



Attitudes of Romanian Population Towards Falsified Medicines.

Extended Version of the Report

Study conducted by OSMR in collaboration with ANMDMR

Author: Bogdan Voicu

Bucharest, January 2025

This report was commissioned by the Romanian Medicines Serialisation Organization (OSMR, www.osmr.ro) in collaboration with the National Agency for Medicines and Medical Devices of Romania (ANM DMR, www.anm.ro). The author, Bogdan Voicu (www.BogdanVoicu.ro), conducted the analyses within the Romanian Quantitative Studies Association (RQSA, www.rqsa.ro). Quantitative data collection was carried out by CCSAS (www.ccsas.ro), a research company experienced in survey data collection.

The opinions expressed in this report belong to the author and do not engage the organizations involved in producing the report or its beneficiaries.

TABLE OF CONTENTS

Summary of Main Results.....	4
1. Introduction.....	8
1.1 Context.....	9
1.2 Proposed solution.....	11
1.2.1 Explanatory model/Theory of Change.....	11
1.2.2 Information Collection.....	13
1.2.3 Survey Data Analysis Methodology.....	14
1.2.3.1 General Principles.....	14
1.2.3.2 Explanatory Factors.....	14
1.2.3.3 Analysis Method.....	21
2. Results: Analysis of Online "Social Documents".....	21
2.1 Comments on News Articles from Press Websites.....	22
2.2 Reactions on Facebook.....	29
2.3 Comments on Dietary Supplement Distributor Websites.....	30
2.4 Conclusions.....	31
3. Results: Survey Data.....	32
3.1 Knowledge about Falsified Medicines.....	32
3.1.1. External Evaluation.....	32
3.1.2. Spontaneous Awareness.....	34
3.1.3. Definition by Properties.....	35
3.1.4. Awareness.....	41
3.2 Interaction with Medication Consumption.....	42
3.2.1. Sources of Information about Medicines.....	42
3.2.2. Perceptions about the Supply of Falsified Medicines.....	44
3.3 Evaluation and Probability of Using Falsified Medicines.....	47
3.3.1. Perceptions about the Effects of Falsified Medicines.....	47
3.3.2. Probability of Using Falsified Medicines	47
3.4 Types of Conditions and Opinions on Falsified Medicines.....	53
3.5 The Role of Regulatory Authorities.....	56
4. A Recap of the Survey Results.....	5
5. Action Recommendations.....	64

List of Cited Works.....66

Appendix. The Questionnaire, Weighting Strategy, and Frequency Distributions..... 71

LIST OF FIGURES AND TABLES

Figure 1. Elements of the Theory of Change (Preliminary Model)12

Figure 2. Research Stages and Major Information Flows 13

Figure 3. Field Operator's Evaluation of Respondents 32

Figure 4. The Link between Awareness and Interest in the Topic 34

Figure 5. Defining Falsified Medicines by Their Possible Traits 35

Figure 6. Knowledge about Specific Characteristics of Falsified Medicines 36

Figure 7. Number of Characteristics of Falsified Medicines Correctly Identified by Respondents out of a Total of Six Characteristics 38

..... 38

Figure 8. Awareness Scale of Falsified Medicines.....41

Figure 9. Level of Trust in Different Sources of Information about Medications43

Figure 10. Trust in the Authenticity of Medications Purchased from Authorized Locations 44

Figure 11. Perceptions about the Presence of Falsified Medicines at Online and Ambulant Distributors, Compared to Standard Distributors (Physical/ Hospital Pharmacies, Doctors, Hospitals) Based on Overall Trust in the Supply Chain 45

..... 45

Figure 12. Probability of Using Falsified Medicines by Age, Eliminating the Effects of Other Factors 47

..... 47

Figure 13. Opinions on the Consumption of Falsified Medicines 48

Figure 14. Word Cloud Resulting from the Question: "What Measures Do You Think Should Be Taken to Better Protect the Public from Falsified Medicines?" (Open-ended Question) (q17).....57

.....57

Table 1. Medical Literacy Scale: Exploratory Factor Analysis 16

Table 2. Construction of the Predisposition Score to Believe Fake News 18

Table 3. Analysis of Options for Receiving Medical Advice 19

Table 4. Factor Analysis of Opinions on the Consumption of Falsified Medicines 49

Table 5. Correlations between the Four Attitudinal Factors towards the Consumption of Falsified Medicines50

.....50

Table 6. Correlations between Different Positions on Falsified Medicines and the Four Attitudinal Factors 51

..... 51

Table 7. Simple Associations between the Type of Condition Experienced in Recent Months and Various Indicators Related to Falsified Medicines54

.....54

Table 8. Associations Resulting from Multivariate Analysis between the Type of Condition Experienced in Recent Months and Various Indicators Related to Falsified Medicines	55
Table 9. Opinions on the Serialization of Medicines	57

Summary of Main Results

Objective: This report explores the issue of falsified medicines and the exposure of the Romanian population to these products.

Method: Analyses were conducted on media appearances about falsified medicines, focusing on reader comments. Similarly, sets of comments on the websites of some distributors of medicines and supplements in Romania were analyzed. These two sources, along with the analysis of international academic and grey literature in the field, formed the basis for designing a representative survey for the adult population of Romania (face-to-face questionnaires, sample of 1200 respondents, maximum sampling error: $\pm 2.8\%$).

Overall Conclusion:

1. There is considerable potential interest in the issue of counterfeit medicines, but the level of knowledge in this area is low.
2. At the population level, there is a clear rejection of the intentional consumption of counterfeit medicines.
3. A group of 7-10% of the population has the potential to intentionally consume falsified medicines. Others may do so unintentionally.
4. A mix of limited access to medical resources in the area, credulity, and permeability to poor-quality information, lack of medical literacy, low education, and exposure to the sale of dietary supplements can increase the predisposition to consume falsified medicines. For the vast majority of the population, however, this remains a low risk.
5. Communication campaigns on this topic can be targeted at specific segments of the population and can use dedicated communication channels. For example, a mix of placing leaflets in certain medical offices (e.g., dermatology) and advertising on TikTok and certain types of websites can be imagined. The details and precautions to be taken are formulated extensively in the conclusions of this report.

Results in Brief:

Presence of the Topic in Public Debate:

6. There is at most minor media interest in the topic of falsified medicines. Prevention elements rarely appear in the foreground, with interest being more towards penalties for suppliers/distributors of falsified medicines. The effect is a reduced quality of texts circulated in the press and a lack of online reader engagement with content related to falsified medicines.
7. Analysis of comments on websites selling medicines and dietary supplements, as well as those from press articles in Romania discussing falsified medicines, leads to the conclusion that the subject is absent from public debate.

Knowledge:

8. The survey includes many questions to which one in four or five respondents declared they did not know what to say, indicating a lack of real contact with the discussion about falsified medicines.
9. Analysis of survey data shows, however, that there is a strong interest in the topics addressed. The directly expressed interest is complemented by a low number of refusals to answer questions, but also a high proportion of "don't know" responses for most questions directly related to falsified medicines. The proportion of "don't know" responses decreases to usual survey values for questions not dealing with falsified medicines, while the proportion of refusals to answer rises to usual levels for questions unrelated to falsified medicines.
10. Two-thirds of respondents claim they knew what falsified medicines were before this survey.
11. More than two-thirds estimate that they cannot correctly identify a falsified medicine and cannot define it spontaneously. This reinforces and makes evident the need for information.
12. Just over half of respondents can correctly identify at least four out of six characteristics of falsified medicines.
13. Personal interaction with medicines increases both knowledge and confusion regarding falsified medicines. It suggests that pharmacies are a good place to place communication materials.
14. For knowledge about falsified medicines, the density of family doctors does not act as a favorable factor, but the volume of purchasing prescription medicines does. This means that it is not enough to have a family doctor; you also need to interact with them. Therefore, for effective communication campaigns, distributing informational materials through family doctors is below the potential of distributing them through pharmacies.

Information and Interaction

15. The majority of respondents want to learn more about falsified medicines, indicating a promising field of potential information demand. Those who already know something about the subject want to know even more and are more likely to seek additional information.

Hence, there is a need to first bring the information to the ears of those who have not yet learned about the existence of falsified medicines.

16. Those who do not know and do not want to learn about falsified medicines represent approximately 8% of the population. They are generally less educated, come from localities with more family doctors per inhabitant (perhaps these doctors take on the need for information?), and from counties where more dietary supplements are sold and fewer over-the-counter (OTC) medicines are sold.
17. The majority of the population (72%) trusts that there is no risk of falsified medicines in authorized places to distribute medicines. Similar majorities expect to frequently find falsified medicines in online pharmacies (57%), on other online sites (70%), or from street vendors (74%).
18. Conversely, the proportion of those who believe that falsified medicines cannot be found in physical pharmacies or can only be found there very rarely reaches 38%, with the corresponding figure being 45% for hospital pharmacies, 46% for doctors' offices, and 48% for medicines used in hospitals. (The corresponding proportions are 11% for online pharmacies, 6% for other online sites, and 7% for street vendors; the complement to 100% in these figures is given by those who expect to find such medicines 'rarely' in the mentioned places or by those who cannot formulate a response due to lack of information).

Behaviours

19. The majority of the population would not consume falsified medicines. Three-quarters of the population firmly reject the idea, and only 7-11% would accept it intentionally.
20. In the Romanian population, about 7% believe that falsified medicines have fewer side effects, and 12% believe they have better effects than other medicines.
21. Three-quarters of the sample would not consume falsified medicines under any circumstances. 8-11% are predisposed to consumption, and the rest would rather not do so even if they were in a serious situation.
22. Objective factors that would lead to consumption (in fact, subjective representations of the current reality) are related to accumulated poverty (not current income, but the material condition of the household), the desire for profit at any cost, the habit of consuming counterfeit products, the continuous presence of illness (chronic patients in the household), and the absence or scarcity of medical services in the locality.
23. Attitudinal factors that generate consumption are, in order, the need for consumption (at an affordable price), the fact that it is an accepted consumption behavior by those around, followed by the representation of a reduced risk of use. Ethical considerations also play a preventive role, but to a lesser extent. All these factors, across the Romanian population, have values that prevent the consumption of counterfeit medicines. However, they increase for a minority of the population, which can thus be exposed to consumption regardless of their knowledge about falsified medicines.

24. Negative factors are amplified by susceptibility to fake news, credulity to unqualified advice, desire for material gain, poor material condition, low education, and high sales of dietary supplements. Conversely, high education, medical literacy, higher presence of medical service providers, direct experience of purchasing medicines, and medical care contribute to strengthening preventive factors.

Evaluation of System Actors and Representations about Policies to Follow

25. The generalized distrust in institutions in Romania also extends to the authorities in the field.
26. The police and NGOs are credited as legitimate organizations to combat falsified medicines, each attracting the support of 50% of the population. The government is rated at only 20%, the same as doctors and hospitals, while pharmaceutical manufacturers and pharmacies are considered to have at most a minor role.
27. Information and control are the key words that manage representations about the type of desired intervention. In the background, various types of fines and penalties for those who distribute falsified medicines are placed.
28. Knowledge about the presence of serialization is low and there is a need for information about it.

Types of Conditions

29. Attitudes and behaviors related to counterfeit medicines do not differ substantially by types of conditions.
30. One type of condition seems to pose higher risks than the population average: dermatological problems. Those who experience them are more susceptible to consuming falsified medicines and/or developing an attitude that may lead to consumption. This would be the main distinct target that requires specially designed communication for the particularities of these conditions.
31. A campaign targeted at types of conditions can also consider mental health conditions to increase trust in the distribution chain (both standard and online/street vendors), and cardiovascular conditions to strengthen the ethical reasons for not consuming falsified medicines.

INTRODUCTION

This report aims to document the attitudes of the Romanian population towards falsified medicines, with the goal of providing OSMR and ANMDMR with elements to support their policies and programs for preventing and combating the phenomenon. Specifically, we considered seven types of objectives:

1. Investigating the population's knowledge about the presence of falsified medicines.
2. Investigating the propensity towards consumption behaviors of falsified medicines.
3. Investigating attitudes towards falsified medicines.
4. Identifying the factors that determine the above.
5. Identifying sources of knowledge and information.
6. Identifying trust in the measures proposed by the authorities in the field.
7. Proposing recommendations for a campaign to raise awareness of the phenomenon and warn the population about its negative effects.

To understand the approach to these seven objectives, it is useful to first observe the contemporary context of falsified medicines. This is what the next section (1.1 *Context*) aims to do, which constitutes a brief review of some references from the international literature. Then, I explain how the analysis in this report is structured, showing why we used the data collection methods and types of analysis proposed and developing in detail some of the related methodological elements (subchapter 1.2 *Proposed Solution*).

Apart from this introductory chapter, the report includes two chapters dedicated to the results. Two types of methods are used: the first consists of analyzing spontaneous reactions from a part of the Romanian population that generates online comments. The goal is not to provide an image of the population, it is not a type of probabilistic research, but an attempt to document types of reactions. The second, more refined and more expensive method, is the analysis of survey data conducted on a probabilistic sample, representative of the Romanian population, which tests in detail the hypotheses derived from the literature review, discussions with OSMR representatives, and the qualitative analysis mentioned above. The order of operations is recommended by both the literature in any discipline and logic; it is natural to first use heuristic methods, which are also cheaper, and then to test the observations on large, expensive samples that allow the generalization of observations to the entire adult population of Romania. Therefore, the two chapters dedicated to the results are ordered according to the same principle: first the qualitative data (chapter 2 *Results: Analysis of "social documents" present online*), then the quantitative data (chapter 3 *Results: Survey Data*).

To avoid interrupting the flow of the chapters dedicated to the results, I inserted before them, at the end of the "Introduction," a subchapter on how we constructed some of the indicators included in the quantitative data analysis (subchapter 1.2.3 *Survey Data Analysis Methodology*). It is worth noting in this context that throughout the report we avoided more "technical" jargon and placed it in footnotes. The text can thus be read without much effort, and those eager to understand the details of the analysis can find them in the aforementioned footnotes.

The last third of the report provides a recap of the results (chapter 4 *A Recap of Survey Results*), this time organized not thematically, but by types of factors that can influence the existing situation, with the explicit aim of helping to structure the recommendations in the final chapter (chapter 5 *Recommendations for Action*).

1.1 Context

A rich body of literature has warned in recent decades about the extent of the falsified medicines market. It consists of press reports, grey literature (research reports), and academic literature. Some international examples are listed in Box 1. The phenomenon is estimated to reach about 10-11% of the total medicines market (Pathak et al, 2023) and 4.4% of the European Union market (Woratschka, 2016). The European Alliance for Access to Safe Medicines estimated in 2008 that the chances of buying a counterfeit medicine online were 63% (EAASM, 2008). The global market is estimated to be somewhere between 200 and 431 billion dollars annually (Gurney et al, 2017; Miller and Winegarden, 2020).

The phenomenon is countered in the European Union through large-scale operations and fairly elaborate legislation, centered on the EU's *Falsified Medicines Directive (FMD)*. Nevertheless, an operation at the European Union level, carried out in April-October 2023, led to the confiscation of falsified medicines worth 64 million Euros. In the United Kingdom, the post-Brexit situation can be used as an indicator of the dynamics of reality in the absence of the aforementioned European regulation. Given that the UK was already a significant target for counterfeit distribution (Hall et al, 2016), existing reports indicate large quantities of falsified medicines detected in the first two years after Brexit (Burns, 2022), seizures of 30 million pounds in 2023 (UK Government, 2024), and a continued presence of falsified medicines throughout 2024 (Homer & Johal, 2024). The phenomenon is far from new. In India, for example, it has led to the development of companies specialized in detecting falsified medicines for decades (Bate, 2008).

In Romania, discussions revolve around millions of Euros (Pocototilă et al, 2024) and knowledge about falsified medicines at the population level is below 40% (IGPR, 2023, with the caveat that concrete details about the study could not be found). Romanian legislation includes European legislation and has been attentive to the phenomenon since 2006 (Arjoca, 2011). The presence of the risk of falsifying seems to be insufficiently known to consumers (IGPR, 2023; Szekely et al, 2015).

Box 1. Examples of International Articles on Falsified Medicines

Akunyili, D. (2004). Fake and counterfeit drugs in the health sector: The role of medical doctors. *Annals of Ibadan Postgraduate Medicine*, 2(2), 19-23.

Hodges, S., & Garnett, E. (2020). The ghost in the data: Evidence gaps and the problem of fake drugs in global health research. *Global Public Health*, 15(8), 1103-1118.

Miller, H. I., & Winegarden, W. (2020). Fraud in your pill bottle: The unacceptable cost of counterfeit medicines. *Center for Medical Economics and Innovation Issue Brief*. Pacific Research Institute.

Pathak, R., Gaur, V., Sankrityayan, H., & Gogtay, J. (2023). Tackling counterfeit drugs: the challenges and possibilities. *Pharmaceutical Medicine*, 37(4), 281-290.

Pitts, P. J. (2020). The spreading cancer of counterfeit drugs. *Journal of Commercial Biotechnology*, 25(3), 20-33.

Po, A. L. W. (2001). Too much, too little, or none at all: dealing with substandard and fake drugs. *The Lancet*, 357(9272), 1904.

Sansone, A., Cuzin, B., & Jannini, E. A. (2021). Facing counterfeit medications in sexual medicine. A systematic scoping review on social strategies and technological solutions. *Sexual Medicine*, 9(6), 100437-100437.

Ziavrou, K. S., Noguera, S., & Boumba, V. A. (2022). Trends in counterfeit drugs and pharmaceuticals before and during COVID-19 pandemic. *Forensic Science International*, 338, 111382.

Essentially, we are discussing a category of sub-standard medicines whose origin, content, and traceability are uncertain, which can affect their properties. These medicines are increasingly visible in the contemporary world (Bandiera, 2017; Hodges & Garnett, 2020; Pitts, 2020), especially regarding online sales (Limbu & Huhmann, 2023). The already growing trend was accentuated by the COVID-19 pandemic (Ziavrou et al, 2022) and the type of organization of distributors (Syed & Milburn, 2024). The health consequences can often be severe (Amir-Azodi et al, 2024; Rahman et al, 2018), and cases leading to death are extremely visible and covered by the press worldwide (for example, see Rosenberg, 2014). Hence the increasing attention given to the phenomenon, which is evidenced by a plethora of academic articles analyzing it from various perspectives (a short selection is available in Box 1, more are cited throughout the report and can be found in the list of cited works), complemented by grey literature, produced both transnationally and by various states, as well as press reports. Here are some examples in this regard. Major international organizations, such as the European Medicines Agency (EMA), Interpol, and WHO, have dedicated pages on their websites and recurring news where they draw attention to the phenomenon.

- Dedicated pages:
 - o European Medicines Agency (EMA). *Buying medicines online*, <https://www.ema.europa.eu/en/human-regulatory-overview/public-healththreats/falsified-medicines-overview/buying-medicines-online#dangers-of-falsifiedmedicines-10477>
 - o European Medicines Agency (EMA). *Falsified medicines: overview*, <https://www.ema.europa.eu/en/human-regulatory-overview/public-healththreats/falsified-medicines-overview>
 - o Interpol. *Fake medicines can be counterfeit, contaminated or mislabelled*. Don't take the chance. <https://www.interpol.int/Crimes/Illicit-goods/Shop-safely/Fake-medicines>
 - o World Health Organization (WHO). *Substandard and falsified medical products*, https://www.who.int/health-topics/substandard-and-falsified-medicalproducts#tab=tab_1
- News:
 - o World Health Organization (WHO). 2024. WHO issues warning on falsified medicines used for diabetes treatment and weight loss, June 20th, 2024, <https://www.who.int/news/item/20-06-2024-who-issues-warning-on-falsifiedmedicines-used-for-diabetes-treatment-and-weight-loss>
 - o World Health Organization (WHO). 2024. Medical Product Alert N°2/2024: Falsified OZEMPIC (semaglutide). Falsified OZEMPIC (semaglutide) identified in the WHO Regions of Americas and Europe, June 19th, 2024, [https://www.who.int/news/item/19-06-2024-medical-product-alert-n-2-2024--falsified-ozempic-\(semaglutide\)](https://www.who.int/news/item/19-06-2024-medical-product-alert-n-2-2024--falsified-ozempic-(semaglutide))

In Romania, press reports and sporadic studies indicate a high incidence of falsified medicines and extremely low awareness about them:

- **Mediafax. 2010.** The institution that approves dietary supplements: We would not recommend them to anyone. We approve them on trust, Mediafax, February 3, 2010, *An external link was removed to protect your privacy.*
- **Pocotilă, Andreea, Dimitriu, Sergiu, Nedea, Alex. 2021.** The huge scam of dietary supplements: millions of euros from lies that spread across the internet, Recorder, February 25, 2021, *An external link was removed to protect your privacy.*
- **Postolache, Ana Maria. 2019.** How to know if a supplement or natural product is authentic or counterfeit, La taifas, November 6, 2019, *An external link was removed to protect your privacy.*
- **Tobias, Andreea. 2023.** Over 60% of Romanians cannot tell the difference between real and counterfeit medicines, Mediafax, February 25, 2023, 11:18, *An external link was removed to protect your privacy.*

Despite this attention, data on the extent of the phenomenon remain scarce (Hodges & Garnett, 2020), and the presence of falsified medicines is not excluded even in the most reputable pharmacies (Cheng, 2009). Knowledge about the factors that generate consumption is sometimes contradictory (Liu & Lundin, 2016). Hence the need to document the phenomenon, which this report aims to address.

The factors that lead consumers to consider falsified medicines are diverse. They include the absence of authentic medicines, which are sometimes insufficient to meet demand (Nistor et al, 2023), price (Ivanitskaya et al, 2010; Wagiella et al, 2022), the behavior of friends, social norms, lack of awareness of risks (Ivanitskaya et al, 2010; Noun et al, 2021; Ofori-Parku, 2022), insufficient medical literacy (Zaman, 2018), and the influence of social media (Baratto & Baratto, 2020).

Factors that can counteract the consumption of falsified medicines include advice from doctors to populations at risk of using such medicines (Akunyili, 2004), the involvement of large companies in supporting local companies in third-world countries to facilitate traceability and production to contemporary standards (Po, 2001), the use of technology to detect them (Sansone et al, 2021; Singh & Kumar, 2024), increasing pharmacists' knowledge (Shahverdi et al, 2012), constant communication with consumers (Ofori-Parku, 2022), and restrictive legislation (Moken, 2003).

Above all, consumers remain the ultimate cause of their own consumption and the key to prevention solutions (Alfadl et al, 2013; Bird, 2007; Por et al, 2020), hence the report's focus on investigating their perspectives.

1.2 Proposed Solution

1.2.1 EXPLANATORY MODEL/THEORY OF CHANGE

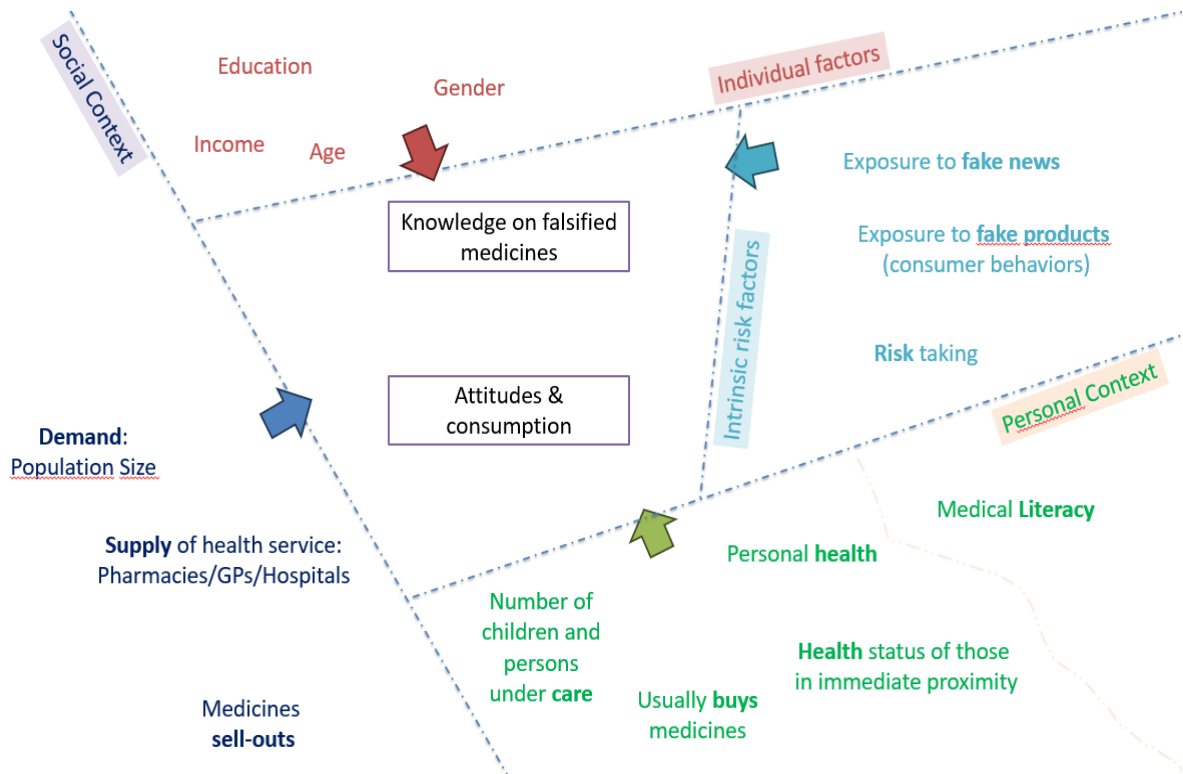
Figure 1 brings to the forefront the explanatory model of the studied social reality, designated in the last decade by international organizations as the "theory of change." More precisely, based on existing knowledge, we discuss how (1) knowledge about falsified medicines is formed and

(2) attitudes towards these medicines and consumption behaviors are shaped. The two are evidently interconnected and depend on social and personal factors. On one hand, it involves specific medical care and medication needs, on the other hand, it involves personal resources (education, knowledge, wealth/money), and on a third hand, it involves the existing market supply. The supply is mediated in turn by the consumption behaviors of those around and the knowledge about the existence of the market and how to use it.

The explanatory model constructs knowledge about falsified medicines, attitudes towards them, and consumption behaviors as a result of the mentioned factors. Some factors, such as general exposure to counterfeit products, can only mediate the relationship between education and knowledge and the positioning towards falsified medicines.

Therefore, it is necessary to investigate the factors suggested by Figure 1, relate them through appropriate analysis methods, identify the probabilities of specific social groups being exposed to the risk of using falsified medicines, and construct recommendations in accordance with the identified needs. The recommendations can be related to increasing awareness of the phenomenon, specific ways to avoid it, and ways to control the channels through which it spreads.

Figure 1. Elements of the Theory of Change (Preliminary Model)



1.2.2 INFORMATION COLLECTION

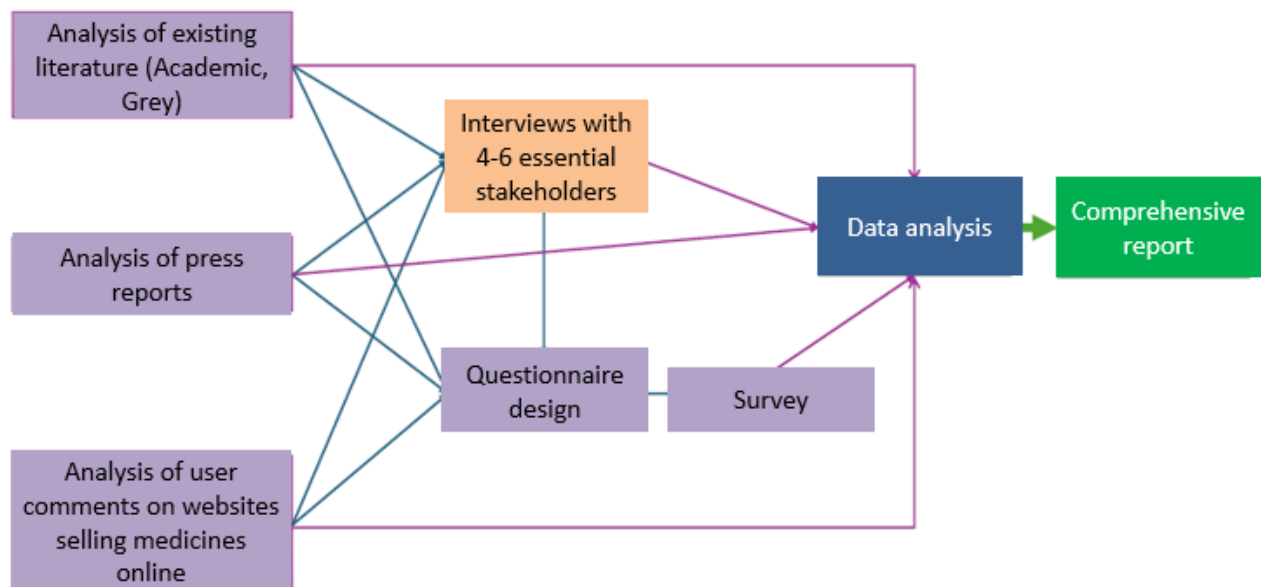
We initially proposed five data sources:

- A nationally representative survey with the general population to investigate all the aspects mentioned above, producing quantitative data. The survey constitutes the main data source.
- Three qualitative sources:
 - Analysis of existing international literature
 - Analysis of existing press reports (only Romanian press)
 - Analysis of user comments on websites that sell medicines
 - The alternative of interviewing a few stakeholders (the orange square in Figure 2) was also considered, but it was decided that discussions with OSMR representatives would be more efficient.

The survey constitutes the main data source. Its design was carried out taking into account input from the other sources.

The analysis of the literature involved inspecting what has been written in the field to refine the proposed preliminary explanatory model. The analysis of press reports had the same purpose, but it was further tailored to the situation in Romania. Comments on articles and materials posted online were also important. The analysis of user comments on websites that sell medicines was part of the same approach: it provided preliminary information about how consumers think, which was later refined in the questionnaire, producing nationally representative data through the conducted survey.

Figure 2. Stages of Research and Major Information Flows



The conducted survey is representative. Data were collected from 95 localities, from 1200 respondents. The sample selection involved multistage stratification and probabilistic selection in each stratum and at each stage of sampling. Household selection followed the random route method, and within households, the Kish grid was used. Refusal to respond led to replacement, and lack of contact was followed by at least two other visits at different times and on different days (a total of at least three visits before giving up on the selected respondent).

The selection of sources for the analysis of comments is stratified, focused on a maximum of 10 sources, without intending to ensure representativeness, but only to provide the primary information that was later refined into the questionnaire questions and is typologically analyzed in this report. Within each data source (news site), we exhaustively considered news about falsified medicines from the last 10 years, given the small number of such news.

1.2.3 SURVEY DATA ANALYSIS METHODOLOGY

1.2.3.1 GENERAL PRINCIPLES

For the analysis of survey data, the report is structured into essential thematic chapters: knowledge about falsified medicines, interaction with them, propensity for use, attitudes towards regulatory authorities, and their role.

Each theme is approached by first showing the distribution of responses in the analyzed sample. Then, the profile of those who have one opinion or another is studied. To avoid attribution errors, the analysis is multivariate: for example, instead of stating the association between education and knowledge about falsified medicines, we analyze the relationship between education and knowledge while eliminating the effect of gender. To clarify, it is useful to observe that today the level of school education is higher among women than men. Therefore, observing that the more educated have higher knowledge about falsified medicines might be insufficient. On one hand, the association might actually hide the gender-knowledge relationship. On the other hand, it is useful to understand exactly how much both gender and education contribute to knowledge. Furthermore, the analyses extend the number of factors considered to elements related to age, family situation (especially if they have close ones who consume medicines), the propensity to consume falsified items in general, and the presence of pharmacy networks nearby.

For better text fluency, the following subchapters describe the factors considered, so that when the key results of this research are presented, we can focus exclusively on the essential aspects and not on methodological details.

1.2.3.2 EXPLANATORY FACTORS

1.2.3.2.1 SOCIO-ECONOMIC STATUS

The gender declared by respondents includes the male-female dichotomy (no respondent declared another gender identity, one respondent refused to define themselves in any way), age (the youngest respondent is 18 years old, the oldest is 94 years old), education (24% of the weighted sample graduated at most from middle school, 18% have a secondary-level professional diploma – vocational school/apprenticeship, 29% graduated from high school, 6% graduated from non-

university tertiary education – post-secondary school/foreman school, 18% have a university degree at the bachelor's level, and 6% have a master's or doctoral degree).

1.2.3.2.2 HEALTH STATUS AND CONTACT WITH MEDICAL CARE

Marital status (single, married, cohabiting, divorced, separated, widowed) is taken into account because, beyond age, being in a couple implies a higher probability of encountering issues related to medicines. Similarly, we added household size (the average in the sample is 2.1 persons), as well as the presence of children under 6 years old (7%), minors between 5 and 18 years old (11%), people over 65 years old (17%), and those with chronic illnesses (20%).

As in any survey, questions about income lead to refusal to respond from one in five respondents. In our case, it is 23%. Additionally, as a complementary measure of household status, interview operators evaluated each household in terms of material condition (5-point scale: 1-Very poor, 2-Poor, 3-Neither poor nor rich, 4-Rich, 5-Very rich). Furthermore, we know if the dwelling is a house (55%), part of a house (2%), an apartment in a block (43%), a tent or a trailer (one respondent), or something else (two respondents). Given the small number of cases in other categories, in the analysis, we combined living in a house into a single category (57%), which we contrast with living in a block (43%) and "other situations" (0.2%).

There was an intention to use registration with a family doctor as an explanatory factor, but since 98% of respondents are registered with a family doctor, the variation in the sample is insufficient to draw conclusions in this regard.

Instead, we have a good measure of the personal state of direct contact with medicines and healthcare: 70% of respondents have taken medicines in the last six months, 28% say a close one has taken medicines (this figure constitutes an underestimation but is extremely useful because - compared to the exact estimate - it more faithfully indicates contact with medicines, as it shows the proportion of those who actually know about acquaintances taking medicines and are possibly more involved in discussions about them). 48% have had an illness in the last six months, and 30% have chronic illnesses. Again, the figures describing the state of close ones are lower (19% and 14%, respectively), with the interpretation being similar to taking medicines. We calculated an indicator that describes the number of such contacts with healthcare: 22% have not taken medicines, do not have chronic illnesses, or have not had any illnesses in the last six months, nor do they have close ones who they know have had illnesses or taken medicines in the last six months. The rest, 14% have one such experience, 25% have two, 23% - three, 7% - four, 4% - five, 4% - all six.

In 77% of cases, the respondent is the one who buys medicines, in 29% other household members also do, and in 3% of cases, people outside the household also do. It is noteworthy that there are no households where no medicines are bought at all. However, there are a few households (3% of the sample) where no medicines have been bought in recent months. Otherwise, in 95% of cases, medicines were bought from a physical pharmacy. There are small proportions of those who also bought online (5%), from a hospital (2%), or from friends, from another country, directly from a doctor (1% each), or from other sources (0.2%). In total, 9% purchase medicines also from sources other than physical pharmacies.

1.2.3.2.3 MEDICAL LITERACY SCALE

Medical literacy, which is the ability to understand communication on health care topics, is considered a key element of health-related behaviors (Nutbeam & Lloyd, 2021). To evaluate medical literacy, I use a reduced version of the HLS-EU-Q47 scale (European Health Literacy Survey Questionnaire), which has been used in several recent publications (e.g., Sørensen et al, 2013; Sørensen et al, 2013; Maie et al, 2021; Pelikan et al, 2019). The central idea is to evaluate the respondent's positioning towards elements of health care and, especially, contact with medicines, leaflets, and doctors, a common principle of many medical literacy scales (Chen et al, 2018; Davis et al, 1998; Loman et al, 2024; Suka et al, 2013; 2014; 2015). This principle complements an exhaustive testing of medical knowledge, as proposed by other scales (see Parker et al, 1995; Rudd et al, 2023), having the advantage of measuring medical literacy more quickly, even if it is more of a subjective representation than an objective construct of the evaluated person's knowledge.

The advantage of quick measurement is, however, predominant. For even more efficiency, I used the HLS-EU-Q47 scale, analyzing the mentioned works that underpin it, and selected seven of its items, those that should be most strongly related to the ability to understand contemporary medical care.

Table 1. Medical Literacy Scale: Exploratory Factor Analysis

		To a large extent	To a very large extent	Factor Loading	Communalities
1	Do you understand the leaflets that come with your medicines?	41%	39%	,567	,321
2	Do you understand what your doctor is telling you?	40%	54%	,794	,631
3	Do you understand the doctor's or pharmacist's instructions on how to take a prescribed medication?	32%	63%	,742	,550
4	Do you know how to assess whether the information about diseases on websites is true or not?	27%	15%		
5	Do you know how to assess when you need a medical check-up?	41%	51%	,573	,328
6	Do you understand health advice from family members or friends?	45%	29%		
7	Can you decide whether you should get the flu vaccine?	32%	49%	,428	,183

*The possible response options were: to a very small extent, to a small extent, to a large extent, to a very large extent, cannot assess, prefer not to answer. The proportions of those who cannot assess are small (below 2% for all questions except the fourth one), and those who did not respond are below 0.7%. The notable exception is the question "Can you assess whether the information about diseases on websites is true or not?" with 10% "cannot assess" responses. The complete results are available in the appendix of this report (page 21 and following). The exploratory factor analysis is

adequate for the data ($KMO=0.785$, after eliminating questions 4 and 6), the scree plot indicates the presence of a single factor (regardless of whether we exclude the mentioned questions or not), and the factor extracted using the maximum likelihood method explains 35% of the total variance.

Table 1 presents the result. The first column shows how 39% of respondents are confident they can read the leaflets that accompany medicines, 54% understand communication with the doctor to a very large extent, etc. Few avoid responding, less than 3% of the total sample for each question, except for the ability to discern information from online sites (question 4), where 10% say they cannot tell if they are capable of such reading, and 0.6% prefer not to answer.

Exploratory factor analysis (a technique that allows the construction of more refined indicators based on responses to question packages) allows us to construct a score that denotes overall medical literacy. Medical literacy thus measured is directly related to the six items (excluding the one related to websites, as detailed below) and explains the response patterns to the respective questions. The closer the "communality" (the last column) is to 1 (the higher it is), the better each respondent's answer to the respective item (i.e., the question in the respective row) is explained by their medical literacy. In the case of navigating online sites (question 4) and family and friends' advice (item 6), the communality dropped below 0.1, the conventional threshold from which it is considered not worth remaining in the composition of the medical literacy score formula. The higher the saturations (the penultimate column), the stronger the connection between the calculated score and the respective item.

In the rest of the report, I will work with this medical literacy score, to which I add the ability to discern information from medical websites. The rest of the questions in Table 1 thus served only to calculate medical literacy.

The item about navigating online sites is transformed into a variable with two categories: knows how to navigate (if they chose "to a very large extent" or "to a large extent," i.e., 42% of the sample), versus does not know or cannot assess (the remaining 57% of the sample). The 0.6% who did not respond were excluded from the analysis.

1.2.3.2.4 PREDISPOSITION TO FALSIFICATION

Some people are predisposed to consuming potentially falsified products or information. For example, they may be inclined to believe what we now call fake news or to buy counterfeit products. It is possible that such people also have a higher risk of consuming falsified medicines. Therefore, we sought to measure three types of exposure to falsification in the questionnaire:

- Predisposition to believe fake news;
- Predisposition to consume counterfeit goods;
- Selection of medical advice from uncertified sources.

These are opposed by another score:

- Predisposition to select medical advice mainly from certified sources (specialist doctor, family doctor, pharmacist).

For the **predisposition to fake news**, we used a method already established in the literature (Arin et al., 2023; Jones-Jang et al., 2019; Maertens et al., 2024). Specifically, we selected a set of five

statements that appeared in the Romanian press in September-October 2024, that is, one month before the data collection for this survey. We aimed for three of the news items to be false and two to be true, but with the potential to be contested and with varying degrees of falsification. Additionally, we tried to have a thematic proximity to health care and nutrition, but without immediate connections to medicines.

Table 2 lists the five questions. We asked respondents to specify which are true and which are false. Each respondent receives one point for the three news items that were false but indicated as true. Another point is awarded for the false news that was labeled as true. In other words, each respondent can accumulate a minimum of zero and a maximum of five total appreciation errors ("I cannot appreciate" is considered a correct answer).

Table 2. Construction of the predisposition score to believe fake news

Of the six titles below, taken from the press, which are true, and which are not?						
		True	False	Don't know	I'd rather not answer	TOTAL
1	Sheep plague was brought to Romania to stop the export of sheep meat from Romania to Arab countries.	47%	29%	23%	0,7%	100%
2	Europe does not produce the active substance for medications.	17%	44%	38%	0,9%	100%
3	Scientists have preserved human DNA on a crystal that can withstand billions of years.	17%	37%	46%	0,5%	100%
4	TV advertisements for unhealthy food products will be banned in the United Kingdom starting in 2025.	27%	25%	48%	0,1%	100%
5	In Romania, pregnant women can get the flu vaccine for free.	50%	16%	35%	0,2%	100%

Sources:

- (1) Circulated by an AUR deputy and verified by factual.ro on 27.09.2024 (<https://www.factual.ro/declaratii/fals-marius-lulea-aur-despre-pesta-rumegatoarelor-mici-ovine/>)
- (2) The news is partially true, as official European Union documents mention that some active substances are not produced in Europe (European Union, 2022: page 2, article 5). However, it was extrapolated by a minister of investments and European projects in a statement on July 15, 2024. (<https://www.factual.ro/declaratii/fals-adrian-caciu-despre-productia-de-medicamente-din-europa/>)
- (3) Present in Romanian news in September-October 2024 (for example: <https://stirileprotv.ro/stiri/actualitate/oamenii-de-stiinta-au-salvat-adn-ul-uman-pe-un-cristal-care-poate-rezista-miliarde-de-ani.html>), the news takes up an academic report: <https://www.southampton.ac.uk/news/2024/09/human-genome-stored-on-everlasting-memory-crystal.page>.

(4) The news reflects a statement from the British government in September 2024: <https://questionsstatements.parliament.uk/written-statements/detail/2024-09-12/hcws93>. However, it is false because the government statement includes limitations on the mentioned advertisements, not total bans.

(5) The news is correct, being present on numerous Romanian websites in September-October 2024, for example: <https://www.euronews.ro/articole/vaccinul-antigripal-in-farmacii-este-gratuit-pentru-copiii-sub-18-ani-gravide-si>

20% of the sample has a predisposition score towards fake news of 0, meaning they did not give any incorrect answers. 35% gave one incorrect answer, 25% gave two, 13% gave three, 4% gave four, 0.4% gave five, and 2% did not answer at least one of the five questions.

To evaluate the **predisposition towards counterfeit goods**, I used responses to two items that asked for agreement with the statements: "A branded T-shirt is just as good as a counterfeit one," and "What you buy without a receipt is better or the same as similar products or services bought with a receipt." The first item refers to the quality of the counterfeit product. The second is related to the price. Responses varied from "to a very small extent" to "to a very large extent" on a 4-point scale.

I also asked respondents where they receive medical advice from (Table 3). I used a specific analysis technique called exploratory factor analysis to identify orientations towards types of information sources. The first factor consists of orientations towards advice from sources outside the medical system, while the second prioritizes information from certified channels: family doctor, specialist, pharmacist.

Table 3. Analysis of options regarding receiving medical advice

If you need medical advice, how likely are you to go to...*	very likely*	Factor loadings		comunalities
		gets medical advice from social network	gets medical advice from certified sources	
1 family doctor (GP)	70%	-,162	,773	0,531
2 A specialist doctor	68%	-,050	,601	0,341
3 Pharmacist	31%	,225	,338	0,221
4 A doctor friend	26%	,696	,064	0,522
5 A nurse friend	18%	,776	,105	0,673
6 Another type of friend	4%	,481	-,125	0,202
7 Search online	8%	,389	-,138	0,131
Varianta explicata		25%	12%	

* The possible response options were: very unlikely, unlikely, likely, very likely, cannot appreciate, prefer not to answer. The proportions of those who cannot appreciate are small (less than 1% for the first two items, 3-4% for the rest), and those who did not respond are under 0.5%. The first column of the table only shows the proportion of those who indicated "very likely." Complete results are available in the appendix. Factor analysis is suitable for the data (KMO=0.672), and it led to the extraction of two factors (using Maximum Likelihood estimation), which also corresponds to the

visual analysis of eigenvalues through the scree plot (scree test). The two factors are correlated with each other (PROMAX(4) rotation, $R=0.465$),

1.2.3.2.5 RISK PREDISPOSITION

Risk-taking or risk-avoidance is one of the major factors influencing consumer behavior (Ahmed et al., 2022; Gomez-Mejia & Blakin, 1989; Mandrik, 2005; Weber et al., 2002; Zaleskiewicz, 2001). In the absence of stable scales, this report uses two estimates of risk exposure, namely the responses (on 4-point scales) to the questions: "I prefer to avoid risks" and "I like to take risks to gain more."

1.2.3.2.6 MEDICAL CARE OFFER IN THE LOCALITY

Three types of medical service providers at the local level are relevant: pharmacies, family doctors, and hospitals. Their presence can facilitate access to information and reduce the likelihood of consuming falsified medicines. The presence of these providers is influenced by the size of the locality, the composition of the population, and similar services in neighboring localities.

The influence of the **size of the locality** is straightforward: it is one thing to have a pharmacy for 100 inhabitants and another to have a pharmacy for 10,000 inhabitants.

The **composition of the population** also matters: the need for medical care is higher for preschoolers, decreases for school-aged children, decreases even more for adolescents and young adults, and starts to increase again for those over 50-60 years old (Lucas-Gabrielli et al., 2016). Therefore, it is necessary to adjust the population by age.

The presence of service providers in neighboring localities is also important: If the localities Canguru and Dromaderu are adjacent, and Canguru has a pharmacy but Dromaderu does not, it is as if Dromaderu has a pharmacy. Obviously, if the distance is greater, say about 5 kilometers, it is as if Dromaderu has "almost a pharmacy," let's say about 90% of a pharmacy. As the distance increases, the impact of the pharmacy in Canguru on the residents of Dromaderu decreases. Additionally, the impact depends on the size of the two localities. Moreover, if Dromaderu is large, in fact, even those in Canguru no longer have a whole pharmacy. Therefore, it is necessary to adjust the presence of pharmacies, family doctors, and hospitals according to their presence in neighboring localities and their populations.

All this dependency of access indicators to medical services is described and exemplified for the case of Romania in Voicu et al. (2023). Therefore, we have taken a series of indicators from the mentioned article referring to:

- The number of pharmacies per inhabitant (adjusted with the population structure and the situation in localities within a 30-kilometer radius)
- The number of family doctors per inhabitant (adjusted with the population structure and the situation in localities within a 30-kilometer radius)
- The number of hospitals (adjusted with the situation in localities within a 30-kilometer radius)

The mentioned indicators are graphically illustrated at www.rqsa.ro/medical-desertification/ .

1.2.3.2.7 MEDICINE SALES IN THE COUNTY

Access to medicines can be another factor that determines familiarity with the issues addressed in this report, as well as attitudes related to this topic. Therefore, we use indicators regarding the number of units sold in 2023 for three distinct categories: over-the-counter (OTC), prescription-only (RX), and food supplements (FS). The indicators, at the county level, were provided by IQVIA Romania at the request of OSMR.

1.2.3.3 ANALYSIS METHOD

With the explanatory factors thus measured, we can proceed to the actual analysis. For this, we conducted multilevel causal analysis models, with respondents grouped by locality and county of residence.

Given the high non-response rate to the income question (23%), the analyses are conducted in two distinct scenarios: first, we performed the analysis without considering income, then we repeated everything by adding income into the analysis, thus avoiding attribution errors due to this high non-response rate. When included in the analysis, income is logarithmized to ensure a distribution closer to the normal distribution.

2 RESULTS: ANALYSIS OF ONLINE "SOCIAL DOCUMENTS"

This chapter aims to provide preliminary information. Before presenting the survey data, it discusses possible types of reactions to the phrase "falsified medicines." It is based on the investigation of media sites and sites that distribute medicines. The investigation is not exhaustive; as explained below, it was only intended to identify types of reactions, not to be representative. The texts I analyze are the readers' comments, their reactions. These constitute content (referred to in social sciences as "social documents") that exemplifies the way people relate to "falsified medicines."

To generate a relevant corpus of literature, I did not select news randomly but followed a sampling method that could lead to observing typical reactions:

1. I analyzed news sites that allow reader reactions. Some sites in Romania no longer allow interaction with readers, but others do. Therefore, I chose the top audience sites from similarweb.com and statista.com, selecting the five most visited Romanian news sites from both. Among them, I retained only those that accept comments. In these, I searched for "falsified medicines," limiting the search to articles published between 2015-2024.
2. Since most news sites do not include reader comments, I chose a social media platform that includes news reposts and is the most visited in Romania: Facebook (Statista, 2025). I analyzed the Facebook feed, specifically searching for the phrase "falsified medicines" and observed the reactions to the respective news. I required that the news be generated by the Romanian press, not by independent commentators, to avoid placing it in a specific group of social media users (in a "bubble"). I considered the first 10 results from a Google search (using the advanced search feature) with the specification: "falsified medicines site:facebook.com."

3. I investigated buyer comments on the site of a distributor of food supplements: Secom (natural products). The choice of the site was simplified: it is among the few sites of major players in the medicine and supplement distribution market that accept user comments. For example, among the major pharmacy chains, I found comments on the helpNet site, but only for products that are not in the pharmaceutical area (e.g., baby bottles) and for food supplements, while for medicines, they are not allowed. Therefore, I preferred to limit the analysis to Secom. On this site, I followed a procedure for selecting comments that considered the best-selling products of the top-selling manufacturers, hypothesizing to observe possible consumer evaluations that contrast quality with falsification.

2.1 COMMENTS ON NEWS FROM PRESS SITES

The five most visited news sites in Romania, according to similarweb.com, are Yahoo, Digi24, Adevărul, G4Media, and HotNews (<https://www.similarweb.com/top-websites/romania/news-and-media/>). Statista reports ProTV, Digi24, Stiripesurse, Libertatea, and Ziare.com as the top news sources (source: statista.com). SimilarWeb bases its data on 2024, while Statista refers to 2023. The reliability of these measurements is not crucial; the idea was to have a non-random selection tool to avoid affecting the types of reactions found on these sites.

Combining the two lists results in Yahoo.com, Digi24, Adevărul, G4Media, HotNews, ProTV, Stiripesurse, Libertatea, and Ziare.com. Among these, only Adevărul, G4Media, HotNews, and Libertatea accept comments.

Yahoo.com also accepts comments, but since its audience is international and the content is in English, it was excluded. Ziare.com is a news aggregator, making analysis more complicated (it cannot be compared with the other sites considered), so it was also excluded from this brief exploration.

To obtain similar searches, I used Google's search engine with the specification "medicamente falsificate site:g4media.ro" (g4media.ro is used as an example; the search was adapted to the domain name where it was conducted). The results were then filtered by date. Note that using this type of search allowed the identification of related phrases such as "medicamente false," "medicamentelor falsificate," etc., without restricting the search spectrum but without expanding the semantic area by using synonyms to maintain the exploratory purpose of this analysis.

Each result obtained was investigated by complete reading and comment analysis (where present).

Adevărul has 23 news articles over ten years of interest. I present them in more detail to better understand the analytical approach:

- June 7, 2015: "Counterfeit medicines, an attack on the population's health. The case of syringes containing glucose instead of interferon" (author Claudia Spiridon) did not attract any comments.
- June 18, 2015: "Fake medicines eliminated by the EU through the introduction of a unique code. The case of Pegasys syringes containing glucose instead of interferon" (author Claudia Spiridon) did not attract any comments.
- June 7, 2017: "50% of medicines sold online are counterfeit" (Claudia Spiridon) attracted one comment from "stefan din nord": "wow, the article is timely. Just an hour ago, I was looking

for a natural medicine Silimarina from Walmark. I didn't order, and I'm glad I didn't. I prefer to pay a little more at the pharmacy than to get scammed online."

- August 21, 2018: "How the offensive against counterfeit medicines will look" (also written by Claudia Spiridon) did not attract any comments.
- November 5, 2019: "Which medicines are most frequently counterfeited. You risk buying them if you use unreliable sources on the Internet," signed by Alina Mitran, from local news in Slatina, also attracted no reader reactions.
- October 22, 2020: "Manufacturers warn that different counterfeit or falsified medicines may appear during the holidays. Recommendations made." Taken from news.ro, the article attracted the first comment, which I reproduce as is, noting the nickname of the commenter – Tomescu Tom: "Bree ... if you want to buy an aspirin, the gesture already makes you suspect .. If you buy something for cold and flu ... you're done for You need courage, no joke, to go to the pharmacy ... :)))"
- October 22, 2020: "Manufacturers warn that different counterfeit or falsified medicines may appear during the holidays. Recommendations made." Taken from news.ro, the article attracted the first comment, which I reproduce as is, noting the nickname of the commenter – Tomescu Tom: "Bree ... if you want to buy an aspirin, the gesture already makes you suspect .. If you buy something for cold and flu ... you're done for You need courage, no joke, to go to the pharmacy ... :)))"
- December 15, 2021: "Europol investigates 33 criminal groups in Europe that allegedly falsified medicines during the pandemic," signed by Marius Țaga, again attracted 0 comments.
- May 29, 2024: "Trafficking with Ozempic and three other diabetes medicines used for weight loss. Falsified prescriptions, reimbursements, and illegal sales," signed by Cristina Stancu, attracted one comment from Ludwig I: "I know a couple who tried something like this, and besides getting terrible stomach burns, it didn't help at all. The manufacturer clearly states that it is not against obesity.. probably it regulates blood sugar and reduces hunger, but the side effects are strong... Genetics is the most important... you can eat yogurt and salads and be bloated, while your colleague eats sugar-coated donuts and doesn't have any problems... Plus, hormonal changes are strong with what we eat.. almost all food is a chemically processed mush full of flavors and enhancers.." The comment received a "Like."
- September 3, 2018: "Counterfeit or low-quality medicines endanger patients' lives in low- and middle-income countries" (signed: News.ro) - comments: 0
- September 3, 2018: "Romania declares war on counterfeit medicines purchased online. How to detect fake pills" (signed: Claudia Spiridon) - comments: 0
- June 20, 2024: "Global alert issued regarding the fake weight loss medicine Ozempic" (signed: Ștefan Borcea) - comments: 0
- September 15, 2023: "The Ministry of Health introduces new strict rules for psychotropic medicines, requiring a special registered form" (signed: Florina Ilincea) - comments: 0
- April 17, 2024: "Kasper Ernest, EMVO: European patients need to know that there is a functional system that protects them throughout the chain, from the factory to the pharmacy" (signed: ADH) - comments: 0 (the article was written at the initiative of OSMR and is marked as such on the Adevărul site)

- March 20, 2023: "German citizen caught with 17,000 boxes of possibly counterfeit medicines at PTF Nădlac" (signed: Redacția Adevărul) - comments: 0
- August 3, 2022: "Why half of pharmacies have not registered in the Medicine Verification System" (signed: Laurențiu Sârbu) - comments: 0
- October 21, 2013: "Counterfeit Xanax by the Chinese, confiscated in Switzerland" (signed: Andrada Floria) - comments: 0
- January 28, 2015: "Searches at suspects of tax evasion in the medicine trade. The damage is estimated at 3 million euros" (signed: Ioana Nicolescu, Lavinia Bălulescu) - comments: 0
- January 28, 2015: "Searches in Balș at suspects of tax evasion with cancer medicines" (signed: Mugurel Manea) - comments: 0
- November 23, 2021: "Video 7,000 antiviral pills hidden in the ceiling of a minibus, discovered at the border PHOTO VIDEO" (signed: Cristina Moroza) - comments: 1. The only comment comes from "Atent Verificatorul" and states: "so the Ukrainians had the cure for covid all this time .. ha ha."
- March 10, 2017: "PSD project: Higher prison sentences for falsifying food, medicines, and brands" (signed: Radu Eremia) - comments: 4. Related to politics, the article attracts more comments, as follows:
 - Aurel Paun: Good proposal, but why doesn't PSD propose higher sentences for corrupt and thieving politicians?? PSD takes care to get its own criminals out of prison.
 - Carmen Florea: Aha, you calmed the masses ... You go from corner to corner and charm with 'higher penalties,' but not for you, some thieves, but on the contrary: it won't be long until you legalize theft. High penalties for the robbers who have been plundering and looting the country for 27 years, while you hide, thieves. You found the solution, scoundrels.
 - blnt eri: He meant to say lower penalties. People make mistakes :) PSD scam.
 - mircea truta: If the authors are PSD members, the law does not apply.
- **January 25, 2018:** Large-scale raids on drug traffickers. They were selling Codeine and Xanax on the Internet. The investigation is conducted in collaboration with American authorities (signed: Claudia Spiridon) - comments: 0
- **June 29, 2018:** The European Association of Euro-pharmaceutical Distributors: When a medicine is missing in an EU state, we deliver products from other states to patients (signed: Dan Anghel) - comments: 1. The comment comes from Galeriu Crestinu: "The PHARMA colossus has become a globalist-Marxist monopoly without which we can no longer live.... that's why they are destroying the village with its traditions that used to 'doctor' itself very well until this 'saving' industry appeared.... generating sure profit from people's suffering."
- **May 15, 2023:** How Arnold Schwarzenegger doped with a Romanian product. He pumped up his muscles with a medicine made in Cluj (signed: Paul Cirican) - comments: 9. Again, there are many comments, and even a small dialogue develops:
 - **Nevastuica Digitala:** It was pointless to take naposim if you didn't have exceptional genetics to counteract the side effects (4 Likes)
 - **Valentin Ionut Rotaru:** I don't understand why you had to take them, seeing that they had more side effects than benefits
 - **BOXCAR Willie:** At that time, the side effects were not very well known. Moreover, these effects do not appear if the doses are correct. The medicine itself was not designed for doping but for treating muscular dystrophies. In other words, attributing the two bypasses to

its use is nothing but a supposition. The statement that Arnold "did not die at 40 like others" also seems ill-intentioned and tendentious to me. Seriously? The number of bodybuilders who used anabolic steroids and reached reasonable ages is very large for them to be considered exceptions, while those who die are the rule. (3 Likes)

- **IISUS HRISTOS E EVREU:** Didn't SiDoPa take it too?
- **Pop Max:** With naposim and decanofort, all the scrawny ones turned into robots in my time. (2 Likes)
- **BOXCAR Willie:** They only turned into "robots" if they trained seriously. There is no medicine that makes your muscles grow if you sit around drinking beer. (5 Likes)
- **Pop Max:** You're right. All my acquaintances who took steroids trained seriously, had detailed exercise programs, and strict diets. I don't know anyone who took pills without being absolutely obsessed with these things. (1 Like)
- **BOXCAR Willie:** I know fools who believe that supplements can generate miraculous results even if they come to the gym just to hang out on WhatsApp. (1 Like)
- **Victor Malescu:** Anabolic steroids and dietary supplements are the way to develop the human body in a much shorter period and to overcome resistance to effort through doping. Hence the accidents, ligament fractures, etc., and many other complications at all levels. For example, Sylvester Stallone took Stanozolol as an anabolic steroid, and during the time when the Rambo movie came out, he even advertised Stanozolol. It is dangerous when, in the desire to reach the top in a competition, people abuse it without considering the morphology and capacity of the body to handle the expected effort. ps. Sylvester Stallone has been operated on multiple times, including for a herniated disc, a total of 30 times, as the actor declared.

In other words, in Adevărul, we have 2-3 articles per year that attract very few comments. Out of 23 articles, one is produced at the initiative of OSMR, and only 7 have attracted comments.

Two texts are more special, and they are the most commented. One is the legislative initiative of PSD, and the comments shift the discussion towards political preferences, practically ignoring the content related to falsified medicines. The most effective text in attracting comments is the one about an international star, but that discussion dates back four decades (!).

If the comments related to politics usually lead the discussion to triviality, half of the comments unrelated to politics or Arnold Schwarzenegger do the same. Three mock the news. Two others bring personal experiences with falsified medicines to the forefront, being the only comments that thus contribute to a public discussion.

G4Media posts about falsified medicines are usually signed with great courage by "Redacția" and include news taken from other sites, international or Romanian. There are 13 such posts relevant to this analysis:

- **May 11, 2020:** Global crime has adapted to the pandemic, warns the Interpol director (signed: Redacția) - comments: 0
- **January 19, 2022:** Gilead company accuses a network of counterfeiters of selling counterfeit versions of its HIV treatments worth 250 million dollars (signed: Redacția) - comments: 2

- **September 17, 2022:** The Ministry of Health appeals to the population to buy medicines from authorized sources and use them correctly (signed: Redacția) - comments: 2
- **February 14, 2023:** Alexandru Rafila on medicines bought online, outside authorized pharmacies: "They represent a danger / We have a lot to do in educating the public, patients" (signed: Redacția) - comments: 0
- **February 24, 2023:** The success on TikTok of an antidiabetic medicine used for weight loss worries doctors (signed: Redacția) - comments: 0
- **February 25, 2023:** National study on the phenomenon of counterfeit medicines and food supplements: 62.3% of people admitted they cannot detect the differences, almost half do not check the packaging (signed: Redacția) - comments: 0
- **April 5, 2023:** Bloomberg analysis: How dangerous are generic medicines from India? Very / Dozens of children killed in recent months by cough syrups or people left blind due to eye drops (signed: Redacția) - comments: 0
- **October 21, 2023:** Fake Ozempic injector pens have been identified in European countries, warn EU regulatory authorities (signed: Redacția) - comments: 0
- **October 24, 2023:** Counterfeit versions of Ozempic, an antidiabetic medicine used for weight loss, have hospitalized several people in Austria (signed: Redacția) - comments: 0
- **October 31, 2023:** After Austria, Belgium also confiscates counterfeit doses of Ozempic, an antidiabetic medicine used for weight loss (signed: Redacția) - comments: 0
- **November 6, 2023:** Counterfeit and fake medicines: EU launches an investigation into AliExpress (signed: Florin Marinescu) - comments: 1
- **February 4, 2024:** Over 1,200 people indicted in the latest operation against drug trafficking in the EU (signed: Redacția) - comments: 1
- **May 29, 2024:** Raids on a network that allegedly falsified over 700 prescriptions for Ozempic and other diabetes medicines, which were sold on social networks to people who wanted to lose weight / Administrator of a private clinic, a nurse, 8 pharmacists, and 3 other defendants were detained (signed: Damian Matei) - comments: 0

The six comments accumulated on the posts are reproduced below:

- Ion: Hexi Pharma is in everything.
- Contra Gica: Ihi, like those from CIPLA in India. Watch the documentary FIRE in The Blood. In fact, the medicines were not counterfeit, they just didn't pay them royalties... Good luck!
- Ghyula: So what are the sources? Like those from 2 years ago, official ones. The bastards are never satisfied. Soon you will only breathe from official sources. They closed the water story because nature doesn't do what the hag from Brussels and the one from Washington want. Nature does what it wants. And it will sweep away these witches perched at the top of the countries. And the punishment for witches is the same as during the Inquisition. And there is still wood.
- Citizen: Those Ukrainian ones sold at the market are definitely good now.
- Regele: communism = theft, deceit, falsification
- Un Ardelean: As long as the manufacturers' margins – after deducting R&D investments – are outrageous, we will always have counterfeit products. And to see how big they are, look at the discounts pharmacies get when buying. You will be shocked...

Except for the comment signed "Regele," all the others connect the theme with conspiracy theories and place it largely in derision. The comment that only apparently makes an exception leads to the political interpretation of the theme, which, in essence, is what the rest of the commentators on this site do, who actually resemble political trolls (Simchon et al., 2022; Verbalyte et al., 2022). Their role is to actually prevent the discussion about the subject (Darmann et al., 2019) and, beyond this anarchic role, to take over a public discourse that reproduces relatively generalized representations in the community about a "normative objectivity" (Lieback, 2019).

Libertatea shows less interest in the theme, with only 8 articles in 10 years, predominantly taken from Romanian news feeds. None of the articles attract any comments:

- **January 28, 2015:** Cancer patients treated with counterfeit medicines. The General Prosecutor's Office conducts large-scale raids (signed: Iulian Simbeteanu).
- **June 14, 2016:** Counterfeit medicines, sold in Romania on the internet and in pharmacies (signed: Petre Dobrescu).
- **March 15, 2017:** How to recognize counterfeit products on the internet. 10 tips from specialists (signed: Gabriela Boceanu).
- **June 7, 2017:** The danger of unauthorized treatments. The black market for medicines on the internet is full of products for cancer and potency (signed: Sorin Golea).
- **January 25, 2018:** Raids on drug traffickers! The suspects sold medicines on the black market in the USA (signed: Remus Vlad).
- **January 26, 2018:** 14 people detained in the case of drug traffickers from Cluj. How they sold pills without a prescription on the internet (signed: Petre Dobrescu).
- **January 28, 2022:** Which counterfeit medicines "treat" us. The black market exceeds 4 billion euros (signed: Simona David).
- **May 29, 2024:** Ozempic trafficking network detected by police. The medicine used for weight loss was illegally reimbursed through CNAS (signed: Ciprian Iana).

Finally, HotNews presents the most interesting case. The vast majority of the 20 articles about falsified medicines by HotNews in the period 2015-2024 are most likely taken from news feeds or news sites. HotNews has paid attention to the subject, but a good part of the texts are signed anonymously as "Redactia Hotnews".

- **January 28, 2015. Counterfeit cancer medications sold through the pharmacy chain Elena** (signed: Hotnews Editorial Team)
- **January 28, 2015. VIDEO: Raids on suspects of tax evasion in the trade of medicines. The damage is estimated at 3 million euros** (signed: Ionuț Băiaș)
- **February 16, 2015. Online meeting: Marius Savu, president of the National Agency for Medicines and Medical Devices, discussed generic medicines online** (signed: Hotnews Editorial Team)
- **March 8, 2016. Pharmacists: Companies import cheap medicines, then export them at high prices. Patients suffer** (signed: Hotnews Editorial Team)
- **March 30, 2016. Klaus Iohannis sends amendments to the Pharmacy Law for re-examination** (signed: Hotnews Editorial Team)

- **June 10, 2016.** Millions of dangerous medicines confiscated by Interpol. Their value exceeds 46 million euros. Almost 5,000 websites selling them were closed (signed: Hotnews Editorial Team)
- **June 14, 2016.** Raids on people selling counterfeit medicines dangerous to health online. The damage is 300,000 euros (signed: Hotnews Editorial Team)
- **September 30, 2016.** Counterfeit medicines cause losses of 10 billion euros per year to the EU pharmaceutical industry (report) (signed: Hotnews Editorial Team)
- **January 30, 2019.** New regulations regarding the sale of medicines on the internet (signed: Ana-Maria-Mihaela Teodorescu)
- **February 7, 2019.** Pharmacists will be able to scan the code of each box of medicines to check if they are counterfeit (signed: Alina Neagu)
- **February 20, 2020.** Inclusive Investigation: Organized crime fights with the pharmaceutical industry and authorities (signed: Hotnews Editorial Team)
- **March 25, 2020.** Europol warning: Criminal groups flood markets with alleged remedies against coronavirus (signed: Hotnews Editorial Team)
- **April 9, 2020.** Wave of counterfeit medicines caused by the COVID-19 pandemic (signed: Hotnews Editorial Team)
- **June 22, 2020.** WHO calls for increased global production of dexamethasone / "Do not take it preventively as it could cause harm. Beware of counterfeit medicines" (signed: Hotnews Editorial Team)
- **July 7, 2020.** Smuggling and counterfeiting, general overview – How big is the phenomenon, what products it includes, and what has changed due to the Covid-19 crisis (I) (signed: Vlad Barză)
- **December 24, 2020.** Appeal from medicine manufacturers: During the holidays, counterfeit or fake health products may appear. Do not risk your health! (signed: Alina Neagu)
- **January 24, 2023.** WHO calls for immediate measures after hundreds of children allegedly died from counterfeit cough syrups (signed: Sebastian Jucan)
- **October 24, 2023.** The counterfeit version of the most popular weight loss drug, Ozempic, can lead to death (signed: Hotnews Editorial Team)
- **June 28, 2024.** 193 people indicted in the USA in a health fraud case with damages of 2.75 billion dollars (signed: Andrei Georgescu)
- **November 10, 2024.** Traian Băsescu warns about the abusive use of his name in the promotion of online medicines (signed: Alexandra Coșlea)

Comments were allowed on only one of the articles, although the news site allows comments on a good portion of its posts. The article that has comments enabled is from June 2024 and refers to counterfeit medicines in the USA, but it does not attract any comments. Subsequently, the site did not allow comments on an article from November 2024 in which former President Băsescu mentioned counterfeit medicines, even though it usually accepts comments on articles related to politics. It can be speculated that the decision is made for financial efficiency reasons: allowing comments requires moderation, and the site is interested in optimizing costs. Allowing readers to comment in less attractive areas implicitly means a greater load for the employees who perform moderation, which means additional costs. Hence, there may be a tendency to leave the comment section open only on posts where more comments are expected.

HotNews, however, presents an extremely special situation that makes it valuable for this investigation: from time to time, the portal has dialogues between guests and readers. This practice has existed almost since the site's inception: the guest is in the studio, the camera is on, video streaming is present, and site visitors ask questions in writing for almost two hours. The guest responds in writing to the received questions. A moderator removes questions that are not appropriate to the topic.

HotNews had such an action that also led to a few words about counterfeit medicines on October 30, 2018, when the guest was the executive director of ARPIM (October 30, 2014. webPR: Online meeting Problems in the Romanian medical system – a life struggle for patients. The Executive Director of ARPIM Dan Zaharescu discussed online with readers, signed: Hotnews Editorial Team). The resulting post is not of interest for this report in terms of time coverage (it falls outside the analyzed period), but it creates context for a second similar meeting on February 16, 2015, with the president of the National Agency for Medicines and Medical Devices, an article included in the list above. The discussion was centered around generic medicines and included a component about counterfeit medicines, sparked by the last question from a reader. I reproduce the question exactly, which practically plays the role of a "comment" in the logic of this analysis:

andreesanu • Why have counterfeit medicines reached Romania? How do you control the quality of imported medicines? How do medicines in Romanian pharmacies end up costing double or triple the prices in the EU? Why do some basic medical devices have prices of 50-60 million old lei, for example, a hearing aid implanted in one ear in 5 minutes at a private clinic costs as much as the pension of an average Romanian for 6 months?

2.2 REACTIONS ON FACEBOOK

On Facebook, I identified only four news articles related to the interest of this report, using the terms "medicines" and "counterfeit" and being issued by the Romanian press. Beyond the rather restrictive condition related to the terms, the number of search results is small anyway and again suggests the lack of current public interest in the topic. All four news articles contained video content, generated by:

- **Mehedințiul Meu**, February 21, 2023, **COUNTERFEIT MEDICINES SOLD ONLINE**, <https://www.facebook.com/watch/?v=6510745928955196>, 3 Likes, 260 Views, no comments.
- **TV Știri**, May 24, 2024, **A network of pharmacists and doctors led by a nurse trafficked large quantities of medicines with falsified prescriptions**, <https://www.facebook.com/watch/?v=1879856545787959>, reactions (3 Likes, 2 Wow), 566 views, no comments.
- **ProTV**, February 5, 2022, **Medicines that endanger your life**, <https://www.facebook.com/watch/?v=612324539869381>. 15,000 views, 201 reactions (likes, wow), 22 comments.
- **Realitatea.NET**, October 4, 2022, **INSPECTIONS at pharmacies and medicine distributors in Romania - Competition Council, investigation about anticoagulants**, <https://www.facebook.com/portalu.realitatea.net/posts/10167369460050019>, 1 Like, no comments.

The reactions to the ProTV news article are 22. Some are irrelevant due to the sense of falsification left by the account from which the comment was made. Other comments are simple trolling posts (for example, a supposed Dana Enache says "Tu essca cum dracu nu teai schimbat eu aveam 16 de cand team vazut tu tot asa esti stiu ca te machiaza dar te intreb cum ...esti asa"). However, there are a number of comments that are useful in understanding the reporting patterns on counterfeit news. Noting that the news refers to "Inspectorul pro discovered a site that illegally sells medicines," here are the useful reactions grouped by type within the analysis:

Blame on the buyers:

- **Lidia Vi:** That's what happens when people are gullible.
- **Sergiu Fendrihan:** Well, we have to be careful, there are many scams.

Blame on the authorities and the "system":

- **Razvan Cristian Ion:** Romania has no laws... that's great! Who is responsible? All the guilty should be impaled.
- **Cristian Daniel Andritoiu:** You are dealing with the Romanian mafia.
- **Jeny Nancu:** Oh Lord, how they play with people's lives for money, they got infected by Ursula with the experiments that make us guinea pigs.
- **Mihai Szabo:** And what should we do, if for example in the case of ALS, there are no medicines, and I have to buy from India or Japan. We live in a crappy medical system, really crappy, there are too few doctors who don't accept money to pay attention to patients!!!

The need to punish the perpetrators:

- **Jeny Nancu:** Oh Lord, give them according to their deeds.

General conspiracy theories:

- **Lidia Vi:** Everything is counterfeit, even the food in stores, but you don't say anything about that?

Blame on profit-hungry producers and distributors:

- **Veronica Asaftei:** The poor common man goes where it's cheaper.
- **Marin Daniela:** Medicines are enormously overpriced from the producer to the patient. Intermediaries who produce nothing, just indirectly suck money from the sick. (2 Likes)
- **Dan Glodeanu:** Pharmacies should sell at the internet price and no one would buy from the scammers anymore.

Emphasis on prevention:

- **Valeria Luchian:** Stop buying weight loss products, girls.

2.3 COMMENTS ON DIETARY SUPPLEMENT DISTRIBUTORS' WEBSITES

On the Secom website, I selected the four most searched supplement brands, according to the site's statement (on the site, go to "Supplements" and the most searched brands appear on the right). At the time of the analysis, these were, in order, Good Routine, Solaray, ChildLife, Jarrow. For each, I considered the six best-selling products (the classification is also from the site). For these, I analyzed

the reactions to the six best-selling products, studying the comments from the period June-October 2024.

Most comments refer to generalities. Specifically, on the Secom site, it seems that there is a request to evaluate the purchased product immediately after receipt. The site's option seems to be to impose comments in the spirit practiced by Chinese merchants (AliExpress/Alibaba, Temu, etc.): you can leave comments only for a short period after receiving the product. However, as some of those who left comments noted, especially for medicines and supplements, the effects can be seen over time. This did not prevent reactions such as: "my child has visibly improved their immunity."

In the context described by the elements specified above, it should be noted that none of the comments on Secom refer to counterfeit medicines, with consumers not using this term for comparison.

2.4 CONCLUSIONS

Summarizing this review of reader comments on press articles and distributor sites, a few major ideas emerge. On the one hand, the vehicle that aggregates and amplifies public interest – the press – has a reduced concern for the subject. The interest of the press is mainly sparked by reports from the European level, communications from Romanian officials, major crisis moments (COVID-19), the increase in sales of Ozempic (2024), and police statements.

The impact is most likely extremely reduced. The few comments describe, on the one hand, the lack of public engagement and, on the other hand, the dryness of press reports, coming from journalists whose documentation in the field seems to be at most superficial. Some articles are in fact simple reproductions from other sites that often provide (poor quality) translations of foreign news, which in turn are not necessarily successful copies of the original news.

The types of reactions, as few as they are, also define the audience of the analyzed sites: personal reports in the case of Adevărul, trolling in the case of G4media, no reaction at Libertatea, the decision not to allow comments in the case of HotNews.

The implications for the development of the questionnaire were simple: It was necessary to first carefully investigate the notoriety of the topic, the knowledge of the concept, testing the extent to which respondents overlap their own definition with the meaning given by OSMR to falsified medicines. Expectations were related to a reduced interaction of the population with the debate about falsified medicines. The results are presented in the next chapter.

Observing the comments on the ProTv news distributed by Facebook suggested the need to measure the attitudinal positioning towards the consumption of medicines.

3.RESULTS: SURVEY DATA

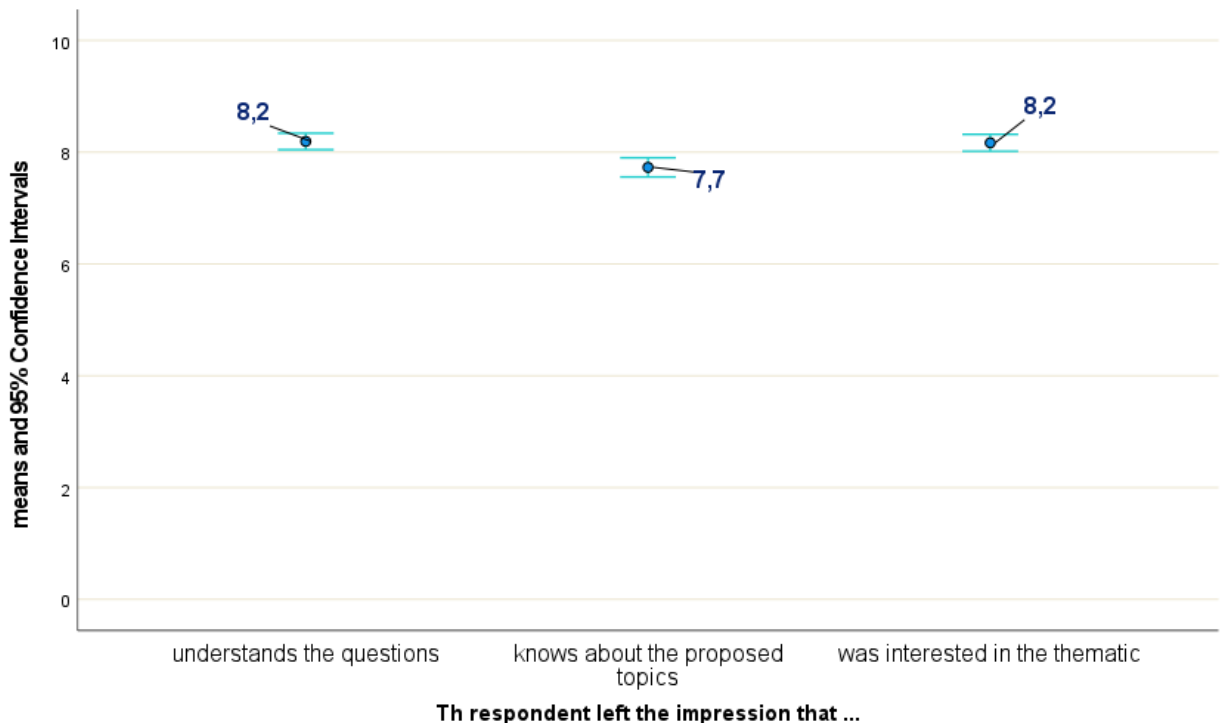
3.1 KNOWLEDGE ABOUT FALSIFIED MEDICINES

We begin exploring the survey data by discussing the notoriety of falsified medicines. Considering the investigation from the previous chapter, it is necessary to account for potential desirability effects in respondents' answers. Therefore, we used different methods to estimate what is truly known: interviewer evaluation - Interviewers assessed whether the respondents were genuinely interested in the subject; Respondent Declarations - Respondents declared whether they knew about counterfeit medicines or not; Identification of Properties - An evaluation of how well respondents identified the properties of counterfeit medicines.

3.1.1 EXTERNAL EVALUATION

The first thing I propose we look at is not the respondents' opinions but how those who administered the questionnaires describe the respondents. It is useful in this context to recall the data collection process. The survey was conducted face-to-face. In other words, a "field operator," whom we also call an "interviewer," visited the randomly selected address and, in case of contact during the minimum 3 scheduled visits, quickly made a table with those living at that address. Then, the interviewer selected the adult who was to have the next birthday. This person was given the questionnaire. The field operator read the questions and answer options, and the respondent answered with their own choices. At the end, the interviewer had to answer a few questions regarding the interview.

Figure 3. Field operator's assessment of respondents



Note: The points with attached values (8.2; 7.7; 8.2) represent the averages of the responses to the respective questions. The intervals around the averages are 95% confidence intervals (if we repeat the survey 100 times, these intervals represent the range where at least 95 of the estimated averages will fall).

This subchapter discusses these questions. We asked the interviewer to tell us if the respondent seemed to understand the questions, was aware of the issues addressed, and was interested in the topics discussed. Each such question was scaled from 0 to 10, with higher values indicating a closer alignment of the respondent with the questionnaire's theme. Figure 1 describes the responses to the three questions. The averages are around 8: higher regarding understanding and interest in the questions, slightly lower regarding the actual knowledge of the issues addressed. Overall, as shown in the appendix with the distribution of responses, only 10-11% of the sample falls below the theoretical midpoint of the scale (5), and the majority are rated on all questions with scores of 9 or 10, indicating good knowledge, interest, and understanding of the issues addressed.

In essence, this is good news for OSMR and ANMDMR: the topic is of interest to citizens. Of course, the interviewer's evaluations may also be distorted. However, the operators have experience in data collection and had the opportunity to compare several respondents, thus having a relatively objective evaluation of them. Beyond potential distortions, this is the best external evaluation we can operate with for now.

With these precautions in mind, we proceeded to construct an interest indicator for the questionnaire's issues based on the three items discussed in this subchapter so far. The multivariate analysis of the resulting indicator leads to several important conclusions:

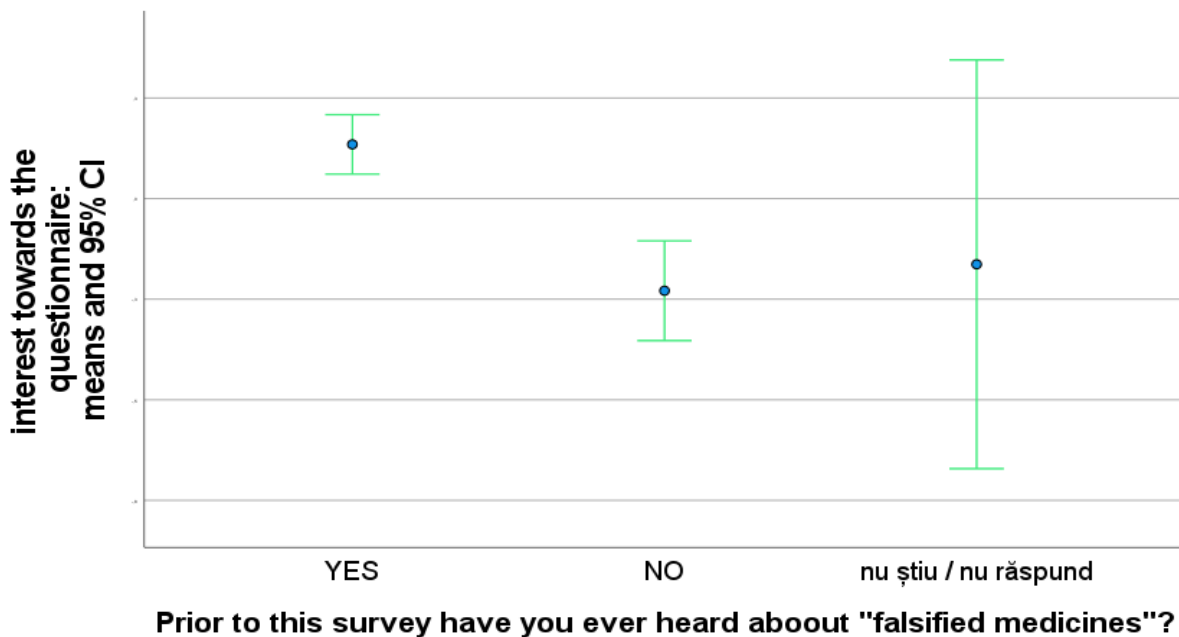
- There are no differences between respondents associated with age, gender, monthly income, migration experience, or marital status, household size, presence of children, elderly, or those with chronic illnesses in the household.
- Interest is higher among those with higher educational attainment.
- Interest is higher among those from wealthier households.
- Interest increases with the number of contacts with medicines and healthcare (medicine consumption, someone in the household, chronic illnesses, or conditions in the last six months, for the respondent or someone close).
- Interest is higher among those who define themselves as more satisfied with their own health.
- Medical literacy increases interest in the issue, but the conversion is not significant: a one percent increase on the medical literacy scale is equivalent to an increase of approximately 0.1% on the interest scale for the addressed topic.
- Interest is lower among those more prone to risk-taking.
- The density of medical service offerings (pharmacies, general practitioners, hospitals) in the locality has no impact on interest in the questionnaire's topic.
- The more over-the-counter medicines sold in the county's pharmacies, the higher the interest in the addressed topic.
- There is no association with the sale of dietary supplements.

- However, there is a decrease in interest as the volume of prescription (RX) sales increases at the county level, and an increase in interest when the number of units sold without a prescription rises.

3.1.2 SPONTANEOUS AWARENESS

Avoiding jumping to conclusions related to the above, it is good to add a second element to the picture of knowledge about counterfeit medicines: the declared notoriety of the topic. We asked the respondents if "Before this survey, had you ever heard of 'falsified medicines'?" Two-thirds answered positively, while one-third said they had not heard of such a thing. It is possible that the calculation of the proportion of those who know about falsified medicines is slightly overestimated due to desirability effects: they did not want to be looked down upon by the interviewer. However, the connection with the external evaluation provided by the interviewers is strong (Figure 4), which leads to the hypothesis that the notoriety is likely not far from 65%, as indicated by the initial estimate.

Figure 4. The relationship between awareness and interest in the topic



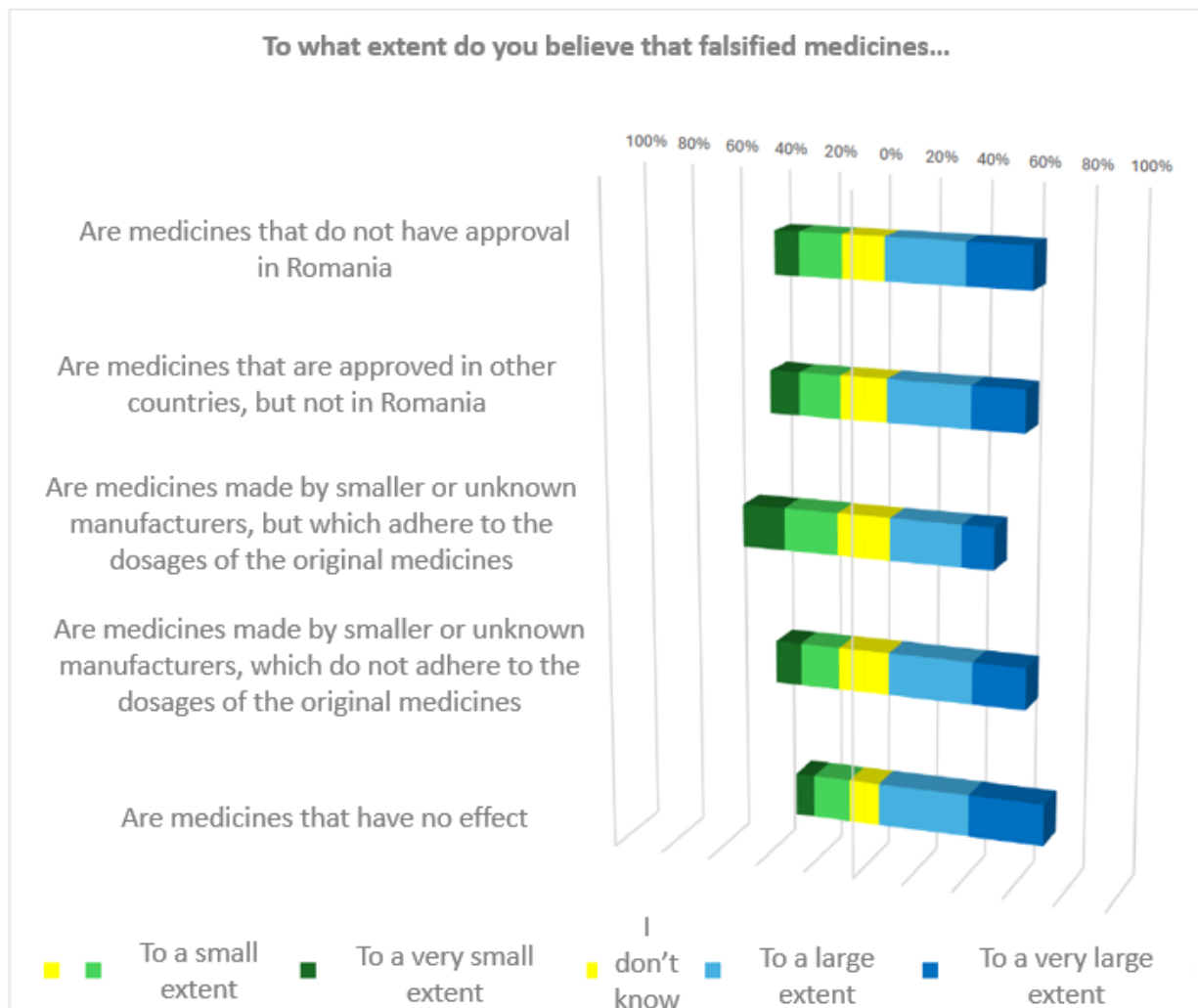
The multivariate analysis reveals the stability of the association with interest in the addressed topic (the association remains strong even after eliminating the influence of all potential explanatory factors presented in the methodology chapter). Additionally, the following associations are observed:

- Women are twice as likely as men to say they have heard of falsified medicines.
- Those who prefer to avoid risks are slightly more likely to claim they have heard of falsified medicines.

3.1.3 DEFINITION BY PROPERTIES

In the previous subsection, we tested the spontaneous awareness of falsified medicines. In other words, we wanted to see how respondents react to the mention of the term " falsified medicines" as it is. We asked if they would tell us whether they had heard about them without explaining what the term refers to. Of course, these statements may include desirability effects: the respondent answers positively just to avoid being disregarded or to please the interviewer, to show that they know and are not outside the contemporary flow of knowledge.

Figure 5. Defining Falsified Medicines by their possible traits

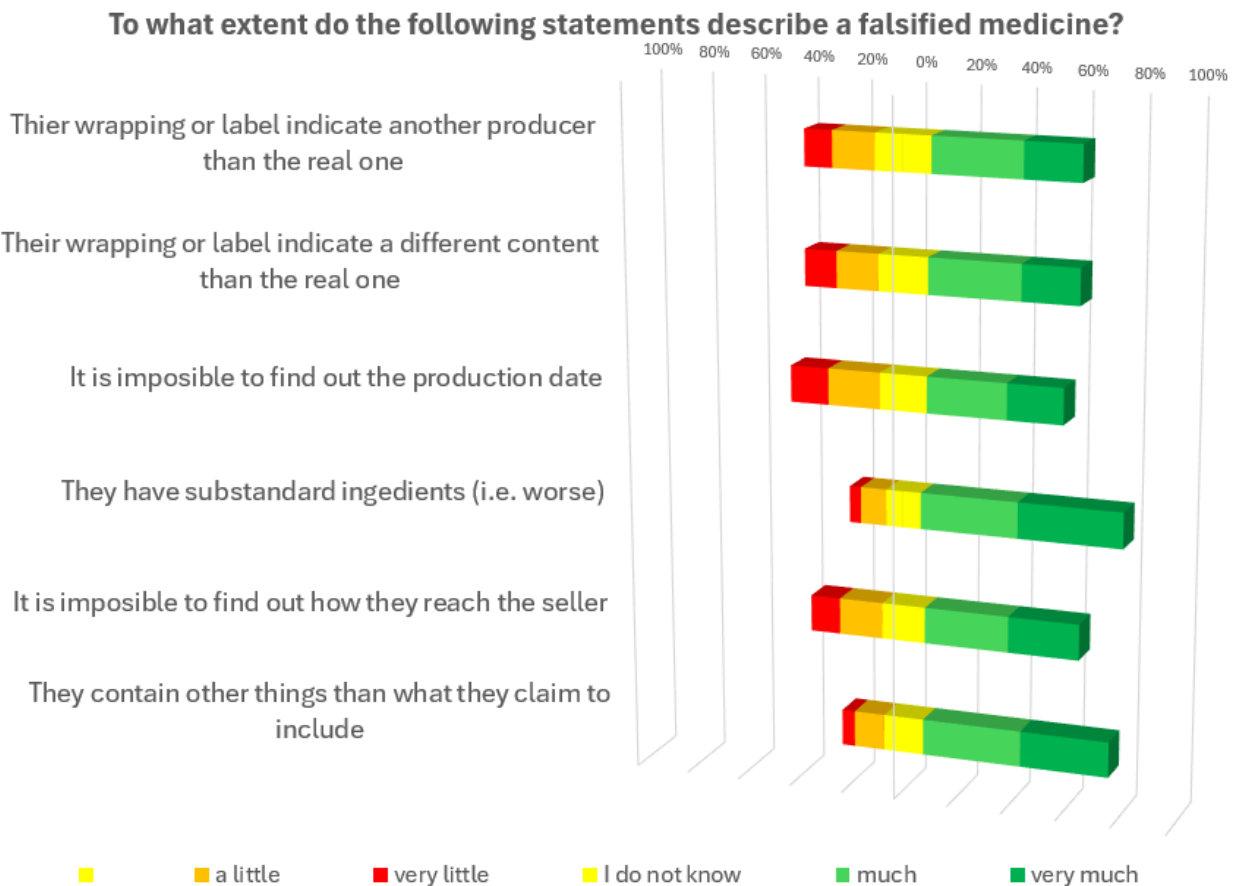


Note: For each item, the difference up to 100% is accounted for by those who did not respond. Their proportion is very small, ranging from 0.001% to 0.05%. Therefore, this category was excluded from the graph to facilitate its readability.

To eliminate these distortions, we evaluated the interest in the topic at the end, as already explained above, for an even better reassessment of the response quality. Immediately after testing spontaneous awareness, we proceeded to test the extent to which elements from the standard definition of counterfeit medicines are considered by respondents to be true characteristics of these medicines.

To avoid inducing other desirability effects, we adopted a **three-step procedure**. First, we offered some possible traits of falsified medicines that do not overlap with the definition (Figure 5). More precisely, a falsified medicine can have any of these characteristics, but they do not define it as counterfeit. Moreover, some of these characteristics can theoretically be applied to non-falsified medicines as well. These items in Figure 5 allow the construction of a confusion score, which shows to what extent a respondent has rather vague ideas about what falsified medicines are. Additionally, each item allows the evaluation of the spread of certain stereotypes about medicines, being useful in the communication process about them.

Figure 6. Knowledge about specific characteristics of falsified medicines



Note: For each item, the difference up to 100% is accounted for by those who did not respond. Their proportion is very small, ranging from 0.001% to 0.6%. Therefore, this category was excluded from the graph to facilitate its readability.

The second step involves effectively testing the knowledge about what falsified medicines truly are. Figure 6 includes the second set of relevant items, which represent the real characteristics of falsified medicines. We requested the same type of evaluation for these items as we did for the uncertain properties of medicines discussed in the previous paragraph. The items in Figure 6 are used to construct a knowledge score about falsified medicines.

At the end, all items are used to evaluate the actual access to information. Specifically, we counted how many times each respondent answered "I don't know" and thus constructed a score of effective interaction with the concept of counterfeit medicine.

Keeping in mind the purpose of these questions, it is time to discuss the results of the two sets of items. As mentioned, we started by offering a series of alternatives that are not directly related to the definition but could (or could not!) be consequences of counterfeiting (Figure 5):

- ? There are medicines that are not approved in Romania
- ? There are medicines that are approved in other countries, but not in Romania
- ? There are medicines made by smaller or unknown manufacturers that respect the doses of the original medicines
- ? There are medicines made by smaller or unknown manufacturers that do not respect the doses of the original medicines
- ? There are medicines that have no effect

We found that, in general, one in five respondents declared that they did not know how to answer the question. Only for "there are medicines that have no effect" did the proportion of "I don't know" responses drop to 12%. This figure is high for an opinion poll and strongly indicates a lack of knowledge.

Those who offer opinions about the components under discussion tend to allocate them mostly as part of the characterization of counterfeit medicines: just over 50% believe that they are not approved in Romania (56%) or that they are approved in other countries but not in Romania (54%). 54% believe that they are medicines made by smaller or unknown manufacturers that do not respect the doses of the original medicines. 60% consider them to be medicines without effect. 41% believe that they are actually medicines that respect the correct formula but are produced by small or unknown manufacturers, a kind of artisanal products.

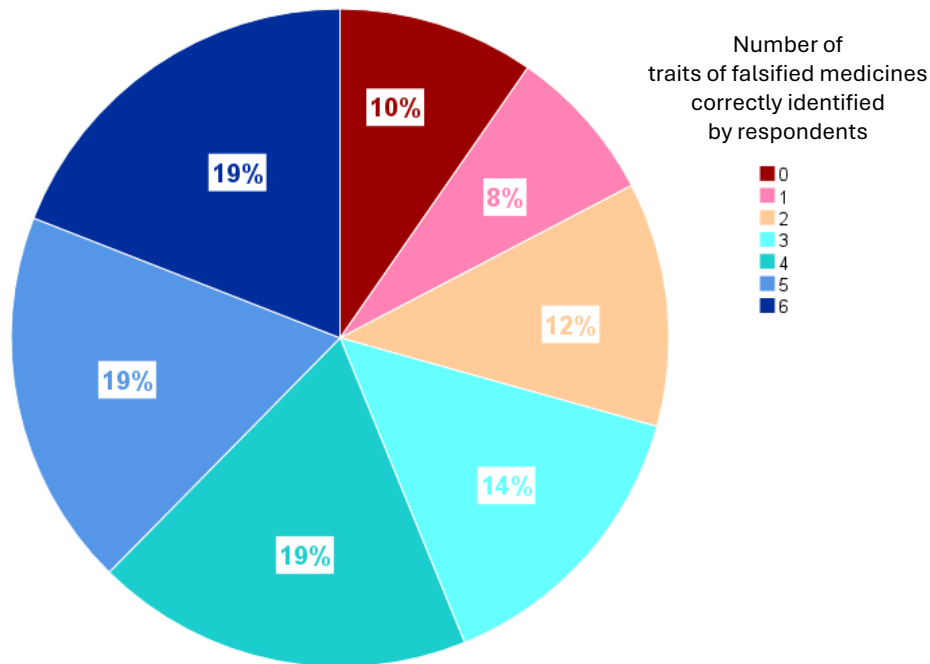
As mentioned, we used these items to construct a confusion score. This indicates how much the respondent is tempted to describe falsified medicines with inaccurate or incomplete properties.

Similarly, we proceeded with the knowledge score. This score is based on the items in Figure 6. Again, the number of "I don't know" responses is high, ranging between 13% and 21%. Half of the respondents (51%) say that the label incorrectly indicates the manufacturer. A similar figure (54%) concludes that the label falsifies the ingredients. 49% consider that the manufacturing date is impossible to determine, 74% believe that the ingredients are inferior, 57% think that the distribution

chain is uncertain, and 68% believe that the falsified medicine contains something other than what it claims to contain.

An intuitive way to evaluate these responses is to count, for each respondent, the number of items in this package to which they responded with "to a very large extent" or "to a large extent," thus expressing agreement with one of the properties of falsified medicines. The results indicate the presence of a majority (57%) who correctly identify at least 4 out of 6 characteristics, which represents an apparently more optimistic estimate than the IGPR report from 2023. The IGPR report estimated that 60% declared they could not differentiate a falsified medicine from an authentic one. However, I reiterate the caution related to the impossibility of evaluating the quality of this measurement, as well as the fact that the IGPR estimate and the one we conducted are not perfectly comparable. The IGPR estimate refers to a subjective representation, while the one we proposed is a cognitive test.

Figure 7. The number of characteristics of falsified medicines that were correctly identified by respondents out of a total of six characteristics.



Note: The characteristics analyzed are those from Figure 6.

It is also notable that 10% of respondents do not correctly identify any characteristics (Figure 7). These individuals are prime targets for communication campaigns and may also be among those who have the potential to consume falsified medicines. Both hypotheses will be analyzed. However, in this chapter, we will only discuss the profile of those who know less (with consequences for communication campaigns), while the connection with exposure to consumption will be addressed in Chapter 3.3.1 *Representations about the effects of falsified medicines*.

Before proceeding, let's observe the distribution of those who responded with "I don't know" to the questions from both sets discussed in this subsection. There are a total of 5+6=11 items. 60% of respondents did not say "I don't know" at all, 16% said it once, 10% said it twice, 5% said it three

times, 4% said it four times, 3% said it five times, 3% said it six times. No one indicated "I don't know" 7, 8, 9, 10, or 11 times.

It is now time to analyze the differences among respondents regarding the confusion score, the knowledge score, and the number of "I don't know" responses. As in the other subsections of this report, I will list below only the statistically significant relationships, meaning those that we are confident will be found in the population. More precisely, we will observe them as such if we repeat the study on at least 95 out of 100 similarly constructed samples. For better visualization, I have grouped the results by types of explanatory factors.

- The confusion score is higher among women than men. Additionally, women give fewer "I don't know" responses.
- Those with higher incomes give fewer "I don't know" responses.
- The more positively individuals self-evaluate their health status, the lower their knowledge score about falsified medicines and the fewer "I don't know" responses they give.
- Those who usually purchase medicines themselves have lower confusion scores.
- Higher medical literacy increases both confusion and knowledge.
- Those who say they can decipher information about diseases found online have systematically higher confusion scores and give fewer "I don't know" responses, without necessarily increasing their knowledge.
- Those predisposed to believing fake news systematically give fewer "I don't know" responses and have a lower knowledge score.
- Individuals who prefer to avoid risks tend to have higher confusion scores but also higher knowledge scores. Conversely, those who take risks to gain more tend to give fewer "I don't know" responses.
- In areas with a higher density of family doctors relative to demand, the proportion of "I don't know" responses increases. Conversely, the probability of responding "I don't know" slightly decreases ($p < .10$) in places with more hospitals.
- In counties where more prescription medicines are sold, the likelihood of responding with "I don't know" decreases. In areas where more over-the-counter medicines are sold, both the confusion score and the knowledge score slightly decrease. However, the knowledge score increases in places where more dietary supplements are sold.

An overview of these results highlights the importance of observing those who frequently say "I don't know," or more precisely, those who rarely say it. On one hand, the types of associations with other variables indicate that there is an avoidance of declaring "I don't know" about counterfeit medicines among those with a higher status, as well as those predisposed to believing fake news or receiving medical advice from anyone. In areas where more prescription medicines are sold (i.e., where people visit doctors more often), the probability of saying "I don't know" decreases, suggesting the importance of utilizing family doctors beyond their mere physical presence. In other words, it is not enough for family doctors to exist (as their presence increases "I don't know" responses); the question is whether they actually interact with their patients.

Personal interaction with medicines increases both knowledge and confusion. This suggests that pharmacies are a good place to place communication materials. Considering the

conclusion of the previous paragraph, an effective communication campaign would rather choose pharmacies over family doctors.

There is a higher presence of confusion in social strata exposed to fake news, unverified advice, or those who prioritize profit and take risks. These categories likely also have a high risk of being exposed to falsified medicines (as will be shown in Chapter 3.3.1 *Representations about the effects of counterfeit medicines*). The somewhat paradoxical recommendation for those who want to avoid using falsified medicines is to use typical fake news dissemination media, such as Facebook and TikTok, as these are credible to those exposed to falsified medicines.

The analysis of the relationship between the knowledge scores, confusion scores, and the proportion of "I don't know" responses provides some clarifications on how respondents construct their representations of falsified medicines. On one hand, the confusion score and the knowledge score are linked to each other. In other words, although it may seem counterintuitive, those who are better at identifying falsified medicines also have many stereotypes that extend the definition beyond its limits. Consequently, we are dealing with an interesting group of respondents who correctly identify counterfeit medicines out of excessive caution: they are suspicious of everything and tend to classify many medicines as falsified.

At the same time, there is a weak association between confusion and "I don't know," meaning that those with a higher confusion score tend to say "I don't know" less often. Additionally, the knowledge score decreases for those who frequently say "I don't know."

To better explore these placements on the three scores, we conducted an analysis that allows the classification of respondents into relatively homogeneous groups. The analysis reveals the presence of three groups of respondents:

- Low confusion, low knowledge, few "I don't know" responses (30% of the sample)
- High confusion, high knowledge, few "I don't know" responses (38% of the sample)
- Medium confusion, medium knowledge, many "I don't know" responses (32% of the sample)

It should be noted that "many," "few," and "medium" in the above categories represent relative positions compared to the rest of the sample. In the first two groups, the proportion of those who do not give any "I don't know" responses is 83% and 85%, respectively. In the last group, there is no respondent who does not say "I don't know" at least once to the 11 questions we are discussing.

The primary group of interest regarding the risk of exposure to falsified medicines is the first group: people who believe they know a lot (few "I don't know" responses, with only 17% having given at least one "I don't know"), but who actually ignore the characteristics of counterfeiting (low knowledge), even though they do not generate confusion.

With the observation that analyses for each individual indicator (knowledge, confusion, "I don't know") are more precise, here is the characterization of the factors that favor placement in the first group, where there are few "I don't know" responses:

- Are more educated.
- Do not have minors between 5 and 18 years old.

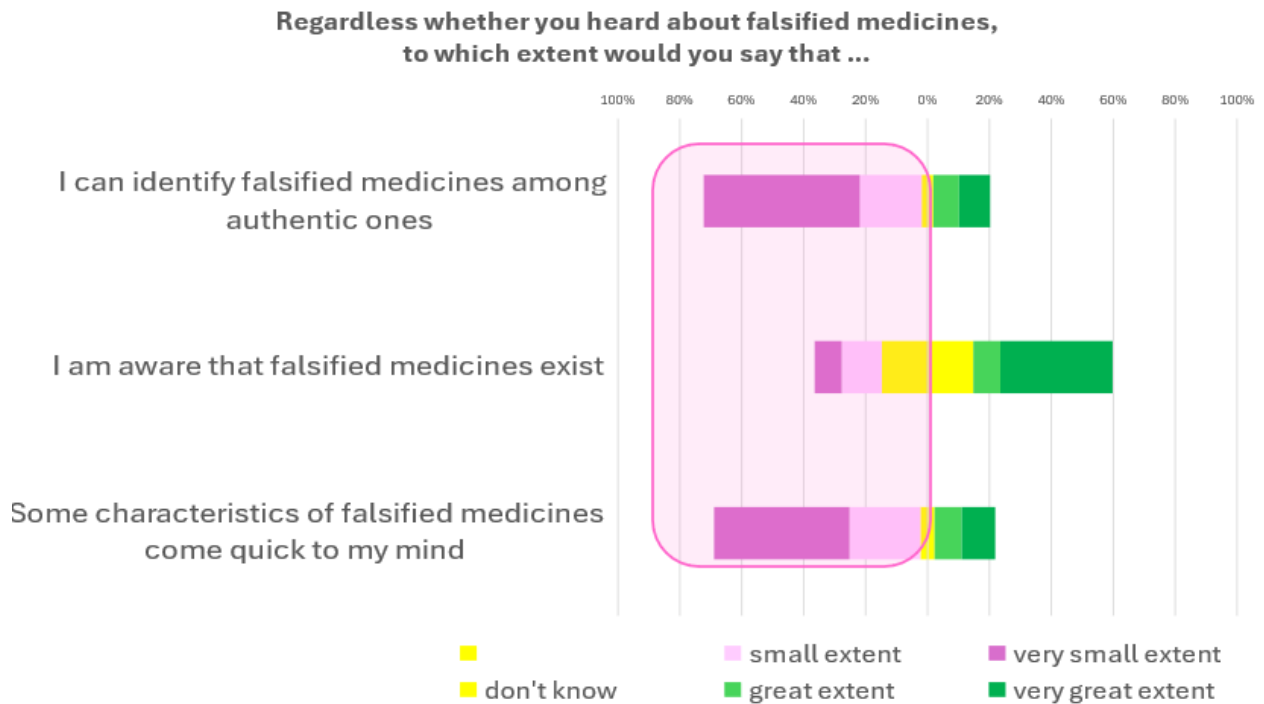
- Do not have adults over 65 years old.
- Come from larger households.
- Have lower medical literacy.
- Prefer to take risks.
- Are more likely to believe fake news.

In other words, we are talking about educated individuals with low medical literacy, exposed to fake news, and with fewer family members requiring medical care. This underscores the need to disseminate information through networks accessible to them.

3.1.4 AWARENESS

One final option to investigate knowledge about falsified medicines is related to awareness of their presence. The idea of the scale used is directly taken from Ofori-Parku & Park (2022), who used it on a sample in the United States with reference to falsified medicines.

Figure 8. Scale of awareness of falsified medicines



Note: For each item, the difference up to 100% is accounted for by those who did not respond. Their proportion is very small, below 1%, therefore that category has been excluded from the graph to facilitate its readability.

There are three items included in the scale (Figure 8), which show a large majority (71%) who say they cannot identify falsified medicines, 30% who do not know if they are aware of the existence of falsified medicines, and another majority (67%) who cannot quickly say what falsified medicines are. Overall, it becomes even clearer that there is no strong awareness of the concept.

The distribution of responses to the three questions, and especially the large number of "don't know" responses to the second question, make it impossible to construct an indicator from the three items. Instead, I used the first and third items to create an average that reflects awareness or, more precisely, the subjective representation of awareness of the presence of counterfeit medicines. I also studied this indicator and concluded that:

- Reported awareness is lower in wealthier households.
- Awareness increases if there are chronically ill individuals.
- The subjective representation of awareness increases among those who consider themselves healthier.
- Awareness decreases if other household members usually buy medicines.
- Those who say they can assess the information about diseases on websites have a higher level of subjective awareness.
- Awareness decreases among those who believe that a counterfeit product is as good as a "branded" one and increases among those who say that what you buy without an invoice is as good or better than original or official products.
- Subjective awareness also increases among those who tend to take risks to earn more.
- Awareness decreases when the number of pharmacies relative to the population in the area increases and when there are more hospitals nearby.
- Subjective awareness is higher in counties where more dietary supplements are sold, as well as in those where fewer over-the-counter (OTC) medicines are sold.

3.2 INTERACTION WITH MEDICATION CONSUMPTION

3.2.1 SOURCES OF INFORMATION ABOUT MEDICINES

44% of the sample says they have heard about falsified medicines on television. 6% mention the radio as a source, 21% social media, 8% the written press and news websites, 5% other websites, 15% from other sources, 2% do not remember where they heard it from, and 35% have never heard of falsified medicines. Obviously, some have heard from multiple sources, hence the impossibility of summing up the mentioned figures.

78% would like to learn more about these falsified medicines. The percentage increases to 82% among those who have already heard about such products and decreases to 73% for those who had not heard of falsified medicines before the survey. Thus, we are dealing with a population eager for information, especially if they have already heard something about the subject. The challenge for the others is to make them hear something about the subject first, and then their desire to learn more about it is likely to increase as well.

Those who do not know and do not want to know about falsified medicines constitute 8% of the sample. This 8% can be an important target to prevent them from becoming a high-risk group. Their profile was constructed considering only status variables and locality-level variables. They are generally less educated, live in areas with a lower load on family doctors, and in counties where many dietary supplements and few over-the-counter (OTC) medicines are sold.

For those who want to be informed (the 78% mentioned above), it is important to observe their preferred communication channel: 64% of them (which is 51% of the sample) mention television,

14% social media channels, 10% pharmacy leaflets, with the rest of the channels attracting only less interesting minorities for communication campaigns on this topic.

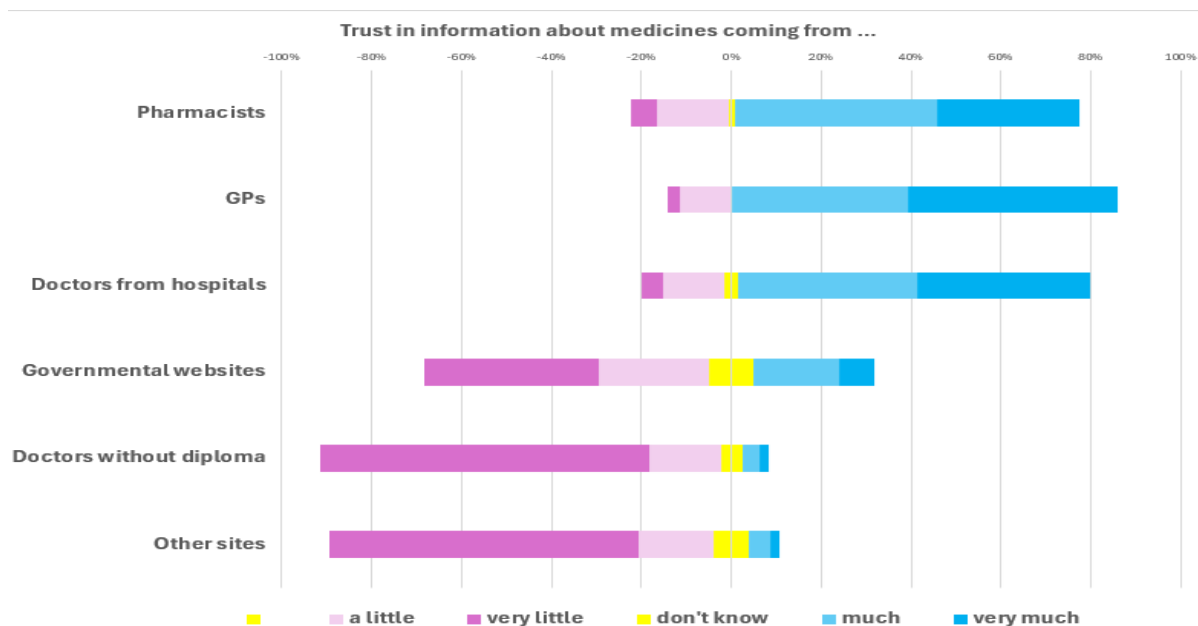
The preferred source of information does not significantly differentiate respondents regarding their knowledge score of falsified medicines. In other words, regardless of the source from which they want to be informed, respondents present the same average knowledge scores. For example, those who want to be informed through social media and those who want to be informed through TV have the same average knowledge score. The same applies to the confusion score, the likelihood of consuming fake news, the consumption of counterfeit articles, and the place where medical advice is sought (doctors, other sources, etc.). Only those who prefer information "from other websites" have a higher probability of preferring counterfeit products compared to those who prefer television or pharmacy brochures.

In this case, the profile of those who prefer TV, social media, or brochures (the channels that attract enough potential consumers to allow statistical analysis) was also constructed. The results reveal that:

- Preference for TV increases with age and is higher in areas where there are more pharmacies relative to demand and where more OTC units are sold. However, this preference decreases in counties where more prescription medicines are sold.
- Women choose social media more than men. Those from wealthier households are also more likely to choose social media.
- Preference for brochures does not show any significant association with any particular status category.

We also tested the trust in several potential sources for countering falsified medicines (Figure 9). Across the entire population, there is an acceptance of certified advice (family doctors, pharmacists, hospital doctors), which reaches trust levels of around 80%, and an almost generalized distrust in any other sources. Notably, there is a lack of credibility in government websites, which likely includes any sites of centrally placed associations. For these, the process of building trust will be slow. Current communication campaigns need to go more through doctors and pharmacists for efficiency and maintain a constant and coherent presence (without major changes) regarding official websites.

Figure 9. Level of Trust in Different Sources of Information about Medicines

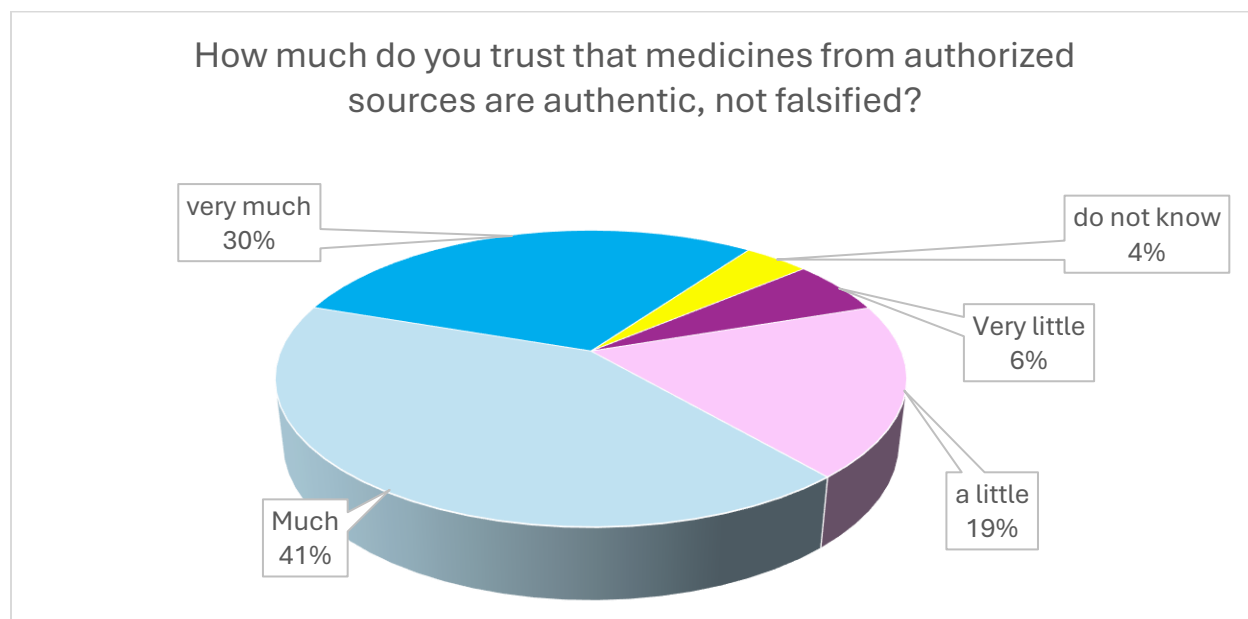


Note: For each item, the difference up to 100% is accounted for by those who did not respond. Their proportion is very small, ranging from 0.001% to 0.5%, therefore that category has been excluded from the graph to facilitate its readability.

3.2.2 PERCEPTIONS ABOUT THE SUPPLY OF FALSIFIED MEDICINES

Directly linked to the trust in system actors is the evaluation of the places where medicines are sold. As illustrated graphically in Figure 10, the majority of respondents are quite confident in the ability of the places where they purchase medicines to select non-falsified medicines.

Figure 10. Confidence in the authenticity of medicines purchased from authorized locations.



I examined how respondents perceive the frequency of falsified medicines in different locations. Seven types of places where medicines can be obtained were considered: physical pharmacies, online pharmacies, other websites, hospital pharmacies, doctors, ambulant distributors, and hospitals. For each of them, respondents were asked if they expect to find falsified medicines there "very rarely/never," "rarely," "often," or "very often/all the time."

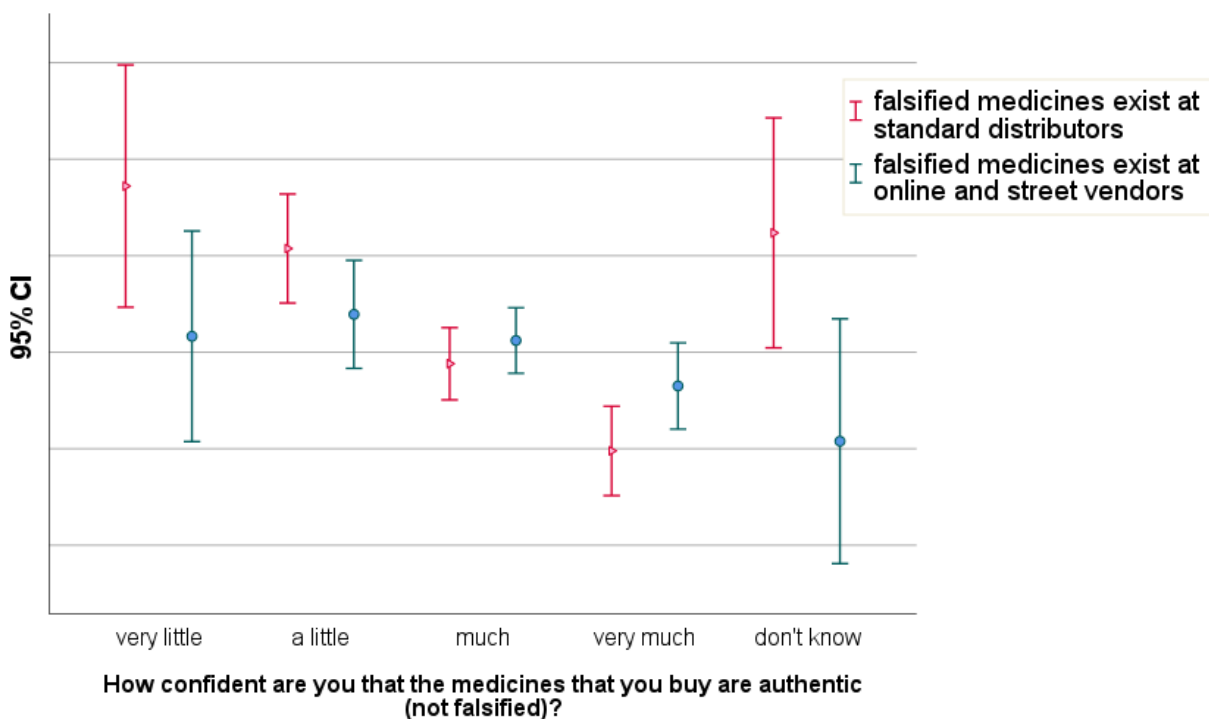
58% of respondents expect to frequently find falsified medicines in online pharmacies, 21% in physical pharmacies, 70% on other online sites, 18% in hospital pharmacies, 74% from ambulant distributors, 16% in doctors' offices, and 16% in hospitals. Therefore, there is a lower level of trust in online and ambulant sales. Again, the number of "don't know" responses is high (11-14% for each type of provider), accompanied by a very low proportion (below 0.2%) of refusals to answer the question. This confirms one of the points already discussed in this report: there is a high interest in the topic of counterfeit medicines, but also a low level of knowledge about them.

I used the responses to the seven questions to calculate two indicators: one about the representations of finding falsified medicines at standard distributors (physical pharmacies,

hospital pharmacies, doctors' offices, hospitals), and the other about finding them at online or ambulant distributors.

Figure 11 takes it a step further and compares these two factors with trust in the distribution chain as a whole. It is observed that trust levels in the medicine supply chain are more strongly correlated with the absence of suspicions of counterfeiting in "standard" chains (pharmacies, hospital pharmacies, doctors, hospitals) compared to suspicions related to new distributors (online, ambulant).

Figure 11. Representations about the presence of falsified medicines at online and street vendors, compared to standard distributors (physical/hospital pharmacies, doctors, hospitals) based on the trust in the overall supply



I also studied the profile of those who trust that authorized pharmacies do not sell falsified medicines, as well as the variation of the two factors that distinctly reflect representations about standard distributors and online/ambulant distributors. The results reveal that:

- Those who have lived abroad have less trust in the distribution chain but do not specify this distrust towards any particular type of distributor.
- As the number of household members increases, there are more representations about a higher frequency of falsified medicines at standard distributors.
- The presence of children under 5 years old in the household decreases trust in the overall distribution chain but increases trust in standard distributors.
- The presence of minors between 5 and 18 years old in the household increases trust in standard distributors.

- The presence of individuals with chronic illnesses increases the likelihood of having more representations about the frequent occurrence of counterfeit medicines at online/ambulant distributors.
- When other household members also buy medicines, trust in the distribution chain decreases, and representations about the frequent occurrence of falsified medicines at standard distributors increase.
- If someone outside the household buys medicines for the household, the likelihood that the respondent believes falsified medicines frequently appear in both the standard and online/ambulant distribution chains increases. The effect is stronger on distrust in the standard chain.
- Alfabetizarea medicală crește încrederea în ansamblul lanțului de distribuție, și are un efect foarte ușor asupra credinței că nu sunt medicamente falsificate în lanțul de distribuție standard, dar sunt în cel online/ambulant.
- Cei mai expuși la a crede fake news au încredere mai mică în lanțul de distribuție, și identifică mai frecvent decât restul medicamente falsificate în lanțul standard de distribuție. Efectul nu apare și în cazul reprezentărilor despre distribuitorii online/ambulanți.
- Credința că „Ceea ce cumperi fără factură este mai bun sau la fel” este asociată ușor cu neîncrederea în sistemul de distribuire, și foarte puternic cu reprezentările despre prezența medicamentelor falsificate și în lanțul standard și la distribuitori online/ambulanți.
- Cei predispuși să ia în considerare sfaturi medicale de oriunde au probabilitate mai mare să aibă reprezentări ce indică prezența medicamentelor falsificate și în lanțul standard și la distribuitori online/ambulanți. Efectul este diametral opus la cei care prioritizează sfaturile medicale din surse certificate (medici de familie, specialiști, farmaciști): acești au încredere în lanțul de distribuție, iar încrederea se răsfânge puternic pe distribuitorii standard și parțial și pe cei online/ambulanți.
- Cei ce preferă să evite riscurile sunt mai suspicioși cu privire la ambele tipuri de distribuitori și la lanțul de distribuție în întregul său. Cei care își asumă riscuri pentru a câștiga mai mult sunt ușor mai neîncrezători în distribuitorii standard, dar mai puțin suspicioși față de distribuitorii online/ambulant.
- În zonele cu număr mare de farmacii și spitale scad suspiciunile față de lanțul distribuitorilor standard.
- Privite la nivel de județ, vânzările de suplimente alimentare cresc suspiciunile față de lanțul distribuitorilor standard, cele de medicamente fără rețetă (OTC) scad suspiciunile față de distribuitorii standard și le cresc pe cele față de distribuitorii online/ambulanți, iar cele de medicamente cu rețetă scad ușor suspiciunea față de distribuitori online/ambulanți. Probabil aici asistăm nu doar la un efect al interacțiunii directe cu cumpărarea ci și al normei sociale de a cumpăra medicamente: când cei din jur intră în contact mai frecvent cu distribuitorii, cunoașterea colectivă crește și crește și capacitatea de a decela între produsele autentice și cele falsificate.

Overall, the tendency to consume counterfeit products and fake news, to believe advice from people without certified medical qualifications, and the dependence on others to buy medicines increase distrust in the medicine supply chain, affecting both standard and online/ambulant distributors. The antidote is medical literacy, direct interaction with distributors, contact with

qualified medical personnel (family doctors, specialists, pharmacists), and having more pharmacies and hospitals in the area.

It is important to note that this is not about gender, age, education, or material status, but about elements related to direct experience and the type of exposure to information. Anticipating the recommendations chapter, we can reaffirm an important conclusion regarding where OSMR can channel its communication efforts: where fake news is gathered and in pharmacy chains. This approach targets two types of audiences: those predisposed to consuming falsified medicines are addressed in areas abundant in fake news, while those with a lower probability receive reinforcement of their attitudes. Both strategies will be detailed in the final chapter, showing how they contribute to building and maintaining trust in the system and positive representations of the authorities in the field.

3.3 EVALUATION AND PROBABILITY OF USING FALSIFIED MEDICINES

3.3.1 PERCEPTIONS ABOUT THE EFFECTS OF FALSIFIED MEDICINES

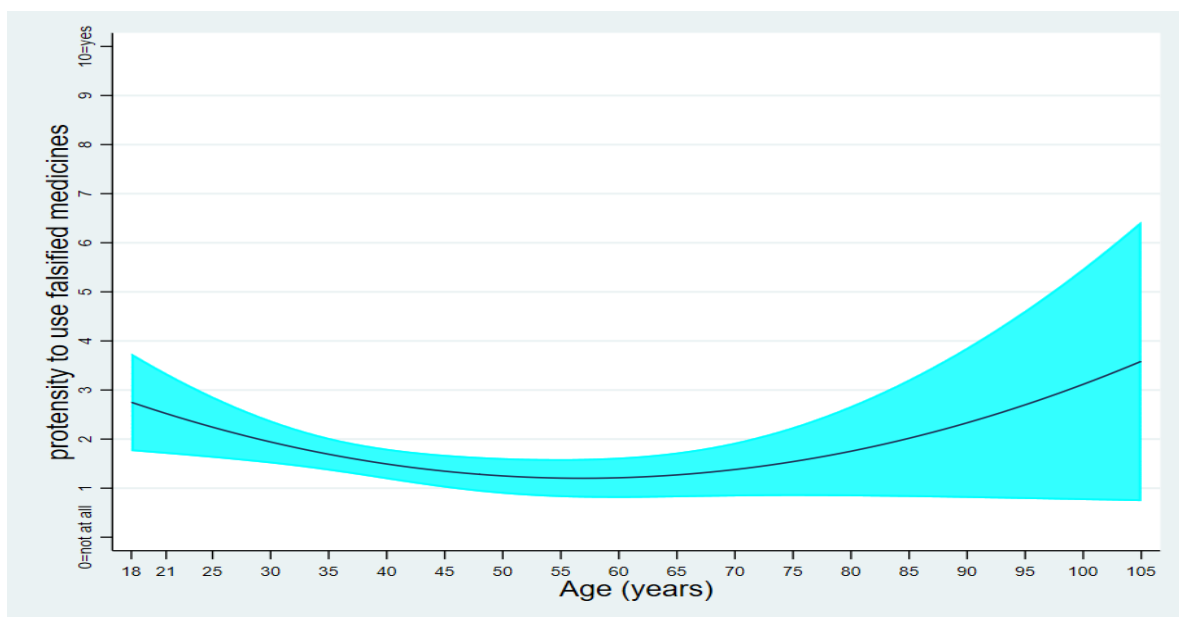
As a prelude to attempting to measure the consumption of falsified medicines, we tested the perception of two types of effects of these medicines:

First, we asked whether they have weaker or better effects compared to "other medicines." Respondents were asked to place themselves on an 11-point scale, where 0 meant "weaker effects" and 10 meant "better effects." An extremely strong majority, considering the length of the scale, 58%, chose 0, indicating "weaker effects." Additionally, 12% indicated that they did not have enough information ("don't know"). Negligibly few (0.2%) refused to answer the question.

Similarly, we contrasted on an 11-point scale the idea that falsified medicines "have fewer side effects" (value 0 on the scale) with the idea that they "have more side effects" (value 10). Again, the "don't know" responses were 11%, and those who did not respond were practically negligible (0.03%). 48% chose the extreme value (10), with 7% and 8% indicating 9 and 8, respectively, showing a clear tendency to believe that the effects of counterfeit medicines are inferior to those of other medicines.

3.3.2 PROBABILITY OF USING FALSIFIED MEDICINES

Figure 12. Probability of using falsified medicines based on age, excluding the effects of other factors



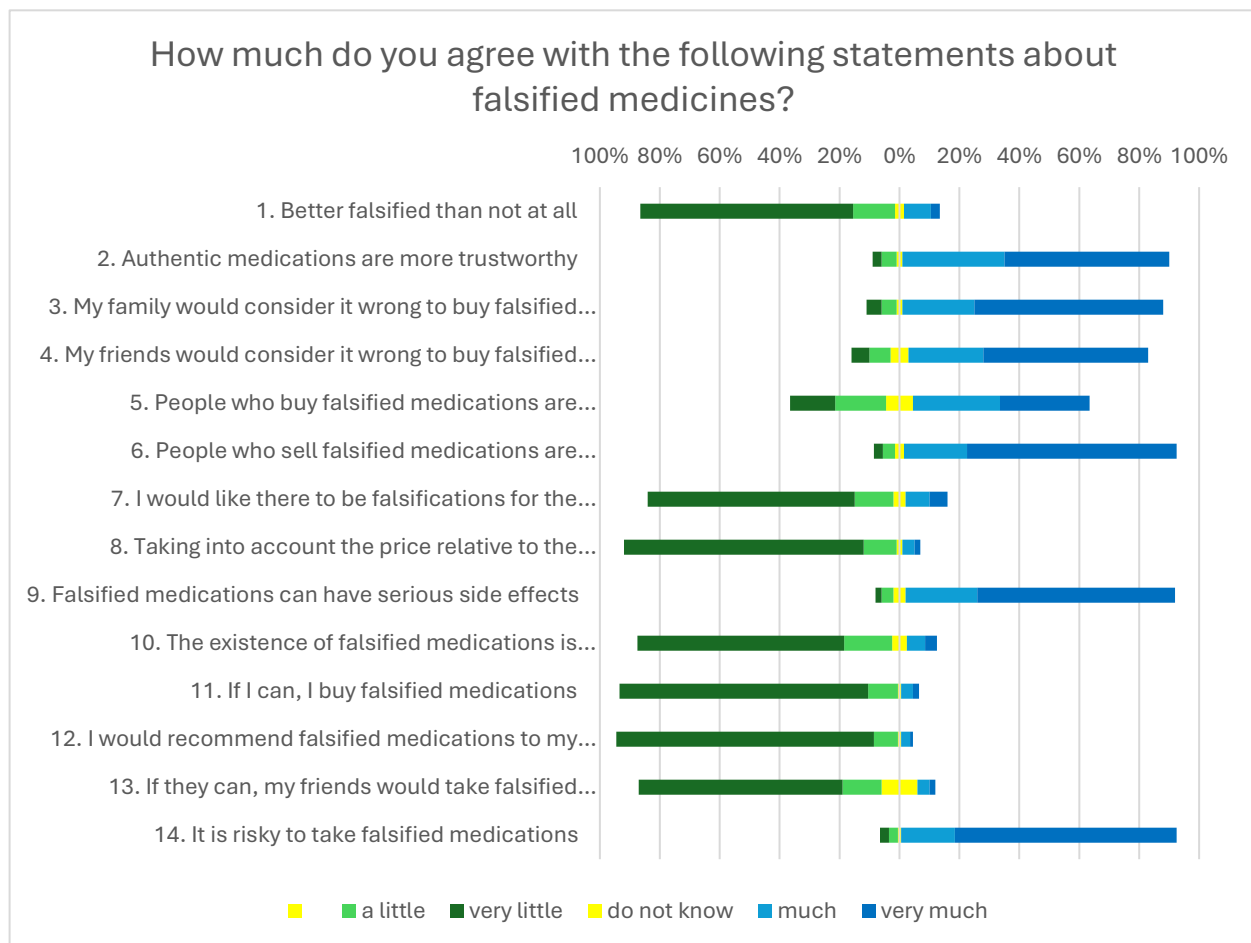
Note: Results from multivariate analysis. The continuous line represents the estimated value of responses for each age. The cyan-colored band represents the 95% confidence intervals. Interpretation: The likelihood of usage is minimal around the age of 55. It increases more at younger ages and also increases at older ages. At approximately 97 years old, the propensity to consume becomes as high as at 18 years old and continues to increase, but the estimation is less precise (the confidence interval is wider), indicating both a smaller subsample and a greater variety of behaviors.

To better investigate the reasons leading to the consumption of falsified medicines, we proposed a scale of 14 items (included in Figure 13), which conceptually aimed to measure four types of orientations towards falsified medicines: consumption behaviors driven by need, ethical considerations, risk assessment, and social norm pressure. The items and the entire scale construction are inspired by existing works (Aalfald et al., 2013; Ofori-Parku & Park, 2021).

The results are notable for the small number of "don't know" responses compared to the rest of the questionnaire (numerical details can be found in the appendix). This confirms that while the subject is unfamiliar, once brought to the forefront, respondents have clear opinions about it. The opinions are quite radical:

- On one hand, there is a strong rejection of the use of falsified medicines driven by necessity. Specifically, 83% of respondents completely reject their use (item 11), 71% are firmly against using them even if there is no alternative (item 1), and 69% totally reject the idea of wanting counterfeit versions of the medicines they need. Additionally, 80% would not consume them regardless of the price (item 8), and 69% do not consider them to be beneficial for patients.

Figure 11. Opinions on the consumption of falsified medicines



- **Ethical** issues are also well-defined: 55% clearly state that their family would consider it wrong to buy such medicines. The same percentage applies to friends. Additionally, 55% are absolutely certain that authentic medicines are more trustworthy, and 70% consider the sale of falsified medicines to be a definite crime. There is less consensus regarding the purchase of falsified medicines (item 5): 59% consider it more of a crime, 32% would not criminalize it, and 9% cannot assess it (this is the only item with a high proportion of "don't know" responses).
- **Risk** assessment indicates strong agreement (66%) with the potential presence of serious side effects (item 9) and that "It is risky to take falsified medicines" (74%). The crime of selling such medicines, already mentioned in the previous paragraph, can also be categorized as a risk-related factor.
- Finally, **the social norm**, given by the use of falsified medicines by those around, shows expectations of disapproval from the social network: 86% would not recommend falsified medicines to friends, and 68% believe their friends would not consider using such products.

We went further to identify the extent to which we can reduce this complex space to the four dimensions suggested above: consumption driven by need, ethical judgments, risk assessments, and social norms, elements also considered by Ofori-Parku & Park (2022). We used a technique called factor analysis, which has been mentioned several times in this report. This time, we forced the analysis to use the set of items to calculate respondents' orientations on four dimensions. As shown in Table 4, we indeed have the four mentioned dimensions.

Table 4. Factor analysis of opinions on the consumption of falsified medicines

To which extend do you agree with the following statements related to falsified medicines	Factor loadings				Communalities
	1 need	2 ethics	3 risk	4 social	
10. The existence of falsified medications is beneficial to patients	,801				,503
7. I would like there to be falsifications for the medications I need	,690	,101	-,105	-,113	,431
1. Better falsified than not at all	,655				,368
8. Taking into account the price relative to the benefits, I prefer falsified medications	,573			,219	,638
11. If I can, I buy falsified medications	,420			,340	,552
4. My friends would consider it wrong to buy falsified medications		,935			,787
3. My family would consider it wrong to buy falsified medications		,561	,160		,453
14. It is risky to take falsified medications			,675	,162	,410
9. Falsified medications can have serious side effects			,639		,392
6. People who sell falsified medications are committing an offense		,167	,411		,318
2. Authentic medications are more trustworthy		,206	,321		,188
12. I would recommend falsified medications to my friends	,134			,871	,868
13. If they can, my friends would take falsified medications	,335			,407	,514
Explained variance	33%	10%	4%	3%	

Note: KMO = 0.887. The total variance explained by the four factors is 49%. Extraction method: Maximum Likelihood. Rotation method: Promax with Kaiser Normalization (kappa = 4). One item was excluded from the scale: "5. People who buy counterfeit medicines commit a crime," as it had a communality below 0.1. Saturations between -0.1 and +0.1 are not presented to facilitate reading and interpretation.

For readers familiar with technical details, Table 4 already includes everything useful to know. For those completely uninterested, it is simple to skip directly to the next paragraph. Otherwise, I mention that the first four columns indicate the extent to which each of the dimensions in the column explains the responses to the items in the rows. The higher the factor loading, the better the dimension/factor in the column is associated with the item in the row. I have distinctly colored those defining areas for the four extracted factors.

For example, the consumption driven by need factor is very strongly associated with items 10, 7, 1, and 8, moderately with items 11 and 13, and somewhat weaker with item 12. It is noteworthy that an item can be associated with one or more factors. The last column (communality) shows how well the item in the row is explained by the four factors considered. The least explained item is item 2 ("medicines are trustworthy," taken from Aalfald et al., 2013), whose more unspecific wording makes it less connected to the space described by the rest of the items, having a risk component (reaction to the specification of trust) and an ethical component probably generated by the use of the term "authentic." Similarly, item 11 ("If I have the opportunity, I buy counterfeit medicines") is quite strongly linked to the social norm (given by the presence of the opportunity, which indicates access to networks that supply counterfeit medicines, in other words, the acceptance of the behavior by those around) and the need for use.

Therefore, we are discussing four factors: consumption driven by need (first factor), rejection based on ethical considerations (second factor), rejection based on risk considerations (third factor), and replication of behavior in peer groups, leading to a social norm of accepting the consumption of falsified medicines. Consumption driven by need and acceptance through social norms are positively linked, just as rejection based on ethical reasons and rejection based on risk reasons form a pair of factors for rejecting the consumption of falsified medicines (Table 5).

Table 5. Correlations between the four attitudinal factors towards consumption of falsified medicines

	need	social norm	etics	risk
<i>need</i>	1			
<i>social norm</i>	0,835	1		
<i>etics</i>	-0,310	-0,384	1	
<i>risk</i>	-0,711	-0,642	0,603	1

Note: Correlation coefficients can range from -1 to +1. The closer they are to the extremes (-1/+1), the stronger the association between the two factors. All correlations in the table are Pearson correlations, and the coefficients are significant at $p \leq 0.05$.

Table 6 provides information on how the four factors are related to other phenomena described in this report. Knowledge and confusion regarding falsified medicines are marginally related to rejection motivations. When the rejection of falsified medicines is motivated by risks or ethics, both confusion and knowledge about falsified medicines increase.

A stronger association appears concerning the suspicion that there are falsified medicines at standard distributors. This suspicion is stronger when there is a tendency towards necessity consumption and acceptance through the norms of belonging groups. However, suspicion tends to be rejected when risk factors or ethical considerations are strong, but the connection in this case is weaker.

In contrast, the suspicion that counterfeits appear at online/ambulant distributors is stronger when the risk of using falsified medicines is lower or when ethical considerations are weaker, and it decreases when the social norm of using these medicines is weaker.

Table 6. Correlations between different positions on falsified medicines and the four attitudinal factors

	acceptance		rejection	
	need	social norm	etics	risk
knowledge score	-0,009	-0,010	0,155	0,187
confusion score	0,053	0,027	0,160	0,139
beliefs that falsified medicines exist at standard distributors	0,389	0,297	-0,118	-0,270
beliefs that falsified medicines exist at online and street vendors	-0,029	-0,104	0,123	0,136
If severely ill, would you be willing to consume a falsified medicine if no authentic one is on the market?	0,525	0,469	-0,244	-0,441

Note: Correlation coefficients can range from -1 to +1. The closer they are to the extremes (-1/+1), the stronger the association between the two factors. All correlations in the table are Pearson correlations. Coefficients in bold are significant at $p \leq 0.01$, while the rest are not significant even at $p \leq 0.10$.

Regarding actual consumption (the highlighted row in Table 6), the strongest association is with necessity consumption. Social norms and risk rejection also show strong associations. The impact of ethical considerations is somewhat weaker.

The moral of these associations is that the main factor that can drive people towards consuming medicines is perceived need. Social norms play a facilitating role, while perceived risk can also lead to behavioral restraint. Ethical considerations also have preventive roles, but to a lesser extent. The four factors have a reduced impact on suspicions about the presence of falsified medicines at standard distributors. Other types of phenomena (knowledge, confusion,

suspicion related to online/ambulant distributors) are less influenced by these four attitudinal factors.

Moving forward, the investigation of individual differences reveals that:

- For those who have lived abroad, the necessity consumption and the importance of social norms decrease.
- As the level of education increases, the necessity consumption and the importance of social norms decrease, while the importance of ethical considerations increases.
- Those living in wealthier households place less importance on social norms.
- For individuals with higher incomes, ethical considerations matter less.
- For divorced individuals, the importance of necessity consumption and social norms decreases. For those not in a couple (separated, divorced, widowed, single), the importance of ethical factors increases.
- The presence of minors aged 5 to 18 in the household decreases the propensity for necessity consumption and increases the preventive role associated with perceived risk.
- The presence of individuals over 65 in the household increases the role associated with ethical considerations.
- If another household member buys medicines, the importance of necessity consumption decreases. If the respondent buys medicines, the importance of social norms slightly decreases. If someone else buys medicines, the importance of social norms decreases, and the preventive role of risk and ethical considerations increases.
- Medical literacy decreases the role of social norms and necessity behavior and increases the role of preventive factors (risk, ethics).
- Credulity towards fake news increases the role of social norms and consumption behavior and decreases the propensity to consider risks and ethics.
- The propensity to consider counterfeit products as good as the imitated ones increases the role of necessity consumption and social norms.
- For those open to medical advice from unverified sources, the probability of accepting necessity consumption, following the example of those around them, and being less attentive to risks increases. Those who predominantly receive medical advice from other sources are at the opposite end, with lower scores for necessity consumption and social norms, but higher for preventive factors (risk representation and ethical considerations).
- Those who avoid risks place greater importance on attitudinal factors related to risk and ethical considerations.
- Those who take risks to gain have a higher probability of accepting necessity consumption, social norms, and minimizing the risks of consuming counterfeit medicines.
- The presence of hospitals in the area decreases the role of necessity consumption, the influence of accepted consumption in the social network, and increases the preventive role of perceived risk.
- In counties where more dietary supplements are sold, necessity consumption and the impact of social norms are stronger. Conversely, the role of perceived risk decreases.
- A higher volume of over-the-counter medicine sales at the county level is associated with a lower importance of necessity consumption, social norms, and an increased preventive role of perceived risk.

Therefore, we are discussing a mix where susceptibility to unverified advice, fake news, and the desire for quick gains are associated with factors that can favor the consumption of falsified medicines (they do it out of necessity, they do it because those around them do it) and deteriorate the importance associated with the risks of falsified medicines.

On the other hand, education, medical literacy, and the presence of medical service providers in the area increase the importance of preventive factors (risk, ethics) and decrease necessity consumption and the influence of those around them. The material condition of the household also acts as a buffer, but higher current income means a deterioration of ethical factors.

3.4 TYPES OF CONDITIONS AND OPINIONS ON FALSIFIED MEDICINES

I explained in Chapter 1.2.3.2.2 Health Status and Contact with Medical Care (page 14) that 78% of the sample had at least one contact with illnesses or conditions in the past months, either by taking medication, having a chronic condition or another illness, or having a close one in one of these three situations.

The total number of such contacts with healthcare has been used so far as a potential explanatory factor for different facets of positioning towards falsified medicines. It has been shown that its practical impact does not exist, as other more important factors eliminate its possible influence. However, we can study the impact of the type of condition. For example, it may be useful to know who is most at risk of using falsified medicines. If we find that one or more types of conditions increase the likelihood of using counterfeit medicines, it might be a good idea for the type of specialists treating those conditions to be of interest as intermediaries in a communication campaign.

For the 78% who had contact with healthcare in the months preceding the interview, we asked about the type of condition from a list that included:

- Cancer (of any type) (2%)
- Respiratory problems (6%)
- Digestive problems (3%)
- Bone problems (6%)
- Hormonal problems (1%)
- Mental health (2%)
- Diabetes and nutrition, including obesity (8%)
- Neurological (2%)
- Dermatological (1%)
- Immunity problems (2%)
- Gynecological (1%)
- Ophthalmological (2%)
- Aging-related (2%)
- Cardiological and hematological (17%)
- Other (14%)

The parentheses above indicate the incidence of each type of condition within the sample. Given that the total sample size is 1200 respondents and generally a minimum of 20-30 is needed to

observe a statistical relationship, it follows that practically any condition encountered by at least 2% of the sample could provide us with useful information.

Therefore, it is useful to repeat the analyses from previous chapters to identify the effect of each type of condition on attitudinal factors related to the consumption of falsified medicines, the probability of actual consumption, knowledge and confusion about what falsified medicines are, and suspicion regarding the presence of falsified medicines at distributors. We are interested in both the direct association and the pure effect, which results after eliminating the influence of other causes, such as age, gender, exposure to fake news, the presence of medical service providers in the locality, household structure, etc.

A simple association, without controlling for the influence of other factors, can tell us if, in absolute terms, those who, for example, visit a dermatologist's office are systematically more inclined towards the consumption of falsified medicines or are more likely to avoid them. If they are more inclined, we would know that an effort to bring information to the patient should be concentrated there. Multivariate analysis, in which we eliminate the impact of other factors, can reveal the need for information for certain types of diseases that would otherwise be hidden by the influence of the population structure encountering the respective condition.

Table 7. Simple associations between the type of condition experienced in the last few months and different indicators related to counterfeit medicines

Condition Type	Propensity towards consumption	Attitudinal factors				Defining*		Confidence* in the distribution chain	Suspicion towards distributors*:	
		Need	Social norm	perceived risk	Ethical reasons	knowledge	confusion		standard	Online/Street vendors
Cancer (any type)										
Respiratory problems									-	-
Digestive problems					+				-	
Bone problems										
Hormonal problems									-	
Mental health									+	
Diabetes and nutrition, including obesity					+					
Neurological	-		-	+	+					
Dermatological						(+)				
Immune problems						+				
Gynaecological					+					
Ophthalmological										
Aging										
Cardiological and haematological				+						
Other		-	-					-		

Note: * The definition of falsified medicines, confidence that they do not distribute falsified medicines, and suspicion that they might distribute falsified medicines. The method of measuring all indicators is described in previous chapters. Plus and minus signs indicate significant positive and negative associations, respectively, at $p \leq 0.05$, tested with the t-test (for differences between means) between the condition in the row and the indicator in the column. Parentheses denote significant associations at $p \leq 0.10$. A positive association means that the presence of the condition in the row leads to significantly higher values for the indicator in the column.

Table 8. Associations resulting from multivariate analysis between the type of condition experienced in recent months and various indicators related to counterfeit medicines

Condition Type	Propensity towards consumption	Attitudinal factors				Defining*		Confidence* in the distribution chain	Suspicion towards distributors*:	
		Need	Social norm	perceived risk	Ethical reasons	knowledge	confusion		standard	Online/Street vendors
Cancer (any type)				+			-		-	
Respiratory problems				[-]					-	-
Digestive problems		[-]	-	+	+				(-)	
Bone problems							[-]			
Hormonal problems								[-]		
Mental health										[+]
Diabetes and nutrition, including obesity										
Neurological					+				-	
Dermatological	[+]	+	+	-		+		[-]		+
Immune problems	[+]									
Gynaecological										
Ophthalmological										
Aging									[-]	
Cardiological and haematological					-					
Other					-					

Note: * The definition of falsified medicines, confidence that they do not distribute falsified medicines, and suspicion that they might distribute falsified medicines. The method of measuring all indicators is described in previous chapters. Plus and minus signs indicate significant positive and negative associations, respectively, at $p \leq 0.05$, tested in multilevel models, with the specifications and predictors used in the rest of the report. Round parentheses denote significant associations at $p \leq 0.10$. A positive association means that the presence of the condition in the row leads to significantly higher values for the indicator in the column. Square brackets indicate that the association disappears if the effect of current income is not taken into account.

Tables 7 and 8 illustrate the associations between types of conditions and the studied phenomena. Table 7 highlights the bivariate associations, meaning those where the influence of other factors is not eliminated. We simply observe that a single type of condition leads to an effect that would suggest a stronger need for intervention: those who have faced mental health issues tend to identify falsified medicines more often at standard distributors (pharmacies, hospital pharmacies, medical offices, hospitals). The cells colored in light green indicate where the need for information appears to be lower than the rest.

When we move to multivariate analysis, which takes into account the patients' profiles (Table 8), the reality becomes more complex. In the table, cells are colored light green if we can worry less about them, light orange if there is a warning sign but it is less pronounced, and light purple if the need for intervention is clearly stronger.

It becomes clear that a communication campaign based on the type of condition should prioritize the distribution of materials in places frequented by those with dermatological conditions. It can also target mental health conditions to provide tools for understanding distribution chains and cardiological conditions to reinforce the ethical reasons why counterfeit

medicines should not be consumed. Those with digestive problems need less information and stimulation compared to other types of conditions.

The results regarding those with dermatological conditions are remarkable. I remind you that their proportion in the sample is small, which shows that we are discussing significant effects within a small group of respondents, suggesting that the need for intervention might be even greater than estimated.

Using similar logic, it is possible that the need for intervention among those with gynecological, hormonal, or immunity problems is underestimated. For those with neurological conditions, the reduction in differences after controlling for other factors (visible by comparing Table 7 with Table 8) suggests that their behavior and attitudes might not be much different from the rest of the population.

3.5 THE ROLE OF REGULATORY AUTHORITIES

The current activity of regulatory authorities in preventing the introduction of falsified medicines into the market is viewed with some skepticism: 25% of the sample considers them effective, 9% of respondents cannot assess, 25% consider them neither effective nor ineffective, and 39% consider them ineffective. These figures should be understood in the broader context of the generally negative evaluation of trust in institutions in Romania (see Deliu, 2024 for a discussion on the low level of trust in institutions).

Somewhat surprisingly, the Police and NGOs are considered the most legitimate intervention solutions: 50% of the sample considers each of these types of organizations as justified to intervene in the issue of falsified medicines. At a considerable distance (20%) are the Government, as well as "Doctors and Hospitals." The World Health Organization is considered legitimate by 15% of the sample, while pharmacies, medicine manufacturers, and the European Union are placed at 2-4%.

We also inquired about the type of intervention that should be implemented. The question was open-ended, giving respondents the opportunity to express themselves freely. Although such questions are not typically useful in surveys, in this case, we preferred to observe the spontaneously expressed opinions. It is important to note that if, for example, some respondents indicate that controls should be implemented while others do not, the latter are not necessarily against controls; they might even consider it an excellent idea but simply did not express it. Therefore, the results should be taken with caution.

Precautions should also be tied to the fact that respondents generally avoid open-ended questions, express themselves very briefly, and field operators do not fully transcribe the respondents' statements to increase their efficiency.

With these precautions in mind, it is noteworthy that approximately 70% of respondents provided usable answers. Even though most of the responses included generalities, the high proportion of responses gives us a new indication of the respondents' interest in the topic addressed.

At the end of the questionnaire, we included two questions about the tracking of the medicine supply chain, specifically about serialization (Table 9). The questions did not aim to assess the quality of the system but rather to observe the awareness of its presence. The high number of "I don't know" responses is significant even for this questionnaire and indicates a lack of awareness about the system. This suggests that the OSMR should develop a more extensive information campaign in this regard.

4. A SUMMARY OF THE SURVEY RESULTS

This chapter brings together the previously presented results, but this time organizes them by types of factors to provide a better overview and understanding of their actions.

SOCIO-DEMOGRAPHIC FACTORS

Gender

- Women are twice as likely to report having heard of falsified medicines. Additionally, confusion regarding the definition of falsified medicines is higher among women.
- Men are more likely to say "I don't know" when asked about the characteristics of falsified medicines and are also more likely to consume falsified medicines.

Age

- Age has practically no effect in the models run, with one important exception: both the youngest and the oldest individuals have a higher probability of consuming falsified medicines.

Education

- Increases interest in the topic of falsified medicines.
- Regarding attitudinal factors that determine the stance on falsified medicines, as the level of education increases, necessity consumption and the importance of social norms decrease, while the importance of ethical considerations increases.

Income

- Those with higher incomes are more likely to say "I don't know" when asked about the characteristics of falsified medicines.
- Regarding attitudinal factors that determine the stance on falsified medicines, for those with higher incomes, ethical considerations matter less.

Household Status

- Respondents from wealthier households show a higher interest in the questionnaire's topic but also have a lower subjective awareness regarding their ability to identify falsified medicines.

International Migration Experience

- They are more suspicious of the medicine distribution chain.
- They have a lower probability of consuming falsified medicines.
- Regarding attitudinal factors that determine the stance on counterfeit medicines, for those who have lived abroad, necessity consumption and the importance of social norms decrease.

Therefore, we are dealing with a small variation due to gender, no significant influence from age, and a more important but not decisive role from the level of education, material status, and migration experience. These factors act as buffers that prevent the risk of consuming falsified medicines.

HOUSEHOLD STRUCTURE - POTENTIAL CONTACT WITH MEDICAL CARE:

Marital Status

- Regarding attitudinal factors that determine the stance on falsified medicines, for divorced individuals, the importance of necessity consumption and social norms decreases. For those who are not in a couple (separated, divorced, widowed, single), the level of ethical considerations increases.

Household Size (Number of Members)

- In larger households, there are more frequent suspicions regarding the presence of falsified medicines at standard distributors.

Presence of Minors in the Household

- The presence of children under 5 years old in the household decreases confidence in the general distribution of medicines.
- The presence of minors (regardless of age) in the household decreases suspicions about the presence of falsified medicines at standard distributors.
- Regarding attitudinal factors that determine the stance on falsified medicines, the presence of minors aged 5 to 18 in the household decreases the propensity for necessity consumption and increases the preventive role associated with perceived risk.

Presence of Adults Over 65 Years Old

- Regarding attitudinal factors that determine the stance on falsified medicines, the presence of individuals over 65 years old in the household increases the preventive role associated with ethical considerations.

Presence of Chronically Ill Individuals

- Increases subjective awareness about the presence of falsified medicines.
- Increases suspicion related to online/ambulant distributors.

In general, more frequent potential contact with healthcare leads to positions that prevent the use of falsified medicines and increase vigilance towards them. The presence of children, in particular, has such effects. It is likely that more frequent contact with doctors or pharmacists plays an important role here, as they transfer knowledge to those they serve. As a result, there is a higher risk of exposure to falsified medicines for those who are... healthier!

MEDICAL LITERACY AND RELATED ISSUES

Medical Literacy...

- **Increases interest** in the topic of the questionnaire.
- **Boosts confidence** in the distribution chain.
- **Reduces suspicion** regarding the presence of falsified medicines at standard distributors.

- **Increases suspicion** regarding the presence of falsified medicines at online/ambulant distributors.
- **Decreases the likelihood** of using falsified medicines.
- Regarding attitudinal factors that determine the stance on counterfeit medicines, medical literacy **reduces the role of social norms** and necessity behavior while **increasing the role of preventive factors** (risk, ethics).

Those Who Claim They Can Decipher Online Health Information

- Have a **better perception** of their ability to identify falsified medicines. However, this does not translate into practice, as they also have systematically higher confusion scores and give fewer "I don't know" responses without actually increasing their knowledge.
- Are **more likely** to consume falsified medicines.

Medical literacy proves to be important, acting as an essential preventive factor. Another major risk factor emerges: the strong belief that one is knowledgeable. Confidence in one's expertise can be harmful when it appears in the absence of actual knowledge. This is one of the great advantages of the multivariate analyses we conducted: we can observe the effect of the belief in one's expertise after eliminating the impact of genuine knowledge. Returning to the conclusion, a target for communication campaigns should be to provide information on websites that have the potential to mislead the population. I will explain in the recommendations chapter how this can be achieved.

DIRECT CONTACT WITH MEDICAL CARE

Self-Assessment of Health Status:

- **Interest in Falsified Medicines:** The healthier a respondent perceives themselves to be, the more interested they are in falsified medicines.
- **Knowledge and Awareness:** Higher self-assessment levels of health are associated with less knowledge about the characteristics of falsified medicines and a lower tendency to say "I don't know" when asked about these characteristics.
- **Acceptance of Falsified Medicines:** Those who feel healthier are less likely to reject the potential use of falsified medicines.

Number of Health Care Contacts:

(This includes medication consumption, chronic illnesses, recent health conditions for the respondent and their close ones)

- **Interest in Survey Topics:** Increased health care contacts lead to a higher interest in the survey topics.
- **Probability of Using Falsified Medicines:** More health care contacts increase the likelihood of using falsified medicines.

Purchasing Medicines by the Respondent or Close Ones:

- **Identification Ability:** The ability to identify falsified medicines (subjective awareness) decreases when another household member usually buys the medicines.
- **Trust in Distribution Chain:** When other household members purchase medicines, there is a decrease in trust in the distribution chain and an increase in the perception of the frequency of falsified medicines appearing at standard distributors.

- **Perception of Falsified Medicines:** If someone outside the household buys medicines for the household, the respondent is more likely to believe that falsified medicines frequently appear in both the standard and online/ambulant distribution chains. This effect is more pronounced on reduced trust in the standard chain.
- **Attitudinal Factors:** Regarding the attitudinal factors that determine the approach to falsified medicines:
 - If another household member buys medicines, the importance of necessity consumption decreases.
 - If the respondent buys medicines, the importance of social norms slightly decreases.
 - If someone else buys medicines, the importance of social norms decreases, and the preventive role of risk and ethical considerations increases.

The idea that direct contact with purchasing medicines best prevents the consumption of falsified medicines by generating purchasing experience is confirmed.

BEHAVIORAL AND ATTITUDINAL FACTORS

Exposure to Fake News:

- **Belief in Fake News:** Those predisposed to believe fake news are less likely to respond with "I don't know" to questions about the characteristics of falsified medicines and tend to have lower knowledge scores.
- **Suspicion:** Individuals more exposed to believing fake news are more suspicious about the presence of falsified medicines in the distribution chain in general, and particularly at standard distributors.
- **Consumption of Falsified Medicines:** Those who believe in fake news have a higher probability of consuming falsified medicines.
- **Attitudinal Factors:** Credulity towards fake news increases the role of social norms and consumption behavior while decreasing the propensity to consider risks and ethics when it comes to falsified medicines.

Attitudes Towards Falsified Products:

- **Quality Perception:** Those who would buy falsified products because they perceive no difference in quality tend to self-assess with lower scores regarding the awareness of falsified medicines.
- **Price Sensitivity:** Individuals who would buy products without a receipt because they are cheaper tend to self-assess with higher scores regarding the awareness of falsified medicines. They also have greater distrust in the medicine distribution chain and higher suspicion that falsified medicines frequently appear both at standard and online/ambulant distributors.
- **Willingness to Consume:** Those predisposed to buying falsified products for their price are more willing to consume falsified medicines.
- **Attitudinal Factors:** The propensity to consider counterfeit products as good as the imitated ones increases the role of necessity consumption and social norms when it comes to falsified medicines.

Those Who Prioritize Medical Staff Advice:

- **Trust in Distribution Chain:** They trust the medicine distribution chain, with strong confidence in standard distributors (physical pharmacies, medical offices, hospital pharmacies, hospitals) and partially in online/ambulant distributors (online pharmacies, other websites, ambulant vendors).

- **Lower Probability of Using Falsified Medicines:** They are less likely to use falsified medicines.

High Importance of Non-Medical Advice (in Health Matters):

- **Confusion and Confidence:** Those who would take medical advice from anyone tend to be more confused in defining non-counterfeit medicines, yet more confident in what they say about them (fewer "I don't know" responses when asked to evaluate their characteristics).
- **Suspicion:** They are more suspicious of the pharmaceutical product distribution chain, frequently perceiving the presence of falsified medicines at both standard and online/ambulant distributors.
- **Higher Probability of Consuming Falsified Medicines:** They have a substantially higher probability of willingly consuming falsified medicines.
- **Attitudinal Factors:** For those open to medical advice from unverified sources, there is an increased likelihood of accepting necessity consumption, following the example of those around them, and being less attentive to risks. Those who predominantly receive medical advice from other sources are the opposite, with lower scores for necessity consumption and social norms, but higher scores for preventive factors (risk representation and ethical considerations).

Attitudes Towards Risk:

- **Risk Avoidance:** Those who prefer to avoid risks tend to have higher confusion scores but also higher knowledge scores. They are also more suspicious of the presence of falsified medicines at both standard and online/ambulant distributors.
- **Attitudinal Factors:** Those who avoid risks place greater importance on attitudinal factors related to risk and ethical considerations.
- **Risk-Taking for Gain:** Those predisposed to taking risks for greater gain consider themselves more aware of the presence of falsified medicines. They also tend to give fewer "I don't know" responses when asked about the characteristics of counterfeit medicines.
- **Trust in Distributors:** Regarding the presence of falsified medicines at distributors, those who take risks for gain are slightly more distrustful of standard distributors but less suspicious of online/ambulant distributors.
- **Attitudinal Factors:** Those who take risks for gain are more likely to accept necessity consumption, social norms, and minimize the risks of consuming falsified medicines.

The predisposition to believe fake news, consume falsified goods, and take advice from anyone regardless of their qualifications forms a complex of factors that create a risk of consuming falsified medicines. Attitudes towards risk are difficult to influence, but understanding their effect makes it clear that any communication campaign should avoid invoking risk as an argument.

MEDICAL SERVICE PROVIDERS IN THE LOCALITY

- A higher density of family doctors increases the proportion of those who respond with "I don't know" to questions about the characteristics of falsified medicines.
- A higher number of pharmacies relative to the population decreases suspicions about the presence of falsified medicines at standard distributors.
- The presence of more hospitals in the area is associated with fewer suspicions about the presence of falsified medicines in the standard distribution chain.
- Those in areas with fewer pharmacies are more willing to consume falsified medicines.
- Those in areas with more hospitals are less willing to consume falsified medicines.

- Regarding the attitudinal factors that determine the approach to falsified medicines, the presence of hospitals in the area decreases the role of necessity consumption, the influence of accepted consumption in the social network, and increases the preventive role of perceived risk.

The presence of service providers in the locality is an essential element in preventing the consumption of falsified medicines. However, this aspect of medical infrastructure is difficult to modify.

SIZE OF THE LOCALITY

It does not have any significant impact on the analyses conducted.

MEDICINE SALES IN THE COUNTY

Prescription Medicines (RX):

- **Increased Interest:** Higher sales of prescription medicines increase interest in the survey topics.
- **Reduced Uncertainty:** They also decrease the likelihood of respondents answering "I don't know" to questions about the characteristics of falsified medicines.

Over-the-Counter Medicines (OTC):

- **Decreased Interest:** Higher sales of OTC medicines decrease interest in the survey topics.
- **Increased Subjective Awareness:** Higher sales increase the subjective perception of the ability to detect counterfeit medicines.
- **Reduced Confusion:** Higher sales reduce confusion regarding counterfeit medicines but also lower the recognition scores for falsified medicines.
- **Changed Suspicion Levels:** Higher sales decrease suspicion towards standard distributors and increase suspicion towards online/ambulant distributors regarding the presence of falsified medicines.
- **Willingness to Consume:** Those in areas with fewer OTC medicine sales are more willing to consume falsified medicines.
- Regarding the attitudinal factors that determine the approach to falsified medicines, a higher volume of over-the-counter medicine sales at the county level is associated with a lower importance of necessity consumption and social norms, and an increased role of perceived risk as a preventive measure.

Dietary Supplements (FS):

- **Subjective Awareness:** The subjective perception of the ability to detect falsified medicines is higher in counties where more dietary supplements are sold.
- **Knowledge Score:** The knowledge score regarding counterfeit medicines increases in counties where more dietary supplements are sold.
- **Suspicion Levels:** In areas where more dietary supplements are sold, there is greater suspicion about the presence of falsified medicines in the standard distribution chain.
- **Willingness to Consume:** Those in areas with higher sales of dietary supplements are more willing to consume falsified medicines.

- **Attitudinal Factors:** Regarding the attitudinal factors that determine the approach to counterfeit medicines, in counties where more dietary supplements are sold, the importance of necessity consumption and the impact of social norms are stronger. Conversely, the role of perceived risk decreases.

Areas with high sales of over-the-counter (OTC) medicines have the advantage of reducing exposure to falsified medicines. This is most likely due to a mechanism of direct contact propagated through social norms: people have access to the knowledge of everyone around them with whom they are in contact, creating a positive externality of collectively accumulated knowledge. On the other hand, high consumption of dietary supplements is positioned at the opposite end of the spectrum.

5. ACTION RECOMMENDATIONS

Confidence in the effectiveness of measures taken by authorities to counteract falsified medicines is low, but this reflects more the reduced confidence in the Romanian institutional system rather than an objective evaluation. Let's not forget that the data was collected during the period leading up to the (canceled) presidential elections in the fall of 2024, with the corresponding societal atmosphere.

In this context, expectations for intervention (who should intervene) are directed partly towards the Police and partly towards NGOs, which is advantageous for OSMR, as it is an NGO.

There is a simple structure through which OSMR can contribute to combating falsified medicines, and at the center of this structure must be communication. What this report brings is not necessarily the idea that communication is needed, but a better definition of the levels at which communication should take place.

Communication Content

a. **Awareness of Falsified Medicines:** It is important for the public to know that falsified medicines exist, understand their effects, and learn how to identify them.

b. **Efforts to Combat Falsified Medicines:** The public should be informed about the measures being taken to combat falsified medicines.

c. **Serialization Awareness:** The awareness of serialization is relatively low, and a campaign to increase this awareness could be considered. There may be a public misunderstanding of how serialization works. Additionally, there might be resistance to serialization due to the rejection of the state's regulatory role, especially through political trolling interventions that reduce public trust in institutions.

d. **Medical Literacy:** Given the proven role of medical literacy, communication campaigns and supported policies can benefit from disseminating information that generally increases medical knowledge.

e. **Avoiding Risk References:** References to the risks associated with falsified medicines should be avoided in public communications, as they may lead to the opposite effect, increasing the likelihood of counterfeit medicine consumption. It would be particularly useful to avoid asserting that falsified medicines are cheaper.

f. **Research and Costs:** The content can discuss the usual research process behind any given medicine, the costs involved, and the role of serialization.

g. **Media Interest:** Increasing media interest, for example, by providing examples from around the world (OSMR can monitor news from other parts of the world and popularize them). It is important for OSMR to maintain a constant flow of short messages, preferably weekly or biweekly, to create a habit for the media to regularly pick them up. This consistent communication can help ensure that the public stays informed and engaged with the ongoing efforts to combat falsified medicines.

Preferred Communication Targets

Three Highly Relevant Public Groups:

- Those most exposed to consumption: Beyond the favoring factors that we exploit in the rest of the recommendations, it is noteworthy that, paradoxically, those most at risk of consuming counterfeit medicines are those without health problems. Combined with poorer financial status, this category becomes necessary to target. It is likely that those in the mentioned group can be reached through campaigns run on new social media, primarily TikTok.
- Those who, regardless of knowledge and exposure, may consume willingly: These are individuals who take risks for material gain, prefer uncertified advice, and generally prefer counterfeit products. We often find them in poorer enclaves of wealthier localities. A communication campaign can place flyers in family doctors' offices and pharmacies in these areas.

Geographical concentration:

- The high risk of consumption and/or gullibility appears mainly in counties where many FS units and few OTC units are sold, and in localities where there is a relative medical desertification: few pharmacies, few family doctors, few hospitals.

Communication Means and Channels

- Perceived need is a primary factor. From this, the role of doctors emerges as a major factor with long-term effects.
- Considering all analyses, we can discuss placing flyers in:
 - Pharmacy chains (the latter may be interested in generating materials to combat the presence of counterfeit medicines)
 - Dermatologists' offices
 - The areas mentioned above in this chapter
- Materials (ads) on disease-related websites, especially those that disseminate unclear information. There is a major dilemma here: such an action would actually increase the revenues of those who promote solutions that ultimately lead to counterfeit medicines. Therefore, content can be placed on websites, vlogs, podcasts, etc., of individuals who are on the borderline between diletantism and being informed, but with a tendency to lean more towards being informed, and who can be influenced to become more reliable sources of information.

- The role of the Police: It is difficult to identify a strong communicator at the level of authorities due to current endemic distrust. However, the Police hold a superior legitimacy. It may be useful for OSMR and ANM to have joint public positions with the Police in the coming years.
- OSMR is also a good communication channel, provided it emphasizes its role as an NGO. However, the message will be addressed more to the less at-risk segment of society, as the higher-risk segment is less likely to trust the NGO sector.
- Television can be a good communication channel and should not be ignored. The same goes for other channels, but their efficiency is lower. The only one that can be effective alongside television and flyers seems to be social media. Facebook is the social media platform that includes news shares and is the most visited in Romania (Statista, 2025), but we have observed that news about falsified medicines attracts few views. TikTok is probably the most used social media platform in Romania in 2024 (Kemp, 2025). It is also likely the most used by those prone to consumption. Therefore, it is useful to identify a way to place messages on this type of network.

LIST OF CITED WORKS

- Ahmed, M. A., Khattak, M. S., & Anwar, M. (2022). *Personality traits and entrepreneurial intention: The mediating role of risk aversion*. *Journal of Public Affairs*, 22(1), e2275.
- Akunyili, D. (2004). *Fake and counterfeit drugs in the health sector: The role of medical doctors*. *Annals of Ibadan Postgraduate Medicine*, 2(2), 19-23.
- AlfAdl, A. A., IbrAHIM, M. I. M., Maraghi, F. A., & Mohammad, K. S. (2016). *An examination of income effect on consumers' ethical evaluation of counterfeit drugs buying behaviour: a cross-sectional study in Qatar and Sudan*. *Journal of Clinical and Diagnostic Research: JCDR*, 10(9), IC01.
- Amir-Azodi, A., Setayesh, M., Bazyar, M., Ansari, M., & Yazdi-Feyzabadi, V. (2024). *Causes and consequences of quack medicine in health care: a scoping review of global experience*. *BMC Health Services Research*, 24(1), 64.
- Arin, K. P., Mazrekaj, D., & Thum, M. (2023). *Ability of detecting and willingness to share fake news*. *Scientific Reports*, 13(1), 7298.
- Arjoca, A. L. (2011). *Fighting against Counterfeiting of Medicines in Romania. A New Challenge for the Romanian Authorities*. *Rom. J. Intell. Prop. L.*, 130.
- Bandiera, R., & Marmo, M. (2017). *Re-framing 'counterfeit from a public health perspective': A case for fraudulent medicine*. *Australian & New Zealand Journal of Criminology*, 50(2), 195-212.
- Baratto, G., & Baratto, G. (2020). *The illegal trade of medicines: the roles of the internet and social media websites*. *The Illegal Trade of Medicines on Social Media: Evaluating Situational Crime Prevention Measures*, 7-35.
- Bate, R. (2008). *The deadly world of fake drugs*. Washington, DC: American Enterprise Institute.

Bird, R. C. (2007). Counterfeit drugs: a global consumer perspective. *Wake Forest Intell. Prop. LJ*, 8, 387.

Burns, C. (2022) More than 15,000 falsified medicines found in UK supply chain over past two years, *The Pharmaceutical Journal* February 2022, Vol 308, No 7958;308(7958)::DOI:10.1211/PJ.2022.1.131242

Chen, Y. C., Chang, L. C., Liu, C. Y., Ho, Y. F., Weng, S. C., & Tsai, T. I. (2018). The roles of social support and health literacy in self-management among patients with chronic kidney disease. *Journal of Nursing Scholarship*, 50(3), 265-275.

Cheng, M. M. (2009). Is the drugstore safe? Counterfeit diabetes products on the shelves. *Journal of diabetes science and technology*, 3(6), 1516-1520.

Dammann, C. M., Stukus, D. R., Patrick, M. D., & Nuss, K. E. (2019). How to spot and deal with Internet trolls, pp. 189-202 in Stukus, D. R., Patrick, M. D., & Nuss, K. E. (2019). *Social Media for Medical Professionals: Strategies for Successfully Engaging in an Online World*. Springer.

Davis, T. C., Michielutte, R., Askov, E. N., Williams, M. V., & Weiss, B. D. (1998). Practical assessment of adult literacy in health care. *Health Education & Behavior*, 25(5), 613-624.

Deliu, A. (2024). Pesimism, optimism și încredere în instituții în România actuală. pp. 74-90 în s.M. Stănescu, C. Zamfir, și S.Mihaiu. (coordonatori). *Policrizele societății românești: studii și eseuri. Este România pregătită?* București: Editura Pro Universitaria, ISBN 978-606-26-1940-4.

EAASM. (2008). *The Counterfeiting Superhighway*, accesat online pe 4 septembrie 2024 la https://eaasm.eu/wp-content/uploads/455_EAASM_counterfeitingreport_0206081.pdf

UIPO (2024). *EUIPO contributes to operation seizing 64 million EUR of fake medicines across the EU*, Published:14/02/2024, accesat pe 23 octombrie 2024 la <https://www.euipo.europa.eu/en/news/euipo-contributes-to-operation-seizing-64-million-eur-offake-medicines-across-the-eu>

Gomez-Mejia, L. R., & Balkin, D. B. (1989). Effectiveness of individual and aggregate compensation strategies. *Industrial Relations: A Journal of Economy and Society*, 28(3), 431-445.

Gurney, B., Amundson, G., & Boumediene, S. L. (2017). Ways to battle the \$431 billion fake pharmaceutical industry. *Review of Business & Finance Studies*, 8(1), 33-40.

Hall, A., Antonopoulos, G. A., Hall, A., & Antonopoulos, G. A. (2016). *The Online Trade in Illicit Pharmaceuticals: The UK Context. Fake Meds Online: The Internet and the Transnational Market in Illicit Pharmaceuticals*, 19-45.

Hodges, S., & Garnett, E. (2020). *The ghost in the data: Evidence gaps and the problem of fake drugs in global health research*. *Global Public Health*, 15(8), 1103-1118.

Homer, A., Johal, N. (2024) *Deadly new drugs found in fake medicines in the UK*, BBC 29 October 2024, accesat online pe 12 ianuarie 2024 la <https://www.bbc.com/news/articles/cx2520kvl1wo>

IGPR (2023). *Atenție la medicamentele și suplimentele alimentare contrafăcute!*, publicat pe 25

Februarie 2023, accesat online pe 20 decembrie 2024, la <https://politiaromana.ro/ro/stiri/atentie-lamedicamentele-si-suplimentele-alimentare-contrafacute>

Ivanitskaya, L., Brookins-Fisher, J., O'Boyle, I., Vibbert, D., Erofeev, D., & Fulton, L. (2010). *Dirt cheap and without prescription: how susceptible are young US consumers to purchasing drugs from rogue internet pharmacies?*. *Journal of medical Internet research*, 12(2), e1520.

Jones-Jang, S. M., Mortensen, T., & Liu, J. (2019). *Does Media Literacy Help Identification of Fake News? Information Literacy Helps, but Other Literacies Don't*. *American Behavioral Scientist*, 000276421986940. doi:10.1177/0002764219869406

Kemp, S.. (2024) *Digital 2024: Romania*, Datareportal, accesat pe 18.01.2025 la <https://datareportal.com/reports/digital-2024-romania>

Lieback, H. (2019). *Truth-Telling and Trolls: Trolling, Political Rhetoric in the Twenty-First Century, and the Objectivity Norm*. *Aspeers*, (12).

Limbu, Y. B., & Huhmann, B. A. (2023). *Illicit online pharmacies: a scoping review*. *International Journal of Environmental Research and Public Health*, 20(9), 5748.

Liu, R., & Lundin, S. (2016). *Falsified medicines: literature review*. *Working Papers in MEDICAL humanities*, 2(1).

Loman, L., Brands, M. J., Leeman, E. J., Politiek, K., & Schuttelaar, M. L. A. (2024). *Health literacy in hand eczema and atopic dermatitis: Revealing the extent of the problem both in the general and the clinical population*. *Contact Dermatitis*, 91(Supplement 1), 35.

Maertens, R., Götz, F. M., Golino, H. F., Roozenbeek, J., Schneider, C. R., Kyrychenko, Y., ... & van der Linden, S. (2024). *The Misinformation Susceptibility Test (MIST): A psychometrically validated measure of news veracity discernment*. *Behavior Research Methods*, 56(3), 1863-1899.

Maie, A., Kanekuni, S., Yonekura, Y., Nakayama, K., & Sakai, R. (2021). *Evaluating short versions of the European Health Literacy Survey Questionnaire (HLS-EU-Q47) for health checkups*. *Health Evaluation and Promotion*, 48(4), 351-358.

Mandrik, C. A., & Bao, Y. (2005). *Exploring the concept and measurement of general risk aversion*. *Advances in consumer research*, 32, 531.

Miller, H. I., & Winegarden, W. (2020). *Fraud in your pill bottle: The unacceptable cost of counterfeit medicines*. *Center for Medical Economics and Innovation Issue Brief*. Pacific Research Institute.

Moken, M. C. (2003). *Fake pharmaceuticals: how they and relevant legislation or lack thereof contribute to consistently high and increasing drug prices*. *American journal of law & medicine*, 29(4), 525-542.

Nistor, A. L., Pisani, E., & Kok, M. O. (2023). *Why falsified medicines reach patients: an analysis of political and economic factors in Romania*. *BMJ global health*, 6(Suppl 3), e009918.

Noun, M., Nasr, L., Khan, I., Arafat, B., & Assi, S. (2021). *Knowledge and perspectives of the public*

towards the prevalence and harm associated with counterfeit medicines in Lebanon. *Emerging Trends in Drugs, Addictions, and Health*, 1, 100019.

Nutbeam, D., & Lloyd, J. E. (2021). Understanding and responding to health literacy as a social determinant of health. *Annu Rev Public Health*, 42(1), 159-73.

Ofori-Parku, S. S. (2022). Fighting the global counterfeit medicines challenge: A consumer-facing communication strategy in the US is an imperative. *Journal of Global Health*, 12.

Ofori-Parku, S. S., & Park, S. E. (2022). I (Don't) want to consume counterfeit medicines: exploratory study on the antecedents of consumer attitudes toward counterfeit medicines. *BMC Public Health*, 22(1), 1094.

Parker, R. M., Baker, D. W., Williams, M. V., & Nurss, J. R. (1995). The test of functional health literacy in adults: a new instrument for measuring patients' literacy skills. *Journal of general internal medicine*, 10, 537-541.

Pathak, R., Gaur, V., Sankrityayan, H., & Gogtay, J. (2023). Tackling counterfeit drugs: the challenges and possibilities. *Pharmaceutical Medicine*, 37(4), 281-290.

Pelikan, J. M., Ganahl, K., Van den Broucke, S., & Sørensen, K. (2019). Measuring health literacy in Europe: introducing the European health literacy survey questionnaire (HLS-EU-Q). In *International handbook of health literacy* (pp. 115-138). Policy Press.

Pitts, P. J. (2020). The spreading cancer of counterfeit drugs. *Journal of Commercial Biotechnology*, 25(3), 20-33.

Po, A. L. W. (2001). Too much, too little, or none at all: dealing with substandard and fake drugs. *The Lancet*, 357(9272), 1904.

Por, C. S., Keshavarzi, F., Yap, C. S., & Soh, Y. C. (2020). Knowledge, attitude and practice of general public towards counterfeit and adulterated medicines: a cross-sectional study in malaysia. *Current Trends in Biotechnology and Pharmacy*, 14(5), 82-91.

Rahman, M.S., Yoshida, N., Tsuboi, H., Tomizu, N., Endo, J., Miyu, O., Akimoto, Y. and Kimura, K., (2018). The health consequences of falsified medicines-a study of the published literature. *Tropical Medicine & International Health*, 23(12), 1294-1303.

Rosenberg, T. (2014). The fight against fake drugs. *The New York Times*. 4.06.2014, accesat online pe 20 decembrie 2024 la <https://www.povertyactionlab.org/sites/default/files/2014.06.04-Drott-NYTimes.pdf>

Rudd, R. E., Anderson, J. E., Oppenheimer, S., & Nath, C. (2023). Health literacy: an update of medical and public health literature. In *Review of Adult Learning and Literacy, Volume 7* (pp. 175-204). Routledge.

Sansone, A., Cuzin, B., & Jannini, E. A. (2021). Facing counterfeit medications in sexual medicine. A systematic scoping review on social strategies and technological solutions. *Sexual Medicine*, 9(6), 100437-100437.

Shahverdi, S., Hajimiri, M., Pourmalek, F., Torkamandi, H., Gholami, K., Hanafi, S., ... & Javadi, M. (2012). Iranian pharmacists' knowledge, attitude and practice regarding counterfeit drugs. *Iranian journal of pharmaceutical research: IJPR*, 11(3), 963.

Simchon, A., Brady, W. J., & Van Bavel, J. J. (2022). *Troll and divide: the language of online polarization*. *PNAS nexus*, 1(1), pgac019.

Singh, R., & Kumar, K. (2024). *Counterfeit Medicine Detection Using Blockchain Technology*. In *Future of AI in Medical Imaging* (pp. 76-91). IGI Global.

Sørensen, K., Pelikan, J. M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., ... & Brand, H. (2015). *Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU)*. *The European journal of public health*, 25(6), 1053-1058.

Sørensen, K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., ... & Brand, H. (2013). *Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q)*. *BMC public health*, 13, 1-10.

Statista. (2025). *Most used social media platforms in Romania in 2024*, accesat 18.01.2025 la <https://www.statista.com/statistics/1172720/romania-most-used-social-media-platforms/>

Suka, M., Odajima, T., Kasai, M., Igarashi, A., Ishikawa, H., Kusama, M., ... & Sugimori, H. (2013). *The 14-item health literacy scale for Japanese adults (HLS-14)*. *Environmental health and preventive medicine*, 18, 407-415.

Suka, M., Odajima, T., Okamoto, M., Sumitani, M., Igarashi, A., Ishikawa, H., ... & Sugimori, H. (2015). *Relationship between health literacy, health information access, health behavior, and health status in Japanese people*. *Patient education and counseling*, 98(5), 660-668.

Suka, M., Odajima, T., Okamoto, M., Sumitani, M., Nakayama, T., & Sugimori, H. (2014). *Reading comprehension of health checkup reports and health literacy in Japanese people*. *Environmental Health and Preventive Medicine*, 19, 295-306.

Syed, I. U., & Milburn, T. W. (2024). *Rethinking counterfeit medical supply chains: A critical review of the current literature*. *Health Care Science*.

Szekely P, Kelemen L, Fittler A, et al. *Attitude of patients and customers regarding purchasing drugs online*. *Farmacia* 2015; (1): 93-8

UK Government. (2024) *Illegal medicines worth more than £30 million seized in the UK in 2023*. Press release, 30 January 2024 accesat online pe 2 ianuarie 2025 la <https://www.gov.uk/government/news/illegal-medicines-worth-more-than-30-million-seized-in-theuk-in-2023>

European Union. (2022) *REGULATION (EU) 2022/123 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 January 2022 on strengthening the role of the European Medicines Agency in crisis preparedness and management for medicinal products and medical devices*, Official Journal of the European Union 31.1.2022 L 20-RO.

Verbalyte, M., Keitel, C., & Howard, K. (2022). *Online Trolls: Unaffectionate Psychopaths or Just Lonely Outcasts and Angry Partisans?*. *Politics and Governance*, 10(4), 396-410.

Voicu, B., Fărcășanu, D., Mustață, M., Deliu, A., & Vișinescu, I. (2023). *Using laws, common sense, and statistical approaches to design indicators for 'medical desertification'. An application on the Romanian case. Social Science & Medicine, 327, 115944.*

Wagiella, W. W., Shantier, S. W., & Gadkariem, E. A. (2020). *Public Awareness and Attitude towards Counterfeit Medicines in Sudan: A cross-sectional study. medRxiv, 2020-09.*

Weber, E. U., Blais, A. R., & Betz, N. E. (2002). *A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. Journal of behavioral decision making, 15(4), 263-290.*

Woratschka, R. (2016). *EU-Studie zur Pharmabranche: Milliarden Schaden durch gefälschte Medikamente, Taggespiel 29.09.2016, accesat online pe 9 septembrie 2024 la <https://www.tagesspiegel.de/politik/milliardenschaden-durch-gefalschte-medikamente-5230816.html>*

Yadav, V., Budania, N., Mondal, A., Kumar, N., Kumar, R., Bhardwaj, V. K., ... & Sharma, P. (2018). *A questionnaire-based study on knowledge and attitude towards counterfeit medication among the doctors in tertiary care hospital. Int J Basic Clin Pharmacol, 7(4), 802-806.*

Zaleskiewicz, T. (2001). *Beyond risk seeking and risk aversion: Personality and the dual nature of economic risk taking. European journal of Personality, 15(S1), S105-S122.*

Zaman, M. H. (2018). *Bitter pills: the global war on counterfeit drugs. Oxford University Press.*

Ziavrou, K. S., Noguera, S., & Boumba, V. A. (2022). *Trends in counterfeit drugs and pharmaceuticals before and during COVID-19 pandemic. Forensic Science International, 338, 111382.*

APPENDIX. QUESTIONNAIRE, WEIGHTING STRATEGY, AND FREQUENCY DISTRIBUTIONS

The data presented in this chapter include frequency distributions ("percentages") and central tendency indicators (e.g., means, medians). The mentioned statistics are calculated based on the weighted sample. (Weighting involves recalibrating the resulting sample to reflect the actual structure of the population).

Weighting recalibrated the population distribution according to distributions by age, gender, education, environment, geographical location, locality size, and intersections between these factors, using a raking procedure implemented with the SPSSINC RAKE routine in SPSS 27.

As with any survey, the results are affected by measurement errors, as follows:

- Estimated proportion: 50% → sampling error: ±2.83%
- Estimated proportion: 40% or 60% → sampling error: ±2.77%
- Estimated proportion: 30% or 70% → sampling error: ±2.60%
- Estimated proportion: 20% or 80% → sampling error: ±2.27%
- Estimated proportion: 10% or 90% → sampling error: ±1.70%

The understanding of these figures is simple: Suppose that 50% of respondents state that object X is white. This means that the 50% proportion has an associated estimation error of 2.8 percentage points. Therefore, if we repeated the study 100 times, in 95 out of the 100 samples, the proportion of those who state that X is white would be between 47.2% and 52.8%.

Similarly, if the estimated proportion is 10%, it means that we expect that in the population of Romania, those who state that X is white are between 8.3% and 11.7%.

It is observed that precision is higher for smaller or larger proportions. In other words, the closer we get to 50%, the wider the interval in which the estimated proportion is placed.

The presence of these sampling errors makes reporting decimals for most of the statistics we propose unnecessary. Therefore, to ease reading, we have sought to eliminate these unnecessary decimals from the report. Rounding to whole numbers can sometimes lead to apparent totals of 100% or 99%. (For example, if we round 22.2%, 33.4%, and 44.4%, the resulting proportions are 22%, 33%, and 44%, whose sum is 99%. This is not an error, but merely an indication that we are working with normal sampling errors in any survey, and therefore, we preferred to round to whole numbers).