NoRumourHealth book:

Experiences from a project to help the elderly understand health misinformation

No Rumour

HEALTH

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NO RUMOUR HEALTH PROJECT

Project number: 2019-1-ES01-KA204-064037

Project coordinator: Carolina Moreno-Castro (University of Valencia)

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Introduction: How science communication could improve to stop spreading rumours-related health in media and social networks?

The overlapping of multiple discourses on health-related topics generates problems for the general public when identifying true or false content. Currently, in Western countries, most people, starting in adulthood, access different devices that allow them to be connected (tablet, mobile, laptop or PC) due to technological development. The decision to spend more or less time connected to these devices depends on each person or group. However, there are dangers of excessive dependence on the information received, as would be the case with older people, or becoming a compulsive generator of content, as with adolescents. In this project, from the beginning, we considered the value that a specific APP could have to help the elderly to identify if the pieces of information they receive on their mobiles about the health-related topic are based on scientific evidence or just rumours. This project's main objective is to empower the elderly for knowing the facts and fake news proactively.

During the covid-19 pandemic, social scientists studied misinformation's impact on the elderly. For example, in the study by Choudrie et al.

(2021)[1], twenty older adults were interviewed, and it found that they were more willing to trust traditional media than new formats. Likewise, they explained that they were confused and that the content about the veracity of the information related to the prevention and cure of COVID-19 provoked doubts in them.

In the light of the project's framework, in 2021, we published an exploratory study about hoaxes related to the prevention or cure of covid-19. The hoaxes were studied to assess their nature and not the effects on a specific audience, but they were one of the research designs while No Rumour Health's first phases were being developed[2].

The bibliographic review and the implementation of the different studies during the covid-19 pandemic helped us reframe the development of the project, as the elderly were more exposed to fake news and misinformation. In other words, the rumours were a more central issue in their lives due to the coronavirus pandemic.

1   Cfr. Choudrie, J., Banerjee, S., Kotecha, K., Walambe, R., Karende, H., & Ameta, J. (2021). Machine learning techniques and older adults processing of online information and misinformation: A covid 19 study. Computers in Human Behavior, 119, 106716. https://doi.org/10.1016/j.chb.2021.106716

2   Cfr. Moreno-Castro, C., Vengut-Climent, E., Cano-Orón, L., & Mendoza-Poudereux, I. (2021). Exploratory study of the hoaxes spread via WhatsApp in Spain to prevent and/or cure COVID-19. Gaceta Sanitaria, 35(6): 534-541. https://doi.org/10.1016/j.gaceta.2020.07.008

Table. 1. Dissemination of studies carried out within the framework of the No Rumour Health project

Date	Kind of dissemination	References and links
2020	Seminar	Moreno-Castro, C. (2020) De las teorías de la conspiración a los ingredientes mágicos: desinformación en tiempos de la COVID-19. Seminar given within the cycle of conferences Public health, communication and history: The challenges of the pandemic, organized by the López Piñero Interuniversity Institute (University of Valencia)
2020	Science Talk	Vengut-Climent. E. (2020). Una pandèmia d'informació. Science talk presented in the cycle Science outdoor organized by the Jardí Botànic. 17 September 2020.
2020	Oral presentation	Moreno-Castro C, et al. (2020). Oral presentation. "Exploratory study of the hoaxes spread via WhatsApp in Spain to prevent and/or cure COVID-19". Gaceta Sanitaria, 35(6): 534-541. https://doi.org/10.1016/j.gaceta.2020.07.008Congreso Bulos de Salud Conference. October 27, 2020.
2021	Article (JCR Q3)	Moreno-Castro, C., Vengut-Climent, E., Cano-Orón, L., & Mendoza-Poudereux, I. (2021). Exploratory study of the hoaxes spread via WhatsApp in Spain to prevent and/or cure COVID-19. Gaceta Sanitaria, 35(6): 534-541. https://doi.org/10.1016/j.gaceta.2020.07.008
2022	Article (JCR Q2)	Moreno-Castro, C. (2022). Tipología y patrones de los bulos difundidos durante la pandemia de la covid-19 sobre salud y nutrición. Arbor, (Accepted for publication in the Arbor Journal).
2022	Plenary Speaker	Moreno-Castro, C. (2022): (Dis)misinformation, polarisation and hypocognition on health-related stories disseminated through the digital ecosystem. XXVII Conference on Contemporary Philosophy and Methodology of Science, 10 and 11 March 2022 University of A Coruña (Ferrol-Spain)

All these studies allowed us to understand the working framework with the elderly better. In addition, it also allowed the APP's development in a collaborative and co-creative way. The best way for science communication to help prevent hoaxes about health-related topics will be to use different applications such as apps, plugins, and elements that allow them to verify the information before reaching a fact-checking company. Only in case of doubts they could reach fact-checkers. The idea is to have the elderly with skills to stop spreading (dis)misinformation.

Furthermore, there are two essential dimensions to this scenario. The first one is that the science education of citizens allows them to know if the information they access is verified and comes from reliable sources.

The second one is about public institutions' role in disseminating science information. The academic o researching institutions should be more proactive with science communication and have greater visibility of research results. The open science movement is fighting to disseminate the findings around society. In conclusion, our app will depend on the database knowledge for sharing with citizens in a friendly way to empower them to identify true and false messages on health-related topics.

Image 1. Source: Moreno-Castro, C. *et. al.* (2021) *Exploratory study of the hoaxes spread via WhatsApp in Spain to prevent and/or cure COVID-19. Gaceta Sanitaria*, *35*(6), 534-541.

Chapter 1

The design of a mobile application for the elderly to identify false rumours and scams

One of the challenges of the NoRumourHealth project was to offer the older population tools to detect and avoid the consequences of health false rumours. Older people have had to adapt to the rapid technological evolution suffered in recent years. This sector of the population had a childhood practically devoid of current technologies and they have witnessed the first gradual and finally abrupt change in lifestyle, which has made us almost completely dependent on technology today. Therefore, it is not surprising that the population sector with the least use of new technologies is that of people over 65 years of age. In fact, although according to the Spanish Statistical office (INE) data, 85.8%[1] of the population uses the Internet daily, the analysis by age group shows how, among the population over 65, only 56.3% use the Internet daily. This is a clear example of the digital divide that exists between the different sectors of the population.

NoRumourHealth, in addition, addresses specifically to that population sector that uses digital devices in a rudimentary way and, consequently, can be affected by the dissemination of false rumours without being able to use some resources that already exist in the network to defend themselves.

The active participation of the final users in the different activities of the project highlighted this digital gap. Many of the difficulties that the participants expressed in handling the disinformation modules are basic doubts about handling videos on YouTube (for example, how to pause the video or listen to it again) or doubts about basic handling of mobile devices (some users did not know how to access the application download platform or once they installed the application they did not know how to find where it was installed on their own devices). In this context, thus, the co-creative perspective of the project acquires a fundamental value.

Unfortunately, the restrictions imposed by the pandemic have prevented the co-creative process from being as participatory as planned, since it was not possible to carry out the initial workshops in the spring of 2020 and, for the reasons already stated, it was not possible to replace them with an online version. Therefore, it was decided to carry out an online survey that would allow the work team to obtain a global vision of the perspective of the target population.

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1. Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los Hogares 2021. Según los datos del INE el 85,8% de la población utiliza internet de forma diaria. Sin embargo, cuando se realiza un análisis por edades, se comprueba la brecha entre la población más joven y las más envejecida. Así, la población mayor de 65 años que afirma utilizar internet diariamente desciende hasta el 56,3%. A pesar de que esta cifra ha aumentado progresivamente, y, de hecho, en tan solo un año ha aumentado 6 puntos, es una clara muestra de la brecha digital y de la diferente destreza de los usuarios frente a las nuevas tecnologías

1.1 Initial survey

The first phase of co-creation of the project was carried out through an online survey that remained open for participation between May 29, 2020, and August 31, 2020. In total, 79 complete and 71 incomplete surveys were registered. Of these, 49 respondents were older than 60 years and 30 youngers than 60. The objective of this first phase was, on the one hand, to detect if the sketch created was intuitive for the elderly population and, on the other, if the contents were understandable and meet their needs. The survey contained 7 questions on the usability of the application, 3 on the type of content and amount of content, and 3 generic questions on disinformation. Annex 1 shows the complete survey and the results by country.

• 2.1.1 Usability

Regarding the usability questions, it was clear that users tend to scroll down to complete the information (above actions such as clicking) and to navigate the menu or access more options. It was also identified the need to keep a large font size and ensure that this does not skew the text. The icons were also valued as an aid for understanding and lightening the text.

• 2.1.2 Content

Regarding the content, this initial survey allowed also to detect some headings that were confusing due to its writing in Spanish, Greek and Polish but were understandable in English.

One of the options included in the pilot versions was sharing the content with other users. However, most of the participants assured they would not share it on public social media. Among those who said that they would do it, the most frequent option was Facebook, followed by private messaging channels (WhatsApp and Telegram). It is noticeable that WhatsApp was an option selected by people who filled the survey in Spanish. Despite the limitations, the survey allowed the team to establish the general lines of development of the application. Thus, in the first place, the options on the main menu were reformulated since comprehension difficulties were detected and it was verified how users opted for unexpected paths. Regarding comprehension, it was also found that texts should be kept short and with concise statements, using large fonts and links to reliable sources for more information

1.2 Workshop for testing pilot versions

In September 2021, the Consortium had the pilot version of the APP ready for being tested by people over 65 in a series of workshops. This second part of the co-creative process had the goal of testing its usability and the comprehension of the contents before releasing the final version.

Co-creative workshops took place during October and December 2021 in Spain, Poland and Greece. In total 60 people participated in Spain, 20 in Greece and 23 in Poland. All activities were organized face-to-face except one of the workshops in Spain and one workshop in Poland.

• **Workshops in Spain**

For the organisation of the workshops in Spain a double strategy was carried out. On the one hand, an online registration form was launched open to anyone, and, at the same time, some promotional material was sent to elderly associations who might be interested in participating.

The online form was completed by 57 people, but only 30 of them completed all the data. The registration form allowed you to choose between one of the two sessions scheduled in person or the online option. Most of the users opted for the online session.

On the other hand, the search for interested associations made it possible to establish contact with three Elderly Care Centers founded by the Generalitat Valenciana and a city council in a Valencian village, Ròtova. One of the centres for the elderly requested the organization of a session at its facilities, as well as the Ròtova town hall. The other two centres for the elderly referred their users to the face-to-face session scheduled at the Institut d'Investigació Beatriu Civera of the University of Valencia.

• **Workshop in Poland**

The workshops in Poland were organised in cooperation with Third Age University in Rzeszów. Danmar Computers felt that it was a good entity to contact local senior citizens looking for new knowledge in the field of fighting fake news and misinformation. Due to the coronavirus pandemic and the fact that the target group of the project was a high-risk group, Danmar finally decided to hold the meeting online. A big help here came from the University of the Third Age, which used its internal network to organise the connection between the older people from the university and the Danmar Computers team. After the event, Danmar shared a questionnaire to be filled out in Polish. The University of the Third Age also disseminated this questionnaire to those who attended.

• **Workshops in Greece**

For the organisation of the workshops Evropeii Inhilates sent several emails to local associations in Volos. Invitations for participating were also sent to personal contacts in the area that have also previously worked with the Evropeii Inhilates. The event took place in the facilities of a school and the local education authority provided the equipment.

Image 2. Workshop at Institut d'Investigació Beatriu Civera of the University of Valencia.

Image 3. Workshop at Elderly Care Center Illes Canàries (València). .

1.2.1 Sociodemographic profiles of participants in the workshops

Testing the pilot version of the APP with final users was essential to guarantee that the product developed met their needs. For this reason, it was also essential to test it with a great variety of profiles.

Table. 2. Gender of participants per country

Gender	Spain	Greece	Poland	TOTAL
Male	20	4	6	30
Female	26	16	17	59
TOTAL	46	20	23	89

Table. 3. Age of participants per country

Age	Spain	Greece	Poland	TOTAL
60-65	8	10	14	32
66-70	10	4	4	18
71-75	11	6	5	22
76-80	8	0	0	8
+81	9	0	0	9
TOTAL	46	20	23	89

Table. 4. Place of residence of participants per country

Place of residence	Spain	Greece	Poland	TOTAL
Urban	31	20	18	69
Rural	15	0	5	20
TOTAL	46	20	23	89

Table. 5. Level of studies of participants per country

Studies	Spain	Greece	Poland	TOTAL
Non formal education	7	0	0	7
Primary	15	6	2	23
Secondary	7	12	0	19
Vocational training	6	0	19	27
University degree	11	2	2	15
TOTAL	46	20	23	89

1.2.2 Frequency of use of technology

It was important to know the real ability and frequency of use of new technologies in the testing phase as this would allow partners to know if users with low-technological abilities will eventually be able to use the APP. In fact, as it was verified during workshops, some of the doubts of participants were on many occasions very general questions. For example, some of them didn't know how to access to the store on their devices to download the APP.

Table. 6. Frequency of use of computers or tablets of participants per country

How often do you use computers or tablets?	Spain	Greece	Poland	TOTAL
Daily	11	4	6	21
Every two days	5	3	14	22
Weekly	6	13	3	22
Never	21	0	0	21
TOTAL	43	20	23	86

Table. 7. Freqeuncy of use of mobile phone of participants per country

How often do you use mobile phone?	Spain	Greece	Poland	TOTAL
Daily	41	20	23	84
Every two days	2	0	0	2
Weekly	0	0	0	0
Never	3	0	0	3
TOTAL	46	20	23	89

Table. 8. Preferred source to access to health information of participants per country

Preferred source to access to health information	Spain*	Greece	Poland*	TOTAL
Television	25	18	18	61
Newspapers	14	1	7	22
Websites (specify)	10	1	3	14
Health professionals	18	0	11	29
Friends and acquitances	4	0	6	10

*Users marked more than one option

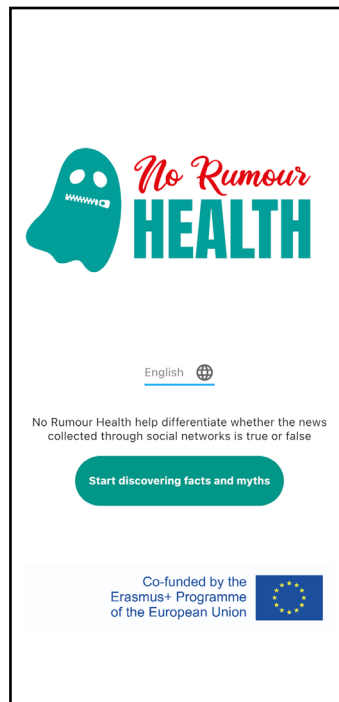Workshops in Poland have shown that a large proportion of older people use daily mobile phones (not necessarily smartphones) and their main source of information still is television, but also talking to health professionals. A very small number of respondents answered that these were websites. And if they mentioned websites, they were websites which present rather general news from the country and region.

1.3 Evaluation and improvements after the piloting sessions

The workshops made it possible to detect some usability errors for the elderly and observe how they handled the application. Thus, it was observed that most of them, when entering the option to search for information by words, had a mental block and asked for help since the keyboard did not appear by default. On the other hand, the team could also detect that the option of search was too precise as elders sometimes did not write some words properly and they had problems to find information that it was included in the application.

No Rumour HEALTH

English 🌐

No Rumour Health help differentiate whether the news collected through social networks is true or false

Start discovering facts and myths

Co-funded by the Erasmus+ Programme of the European Union

Another of the goals of the workshop was to test if the information was understandable for participants. In general terms, the direct response format (true-false) and the explanatory paragraph was clear and direct for most of the participants. Regarding the amount of information, mixed comments were received. In one of the workshops, the participants acknowledged that they had not even read the entire explanation, but, at the same time, the comments received indicated that a longer explanation would be desirable.

In general, both the interaction with the application and its understanding was positive. As it was collected in one of the questionnaires "it is very informative and gives a lot of confidence" and "I see it very clearly and quickly".

Users with less digital skills faced, however, the difficulty of handling a new application ("I must improve to understand it better, but I found the app very interesting").

At the end of the workshop, they were given a questionnaire. Regarding the question about whether the information offered by the application is clear and understandable, the average score in the online workshop was 8.5.

The collection of all the information provided by the elderly during the workshops favoured the improvement of the app by modifying several aspects of the application:

• Usability

Participants on workshops used their own devices to test the APP. Therefore, the team could test how it looked on different mobiles. It was detected that those phones that had been set with a big font, sometimes did not properly adapt the content so some sentences were incomplete, as shown in image 1. It was also detected that, when this happened, the scroll down option got blocked.

Regarding navigation, most of the users understood how the application works. However, many of them got stuck when clicking on the option "search" as, when the screen opened up, they did not know what to do in order to look for the information. The concept of the design had assumed that users would understand that they had to touch the "search" so the keyboard appeared on the screen. However, most of the users got stuck and asked for help.

On this same option, the team detected that searching criteria was too accurate. That is to say, when users typed a keyword, such as cancer for example, and they forgot an accent mark (which is compulsory in Spanish but many people forget to write when typing on a mobile phone), they could not find anything. For this reason, searching criteria was slightly modified.

• Users suggestions

Participants on workshops also suggested some improvements or features they felt were missing on the APP. Most of them were related with sharing options of the APP. They suggested to include the option sharing the APP on the main menu.

They also suggested to include the searching option within each of the categories of misinformation so it is easy to find specific contents within the APP.

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1.4 Mobile application development

The creation and development of a mobile application was quite a challenge for Danmar Computers. Although technically the company has experience in the implementation of many mobile applications, in this case, however, the novelty was the target group and the requirements it sets when creating a mobile application.

To create the mobile app Danmar Computers used the Dart language and the open-source UI framework Flutter. It was chosen because it's a high-performance cross-mobile framework and gave us possibility to create an Android and iOS version of the mobile app simultaneously. The software used to write the app was Android Studio.

The application development process itself took place within the consortium in several phases. At the beginning there was a phase of collecting ideas, research and defining how the application would work. Initial templates concerned how users would navigate in the application, what options they would have, etc. A mock-up was then prepared by the University of Valencia. The mock-up served as a sketch of the application, which was later created by a team of developers from Danmar Computers. The application was tested in 3 countries with the project target group and was adapted to the users based on the feedback received.

The application is available on two operating systems. and is prepared in 4 languages of the project partners: English (the official language of the project), Spanish, Greek and Polish.
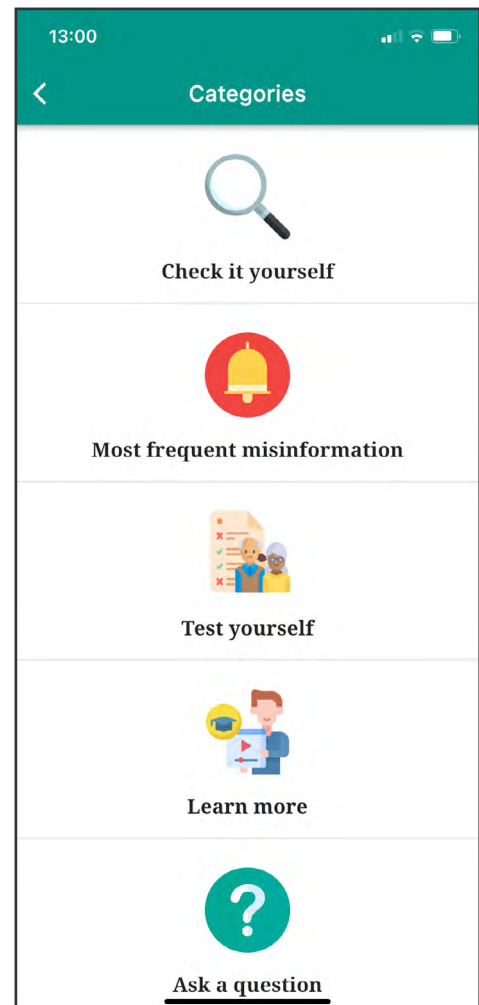

Image 4. Main screen of the mobile APP

iOS
 https://apps.apple.com/app/no-rumour-health/id1550758959

Google
 https://play.google.com/store/apps/details?id=eu.dcnet.nrh

The application consists of four main parts, namely:

- Check it yourself
This part of the application allows you to search for false rumours in the misinformation database prepared by partners.

- Most frequent misinformation
One of the main parts of the mobile app is a database of the most popular misinformation related to health. It consists of false rumours divided into 12 categories:

· Food;
· Treatments;
· COVID-19;
· Cancer;
· Cardiovascular diseases;
· Respiratory diseases;
· Diabetes;
· Neurodegenerative diseases;
· Osteoarticular diseases;
· Mental Health;
· Vaccines;
· Hearing.

In each category there are myths prepared by the project partnership, which are presented in a rather simple form. Namely, the user sees with an icon and a concise text whether the information is a myth or not and they can also find a short explanation of the information. The user then has two options, they can click on the "Learn more" button and get more information about the false rumour. The user will then be taken to an external page that explains the issue in a more descriptive way. Additionally, (s)he can use the "Share and stop the rumour!" option. Using this button, the possibility of spreading the myth through the applications available on the user's smartphone appears among others via: Messenger, WhatsApp, Gmail, Snapchat, Facebook, Telegram, ShareMe and so on. The number of platforms and communicators available depends on what is installed on the users' phone.

- Test yourself
Test yourself is a quiz that was created to provide end users with the opportunity to test their acquired knowledge. The test is available in single and multi (two) player format. It is also available in two difficulty levels: beginners and advanced. The quiz assesses the ability to recognise the likelihood of fake-news by analysing examples of headlines and possible information's. An explanation is also included with the quiz content to help users better understand why a particular answer is correct or incorrect.

- Learn more
This button takes users to a website where there are webinars that will give them the knowledge to better recognise fake news and misinformation. It is very important that, in addition to ready-made answers (database in mobile app), users are also given the opportunity to improve their skills and learn hoax recognition techniques.

If users want to learn more about the mobile application, how to download it, install it and how to use it, they can watch the prepared webinar with instructions. The webinar is available on the project website in 4 languages.
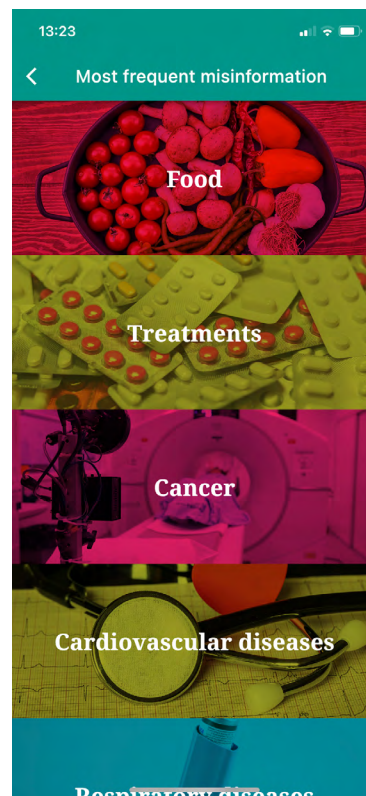

Image 5. Information organised by topics

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Chapter 2

The voice of the experts

This chapter presents the views on health misinformation of experts in different health and communication areas from Spain, Poland, and Greece. Their contributions may help to deepen into the causes of health misinformation, the role social networks and media play in its dissemination, the risk it represents and the measures that should be taken to fight it.

Health misinformation is everywhere, and its spread has intensified in Europe with the coronavirus pandemic. Spain, Poland, and Greece share common false rumours and a general concern among experts to find ways to tackle them. We are currently experiencing a major anti-vaccine offensive aimed at damaging COVID-19 vaccination campaigns. It is, thus, more important than ever to raise public awareness of the health risks posed by the spread of this misinformation. In this sense, all the European experts interviewed agree on the need to take action to tackle health misinformation and on the fundamental role that health professionals play in doing so.

Health misinformation can have different motivations. Among them, lack of knowledge about medical and scientific issues, the discrediting of third parties and the desire to attract attention are some of the most powerful ones. Moreover, the lack of critical thinking also plays a role, as Esther Samper, a doctor and health communicator in many media outlets, highlights in her interview. Guillermo Martín Melgar, 'Farmaenfurecida' on social media, also warned that much of this misinformation appears because "we all want to know everything, and that is impossible. There is some knowledge that need years and years of study to get. If you don't have it, you mess things up when talking about that issue".

For Pania Karnani, head of the European and International Research Projects Department at Prolepsis, the spread of false rumours during the pandemic has been influenced by the fact that many people have been looking for simple explanations for what is happening, not complicated ones, which has led them to believe in fake news.

False rumours can threaten health, either in a direct or in an indirect way. In fact, Roi Piñeiro, head of the Paediatrics Service at the Hospital Universitario General de Villalba, stressed that "any news that encourages the use of pseudoscience, and the withdrawal of science-based treatments has a direct impact on health".

In countries such as Poland, this misinformation has even led to acts of vandalism against doctors and health facilities. As Dr Marzena Jankowska-Mihułowicz said: "It is likely that these acts of terror were a way to ease their fear for the illness". Experts also share the same feeling that society has polarised. Moreover, recent months in Europe have seen a proliferation of false rumours about Covid vaccines, as well as a widespread feeling among experts that society "has become polarised". Evangelos Lamprou, a journalist at the Ionian University in Corfu, Greece, says vaccination rates have been affected by this misinformation: "Many people have been victims of false rumours about the harm and dangers of vaccination and about fabricated deaths caused by COVID vaccines".

COVID-19 vaccines misinformation is recurring during lasts months but there are many other topics involved. "Since the pandemic started, I've debunked between 70 and 90 false rumours relating only to antennas, 5G, vaccines, magnetism... But, from what I perceive, the topics are very varied," explained Alberto Nájera, Professor of Radiology and Physical

Medicine at the University of Castilla la Mancha.

The media sometimes also contribute to the dissemination of this fake news by exaggerating health-related and COVID-19 news. Sometimes, they do this to gain clicks and create sensationalist headlines "which denialists and anti-vaccine people then use as a weapon, even if they don't read the text of the news", Farmaenfurecida pointed out. Social media and instant messaging applications play even a bigger role. Thus, becoming the main source of health misinformation dissemination. For Gemma del Caño, pharmacist and science communicator, social media "are the fuel that can ignite a false rumour and we need a strong commitment to fight this misinformation".

Among the experts' proposals to stop the spread of misinformation, Conchi Lillo, a researcher at the Institute of Neurosciences of Castilla y León (INCYL), pointed out that "truthful and verified information should be the first to appear when searching for health information in common search engines". In addition, the experts interviewed insisted on the importance of not sharing information if we are not sure of its veracity and origin and appealed to the "necessary responsibility" of all citizens. Jolanta Stec-Rusiecka, professor at the University of Technology in Rzseszow, commented on the relevance of verifying information and the significant role that education should play in teaching people about truthful information. Finally, Hans Eguía, doctor specialised in telemedicine from the Spanish Society of Primary Care Doctors (SEMERGEN), recommended training health professionals to improve doctor-patient communication and to promote more health professionals in the field of telemedicine.

Alberto Nájera: "Fear of the unknown led to the search for answers"

Alberto Nájera, Professor of Radiology and Physical Medicine in the Department of Medical Sciences at the Faculty of Medicine of Albacete (University of Castilla-La Mancha).

Why does misinformation spread?
Well, that is a good question. But I will also add where it comes from. In some cases, it is to manipulate information, as seen in some presidential elections. In others it is due to the interests of certain movements such as the anti-vaccine one. And, in others, it is due to a desire to attract attention. But there are, without a doubt, many different reasons.

Are there any false rumours that could pose a threat to public health or the health of individuals?
Of course, we have already seen how the denialist and anti-vaccine movements 'lies put all of us at risk. In other   cases it is fake news the one creating social response or misinformation, fears, etc.

How has the pandemic affected the spread of health misinformation in Spain?
Salud Sin Bulos will be able to provide better information on this. My opinion is that the fear of the unknown and the situation we were living through, especially at the beginning of the pandemic, made people look for answers. Some people   took advantage of this to send out audios or texts in bulks questioning, for example, the existence of the virus. I remember the case of a so-called Galician doctor who was aberrant. Now that lady is leading a part of the denialist movement. The irresponsibility of some people, usually without scientific training or experience, is shameful, but their dangerous messages get through.

What kind of false rumours have you detected as predominant in Spain?
In my case, since the beginning of the pandemic I have debunked between 70 and 90 false rumours related to antennas, 5G, vaccines, magnetism, etc. But from my perception, the topics are very varied, you just need to see how many there are on the website of a verification agency. But the most worrying ones are those that can harm health and endanger all of us. There should be some monitoring capacity and their promoters should be brought to justice for their lies.
What would be your proposal to stop the spread of health false rumours, especially those that affect the elderly?
As I said, I don't know if it would be possible to monitor these accounts or channels that spread false rumours indiscriminately. Given the evidence that the dissemination of lies or misinformation relating to health endangers society, especially in times of pandemic, we should act forcefully.

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Which public health measures do you think should be adopted to tackle misinformation?
Well, in my opinion, promoting a critical spirit and truthful information. It is necessary to give an answer responding   to this dangerous misinformation.

Do fact checking agencies usually use professionals to verify information?
In the experience I had with them, they always use more than one expert. They look for professionals or experts of recognised prestige. Sometimes we have to disprove very absurd things, but we must do it.

What role do private messaging networks play in spreading false rumours?
Nowadays, YouTube or Facebook have made a great effort. Twitter still has a lot of work to do, but there is still room for whistleblowing on social networks. In messaging applications such as WhatsApp or Telegram, through groups or dissemination channels, people act with total impunity. Telegram channels fuel these movements. Working in a unidirectional way, people join in and are bombarded daily with thousands of false messages, sometimes encouraging insults or harassment of those who disprove their disinformation. Other platforms such as Twitch or video streaming should act drastically. One solution that caused these movements to partly leave WhatsApp was to limit the number of message, video or image forwards to a maximum of 5 users. When a message has been redirected a lot, it limits to one forward. Although this is an option, it does not solve the problem.

What role do you think the media play in spreading health false rumours?

Traditional media contact experts more often than before. Information is more reliable and objective, but there is still a long way to go. Smaller media may not have access to this possibility and can easily fall into the trap of spreading false news.

I think that thanks to the pandemic, a lot of progress has been made. Traditional media contact experts more often than before. Information is more reliable and objective, but there is still a long way to go. Smaller media may not have access to this possibility and can easily fall into the trap of spreading false news. I am concerned, for example, that general programmes, and sometimes on public television, include content on pseudo-therapies which, in a way, are also health false rumours that put us at risk. Morning or evening shows should try to avoid this type of misinformation.

Conchi Lillo: "We humans are naturally attracted to magical things".

Mª Concepción Lillo Delgado, PhD in Neurosciences, lecturer in Cell Biology at the University of Salamanca, science communicator and researcher at the Institute of Neurosciences of Castilla y León (INCYL).

Why does misinformation spread?
In my opinion, there are several factors: lack of knowledge, the abundance of people on social networks who spread disinformation for their own benefit, false beliefs, biases, and that natural attraction we humans have for the magical things and anything that surprises us.

Are there false rumours that could pose a threat to public health or the health of individuals?
Of course, nowadays, and especially amid a pandemic, we are constantly receiving false rumours and false news about what viruses are, how they spread, the effectiveness of vaccines, etc.

How has the pandemic affected the spread of health misinformation in Spain?
I think false rumours have increased in number, above all because the interest in the topic has grown and where there is no news and accurate information, there are false rumours and misinformation. It is very easy to spread a false rumour nowadays thanks to the large number of dissemination channels that are beyond the control of measures to verify the news. This has been exploited by those who find a particular or professional interest to enrich themselves with it. I also believe that now that we have at our disposal, not only the dissemination channels, but also society's interest in this knowledge, the general media should take advantage of these tools to provide truthful and verified information and not serve as a platform to continue disseminating disinformation.

What kind of false rumours have you detected as predominant in Spain?
Among many others, the most common nowadays are those related to the effectiveness of vaccines promoted by anti-vaccine groups, the false rumour that the SARS-CoV-2 virus does not exist or has not been isolated or photographed, promoted by pandemic denialists, the false rumour that there are toxic substances in vaccines, the false rumour that there are effective drugs against COVID-19 derived from bleach, etc. Or a more general one that has nothing to do directly with SARS-CoV-2, that the cure for cancer exists, but that the pharmaceutical companies do not want it to be known. All kinds of conspiracies related to drugs...

What would be your proposal to stop the spread of health misinformation, especially those that affect the elderly?
The first one would be that the general media think very carefully about what kind of news they report. They should always check their information, and, above all, they should be careful with sensationalist headlines. Another proposal would be that truthful and verified information should be the first to appear when people search for health information in traditional search engines. Finally, something that each of us can do is not to share any information if we are not sure if it is truthful or not. Another proposal would be that traditional media, such as TV, showed more advertisements promoting where you can find truthful information and what kind of sources to be more cautious about when informing oneself.

What public health measures do you think should be taken to tackle misinformation?
Both the Ministry of Health and the regional departments of health of each area should be more present in the media, providing accurate information in health centres and hospitals. Above all, one thing that should be done is to prosecute and punish all disinformation profiles and channels that spread disinformation on social networks that threaten public health. In addition, individuals and entities should be prosecuted and punished for breaking the law by acting as health personnel, diagnosing or selling possible remedies, committing labour intrusion and taking economic advantage of the vulnerability and ignorance of others, deceiving them with false hopes of healing, cures or false treatments.

Do fact checking agencies usually use professionals to verify information?
I don't know if they always do, but I have been consulted on several occasions as an expert in neuroscience. From the way they present their arguments and links to sources, I understand that they do.

What role do private messaging networks play in the spread of misinformation?
They are the main source of misinformation.

What role do you think the media play in the spread of health false rumours about health?
They are accomplices of disseminating. I believe, as I have already mentioned, that they should be more professional and take special care in how and what type of information they disseminate so as not to create unnecessary alarms, false hopes and certainly not serve as a platform for the dissemination of misinformation.

Something that each of us can do is not to share any information if we are not sure if it is truthful or not.

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Esther Samper: "The enormous attention the pandemic has received has been noticed in a clear increase in health false rumours"

Esther Samper, BSc in Medicine, Master's degree in Biomedical Biotechnology, PhD in Cardiovascular Tissue Engineering (Regenerative Medicine). She works as health disseminator in different media.

What is the reason why misinformation spread?
There are many reasons, but I think the main one is because we often do not check whether the information we receive through social media is true or not. There is a general lack of critical thinking , and many messages that are false are accepted as true and shared with other people without thinking too much about it.

Are there false rumours that can pose a threat to public health or an individuals' health?
Absolutely, and they can directly or indirectly threaten health. The clearest example we have seen in this pandemic is the false rumours that grossly exaggerate the dangers of the COVID-19 vaccines and lead some people to refuse vaccination. This not only puts the people around them at risk (because they are at greater risk of infection and of transmitting the coronavirus to those around them), but also to themselves. Many deaths could have been prevented

Most of them have fought the false rumours either directly (by debunking the false rumours) or indirectly (by providing good information).

if this irrational fear for vaccines fostered by misinformation could be avoided. Another clear example of direct harm to people caused by misinformation are poisoning or adverse effects caused by the consumption of supposed cures for COVID-19 that were known to be useless (chlorine dioxide, ivermectin, hydroxychloroquine, etc.).

How has the pandemic affected the spread of health misinformation in Spain?
The enormous attention that the pandemic has received has led to a clear increase in health false rumours. This is logical, because for many months we have lived immersed in a serious health crisis that has conditioned, and still continues to condition many aspects of our lives. There was a great need for information. When people follow a topic with a lot of interest, it is to be expected that more misinformation would also arise around it, and that false rumours will spread fast because many people is paying attention to them and are concerned about this issue.

What types of false rumours have you detected as predominant in Spain?
I would classify them into three predominant categories which, moreover, have also come in waves: false rumours about false cures or treatments for COVID-19, false rumours about face masks and false rumours about vaccines.

Which would be your proposal for stopping the spread of health false rumours, especially those that affect the elderly?
Education in critical thinking, but specifically education when it comes to how we should act when we receive information from social media. Whenever we receive a news item or message from someone with health-related content, all we need to do is copy the information into Google to find some information from verification agencies that tell us whether it is true or not. There are also details that can make us suspicious: very strong and striking information, data that we had not heard before from health professionals or in the media, conspiracies...

What kind of public health measures do you think should be implemented to tackle misinformation?
I think the most cost-effective measure is to educate in critical thinking in schools and high schools to prevent misinformation. But, at the present time, I think it is advisable to carry out population surveys to assess the situation. This is something that has been done on many occasions in this pandemic, especially to find out the social perception of vaccines. Once it is known which are there most misinformation issues, then it would be necessary to assess which is the most effective way of combating it, considering both health professionals and social researchers.

Do fact-checking agencies usually use professionals to verify information?
Yes, I know they do this all the time, interviewing specialists in the field.

What role do private messaging networks play in the spread of false rumours?
Social networks are amplifiers of false rumours, especially WhatsApp. They are like fuel it, they make it spread much faster.

What role do conventional media play in the spread of health false rumours?
Most of them have fought the false rumours either directly (by debunking the false rumours) or indirectly (by providing good information). In addition, there has been a lot of collaboration between various media and verification agencies. Unfortunately, however, there are shows/media that have more or less intensively spread false rumours.

Guillermo Martín Melgar: "Networks like Telegram are the modern sect"

Guillermo Martín Melgar, 'Farmaenfurecida' in social networks, is a community pharmacist, writer and communicator.

What is the reason why misinformation is spread?
Regarding the media, it is usually to get clicks, because a false rumour is much more attractive than real news. There are also people who want to gain notoriety and there are also false rumours that are spread for political purposes.

Are there false rumours that may pose a threat to public health or the health of individuals?
Yes, all health-related false rumours can pose a threat to public health in the sense that anyone who believes them and follows them can endanger themselves or others. This is what we are seeing with the issue of face masks and/or vaccines: people are no longer just putting themselves at risk, but they are also telling people to imitate them and assume their risks and behaviours that could put them at risk.

How has the pandemic affected the spread of health misinformation in Spain?
The pandemic has been a trigger, in part, because many people, especially the generation older than ours, our parents, have discovered social networks for the first time, especially during lockdown, because many people were bored. And social media, for a person who knows how to filter information, it's fine, but for a person who believes everything on Facebook, obviously, it's dynamite. So, during the pandemic I would say that the amount of fake news has increased tenfold, and many of them, such as those related to the pandemic, complement each other, so they are more than just fake news, they have become a parallel story, a snowball of fake news, and not just a single piece of fake news.

What types of false rumours have you detected as predominant in Spain?
In Spain, two types of false rumours predominate now: on the one hand false rumours related to politics, which we see every day, and on the other hand, false rumours related to the pandemic and

All health-related false rumours can pose a threat to public health in the sense that anyone who believes them and follows them can endanger themselves or others.

health issues. Honestly, we live in a country used to recommend medicines, as if everyone was a doctor... And now, the pandemic appeared and we all want to know everything, and that is impossible. There is some knowledge that need years and years of study to get. If you don't have it, you mess things up when talking about that issue.

What public health measures do you think should be taken to tackle misinformation?
Public health measures, for the time being, would be to eliminate subsidies or to fine and/or sanction those media that disseminate information that has been proved to be openly false. By this, I mean information that it is scientifically proven to be false. This is not a matter of opinion; everyone can have their own opinion. We are talking about things that are either true or not.

Do fact checking agencies usually use professionals to verify information?
Yes, fact checking agencies usually use highly trained professionals, some of whom, in fact, I know myself. The problem with these people who share false rumours is that they are usually so sectarian in their behaviour that they do not trust these professionals.

What role do private messaging networks play in the spread of false rumours?
With regard to private networks such as Telegram and others, the role is very broad. They form communities that feed off each other and their members interact and become stronger and recruit more people. Really, networks like Telegram, right now, are the modern sects.

What role do you think the media play in spreading health false rumours?
The media, on the one hand, are greatly exaggerating some health and coronavirus-related news in order to gain clicks, which means that people stop trusting the media. And they even create sensationalists headlines which denialists and anti-vaccine people then use as a weapon, even if they don't read the text of the news.

Gemma del Caño: "We, individuals to become firewalls instead of matches"

Gemma del Caño, Farmagemma on social media, pharmacist and science communicator.

Why does misinformation spread?
In my opinion, it could be for various reasons, either ignorance of the subject, because information has not been already check correctness , or because some people have the intention to discredit a person or a subject. I don't rule out that some of them are directly malicious and to make "noise".

Are there false rumours that could pose a threat to public health or the health of individuals?
You only have to observe it, we have seen it with vaccines. But any false information that prevents someone from making a free and informed choice influences society.

How has the pandemic affected the spread of health misinformation in Spain?
Misinformation on health issues has multiplied, but it is also true that health professionals who do give correct information have been given more voice, and I prefer to keep that in mind.

What kind of false rumours have you detected as predominant in Spain?
In recent times, it has been about the vaccine, COVID-19...

What would be your proposal to stop the spread of health false rumours, especially those that affect the elderly?
We need individuals to become firewalls rather than matchsticks. This is a necessary individual responsibility. In the same way, it is essential that the media that reach the elderly population inform themselves correctly, as well as putting ethics as a standard before giving any information.

What public health measures do you think should be taken to tackle misinformation?
There are already fact-checking sites, but we need to reach more people. Lots and lots of easily accessible communication (because the information is there, but it is hard to find) by institutions.

Do fact-checking agencies usually use professionals to verify information?
From what I see and personally verify, yes.

What role do private messaging networks play in the spread of misinformation?
They are the fuel that can ignite a false rumour. Private messaging networks must provide those who explain scientifically trusted information with all possible means of dissemination. They must provide, as well, an exquisite control (something more than an algorithm or nothing at all) to stop false information.

What role do you think the media play in the spread of health misinformation?
They play the same role as the social media, both messaging and social networks, a firm commitment is needed in the fight against disinformation. It is essential to stop the vicious circle of "they consume false rumours and scaremongering - we give them false rumours and scaremongering".

Misinformation on health issues has multiplied, but it is also true that health professionals who do give correct information have been given more voice,

Jankowska-Mihułowicz: "There are false rumours that can threaten public or individual health, such as the anti-vaccine movement-driven reluctance of over 42% of the Polish population to vaccinate against SARS-CoV-2"

Marzena Jankowska-Mihułowicz, assistant professor in the group of research and teaching in the Rzeszow University of Technology at the Faculty of Management in the Department of Enterprise Management

What are the reasons why misinformation is spread?

Based on observations of social life in Poland, it may be assumed that there are many reasons for the spread of deceptions connected with methods of treatment, such as: low trust of part of society for authorities, public undermining of authorities, low level of education of part of the society, lack of ability to search for knowledge of part of society, lack of ability of part of society to apply knowledge in practice (intelligence), numerous negative models on the part of politicians ruling the country, active and intrusive activity of harmful social movements, such as any-vaccine movements, the rapid propagation of false information on the Internet, the very nature of the Internet being overloaded with information, information noise, information smog, both scientific information (rational, well-founded, confirmed by research, giving good results) and non-scientific information (confusing, harmful, chaotic, out of context, silly content).

the pandemic influenced the spread of health misinformation in such a way that a manipulated and uninformed segment of the population began to attack medical staff and medical facilities (...) It is likely that these acts of terror were a way to ease their fear for the illness.

Are there false rumours that can pose a threat to public health or an individuals' health?

Yes. There are false rumours that can threaten public or individual health, such as the anti-vaccine movement-driven reluctance of over 42% of the Polish population to vaccinate against SARS-CoV-2 (data as of 02-01-2022 based on Gospodarka This unwillingness to vaccinate and the passivity of 42% of the Polish population causes difficulties in obtaining herd immunity and increases the probability of developing and transmitting subsequent variants of the SARS-CoV-2 virus. Moreover, unscientific methods of treatment sometimes applied by patients on their own - based on common opinions, rumours, gossip - may lead to the deterioration of health and even death. They result in a false sense of security and in patients visiting medical facilities too late.

How has the pandemic affected the spread of health false rumours in Poland?

In Poland, the pandemic influenced the spread of health misinformation in such a way that a manipulated and uninformed segment of the population began to attack medical staff and medical facilities - threats, heckling, destruction of property and vandalism ensued. The indicated acts of terror probably strengthened the supporters of misinformation in their belief that they were right to act. It is likely that these acts of terror were a way to ease their fear for the illness. The first social dimension of the effects of misinformation is, thus, the targeting of the helpers, which seems unthinkable in a developed civilisation.

Another social dimension of health misinformation is the increasing number of deaths - "The reported number of deaths in Poland in 2020 increased compared to previous years 2016-2019, with 67,000 more deaths in 2020 relative to 2019 [...]. Of the increase in the number of deaths in 2020 relative to the previous year, 43% are deaths reported by Sanitary and Epidemiological Stations with the cause of death

SARS-CoV-2. [Moreover, 27% of the surplus are deaths in other persons diagnosed with SARS-CoV-2 infection in the past]. According to medical reports, a more severe course of SARS-CoV-2 infection and more deaths are observed in unvaccinated people.

What type of false rumours have you detected as predominant in Poland?
I have not conducted research on the predominant types of health misinformation in Poland, but based on data cited in the press and on Internet portals, it is possible to identify misinformation related to: excessive death scares after COVID-19 vaccination due to human experimentation and untested vaccines; exaggeration of post-vaccination health problems - COVID-19 Vaccine Adverse Reactions. It seems that people consider most of the post-vaccination ailments to be the effects of vaccination; apart from the SARS-CoV-2 pandemic, there is financial false rumours - e.g. encouraging the purchase of expensive placebos or the use of scientifically unproven treatments; corruption offences that take place at the interface between politics, business, and criminal groups - lucrative medical contracts, which are carried out with public money, and which never benefit Polish citizens or suffer more losses than benefits.

Which would be your proposal for stopping the spread of health false rumours, especially those who affect the elderly?
In a state governed by the rule of law, fraud   is detected by the relevant services, then the Polish Court examines the case and issues a decision - a judgment to be applied. A similar approach should be taken to tackle health misinformation.
What kind of public health measures should be implemented to tackle misinformation?
In order to combat public health misinformation, measures such as: public education, preventive health care, direct care by family doctors and specialists, state involvement in pro-health campaigns (marketing, information, research programmes, treatment programmes, subsidising programmes, etc.), an interdisciplinary approach to people's health, ensuring their well-being, work life balance - an active attitude and cooperation between legislators, employers and employees - should be implemented.

What role do private messaging networks play in spreading false rumours?
Certainly big. People who form social groups (e.g. anti-vaccines) and communicate mainly via the Internet may have the misleading conviction that "the whole world" supports their views, because they do not receive nor look for information beyond their closed network.

What role do conventional media play in the spread of health false rumours?
The role of the conventional media in disseminating health misinformation is inversely proportional to the intelligence of the editors and journalists of these media. The direction, intensity and speed of the influence of the conventional media on audiences is enormous in Poland.

Jolanta Stec-Rusiecka: "Fraudsters take advantage mainly of seriously ill people, often with incurable diseases"

Jolanta Stec-Rusiecka holds a PhD on economic sciences in the discipline of management sciences (Faculty of Economic Sciences of the EU in Wrocław). Currently, assistant professor in the group of research and teaching staff at the Enterprise Management Department at the Faculty of Management of the Rzeszów University of Technology

What are the reasons why misinformation spread?
I believe that health scams tend to trick older people into buying all kinds of "miracle drugs" that are not effective. Fraudsters take advantage mainly of seriously ill people, often with incurable diseases.

Are there any false rumours that can pose a threat to public health or an individuals' health?
I believe that drugs considered "super effective" in severe disease can be dangerous because people who use them may not benefit from other, more effective treatments and thus lose their ability to recover (even lead to death).

The decision to take various types of medicinal preparations should always be individual (adjusted to the patient's health condition and medications taken).

How has the pandemic affected the spread of health misinformation in Poland?
I believe the pandemic has contributed to the generation of more misinformation. The decision to take various types of medicinal preparations should always be individual (adjusted to the patient's health condition and medications taken). All information should be verified, and medication should be consulted with a person with medical knowledge.

What type of false rumours have you detected as predominant in Poland?
Recently, there are more and more false rumours, including those related to the pandemic, which is often reported and duplicated by various media. There is often information about medicinal preparations intended for the treatment of, for example, serious diseases, but, in reality, they are ineffective.

Which would be your proposal for stopping the spread of health misinformation, especially that who affect the elderly?
Searching for reliable information about medicinal preparations. Reasonable treatment, also considering the side effects of the preparations. Enquiring about the use of drugs with a person with medical knowledge.

What kind of public health measures should be implemented to tackle misinformation?
Providing reliable information and disease prevention. It is very important to research and verify the information. Education and the use of proven and effective preparations also play an important role.

Do people usually visit fact-checking agencies to verify information?
I think that few people verify information obtained from different media, which is a big mistake. Nowadays, there is a lot of "fake news" appearing in the media that mislead the audience in order to achieve certain benefits (e.g. financial).

What role do private messaging networks play in spreading misinformation?
Private communication networks play a key role in spreading all kinds of false information, including health information, so everyone should be inquisitive and try to verify the information received.

What role do conventional media play in the spread of health misinformation?
Information provided by conventional media is usually checked, although in my opinion some conventional media in Poland also give a lot of false information.

Evangelos Lamprou "Fake news, false rumours and rumours had a great effect on the vaccination rate"

Evangelos Lamprou, PhD Candidate at the Department of Digital Media and Communication at the Ionian University. His areas of research cover crowdsourcing on media websites and applications of communication and journalism content.

What are the reasons why misinformation is spread?

Misinformation is spread mostly through media, and rumors. Its spread happens mostly through social media, blogs and websites which have little or no credibility. The main reason this happens in Greece is that lots of citizens believe that many traditional media (TV stations, newspapers, etc) and even health scientists are corrupted and in favour of the Greek government. This belief derived mostly from the fact that traditional media in Greece, mostly TV stations, lost their credibility during the austerity era since they were presenting the austerity measures imposed as positive and inevitable for the country and citizens. This fact, in combination with the low level of media literacy of many citizens, especially the elderly, leads them to "seek the truth" in low quality websites and blogs that promote false rumours, fake news, conspiracy theories, and even question science and medicine.

Are there false rumours that can pose a threat to public health or an individuals' health?

Definitely. There are false rumours that present COVID-19 vaccination as harmful and potentially dangerous, empowering the belief that citizens should not be vaccinated. Furthermore, conspiracy theories such as the one stating that "5G networks in combination with mRNA vaccines track citizens" affect a significant number of people who believe that vaccination is a part of a great conspiracy imposed by conspiring centres. These false rumours and conspiracy theories derive from low-quality news outlets some of them are quite popular, (such as makeleio.gr) social media, and blogs.

On the other hand, traditional media received great amounts of money from the government in order to carry out a vaccination campaign (the notorious Petsas list). However, this turned out to be a drawback because many central media not only promoted the vaccination campaign but also became fanatic supporters of the Greek government. This led a significant number of citizens to believe that even vaccination campaign is propaganda imposed by the Greek government. Therefore, they searched for information in low-quality news outlets, as aforementioned, putting themselves in danger.

How has the pandemic affected the spread of health misinformation in Greece?

The pandemic in Greece brought turbulence. There is no doubt that health false misinformation has been spread, mostly those concerning vaccination. The vaccination campaign carried out mostly from traditional media didn't have the planned effect on all citizens due to the belief that most of them are corrupted in favour of the government. Even though the messages delivered were correct, lots of citizens were not convinced due to the vast amount of money spent by the government on these information campaigns (the notorious Petsas list) while the public health system didn't receive any or little reinforcement. Citizens questioned vaccination and its importance, and as a result, the vaccination rate in Greece was not very fast. Some people even thought that not participating in the vaccination procedure is a form of resistance against the government.

Do you think the vaccination rate has been influenced by fake news?

Definitely. Fake news, false rumours and any kind of misinformation had a great effect on the vaccination rate. As I have already explained, traditional media received great amounts of money from the government while the public health system did not receive any or little reinforcement. As a result, many citizens who do not trust traditional media fell victims of misinformation that vaccination is potentially harmful for their health and potentially dangerous.

What type of false rumours have you detected as predominant in Greece?

Currently, mostly those false rumours concern the COVID-19 pandemic. Claims and statements that vaccination is dangerous, and that COVID-19 are just flu and deaths caused by vaccination. These claims come mostly from low-quality internet outlets or social media, but also disinformation deriving from

traditional media in favour of the government which presents the situation as ideal and the management of the COVID-19 crisis as successful while Greece has one of the highest death rates per million in Europe, mainly due to the obsolete health care system and the absence of a sufficient number of intensive care units.

Which would be your proposal for stopping the spread of health false misinformation, especially those who affect the elderly?

I think that, in many cases, the elderly think they are abandoned by the state. The lack of quality health care in combination with the severe inflation and the immense rises of electricity and basic goods prices make them think that the state does not care about them. This makes them vulnerable to fake news, conspiracy theories and false rumours. They just don't believe the health care messages. My proposal is to provide them with active information from health care specialists door to door and a vaccination strategy which is based on convincing them face to face and not only through media campaigns.

The lack of quality health care in combination with the severe inflation and the immense rises of electricity and basic goods prices make them think that the state does not care about them. This makes them vulnerable to fake news, conspiracy theories and false rumours. They just don't believe the health care messages

What kind of public health measures should be implemented to tackle misinformation?

As a mentioned before, an active information campaign from health care specialist's door to door and a vaccination strategy which is based on convincing the elderly face to face and not only through media campaigns could give them the message that the state is there for them and not only through media campaigns. Also, a real reinforcement of the public health system could strengthen this message. State measures such as fines and punishment implemented by the Greek government to elderly people who choose not to vaccinate themselves cause hostility and negative reactions.

Do people usually visit fact-checking agencies to verify information?

Unfortunately, they do to a very low rate. Fact-checking agencies are something very new to their culture and most of them (mostly the elderly) ignore their existence. This is a matter highly dependent on the low rate of media literacy. People who are not fond of or do not trust traditional media and do not trust the Greek state are very vulnerable to fake news, false rumours, and misinformation because they get informed from low quality outlets which claim to be anti-systemic (such as makeleio.gr). Media literacy in my opinion is one of the most significant keys and weapons in the fight against misinformation and should be included in education.

What role do private messaging networks play in spreading false rumours?

All low-quality media outlets which spread fake news and false rumours mostly depend on peer-to-peer sharing in order to spread their content. This gives an anti-systemic feeling to all those citizens who are not fond of traditional media and do not trust the Greek state. Conspiracy theories and false rumours spread this way from people who believe that they found the "hidden truth" and all those facts the "corrupted" state-funded systemic traditional media hide from them.

Pania Karnani: "Communication experts have not been consulted nor sufficiently involved but their knowledge is necessary to stop the spread of health false rumours"

Pania Karnaki, Psychologist with a specialization in health promotion. She is the Head of the Department of European and International Research Projects in Prolepsis. She has a BsC in Psychology from Degree College and a Master's degree in Health Science (Health Promotion) from Edith Cowan University, Western Australia.

How has the pandemic affected the spread of health misinformation Greece?
Like in all other countries, false news is spreading like fire, over the social media mainly, but also through radio and television, but mostly radio. Certain journalists who are anti vaxxers or they don't believe in the seriousness of the pandemic are contributing to the spread of fake news.

Why do you think misinformation spreads so fast?
Mainly because the pandemic is something new and most of the people don't understand it. As a society we don't realize how serious the situation is; some don't believe and don't understand it. So, when somebody has an easy explanation for what is happening, people take it in. They want to believe it because fake news usually offer a very clear explanation of what is going on and people like clear and not complicated explanations.

Do you think the vaccination rate is being influenced by fake news?
Yes, certainly. In Greece specially the church is playing a very big role in the low vaccination rates in certain age groups such in people over 60. There's a significant percentage of people over 60 who are still not vaccinated, and the church has played an important role.

In what sense?
Well, of course the official church is pro vaccination, but there are many priests and monasteries that are against vaccination and they are often influencing their parishioners. They persuade them that vaccination

I believe that the most important thing that needs to be done is communication. Learning how to access the nonbelievers and through proper and targeted and tailor-made communication to try to inform people in a legitimate way about what is going on.

is something that is not going to help them, they also repeat ideas like all these fake news about the microchips and experiments...

What kind of misinformation have you detected as predominant in Greece?
Predominantly false rumours that affirm that COVID-19 it's a new disease and there's no way that the vaccine could have been developed so quickly, and hence it's at an experimental stage and we are all part of and of that experiment. Recently, there is also some misinformation that affirm that vaccine contains cells from aborted fetuses...

What kind of public health measures do you think should be implemented to a stop or at least to limit the spread of health misinformation?
I believe that the most important thing that needs to be done is communication. Learning how to access the nonbelievers and through proper and targeted and tailor-made communication to try to inform people in a legitimate way about what is going on. You need to target people, especially over 60, with the correct arguments. Tackling fake news, it's very complicated, it's not easy, but I believe that no communication analysis has taken place and communication experts have not been consulted; they have not been involved at all.

Do you think media are playing their role correctly?
No, they're not playing their role correctly. Official media are of course, all pro vaccination. You don't see a main TV or radio station being against vaccination. However, there are some examples. There is a very popular journalist who had his own radio station for many years and also his own TV statio n. He was very popular and had several programs on prime time and he was against vaccination. He died from COVID-19 not even a month ago. And then his followers said that his death was intentional, that they killed him in order to make their case stronger. So there are people that still don't believe that this man died.

An official media, though, could play a stronger role, but they don't. They just stick to what, the government says, but they don't take their own initiatives to create social messages to promote vaccination. So, I could say that they should play a better role.

Also, the problem in Greece is that a lot of radio and TV stations and media are pro the government. So, it's strange how politics have been involved with the pandemic. Thus, you hear people saying, "this radio station is pro-government, so I'm not believing anything they say".

Have you seen a big change in the way health misinformation spreads since the outbreak of the pandemic?

Fake news, misinformation and conspiracy theories have always existed. But, yes, it has been amazing to see the number of people who now believe in fake news and in these conspiracy theories that are now increasing. It is specially concerning to see that people close to the orthodox church being against vaccines.... And it's not very nice to see this because, well, I mean the religion and churches are something so sacred, but in these circumstances, they are creating problems.

Chapter 3. A practical guide for detecting health false rumours

Detecting fake news may be not so easy on certain areas or topics for people non familiarized with it. Even though we all should be cautious when reading health information, there are some tips that can help us to detect misleading information. On this chapter we will understand first what is health disinformation, which are the most frequent topics, how we can spot misinformation and how can we contribute to stop false rumors on health and prevent its consequences.

3.1 Introduction: What is health misinformation

When we speak of health misinformation, we refer to dubious, misleading, or false information in nature. Although it can be called by different names depending on its characteristics, throughout this guide we will refer to it as false rumours.

Rumours, manipulated content, and fake news have always existed in all areas of life: from political or economic rumours to false rumours about people's private lives. When there is an excess of information, as it happens nowadays, it is very difficult to distinguish what is reliable from what is not. Health is one of the topics where there are more false rumours, as the natural fear of losing wellbeing make people become vulnerable and prone to believing them.

There are many ways in which false rumours could be classified. Within this guide we will speak about three types of categories to specify the different types of false rumours:

1. Satires or parodies: This can appear in form of images or funny news circulating on the internet. Although they only have the intention of making people laugh, those satires can generate confusion and turn into false rumours.

2. Decontextualised content: This is especially frequent with images that show a real situation but they don't correspond to the text or explanation they go with. For example, when a picture is used to illustrate a fake information. Images give the sense of credibility even if they are showing an event happened in another country or at another time. Information is basically taken out of context any image, phrase, or similar that contains true or false information.

3. Misleading content: A content that has been altered on purpose. This is also frequently done with images that are post-edited. This is also quite frequent with videos or pictures but even with official communications from governments as anyone can copy and use their logos and send information as if it was real.

Health false rumours are sent through many ways. From a conversation with a with a family member or friend who tells us some "natural remedy" or "miracle solution", or through websites of dubious quality, the media or, in recent years, through social networks. Since the outbreak of the COVID-19 pandemic, health false rumours have increased on social networks. Facebook, WhatsApp, and Telegram among others are platforms where anyone can publish and share almost any kind of content. For this reason, they can be a source of confusion when we cannot differentiate whether the information, they disseminate is true or not.

Most of the times, we receive false rumours through people in which we trust. In fact, it is precisely the trust we have in them what leads us to believe fake information as we know they do not mean any harm. Even if this person has no intention of deceiving anyone, the information they send may be fake without us even knowing it.

Key messages

" False rumours are presented in different ways and in many cases, information that was not intended to be false, can end up being fake.

" The trust we place in the person who sends the message is often a key point for us to believe the information.

" Fake information can reach us through different channels, but social networks have accelerated its distribution. It is necessary to be an active subject when consuming information.

Most frequent topics on health false rumours and its risks for people. Health false rumours cover all topics. However, there are some areas in which it is more common to find them, maybe because they generate more social interest, they cause uncertainty or fear or maybe because they promise very effective solutions that we would like to believe. These areas are food, cancer, alternative therapies, vaccines, and, in the last years, COVID-19.

In general, false rumours related to food tend to attribute almost miraculous properties to certain products. It is advisable to distrust any information that assures that a product can prevent or cure any illness or condition. On the other hand, some information tends to say that some foods pose a serious risk on health or are the unique cause of several illnesses. If there is no medical prescription, there is no reason to restrict the consumption of specific foods. In the following chapter you can find the most frequent list of false rumours about nutrition.

False rumours related to COVID-19 have also spread lately. The fear to the unknown and the uncertainty of the pandemic has proliferated false rumours that promote natural remedies, miraculous treatments and preventive methods. Not only are these fake treatments useless, but they can create a false sense of security which can lead to start treating the disease too late. Apart from the obvious risk for health of following treatments without evidence, this "alternative" messages can also undermine the trust on health authorities. During pandemic, it is advisable to follow the recommendations of official health bodies, because if health recommendations are not followed, it is more complicated to control the pandemic.

Another major concern for the population is the fear of being diagnosed with **cancer**. The fear of getting cancer and the uncertainty of facing a cancer diagnosis, may lead to the search for miraculous solutions. That is why in recent years some dangerous movements have emerged that promise "another way" of treating cancer that has no scientific evidence. On the other hand, some health false rumours promise to have the secret recipe for preventing cancer, usually eating or drinking certain food or miraculous products, or avoiding others. However, cancer is not only one disease, but many diseases characterised by the development of abnormal cells, which divide, grow and spread uncontrollably in any part of the body. All cancers, like many other diseases, are a complex disease that does not have a single cause. Although it is true that certain eating habits can contribute to their prevention, no food can be considered "anti-cancer".

Other widespread rumours are those about a**ncient medicine or alternative therapies**. In the case of alternative therapies, they are not always supported by evidence, and they can sometimes cause significant health damage. It is important to always trust health professionals and treatments that have been proven effective through scientific studies.

Another common topic in health misinformation are **vaccines**. It has been proved that vaccines are very effective and have great benefits for public health. However, rumours about vaccines are frequent. There is still a false belief that vaccines create autism or weaken the immune system, even though numerous studies have denied this.

Risks of following health false rumours

The main risk of following advice not based on scientific evidence is that this can lead to make bad decisions. For this reason, o**ne should never abandon treatments prescribed by health professionals** without first consulting them. It is especially important to be careful with false rumours that propose alternatives to conventional medicine claiming that these are more natural products, without side effects and traditional, but without any scientific evidence to support their usefulness.

In some cases, **pseudotherapies** treatments not only fail to cure, but can make symptoms worse because, on the one hand, they delay getting effective treatment and, on the other hand they can worsen the prospects of the disease. There are even some pseudo-therapies that aim to cure diseases that are not even diseases.

Some false rumours cause an exaggerated fear to certain medical conditions or to situations of uncertainty, caused by false alarms in information.

They can even **aggravate epidemics**, since some false rumours invite people to stop following health and hygiene recommendations or encourage them to follow treatments that will have no positive effect on their health.

Fake rumours can also lead to discrediting institutions or individuals based on false accusations. This undermines trust in the institutions. They can also create confusion among patients suffering from a disease, so it only adds uncertainty and uneasiness to their situation.

❝ It is important not to rely on information we receive about health issues whose origin or reliability we do not know.

❝ Following false rumours or encouraging others to follow them can have serious consequences for your health.

❝ Even if the false rumours are not malicious, they can cause harm to those who follow them.

3.2 How to spot health false rumours

Recognising health false rumours is not always easy. However, we can learn to spot them by paying attention to their most frequent features. Those clues will help us to be aware of health false rumours. false rumours

One of the reasons why false rumours spread quickly is because of their ability to appeal to emotions like anger, fear, frustration or hope. When those emotions arise, the interest for the information increases and on many occasions without thinking whether it is true or not.

Health false rumours usually relay on two emotions: the fear to the illness and death, and the hope of finding a cure. When we feel fear, we are more vulnerable, so it is easy for us to believe information that is not true. At the same time, the hope of finding an easy solution to a complex problem when one lives in a situation of uncertainty or have an uncertain diagnosis makes it easier to believe any information.

One of the reasons why false rumours spread quickly is because of their ability to appeal to emotions like anger, fear, frustration or hope.

For example, **it is very common for food false rumours** to appeal to the hope of preventing or curing an illness. Although it is true that a balanced diet can improve the prognosis of a disease, or reduce the chances of getting it, it is not true that food can prevent or cure any disease or illness.

In the same way, the fear of contracting a serious disease makes us want to believe that there is food capable of preventing the appearance of complex diseases. Avoiding food is not necessary if there is no medical prescription.

Regarding **vaccines**, there are also many of false rumours circulating about them. For example, the hope that tuberculosis vaccine was effective against COVID-19 promoted the spread of this false rumour at the beginning of the pandemic. Or the fear that one of our beloved ones, especially if they are children, develop a neurological disorder or an illness has also spread the false rumour that vaccinating children made their immune system weaken or even develop autism. In particular, the false rumour that assures that autism is caused by vaccines has largely been debunked by several research studies. However, there are still people that, for the fear of causing a neurological condition to their children, refuse vaccination.

The hope of having an effective remedy against all kinds of diseases leads us to believe news about a product that can easily cure all or some diseases. However, **there are no scientific studies that support either this or most of the therapies that are advertised as "alternative"**.

The same happens with **cancer**, the most complex group of diseases that generate false rumours due to the fear it causes. There are no natural remedies to cure or prevent cancer, but the hope to find an easy way to prevent it promotes the dissemination of this false rumours.

Finally, the uncertainty that the **coronavirus pandemic** has aroused worldwide has led to false rumours about the origins of the virus. Those false rumours, although they seem harmless, undermine the trust of public institutions and health authorities, leading to people not following public preventive measures, such as wearing masks, and putting themselves on risk. Some false rumours related to coronavirus pandemic also promote possible cures for the disease, appealing to the hope of being able to change this situation. However, this can give a false feeling of security and can also make people to follow dangerous practices.

Apart from the emotions that false rumours arise, it is also important to look at the possible motivations behind health false rumours. Sometimes false rumours try to sell "miracle" products, which are products that can supposedly cure an illness quickly. Sometimes, they try to give helpful information, although this is dangerous if they do not have the adequate training background. Sometimes they can also harm a third party by undermining their honour. We must also be aware that there is false information intended to create social alarm or combat a particular ideology.

Common bias and basics of mistrust

• <u>Anyone can believe fake news</u>. Everyone has believed something that was false at some point in their lives. So, the first step is to be aware that this can happen to us. Most people tend to think that they are not conditioned by their beliefs, desires or fears but others are. This is what is known as **blind spot bias**. It may be dangerous because it makes us not to be aware of our own limitations.

Another bias that makes us believe the information we receive is the so-called **confirmation bias**. There is a proven tendency to believe news that confirms precisely what we already believed before reading the news. That is, even if there are data to confirm two radically different theories, we will always give greater relevance to the data that confirm what we believe.

Another bias that leads us to believe false information is what is known as '**homophilia bias**': it has been observed that people tend to interact with those who think like us. This bias is aggravated on social networks because. by the way they work, we usually only receive information - whether it is true or not - of a certain kind, which leads us to think that "everyone says the same and thinks the same way". When this happens, we should review our own mind and make sure that the information we receive is correct and comes from a variety of proven sources.

As explained before, trust is the basis on which many false rumours are spread. We tend to give more credibility to information that we receive through a relative, acquaintance or friend. However, personal trust in someone does not imply that that person knows the subject in depth. We should make sure that the person who is sending or explaining information really understands what is explaining or, at least, they got the information from a credible source.

1. False rumours. <u>They promise impossible or quick cures</u>: When you receive information, doubt any message that promises an immediate or easy solution to a complex illness.

2. They make recommendations based on a single study: Doubt about news based on a single study claiming to have found a cure or treatment for a disease. For any product to be considered as having sufficient evidence, there must be a variety of scientific studies that prove its effectiveness.

3. Indicates that they are based on <u>studies in current development</u>: Do not trust scientific studies in current development, as no valid conclusions can yet be drawn from them.

4. Are <u>based on testimonials</u>: Just because a person says "it worked for me" does not mean it is a valid treatment. A controlled study is needed to prove that it works. Just because it "works" for a person does not mean that it will work for you.

5. They acclaim the <u>power of "natural products"</u> over that of artificial products: Fake news usually claim that something is healthy because it is 'natural' or that certain 'artificial' products are harmful. However, natural products are not healthier than artificial products. Be careful and double check messages that claim that a remedy is better because it is "natural".

6. They emphasize the <u>power of big pharma and other hidden interests</u>: Also, many false messages emphasize the existence of powers with hidden interests that only seek to harm people. Pharmaceuticals and other companies obviously seek to make a profit, but this does not mean that their work is not audited and controlled by national and international health institutions. Messages that include claims such as "you won't see this in the media" or "the pharmaceuticals are hiding information from you" are often not supported by evidence but by fear and mistrust.

7. They use <u>flashy jargon with no real meaning</u>: Finally, doubt about messages that use grandiloquent words that seem scientific but have no real meaning. These are marketing techniques intended to seem scientific.

How to check the veracity of the information

Nowadays, we receive information through a great variety of channels. From an informal conversation with friends and relatives to messages on mobile devices. Every piece of information may be a false rumour. We can pay attention to several clues in order to make sure that the source is reliable.

· The basics for verifying a website

Creating and publishing a website is not very difficult. Anyone can do it, so, when we read information on a website, we should pay attention to its features to avoid reading bad quality information without reliable sources.

First, if a page is dominated by alarmist headlines (such as "you won't believe what happened to a person after taking ibuprofen") you are probably on a website that is only looking to get many readers with poor quality content: the more readers they receive, the more money they win through advertising. Those websites don't pay attention to the quality of the content, so they write sensationalists headline in order to capture attention and get more visits, even if the information is not 100% true.

Furthermore, if you read a text that does not explicitly cite the sources, or they are difficult to identify, you should mistrust. Journalists and scientist always must mention where the information comes from so, if this does not appear, it reveals poor quality content. Also, if there are errors in the writing, if they give not relevant details about the information they provide, if the information they provide cannot be contrasted or if the authors are unknown, it is better not to trust the veracity of their contents. It is also important to look at the date of publication, as we could be reading information that has expired or later found not to be true

· Verifying messages of private messaging applications

In the case of WhatsApp, Telegram or Messenger messages, it is likely that messages are false if they alert about a supposedly deadly danger. This idea plays with the natural fear to death. Messages than appeal to the authority of a professional or a studio that does not exist (or at least are difficult to find) are also quite likely to be fake. Be also especially aware if they contain syntax errors and requests dissemination among your contacts.

False rumours and misinformation can have the form of a text, but they can also be images or videos. There are some entities that dedicate their efforts to verify information. Salud Sin Bulos, Maldita, EFE Verifica or AFP Factual are some of the entities that dedicated exclusively to fighting health false rumours. We can ask them via WhatsApp or social media to check or consult their databases and see if the information we need to verify has been analysed already.

Moreover, the most frequent false rumours are included in the NoRumourHealth application.

Finally, it is important to highlight that, although through these modules we will guide you to learn how to detect fake news, you should always ask your healthcare professionals about the treatments you should follow. Never start or stop treatments on your own without consulting your healthcare professional.

Key messages

" Never start or stop treatments on your own without consulting your healthcare professional. There are verifying agencies that check the veracity of what circulates on the Internet and, when in doubt, we can consult them .
Salud sin Bulos
Maldita.es
EFE Verifica
NoRumourHealth APP
Salud con Lupa
AFP Factuel
Poynter.org

3.3 How to combat fake news on health

Governments, media, technological platforms can contribute in different ways to create an Internet where false rumours and misinformation are only residual. But, in addition to this, each of us as citizens can also contribute to stopping the spread of false rumours and preventing them from having consequences for the people around us.

The overload of messages that are sent daily makes very difficult to distinguish if they are true or not. It is advisable to not send neither forward dubious messages with potential fake-information. One should always check the veracity first. If we cannot check it and we are not 100% sure that it is true... it is always better not to send it.

One of the main questions in order to assess the likelihood of the information to be truth is **what the source of the information is and who or what entity is responsible for it**. If it is not an institution or person with a relevant background in the subject or is not easy to identify who is behind it, doubt about the veracity of what you have received and do not share it.

It is also important to assess whether the person or institution promoting a particular product has interests that may drive them to disseminate these alternatives. Similarly, sometimes fake news seeks to harm an ideology or a particular person. Therefore, if you suspect that there is a conflict of interest... it is better not to share.

When you receive information, it is essential to verify what you read: you can consult specialised media, verification websites, etc. In short, try to check if the information is true. If there are statements such as "you won't see this in the media" or "nobody will tell you this" are included, doubt about their veracity. Remember, if you have doubts, you shouldn't share the information.

Key messages

❝ Always ask your healthcare professional about the information related to health that you receive.

❝ Never stop or change treatments without consulting medical professionals. You should not suggest other people to do so. So, if you have doubts, consult a healthcare professional, and do not share any information that may confuse others.

❝ Entities in charge of verifying false rumours allow you to share this verified information through social media. If we share this verified information, we can contribute to reduce health misinformation.

❝ Agencies like Salud sin Bulos or AFP Factual, among others, can check the veracity of the information, anyone can send them information and the agencies will verify its content for them.

How to report missinformation

Social media platforms usually offer the users the option of reporting misinformation through the platform itself. In this way, platforms can be aware and limit somehow the spread of misleading information.

On most occasions, people share fake news because they think the information is true. For this reason, it is important to talk to the person who has shared the information. If you want to explain someone that the information, they are sharing is false, try to understand their point of view and show empathy. Explaining that uncertainty and fear make us believe false rumours can help them to understand why false rumours are fake. You can also appeal to their critical thinking, invite them to question the information they share. And, above all, do not ridicule them.

Key messages

❝ Double check any information before forwarding it and make sure it is verified information.

❝ In case of doubt, ask healthcare professionals.

❝ Reporting fake news will contribute to stop this misinformation pandemic.

Chapter 4. Common myths on health debunked

The application developed by the NoRumourHealth consortium collects some of the most common health myths and hoaxes. Some of them have been passed down through the ages and are considered "traditional home remedies". Others have arisen in response to complex health conditions. In this chapter we list some of the most common myths and hoaxes, organised by topics[1].

4.1 Common myths about food

Food for preventing diseases or treating illneses

Can people with diabetes eat fruit?
People with diabetes can and should eat at least three portions of fruit a day in the context of a healthy diet adapted to their disease. Link

Should I take magnesium chloride supplements?
Magnesium chloride supplements are not necessary under normal conditions, since our organism is prepared to cover the necessary requirements of magnesium through a healthy diet without the need to consume any type of supplement. Link

Does beer prevent osteoporosis?
Neither beer nor any type of alcoholic drink prevents osteoporosis. Furthermore, the scientific evidence available so far, concludes that the intake of one or two alcoholic beverages per day is sufficient to cause a reduction in bone mass. Link

Can onions cure colds and flu?
Onions do not have antiviral or antibiotic effects, so they cannot cure any disease. Furthermore, no food alone has properties to prevent and/or cure any disease. Link

Are there foods that prevent diseases?
Although diet is a key factor in the development of many diseases, there are no miracle foods. Link

Are sports drinks suitable for treating acute diarrhoea?
Isotonic or sports drinks do not contain the right proportion of minerals for rehydration after diarrhoea. During exercise, the fluid eliminated by sweating has significant amounts of sodium while the fluid eliminated by vomiting, diarrhea or gastroenteritis, eliminates much more potassium and less sodium. Link

Does drinking raw potato juice cure back pain?
The idea that potato juice cures back pain stems from visceral osteopathic reasoning. However, scientific research has not found any kind of efficacy in this type of treatment.

Do cloves and cinnamon cure diabetes?
There is no magic or home remedy that can control or cure diabetes. Link

Can an alkaline diet help you fight the infection of COVID-19 and Cancer?
A healthy, balanced diet helps prevent certain diseases. The alkaline diet, although is based on fruits, vegetables and berries, can lead to certain nutritional deficiencies. Moreover, this diet has no scientific basis. Link

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1. The information in this chapter is based on the scientific evidence available as of December 2021.

Food and cancer

Can food prevent cancer?
Cancer is actually a group of illnesses in which a lot of factors intervene. A single product cannot cure it or prevent it, even if it is a very healthy product. A healthy diet is recommended to prevent some types of cancer and cope with the treatment. Link

Will sugar consumption make your cancer worse?
There is not any scientific study that indicates that sugar consumption makes cancer worse, nor that consuming less sugar cures cancer. However, consuming sugar in excess can cause obesity and obesity is an illness that has been related to the development of different types of cancer. Link

Does eating microwaved foods cause cancer?

Although heating plastic can leak out carcinogens, the amount of these subtances that leaks out is below the security levels that can cause harm. Moreover, the most toxic products have been banned. Link

Do genetically modified foods cause cancer?
Genetically modified foods do not cause cancer. Any type of food (genetically modified or not) contains its own DNA. We digest it easily using our metabolism. Several studies have proved that genetically modified foods do not contain major differences that can cause health risks compared to non genetically modified foods. Link
.
Should I change my diet to cure my cancer?
Your doctor is the one that needs to tell you if you should change your diet. Usually it is not necessary. However, it is always advisable to follow a balanced and healthy diet. Link

Does drinking beer increase the risk of breast cancer and large intestine cancer?
Drinking one beer each day increases the risk of breast cancer and large intestine cancer by 6%

and the percentage increases if you have more than one beer per day. Link

Does shark cartilage prevent cancer?
There is no scientific evidence to support that shark cartilage is an effective treatment for cancer. Moreover, scientists have found sharks with tumours. Link

Food and wellbeing

Is sugar healthy?
It depends, not all sugars are the same. There are two types of sugars: free sugars, those added in the manufacturing process, and intrinsic sugars, naturally present in fruits and vegetables. It is recommended to reduce the consumption of free sugars but not that of sugars in fruits and vegetables. Link

Are detox diets recommended?
There is no scientific evidence that detox diets can help the body to eliminate toxic substances. A healthy organism is capable of constantly eliminating all waste and unnecessary substances from our body on a daily basis. In addition, this type of diet can cause energy and nutritional deficiencies. Link

Can you eat raw fish during pregnancy?
Eating raw fish during pregnancy carries risks because of the possible presence of parasites and pathogenic microorganisms. Link

Is sugar in fruit good for you?
Sugars naturally present in fruits and vegetables are healthy and have no harmful effects on health, so they are healthy. Link

Can an exclusively breastfed baby have milk allergies?
Breastfed babies can have allergies to the cow's milk protein. Link

Does coffee cause hypertension?
Coffee does not cause hypertension. Caffeine produces an increase in blood pressure and

heart rate only slightly and for a transitional period, i.e. coffee consumption cannot cause a person to become hypertensive. However, if a person sufferes from high blood preasure, it is advisible to reduce coffee intake. Link

Are fruit juices as healthy as whole fruits?
Fruit juices are not as healthy as a piece of whole fruit. Whole fruit contains more fibre and other nutrients, therefore it is more filling while containing the same amount of kilocalories. Link

Does parsley cleanse the kidney?
No food, no matter how healthy it is, has properties to prevent or cure any disease on its own. Parsley has diuretic properties widely known in the phytotherapy world, but these are linked to taking certain amounts. Link

Is there a fat-burning soup that allows you to lose up to 8 kilos in a week?
There is no scientific evidence to support the effectiveness of this diet based on a so-called "fat-burning" soup and it would not generally be considered appropriate for moderate long-term weight loss. There are many benefits of losing weight if it is done at a safe pace and gradually through a healthy diet and physical exercise. Link

Do superfoods exist?
There is no clear definition of what a "superfood" is. It is usually assigned to products whose virtues are highlighted. However, no food, no matter how healthy, has the properties to be considered a superfood. Link

Are there superfoods like spirulina, matcha tea or hemp seeds?
Superfoods do not exist No food is essential and, of course, no food has 'extra' properties to the usual ones, no matter how millennial they are or from which countries with exotic names come.

Does drinking lemon juice on an empty stomach improve health?
Lemon juice is a good refreshment that could replace usual sodas which contain a lot of sugars. Water and lemon are two healthy foods within the framework of a varied and balanced diet, but no meal should be replaced by this drink. Its benefits come from its ingestion between meals or as a side dish to other foods. Link

Does eating food at night disturb children?
Sugar does not influence children's behavior. The supposed relationship between sugar intake and childhood hyperactivity is a myth that dates back to the 1970s, when a doctor suggested eliminating some compounds as a treatment for hyperactivity. Link

Is lactose-free milk less fattening?
Lactose is not fattening. The final sugar content in lactose-free milk is the same as in normal milk and has the same nutritional value.

Is it healthy to eat canned vegetables or frozen vegetables?
Yes. Eating fruits, vegetables and legumes, is an essential part of a good diet. You can eat them in all their shapes, sizes and methods of preservation. Link

Are sweeteners harmful to health?
All additives are safe, sweeteners too. But just because they're safe doesn't mean they're necessary. The only caution we should take is not to exceed the dose of polyols (xylitol, maltitol, sorbitol) because they can cause diarrhea. Link

Can watermelon and melon cause indigestion at night?
False, they are great foods to take at any time. Always keep in mind that the main component in both is water so if you drink a lot of these at dinner, you may have to get up and go to the bathroom in the middle of the night.

Should we eat meat?
Not if you don't want to. Many other factors, ethical, economic or environmental factors, play a role into meat consumption. Avoiding it is a perfectly individual choice but there is

no argument for completely eliminating meat consumption in cardiovascular diseases and colorectal cancer risk. Link

Don't drink milk because adults are intolerant
This is a false myth that encourages the avoidance of lactose-containing milk. However, plant-based milks may not always be healthier than cow's milk as, for example, they may contain added sugars. Link

Does fruit make you fat depending on when you eat it?
Fruits and vegetables are low-calorie foods regardless of when they are eaten. Therefore, they should have a predominant place in a balanced diet. Their consumption will replace others that have much more energy and may have a more direct relationship with body weight gain. Link

Is unpasteurized milk healthy?
Consuming unprocessed milk can cause listeriosis, typhoid fever, tuberculosis, diphtheria and brucellosis. Pasteurization is a process by which the presence of microorganisms and pathogenic agents in raw milk are considerably eliminated. Link

Is a gluten-free diet healthier?
A gluten-free diet can lead to a deficit of micronutrients and fibre and the consumption of more sugars. In addition, there is no scientific evidence about its possible benefits. This type of diet is only recommended for people with coeliac disease and intolerance to gluten. Link

Common myths about alcohol consumption and smoking

Does alcohol after a meal really help digestion?
There is little scientific evidence to show that the consumption of liquor, after a meal, can help digestion.However, there is a lot of evidence that confirms the negative effects of excessive alcohol consumption on digestion and also on many areas of someone's health and well-being. Link

Is moderate alcohol consumption good for your health?
Many studies have repeatedly proven that excessive alcohol consumption is the sole or main cause of multiple illnesses and will also interfere with recovery from such illnesses.Link

Can you drive after having two beers?
Driving after drinking one and a half beers in the case of women, or two beers in the case of men, increases the risk of suffering or causing a traffic accident by two and a half. Link

Does smoking a single cigarette a day reduce the risks associated with smoking?

Smoking little or very little produces the same risks of suffering from coronary heart disease, cardiovascular diseases and myocardial infarction as smoking a lot. Quitting smoking is essential to reduce the risk of suffering from these diseases. Reducing the amount of cigarettes consumed per day would not be relevant. Link

Is cannabis good for dementia?
No. In fact, scientific studies have shown that cannabis causes cognitive damage (learning, immediate memory, planning ability, among others). Moreover, if consumption is regular, the damage is not immediately reversed but can take weeks or months. Link

Can alcohol cause dementia?
Alcoholism or alcohol addiction is the biggest risk factor for the onset of all types of dementia, especially those of early onset. This risk could be eliminated, if a person reduces their alcohol consumption below 100 grams of alcohol per week, and especially if they do not consume

more than 3-4 alcohol consumptions in a short time. Link

Common myths about medical treatments

Are there any remedies to cure deafness?
There is no scientific evidence for the effectiveness of any product or medicine that cures deafness. Acupuncture, magnets, or exercises have neither been proven effective. Link

Can a mammogram cause thyroid cancer?
Mammograms do not cause thyroid cancer because the thyroid does not receive direct radiation and the amount of radiation that it could receive is insignificant. Link

Is Parkinson's only treatable with drugs?
No, apart from pharmacological therapy, rehabilitative therapies such as physiotherapy and speech therapy are also recommended for the correct treatment of the disease. Link

Is there a cure for Alzheimer's?
So far there's no cure for Alzheimer's. There is no medicine that can cure it, but its symptoms can be treated. It should be noted that neither coconut oil, stem cells nor medicinal plants can treat or cure this disease. Link

Is there a remedy for joint conditions?
Many diseases that affect the joints, such as arthritis or osteoarthritis, are chronic diseases. Nowadays, there is no treatment that can cure them. Neither Hondocream, Flexumgel nor any other cream are remedies for treating joints. Link

Can anti-influenza drugs cause brain bleed?
The Spanish drug agency has denied that anti-influenza drugs cause brain bleed. Link

Are there remedies for autism?
Autism is a very complex neurodevelopmental disorder whose origin is influenced by various genetic and environmental factors that have not yet been identified. Autism is not a disease. It has no cure, but it can be improved. Link

Can MMS (miracle mineral supplement) cure autism?

The Autism Research Institute has warned that MMS (miracle mineral supplement) is not a proven cure for autism. Autism is not a disease. It has no cure, but it is susceptible to improvement. Link

Is omeprazole a suitable treatment for heartburn?
Taking omeprazole to avoid acidity after a meal is not recommended. This drug does not neutralize existing acidity. Furthermore, the maximum effect is reached after the first four or five days of treatment. An abuse of this drug can lead to problems such as lack of absorption of nutrients. Link

Myths about natural and home remedies

Can food prevent baldness?
Baldness is a genetic problem, and has nothing to do with food. The deficit of some nutrients can produce certain forms of alopecia but in a person genetically susceptible to androgenic alopecia, eating these nutrients, will not prevent their hair loss. It is necessary to receive specific medical therapies. Link

Do scarfs protect the voice and vocal cords?
The air that enters our vocal cords comes through our nose or mouth, not through our neck. Warming the skin on the neck has no direct effect, other than to provide comfort for the person using it. Link

Are cotton buds effective to clean the ears?
When you use a cotton bud for your ear, you introduce wax instead of removing it. Like that, you can make the wax plug worse. This cotton buds are useful just to clean your ear folds, but they are not made to introduce them in your ear canal. Link

Can ear infections be cured with ear candles?
Otitis, commonly known as "the swimmer's ear", is an infection of the ear canal. It wont improve by using heat or any type of combustion next to the ear. In fact, it can be dangerous and cause burns, or stop the ear treatment, which can cause complications. Link

Myths about vaccines

Is the flu vaccine safe?
Flu vaccines are safe. Most of these vaccines cannot cause illness because they are made up of non-contagious dead viruses. The risk of serious harm from a flu vaccine is extremely small. The most common side effect after the vaccine is itching and/or pain at the injection site and usually goes away within 48 hours. Link

Do vaccines cause autism?
There is no scientific evidence linking vaccines to autism. Vaccines, like any medicine, can have side effects, but autism is not one of them. Link

Do vaccines jeopardize children's immune systems?
Vaccines do not overload or deplete a child's immune system. Studies show that even multiple and combined vaccines do not weaken the immune system or compromise its function. Link

Do vaccines have thimerosal?
Thiomersal is a mercury-based chemical no longer found in most standard UK vaccines. In addition, if they do contain it, the WHO has already confirmed that thimerosal is not toxic to the body. Link

Myths about sunprotecion

Is it okay to take UVA rays (using UVA lamps) before summer to prevent sunburns?
There is no such thing as a "healthy tan" neither from the UVA lamps nor the sun. Both UVA lamps and solar radiation are group 1 carcinogens, this means that they can cause the development of some types of cancer (skin cancer in this case). There is clear scientific evidence on this topic. Link

Does sunscreen expire?
Once opened, sunscreen follows the time indicated in the bottle.During this time, the sunscreen mantains its characteristics. This data is represented as an open jar, with numbers and letters 3M-6M-12M (3 months, 6 months or 12 months). In addition, this index refers to adequate conservation conditions. Link

Does sunscreen with a sun protection factor (SPF) indicate the time of protection to solar radiation?

The SPF number reflects how long the sun's UV radiation would take to redden your skin using the product exactly as directed versus the amount of time without any sunscreen. If the first day that we expose ourselves to the sun we can be 10 minutes without getting a sunburn, with a sun protection of SPF 30, it would take you 30 times longer. SPF's index is referred to UVB rays. Link

Can sunscreen provide 100% UV protection?
No sunscreen provides 100% sun protection, not even mixing different types of sunscreens. We cannot block radiation completely. Link

Does solar protection increase if we mix two different sunscreens?
If we use a sunscreen with SPF(sun protection factor) 20 and another with SPF 30, we will not achieve a sunscreen with SPF 50. We will only get the higher SPF, that is to say, SPF 30. Link

Is it enough to apply sunscreen just once a day?
A sunscreen protection is only fully effective for two hours after you use it. That is why you should apply sunscreen every two hours. You should re apply it if you swim for 20 minutes, if you sweat too much or if there has been friction on your skin with sand or the towel, for example. Link

Do you need sun protection on cloudy days?
Solar radiation is not filtered out by clouds, therefore it can cause damage even if we do not feel the heat. If we want to be properly protected, we should also apply sunscreen in winter and when it is cloudy. Link

Does sunscreen prevent tanning?
There is not such thing as a sunscreen that protects 100%, therefore an amount of radiation will always reach our skin. Getting a tan means that the skin is activating its natural protection by producing melanine. Being tanned means that our skin is being attacked by solar radiation and it is producing melanine to protect itself. Link

Do dark skinned people need sunscreen?
Usually, dark skinned people get a tan easier. They count with a larger quantity of melanin type "eumelanin" which is of a darker tone. It is true that they have a lower risk of sunburn but that does not mean that their skin does not suffer the sun's harmful effects. Solar radiation can harm any type of skin. Link

Does melanoma only show up on sun-exposed areas of the body?

No, in women, melanoma most often develops on the arms and legs. In men, melanoma most often appears on the trunk, but it can appear in any part of the body, including armpits or genitals

Myths about cancer

Can Irritable Bowel Syndrome (IBS) lead to cancer?

Patients with Irritable Bowel Syndrome (IBS) have the same probability of developing cancer that the general population. IBS has few associated complication and does not lead to more serious illnesses. Link

Does your car air conditioning pose a cancer risk?

Turning the air conditioning when the car is parked under the sun does not increase cancer risk due to the rise in benzene. It is true that it is a toxic element and extreme care is necessary to manipulate it. However, in cars it is safe. Link

Do Wi-Fi or mobile phones cause cancer?

Scientific evidence shows that using mobile phones does not increase the risk of cancer. Moreover, Wi-Fi and mobile phones use electromagnetic waves, that is to say, they are non-ionising (they are of low energy and do not ionise the matter with which they interact). X rays, for example, are ionising and interact with matter. Link

Can deodorant cause breast cancer?

There is no evidence that relates chemical substances present in antiperspirants and deodorants with alterations in the breast tissue. Link

Can wearing a bra cause breast cancer?

There is no scientific evidence to back the claims that relate wearing a bra, its colour, the number of hours that it is worn, if it has underwire, or the age at which it was first used, with a higher risk of breast cancer. Link

Do mobile radiations produce cancer?

No. So far, the best scientific evidence shows that using mobile phones does not increase the risk of cancer. The radiofrequency electromagnetic radiation that mobile phones or phone masts transmit and receive is non-ionising and is very weak. This non-ionising radiation does not have enough energy to damage DNA and cannot directly cause cancer. Link

Myths about COVID-19

Can vitamin C treat COVID-19?

Vitamin C supplements do not reduce the risk of catching the common cold, flu or coronavirus. Link

Do the masks produce cerebral hypoxia?

The approved masks do not produce either hypoxia or hypercapnia (carbon dioxide retention) because what they filter are particles, they do not retain the air, which can enter and pass through the materials of which they are composed. Link

Can lactoferrin (a protein present in milk) cure coronavirus?

Both lactoferrin and probiotics ARE effective against certain infections, however, it is essential to disprove the hoaxes that confirm their effectiveness against COVID-19, since at the moment there are no studies that promote their administration for the prevention or treatment of the virus. Link

Does alcohol protect against the coronavirus?

Drinking alcohol does not protect against COVID-19 and could be dangerous as frequent or excessive consumption of alcohol can increase the risk of health problems. Link

Is there treatment for COVID-19?

During the evolution of the pandemic, several drugs that could have a potential application as a treatment against COVID-19 were released.

Scientists are still working to develop effective treatments. Link.

Does MMS (Miracle Mineral Solution) cure COVID-19?

MMS has been proposed as the cure for numerous diseases without any study to support it. In the same way, there is no scientific evidence that proves its utility against COVID-19 or any other type of virus. Link

Does the tuberculosis vaccine protect against the coronavirus?

There is no evidence that the tuberculosis vaccine, developed at the beginning of the last century, is useful to protect us against the coronavirus. Link

Does breathing steam from boiling water serve to prevent or cure coronavirus?

Breathing steam from boiling water may improve the symptoms of upper respiratory infections but is not helpful in eliminating coronavirus. In addition, very high temperatures could be harmful to our body. Link

Does ibuprofen worsen COVID-19?

There is currently no evidence that the use of ibuprofen causes serious adverse effects, acute health care utilization, long-term survival or quality of life in patients with COVID-19. Link

Can antibiotics prevent or cure COVID-19?

Antibiotics are only effective for treating diseases caused by bacteria not viruses, such as coronavirus. Antibiotics will only be given if the patient is hospitalized, to avoid possible infection by bacteria. Link

Can an alkaline diet help you fight the infection of COVID-19 and Cancer?

A healthy, balanced diet helps prevent certain diseases. The alkaline diet, although is based on fruits, vegetables and berries, can lead to certain nutritional deficiencies. Moreover, this diet has no scientific basis. Link

Common myths about heart attacks

Can you stop a stroke by pricking the fingers of the person?

There is no medical evidence that using a syringe or needle to prick the fingers of someone having a stroke will help them. In fact, it could waste valuable time. Link

Can coughing stop a heart attack?

If you think that you are having a heart attack, coughing does not help. Experts advice to call the emergency services, sit down and remain as calm as possible until the emergency services arrive. In addition, it is recommended, if available, to take an aspirin while they arrive. Link

If I have tremors, do I have Parkinson's disease?

Not all tremors are indicative of Parkinson's disease, Huntington's disease or taking certain drugs can also cause tremors. Also, not everyone with Parkinson's suffers from tremors. Link

Does Parkinson's produce dementia?

Parkinson's disease does not cause dementia but makes it difficult to make certain movements and expressions, a fact that is often confused with suffering from dementia. Link

Do people with advanced Alzheimer's feel anything?

In the most advanced stages of the disease, feelings of pleasure and pain remain. It is therefore very important to continue to care for the person with love and not leave them in a corner. Link

Common myths about arthritis

Are rheumatoid arthritis and osteoarthritis the same thing?

Although both diseases affect the joints, they are different. Osteoarthritis is caused by injury or normal wear and tear on the joints, while rheumatoid arthritis is a chronic, progressive autoimmune disorder and can occur in other parts of the body as well. Link

Is arthritis a condition affecting only older people?

Unlike osteoarthritis, which is the most common

43

joint disease in the elderly, anyone can have rheumatoid arthritis, from children to the elderly. Because it is a chronic, progressive disease, it is usually more severe in older people, but is usually diagnosed in people between the ages of 30 and 50. Link

Are some of the drugs for rheumatoid arthritis toxic?
Some medicines used to treat rheumatoid arthritis can have serious side effects, but they are usually no worse than the effects caused by the disease. Link

Is rest good for osteoarthritis?
Exercise is good for osteoarthritis because it strengthens the muscles of the joint and helps it to wear out less. Of course, exercise must be adapted to the degree of arthrosis and the affected joint. Generally, walking and swimming are recommended exercises, although any other exercise that can be carried out without pain is recommended. Link

Is Irritable Bowel Syndrome really an emotional disorder?
Stress may be one of the factors that influence suffering from Irritable Bowel Syndrome, but it is not the only one. Therefore, to address this pathology, it is not enough just to reduce the level of stress, but other factors must also be considered. Therefore, it is best to visit a professional expert who will determine the origin of the problem and the best treatment to reduce the symptoms. Link

Myths about mental health

Is Attention deficit hyperactivity disorder (ADHD) real?
Not only is ADHD the most common mental health condition in childhood and adolescence worldwide (4-8%), but there have been "classic" descriptions of ADHD for over a century. Link

Are people with mental illness violent?
The vast majority of people with mental problems are not more likely to suffer violent attacks than others. Only between 3% to 5% of patients are at risk, as long as they are diagnosed with a very

serious mental illness. Link

Is memory loss a natural part of aging?
As people age, it's normal to have occasional memory problems, such as forgetting the name of a person you've recently met. However, Alzheimer's is more than occasional memory loss. It's a disease that causes brain cells to malfunction and ultimately die. Link

Is Alzheimer just a problem of memory loss?
No. Alzheimer's more than occasional memory loss. It's a disease that causes brain cells to malfunction and ultimately die. When this happens, an individual may forget the name of a longtime friend or what roads to take to return to a home they've lived in for decades. Link

Is the key for a healthy age in genes?
Only approximately 25% of the diversity in longevity is explained by genetic factors. The other 75% is largely the result of the cumulative impact of our interactions with our environments, which shape behaviours and exposures across the life course. Link

Does sugar-free foods lead to a fat-free body?
When nutrients like fat are removed from food, artificial ingredients may be added back to the food to account for the taste. This filler may lead to more calories. Link

Are palliative care only for patients at the end of life?
Palliative care is an approach that improves the quality of life of patientes and their families facing the problem associated with life-threatening illness, throuug the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual. Link

Only patients with terminal cancer or with rare diseases can participate in clinical trials
Anyone can participate in a clinical trial, as long as they meet the criteria of the trial in question. Link

Annex

1. Initial questionnaire: design and results

2. Extra material and useful links

3. How to use the APP

Initial questionnaire

WELCOME MESSAGE.
Welcome to NoRumourHealth app design survey!

NoRumourHealth project aims to design a free mobile application and an online module to help the elderly differentiate whether the news they collect through social networks is true or false.

By filling in this survey you will be actively participating in the design of the app so you, as a final user, can enjoy better the experience.

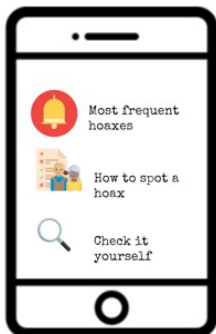**I1. How old are you?** Single answer
Less than 60
60-65
65-70
70-75
75-80
More than 80

1. **Usability:**

U1. Imagine you have received information related to the efficacy of lemon to cure a disease and you would like to know whether this is true or not, where will you click on to search for misinformation?

Most frequent hoaxes
How to spot a hoax
Check it yourself
No answer

U2. Imagine you want to continue looking for other categories in this menu, what will you do? Single answer
Slide right
Slide left
Scroll down
No answer
Other:

U3. Do the icons help you understand the information quicker?
Yes/No

U4. What would you do if you would like to know more about this topic? Single answer
Slide right
Slide left
Scroll down
Click on 'link'

U5. Would you share this misinformation debunking on social media?
Yes/No
U6. (Only if they have answered yes to the previous question). Through which channel will you share this kind of information? Multiple answer
WhatsApp
Telegram
Facebook
Twitter
Instagram
Youtube
Other

U7. Are there any functions you would like us to add?
Open answer

2. *Content:*
C1. The most frequent hoaxes have been classified in:
Nutrition
Treatments
Vaccines
Cancer
COVID-19
Diabetes
Respiratory diseases
Circulatory diseases
Neurodegeneratives diseases
Bones and joint diseases

Which other category do you consider essential? Is there any misinformation you would like to verify?
Open answer

C3. Do you think there is enough information and that it is clearly explained?
Multiple answer
Yes
No
No answer
Other

C3. What do you think could improve the content of the app?

Misinformation

Finally, we would like to ask you 3 questions about general misinformation

M1. Do you think you are exposed to misinformation?
Yes/No/No answer

M2. Which kind of misinformation is it?
You can choose more than one option

Political
Health
Economics
Conspiracy theories
Other

M3. Through which channel do you receive it? Multiple answer
WhatsApp
Facebook
Twitter
Youtube
Media
Other

Thank you! This is the end of the survey, if you would like to participate in other activities of the project, write here your mobile phone number SPACE It will only be use to inform you about activities related to the project and you can always tell us if you don't want to receive any more information.
FINAL MESSAGE:
If you want to keep updated with the project news and continue being an active part in it, follow us on our social media:

Results of the initial survey

This survey was held between 29/05/2020 and 31/08/2020 to ask the final users of the app their opinion about the current design of the app of the project.
The survey was distributed through social media, the project webpage, a post on EPALE and personal contacts of the partners.
In total, 125 people entered the survey.

This report considers the results of all surveys answered up to page 4 or above.

|	
Number of clicks on the survey	125
Number of people who completed more 4 or more pages	79
Number of complete answers	71

The survey was available in English, Spanish, Valencian, Polish and Greek.
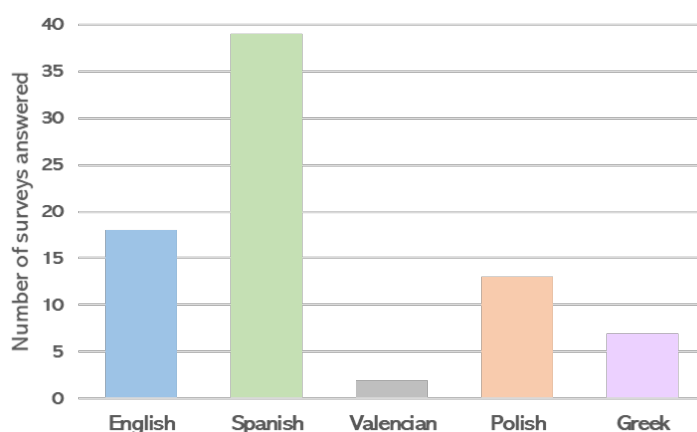
*From now on, Valencian results will be included in the Spanish results.

Moreover, this report studies the results of the surveys answered by people above and below 60 years old. Since the main target of the project are the elderly, their opinion will have a greater influence in the design of the app.

|	
Answers of people older than 60 y. o	49
Answers of people younger than 60 y.o	30
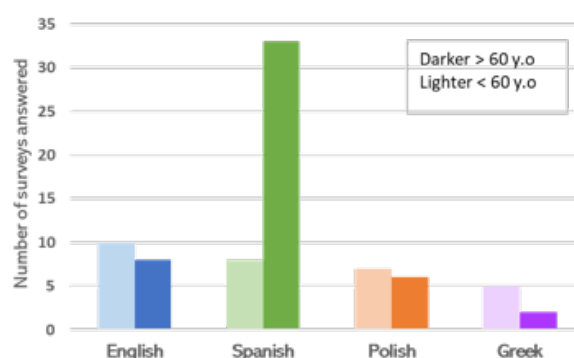
1. ANSWERS OF PEOPLE OLDER THAN 60 YEARS OLD

U1. Imagine you have received information related to the efficacy of lemon to cure a disease and you would like to know whether this is true or not, where will you click on to search for misinformation?

How to spot misinformation	16
Check it yourself	12
Most frequent misinformation	9
I do not know	7

There are significant differences among countries in the answer to this question.
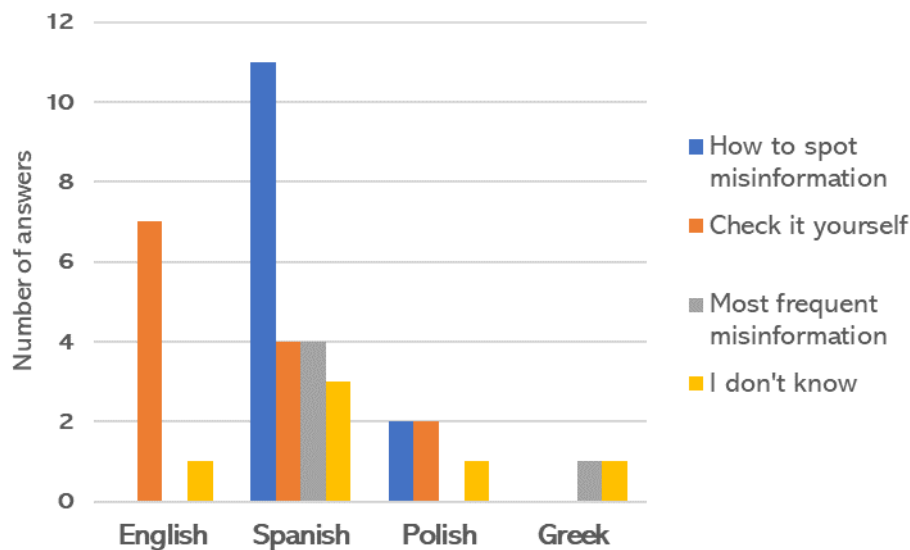
Only in English the sentences are well understood and are formulated in a non-misleading way. These options most be rewritten in all languages but English to help users understand at first sight what they are looking for.

Scroll down	30
Other	5
Slide left	3
Slide right	3
I do not know	0

U2. Imagine you want to continue looking for other categories in this menu, what will you do?

The menu should be extended by scrolling down as it is more intuitive for users.
People who answered 'other' indicated:
Touch to open

U3. Do the icons help you understand the information quicker?

Yes	35
No	10

According to these answers, the use of icons is advisable.

U4. What would you do if you would like to know more about this topic?

Click on 'link'	29
Scroll down	8
Slide right	1
Slide left	0

This function is also well understood and the few people who marked 'scroll down' would easily discover afterwards that they should click on the link.

No	24
Yes	18

U5. Would you share this information is false on social media?

Even though most of the people who answered the questionnaire would not share the misinformation debunking on social media. There is still a considerable amount of people that would share the information is false on social media
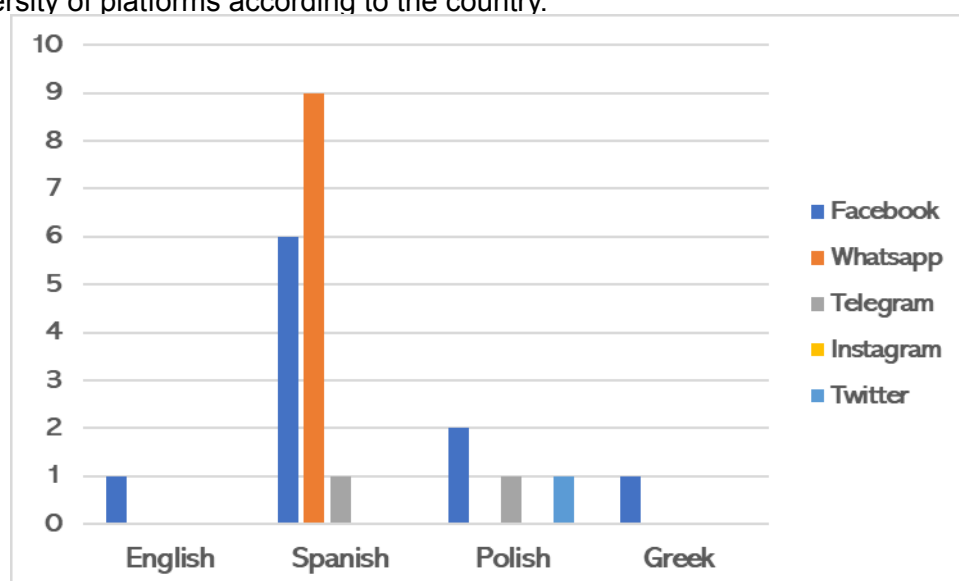
U6. (Only if they have answered yes to the previous question). Through which channel will you share this kind of information?

Facebook	10
WhatsApp	8
Telegram	2
Twitter	1
Other	1
Instagram	0

Other:

E-mail

* There is a diversity of platforms according to the country.

As planned, sharing through both, Facebook and WhatsApp should be available.
If it is possible to carry out a difference by language. WhatsApp should only appear in the Spanish version.

U7. Are there any functions you would like us to add?

Suggestion	Times suggested
One that blocks my mobile or at least ask me for my permission before entering	1
Updates about any new topic that is being disseminated or that is invaded by disinformation	1
Broaden the content	1
Trustful alternatives	1

C1. The most frequent hoaxes have been classified in:
Which other category do you consider essential? Is there any misinformation you would like to verify?

Suggestion	Times suggested
Exercise	4
Nutrition	2
COVID-19	1
Weight loss	2
Syphilis	1
Rare diseases	1
Diabetes	1
Healthy habits	1
Memory diseases	1
GMO	1

C2. Do you think there is enough information and that it is clearly explained?

No, but I will click on the link	16
Yes	14
No	12
Other	2

* The 'No' option is greater in Spanish and English because the third option was added after the platform was shared for a preliminary test

C3. What do you think could improve the content of the app?

Suggestion	Times suggested
Firsts symptoms of degenerative diseases	1
Links to trusted medical sources e.g. Mayo Clinic	1
Plain language	2
Information related to ageing, health, exercise, and nutrition	1
More images	1
Clear and explicit images	1
Better organization of the text	1
Link to trustful scientific pages	2

M1. Do you think you are exposed to misinformation?

Yes	27
No	1

M2. Which kind of misinformation is it?

Political	34
Health	31
Economics	20
Conspiracy theories	18
Other	2

Other:

Every field of knowledge
Nutrition

M3. Through which channel do you receive it? Multiple answer

Media	23
WhatsApp	22
Facebook	20
YouTube	6
Twitter	4
Other	4

Other

| |
|---|
| Google |
| E-mail |
| Instagram |

Differences among countries
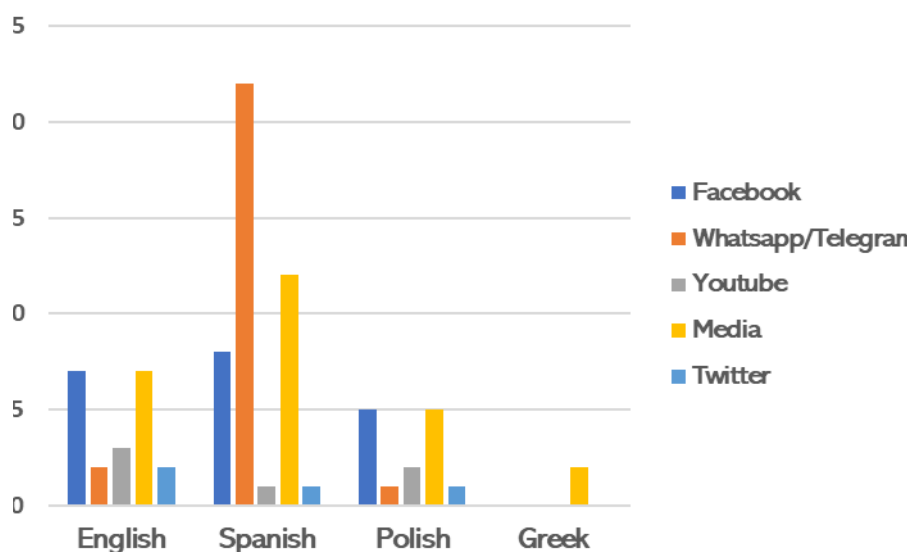
2. ANSWERS OF PEOPLE YOUNGER THAN 60 YEARS OLD

U1. Imagine you have received information related to the efficacy of lemon to cure a disease and you would like to know whether this is true or not, where will you click on to search for misinformation?

Check it yourself	14
How to spot misinformation	8
Most frequent misinformation	6
I do not know	1

Differences amongst countries.
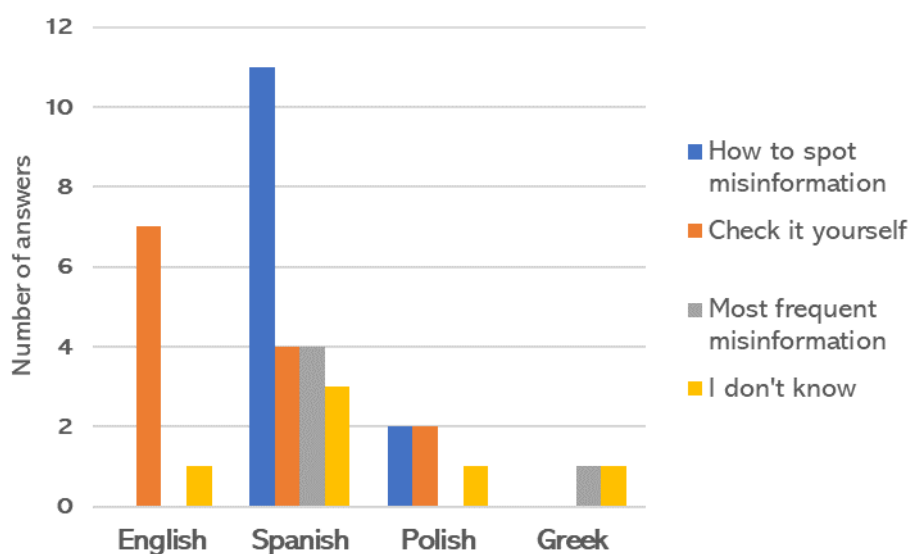
The same trend observed for people older than 60 y.o.

U2. Imagine you want to continue looking for other categories in this menu, what will you do?

Scroll down	22
Other	3
Slide left	2
Slide right	1
I do not know	1

People who answered 'other' indicated:

Scroll up
Press the button

U3. Do the icons help you understand the information quicker?

Yes	21
No	6

The use of icons is advisable

U4. What would you do if you would like to know more about this topic?

Click on 'link'	21
Scroll down	6
Slide right	0
Slide left	1

*This function is also well understood

U5. Would you share this information is false on social media?

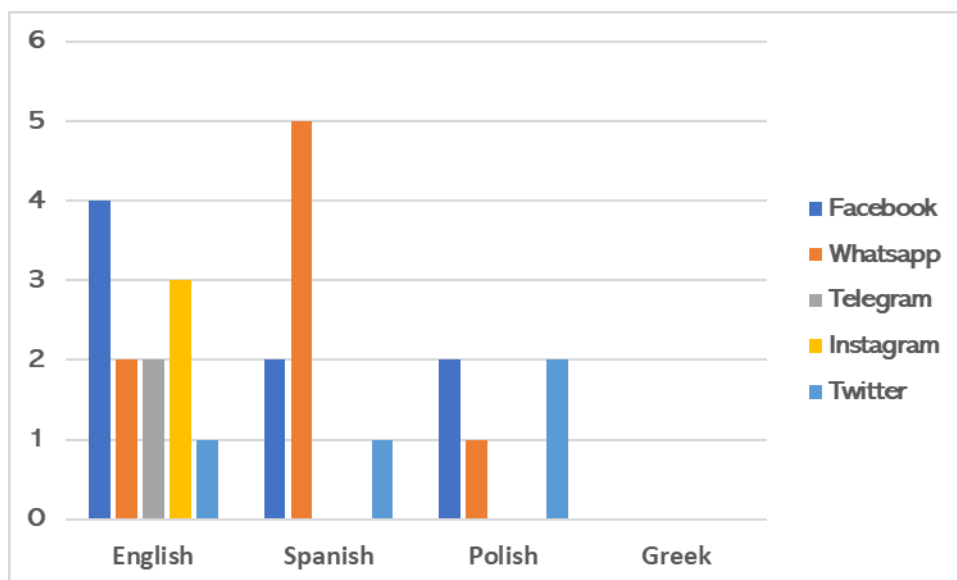|	
No	15
Yes	14

Still there is a considerable amount of people that would share the information is false on social media

U6. (Only if they have answered yes to the previous question). Through which channel will you share this kind of information?

WhatsApp	9
Facebook	9
Twitter	5
Instagram	4
Telegram	3

Other:
* There is a diversity of platforms according to the country.

U7. Are there any functions you would like us to add?

Suggestion	Times suggested
To put a menu of categories of pseudoscience and pseudodoctors	1
Short videos	1
Big fonts and short and clear sentences	1
Like function	1

C1. The most frequent hoaxes have been classified in:
Which other category do you consider essential? Is there any misinformation you would like to verify?

Suggestion	Times suggested
Symptoms	1
Family	1
Autism	1
Conspiracies	1
Racism	1
Rare diseases	1
Education	1
Mental disorder	1
Miracle diets	1
Autoimmune diseases (especially Sjögren)	1
Smog	1
Cholesterol	1

C2. Do you think there is enough information and that it is clearly explained?

Yes	12
No	8
No, but I will click on the link	5
Other	1

* The 'No' option is greater in Spanish and English because the third option was added after the platform was shared for a preliminary test

C3. What do you think could improve the content of the app?

Suggestion	Times suggested
Add categories of fake doctors	1
Explanatory videos	1
Give more scientific arguments	1
That some content is signed by professionals	1
Links to increase information about different topics related	1
Sound	1

M1. Do you think you are exposed to misinformation?

Yes	23
No	1

M2. Which kind of misinformation is it?

Political	20
Health	17
Economics	12
Conspiracy theories	12
Other	2

Other:

History
Any topic

M3. Through which channel do you receive it? Multiple answer

Media	16
Facebook	14
WhatsApp	9
Twitter	9
YouTube	2
Other	2
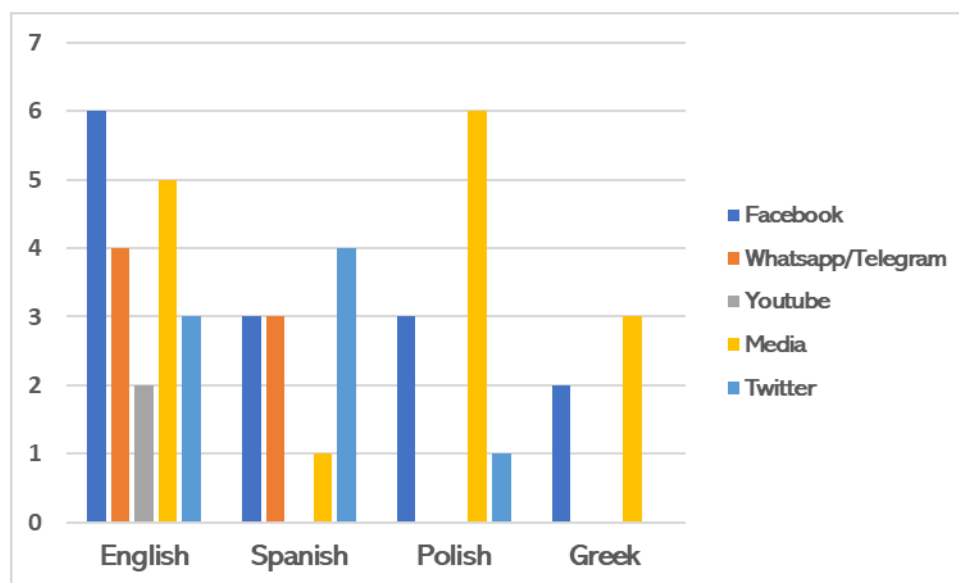
3. CONCLUSIONS

I.   The main menu categories should be rewritten in all languages but in English to make it more understandable

II.   To see more items on a menu or page, we should stick to the common action of scrolling down

III.   The use of icon and images is advisable

IV.   We should stick with the format of short and concise statements, using big size fonts and use links to trustful sources for further information.

V.   Maybe we could include a section of 'reliable sources' divided in similar categories so users know which websites to visit for each category. We could also include an exercise category in this section.

VI.   We should state clearly that the app will not access any information in their device.

VII.   If possible, add a reading option for those people who are visually impaired.

VIII.   We should provide the possibility of share the information at least on Facebook. In Spain, at least, we should include the possibility of sharing it through WhatsApp.

IX.   Some people ask for short videos, we cannot provide them for each topic but we can include in the main menu a link to the e-modules where they can find more information in the videos and the resources.

Extra material and useful links