Summary notes
Online vaccine misinformation project – virtual meeting
13.00-16.00, December 1 2020

Participants:

- ECDC National Focal Points for Communication
- ECDC VPI Technical Advisory Committee (TAC) members
- Project Interviewees from the Member States
- Representatives from:
  - European Commission (including the Joint Research Centre)
  - US CDC
  - WHO-HQ
  - WHO-EURO
  - UNICEF
  - European Medicines Agency
- Contractors (Technopolis Group and Schuttelaar & Partners)

Meeting objectives:

1. To present the preliminary findings from a study on countering online vaccine misinformation, including case study work conducted in six EU/EEA countries.
2. Through interactive discussions with the participating countries, other Member States, and a range of international stakeholders working in the field, to seek validation of the findings (and adjustment, as necessary).
3. Thereby to inform a future phase of the misinformation project, which will entail the development of training materials and other resources for Member States.

Session 1

13.00-13.10: Welcome ([redacted], [redacted] ECDC)

- Background of this ECDC project: It was developed in response to the *Council Recommendation on strengthened cooperation against vaccine-preventable diseases* (adopted Dec. 2018), which states that ECDC shall: *'Counter online vaccine misinformation and develop evidence-based information tools and guidance to support MS in responding to vaccine hesitancy, in line with the Commission Communication on tackling online disinformation.'*
- The spread of online misinformation is a threat to various areas of society (climate, health, democracy). It is also impacting vaccine uptake and there are fears on how it will impact uptake of COVID-19 vaccines. Reminded that in 2019 vaccine hesitancy was declared by WHO as one of the top 10 threats to health.

13.10-13.25: Introduction to the project ([redacted], [redacted] – Unit Disease Programmes, ECDC)

- Objectives of the ECDC project: Map online sources of misinformation on vaccines in the EU/EEA, identify good practices, and provide the basis for a training package to support national public health authorities in how to address this. As a next step, the project shall lead to a proposal for developing resources, tools and a training package for EU/EEA national authorities on addressing online vaccine misinformation.
- Initially the project was planned to focus on MMR, flu and HPV vaccines, but in the context of the pandemic, the topic of future vaccines against COVID-19 was added.
- The meeting is to present preliminary results of the social media analysis performed in six EU/EEA countries, as well as the results of interviews done with representatives from these countries and representatives from international organisations.

13.25-13.55: Presentation of key findings ([redacted] - Technopolis Group; [redacted] - Schuttelaar & Partners, external contractors)

The slides presented by the contractors during the meeting are included as an Annex at the end of this document. The below summary includes key points raised during the presentation and the discussion that followed.

- Together with the preliminary findings presented from the social media analysis and the interviews with country representatives and organisations such as the European Commission and WHO, a literature review is being conducted and will be included in the final outputs of this project.
- Consultations for this project were done with representatives of six countries: Estonia, France, Germany, the Netherlands, Romania and Spain. It was noted that results may not be representative of all activities done at national level in these countries. Country strategies and level of implementation varied. Countries that report high vaccine acceptance may not assign highest priority to this work.

- Active monitoring and countering online misinformation is resource- and time-consuming. It requires access to tools and knowledge. Most of the strategies are based on 'learning by doing', and metrics or data to track effectiveness are often lacking. Therefore, more training is needed on strategies to counter misinformation.
- The methodology for the social media analysis conducted by the contractors in the six countries/languages was based on subjective judgement (i.e. not on artificial intelligence use). A Social listening tool was used: Awario (58 keywords were included in the search), but this cannot be used for YouTube videos (50 videos per disease and language were included, algorithms influenced searches). Items were classified according to source, topic, narratives and technique.
- The social media analysis aimed to identify who creates and who spreads the content. However, identifying the creators is difficult, and the analysis therefore focused primarily on spreaders. These were identified as concerned parents and citizens, proponents of alternative medicine, traditional anti-vaccination proponents and religious groups, as well as profiteers.
- The formation of new alliances and the merging of different groups of opponents to vaccination was observed during the social media analysis. These included right-wing extremists, protest movements and conspiracy theorists.
- Examples of narratives identified include: COVID-19 presented as less dangerous than flu, the vaccine being a danger given its novelty, fears of mandatory vaccination, use of images of children affected by damage from vaccines for other diseases, and speed of vaccine development (safety concern).
- Techniques used for disseminating mis/disinformation include use of pictures, quotes of 'experts' (genuine experts or otherwise). The use of satire was also discussed, along with powerful images and short narratives that are widely spread.
- An average of 5.9% of the sample collected for the social media analysis qualified as misinformation. For YouTube, the percentage rose to 17.6%.
- The key strategies for countering online vaccine misinformation identified included:
    - **Myth busting/debunking**, while understanding the caveat of not wanting to amplify the power and extent of the myth by discussing it.
    - **Professional communication**, which includes "pre-bunking", proactive communications, ensuring information is available, engagement with legitimate concerns and questions, (social) media presence.
    - **Support fact-checkers**, noting the importance of the independence of such organisations.
    - **Focus on science and media literacy**. This helps people to assess information and fact-check for themselves, and to understand how science works and how evidence evolves (for example on the advice on face mask use).
    - **Work with social media platforms**. For example, WHO provides information on how to report content to platforms. Platforms are now signposting to

trustworthy sources and have warnings on dubious content; the downside of this includes concerns about censorship.
    - **Awareness raising for policy makers**, so that they understand the risks of spread of misinformation and provide resources in order to address this.

13.55-14.15: Questions and Discussion

- Key points emerging in the discussion included the need to:
    - Listen to/monitor online communities (often people have genuine questions and concerns, and these need proper responses). Having an ear to the ground avoids "shooting in the dark", and being able to intervene when needed.
    - Occupy the social media space (the researchers noted that there is already a large variety of high quality content online, so ensuring added value of an intervention and a recognised online presence can be challenging).
    - Ensure that sufficient resources are available (human, financial, technical), and that interdisciplinary expertise works jointly in order to strengthen and complement the efforts.
    - Anticipate and evaluate whether a quick reaction is advisable in specific instances of misinformation.
    - Use behavioural insights and apply effective communication techniques.
    - Harness the power of big data analytics. New kinds of metrics are increasingly being used to understand the situation.
- The work done by WHO on Infodemiology and the related conference held during summer 2020 aims at understanding the science and ecosystems around this topic. An implementation science research agenda will be published aimed at looking at the impact of the work (e.g. are we debunking or rather amplifying/reinforcing belief in a piece of misinformation).
- The importance of monitoring and evaluating was highlighted, both in order to assess if the online strategies are successful and to identify lessons learned where things have not gone as well as intended.

14.15-14.25: Break

Session 2

14.25-15.00: Feedback from the participating countries who were present at the meeting

- Netherlands: 5.1.2e 5.1.2e RIVM) and 5.1.2e 5.1.2e (5.1.2e Ministry of Health, Wellbeing and Sports)
  - Twitter is the most used social media platform in the Netherlands because it is easy to use and people can create anonymous accounts and spread whatever they want. However, it may not be as harmful as YouTube because YouTube uses an algorithm that ensures that similar videos will keep appearing in your feed.
  - Monitoring Social Media is crucial in order to have an awareness of the messages and to ensure that strategies will be effective. Overall the Netherlands is doing quite well in monitoring and addressing concerns and questions with correct information.
  - The challenge is to be able to monitor the large amount of misinformation circulating and thus it is vital that you have adequate resources to be able to do that.
  - RIVM uses the commercial social media monitoring tool Costoo, to monitor messages about vaccine information and misinformation. They have four to five staff members working on the social media monitoring.
  - The Ministry of Health has previously seen a decrease in vaccine acceptance, e.g. in religious communities known as the 'Bible Belt' and other groups. To address this issue two years they decided to set up a think tank to address misinformation.
  - The think tank initiated a vaccine alliance with medical professionals (voluntary, un-paid). It includes 35 medical professionals who regularly take part in debates about vaccination.
  - Regarding COVID-19 vaccines, the think tank takes part in online discussions, and directs people to the correct information, as well as presenting this information during online debates/discussions.
  - The think tank is independent from the MoH (as people can be wary of Government institutions), and the members can work independently and share correct information as and when they see it. They have also involved representatives from different Social Media platforms like Facebook and Google in order to flag misinformation and to ensure that it is not the first thing people see on Google searches. There are strict rules around blocking posts however, and platforms have been involved in lawsuits around declaring something as mis/disinformation. For COVID-19 vaccines there will be more involvement of the group, they will need to follow the news regularly and ensure that good information in available.

Spain: 5.1.2e 5.1.2e Vaccine Programme, Ministry of Health) and 5.1.2e (5.1.2e Vaccine Programme, Ministry of Health)

- MoH assesses the coverage of immunisation annually and continue to see high vaccine coverage rates. The MoH thinks that the best way to counter misinformation spread is to try and improve their own communication. They have a working group with different sectors (with Health Care Providers, patients, associations etc.), and they provide this working group with the messages for particular target groups where there are lower rates of vaccination.
- The high vaccination rates may be because of the communication provided to the population from the HCW. When MoH prepares communications, HCW associations are involved in order to ensure that the same information is shared by everyone. For example, in Spain even though the Meningococcal B vaccine is not included in the national immunisation schedule and it has to be purchased, there is still high uptake of the vaccine, as HCWs promote this.
- The MoH has a specific website, with tools to solve questions and answers and with documents in different languages. They also provide a link to possible vaccine-related adverse events as an important source of information.

15.00-15.15: Questions and discussion from other participants

- Sweden, 5.1.2e (5.1.2e , Folkhälsomyndigheten)
  - Sweden currently has high vaccination coverage but they are starting to see that more and more people are asking questions about vaccination.
  - Folkhälsomyndigheten (the national public health agency) tries to ensure that there is a strong network with HCWs and school providers and to support them with relevant information.
  - As part of a project on vaccine acceptance and demand, the Agency developed a method for monitoring public questions on HPV vaccine that earlier this year was quickly adapted to the Swedish response on COVID-19.
  - The method was helpful to identify public questions on topics that the Agency was communicating on, as well as ensuring early detection of upcoming topics or mis/disinformation that required attention. Data and analysis from traditional and social media can be of major importance to inform strategy and to target risk group communication efforts during a pandemic situation.
  - They have run into the issue of GDPR, which very much limits the collection and use of personal data. Legal problems can arise if information collected online (e.g. from influencers) can be traced to an individual.

Additional points:

- What is allowed and what is not regarding the protection of personal data. Perhaps the problem can be addressed by working with aggregated data. Questions around GDPR were raised including around the collection of data and its use.
- There is this ongoing question about how to collect data without running into legal issues of personal information. There is a need to check this with the data protection experts and see how to ensure compliance with GDPR while still collecting usable data.
- There is a section in the ECDC report on social media monitoring around vaccine hesitancy that discussed GDPR and that provides some resources and approaches around this.
- Is the analyses of bots/trolls not allowed any more under GDPR? It is interesting from a public health perspective to know whether vaccine misinformation comes from a human source or not, i.e. to differentiate whether this is toxic noise from the internet or real people.
- Suggestion to have a discussion about setting up **academic partnerships** in this field, as collaborating with academia on longer term research projects may address some of the challenges linked to personal data. It would be very useful to have a list of key academics working in this area.
- DE: We in Germany will do monitoring of COVID vaccine hesitancy and vaccine behaviour in the general population and different subpopulations with a survey design. This is not social media monitoring but a way to collect data that is in accordance with GDPR.
- It is a methodological challenge: how to collect large data and do qualitative analysis and not run into privacy issues. We need to address the methodology issues, and need more support on how to go about this.

15.15-15.45: *A broader perspective*: comments and reflections from the international stakeholders on providing country support in addressing online vaccine misinformation.

- 5.1.2e 5.1.2e *US CDC*
  - The US is in the process of assessing COVID-19 vaccines and approving them. They are providing an infodemic management course and the issue that they will focus on will be the COVID-19 vaccine.
  - We as health authorities are communicating the way we always have since the times when smallpox was around, however this approach is not working so well in the current times. Just providing messages does not work. It is not just the health authorities business to deal with this, it is a whole-society need. Media, civil society, academia etc.
  - We need to understand misinformation and its effects better, including the on/offline gap and the role for all sectors. It may be best to debunk information

but if we are constantly correcting we are chasing the misinformation, not getting ahead of it or preventing its effects. We need to *Be first, be right, be credible* – however, although we currently know about the routine vaccinations, the characteristics of the new COVID-19 vaccines are not clear yet, so it is not fully clear how to answer these questions around the new vaccines until they are approved and in use. This gap in information is therefore being filled by others, including through misinformation.

- It comes down to trust. Rebuilding and building trust during a pandemic is difficult. There are huge inequalities: those most affected are those that were least served, and they have also been the target of campaigns of misinformation.
- We need to build societal digital resilience so individuals can directly address the people in their surroundings that spread misinformation, and address those conversations. People need tools and skills to be able to address one on one. How can we work on this? It should not be a top down approach as it usually is, it is not enough to monitor and then to provide an official response, we need to think on how to inoculate (social inoculation) against misinformation.
- How do we create resilience? There are different infodemic resources, and the approach of 'gamification' is growing, education curriculums in the EU have included such topics already. Other approaches used for increasing resilience to address misinformation can include: training curriculum on health and literacy in schools, WHO's Vaccine Safety Net, information on how to tailor messages, enhancing literacy and self-efficacy.

- 5.1.2e, 5.1.2e Vaccine Preventable Infections
  - Discusses the specific challenges of the vaccine, supply, logistics, and communication challenges regarding how we talk to those who are seen as priority and those that are not. It is clear that this differs also according to the context and the epidemiological situation in each country.
  - The ways in which different preventive measures are communicated can raise questions about the advice given by public health experts and governments during the pandemic. Some recommendations around mask wearing, lockdowns, and different country measures have changed. These changing messages can create confusion, and can erode trust if not communicated properly. There is also pandemic fatigue, which can make people more prone to anti-vaccine narratives and opinions.
  - In Ireland they experienced a drop in vaccination acceptance. Health care professionals are the most trusted source of information, and it was necessary to keep them in the loop, support them throughout the process, leverage the

information they needed for different issues/topics, and ensure transparency on the safety and side effects issues. It worked to use the power of ordinary voices, real people in the narratives (e.g. HPV campaign with Laura Brennan). Important also to work with alliances of all groups so they can share a common approach: keep it simple and reach people where they are, e.g. the older population who are not on social media.

- 5.1.2e, 5.1.2e UNICEF Regional Office for Europe and Central Asia
  - In the Regional Office for Europe and Central Asia we see limited capacities to monitor and to manage rumours. Now with the new COVID-19 vaccines, it is a good opportunity to reinforce the capacities.
  - For Ministries of Health in different countries it is very difficult to create new positions around infodemiology, but examples from the Netherlands could help and be used as a model.
  - One critical gap is how we measure the impact of digital engagement campaigns. If results from evaluations were provided it would be easier to advocate for more budget for this.
  - Need also to strengthen partnerships, we may lack capacities in the area of e-health, but we could look at associations, experts, academia, so that we have people available and they can share reliable information. In the Ukraine the MoH are engaging with support groups, parents, health professionals, and others and are present online and providing relevant and trustful information.
  - How to communicate evidence is also key: for the campaigns, the approach is often not correct, the information is relevant but it is not delivered in the best way. The audience needs to feel engaged, we need to look how the evidence is packaged, how engaging it is, what platforms are most trusted and used to cater to different needs.
  - Behavioural insights are key for digital engagement and to allocate resources in the right places. Reiterating what our colleagues from Spain said: Health professionals are the main trusted source of information and will most probably be that for COVID too. Also surveys show that even people exposed to a lot of Social Media would like to get more information from their HCWs. How can we empower HCWs to be more visible on the platforms and to connect, communicate and engage with families?
  - The project UNICEF are doing with LSTHM on digital engagement campaigns is very good, we all need to invest more in supporting country capacities in this area.

- 5.1.2e, 5.1.2e, Global Infectious Hazard Preparedness Department, WHO
  - In peacetime, we talk about vaccines and the long process it takes to develop them and the research involved. However, it is different in the pandemic, with faster development due to increased funds and urgency. People may therefore be more fearful because they are used to the lengthy process of vaccine development. Also for COVID-19 vaccines not all the information is available yet, e.g. the manufacturers have not released the data yet, and the fact that access to the vaccines will need to be prioritised in the initial stages of vaccine deployment.
  - The big risk is losing those that are undecided about getting vaccinated, so there is a need to get the outreach right. Messages alone will not be enough: this needs a whole-of-society approach for it to work, so we need to try to find the amplifiers in society. These include: youth (see links below in the table on communication tools such as the use GIFS is an important form of communicating with youth), faith-based leaders, employers and unions to tailor the information so they can spread this through their communities to get the messages across.

- 5.1.2e, 5.1.2e, European Medicines Agency
  - EMA's vaccine outreach strategy - we address concerns, use platforms and networks to consult different groups and to identify amplifiers and trusted sources. Also aware of all the different languages, and the need to filter to local level.
  - When COVID-19 arrived, EMA (as evaluators of vaccines in the EU) decided to be more proactive. They put lot of information out to the public and responded to key questions from patients, public, media, and did Social Media monitoring.
  - One new approach is enhancing transparency and engagement with civil society, and in the evaluating expert group they have included observers who can raise concerns.
  - On 11 Dec, EMA will have an open meeting with civil society. They will try to explain the process of vaccine development and authorisation in clear, easy-to-understand language. EMA invites all to get in touch, and next year they will have a meeting in order to use outcomes gathered from this meeting.

- 5.1.2e 5.1.2e, London School of Hygiene and Tropical Medicine
  - It is a challenging area to monitor and capture data that is useful and workable. Social Media monitoring is not representative of the general population, we need to think about the impact and reach of what we find there and combine this with more traditional methods such as surveys to monitor sentiment.

- Monitoring needs to include looking both locally and at a global level, as misinformation spreads around countries and through different languages.
- The LSHTM project with UNICEF explores how to use automated systems, AI and chatbots to address concerns. This can seem like fighting an endless battle, we may block some misinformation it but it moves elsewhere, and people look at the information that reflects their own beliefs.
- We may not be reaching those who need it, we need to think in the long term - how public and individuals can themselves assess what is misinformation and ways to look for more accurate information.

15.45-16.00: Wrap-up and conclusions

- Thanks to all presenters and contributors for the invaluable discussion. The points raised during the discussions are all noted and will be used in the further development of the resources, tools and training materials that will come out of this project.

A list of resources provided by meeting participants from the meeting chat box:

Resources	Link
WHO developing a tool for countries on monitoring: adapting social media listening to fight the COVID-19 infodemic	https://apps.who.int/iris/bitstream/handle/10665/332053/nCoVsitrep29Apr2020-eng.pdf?sequence=1&isAllowed=y
Gamification resources	https://www.getbadnews.com/#intro; https://kidsboostimmunity.com/ https://www.goviralgame.com/en
GIPHY examples as communication tools	https://giphy.com/vaccinesafetynet
Memes and emoji resources as powerful tools of communication	https://www.who.int/news-room/articles-detail/call-for-proposal-who-epi-win-design-lab https://emojipedia.org/syringe/
EMA – public meeting on COVID-19 vaccines	https://www.ema.europa.eu/en/news/ema-organises-public-meeting-covid-19-vaccines#:~:text=EMA%20will%20organise%20a%20public%20meeting%20on%2011,in%20their%20development%2C%20evaluation%2C%20approval%20and%20safety%20monitoring
WHO course on Ethics in planning interventions and researching for infodemic management	https://www.who.int/teams/risk-communication/infodemic-management/1st-who-training-in-infodemic-management https://www.youtube.com/watch?v=3ijbLNc-FSM&feature=youtu.be
Spanish website	https://www.mscbs.gob.es/profesionales/saludPublica/prevPromocion/vacunaciones/home.htm
European Vaccination Information Portal	https://vaccination-info.eu/en/trusted-sources
EMA webpage on COVID-19 vaccines development, evaluation, approval and monitoring	https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/covid-19-vaccines-development-evaluation-approval-monitoring
WHO Coronavirus disease situation report – 100 Page 2: SUBJECT IN FOCUS: Adapting social media listening to fight the COVID-19 Infodemic	https://apps.who.int/iris/bitstream/handle/10665/332053/nCoVsitrep29Apr2020-eng.pdf?sequence=1&isAllowed=y%20Adapting%20social%20media%20listening%20to%20fight%20the%20COVID-19%20infodemic
Article on the sources and correlates of exposure to vaccine-related (mis)information online	https://www.sciencedirect.com/science/article/pii/S0264410X20313116

British Psychological Society Ethics Guidelines for Internet-mediated Research	https://www.bps.org.uk/sites/bps.org.uk/files/Policy%20-%20Files/Ethics%20Guidelines%20for%20Internet-mediated%20Research%20%282017%29.pdf
3rd virtual global WHO Infodemic Management conference	https://www.who.int/teams/risk-communication/infodemic-management/3rd-virtual-global-who-infodemic-management-conference **https://www.who.int/publications/i/item/9789240010314**
European Media Monitoring team. Have been scraping content from misinformation sites and have 11 months of disinformation data. COVID-19 media surveillance text and data mining – weekly briefs	5.1.2i
ECDC Technical Report: Systematic scoping review on social media monitoring methods and interventions relating to vaccine hesitancy	https://www.ecdc.europa.eu/sites/default/files/documents/vaccine-hesitancy-systematic-scoping-review-social-media.pdf
The London School of Hygiene & Tropical Medicine	LSHTM published internal guidance on conducting academic research on social media, including addressing legal and ethical issues. It is a PDF document, LSHTM happy to share with anyone that is interested.
I Boost Immunity (IBI) is a non-profit Canadian health initiative	https://iboostimmunity.com/

15/12/2020

Countering online vaccine misinformation - Key findings from a case study project

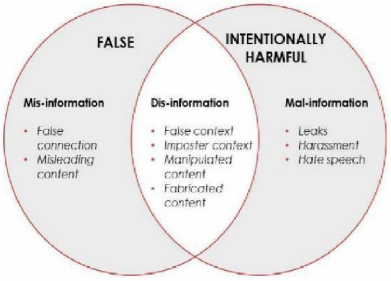
1 December 2020

Agenda

1. What is vaccine **mis-(dis-)information**?
2. **Methodology**
3. **Monitoring** of vaccine misinformation
4. Strategies for **countering** online vaccine misinformation
5. **Preliminary recommendations**

1. What is vaccine mis-(dis-)information?

- Mis- and disinfo differ mainly in **intent**
- **Sources** may differ; **spread** is similar
- Distinction less relevant from **public health perspective**
  - Easily interconvert
  - Both types used in anti-vax discussions



2. Methodology and scope

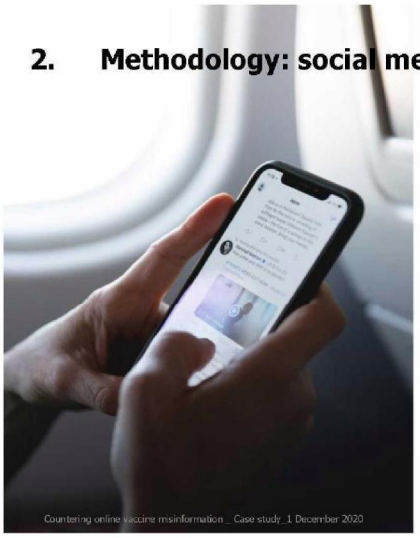
- Literature study (peer-reviewed & grey)
- 6 Country case studies
  - Stakeholder interviews
  - Social media analysis
- Diseases/vaccinations: Influenza, MMR, HPV, Covid-19 (future)
- Recommendations on training materials

2. Methodology: stakeholder consultations

Country	Organisation
Estonia	Estonian Health Board
France	Santé Publique France
Germany	Robert Koch Institute
The Netherlands	RIVM Ministry of Health, Welfare and Sport ('Thinktank Misinformation')
Romania	National Institute of Public Health
Spain	Ministry of Health

EU organisations
EC DG SANTE
EC DG COMM
World Health Organization (HQ)
EUvsDisinfo
EU Disinfo Lab
Standing Committee of European Doctors (CPME)
ECDC

2. Methodology: social media analysis



- Per (combination of) **disease**/vaccinations
- Per main **language** (Spanish, Romanian, Dutch, French, German, Estonian)
- **Timeframe**: 3 months (20 June - 20 September 2020)
- **Media** formats and channels: tweets, news, blogs, website articles, YouTube videos
- **Tool**: AWARIO 'social listening' (partially)

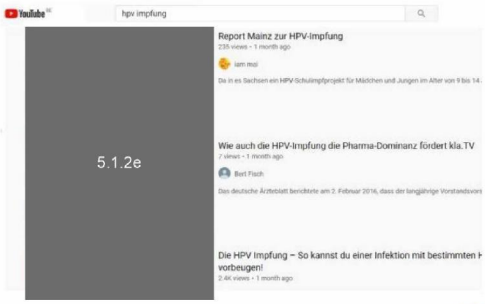
2. Social media analysis – keywords and data extraction

awario

YouTube

	English	French	German	...
Vaccine	*vaccine* *injection* ... *adjuvant* *dose*	vaccin injection ... adjuvant dose	impfstoff injektion adjuvant dosis	
Effects	*damage* *harm* ... *autism* ... *side effect* *handicap* *autoimmune* *disease* *protection*	dommage (causé par le vaccin) nocif nocif ... autisme ... effet secondaire handicap maladie auto-immune protection	impfschaden risiko schädlich ... autismus ... nebenwirkung behinderung autoimmunkrankheit schutz	
Disease 1	*cervical cancer* ...	cancer du col de l utérus ...	menschliches papillomavirus	

Boolean search, e.g. 'vaccine' AND 'risk*' AND 'HPV'



AWARIO: tweets, news, blogs, website articles; Boolean (AND/OR) search; 50 keywords per language; randomly selected **100 online posts/articles** and **50 videos** per disease and language in the timeframe; identification of **misinformation** based on definition; **extrapolation** from sample size

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2. Methodology: Analysis of social media data

Total sample size (~ 3.000)

-> Filtering of **misinformation**

-> Sorting according to Reach* metrics

1. **Source**: Who is spreading misinformation, what is its reach?

1) **Topic**: What is the misinformation about?

2) **Narrative**: How is the narrative set up?

3) **Communications technique**: How is it communicated?

* **Tweets**: number of followers of the account combined with the number of likes, comments and retweets; **News, blogs, and web posts**: daily website traffic; **YouTube videos**: number of views at study time

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