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ONE HEALTH MULTIMODAL SURVEILLANCE IN TIME OF CHANGE: LESSONS NOT LEARNT FROM CASE STUDY OF A/H5N1 SPILLOVER TO MAMMALS IN GDAŃSK METROPOLITAN AREA

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Abstract. *This case study of A/H5N1 spillover to mammals in the Gdańsk area underlines the complexities of managing emerging One Health threats in significant political and economic aspects. We compared the relatively successful rapid regional response with the utterly lost battle in communication and cooperation, emphasising the need for improved interdisciplinary regional and international cooperation and robust surveillance systems in an era of anthropogenic and natural change.*

Keywords: infodemic management, (re)-emerging diseases, early warning systems, one health, preparedness

Introduction. Anthropogenic, climatic, demographic and technological changes have altered the landscape of infectious disease risk as we saw during ASF epizootics (Jarynowski et al., 2024), COVID-19 pandemic and not only human refugee crisis (Jarynowski & Belik, 2022) due to Russian aggression in Ukraine. Our goal/aim is to show how to handle an unknown X disease (Al Asfoor et al., 2024).

The current (April 2024) A/H5N1 outbreak in cats/cattle in the U.S. (Ly, 2024) has shown that lessons have been learnt from an epizootiological standpoint (cats as a sentinel of a more general outbreak), but the same considerations, such as risk communication problems (e.g., contaminated milk), are valid. This paper is describing failures in improving the response to recent natural or anthropogenic crises in public and ONE health, such as the emergence of new pathogens (i.e. disease X) and the increasing occurrence of pandemics (Micah et al., 2023). Here we also discuss ethics and communication with the public in case of disease in companion animals (Makovska, 2020). Some of the mistakes made in the Gdansk region and the rest of Poland could be negative learning examples for ONE Health professionals around the world. To assess changing needs, multiple choices of public and ONE health tools are available, however their proper implementation can still be challenging (Gerilovych et al., 2023). There are assessments of the public and ONE health system's preparedness for emergencies (outbreaks and disasters), but they focus only on specific (known to the scientific community) aspects. This article addresses the gap in understanding how inspections actually respond to Disease X.

History as life lesson. Gdańsk's - heart of so called Tri-city and Pomeranian Voivodeship - historical richness is built on connectivity and citizens paid a bill by also being first in the region to be affected by Plague, Smallpox and Cholera (Duży & others, 2012). Current One Health threats related to climate change, such as zoonotic diseases, antimicrobial resistance, food safety, vector-borne diseases, environmental pollution, pose new categories of risks to humans, animals and the environment and Gdańsk metropolitan area seems to be especially susceptible in this concept (Szkudlarek et al., 2021), especially during tourist season. I.e. in terms of possible spillovers and recombination of Avian Influenza (AI), northern Polish coastline and Gdańsk Bay was identified as one of the most important hotspots in whole Europe due to crossing of main bird migration paths (Waldenström et al., 2022). Since the beginning of 2024, Gdansk has become the fifth largest European freight hub, after Rotterdam, Antwerpen, Novorossiysk and Hamburg, being the undisputed leader in Central Europe with all the new sanitary risks (Waldenström et al., 2022). Moreover, the threat of biological or chemical hybrid aggression from Russia has become real since 2022 (Jarynowski, 2023) and the COVID-19 pandemic increased general understanding of (re-)emerging threats (Aarestrup et al., 2021). Spring of 2024, as expected, showed that A/H5N1 is a serious threat (Plaza et al., 2024).

Unknown epizootics and reactions of inspections. In early June 2023, veterinarians from the Gdansk metropolitan area, together with the provincial veterinary inspection, observed a sudden increase in the mortality of cats (Jarynowski & Belik, 2023). After an outbreak investigation a spillover of A/H5N1 to mammals was confirmed and it was the biggest event of this kind in the last decades in Europe.

During the first days when the etiological cause of infection and its transmissibility (i.e. to humans)/leathility patterns were not known (European Food Safety Authority et al., 2023), Pomeranian sanitary inspectors placed cat owners under epidemiological surveillance. Local Pomeranian Veterinary and Sanitary Inspectorates acted without guidance, understanding that time can be of the essence in this type of event, as there had been no blueprints for such scenarios. The Chief Sanitary and Veterinary Inspectorates created the protocols in early July, when the local epidemic/outbreak was already in its declining phase. In the follow-up phase of the outbreak, the Chief Sanitary Inspectorate suggested that regional offices had performed unauthorised procedures and closed the file.

In addition, the cooperation between Pomeranian scientists (Rabalski et al., 2023) and Inspectorates was very complicated due to a lack of trust and interdisciplinary communication skills in a complex political area (including conflicting positions of the poultry industry and the cat-owning community), and as usual, an epidemic/epizootic was followed by an infodemic (Radziwon et al., 2023). Each interested scientific or government party used its own dataset [Fig. 1] and developed an analysis that ignores other sources of information (and reproduces many errors (Jarynowski & Belik, 2023)), and ultimately we had several competing hypotheses about the source of the virus (from contaminated poultry meat through separate introduction directly from migratory birds to endemicity in an unknown intermediate host between birds and cats).

Inspection officials appreciate agencies (such as WOAHA (World Organisation for Animal Health) and WHO/FAO) because they provide significant intellectual support and adequately communicate risks and uncertainties to the world. By contrast, EU institutions (such as EFSA (European Food Safety Authority) and ECDC (European Centre for Disease Prevention and Control)) promoted many errors and flaws in their communications (Jarynowski & Belik, 2023), with very little institutional support, and most of the EU support came from personal connections between inspectors/researchers. Given such circumstances, the results of the outbreak investigation are officially inconclusive (source unknown).



Fig. 1. Artificial Intelligence generated graphs related to [left] the anecdote of a person searching for his lost keys at night, not where he dropped them, but under a streetlamp because that's where he can see and [right] the story of "The Blind Men and the Elephant": how individuals may understand and describe the same object differently based on their limited and subjective experiences.

Materials and methods.

Debriefing. Post-event or follow-up analysis often involves several scientific methods to understand what happened, why it happened and how similar events can be prevented or mitigated in the future. These analyses are crucial for developing lessons learnt and improving responses to future crises. We attempted to perform scientific methods in deliberative analysis after disasters called Lessons Learned Analysis (Paquay et al., 2022) widely used in military medicine. This is a process for collecting and analysing the experience gained from activities at events to identify successful behaviours and areas of improvement. This includes documenting what should be continued, stopped or adjusted. The first author attempted a professional approach using the Debriefing and Organisational Lessons Learned method, and even obtained verbal permission from local health inspectors and chief veterinary inspectors to conduct structured interviews with key Pomeranian ONE and public health officials involved in the outbreak investigation. However, upon official request for approval (which is required for this type of government work), the Chief Sanitary Inspector and the Pomeranian Voivodship Veterinary Inspector cancelled the appointments. It is also an interesting exercise to contrast the efforts of Pomeranian inspectors with other regions of Poland (Jarynowski & Skawina, 2021), where, for example, the quality of the outbreak investigation (prior to the issuance of guidelines by the chief secretaries from Warsaw) was questionable.

Unconventional data sources. There is a question of hierarchy of data sources, methods etc. In this outbreak investigation (probably first time in Poland in strictly veterinary aspect) real-time social media monitoring (Valentin et al., 2021)/participatory (Bispo Júnior & Morais, 2020) method was applied [Fig. 2].

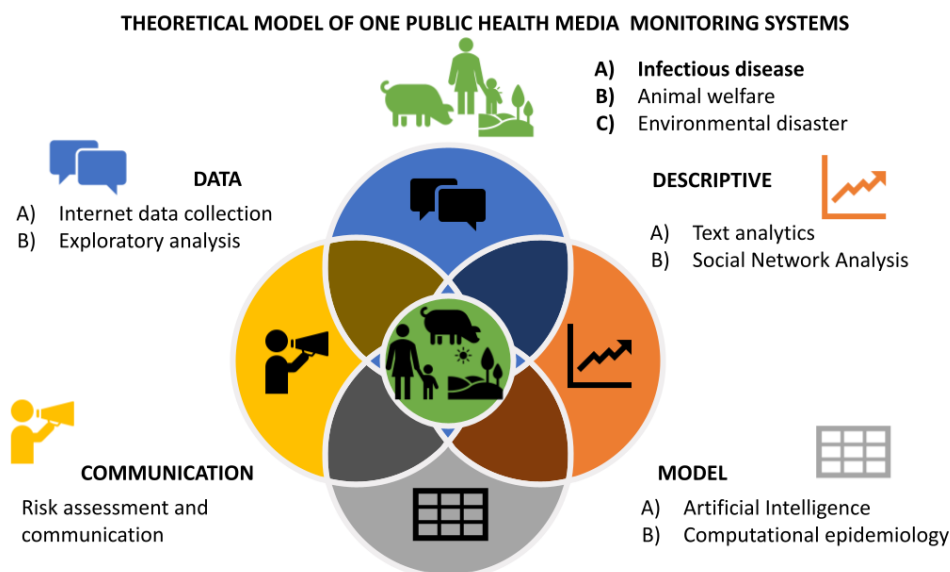


Fig 2. Concept of integration of infoveillance/infodemiology with crisis management and One public health

However, the usefulness of non-conventional surveillance and modelling approaches has not been normalised in terms of how to use this information in practice [Fig. 2]. Thus, for instance Veterinary Inspections did not mention un-official sources at all in their communication (i.e. the uncertainty of laboratory results out of certified systems was not known). As a result, there was a dissonance between the state and NGOs/researchers in the narrative, due to the use of different sources [Fig. 1]. The participatory and Internet trace of user activity are known to be biased, thus it must be interpreted together with an infodemiological approach (Eysenbach, 2020).

Crisis communication. Crisis communication involves the principles and practice of dynamic, effective, clear and persuasive techniques for verbal and written communication of up-to-date information about One Health risks (Steiner, 2024). An infodemic (Eysenbach, 2020) refers to the rapid and uncontrolled spread of information, misinformation, misleading narratives, and outright falsehoods surrounding a crisis – in this case, a disease outbreak. This deluge of information can be just as harmful as the disease itself, hampering effective response, eroding public trust, and leading to harmful behaviours. However, filtered non-official information was used (see subchapter before) in the analysis of source detection and the course of the outbreak (Jarynowski & Belik, 2023). To illustrate the problems of the discourse, we have selected some media reports (Table. 1).

Results.

Infodemic during the A/H5N1 Outbreak. While managing an infodemic is challenging, proactive strategies can mitigate its harm. Outbreak amongst cats in Poland exposed the nation's vulnerability to infodemic chaos. Governments and ONE health institutions did not have infodemic preparedness plans alongside their disease response protocols. The types of misinformation (e.g., hundreds of cat carcasses in Gdansk, the spread of disease to other mammals, toxic environmental contamination, or poultry meat as a source of outbreaks) could have been foreseen, and establishing partnerships with trusted experts and community leaders was possible (if prepared in advance).. A clear taxonomy (classification system) was not applied for misinformation and there was no designated authority to coordinate infodemic response across government agencies, academia, and the media. On the one hand poultry

businesses used public relation agencies to avoid panic among pets owners to their poultry/eggs products, on the other hand agenda setting and clickbait attitude of mainstream media were driving panic with titles such as “Deadly influenza from Butcher shop”. The public was not educated enough on critically evaluating information sources, identifying fake news, and relying on verified channels, although it is essential. Thus, many people wrongly trusted some influencers, who “knew” the origin of the outbreak from the beginning. The lack of official guidelines at the beginning of the outbreak (the first guidelines came from non-governmental veterinary associations) on pet safety during animal-borne disease outbreaks caused people to look for answers on unreliable platforms and fueled rumours of contaminated pet food. Conflicting or incomplete messages from the Ministry of Agriculture (focused on protecting poultry) and local news reporting cat deaths (rp.pl, gazetaprawna.pl) fostered mistrust. The response was fragmented, while well-intentioned, expert warnings (pulsmedycyny.pl) were easily taken out of context, adding fuel to fears about mutation and human risk. Some experts' indications were misused. The search for guidance (gdansk.pl, koty.pl) highlighted the public's need for clear information. This information void created space for predatory fake "cures" or conspiracy theories. The A/H5N1 outbreak is a stark reminder that managing the spread of information is as crucial as managing the spread of disease itself. Without preparation (Aslan et al., 2024), infodemic will continue to undercut public health efforts and erode trust in the institutions meant to protect us.

Table 1

Media Sources used in the article

Type of medium	URL	Summary
nationwide top3 general newspaper	rp.pl	Highlights the discrepancy between the Ministry's focus and public concerns.
nationwide business top15 newspaper	gazetaprawna.pl	News report highlighting cat deaths, demonstrating a need for clear communication.
nationwide medical top5 portal	pulsmedycyny.pl	Features expert opinion that could be misused to spread fear.
regional portal (local government owned)	gdansk.pl	Local authority providing practical pet safety advice, filling a potential information gap.
nationwide top3 cats portal	koty.pl	Offers cat care advice, demonstrating proactive response by some websites.
National Sanitary Inspection portal	gov.pl	Example of an official statement that is accurate but not reader-friendly for concerned pet owners.

Role of scientists. It is questionable how much information should be released to the public during the investigation of the outbreak. Let us compare two scientific discoveries known to sanitary/veterinary inspectors since the beginnings of investigation which could trigger panic in the society: 1) possible contamination of animal feed (Poland is the biggest poultry exporter in Europe (Jarynowski, 2024)); 2) nonfatal cases in dogs (Szaluś-Jordanow et al., 2024).

1) In the beginning of July a non-certified lab in Cracow found A/H5N1 animal feed (cat had typical AI symptoms around a month before) and virus was sequenced in Gdańsk later on (Rabalski et al., 2023). Back-tracking potentially contaminated food (frozen poultry meat) a month after purchase was impossible. In the first case the food researcher went on an early

stage of investigation to the media “Bird Flu in a butcher store”, in second veterinarians instead of publishing their results in a highly cited scientific journal (when the story was “hot”) waited until the outbreak was finished. Inspectors were very upset with the attitudes and performance of researchers particularly from Gdańsk Medical University and Gdańsk University (not trained as veterinarians nor epizootiologists), who disclose this information quickly to the media, in consequence disturbing inspectors work. Moreover, similar complaints happened during SARS-CoV-2 outbreaks in mink in the Pomerania region around 2020/2021 (Rabalski et al., 2022). In informal chats (as described above formal post event debriefing was not possible), inspectors called them “scientific paparazzi”.

2) On the other hand, the information of the positive (Avian Influenza test) dogs stayed in the veterinary community not to cause panic (A/H5N1 course in dogs’ cases were never fatal) in country of dog lovers (there is ~8 million dogs and only 4 million cats in Poland, while usually in other European countries the ratio is moreover equal with some states with even opposite trend). Non-state veterinarians released findings to the general public about positive dogs, only when the outbreak was over (Szaluś-Jordanow et al., 2024) showing respect to their colleagues in Veterinary Inspection.

A question of responsible science can be emerged, because scientists are evaluated not by their input into society but by bibliographies scores. Thus, there is an incentive to use operational information (in statu nascendi) and share it to the world in an initial form (without discussion on uncertainty).

Thus, the mythomaniac role of scientists created by mass media such as Netflix (i.e., “Do not look up”¹, “High Water”²) builds a very wrong picture of crisis management. On the other hand, the old “Chernobyl”³ HBO series or “Epidemic”⁴ are much more realistic, conveying a realistic and intriguing take on the relationship between researchers, inspectors and the state (Kunicki, 2021).

Regional-National Coordination. In Poland crisis management is organised by county “powiat” (i.e. Gdańsk), province “voivodeship” (i.e. Pomerania) and nationwide level. Since the beginning, there were suspected cases from multiple counties around the city of Gdansk, so the coordination of the disaster should be considered at the level of Pomeranian voivodeship. Polish veterinarians were not in the same situation as their colleagues in the USA, who knew (because of Polish experience among others) that cats can be a sentinel of AI in mammals (Plaza et al., 2024). However, some intuition (i.e. using human rapid antigen tests) allowed them to follow into the right direction. Influenza virus was quickly found in the regional Veterinary Hygiene Institute and confirmed in national reference labs.

Regional veterinary inspection is the so-called “civil service” in Poland, so the inspectors have some capacity for unspecified tasks. Thus, in the first part of the outbreak the cost of laboratory tests were covered by Pomeranian Veterinary Inspectorates. Conversely, regional sanitary inspectors are not “civil service” and do not have these benefits (much lower status), hence are more inclined to wait for decision making Chief Sanitary Inspection (which only has “civil service” status). The situation got complicated in the later stage of the outbreak investigation outside of Pomerania, because there was no unified decision of the Chief Veterinary Inspectorate about who should pay for the tests. In some places (such as Pomerania) local inspectors paid, in the other the fees were paid by veterinarians or animal owners. Some non-state institutions such as university researchers, volunteer to analyse samples without payment. This was a huge mistake from an outbreak investigation perspective, because the owners in a great majority refused to pay for the post-mortem

¹ https://en.wikipedia.org/wiki/Don%27t_Look_Up

² [https://en.wikipedia.org/wiki/High_Water_\(TV_series\)](https://en.wikipedia.org/wiki/High_Water_(TV_series))

³ [https://en.wikipedia.org/wiki/Chernobyl_\(miniseries\)](https://en.wikipedia.org/wiki/Chernobyl_(miniseries))

⁴ [https://pl.wikipedia.org/wiki/Zaraza_\(film\)](https://pl.wikipedia.org/wiki/Zaraza_(film))

investigation of their pupils. Local veterinary authorities were complaining for lack of financial and meritoric support from the central institution (Jephcott, 2024).

Pomeranian Sanitary Inspection as being part of the healthcare system was in a much more complicated situation in paying for the test of humans in contact with sick animals (so they did not do it, just observed cases). Improvisation of Pomeranian Sanitary Inspectors was justified with guidelines around over two weeks from identifying that a source may have a zoonotic potential. Almost all sanitary inspectorates outside of Pomerania did not introduce any surveillance (even knowing to have animal cases in their territory) before getting the directive from Chief Sanitary Inspectorate.

Collaboration between local sanitary and veterinary inspectors did not work well in other regions of Poland. Often animal owners who trusted their vets and local veterinary inspectorate were afraid of sanitary inspectorates (they got bad fame during COVID-19 pandemic and first year full scale Russian invasion on Ukraine (Marek, 2022)). For instance, humans in contact did not want to be quarantined (even it was not the case).

International Bodies. We suffer from lack of support and misleading communication from EU institutions (similar filings were during the Ukrainian refugee crisis (Paradowski et al., 2023)).

Problems with ECDC:

- Errors in almost all communications (practical in technical reports and scientific publications - Eurosurveillance journal). All articles have multiple errors i.e. in maps Figure 1.b (Rabalski et al., 2023), Figure 1 (Domańska-Blicharz et al., 2023) suggest that there were cases in Lubuskie and Łódzkie voivodeships, which was not the case at least in the time period marked by authors. As trusted sources of information in the European Union, the Eurosurveillance journal may have asked authors for erratum as they claimed a false argument that spatial distribution of cases do not form any clusters (but they plot data wrongly). Throughout the COVID-19 pandemic rapid publishing caused retraction of some important epidemiological articles in The Lancet and The New England Journal of Medicine (Rzymiski et al., 2020). As of April 2024, Eurosurveillance did not publish any erratum. Moreover, in ECDC bulletin "Weekly threats reports" (at least in reports of weeks 26-28: the apogee of the outbreak investigation) the number of flaws was even higher. The geographical location of samples being negative were confused with positives and the numbers of positive cases were presented differently as these submitted by Polish authorities (ECDC, 2023). Thus, those who do not have contacted involved sanitary/veterinary inspectors from Poland and rely only on EU communicates (also in scientific press) may have a biased understanding of the outbreak.

- Lack of understanding of general context (i.e. agricultural and environmental constraints) by EU medical experts. In general understanding of ONE health concept (with stress on livestock supply chains) is low among epidemiologists at ECDC (who are supposed to support regional ONE public health officers) and usually ends at backtracking food-borne diseases.

Problem with EFSA /DG SANTE (Directorate-General for Health and Food Safety):

- Lack of possibility to use ADNS/ADIS (EFSA et al., 2017) systems with mammal as host (WOAH own EMPHRES allows that kind of data)

- Chaos in internal communication and guidelines in a situation without preparedness plans.

A serious problem, not only in ONE health, is the reluctance to talk about mistakes made, just as much as the reluctance of management to disclose them (Rosiński et al., 2019). On the other positive experience with UN bodies (WHO/FAO) and WOAH, which are much more experienced is such a situation. It is important to underscore that collaboration with UN agencies in biomedical aspects during previous crises such as the flux of Ukrainian refugees was much better than with EU bodies (Jarynowski & Maksymowicz, 2024).

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Discussion

Infodemic management. Poland must learn from the A/H5N1 infodemic. Proactive measures are needed: such as developing robust digital monitoring tools to track narratives and identify emerging misinformation trends (Social Listening); creating a classification system for misinformation types, alongside clear regulations for addressing false narratives, especially on social media platforms (Taxonomy & Regulation).

Table 2.

The proposed taxonomy (Purnat et al., 2021) for health related narratives (adapted from (Romanowska, 2024))

Scope of Impact	Timeframe	Thematic Group	Examples of Misinformation	Consequences on Public Health
Individual & Public Health	Immediate	Vaccinations	False claims about adverse effects, conspiracy theories (mandatory vaccination of cats against AI)	Influences health behaviours and public health initiatives
Individual & Public Health	Immediate	Disease Information	Misinformation about disease origins, symptoms, prevention measures or about H5N1 transmission/sources of infection/ prevention and control of the disease etc.	Directly affects individual (or their animals) health decisions and public response, induced panic (some dogs owners)
Veterinary/ Healthcare Practice	Immediate	Disease Diagnostics	Inaccurate information on diagnostic test efficacy (i.e. use of human tests for animals) and safety	Impacts immediate healthcare/veterinary practices and public health strategies
Public Health Policy	Short to Medium Term	Antimicrobial Resistance (AMR)	False efficacy claims of antibiotics	Contributes to AMR, influencing healthcare practices and policy
Public Perception	Medium to Long Term	Alternative Therapies	Exaggerated claims about the effectiveness of unproven treatments (i.e. advertisements of immunomodulating supplements for cats)	Influences public perception and healthcare choices over time
Environmental Health	Long Term	Environmental Factors	False information about the health impacts of environmental factors (i.e. toxic water killing cats)	Affects long-term environmental health and policy

Environmental Health	Long Term	Climate Change	Misinformation regarding the health impacts of climate change	Impacts long-term public health strategies and environmental policies
Societal Behaviour	Long Term	Social, Economic, Geopolitical Factors	Misinformation about the health impact of socio-economic factors (i.e. false image that epizootic is equally distributed around the country)	Influences societal behaviour and long-term health policy
Public Health	Medium to Long Term	Nicotine and Nicotine Products	False safety and health effect claims of nicotine products	Influences public health initiatives and regulatory policies
Public Health	Medium to Long Term	Alcohol and Alcoholic Products	Misleading information about the health impact of alcohol	Affects public health measures and societal attitudes towards alcohol consumption
Emergency Response	Variable	Disasters	Misinformation about natural and man-made disasters	Impacts emergency preparedness and public safety measures
Societal Behaviour	Long Term	Elections	Misinformation about health policies and candidates' stances on public health issues	Influences voting behaviour, public trust in health systems, and health policy legislation
One Health	Long Term	One Health Mis- and Disinformation	False narratives disconnecting the interrelation of human, animal, and environmental health. False information about H5N1 transmission/impact/efficiency etc	Leads to misguided health practices and policies, overlooking ecosystem interconnectivity
Individual Health	Immediate to Long Term	Oral Health	Misconceptions about dental care, fluoridation, and oral hygiene links to overall health	Affects oral and overall health outcomes, can lead to systemic health issues

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Reproductive Health	Immediate to Long Term	Reproductive Health	False information regarding contraception, pregnancy, and reproductive rights	Influences reproductive choices and can impact public health and rights
Societal Behaviour	Long Term	Cultural/Racial Mis- and Disinformation	Stereotypes and false health narratives related to specific cultures or races	Exacerbates health disparities, affects healthcare delivery and societal inclusion
Societal Behaviour	Variable	Religious Mis- and Disinformation	False claims related to religious beliefs and health practices	Can lead to harmful health behaviours and undermine public health measures
Individual Health	Variable	Age-related Health Myths	Misinformation about ageing and associated health practices	Influences treatment of elderly, affects healthcare policy
Mental Health	Immediate to Long Term	Mental Health Stigmas	False narratives surrounding mental illness and treatment	Contributes to stigma, impacts mental health care seeking and provision
Public Perception	Immediate to Long Term	Celebrity Health Endorsements	Misleading health advice endorsed by celebrities without medical expertise	Influences public health behaviours, can lead to the adoption of unproven or harmful health practices
Public Perception	Immediate to Long Term	AI & Cybersecurity	Myths about AI (artificial intelligence) and cybersecurity risks on health	Causes distrust and fear of technology; may deter from adopting useful innovations
Environmental Health	Immediate to Long Term	Biotechnology, GMO & Genetic Engineering	False claims about the safety and impact of GMOs and genetic modifications (i.e. degenerated meat feed based on poultry feed with GMO grains)	Influences public opinion and policy, potentially rejecting beneficial technologies
Public Health & Safety	Long Term	Nuclear Power/Energy	Misinformation about the risks and benefits of nuclear energy (i.e. radiation from warzone in Ukraine)	Impacts energy policies and public support for nuclear solutions

Public Health & Safety	Immediate to Long Term	5G Technology	Conspiracy theories linking 5G technology to health issues such as cancer or COVID-19	Causes unwarranted fear and resistance to infrastructure development
Societal Behaviour	Immediate to Long Term	Robotics and Automation	Exaggerated fears about robots leading to mass unemployment (i.e. in farming) or loss of human autonomy	May influence public policy and economic decisions; fosters unnecessary fear and resistance to beneficial technology

The WHO document (WHO, 2023) outlines methods for identifying and classifying various types of health-related misinformation and disinformation, which has informed the categories and examples included in this taxonomy. It adheres to internationally recognized standards and practices.

The purpose of the taxonomy is not only to categorise health-related misinformation effectively but also to provide a practical tool that can be actively used by health professionals, educators, policymakers, journalists, and the public to understand, identify, and combat misinformation.

Structural and coordinating aspects. The lesson that decision-makers and organisers of the inspection system have not learned is the one that was learned long ago by scientists dealing with organisation theory - both sociologists and other theorists and practitioners in this field (Wisniewska et al., 2023). In these studies, organisations are seen as “competitive actors, striving to achieve their own goals” (Laumann et al., 1978). Therefore, each of them tries, in accordance with the assumptions of utilitarianism, to maximise their profits by minimising costs. What is important, “final allocation of resources is the product of a large number of small decisions, negotiated at the level of the interorganizational dyad. And these interorganizational organisations are often created by members themselves” (Galaskiewicz, 1985). And as with any organisation, the decisions made depend on power relations. Undoubtedly, “cooperation, coordination and collaboration are the basis of inter-organizational activities” (Castañer & Oliveira, 2020). But they are marked by complex networks of relationships, the understanding of which allows for better organisation and control of the flow of information.

We learnt that for the most unpredictable threats one public health responsibilities and challenges stand on the shoulders of regional stakeholders. It was the case of Legionella outbreak in Subcarpathia (Krzowski & Ostrowska, 2023), Ukrainian refugees wave (Madej et al., 2023) and also Oder river disasters (Free et al., 2023). In each of these cases, analyses revealed deficiencies in coordination at the international and central level and some positive aspects at the local level. As in the case of the ecological catastrophe in the Oder River in 2022 (Jarynowski & Maksymowicz, 2024), when most of the activities were initiated and carried out by smaller local groups, with an ongoing international dispute between Poland and Germany.

And such coordination was also missing in the case analysed in this article. The reason is both the silled operation (organisational silos) of separate inspections and their inability to coordinate and communicate. The reason for this is the fact that the veterinary inspection is a civil service, so it is a more independent structure, and its local veterinary inspector has high prerogatives, comparable to the mayor or the head of the national tax administration, so he is at the top of the official hierarchy. However, the situation is completely different in the case of the sanitary service, which is subordinated to the central authority and is not able to act independently, always waiting for decisions from the capital of the country. This power

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imbalance, known in organisational theory, causes the mentioned lack of coordination and prevents adequate communication between unequal actors.

Such action is therefore consistent with the analyses which indicate that: 1) the more that other organisations are dependent upon the focal organisation for the resources they need, the more likely that organisations are going to view the focal organisation as being influential and 2) those organisations less dependent upon the local system for resources tended to interact less with local agencies and had more disagreements with locals than organisations more dependent upon local systems. Thus, strong (scientifically and man-powered), locally networked and independent (financially and administratively) integrated ONE health inspection on a level of region with ~few millions citizens/tens of thousands km² seems to be the best structure for unknown threats (Al Asfoor et al., 2024).

The matter becomes even more complicated when we add one more necessary element that is an independent organisation related to a separate field: science (e.g. university structure). Scientists should be added to this organisational puzzle, who, although have the knowledge necessary to solve the problem. Yet they are not included in the process, or it happens accidentally. Meanwhile they should be included in the critical process as a natural and independent actor, complementing the entire crisis prevention system (although not with a leading role). But also, in this dimension there is a conflict regarding resources: scientists' goal is scientific work culminating in a high-scoring publication, so their interest is often limited to topics that have publication potential. This, in turn, may lead to a limitation of their scientific interest in a situation that is important from the inspection point of view but has little publication potential. Summarising to avoid mistakes happened in Poland, organisers or ONE health response system should take into consideration: 1) decentralisation in ONE health system, that will promote the transfer of decision-making power from central governments to local entities, enhancing responsiveness to community health needs and streamlining the management and distribution of resources; 2) local integration and networking facilitate cooperation among various ONE health sectors and actors, to create a unified framework for rapid information sharing and collective decision-making at local, and central/international levels, thereby improving the overall effectiveness of ONE health protection.

Conclusions: The future?

A/H5N1 in cats is just an example of an institutional system response during a crisis (Meletis et al., 2024), thus we don't know where new problems will arise, as it could be an invasive species spread from a cargo, a new or AMR (antimicrobial resistant) pathogen, etc. Thus, our example revealed many vulnerabilities to emerging (i.e. zoonotic (Grzybek et al., 2023)) threats at the regional, national and international levels, so we recommend the following for the future:

- Joint outbreak investigation and monitoring/surveillance schemes (Jarynowski & Belik, 2023) of veterinary and sanitary inspections (with the support of local scientists) should be encouraged at the regional level, and supported logistically and financially (at least in the case of Gdansk, the government benefits from increased customs duties, which should offset the risks of the hub's position).

- EU agencies such as ECDC and DG SANTE need to adjust better to new challenges (i.e. disease X) from more experienced players such as WHO or CDC (Bravo-Laguna, 2023).

- Mid-level regional ONE health inspectors should have the possibility to use public financial sources to provide microbiological tests in ONE health problems of unknown origin.

- Unconventional data sources (i.e., participatory epidemiology and infoveillance) should be incorporated into the surveillance/risk assessment scheme (Meletis et al., 2024; Radziwon et al., 2023).

- A national and/or regional Epidemic Intelligence System (Meletis et al., 2024) should operate in real time, aiming to identify, monitor and analyse One Health threat signals through early warning schemes.

- Perform infodemic management and use taxonomy recognized by global experts and global health organisations (if possible) when conducting a surveillance to identify information voids and threats (WHO, 2024). Uncontrolled infodemic should not repeat in the next crises. Pre-established channels for information exchange between government bodies, scientific experts, veterinarians, and reputable media outlets can foster consistent messaging that counters the confusion exploited by bad actors.

- Built resilience system (Aarestrup et al., 2021), educate and implement integrated environmental and behavioural health analytics. It is recommended to build an open ecosystem of tools, reference databases and communities.

- Cultural aspects must be included to trade off panic and outbreak/crisis management (here caution Poles are much more into dogs than cats), which can only be understood by locals (Jephcott, 2024).

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МУЛЬТИМОДАЛЬНИЙ ЕПІДНАГЛЯД В СИСТЕМІ ОХОРОНИ ЗДОРОВ'Я В ЧАСИ ЗМІН: УРОКИ, ЯКИХ НЕ БУЛО ЗАСВОЄНО З ПРИКЛАДУ РОЗПОВСЮДЖЕННЯ А/Н5Н1 СЕРЕД ССАВЦІВ У ГДАНСЬКІЙ АГЛОМЕРАЦІЇ

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Резюме. Це тематичне дослідження поширення A/H5N1 на ссавців у районі Гданська підкреслює складність управління новими загрозами "Єдиному здоров'ю" у важливих політичних та економічних аспектах. Ми порівняли відносно успішне швидке регіональне реагування з абсолютно програною битвою у сфері комунікації та співпраці, підкресливши необхідність покращення міждисциплінарної регіональної та міжнародної співпраці та надійних систем епіднагляду в епоху антропогенних і природних змін.

Ключові слова: управління інфодеміями, (знову) виникаючі хвороби, системи раннього попередження, єдине здоров'я, готовність

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