



TRANSCRIME
Joint Research Centre on Innovation and Crime



**UNIVERSITÀ
CATTOLICA**
del Sacro Cuore

Project CAPSULE

Collecting and sharing information on the Consumers' Awareness about the Purchase of SUBstandard and falsified medicines online to support better e-commerce practices.

FINAL REPORT

July 2024

This study was funded by Michigan State University's Center for Anti-Counterfeiting and Product Protection (A-CAPP) through external research gifts



Center for Anti-Counterfeiting
and Product Protection
MICHIGAN STATE UNIVERSITY

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FINAL REPORT

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Foreword

Project CAPSULE aims to assess the exposure and attitudes of Italian and Spanish consumers toward online sales of medicines, as well as their ability to distinguish online advertisements of substandard and falsified products. The outcomes of this project enhance the understanding of public and private stakeholders regarding consumers' awareness and behaviors, enabling them to refine strategies to combat illicit online medicine sales or devise more targeted information campaigns.

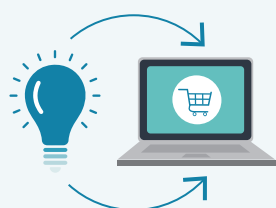
Università Cattolica del Sacro Cuore (UCSC)-Transcrime led project CAPSULE, which was funded by Michigan State University's Center for Anti-Counterfeiting and Product Protection (A-CAPP) through external research gifts.

This document summarizes the main findings of the CAPSULE project.

Key messages

Project CAPSULE investigates **consumers' awareness, attitudes, and behaviors regarding online sales of medicines**. The project relies on a **web survey** conducted in Italy and Spain in January 2024 among two representative samples of regular Internet users who were aware of the possibility of purchasing medicines online and were exposed to online medicine advertisements (e.g., banners, spam emails, social media posts, online pharmacies) and/or engaged in online medicine purchases.

Awareness and Attitudes Toward Online Medicine Sales



- Out of the initial 3,610 respondents reached, Italians exhibited a significantly higher **awareness** (92% of the initial sample) of the **possibility to purchase medicines online** compared to Spanish respondents (54%).



- **Older** and **more educated** respondents showed significantly higher awareness of online purchasing of medicines.

- Most respondents became aware of online medicine purchases through **websites** (62% in Italy and 48% in Spain), followed by **word of mouth** from friends and relatives (30% in Italy and 33% in Spain), **social networks** (26% in both countries), and **advertising emails** (19% in Italy and 18% in Spain).



- The majority of respondents knew that legitimate online medicine sales in Italy and Spain are **limited to non-prescription drugs** (73% in Italy and 66% in Spain). Many considered this the most appropriate option (72% in Italy and 74% in Spain).

- No significant disparities were found between the national samples regarding **acceptable circumstances for purchasing online medicines with uncertain origins**. About 40% of respondents in both countries found it **unacceptable** under any condition.



- In both countries, the main declared motivations for purchasing potentially illicit medicines included the **unavailability** of the same medicine through other channels (23% in Italy and 26% in Spain) and **cost savings** (19% in Italy and 18% in Spain).



- Despite **high trust in healthcare professionals** in both countries, over half of the respondents frequently **rely on the Internet for obtaining medicine information (58% in Italy and 52% in Spain)**, and about 40% of respondents search online for specific health solutions or alternative treatments.



- Only about one-third correctly **differentiated dietary supplements from medicines** (34% in Italy and 32% in Spain). This highlights the difficulties in distinguishing between medicines and other similar products subjected to different regulations.

- Most respondents found purchasing medicines online **convenient** (71% in Italy and 61% in Spain), but expressed **low trust** in receiving the correct products if purchased online (78% in Italy and 80% in Spain).



- Italians are less **concerned about counterfeit medicines** online than Spaniards, who also show more skepticism about the **safety** and **effectiveness** of medicines purchased online.

Experience with Online Medicine Advertisements and Purchases



- Respondents showed a **high exposure to online advertisements** for medicines, with 85% of Italians and 75% of Spanish respondents reporting having seen at least one form of online advertisement for medicines.

- Italian respondents were more likely to have made an **online purchase** (69%) compared to Spanish ones (52%).



- **Flu treatments** were the most advertised medicines in Italy, whereas in Spain there was also high visibility for **weight loss** and **performance-enhancing** products.

- In Italy, **flu treatments** were the most popular online purchases, while in Spain, they ranked second to **performance-enhancing** drugs. Spanish consumers also bought more **weight loss** and **smoking cessation** products than Italians, who, conversely, purchased more **chronic pain** and **cholesterol management** medicines.



- **Websites** were the primary channel for both advertisement exposure and purchases, followed by **social networks** and **e-commerce platforms**.

- A comparison with a previous survey conducted in 2015-2016 by AIFA and Sapienza University of Rome revealed a **significant increase in online medicine purchases** in both countries.

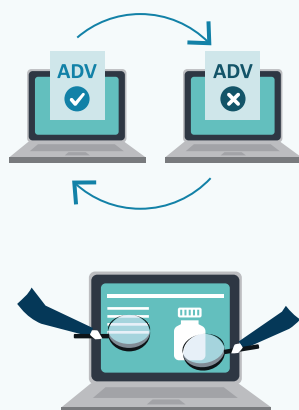
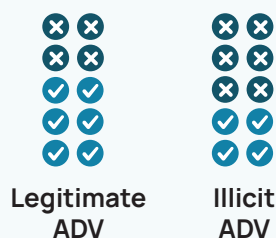
- There was also a notable increase in the percentage of respondents viewing the possibility of purchasing medicines online positively. However, **concerns about the safety of medicines purchased online** remained consistent between the two surveys.

Ability to Recognize Illicit Online Advertisements



- An **experimental section** of the survey assessed respondents' ability to distinguish between legitimate and illicit online advertisements. The results show notable similarities between the two countries.

- Approximately half (53%) of the online advertisements were **correctly categorized** as legitimate or illicit, with only about one respondent out of five correctly identifying the legitimacy of all three proposed images.



- **Legitimate advertisements** were correctly identified more often, with about 63% of the shown images in both countries correctly recognized. However, in a considerable number of cases, respondents were unable to provide a judgment on the proposed images (29% in Italy and 27% in Spain).
- **Illicit advertisements** were correctly identified in only four out of ten responses (43% in Italy and 42% in Spain).
- **Older respondents** and **consumers with lower trust in online sales** exhibited lower accuracy in identifying both legitimate and illicit advertisements.
- When asked to confirm one of their previous answers regarding the legitimate nature of the advertisements, respondents generally **confirmed their initial judgment**, especially if their previous answer was correct. However, 20% to 25% of respondents changed their original answer declaring that they were no longer able to distinguish the legitimacy of the advertisement.
- Respondents declared to assess the possible illegality of an online advertisement primarily by looking at the **absence of the label** certifying authorization from the Ministry of Health, followed by the **absence of a medicine description** or the **presence of errors** in the medicine description. Photos and packaging details were deemed relevant by only a minority of respondents in both countries.

Conclusions and recommendations

In conclusion, Project CAPSULE provides some insights into consumers' attitudes and behaviors towards online medicine sales in Italy and Spain. These results could inform the design of effective and tailored countermeasures. Specifically, the findings:



1. Underscore the importance of **targeted education and awareness campaigns** to help consumers make informed decisions and mitigate potential risks associated with online medicine purchases, considering differences across countries and types of consumers.



2. Highlight that while consumers have a good **knowledge of regulations** governing online medicine sales, they face challenges in **distinguishing medicines** from other health-related products. This indicates a need for improved **product labeling** and **consumer education** to prevent misguided purchases.



3. Identify that the primary risk is associated with **illicit online pharmacies or deceptive websites**, necessitating efforts to enhance the **crime-proofing of legitimate advertisements**.



4. Support the need for **continued research** in this area to understand evolving consumer behaviors and market dynamics.

Background

The **use of the Internet** has transformed global consumption patterns by providing easy access to a wide range of products and services. However, this accessibility has also exposed consumers to **various risks**, including the unintentional or deliberate **purchase of counterfeit or illicit products** (Europol 2021; EUIPO and Europol, 2022). Specifically, the online sale of **substandard or falsified medicines** (henceforth SFMs) has emerged as a significant and rapidly growing criminal activity in recent decades (Ahmed et al. 2022). This includes the sale of medicines that purposely falsify their identity, composition, or source; authorized products that fail to meet their minimum quality standards or specifications; legitimate products but without proper authorizations; and prescription drugs to consumers sold a prescription (WHO 2016).

The **consequences of the COVID-19 pandemic** have further aggravated the situation by increasing the demand for pharmaceutical products and the number of users turning to online platforms for everyday purchases. This scenario has made the illicit medicine market, already characterized by high profit margins and low risk of detection, even more appealing to criminals (OECD and EUIPO 2020; WEF 2021; Ziavrou, Noguera, and Boumba 2022; Jillani, Reinhard, and Hertig 2023).

The rising threat posed by the illicit online sale of medicines is especially concerning because the **pharmaceutical illicit market** offers minimal space for non-deceptive products. Consequently, criminals heavily rely on **deceptive advertisements or sales channels** to reach potential customers. On one hand, consumers drawn by affordable prices or seeking products unavailable through legitimate channels may unknowingly purchase SFMs, either underestimating their prevalence or disregarding existing regulations on online pharmaceutical sales. Online channels such as websites and social media present **significant challenges for consumers** trying to verify **product authenticity**, leaving them primarily responsible for identifying potentially harmful medicines (Barbaranelli et al. 2015). The issue is further exacerbated by the fact that criminals do not always need to convince consumers that they are authorized to sell a particular product and may exploit the legitimacy associated with specific Internet website or platform (Winter, Saunders, and Hart 2003; Kennedy 2020). On the other hand, even consumers knowingly purchasing non-genuine drugs, perhaps due to a lack of legitimate alternatives or anonymity, may be misled about the **products' efficacy** (Kennedy 2020). For instance, during the recent pandemic, some "miracle drugs" purported to prevent or cure COVID-19 were sold online, exploiting people's fears (EMA 2023).

These risks may be accentuated by **varying regulations regarding online pharmaceutical** sales across countries (Sogomonjan and Forcht Dagi 2023). Strict regulations limiting legitimate products or sales channels can drive consumers to seek alternative sources, while a fully open market may lead to numerous vendors and increase online purchasing, thus facilitating criminal deception.

Most **existing research** and **law enforcement actions** have focused on stopping this problem by targeting or understanding the dynamics behind the **online supply of SFMs** (Lavorigna 2015; Kennedy, Haberman, and Wilson 2018; Kennedy, Petlakh, and Wilson 2018). However, it is essential to complement these efforts by also **addressing the demand for these products**. Understanding **consumers' experiences** and **potential exposure** to SFMs online is essential for designing effective awareness campaigns about associated safety risks. Moreover, exploring the cues consumers rely on to identify illicit products advertised online can aid brand owners and online platforms in creating product listings that help customers distinguish between legitimate products and SFMs.

Currently, **empirical knowledge regarding consumer awareness and experiences** with purchasing SFMs online is limited. Although some studies have examined this issue, most have focused on developing countries due to factors such as limited access to medical care, demand for affordable medicines, and corruption

(Lybecker 2007; Alfadl, Ibrahim, and Hassali 2012; Ofori-Parku and Park 2022; Barbaranelli et al. 2015). However, this challenge **extends beyond developing countries**, as evidenced during the COVID-19 pandemic when fake medicinal products and “miracle drugs” were widely available online. The lack of empirical evidence undermines the development of effective policies or information initiatives based on solid empirical grounds. Hence, there is a pressing need to expand current knowledge about consumers’ awareness of online SFM sales and their exposure to this threat.

Aims

Project CAPSULE aims to bridge this knowledge gap by providing brand owners, e-commerce platforms, and public authorities with comprehensive consumers’ awareness, attitudes, and behaviors regarding online sales of medicines. The goal is to develop effective countermeasures, including informative campaigns and improvements to online product listings.

In specific, Project CAPSULE aims to address the **following research questions**:



1. To what extent are consumers **exposed to online advertisements** for medicines, and how common is the **purchasing of medicines online**?



2. What is the level of **consumers’ awareness and attitude** toward the sales of medicines online, as well as the associated risks?



3. How proficient are consumers in **distinguishing between legitimate products and SFMs** advertised online?



4. Which **factors** influence consumers’ exposure to or attitude toward the purchase of medicines online, as well as their ability to distinguish between legitimate products and SFMs?

The selection of **Italy** and **Spain** as case studies was motivated by their stringent regulatory environments, which prohibit the online sale of prescription medicines and restrict legitimate operators’ opportunities to sell medicines online.

Methodology

Project CAPSULE gathered information from **two representative samples** of regular internet users in Italy and Spain through a Computer Assisted Web Interviewing (CAWI) survey. The following sections provide details on the methodology used for data collection.

Questionnaire design

The UCSC-Transcrime team, with the support of Dr Domenico Di Giorgio (Head of Inspection & Certification Department of the Italian Medicines Agency - AIFA), developed an **online questionnaire** consisting of 17 questions (excluding socio-demographic information). The questionnaire was drafted by drawing insights from similar surveys to ensure comparability of results, particularly leveraging a survey conducted by AIFA and Sapienza University of Rome in 2015-2016 as part of the EU-funded project Fakeshare II (Barbaranelli, Di Giorgio, and Gramazio 2016).

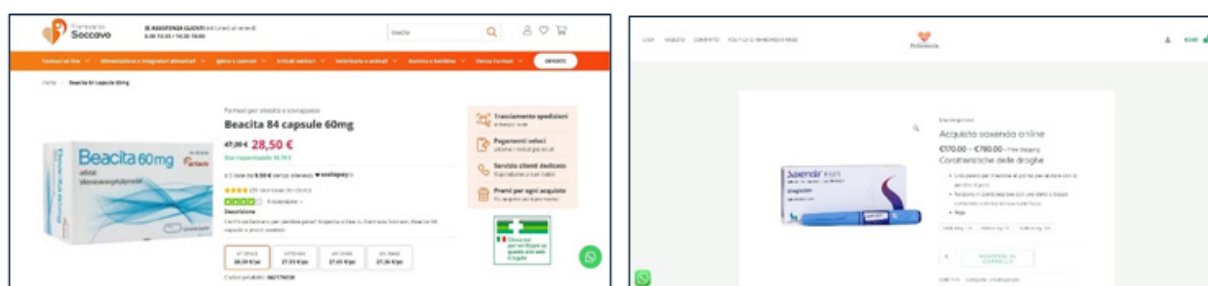
The questionnaire comprised **closed-ended questions** and an **experimental section**. Closed-ended questions gathered information on respondents' awareness, attitudes, and experiences regarding online purchases and advertisements of medicines.

In the experimental section, respondents were shown three different pictures of actual online advertisements for medicines or similar products (i.e. dietary supplements), including at least one legitimate and one illicit advertisement (Figure 1). They were asked to determine the legitimacy of each advertisement. These images were randomly chosen from a pool of six (three legitimate and three illicit) for each country, ensuring equal representation of each image in the sample. The language of the advertisements corresponds to the nationality of the respondents.

Subsequently, a recall question prompted respondents to re-evaluate one of the previously shown images and confirm or revise their initial responses. The advertisement was randomly selected among those for which respondents had provided a judgment previously, aiming to maintain a balance between wrong and right previous answers and legitimate and illicit advertisements.

To ensure the survey's validity, the questionnaire underwent **further validation** with the assistance of a **professional company**¹ specialized in questionnaire collection and research services. This company also administered the survey, enhancing the reliability of the data collection process. A **pilot group** of 107 respondents (55 in Italy and 52 in Spain) tested the questionnaire before full-scale data collection.

Figure 1 - Examples of the images presented to the respondents, featuring a legitimate advertisement (left) and an illegitimate advertisement (right).



1. <https://www.bilendi.it/>

Data collection

The complete survey was administered to two representative samples totaling **2,107 respondents** (1,055 in Italy and 1,052 in Spain) consisting of regular internet users who were aware of the possibility of purchasing medicines online and exposed to online medicine advertisements (e.g., banners, spam emails, social media posts, online pharmacies) and/or engaged in online medicine purchases.

Respondents were selected from **two online panels**, profiled based on geographical area and socio-demographic variables, aligning with the overall Italian and Spanish population distribution. Initially, **two larger representative pools of respondents** (3,610 in total) were reached, with several individuals subsequently excluded after the initial questions for not meeting the minimum inclusion criteria. Data on the **characteristics of excluded respondents** and their responses to screening questions were collected and analyzed.

Quality checks were implemented, filtering out unreliable responses (e.g., rapid survey completions or repetitive Likert scale selections). Unreliable respondents were replaced to maintain the expected sample size (1,050 respondents per country). **Data collection** commenced on January 11, 2024, and concluded on January 26, 2024.

Figure 2 (page 12) presents descriptive information on respondents in the final samples, further details are provided in Annex 1 – Samples.

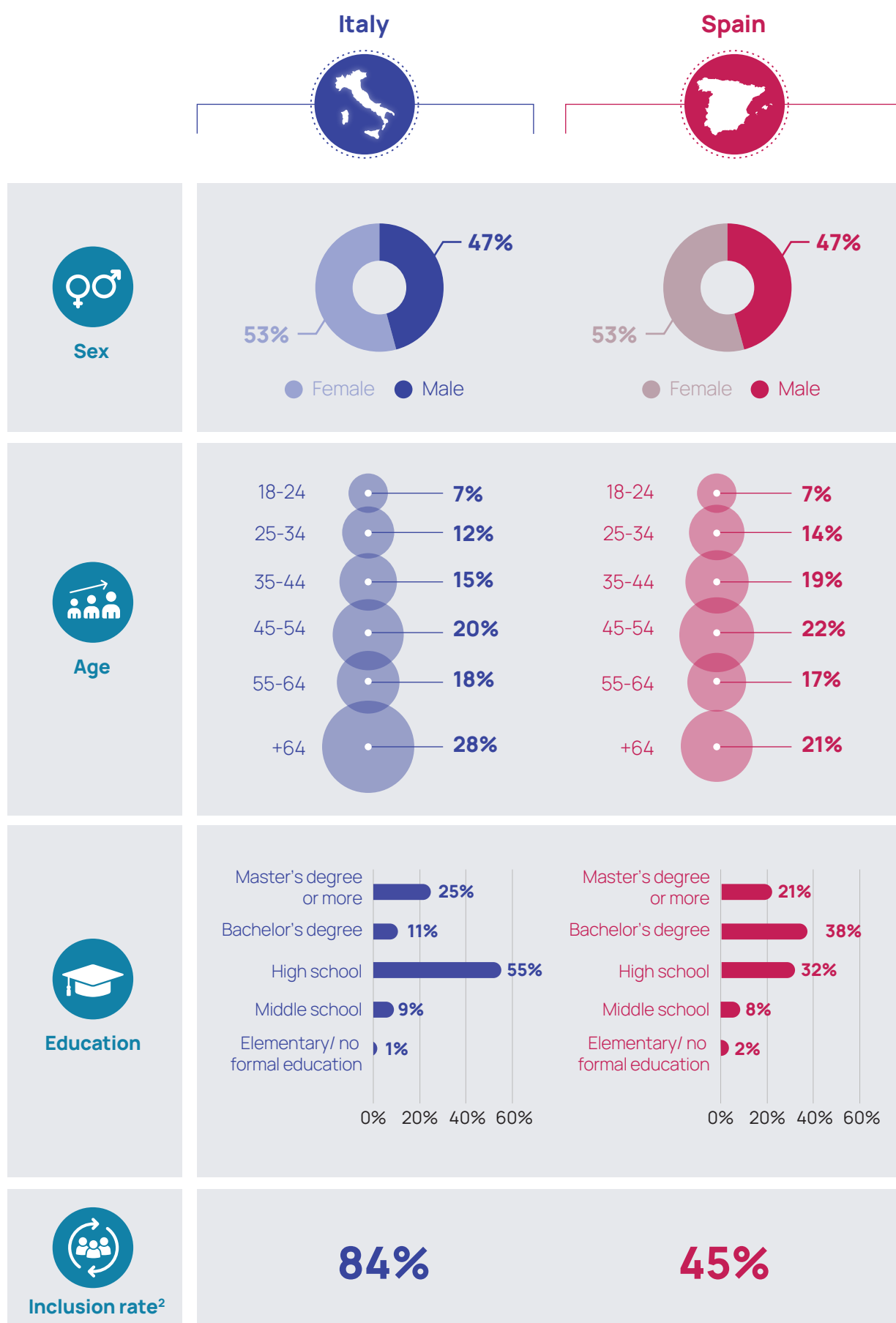
Data Analysis

The collected responses were analyzed using both **descriptive statistics** and **regression models**. Logistic regression models were calculated for each question, with independent variables including sex, age, education, and level of mistrust in online sales. This allowed estimating the influence of **specific consumer characteristics** on their exposure to or attitude toward purchasing medicines online and their ability to distinguish legitimate advertisements. Therefore, reported results concerning significant differences between consumer categories should be interpreted while holding all other factors constant.

Regarding data presentation, a 90% **confidence interval** around each estimated percentage was calculated and depicted in the graphs using either error bars or dashed lines.

The results obtained were **discussed and validated** with representatives from national health regulatory authorities in both countries and academic experts on pharmaceutical crime.

Figure 2 – Characteristics of the final samples



2. Inclusion rate is the percentage of initially contacted respondents who meet all the inclusion criteria

Results

The following sections present the findings of the Project CAPSULE. The first section details respondents' declared level of awareness, knowledge, and attitudes toward purchasing medicines online and the associated risks. The second section explores respondents' exposure to online advertisements for medicines and their experiences with online medicine purchases. Finally, the last section discusses the results of an experiment evaluating respondents' ability to identify illicit advertisements.

Awareness and Attitudes Toward Online Medicine Sales

Out of the initial 3,610 respondents reached, Italians exhibited significantly higher **awareness of the possibility to purchase medicines online** within their country compared to Spanish respondents. Approximately 92% of Italians acknowledged this possibility, while only about half of Spanish respondents (54%) did the same (Figure 3).³

Figure 3 - Are you aware of the possibility of purchasing medicines online in your country? (N 3,610)



In Italy, female respondents showed a higher awareness of the option to purchase medicines online compared to males. In Spain, however, there was no significant difference between genders. Generally, **older individuals demonstrated greater awareness** compared to younger cohorts. For instance, those aged 45 to 54 showed a 36% increase in awareness compared to those aged 18 to 24. This trend continued with age groups of 55 to 64 and 65 and above, with awareness increasing by 74% and 75%, respectively. This may be attributed to the fact that elderly individuals, on average, experience more health conditions and are thus more likely to seek or be informed about purchasing pharmaceutical products.

Similarly, **respondents with higher levels of education were more aware** of the possibility to purchase medicines online compared to those with elementary or no formal education. Awareness increased by 87% for bachelor's degree holders and 115% for those with a master's degree or higher. Across both countries, **higher levels of mistrust toward online sales**⁴ correlated with a lower probability of being aware of online medicine sales.

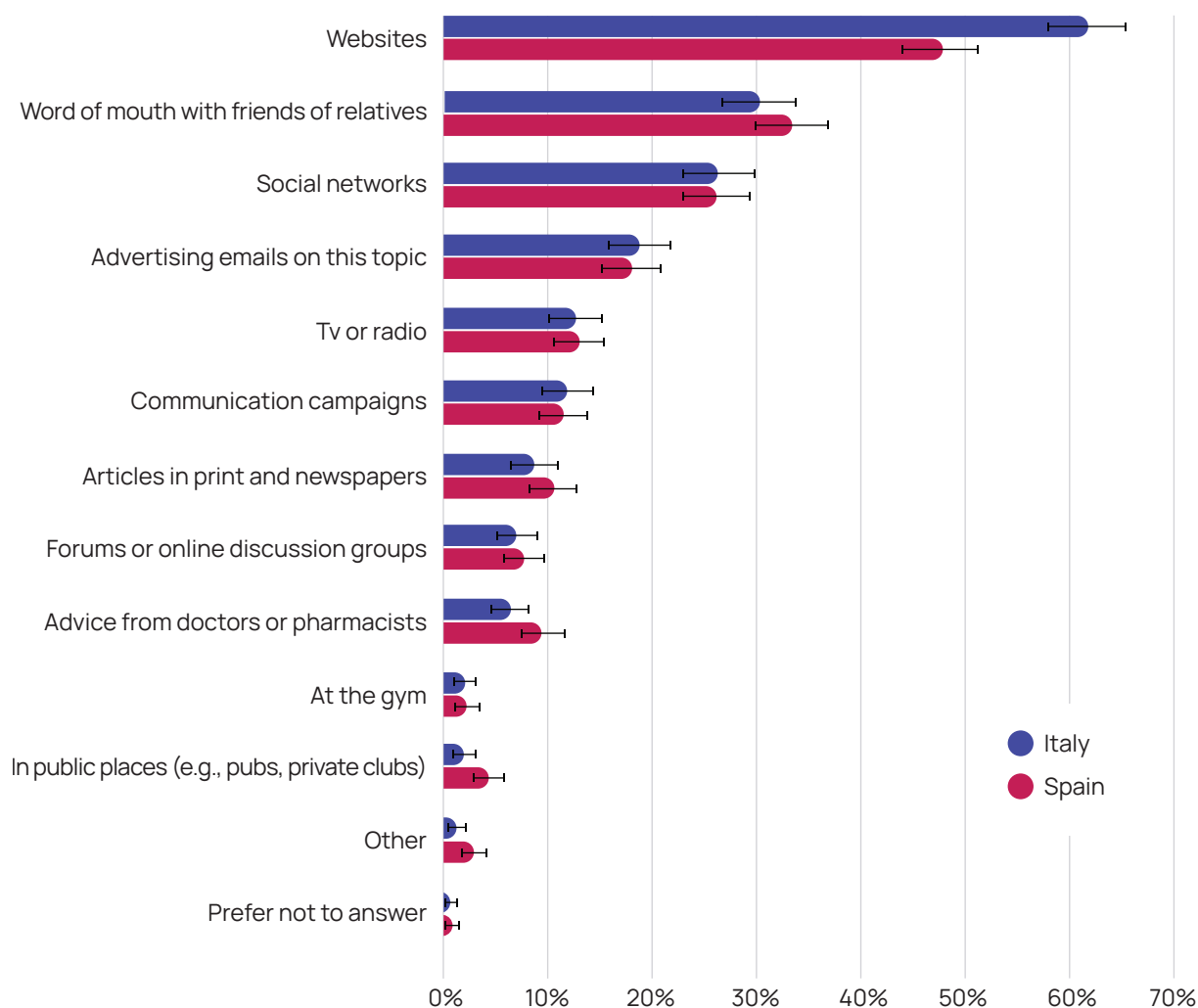
In both Italy and Spain, respondents typically became aware of the option to purchase medicines online through **websites** (62% in Italy and 48% in Spain), followed by **word of mouth** from friends and relatives (30% in Italy and 33% in Spain), **social networks** (26% in both countries), and **advertising emails** (19% in Italy and 18% in Spain) (Figure 4, pg. 14). These findings highlight the importance of informal channels like social networks and word of mouth in disseminating information that ideally should be primarily provided through institutional channels, such as certified campaigns or initiatives.

3. In interpreting these results, it must also be considered that respondents may not have had a clear idea of which products fall under the definition of medicines, for example, including dietary supplements, as will be clarified by other questions.

4. Details about the composite indicators of mistrust in online sales are described in Annex 2 - Mistrust in online sales index.

Analyzing respondents' characteristics, individuals aged 55 and older were more likely to have become aware of the possibility to purchase medicines online through websites and advertising emails compared to those younger than 25. However, they were less likely to have realized this through social networks. Additionally, respondents with education levels higher than middle school had about half the probability of having become aware through friends or relatives compared to those with middle school or lower education levels.

Figure 4 - How did you become aware of the possibility of purchasing medications online? (N 2,419)⁵



The majority of respondents in the final sample **correctly recognized that online medicine sales in both countries are limited to non-prescription drugs** (73% in Italy and 66% in Spain).⁶ Most respondents also considered this option as the **most suitable** (72% in Italy and 74% in Spain) (Figure 5, pg. 15).

Respondents were asked to indicate under which circumstances they would have considered it acceptable to purchase medicines online without being able to ascertain their legitimate origin. No significant differences emerged between the two samples. Slightly more than two-fifths of respondents in both countries indicated that this was **not acceptable under any conditions** (44% in Italy and 42% in Spain). Among the most commonly cited motivations for purchasing potentially illicit medicines were the **unavailability of the same medicine through other channels** (23% in Italy and 26% in Spain) and **cost savings** (19% in Italy and 18% in Spain) (Figure 6, pg. 15).

5. Respondents could have selected more than one option.

6. More details about the current legislations in Italy and Spain about online sales of medicines can be found on the websites of the corresponding national competent authorities, AIFA for Italy (see [here](#)) and AEMPS for Spain (see [here](#)).

Figure 5 - The sale of medicines online in your country is and should be... (N 2,107)

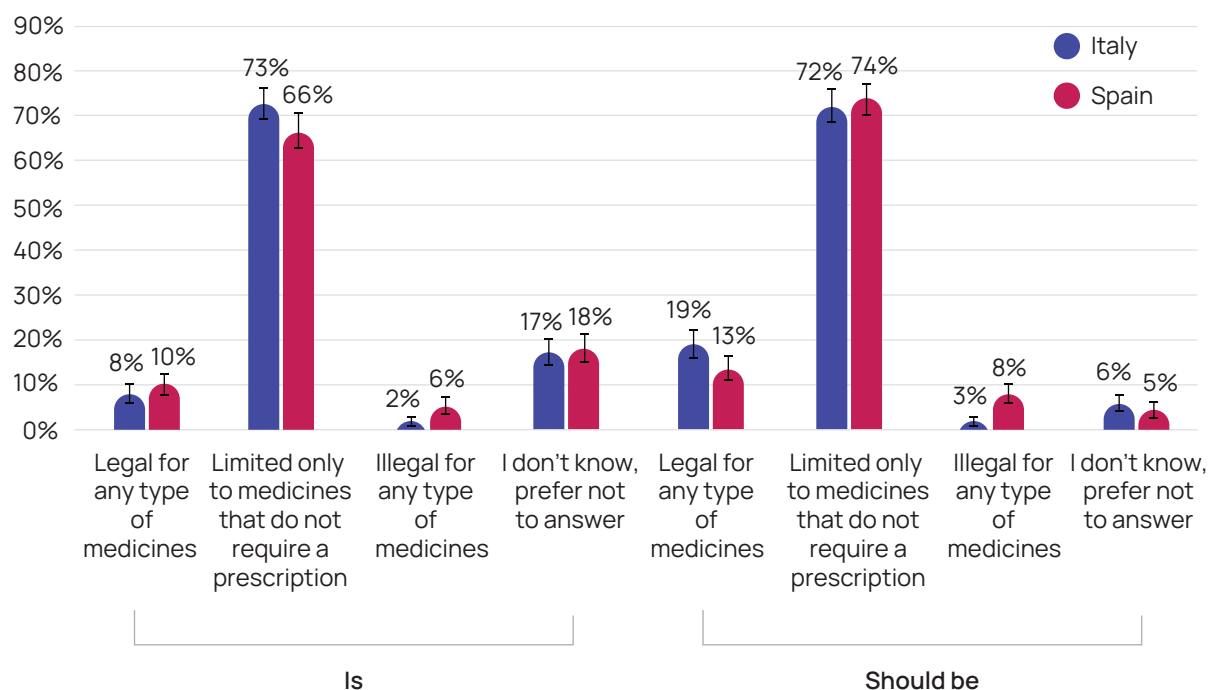
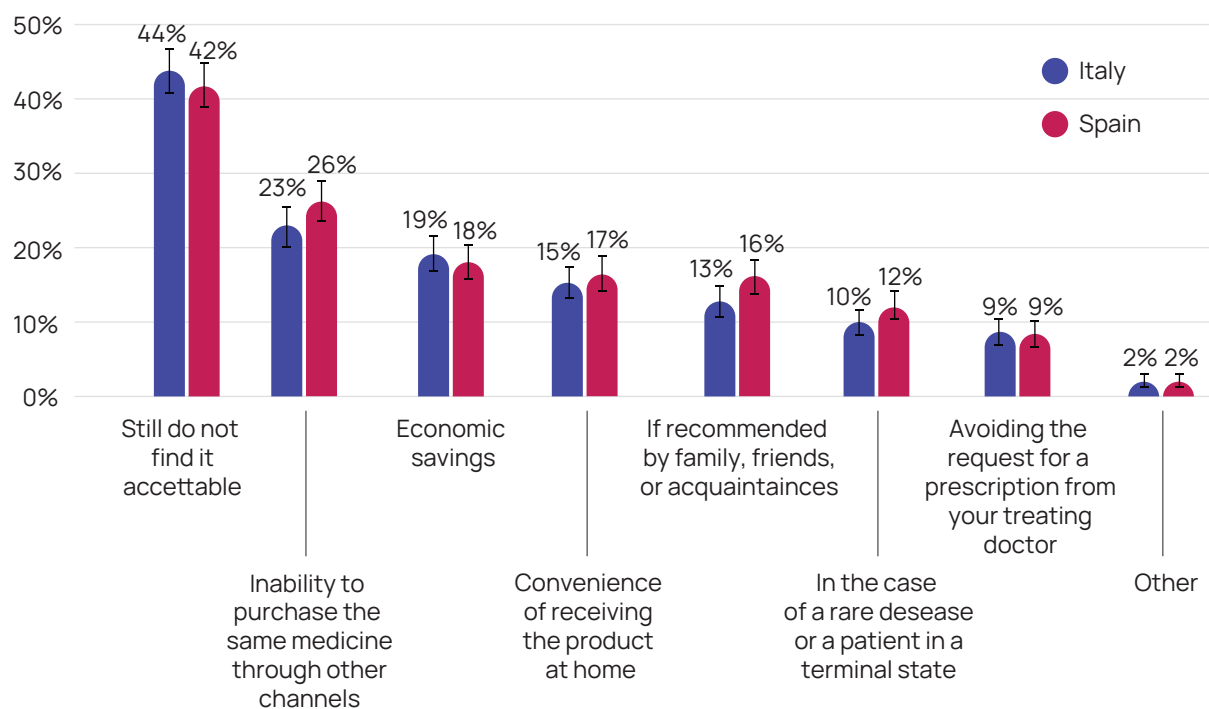


Figure 6 - In which of the following situations would you find it acceptable to purchase a medicine online when you are unable to ascertain its legitimate origin with certainty? (N 2,107)⁷

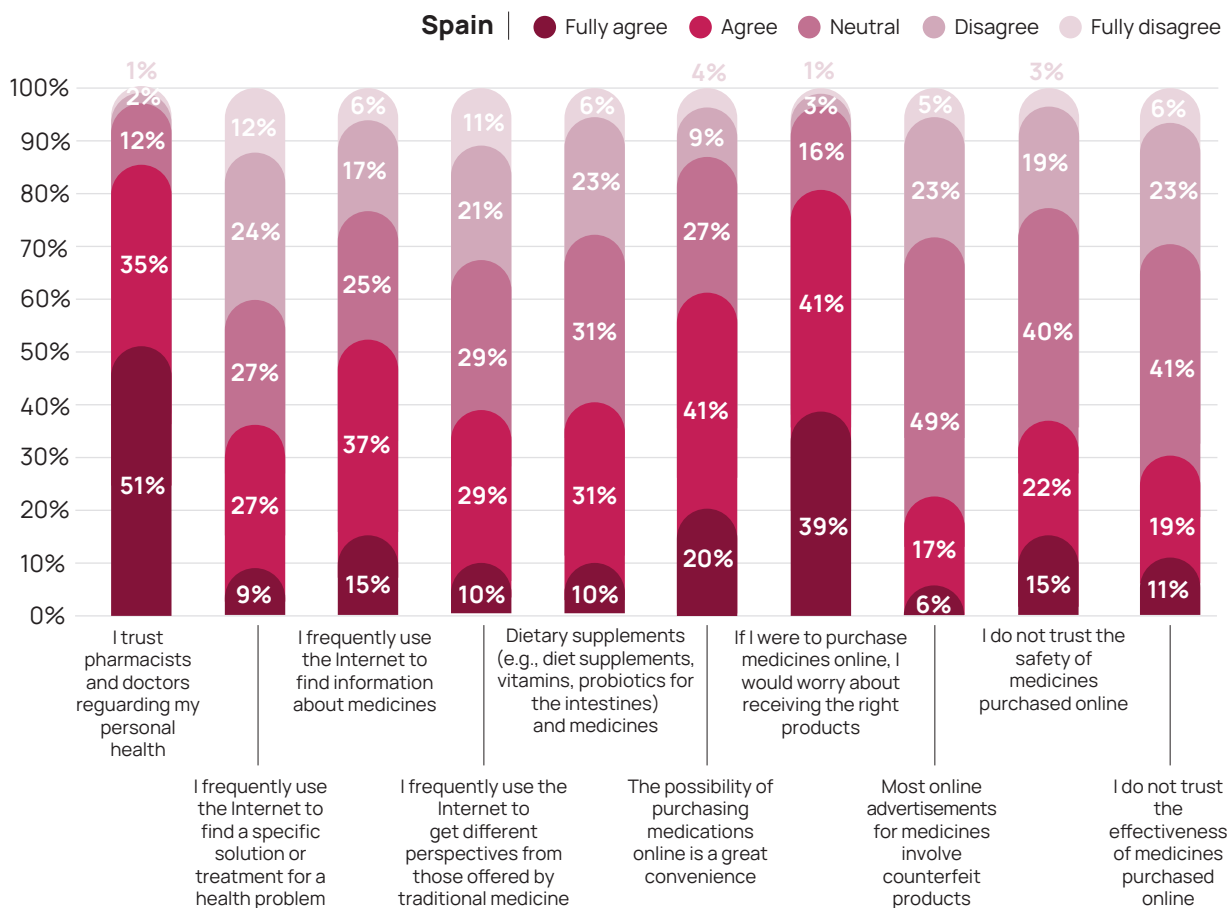
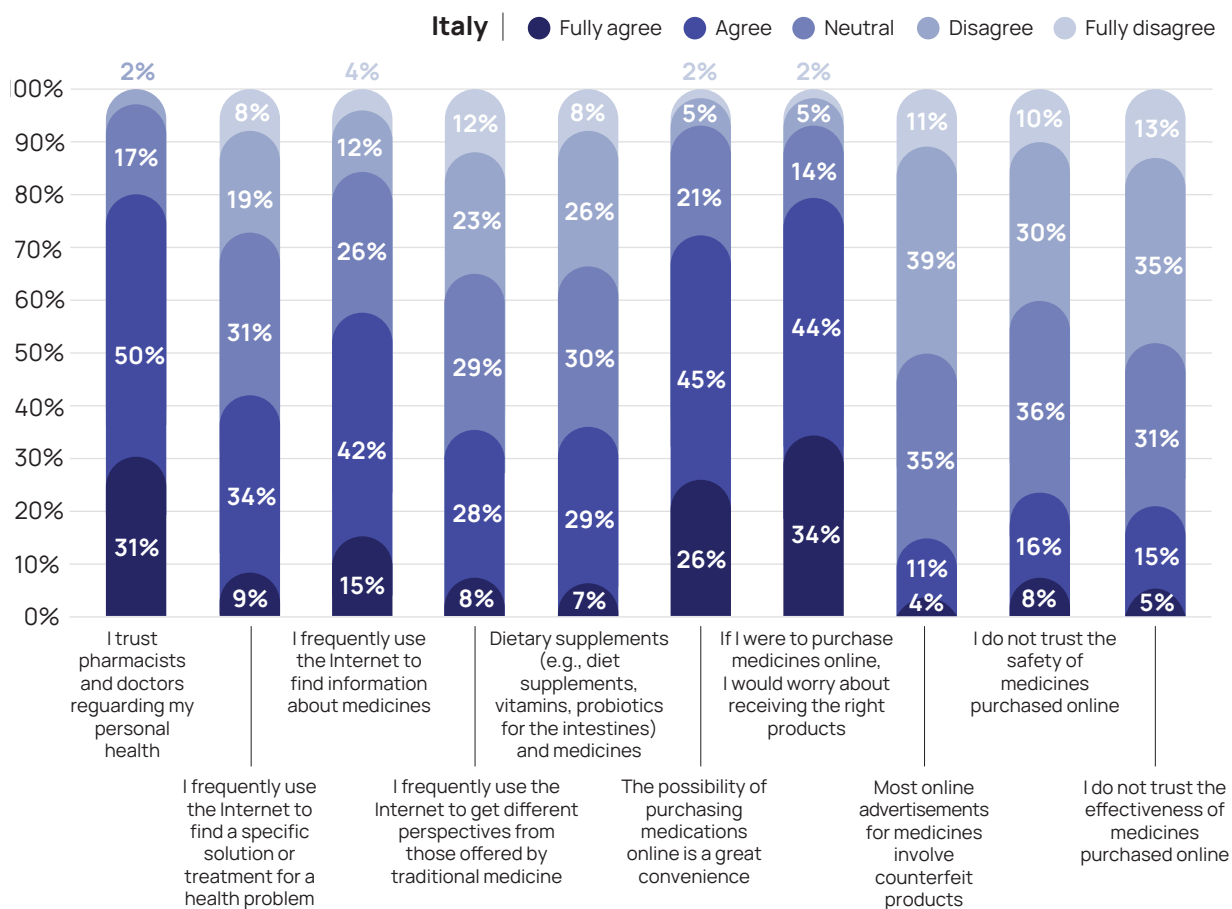


7. Respondents could have selected more than one option.

Respondents also expressed their level of agreement with a range of statements regarding their **trust in healthcare institutions**, their **attitudes toward using the Internet for health information or medical advice**, and the **potential risks associated with purchasing medicines online**. Detailed results are provided in Figure 7, pg. 17. The most relevant findings were:

- More than half of **respondents frequently use the Internet to find information about medicines** (58% in Italy and 52% in Spain). Older respondents, aged more than 45 years, were more likely to disagree with this statement than younger respondents.
- Approximately two-fifths of respondents frequently use the internet to **find specific solutions or treatments** for health problems (42% in Italy and 37% in Spain) or to **explore alternative perspectives** from those offered by traditional medicine (36% in Italy and 39% in Spain). These results align with a global trend, reflecting the increasing popularity of seeking health information online due to factors like easy accessibility, cost-effectiveness, and anonymity (Jia et al. 2021; Wang et al. 2021).
- Despite consumers largely relying on information obtained from the Internet, they also maintained **high trust in pharmacists and doctors** regarding personal health (80% in Italy and 85% in Spain). Trust in pharmacists and doctors was lower for respondents aged less than 45 years old in both countries, although remaining significantly high (75% in Italy and 81% in Spain).
- Only about one-third of respondents correctly considered **dietary supplements** as distinct from medicines (34% in Italy and 32% in Spain). In both countries, respondents aged over 45 years old were more likely to separate medicines and dietary supplements. In Italy, females were less likely to make this distinction than males. These results highlight the difficulties for consumers in **distinguishing between medicines and similar products** sold online and subjected to different regulations. Criminals may leverage these difficulties by deliberately creating ambiguous advertisements to deceive consumers.
- Most respondents perceived the option of purchasing medicines online as **highly convenient** (71% in Italy and 61% in Spain), potentially increasing their willingness to seek medicines through online channels. In Spain males and respondents aged less than 45 years old were significantly more likely to agree with this statement.
- Respondents also exhibited **low trust in online sales**, with approximately eight out of ten expressing **concerns about receiving the correct medicines** if purchased online (78% in Italy and 80% in Spain). This concern was significantly more pronounced among older respondents.
- Italian respondents demonstrated less concern about the **risk of purchasing falsified medicines online**, with 50% disagreeing that most online advertisements for medicines involve counterfeit products and only 15% agreeing with this statement. Conversely, Spanish respondents displayed more uncertainty regarding this risk, with approximately half (49%) expressing no clear opinion about the incidence of sales of counterfeit medicines online. In both countries, female respondents had a lower probability of agreement with this sentence than males.
- Spanish respondents also exhibited slightly greater skepticism than Italian respondents regarding the **safety and effectiveness of medicines** purchased online.

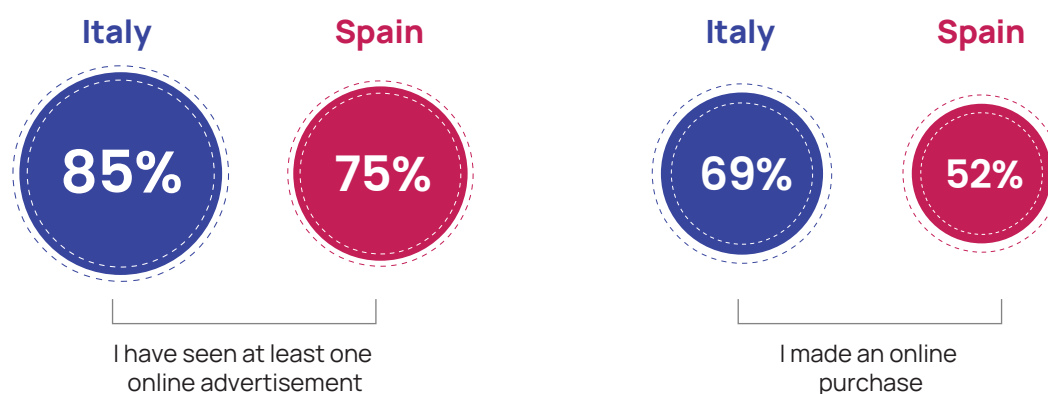
Figure 7 - Please indicate the degree to which you agree with the following statements. (N 2,107)



Experience with Online Medicine Advertisements and Purchases

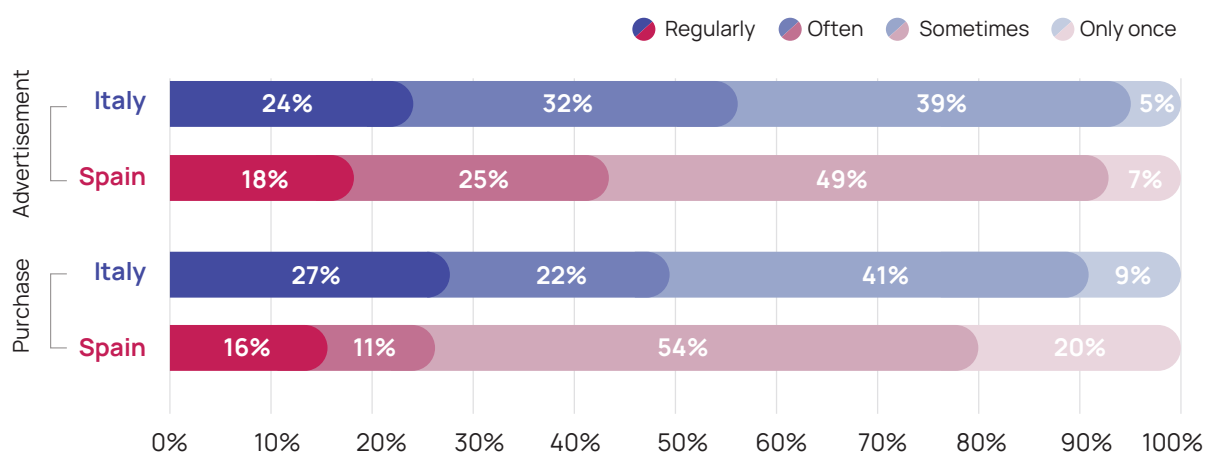
The slightly greater confidence of Italian respondents in purchasing medicines online was reflected in their **actual behaviors**. Not surprisingly, the vast majority of respondents in both Italy and Spain were **exposed to some form of online advertisement** for medicines (85% and 75%, respectively). However, about seven out of ten Italian respondents had also made at least one **online purchase of medicines**, whereas only half of the Spanish respondents had done the same (69% and 52%, respectively) (Figure 8). Overall, 82% of Italian respondents who saw an advertisement also made a purchase, while in Spain, this percentage was 69%. In both countries, younger respondents were more likely to have seen online advertisements than older individuals. However, age was not a significant factor in the probability of having made a purchase. Additionally, a higher level of mistrust in online sales significantly reduced both exposure to online advertisements and the probability of purchase in both countries.

Figure 8 - Have you ever purchased medicines online or noticed online advertisements related to medicines? (N 2,419)



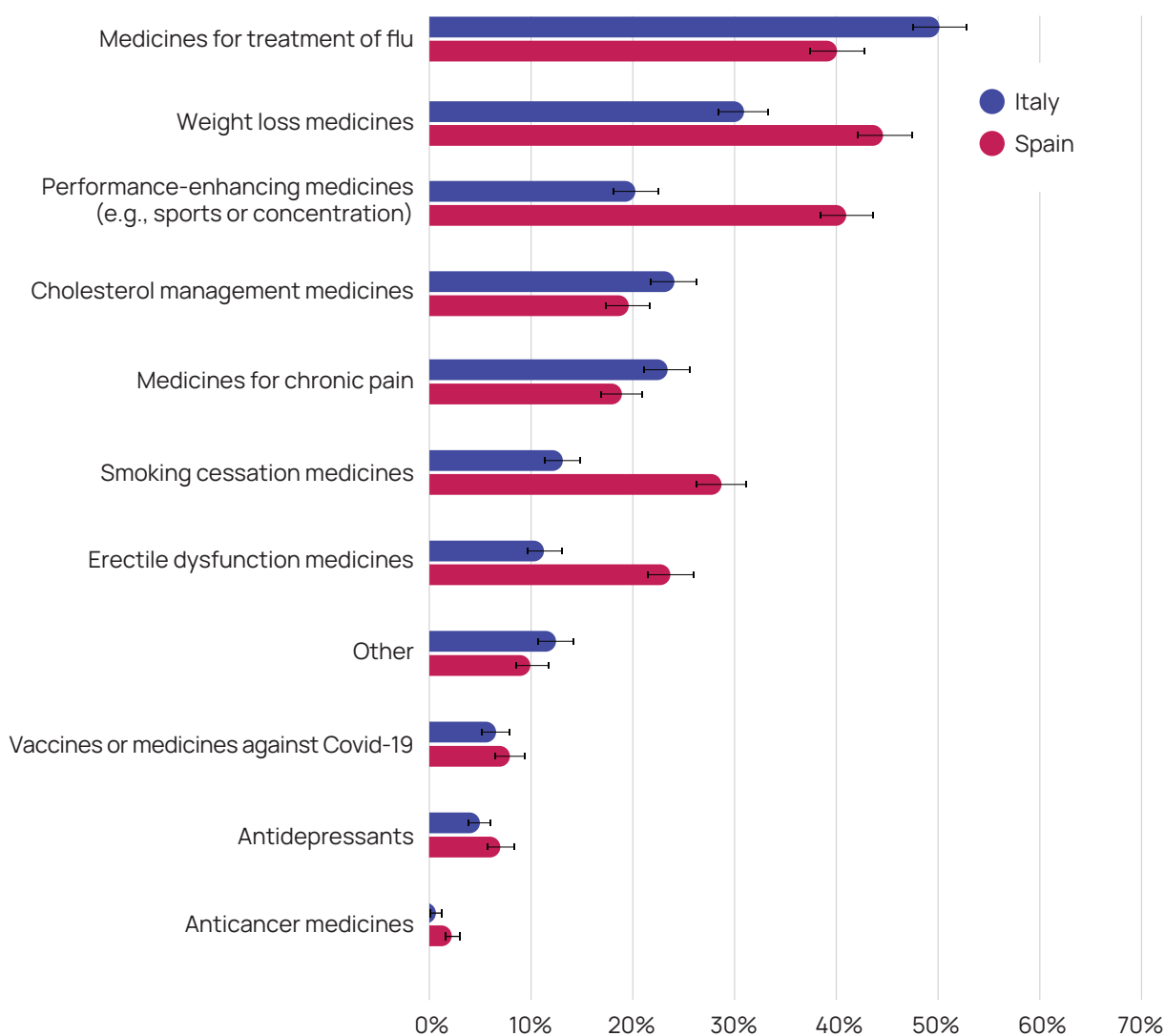
The differing attitudes between the two countries are also evident in the reported **frequency of purchases or exposure** to online advertisements for medicines. More than half of Italians who have seen online advertisements did so regularly or often (56%), whereas in Spain, only 43% reported the same frequency. Furthermore, the gap widened when considering those who purchased medicines online regularly or often: almost half of Italians did so (49%), whereas in Spain, this percentage was only 27%, with a majority of respondents purchasing medicines only occasionally (Figure 9).

Figure 9 - How often have you noticed online advertisements related to medicines or have you purchased medicines online? (N 1,922 - N 1,439)



In Italy, the majority of online advertisements for medicines focused on **flu treatment**, as reported by 50% of respondents.⁸ Similarly, in Spain, flu treatments were also highly advertised, with 40% of respondents noticing them. However, in Spain, the most promoted medicines were **weight loss** and **performance-enhancing products**, noted by 45% and 41% of respondents, respectively. Particularly notable was the significantly higher visibility of performance-enhancing products in Spanish advertisements compared to the Italian sample, with more than twice as many respondents acknowledging them. Additionally, Spanish advertisements featured **erectile dysfunction** and **smoking cessation medicines** to a significantly greater extent compared to Italy. Conversely, advertisements for medicines addressing **chronic pain** or **cholesterol management** were more prevalent in Italy (Figure 10).

Figure 10 - Which types of medicines have you seen in online advertisements? (N 1,922)⁹

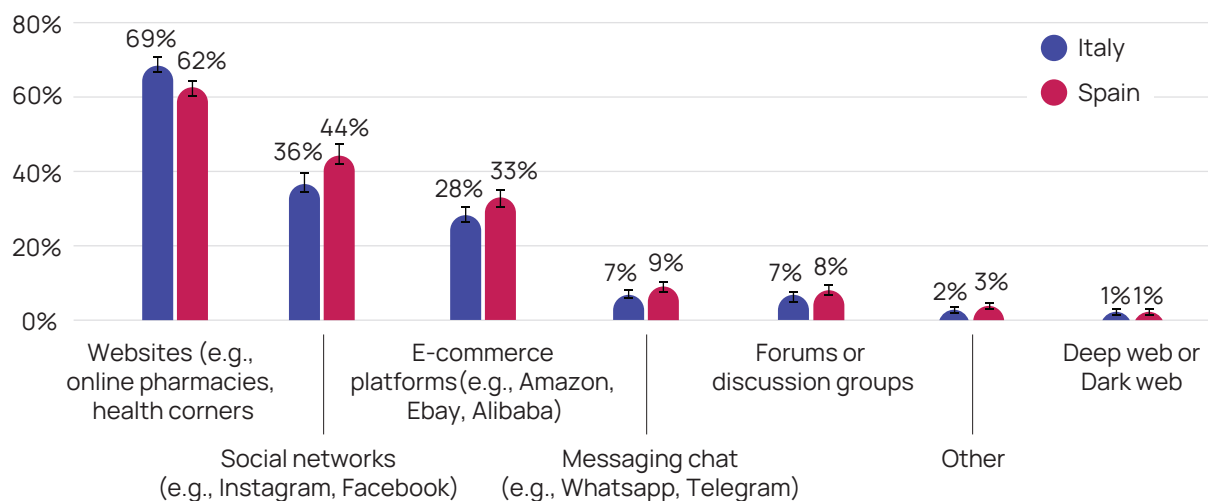


8. Although the questions did not specify any temporal limitation, the high prevalence of medicines for treatment of flu in both advertisements and purchases (as shown in Figure 12, pg. 12) could be partially attributed to the timing of the survey, coinciding with the traditional seasonal peak of flu outbreaks in both countries.

9. The categories of products were chosen and defined to encompass a broad range of the most commonly sold licit and illicit medicines online, while also accounting for slight differences in the definitions of medicine between Italian and Spanish regulations.

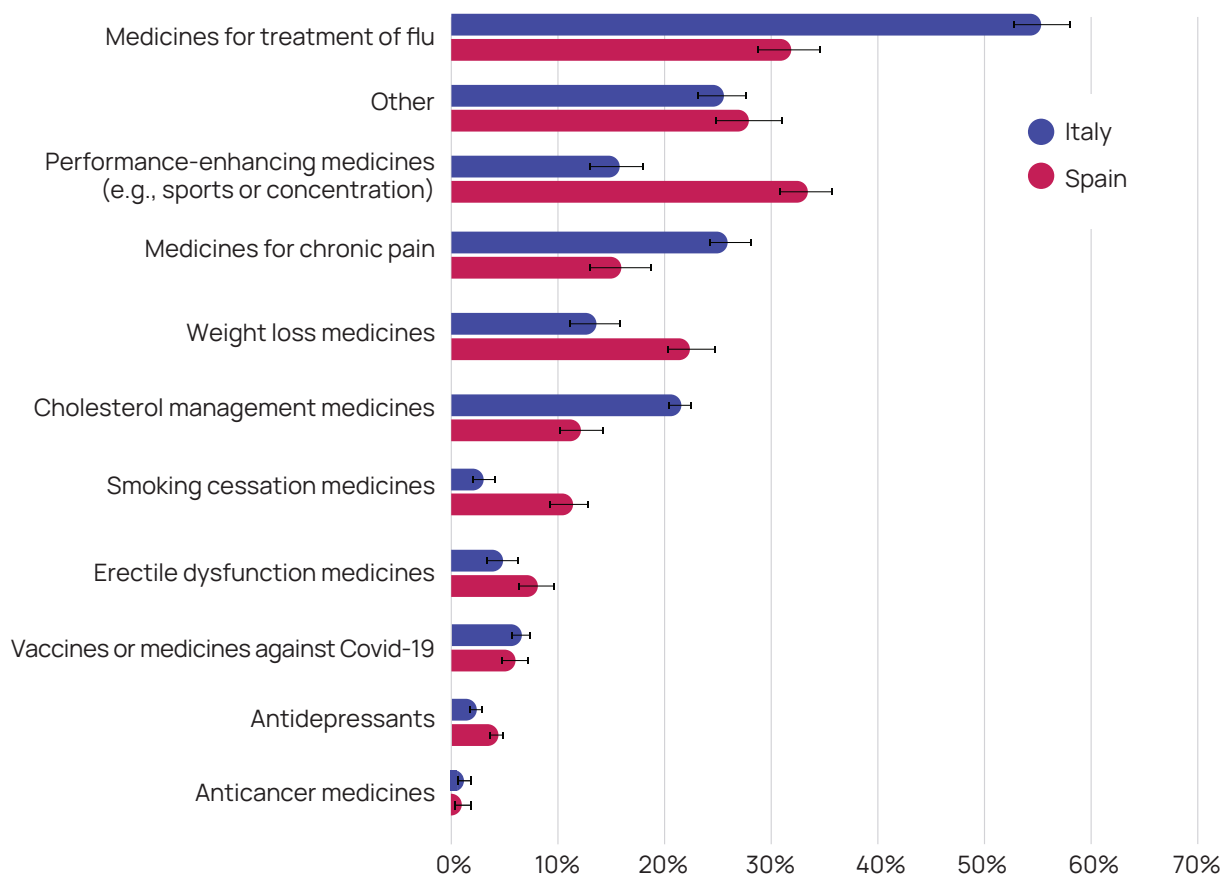
In both countries, respondents primarily saw advertisements for medicines on **websites**, followed by **social networks** and **e-commerce platforms** (Figure 11).

Figure 11 - Through which channels have you happened to see online advertisements for medicines? (N 1,922)



Looking at the medicines purchased online by the respondents, products for the **treatment of flu** were the most commonly purchased medicines in Italy. This category of products also ranked among the most purchased in Spain, although it was second to **performance-enhancing medicines**. Spanish consumers were also more likely to have bought **weight loss** and **smoking cessation medicines** than Italian ones, while the latter purchased more medicines for **chronic pain** and **cholesterol management** (Figure 12).

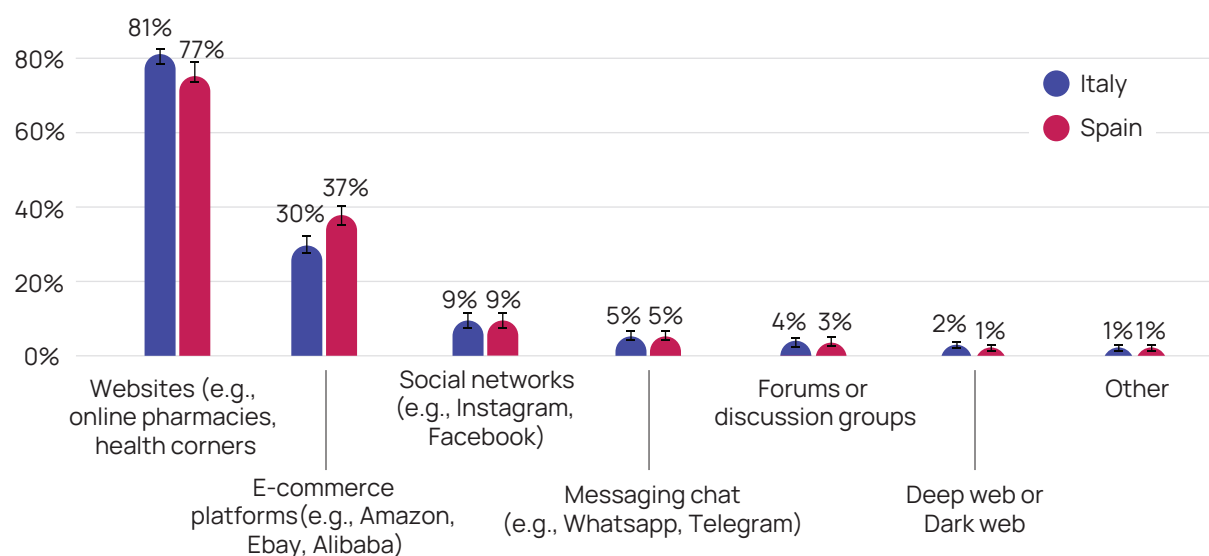
Figure 12 - Which types of medicines have you purchased online? (N 1,439)



Relevant in both countries was also the category “**Other**”, with respondents primarily including dietary supplements or vitamins (36% of other purchased products), analgesic/antipyretic/painkillers (8%), dermatological products (8%), medicines against hair loss (6%), veterinarian products (5%), antacid or digestive medicines (5%), eye drops (3%), and melatonin or relaxants (3%). Specifically, the purchase of **dietary supplements or vitamins** was more prevalent in Italy than in Spain, while the opposite was observed for **dermatological products** and **medicines against hair loss**. These findings clarify that consumers often consider medicines also products that do not fall into the official definition of medicine and are not subject to the same regulations about online sale. Excluding the respondents who purchased veterinarian products or clearly non-medicines (e.g., supplements, vitamins, medical devices, cosmetics), the rate of respondents who purchased medicines online (see Figure 8, pg.18) drops to 63% in Italy and 47% in Spain.

Regarding the channels through which respondents bought medicines online, a large majority in both countries used **websites** (81% in Italy and 77% in Spain), while **e-commerce platforms** appeared to be slightly more utilized in Spain (37%) than in Italy (30%) (Figure 13). Additionally, purchases through e-commerce platforms were significantly more common for male respondents than female ones in both countries. Despite the significant pervasiveness of advertisements through **social networks**, the role of social media platforms for making online purchases was marginal in both countries (9%) and more concentrated among respondents aged less than 45 years.

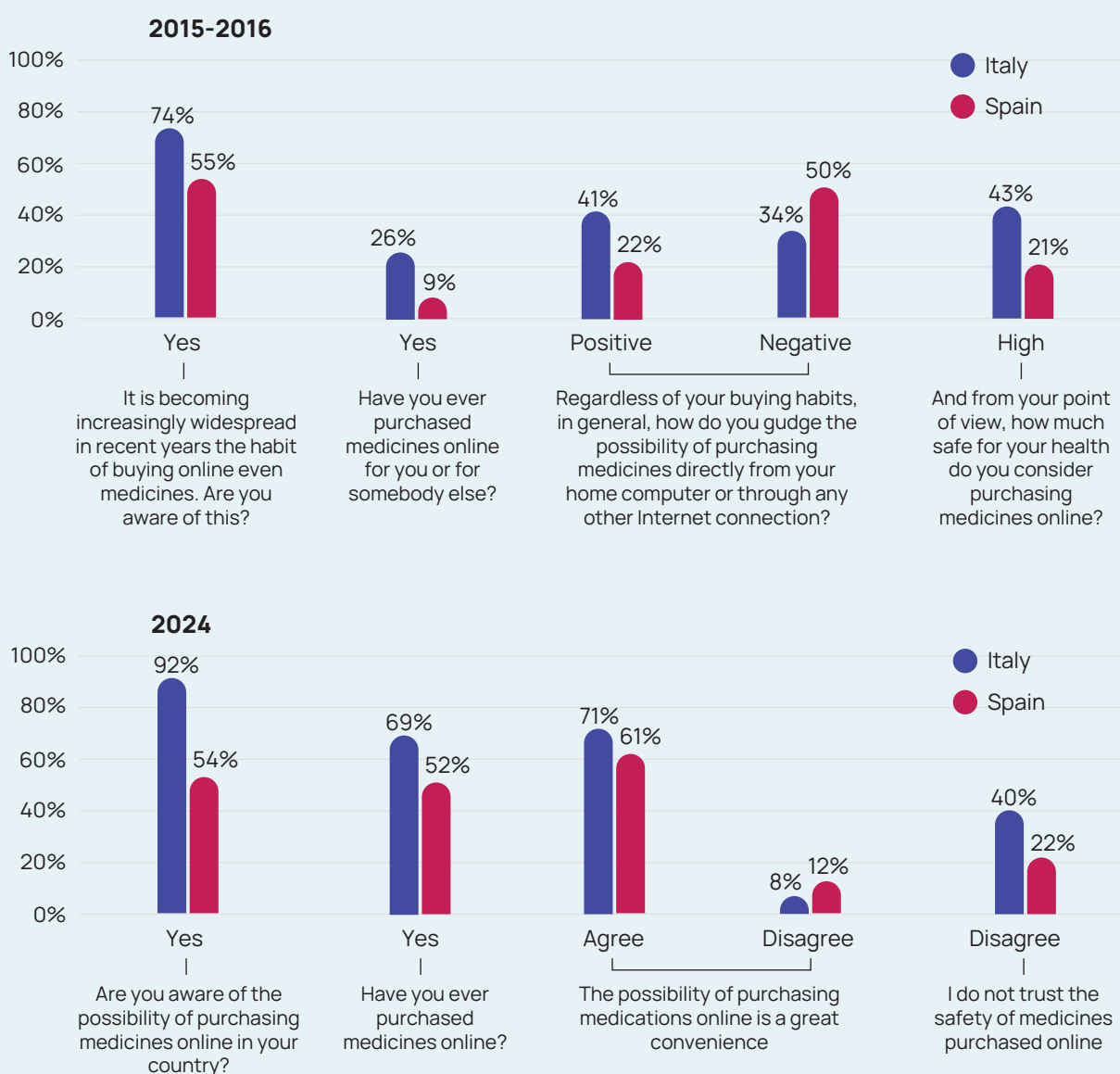
Figure 13 - Through which channels have you happened to purchase medications online? (N 1,439)



Evolutions of consumers' attitude and behaviors between 2015-16 and 2024

The higher awareness and confidence of Italian consumers regarding online purchases of medicines confirm the results of a **previous survey** conducted in Italy and Spain between 2015 and 2016 by AIFA and Sapienza University of Rome in the framework of the EU-funded **project Fakeshare II** (Barbaranelli, Di Giorgio, and Gramazio 2016). Nevertheless, the current results demonstrate a significant increase in the number of respondents who declared having purchased medicines online in both countries. There was also a notable increase in the percentage of respondents who evaluated the possibility of purchasing medicines online positively, whereas judgments about the safety of medicines purchased online remained similar in both surveys (Figure 14). However, it's important to approach comparisons between different surveys cautiously due to differences in questions and samples.

Figure 14 - Comparison between the results of the Fakeshare II survey (2015-2016) and the CAPSULE survey (2024)

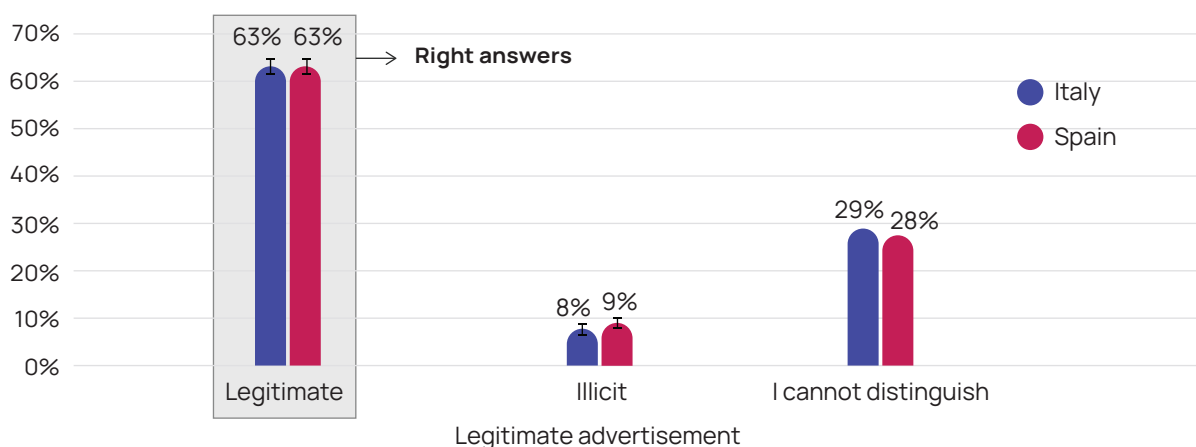


Ability to Recognize Illicit Online Advertisements

In the experimental section, respondents were asked to determine the legitimacy of **three different images of websites offering medicines** or dietary supplements, including both legitimate and illicit advertisements. The obtained results show notable similarities between the two countries.¹⁰ Only about one respondent out of five correctly identified the legitimacy of all three proposed images, resulting in roughly half of the images of online advertisements (53%) being correctly categorized.

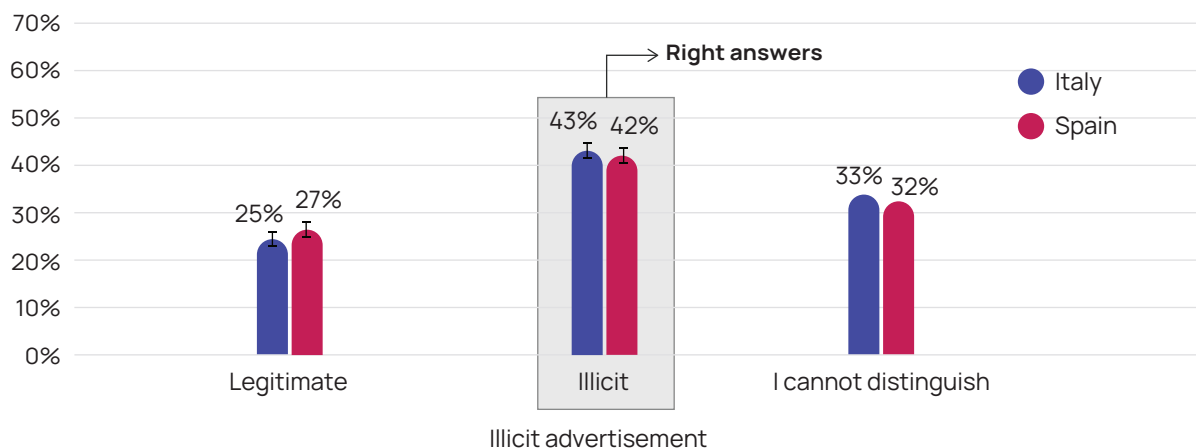
The ability of respondents to identify the legitimacy of an advertisement significantly depended on the nature of the advertisement itself. Respondents were more likely to correctly identify **legitimate advertisements** (approximately 63% of the shown images), while in only a minority of cases they provided a wrong answer. However, it's worth noting that in a considerable number of cases (29% of the shown images in Italy and 28% in Spain) respondents were unable to provide a judgment on the proposed images (Figure 15).

Figure 15 – Type of provided answers on the total number of legitimate advertisements (N 3,162)



On the contrary, when an **illicit advertisement** was shown, the right answer was provided only about four times out of ten, while the number of incorrect answers increased by almost three times. In this scenario as well, respondents did not provide an answer for about one image out of three (Figure 16). In both cases, the likelihood of providing a correct answer drops significantly with increasing age of the respondents and higher levels of mistrust in online sales.

Figure 16 - Type of provided answers on the total number of illicit advertisements. (N 3,159)



10. A sensitivity analysis was conducted, which demonstrating consistent results even when excluding responses for the least recognized legal and illicit advertisements in both countries.

To assess the **strength and consistency of their opinions**, respondents were asked to confirm one of their answers regarding the legitimacy of the advertisements shown to them. Generally, respondents tended to **confirm their original choice** regardless of whether the advertisement was illicit or legitimate. However, a significantly higher percentage of respondents confirmed their initial answer when it was correct (i.e., when they accurately identified the legitimate or illicit nature of the advertisement) compared to when it was incorrect. It is also worth noting that, on average, between 20% to 25% of the respondents changed their original answer, declaring that they were no longer confident in distinguishing the legitimacy of the advertisement (Figure 17 and Figure 18).

Figure 17 - Decision to confirm or change the previous answer by type of advertisement (legitimate/illicit) and country when the previous answer was right (N 963)

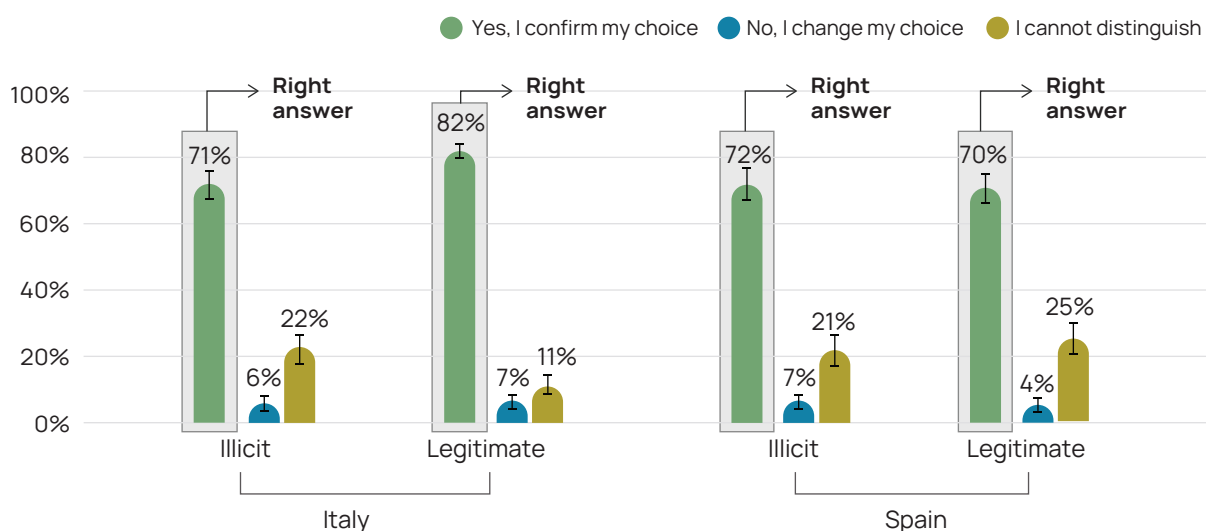
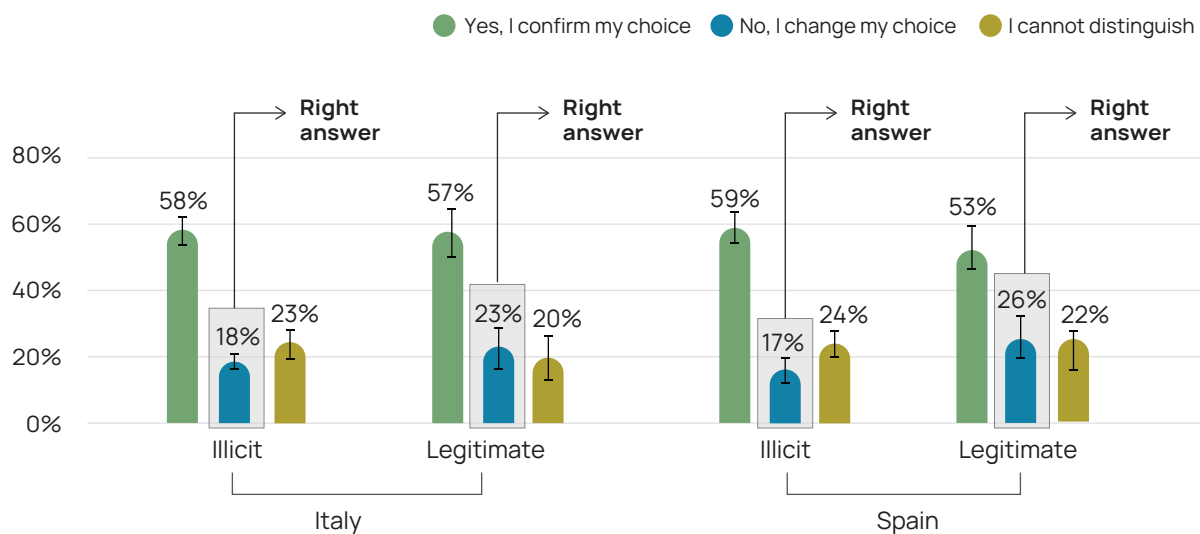
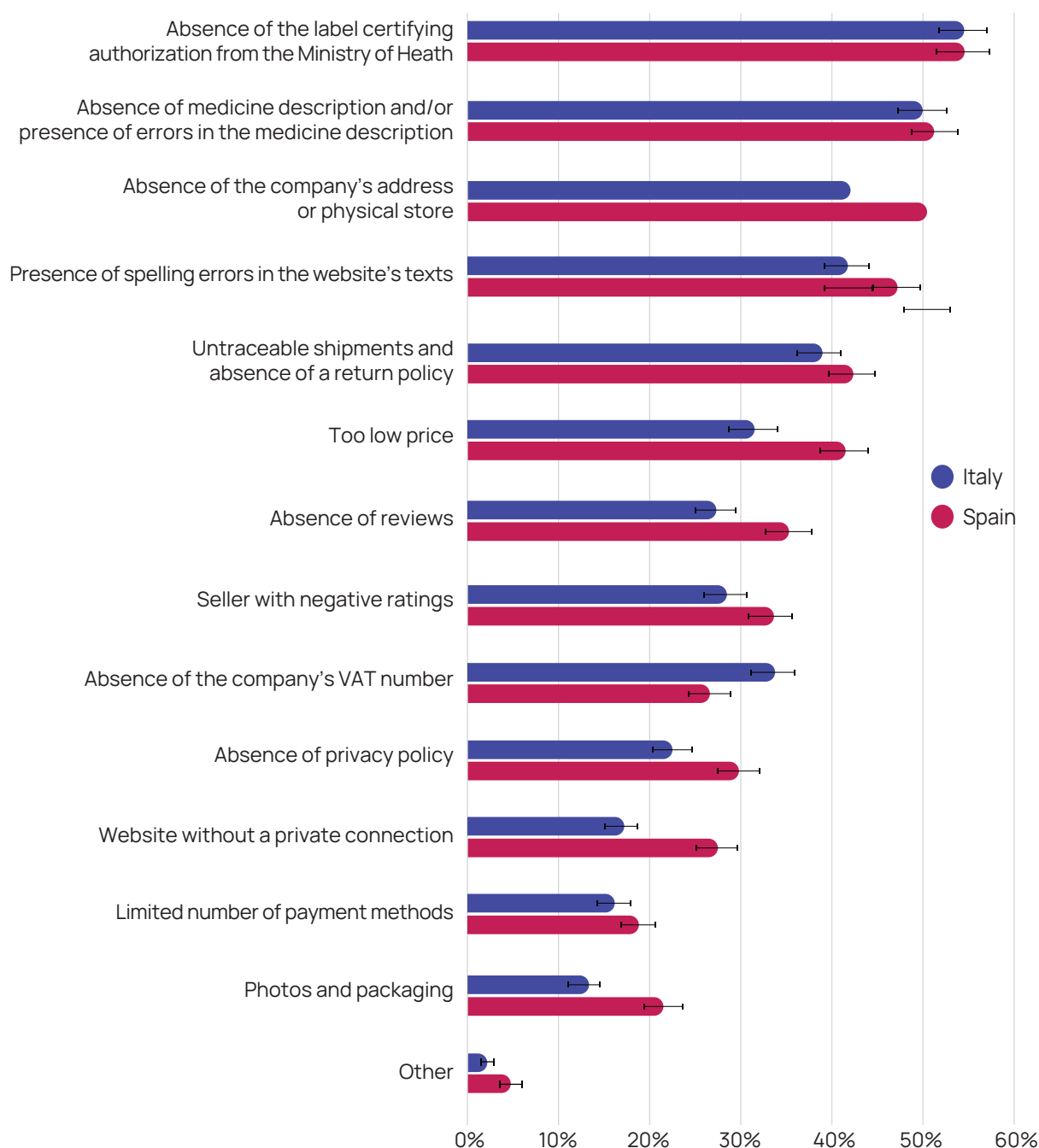


Figure 18 - Decision to confirm or change the previous answer by type of advertisement (legitimate/illicit) and country when the previous answer was wrong (N 854)



Finally, respondents were asked to identify the **factors they would consider** when assessing potential illegality of an online advertisement. In both countries, more than half of the respondents correctly identified the **absence of the label** certifying authorization from the Ministry of Health as a primary red flag for distinguishing illicit advertisements. This was followed by the **absence of medicine descriptions** or **presence of errors in the medicine description**, **lack of company address** or physical store information, the **presence of spelling errors** in the website texts, and advertisements characterized by **untraceable shipment methods** and **absence of a return policy**. A too low price was considered a red flag by only three out of ten Italian consumers and by four out of ten respondents in Spain. Photos and packaging details were deemed relevant by only a minority of the respondents in both countries (Figure 19).

Figure 19 - What characteristics of an online advertisement for a medicine would you consider checking for its possible illegality? (N 2,107)



Conclusions and Recommendations

The findings of Project CAPSULE provide a comprehensive overview of the **demand of online medicine purchases in Italy and Spain**. Analyzing these results reveals several **insights** that could guide **more targeted and effective actions** by both public authorities and private stakeholders. The following bullet points present and discuss some of the main conclusions drawn from the study.

- **Awareness and participation in online medicine purchases have increased** since a 2015-2016 survey, reflecting the global trend of rising e-commerce and the growing market share of legitimate online pharmacies worldwide (TRM 2022). However, in both Italy and Spain, the market share of e-pharmacies remains marginal compared to traditional pharmacies (Stewart 2023). Additionally, the data confirmed a significant difference between the two countries, with Italian consumers exhibiting greater trust in online medicine purchases compared to Spanish ones.
- **Elderly respondents** displayed **heightened awareness** about online medicine sales but **struggle more with distinguishing between legitimate and illicit advertisements**. This highlights the need for targeted awareness campaigns aimed at older populations, who may have increased internet access but limited knowledge to identify potential risks in online purchases.
- Conversely, **younger respondents** demonstrated **better recognition of legitimate versus illicit advertisements**, though they correctly identified only about six out of ten images. However, they also exhibited **lower trust in healthcare professionals** and were more likely to **seek health information online**. The increasing reliance on the Internet for health information is particularly concerning, given the often low quality and reliability of such information online (Swire-Thompson and Lazer 2020, Bin Naeem and Kamel Boulos 2021). This highlights the need to educate consumers and bolster trust in medical professionals or institutions to mitigate exposure to deceptive practices.
- Overall, consumers in both countries demonstrated a **good understanding of current regulations governing online medicine sales** and the requirements for legitimate online vendors, such as the necessity of a Ministry of Health authorization label. However, there remains a **prevalent challenge in distinguishing medicines from other health-related products**, potentially leading to misguided purchases. Efforts should focus on **enhancing consumer knowledge and improving product labeling** to facilitate clearer distinctions between product categories.
- The study highlights **notable disparities in the types of products advertised and purchased** between Italy and Spain. For example, while flu treatments were the most advertised and purchased in Italy, along with medicines for chronic pain and cholesterol management, Spain also saw high visibility and sales for weight loss and performance-enhancing products. These differences suggest **varying demands and supply dynamics** that should be monitored to ensure that advertising and selling practices are compliant with national regulations.
- **Websites** are the primary channels for both advertising and purchases, with **social media** and **e-commerce platforms** playing secondary, yet notable roles. Specifically, social media emerged as a prominent platform for advertising medicines online. This findings highlight the predominant risk posed by **illicit online pharmacies** and **deceptive websites**, but also suggests the need for **collaboration** among authorities, pharmaceutical companies, and online platforms to prevent illicit activities and safeguard consumers.

- Enhancing the security of legitimate websites requires a **consumer-centric approach** to identify potential weaknesses. For instance, consumers often assess the legitimacy of advertisements based on factors like spelling errors in product descriptions or website texts, elements that could be easily fixed by criminals in the future using natural language processing systems to generate more deceptive advertisements. This is particularly relevant given the negligible percentage of legitimate websites compared to illicit ones (Limbu and Huhmann 2023). Therefore, there is a need to design more secure websites that **incorporate unique features** like the Ministry's logo, alongside campaigns to increase consumer awareness about these markers of legitimacy..
- The **design of informative campaigns** should consider the diverse needs of target populations and leverage the channels consumers use to access health-related information. This underscores the importance of defining communication strategies that extend beyond institutional channels.
- The importance of examining consumer perspectives calls for the **regular replication of similar research and expansion to other countries** to understand local market specificities and monitor changes over time. These insights are critical for designing effective countermeasures tailored to specific regional contexts and market dynamics.

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Annex 1 – Samples

Table 1 - Number of respondents by type and inclusion criteria

	Italy	Spain
Contacted respondents	1,254	2,356
Aware of the possibility of purchasing medicines online in Italy/Spain	1,151	1,268
Made an online purchase OR Have seen at least one online advertisement	1,058	1,065
<i>Made an online purchase</i>	799	654
<i>Have seen at least one online advertisement</i>	980	954
Excluded due to additional quality checks	3	13
Final samples	1,055	1,052

*Some respondents may have both seen an advertisement and made a purchase online.

Table 2 – Socio-demographic characteristics of the respondents and inclusion rates

	Italy			Spain		
	Contacted respondents	Final sample	Inclusion rate	Contacted respondents	Final sample	Inclusion rate
Male	49% 609	47% 494	81%	46% 1093	47% 492	45%
Female	51% 645	53% 561	87%	54% 1263	53% 560	44%
18 – 24 years old	7% 90	7% 79	88%	7% 176	7% 73	41%
25 – 34 years old	12% 145	12% 127	88%	12% 292	14% 149	51%
35 – 44 years old	14% 178	15% 154	87%	20% 468	19% 202	43%
45 – 54 years old	20% 247	20% 210	85%	22% 525	22% 227	43%
55 – 64 years old	18% 224	18% 192	86%	17% 398	17% 183	46%
+ 64 years old	30% 370	28% 293	79%	21% 494	21% 218	44%
Elementary/ no formal education	1% 12	1% 8	67%	2% 51	2% 17	33%
Middle school	10% 125	9% 92	74%	10% 241	8% 87	36%
High school	55% 695	55% 581	84%	34% 805	32% 332	41%
Bachelor's degree	10% 128	11% 115	90%	36% 847	38% 397	47%
Master's degree or more	23% 294	25% 259	88%	17% 409	21% 219	54%
TOTAL	100% 1,254	100% 1,055	84%	100% 2,356	100% 1,052	45%

Annex 2 – Mistrust in online sales index

A composite indicator assessing the level of mistrust of respondents in purchasing products online was defined as a linear aggregation of five items encompassing judgements about the regularity, attitudes, and perceived safety of online purchases (Figure 20). The reliability of this index was assessed considering a Cronbach's alpha coefficient, which was found to be 0.68.

Figure 20 - Please indicate the degree to which you agree with the following statements regarding the online purchase of products and/or services

