers for Disease Control (ECDC)**
  - ❖ 400,000 MDR infections, 25 million days / year in hospital
  - ❖ ~ 25 000 excess deaths/year
- ❖ **Burden of AMR Collaborative Group**
  - ❖ EU and EEC countries: 700 000 MDR infections, 33 110 excess deaths and 874 541 disability-adjusted life years (DALY)
- ❖ **Centers for Disease Control (CDC)**
  - ❖ 2 million MDR infection/year
  - ❖ ~ 23 000 excess deaths
- ❖ **National Health Service (NHS)**
  - ❖ By 2050, it will be a financial burden of \$ 100 billion a year
  - ❖ 10 million excess deaths
- ❖ **World Health Organization (WHO)**
  - ❖ Poor clinical outcome is clearly associated with infections caused by MDR pathogens
- ❖ **World Economic Forum (WEF)**
  - ❖ AMR is a similar danger to climate change



# Main hallmarks of antimicrobial resistance (AMR)

- ❖ Lack of antibacterial agents with a new mechanisms of action



- ❖ Improper use of existing antibiotics

- ❖ **MISUSE**

- ❖ **OVERUSE**

- ❖ **SELF-MEDICATION**

- ❖ **Livestock/agriculture: 60%!**

# Educational campaigns



## WORLD ANTIBIOTIC AWARENESS WEEK

❖ 2020. NOVEMBER 18-24.

[HTTPS://WWW.WHO.INT/NEWS-ROOM/EVENTS/DETAIL/2020/11/18/DEFAULT-CALENDAR/WORLD-ANTIMICROBIAL-AWARENESS-WEEK-2020](https://www.who.int/news-room/events/detail/2020/11/18/default-calendar/world-antimicrobial-awareness-week-2020)

## EUROPEAN ANTIBIOTIC AWARENESS DAY

❖ 2020. NOVEMBER 18.

[HTTPS://ANTIBIOTIC.ECDC.EUROPA.EU/EN](https://antibiotic.ecdc.europa.eu/en)



A European Health Initiative



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# Aims

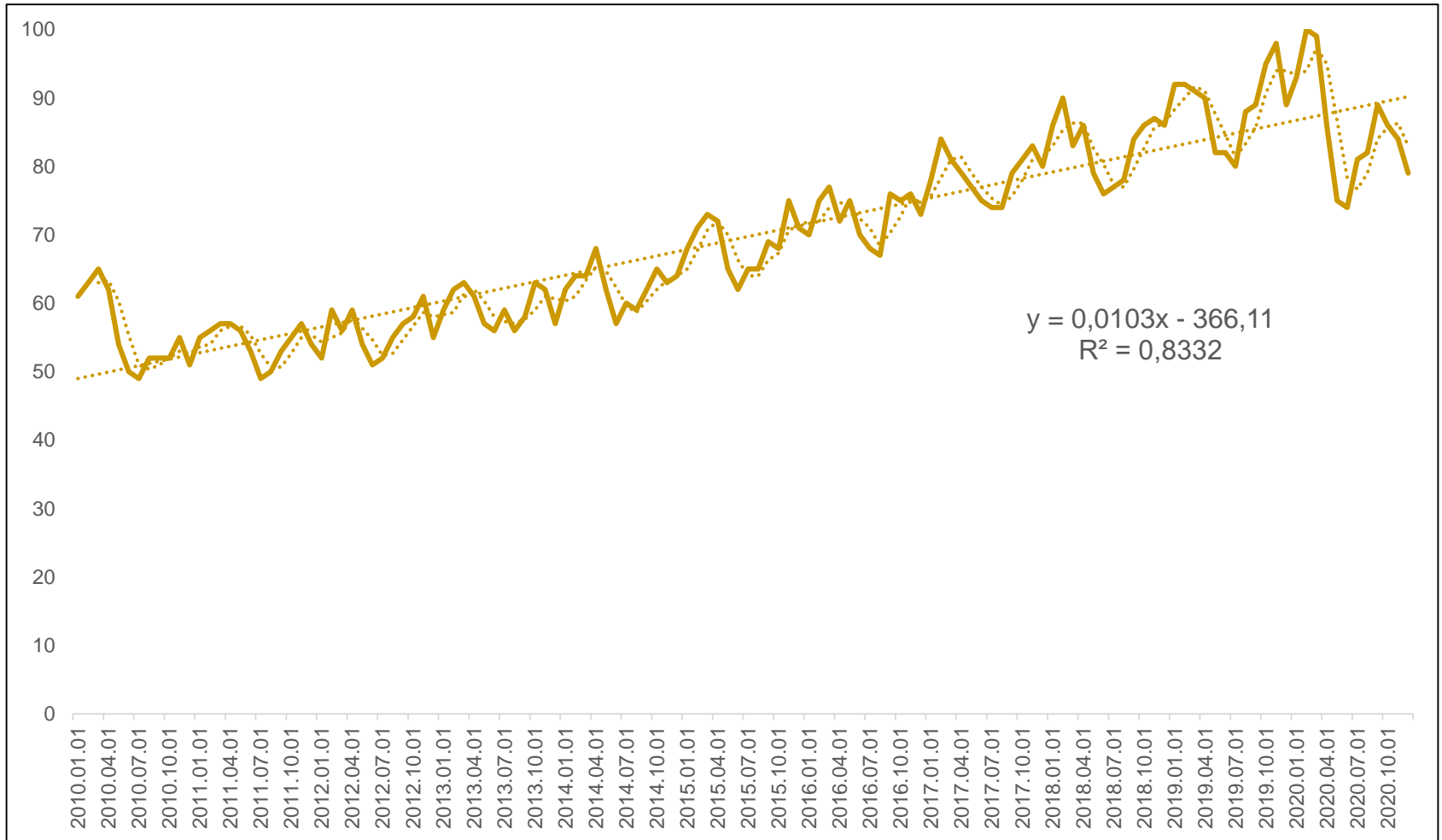
The aim of this infodemiological study was to assess the changes in antibiotic-related Internet queries worldwide and to identify the possible association between the information seeking behaviour for antibiotics and various infectious diseases.

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# Materials and methods

- Google Trends: Qualitative and quantitative data, and spatio-temporal distribution of queries on the topic of antibiotics
- 2010.01.01-2020.12.31, corresponding to all searches worldwide
- „flu”, “common cold”, “UTI”, “sore throat”, “cough”, and “sinus infection”
- relative search volume (RSV), a normalized score ranging between 0-100
- Statistics: SPSS 22.0 (independent sample t-test, ANOVA and Pearson-correlation)

# Results: „antibiotic”



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# Results

- Search intensity for antibiotic-related information (based on the keyword “antibiotic”) has increased by **54.4%** ( $55.5\pm 5.6$  vs.  $85.7\pm 8.4$ ) between 2010 and 2020.
- Countries with the highest search intensity were **Romania** (RSV: 100), the **Philippines** (RSV: 58), **Jamaica** (RSV: 50) and **the USA** (RSV: 43).
- The most common related queries were “**what is an antibiotic**” (RSV range: 54-81), “**antibiotic resistance**” (RSV range: 60-69), “**antibiotic for UTI**” (RSV range: 18-40), “**antibiotic cream**” (RSV range: 12-36) and “**antibiotic side effects**” (RSV range: 15-27).



# Results: antibiotic-related queries

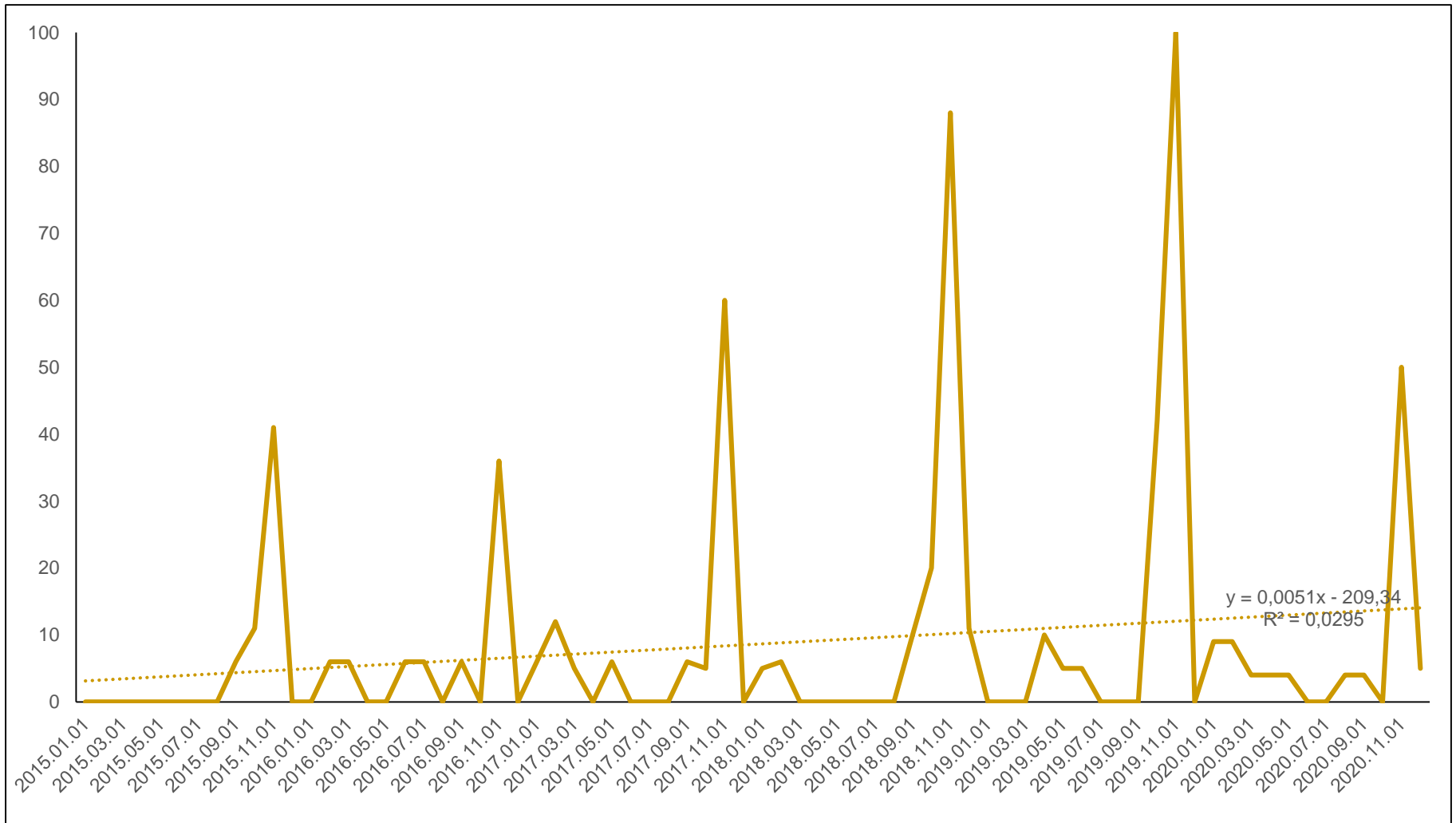
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
antibiotic	100	100	100	100	100	100	100	100	100	100
antibiotic resistance	60	63	60	69	66	67	63	68	62	62
what is (an) antibiotic	59	48	64	59	54	76	64	74	69	81
antibiotic prophylaxis	30		26	18	20	16		14	13	20
antibiotic side effects	25	25	27	19	19	21	22	19	15	
cipro antibiotic	21	11								
hopkins antibiotic guide	18			11						
antibiotic for uti	18	19	29	19	22	32	25	27	33	40
amoxicillin	17	12	22	19	20	17	19	24	22	23
z pack antibiotic	17									
natural antibiotic	15	9	19	15	18	20		15	15	19
johns hopkins antibiotic	13									
keflex antibiotic	12						13			
antibiotic for strep throat	11	12	13			15				
antibiotic for sinus infection	11	11	14	11	10	12	13	16	17	15
penicillin		14		19	16	19	21	19	15	24
antibiotic list		14								
antibiotic cream		12	19	22	25	22	24	25	30	36
doxycycline		12	15							
antibiotic ointment		10	36	30	27	29	33	41		47
augmentin			15	14	10		15			
pneumonia			14							
strep throat				13		14				
antibiotic resistant bacteria					13					
antibiotic definition					12	16	17	15		
triple antibiotic							17		21	28
new antibiotic							14			
antibiotic medicine								19	21	22
antibiotic eye drops								18	19	
over the counter antibiotic									15	
best antibiotic										67
antibiotic meaning										15

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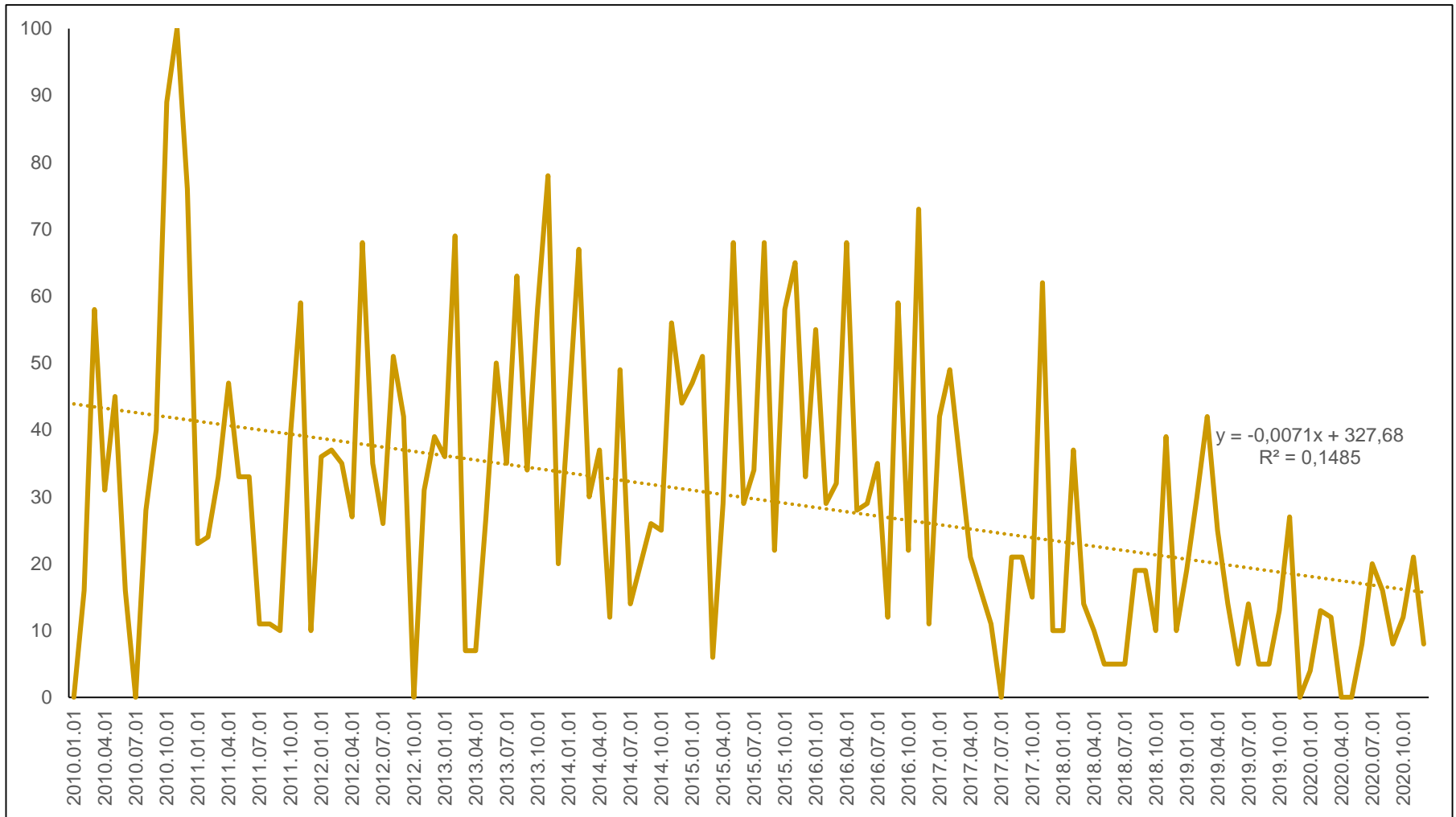
# Results

- EAAD and WAAW-related searches corresponded to **RSVs** **<1** throughout the study.
- Antibiotic-related educational campaigns (EAAD and WAAW) in November **did not have significant effects on RSV values** ( $66.6 \pm 15.5$  vs.  $67.9 \pm 14.1$ ;  $p > 0.05$ ).
- Strong positive correlations were found between antibiotic-related online queries and searches for **flu** ( $R=0.561$ ), **UTIs** ( $R=0.884$ ), **sore throat** ( $R=0.734$ ), **cough** ( $R=0.780$ ), **sinus infection** ( $R=0.553$ ) and the **common cold** ( $R=0.535$ ); in every case,  $p$  values  $< 0.001$  were recorded.

# Results: „EAAD”



# Results: „WAAW”



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# Conclusions

- Analysis of antibiotic-related Internet queries may be a **valuable source of information** of collective health utilization trends.
- The results suggest that antibiotic-related educational campaigns **did not influence the temporal distribution** of Internet searches on this topic.
- Noteworthy associations were seen between **information-seeking behaviour on commonly occurring infectious ailments**.

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# THANK YOU FOR YOUR ATTENTION!

